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FOREWORD

Public debt has reached unprecedented levels in advanced economies. It has become today the most pressing and difficult policy challenge that Western governments have to face. Against this background, the *Banque de France's Financial Stability Review* No. 16 focuses on 'Public debt, Monetary policy and Financial Stability'.

As usual, the Banque de France has invited prominent academics, practitioners and policy-makers to express their sometimes diverging viewpoints on this very topical issue in order to investigate the many aspects of public debt and their potential impact on sustainable growth, financial stability and the conduct of monetary policy. Each paper sheds light on one or several of these aspects and attempts to draw some forward-looking policy conclusions. For ease of reading, they are classified, after an introduction, into four parts, depending on the main themes: macro-economic, fiscal and operational context; financial and regulatory aspects; monetary policy focus; regional and international dimensions.

The **introduction** by C. Noyer stresses that unprecedented levels of public debt in advanced economies have been accompanied by equally unprecedented interventions by central banks, both in their magnitude and diversity. As we may have to live with high debt and non-standard monetary measures for some time, it is essential to maintain clarity of purpose and protect the two core pillars of central banking, inherited from the pre-crisis consensus: the focus on price stability and, its corollary, central bank independence.

The first part recalls the **macro-economic, fiscal and operational context**. As already experienced, high indebtedness of governments could imply the return of financial repression, i.e. heavily regulated financial markets and barriers to free circulation of capital, so that a process of financial 'de-globalisation' may have just begun according to C. Reinhart. Various indicators of public finances have never been so weak for decades in many countries across the world, especially in advanced economies, but policy implications can be drawn for the short and medium terms (C. Cottarelli). To adapt, both public and private sectors need to better understand the dynamics of Western sovereign risk and pivot from a reactionary mode to a pre-emptive one (M. El-Erian).

Part II deals with **financial and regulatory aspects**, in particular the linkages between banks and public debt. A strong nexus between the credit risks of financial sectors and their sovereigns has emerged in the Western economies (V. Acharya, I. Drechsler and P. Schnabl). While perfectly rational, public intervention in a crisis creates a range of moral hazard problems, with repercussions on incentives for both banks and sovereigns (R. Breton, C. Pinto, and P-F. Weber). This two-way interaction between banks and governments is critical for financial stability and appropriate buffers should be built in good times to cushion the impact of bad times for both banks and sovereigns (J. Caruana and S. Avdjiev). However, in the on-going regulatory reform process, overemphasizing certain measures may give a false sense of security, e.g. high capital buffers according to R. Kroszner. Beyond considerations about possible amendments of the current rules to better reflect sovereign risk, supervisory practices (e.g. stress tests) also appear as a powerful tool to address the issue (D. Nouy).

Part III focuses on the impact for the conduct of **monetary policy**. Japan is an interesting case-study where lower potential growth and concerns about future taxes and pension burden have led to more private sector savings, deflationary pressures and low interest rates (M. Shirakawa). To some, an accommodative monetary policy prior to a fiscal consolidation increases both the success likelihood and the credibility of the latter (T. Hellebrandt, A. Posen, and M. Tolle). And if the public sector becomes so indebted that its fiscal sustainability is potentially at risk, then monetary policy has no other choice but to be closely integrated with debt management and fiscal policy (C. Goodhart). Yet accommodative monetary policies raise credibility issues so that others, like N. Kocherlakota, recall the trade-off between potentially large financial damages in

case of sovereign default on the one hand, but the necessity of allowing for default if the central bank is to be independent on the other hand. The difference between two forms of monetary dominance ('soft' and 'hard') might explain why the turmoil persists in several euro area countries while the United States or Japan, which have as much or more debt, have not been very affected (O. Jeanne). Yet contagion plays a crucial role in exacerbating sovereign debt problems in the euro area and has motivated several interventions by the European Central Bank (V. Constâncio). Monetary policy ought to keep inflation expectations anchored containing tail risks to price stability on both sides: downside risks implied by this contagion and upside risks that could result from fiscal dominance (J. Matheron, B. Mojon, and J-G. Sahuc).

Part IV highlights the **regional and international dimensions** of the debate, with a logical focus on the euro area. Some identify gaps in the institutional structure of the euro area (C. Sims), making it particularly vulnerable to the interdependence between banks and sovereigns (S. Merler and J. Pisani-Ferry) and explore the recent proposals to mutualise and repackage part of the sovereign debts (J. Tirole). As regards emerging economies, learning lessons from the past, Latin America has been able to sail through this period of world financial turbulence relatively unscathed but economic interdependence explains global concerns and may justify some further action by the International Monetary Fund (A. Carstens). Improving the international financial architecture should help the world reach a high growth equilibrium despite asymmetries in public debt levels and financial developments according to J-P. Landau. Looking at the longer term indeed, the main challenge remains to re-fashion strategies so as to lay the basis for growth in an environment of fiscal consolidation in Europe, the United States and Japan (Tharman Shanmugaratnam).

Contents

ARTICLES

Introduction

Central banking in a context of high public debt

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Against the backdrop of the financial crisis and unprecedented high public debt, the demands placed on all the major central banks have grown tremendously over recent years. They have responded by taking non-standard measures, adjusting their operational frameworks and significantly expanding their balance sheets.

We may have to live with this conjunction of high debt and non-standard monetary measures for some time to come. It is, therefore, essential to maintain clarity of purpose and protect the two core pillars of central banking, inherited from the pre-crisis consensus: the focus on price stability and, its corollary, central bank independence.

In many advanced economies, public debt has reached unprecedented peace-time levels. At the same time, the crisis has pushed central banks into making equally unprecedented interventions, both in their magnitude and diversity.

A key issue, for markets and policymakers alike is whether our current policy regimes based on monetary dominance (i.e. where the central bank can efficiently fulfil its mandate), price stability and central bank independence will prove robust enough to cope with these two developments.

At this juncture, the question is largely hypothetical. Inflation expectations are firmly anchored, central banks are acting in full independence and monetary dominance seems well assured. However, looking into the future, a number of risks can be detected. They call for very careful policy making and a strengthening of the policy frameworks. This article examines the interaction between monetary and fiscal policies when public debt is very high and outlines a number of consequences and policy implications.

1| Fiscal policy and public debt

Rising debt/GDP ratios have brought advanced economies into unchartered territory. As mentioned in Reinhart and Rogoff's seminal study, "This time is different", all countries whose ratios have exceeded 80% have experienced prolonged periods of low growth and sustained financial instability.

History, however, may be a poor guide in the current circumstances. Financial markets are broader and more developed than at any time over the last century and a half. The world is awash with excess savings looking for safe and liquid instruments to invest in. And all countries have indicated their strong intention to keep debt under control and steer their public finances onto a sustainable path.

There is still a lack of detailed policy prescriptions. One commonly advocated strategy is to combine flexibility in the short run with credible consolidation in the long run. In most countries, no institutional framework exists to underpin such longer-term commitments. Financial market participants therefore may remain sceptical about whether the political process can come to grips with the problems raised by fiscal adjustment.

Credibility is essential because sustainability, itself, is endogenous. As became very clear in Europe during 2011, doubts about debt sustainability can be self-fulfilling. They bring higher risk premia and interest rates which, in turn, require larger primary surpluses and complicate the task of achieving fiscal equilibrium.

In a high-debt environment, the interaction between fiscal policies and capital markets is complex and unstable. Two pitfalls should be avoided: references to history, while extremely useful and instructive, should not be seen as a cause for resignation and implying that defaults are unavoidable. And, conversely, in those countries where deficits can easily be financed, there should be no room for complacency or delaying the adjustment process.

2| Monetary policies

Prior to the crisis, a description of monetary policies in major advanced economies would have centred on four characteristics: they were *focused*, with price stability as their primary or essential objective and with no specific responsibility sought or given for financial stability; they were *limited*, with central banks having very small balance sheets and using interest rates as their only policy instrument; they were *independent*, a condition recognised as necessary to anchor inflation expectations and embodied in very strong institutional frameworks; and they were *successful*: the "Great Moderation", a period of exceptionally low volatility in output and inflation, was widely seen as a product of efficient and wise monetary policies.

There was a happy feeling that, at last, a perennial monetary regime had been found, well-tailored to the characteristics of a modern market economy. Financial markets were efficient and the zero lower bound and liquidity trap appeared as no more than historical curiosities.

With hindsight, of course, we can see now that this "ideal" economy may never have existed. The "Great Moderation" was probably as much a product of "good luck" (brought about by the disinflationary

effects of globalisation) as of good policy. Monetary stability is a necessary, but not sufficient, condition of financial stability, because capital markets are not always and necessarily efficient. And downward financial spirals may quickly bring our economies to the point where interest rates reach the zero level and can no longer be used as effective tools.

As the crisis unfolded, central banks responded by taking unprecedented measures and, in the process, underwent major changes. Their interventions diversified, with two main objectives: to unclog financial markets (through exceptional liquidity provision as well as temporary purchases of assets), and circumvent the zero lower bound by bringing down real long-term interest rates through purchases of public bonds and/or interest rate guidance. As a consequence, central banks balance sheets expanded by a factor of three, dramatically increasing their role in financial intermediation and raising concerns, at least in some quarters, about the possible inflationary impact of these measures.

3| Interactions between fiscal and monetary policies

The interactions between fiscal policy and monetary policy may be considered from different perspectives.

One may be called "technical". In ordinary times, fiscal and monetary authorities interact through the management of public debt. Government bonds are the main collateral for monetary policy. And debt management impacts the shape of the yield curve, hence the monetary transmission mechanisms.

Taking a broader perspective, monetary and fiscal policies jointly determine output and inflation. Such interactions are sometimes called "strategic", because the policy mix results from autonomous actions by both fiscal and monetary authorities, each trying to achieve the outcome closest to its preferences (or mandate). However, if the sovereign is fully solvent, this "policy game" is dominated by the independent central bank, which, in all circumstances, can achieve its inflation target. When taking their policy decisions, central banks look at the fiscal stance, consider it as "exogenous", a source of possible shocks to inflation, and respond accordingly by doing whatever is necessary to achieve price stability.

Unconventional policies bring three additional complexities.

- First, public and private asset purchases are sometimes seen as "quasi-fiscal policies". A dynamic use of their balance sheets by central banks has effects on the allocation and distribution of resources in the economy. It may favour or penalise certain collateral or certain borrowers. It may contribute to transferring resources between private agents.

- Second, as their balance sheets expand, central banks may be perceived as increasing the potential risks to their capital base and/or their ability to distribute the profits generated by seigniorage to the government budget. Most of the time, this perception is unfounded since central banks can mitigate the risks they take through appropriate policies such as haircuts on collateral. However, governments could use this argument to try to influence specific aspects of monetary policy.

- Finally, of course, purchases of public bonds by central banks may be deemed as monetary financing of the government. Indeed, this is the reason why purchases of primary issuances are prohibited in the euro area. Interventions on the secondary market may be justified, either (in the euro area) to unfreeze markets and ensure a proper transmission of monetary impulses, or, in other jurisdictions, to impact long-term rates and risk premia when policy rates hit the zero lower bound. A delicate balance must be found between the scale of these operations – sometimes significant in order to produce results – and the need to avoid any misperception as to the real objective.

4| High public debt

A high level of public debt imposes limits on what both fiscal and monetary policy can achieve.

This is well known for fiscal policy. Beyond a certain point, by no means predictable or automatic, if fiscal policy becomes too accommodative, private agents start expecting further consolidation in the future. They become "Ricardian" and adjust their savings accordingly. Hence, fiscal stimulus becomes counterproductive while consolidation, by contrast, becomes growth enhancing. Europe, today, may be close to such a situation.

High public debt also makes government solvency very dependent on the monetary stance. With a large stock of debt, interest rates significantly impact the fiscal balance. All other things being equal, higher primary surpluses are required to achieve equilibrium and maintain sustainability.

In more extreme circumstances, with very high public debt, and if monetary policy needs to be tightened, there is no way to achieve the necessary primary surplus. There is no "state of world" where the budget constraint and the objective of price stability can be satisfied simultaneously. Economies therefore face a choice between sovereign default and inflation.

Most advanced economies are very far from such a tipping point. Nevertheless, if doubts about debt sustainability in major economies persist, they could affect market perceptions on monetary policies. Should those doubts turn into certainties, advanced economies could move into a territory in which potential conflict between price stability and government solvency could become apparent and acute.

In short, a high level of public debt increases the probability of fiscal dominance (i.e. a situation in which monetary policy loses its independence and efficiency) in the future. If that possibility is perceived and incorporated into today's inflation expectations, it could pose a significant threat to monetary and financial stability.

5| Financial stability

Sovereign bond markets are the most liquid in the world (but not necessarily the most efficient as illustrated by their failure, in the past, to discipline sustainable fiscal policies). For that reason, the sovereign bonds of advanced economies, especially of the United States, naturally serve as stores of value, including for non-residents.

What ultimately secures the risk-free status and hence the liquidity of sovereign debt? According to one currently popular school of thought, the sovereign always retains control over the money printing press and therefore cannot default on its debt. On that count, only those sovereigns who can indeed print money issue truly safe claims. By contrast, sovereigns that have transferred their monetary sovereignty to a supra-national central bank (as in the euro area) cannot issue intrinsically safe debt and will be penalised by higher risk premia and interest rates. This view assumes that currency and bonds are perfect substitutes as instruments for raising government revenues. It internalises the possibility of monetising public debt, whatever the consequences on inflation. I do not share this view.

While technically correct, it is at odds with the essence and the constituents of all current monetary regimes, including central bank independence. A sounder approach would see government debt as risk free and liquid because it is backed by the sovereign's power to tax, now and in the future. For that reason, it is very well-suited to transferring value from one period, or one generation, to another, which is exactly what economic agents expect from a store of value. Obviously, government bonds can only fulfil that function if there is no doubt about the future power to tax, which comes very close to a definition of debt sustainability. And the value of these bonds also depends, over time, on the purchasing power of the currency, i.e. on price stability, and therefore relies on a central bank's credibility to achieve this objective on a permanent basis.

6| Concluding remarks

The demands on all major central banks have grown significantly with the crisis, resulting in a considerable adjustment of their operational frameworks and a significant expansion of their policy instruments.

While they are facing all their responsibilities, central banks are also taking additional risks. The multiplication of their interventions could be interpreted as a dilution of their objectives. There is a tendency among market participants and certain policymakers to consider central banks as "universal problem solvers" whose balance sheets can be used without cost for all sorts of purposes. There is also a doubt, or at least an ambiguity, in the minds of some analysts about the true objective of some of their interventions, such as public bond purchases. Real or perceived fiscal dominance may be seen as possible. In short, central banks' activism makes it harder for them to stick to their core mandate – price stability – in the face of increasing pressures and constraints.

We may have to live with the conjunction of high public debt and unconventional monetary measures for the period to come. Monetary policy will likely, for some time, rely on a diversity of instruments. Macroprudential measures will interact with monetary policies in a complex way.

It is all the more important to maintain our clarity of purpose and stick to two fundamental characteristics of central banks inherited from the pre-crisis consensus: the focus on price stability and, its corollary, central bank independence.

There should be no ambiguity about what central banks are trying to achieve. The more unconventional their actions, the more clarity there should be as to their ultimate purpose. All of the world's major central banks are now engaged in exceptional interventions: either buying huge amounts of debt or providing liquidity to banks. These operations have a clear rationale; but, like any other, they can only achieve their objectives if inflation expectations are solidly anchored. From that point of view, calls by certain economists and market participants for a temporary relaxation of price stability objectives are misguided. It is very significant, on the contrary, that two major central banks, those of the United States and Japan, have recently decided to quantify their price stability objectives and enhance their communication accordingly.

Overall, the euro area is well protected against all of these risks by the robustness of its institutional framework. Price stability is unambiguously the priority objective of monetary policy, enshrined in the EU Treaty. Monetary financing of governments is strictly prohibited. The Eurosystem (the ECB and the national central banks) is extremely well capitalised. Its independence is therefore protected against any risk stemming from the expansion of its balance sheet. As a result, doubts about fiscal sustainability cannot translate into higher inflation. As experience has shown, such doubts lead to higher sovereign spreads.

It is very important, therefore, that credible fiscal consolidation takes place across the euro area. Public debt is also a public good. Its value should be firmly defended and protected now, and in the future.

Macro-economic, fiscal and operational context

Fiscal outlook and fiscal sustainability risks

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Director
International Monetary Fund's Fiscal Affairs Department

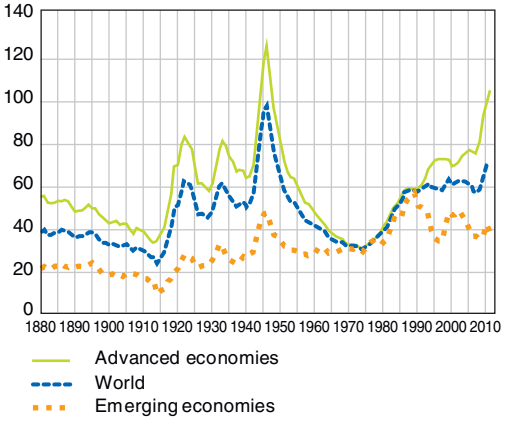
The paper assesses the outlook for public finances in both advanced and emerging economies following the financial crisis. It highlights the risks arising from the current outlook and discusses the key reasons for different market responses to the deterioration of the fiscal accounts across the regions of the world (e.g. between Europe on one side and the United States and Japan on the other side). It draws policy implications for the short and medium term.

NB: *The author thanks to Nathalie Carcenac and Raquel Gomez Sirera for excellent research assistance. He is also grateful to S. Ali Abbas, Abdul Abiad, Tamim Bayoumi, Nina Budina, James Daniel, Philip Gerson, Thomas Helbling, Paolo Mauro, Abdelhak Senhadji, Hajime Takizawa and Anna Ter-Martirosyan, for their extremely useful comments.*

This chapter looks at the state of public finances in the world. It is not a pretty picture: public finances have never been so weak in several economies in decades, perhaps ever in some cases. It is also a very variegated picture: the outlook is weaker in most advanced economies than in the rest of the world. But, in an economically and financially integrated global economy, fiscal shocks in one part of the world reverberate strongly throughout the globe. The concept of world public debt does not have any operational meaning, as debt is issued by individual governments. Yet, it is a useful summary indicator of the joint exposure to shocks: and it has never been so high in decades (Chart 1).

Of course, the state of public finances cannot be summarised by a single indicator. Section 1 reviews baseline fiscal projections for both advanced and emerging economies and the key risks surrounding them. Section 2 provides an overall assessment of macroeconomic vulnerabilities arising from the state of public finances and related policy implications. Section 3 concludes, drawing lessons for the future.

Chart 1
World public debt-to-GDP ratio
(%)



Note: The "world" public debt-to-GDP series is based on debt-to-GDP data for a constant sample of 68 countries, weighted by PPPGDP. Debt data were drawn from the Historical Public Debt Database which has almost full data coverage from 1880-2011 for all advanced and some emerging economies. Gaps for earlier years in both the PPPGDP and debt data series were populated through back-extrapolation using the debt and PPPGDP growth rates of countries for which data was available.
Source: IMF, Fiscal Affairs Department, Historical Public Debt Database, 2011.

1| Baseline outlook and risks around the baseline

The economic crisis that begun in 2008 rocked public finances across the world, but its impact was not uniform. Chart 2 looks at basic fiscal indicators for three relatively homogeneous advanced country groups:

- the "big two" (Japan and the United States): here the shock was large with deficits still close to 10 percent of gross domestic product (GDP) in 2011: looking ahead deficits are projected to decline, but, in the absence of ambitious medium-term adjustment plans, would remain elevated over the medium term.[1] Yet, these countries continue to enjoy strong market confidence and finance their debt at historically low interest rates;

- the euro area where, on average and with key exceptions, the shock was not as strong and adjustment has proceeded rapidly through 2011 in the context of severe market pressures in part of the area;

- the other advanced countries where, with a few exceptions (e.g., the United Kingdom), the fiscal accounts held up relatively well, debt is fairly low and market pressures are not a concern.

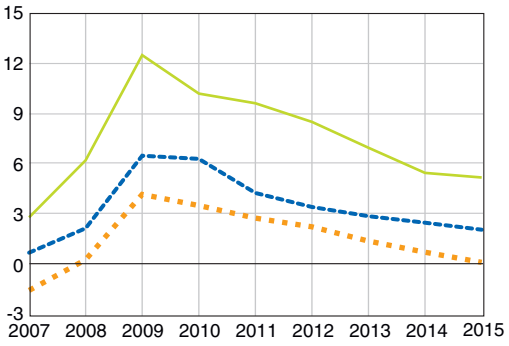
The surge in the public debt ratio highlighted in Chart 2 is mostly due to the fall in GDP with respect to precrisis trends. This fall – acting through revenue losses unmatched by equal spending cuts and the opening of the interest rate-growth differential – explains two-thirds of the rise in the debt ratio for G20 advanced economies (Chart 3). Fiscal stimulus was a relatively small component. The importance of GDP growth in shaping fiscal trends is also highlighted in Chart 4, showing the strong correlation between output and deficit shocks.

Over the longer run, public finances in advanced economies will be subject to major pressures from

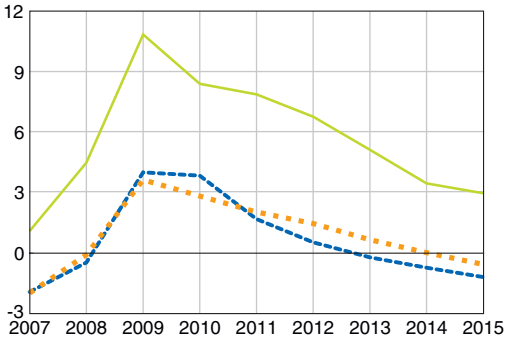
1 *Projections reflect IMF staff assumptions on the policies that are likely to be implemented based on policy announcements. They are consistent with those published in the* January 2012 Fiscal Monitor *of the IMF.*

Chart 2
Advanced economies: basic fiscal indicators
2007-2015
(% of GDP)

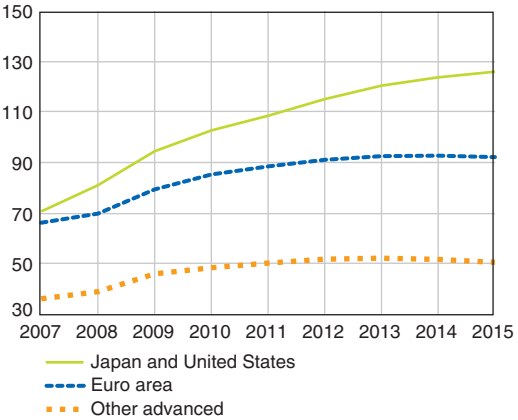
General government overall deficit



General government primary deficit

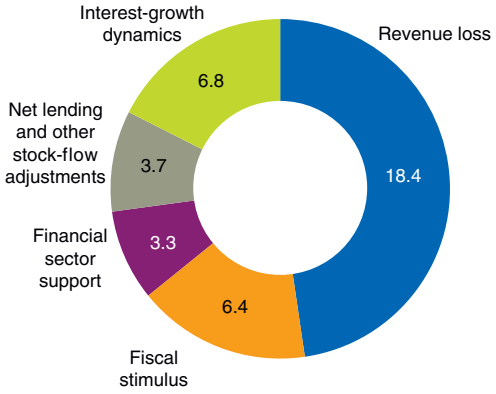


General government gross debt [a)]



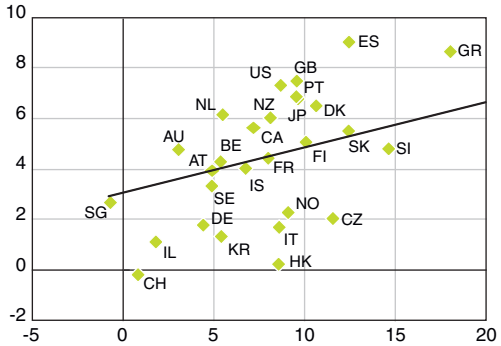
Note: All averages are weighted by purchasing power parity-GDP.
a) For Canada and Japan, refers to net debt.
Sources: IMF, Fiscal Monitor Update *January 2012; and IMF staff calculations.*

Chart 3
G20 advanced economies: increase in general government debt
2008-2015
(pp of GDP)



Note: Weighted average based on 2009 purchasing power parity-GDP.
Source: IMF, Fiscal Monitor, *September 2011.*

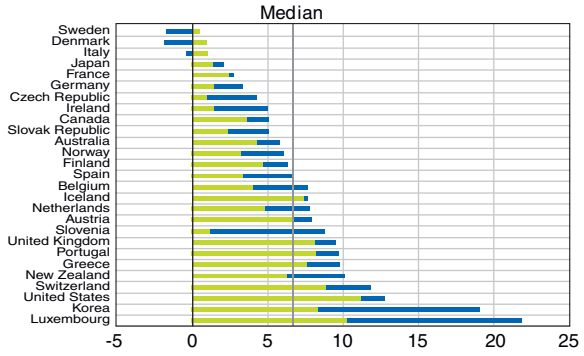
Chart 4
Growth and deficits
(x-axis: deviation of GDP from pre-crisis projections, pp of GDP; y-axis: deviation of deficit from pre-crisis projections, pp of GDP; average 2009-2012)



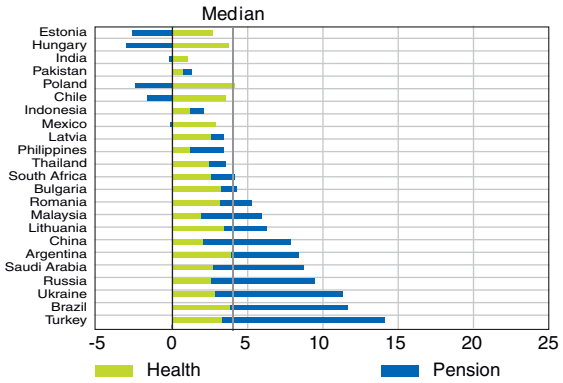
AT = Austria; AU = Australia; BE = Belgium; CA = Canada; CH = Switzerland; CZ = Czech Republic; DE = Germany; DK = Denmark; ES = Spain; FI = Finland; FR = France; GB = United Kingdom; GR = Greece; HK = Hong Kong; IL = Israel; IS = Iceland; IT = Italy; JP = Japan; KR = Korea; NL = Netherlands; NO = Norway; NZ = New Zealand; PL = Poland; PT = Portugal; SE = Sweden; SG = Singapore; SI = Slovenia; SK = Slovakia; US = United States.
Sources: IMF, Fiscal Monitor Update *January 2012; IMF,* World Economic Outlook *October 2007; and IMF staff calculations.*

Chart 5
Entitlement spending increase
2010-2050
(% of GDP)

Advanced economies



Emerging economies



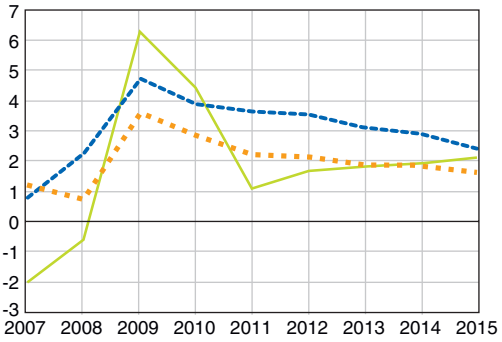
Sources: IMF, 2010, "Macro-fiscal implications of health care reform in advanced and emerging economies", IMF Policy Paper *(Washington), available via the internet at:* http://www.imf.org/external/np/pp/eng/2010/122810.pdf*; IMF, 2011, "The challenge of public pension reform in advanced and emerging economies", IMF* Policy Paper *(Washington), available via the internet at:* http://www.imf.org/external/np/pp/eng/2011/122811.pdf*; and IMF staff calculations.*

pension and health care spending: International Monetary Fund (IMF) staff projects a median increase of 6¾ percentage points (pp) of GDP in this spending over the next fourty years, short of additional reforms (Chart 5).

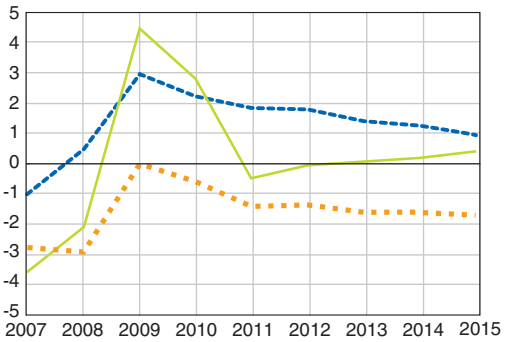
The outlook for emerging economies is considerably better (Chart 6). The fiscal shock was stronger for emerging Europe, where, however, the adjustment has been aggressive, with the average deficit falling below 2 percent in 2011. Altogether, baseline debt dynamics remain favorable in all regions, although debt is still relatively high in Latin America. This better baseline also extends to long-term

Chart 6
Emerging economies: basic fiscal indicators
2007-2015
(% of GDP)

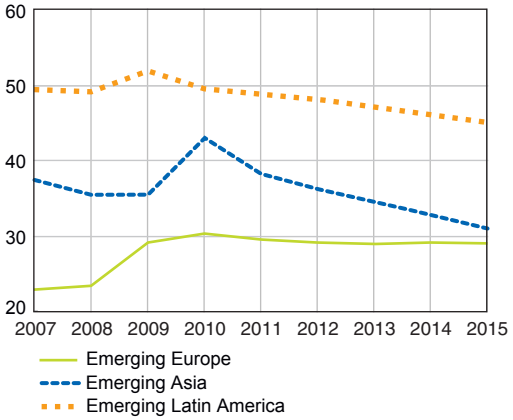
General government overall deficit



General government primary deficit



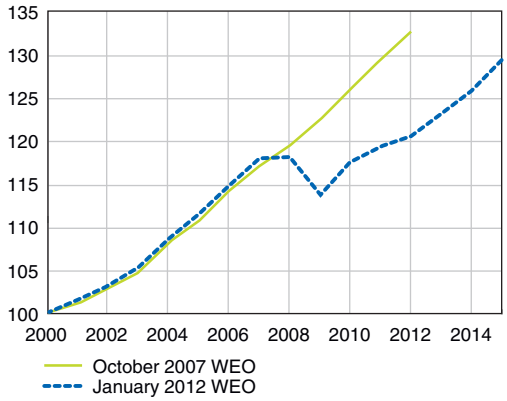
General government gross debt



Note: All averages are weighted by purchasing power parity-GDP.
Sources: IMF, Fiscal Monitor Update *January 2012; and IMF staff calculations.*

spending trends, although pressures in this area are not trivial, with a median increase in pension and health care spending by over 4 pp over the next fourty years.

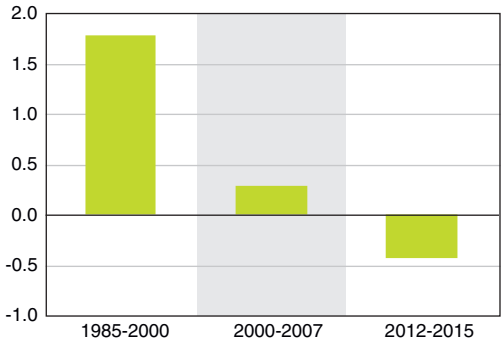
Chart 7
Real GDP in advanced economies, pre-crisis versus current
(index 2000 = 100)



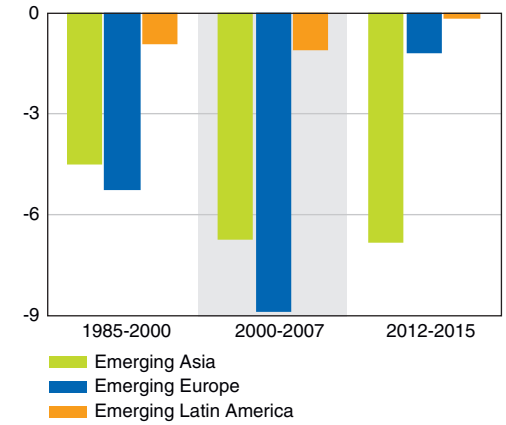
Note: All averages are weighted by purchasing power parity-GDP.
Sources: IMF, World Economic Outlook *January 2012 and October 2007.*

Chart 8
Differential between interest rate and growth by economic group and region
(%)

Advanced economies



Emerging economies



Source: J. Escolano, A. Shabunina and J. Woo, "The puzzle of persistently negative interest rate growth differential: financial repression or income catch-up?", IMF Working Paper, November 2011.

These baseline projections are sensitive to some key assumptions, including:

• the level of GDP in advanced economies: the projections assume that GDP will not go back to the pre-crisis trend (Chart 7), i.e., that the crisis caused a step decline in GDP. This implies a loss of revenues of about 3 pp on average. While a permanent output loss was observed in the aftermath of most financial crises, (IMF, 2009) one could hope for upside surprises;

• interest rates and growth in advanced economies: given the high debt levels in advanced countries, assumptions on interest rate in these countries are critical. The assumptions underlying the baseline projections are fairly optimistic, taking into account the surge in debt ratios (Chart 8), and evidence that high debt is typically associated with low growth and higher interest rates;[2]

• growth and interest rate assumptions are critical also for emerging economies. The baseline assumes that the interest rate-growth differential will remain negative in all regions. A negative differential – which explains why during 2012-2015 debt trends are favorable in the presence of primary deficits on average (except in Latin America) – is not uncommon in emerging economies, reflecting not only high growth but also financial repression and underdevelopment (Escolano, Shabunina and Woo, 2011). The differential could, thus, be less favorable in the future in the context of increased financial liberalisation;

• no financial sector shock is projected in the baseline. Leaving aside the issue of shocks arising from public finances (which are assessed below), this is a relatively optimistic assumption as the financial sector has not fundamentally changed since 2007;

• assumptions on demographics and the cost of medical services are critical for long-term spending

2 *See Reinhart and Rogoff (2009), Cecchetti, Mohanty, and Zampolli (2011), and Kumar and Woo (2009) regarding the relationship between public debt and growth. There is ample evidence that public debt affects interest rates, see, for example, Baldacci and Kumar (2010).*

trends (see also IMF, 2010, and IMF, 2012). In the past, baseline demographic projections have systematically underestimated the increase in life expectancy, so the above projections for pension and health care spending may be on the optimistic side. Things are more complicated regarding the cost of medical products. Their rise has been the most important driver of health care spending in past decades and is expected to remain so in the future, short of major changes in the structure of public health care systems (e.g., increased private co-financing).

Altogether, there is no reason to regard the baseline projections as particularly pessimistic. Indeed, leaving aside the possibility of a recovery in output levels, other risk factors point in the opposite direction. To these one has to add policy implementation risk, as the baseline projections do reflect sizable adjustment at least early in the projection period.

2| Assessment of the fiscal outlook and related risks

How bad is this fiscal outlook and how likely is it that concern about the ability of governments to repay their debt results in further widespread sovereign market disturbances?

For most advanced countries the fiscal position in 2011 was unsustainable: four-fifths of them were running primary deficits, even on a cyclically-adjusted basis, and would therefore not have been able to stabilise the debt ratio for any positive level of the interest rate-growth differential. The unsustainability of current policies is even more obvious when the trend increase for pension and health care spending is taken into account: almost all advanced countries would eventually be running a primary deficit in the absence of adjustment. The position of emerging economies is different, but only up to a point: while two-thirds of them were running cyclically-adjusted primary deficits in 2011,[3] their interest rate-growth differential (possibly reflecting, as noted, financial repression) has been, on average, negative over several decades which implies that debt stability can be obtained with negative primary balances.[4] However, emerging economies have in the past faced sudden surges in the interest rate-growth differential that have destabilised their debt dynamics. Moreover, as these countries liberalise their financial system, borrowing conditions for governments may deteriorate. This said, at present the key risk for the fiscal position of emerging economies stems from spillover effects coming from sovereign debt markets in advanced economies, acting through lower growth, higher interest rates, or both. It is therefore appropriate at this point to focus on advanced economies.

The fact that the fiscal stance of most advanced economies is unsustainable does not mean that their debt is unsustainable. Fiscal unsustainability implies that current fiscal policies cannot last forever: something needs to be adjusted otherwise the debt ratio would explode. One form of adjustment would be to raise the primary balance to a level that is sufficiently high to stabilise the debt ratio (what I will refer to as "orthodox adjustment"). It is only when the primary balance needed to stabilise the debt ratio is regarded to be too large to be reached and/or sustained over time that debt can be regarded as unsustainable. In that case, it will be necessary to tax the holders of government paper (either through debt restructuring, financial repression, or monetisation). This raises the key issue of how likely it is that fiscal adjustment can take place over the medium term through orthodox tools.

Views on this have differed. Some have argued that debt has reached such levels that unorthodox approaches are inevitable, at least in some countries, a position that seems to have been vindicated by events in Greece. Others, however, have argued that concerns about fiscal sustainability are overblown. Debt has already been lowered from high levels on other occasions in an orderly way, for example after major wars.

There is no doubt that the pessimistic view has strong supporting arguments. The challenges ahead are virtually unprecedented. Advanced countries' debt exceeded the current level only once during the last one hundred and thirty years – at the end of World War II (Chart 1). On that occasion, nonorthodox solutions were necessary for the war's losers. The fact that debt was honored by the winners

3 *Based on the sample of emerging economies covered in IMF (2011).*
4 *A negative differential between interest rate and growth implies that the larger the debt the lower is the primary balance needed to stabilise it. Thus, as long as the differential remains negative, the debt ratio would eventually converge for any negative primary balance.*

does not prove much, as conditions are not fully comparable.[5] One could argue that, at least in the United States and Japan, fiscal risks cannot be large, given markets' benign assessment (interest rates are at historical lows for these countries), signaling that markets do expect fiscal adjustment to take place, eventually. But, perhaps somewhat cynically, one can point at the underestimation of risks by markets that preceded 2007, including in assessing fiscal risks in the euro area.

Nevertheless, I believe orthodox adjustment is still possible, and indeed is the preferred way to go. Granted, the needed adjustment is large, especially if the goal is to lower public debt ratios rather than just stabilise them, but is not out of reach. Moreover, unorthodox approaches also involve costs, probably higher than those arising from orthodox fiscal adjustment. This said, it will not be easy. Moreover, orthodox adjustment will require more than just fiscal tightening: other policies will also play a critical role. These points are addressed in turn.

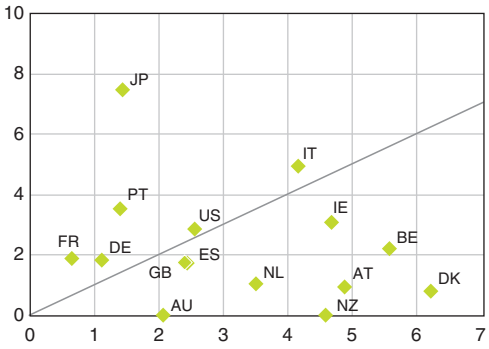
2|1 Is the extent of the required adjustment economically and politically feasible?

Answering this question requires assessing whether the primary balance needed to, at least, stabilise debt in relation to GDP can be achieved and maintained over time without excessive stress for the economy.

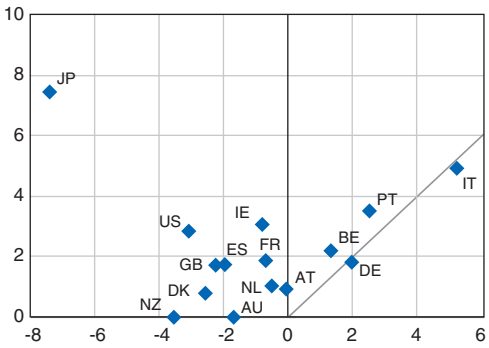
One problem however, is that the calculation of the debt stabilising primary balance crucially hinges on the differential between the average interest rate on public debt and the GDP growth rate. At any point in time, such a differential is affected by market sentiment and does not always reflect fiscal fundamentals: the most obvious example is the failure of financial markets to appreciate differences in the fiscal positions of the euro area countries before 2008. Thus, in assessing debt sustainability it is critical to use interest rate-growth differentials that reflect a "normal" relationship between such differentials and debt ratios. The following results are based on econometric estimates in Baldacci and Kumar (2010) and Kumar and Woo (2010).

Chart 9
Cyclically adjusted primary balance that needs to be achieved to stabilise debt [a)]

(x-axis: highest CAPB, 10-year rolling average;
y-axis: required CAPB for debt stabilisation; % of GDP)



(x-axis: highest CAPB, 10-year rolling average;
y-axis: CAPB 2012; % of GDP)

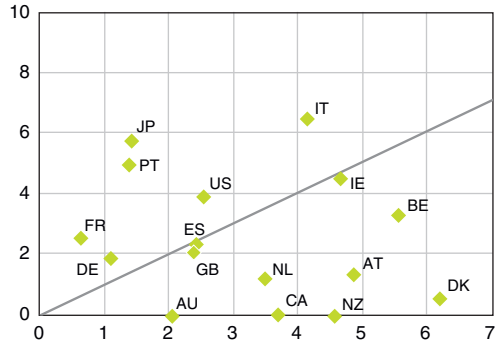


AT = Austria; AU = Australia; BE = Belgium; DE = Germany; DK = Denmark; ES = Spain; FR = France; GB = United Kingdom; IE = Ireland; IT = Italy; JP = Japan; NL = Netherlands; NZ = New Zealand; PT = Portugal; US = United States.
a) For Australia, Canada, Japan and New Zealand, refers to net debt.
Notes: For each advanced economy, the top panel of this figure reports, on the horizontal axis, the largest primary surplus that the country has ever attained, on average, in any 10-year period since 1970 (subject to data availability). On the vertical axis is the level of the cyclically adjusted primary balance that each economy needs to achieve in order to stabilise its debt ratio, taking into account the endogenous (dynamic) impact of debt levels on the interest-growth differential. The analysis assumes a 5-year convergence of initial country-specific interest-growth differentials (based on WEO projections) toward model-based interest-growth differential, which uses empirical estimates of the effect of public debt on economic growth (Kumar and Woo, 2010) and on interest rate (Baldacci and Kumar, 2010).
Sources: IMF, Fiscal Monitor Update *January 2012; and IMF staff calculations.*

The vertical axis of Chart 9 (top panel) reports, for advanced countries, the cyclically-adjusted primary balance (CAPB) needed to stabilise the debt ratio starting with its projected level at end-2011 and assuming the debt is stabilised, following 2011, through a gradual adjustment (see chart footnote).

5 *There are three fundamental differences between the 1950s and the 2010s. First, in the 1950s advanced countries had a young population, which implied faster potential growth and a lower burden from future entitlement spending. Second, the financial sector was repressed (with tools ranging from interest rate caps to investment requirements in government paper). Third, the Greek debt restructuring has broken a taboo that had lasted since World War II – namely that advanced countries do not default on their debt – with likely unfavorable implications for risk perceptions and risk premia.*

Chart 10
Cyclically adjusted primary balance that needs to be achieved to reduce debt ratio [a)]
(x-axis: highest CAPB, 10-year rolling average; y-axis: required CAPB for debt reduction; average 2011-30, % of GDP)



a) For Australia, Canada, Japan and New Zealand, refers to net debt.
Notes: For each advanced economy, this chart reports, on the horizontal axis, the largest primary surplus that the country has ever attained, on average, in any 10-year period since 1970 (subject to data availability). On the vertical axis is the level of the cyclically adjusted primary balance that each economy needs to achieve on average over 2011-2030 in order to reduce its debt ratio to 60 percent by 2030, taking into account the endogenous (dynamic) impact of debt levels on the interest-growth differential. See Note on Chart 9 for interest rate-growth assumptions. For Japan, the targeted debt ratio is 80 percent. For countries with debt levels below 60 percent, the initial debt ratio is chosen as a debt target.
Sources: IMF, Fiscal Monitor Update *January 2012; and IMF staff calculations.*

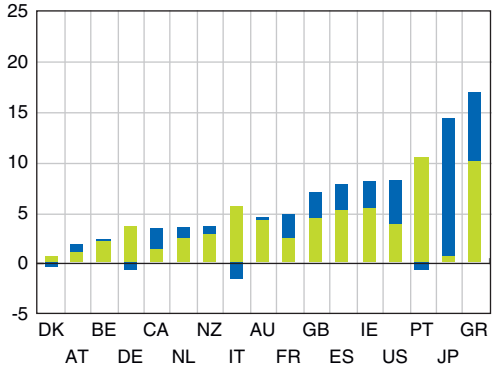
The horizontal axis reports the maximum CAPB sustained on any rolling ten-year period by each country. The chart shows that the primary balances needed to stabilise debt ratios at around the current levels had been sustained in the past by most countries. This is not to imply that, with respect to the primary balance projected for 2012 (which already reflects sizable adjustments this year), the adjustment will be easy: as illustrated by the bottom panel, most countries are still far away from the debt stabilising primary balance. But this means that the goal is distant, not that it is unreachable.

This analysis, however, does not take into account that just stabilising the debt ratio may not be sufficient. Stabilising debt at about its current level has several drawbacks, the most important being the vulnerability to shocks to the interest rate-growth differential, which could push debt on an unsustainable path. Moreover, the evidence that high public debt leads to lower potential growth is fairly strong (as noted above), and provides an additional reason to aim at lower debt ratios.

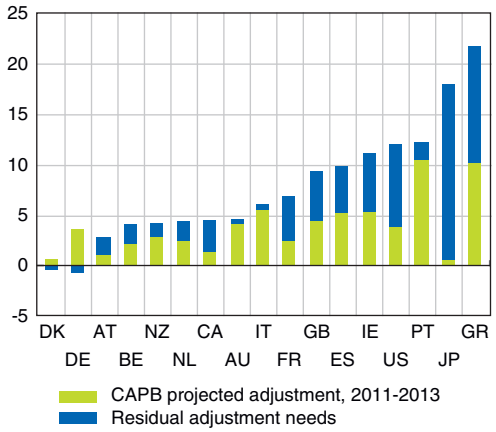
It is therefore useful to look also at the primary balance that would need to be maintained for some time in order to *lower* the debt ratio to a more reasonable level.

Chart 11
Selected advanced economies: illustrative adjustment needs and projected fiscal adjustment
(% of GDP)

To stabilise debt



To reduce debt



Notes: The figure compares the projected change in the cyclically adjusted primary balance (CAPB) between 2010 and 2013 with the estimated adjustment needs between 2010 and 2020 to achieve debt targets in 2030 (see footnotes in Charts 9 and 10). A negative figure indicates that the required adjustment to stabilise or to reduce debt will be exceeded by 2013.
Sources: IMF, Fiscal Monitor Update *January 2012; and IMF staff calculations.*

This is done in Chart 10, which reports on the vertical axis the average primary balance during the period needed to lower the debt ratio below 60 percent by 2030. The horizontal axis reports again the maximum primary balance sustained by each country in the past. The figure shows that several countries have never managed to sustain a primary balance at the level that would be needed. This may mean that a less ambitious long-term objective would be needed, or that the adjustment may take longer, although it could also simply mean that these countries have never needed to maintain a large primary surplus in the past. In any case, for several countries in Europe, current fiscal adjustment plans, in some cases already legislated, imply significant progress in achieving the required primary balance (Chart 11).

2|2 The cost of unorthodox approaches

While stabilising or lowering public debt through a strengthening of the primary balance is costly, unorthodox approaches also involve sizable costs.

Debt restructuring has well known costs in terms of reputation and future market access. But the fact that in the past default by sovereign countries mostly consisted of default on foreign debt has hindered the understanding that debt restructuring – a tax on bond holders – has also, like any other tax, a direct contractionary effect on domestic activity if debt is held domestically. Moreover, it is a massively frontloaded tax, and one whose incidence is hard to predict. Even the portion on the tax that falls abroad can have large negative spillover effects if foreigners are closely integrated with the home economy (as is, for example, the case for euro area countries).

The inflation tax would be effective only if inflation were raised rapidly to very high levels: this is because, with base money and, thus, seignorage at relatively low levels in advanced economies, revenues from inflation mostly come from the erosion in the value of public debt issued at fixed interest rates.[6] Assuming the real interest rate on newly issued debt is unaffected by inflation, the amount of public debt eroded by inflation would shrink rapidly as old debt is rolled over, so only a sudden inflation shock could have large effects. For example, for the G7 economies, on average, inflation would have to rise to 30 percent during 2012-13 (and 8 percent in 2014-16) to lower debt ratios by 30 percentage points.[7] These inflation levels involve high costs, including those arising from the subsequent disinflation attempts.

Finally, financial repression will involve distortions in resource allocation. But, its main problem is that, in a more complex and global financial system, it will be more difficult to enforce than in the past, and, to the extent it is effective, it may have undesired effects which are difficult to anticipate, including through capital flows between repressed and unrepressed financial systems.

2|3 Managing orthodox fiscal adjustment: not just a matter of fiscal tightening

Given the magnitude of the fiscal effort required, an adjustment strategy based entirely on fiscal tightening – particularly massively frontloaded fiscal tightening – would run into major problems. Growth would suffer through standard Keynesian effects. Low growth is a problem in itself. It may also become a problem for the sustainability of fiscal adjustment if markets get worried about it and require higher interest rates to invest in countries with low growth. There is indeed evidence that this perverse market reaction to the fiscal tightening-growth interaction has characterised market responses during the current cyclical phase.[8]

This points to the importance of focusing on the implications of fiscal tightening for aggregate demand. The pace of fiscal tightening should take into account the prospects for private sector growth: steady adjustment at a gradual pace seems to be more appropriate than front-loaded adjustment in the current phase of still fragile recovery in private sector demand. Some countries will have to undergo rapid fiscal adjustment, given financing constraints and concerns about an already high level of public debt. Even in these cases relying solely on fiscal adjustment would not be appropriate.

To start with, monetary policy would have to be accommodative: interest rates are already low, but, if fiscal adjustment is implemented, they should remain low, thus favoring private sector crowding in.

Monetary policy can also play a direct role in increasing the liquidity of the government paper market, thus preventing a fiscal tightening-induced growth deceleration from triggering a fiscal confidence crisis. In this respect, one surprising feature of the current fiscal landscape in advanced economies is the fact that some high deficit, high debt countries (such as the United States and Japan) enjoy much lower interest rates than some euro area countries with comparable or better fiscal fundamentals. Do fiscal fundamentals

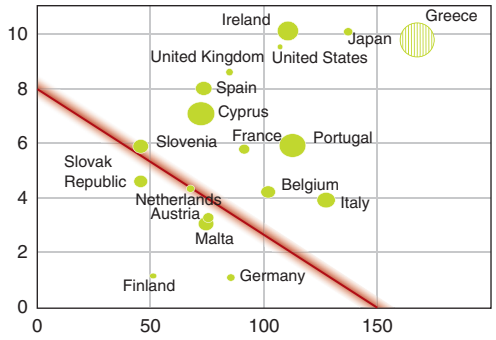
6 *The extraordinary surge in the demand for liquidity, matched by a surge in the supply of base money, after the crisis caused a rapid increase in seignorage revenues. As a result, the government-central bank consolidated balance sheets did not deteriorate as rapidly as the government balance sheets during 2009-11 (see IMF, Fiscal Monitor, forthcoming, April 2012). This increase, however, is bound to be reversed when the demand for base money returns to more normal levels.*

7 *This is with respect to a baseline of inflation at about 2 percent. Alternatively, the same decline in debt can be achieved with inflation at 18 percent throughout 2012-2016.*

8 *See Cottarelli (2012).*

Chart 12
General government deficit versus debt in selected countries, 2011 [a)]

(x-axis: debt; y-axis: deficit; % of GDP)



a) For Japan refers to net debt.
Notes: The size of the balloon for each country is proportional to the size of its 5-year CDS spread in December 2011, except for Greece (the size of its balloon was capped). All large balloons are on the right of the red line, a vulnerability threshold reflecting a combination of high deficits and debt.
Sources: Markit; IMF, Fiscal Monitor Update *January 2012; and IMF staff calculations.*

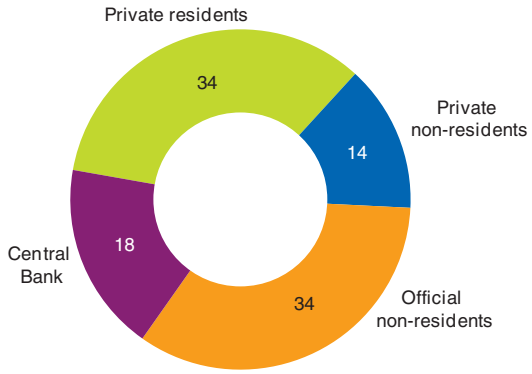
not matter? They do: Chart 12 suggests that having weaker fiscal accounts is a necessary condition to have higher CDS spreads. But not a sufficient one: the United States, Japan and the United Kingdom, all enjoy low spreads. One reason for this is the role played by their central banks in the government paper market. While motivated by monetary policy goals, the sizable purchases of government paper through quantitative easing policies helped contain the yields on government paper: in mid-2011 the Federal Reserve held 18 percent of the debt issued by the US Treasury (net of holdings by the social security administration). The Bank of England held 20 percent of UK Treasury debt, having financed the entire fiscal deficit in 2009. The holdings of government paper by the Bank of Japan are lower (9 percent), but Japanese banks invest heavily in government paper, and they borrow heavily from the Bank of Japan (Chart 13).

One has to interpret this evidence with care. First, it should not be taken as evidence that government debt financing by the central bank can be a permanent solution. Rather, it is a crisis management tool. The availability of central bank financing is helpful, but cannot be a substitute for fiscal adjustment, except for countries hoping to rely heavily on the inflation tax (see above).

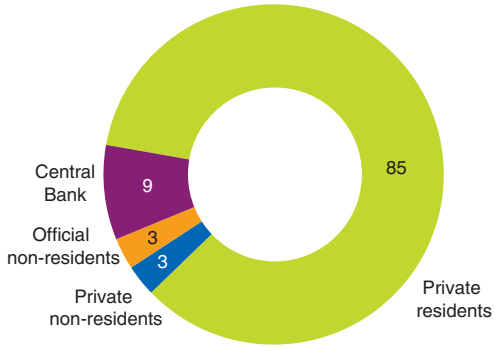
However, countries in the euro area, where major fiscal credibility problems have emerged, do not have an independent monetary policy. And the institutional constraints binding the ECB limit its room for maneuver in supporting directly the government paper market of the countries undergoing fiscal adjustment. This is why it is particularly important that in the euro area, resources from member countries – adequate firewalls as

Chart 13
Holders of government debt
(% of total outstanding)

US Federal government: Treasuries securities [a)]



Japan central government: Japanese government bonds [b) c)]



a) Includes marketable and nonmarketable debt; excluding holdings by the pension administration.
b) Includes Fiscal Investment and Loan Program (FILP) bonds and does not include T-Bills.
c) Includes Japan Post Insurance and excludes public pensions.
Note: Data as of 2011:Q2 for the United States, 2011:Q1 for Japan.
Sources: Country authorities; Japan Post Bank; Currency Composition of Official Foreign Exchange Reserves (COFER) database; and IMF staff estimates.

well as tools to pool fiscal risks in the context of a strengthened fiscal compact – are made available in support of the fiscal adjustment process.

In spite of the supportive role that monetary policy can play, a prolonged phase of fiscal tightening in advanced economies may slow, other conditions being the same, the pace of aggregate demand growth. Will there be sufficient demand at the global level? Here an increasing role can be played by fast-growing emerging economies with strong fiscal and external positions.

Finally, it will be critical to strengthen potential growth in advanced economies. Faster growth would have major implications for fiscal accounts over the medium term, particularly in countries with fairly high levels of taxation, as in most advanced economies: a country that, starting with a public debt-to-GDP ratio of 100 percent, managed to raise its annual growth by a single percentage point would lower its debt ratio by 29 percentage points in ten years, if it saved all the additional revenues (assuming a revenue-to-GDP ratio of 40 percent, similar to the level in many advanced countries). This will require reforms in goods, financial and labor markets. In the fiscal area, it will require a shift towards less distortionary taxation models, and care in implementing expenditure cuts, protecting public spending that has stronger positive impact on potential growth (Cottarelli and Keen, 2012).

3| Some concluding remarks and lessons for fiscal policy management

The last four years have changed in many respects our appreciation of fiscal solvency risks.

• First, the belief that fiscal solvency risks could arise only for emerging and low-income countries has been shattered. Several advanced economies in Europe have been hit by confidence crises. The fact that the focus of this crisis has been the euro area is indicative of the importance, in fending off short-term problems, of having adequate short-term financing. But it does not mean that the availability of financing is sufficient to avoid confidence problems arising from lack of long-term fiscal adjustment. No country should feel exempt from the need for a long-term sustainable fiscal position.

• Second, and relatedly, countries with high debt are exposed to the vagaries of financial markets and to self-fulfilling confidence crises. The compounded effect of high debt levels with high interest rates, in the presence of a confidence crisis, is extremely hard to manage. Debt normally rises at times when financing is cheap and policymakers harbor the illusion that "this time will be different" (Reinhart and Rogoff, 2009). What happened in the last four years sends a strong cautionary message to countries with moderate debt levels: they should keep them as such.

• Third, the financial-fiscal nexus has also proven more important than ever in managing fiscal policy. Developments in 2008-2009 proved how severe the cost of a financial crisis can be for the fiscal accounts, going well beyond the direct support to the financial sector. The costs can be so large that a strategy of prepositioning the public sector for possible shocks – e.g., by keeping debt low in good times – can only help if the financial sector is not too large: in other cases, the only viable strategy seems to be to avoid that the financial sector becomes a source of large shocks through appropriate regulation and supervision. The ongoing sovereign debt crisis also shows the difficulty of managing such a crisis in a complex financial environment, when banks are highly exposed to sovereign risk and higher risk premia for the sovereign rapidly spill over to the rest of the economy. One possible solution would be to rely more on external sources of financing. But the latter have proven to be more volatile than domestic sources. Again, all this confirms the need to maintain public debt at low levels.

Finally, the 2008-2011 experience has confirmed the importance of growth for sound fiscal balances. The surge in public debt during 2008-2010 was primarily driven by the output collapse. Looking ahead, the pace of fiscal adjustment – at least in those countries with sufficient fiscal space to consider the matter – will have to take into account its short-term growth implications, particularly given the current focus of markets on short-term growth. Beyond the short term, lowering the debt-to-GDP ratio in advanced countries will be greatly facilitated by a rise in potential growth.

References

Baldacci (E.) and Kumar (M. S.) (2010)
"Fiscal deficits, public debt, and sovereign bond yields", *IMF Working Paper* No. 10/184.
http://www.imf.org/external/pubs/ft/wp/2010/wp10184.pdf.

Cecchetti (S.), Mohanty (M.) and Zampolli (F.) (2011)
"The real effects of debt", *BIS Working Paper* No. 352, Bank for International Settlements.
http://www.bis.org/publ/work352.pdf.

Cottarelli (C.) (2012)
"Fiscal adjustment: too much of a good thing?", *http://www.voxeu.org/index.php?q=node/7604.*

Cottarelli (C.) and Keen (M.) (2012)
"Fiscal policy and growth: overcoming the constraints", *in Ascent after decline. regrowing global economies after the great recession,* ed. by O. Canuto and D. M. Leipziger (Washington: The World Bank).

Escolano (J.), Shabunina (A.) and Woo (J.) (2011)
"The puzzle of persistently negative interest rate-growth differentials: financial repression or income catch-up?", *IMF Working Paper* No. 11/260.
http://www.imf.org/external/pubs/ft/wp/2011/wp11260.pdf.

International Monetary Fund (2009)
"What's the damage? Medium-term output dynamics after financial crises," *World Economic Outlook*, Chapter 4, October.

International Monetary Fund (2010)
"Macro-fiscal implications of health care reform in advanced and emerging economies", IMF Paper of the Fiscal Affairs Department, Washington, DC.
http://www.imf.org/external/np/pp/eng/2010/122810.pdf.

International Monetary Fund (2011)
Addressing fiscal challenges to reduce economic risks, IMF Fiscal Monitor, Washington, DC.
http://www.imf.org/external/pubs/ft/fm/2011/02/pdf/fm1102.pdf.

International Monetary Fund (2012)
"The challenge of public pension reform in advanced and emerging economies", IMF Paper by the Fiscal Affairs Department, Washington, DC.

International Monetary Fund (2012)
As downside risks rise, fiscal policy has to walk a narrow path, IMF Fiscal Monitor Update. Washington, DC.
http://www.imf.org/external/pubs/ft/fm/2012/update/01/fmindex.htm.

Krugman (P.) (2009)
"The burden of debt", *The New York Times*.
http://krugman.blogs.nytimes.com/2009/08/28/the-burden-of-debt/.

Kumar (M. S.) and Woo (J.) (2010)
"Public debt and growth", *IMF Working Paper* No. 10/174.
http://www.imf.org/external/pubs/ft/wp/2010/wp10174.pdf.

Reinhart (C.) and Rogoff (K.) (2009)
"This time is different: eight centuries of financial folly", Princeton University Press.

When Western sovereign risk is in play

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Sovereign risk was a big macro theme in 2011, and understandably so. This theme will not abate in 2012. Indeed, this year will likely feature many additional sovereign risk developments that will impact in a consequential manner the functioning of the global economy and financial markets. In the process, they will continue to fuel uncertainty and volatility, to alter the behaviour of companies and individuals, to challenge the effectiveness of government policies, and to impact market correlations and stability. Both the public and private sector need to understand better the dynamics of Western sovereign risk and, importantly, react responsively and in a more timely, comprehensive and decisive manner. They need to pivot from a reactionary mode to a pre-emptive one. And they need to do so in a coordinated and sustained fashion otherwise they will all find it much harder to restore growth, jobs and financial stability.

Sovereign risk was a big macro theme in 2011 and early 2012, and understandably so. America lost one of its AAA credit ratings, as did France. Europe's periphery suffered multiple downgrades, with Greece, Ireland and Portugal all slipping to "junk" status. Many of the other euro area members were either downgraded or saw their ratings placed on "negative outlook". Greece embarked on the largest sovereign debt restructuring in history. And traditional market measures of credit risk on sovereign bonds issued by Western governments reached levels once deemed unthinkable.

This theme will not abate in the rest of 2012. Indeed, this year will likely feature many additional sovereign risk developments that will impact in a consequential manner the functioning of the global economy and financial markets. In the process, they will continue to fuel uncertainty and volatility, to alter the behaviour of companies and individuals, to challenge the effectiveness of government policies, and to impact market correlations and stability.

Both the public and private sector need to understand better the dynamics of Western sovereign risk and, importantly, react responsively and in a more timely, comprehensive and decisive manner. They need to pivot from a reactionary mode to a pre-emptive one. And they need to do so in a coordinated and sustained fashion otherwise they will all find it much harder to restore growth, jobs and financial stability.

This is the general context in which the present paper seeks to discuss the impact, known and uncertain, of recent developments in Western sovereign risk. Following this introduction, and with the focus of this paper primarily on the euro area, Section 1 points to some of the key changes that have taken place recently. Section 2 points to the drivers for these changes and Section 3 considers the outlook. Section 4 speaks to the required adaptations, followed by the concluding remarks.

1| The "what" of Western sovereign risk

There are multiple metrics that illustrate the dramatic changed circumstances for Western sovereign risk, whether it is relative to their recent history, in absolute terms or in comparison to emerging economies. Three are chosen for the purpose of this analysis: bond yields, credit default swaps, and market access.

1|1 Bond yields

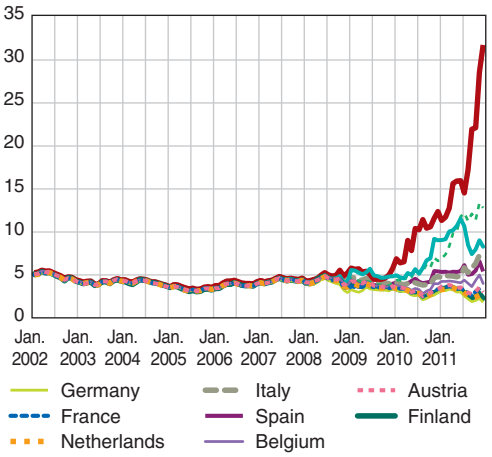
Chart 1a illustrates how the yields on 10-year bonds issued by several euro area economies have behaved over the last ten years.

After moving together for much of the period, we see pronounced differentiation and volatility starting in 2009. By the end of 2010, it is no longer clear that the chart reflects a group of countries with similar economic and financial characteristics, let alone a set that belongs to a monetary union.

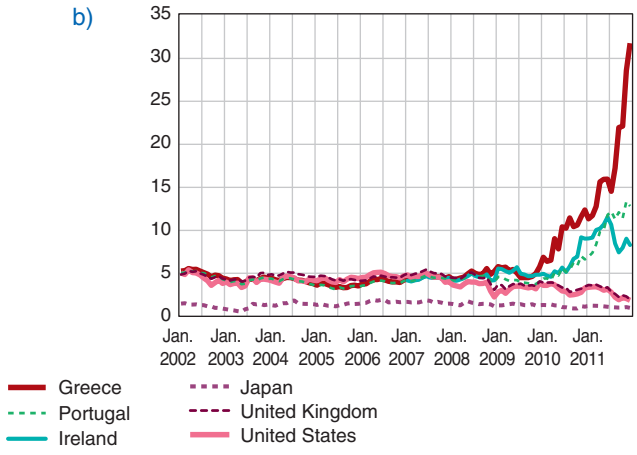
Chart 1
The yields on 10-year bonds

(in basis points)

a)



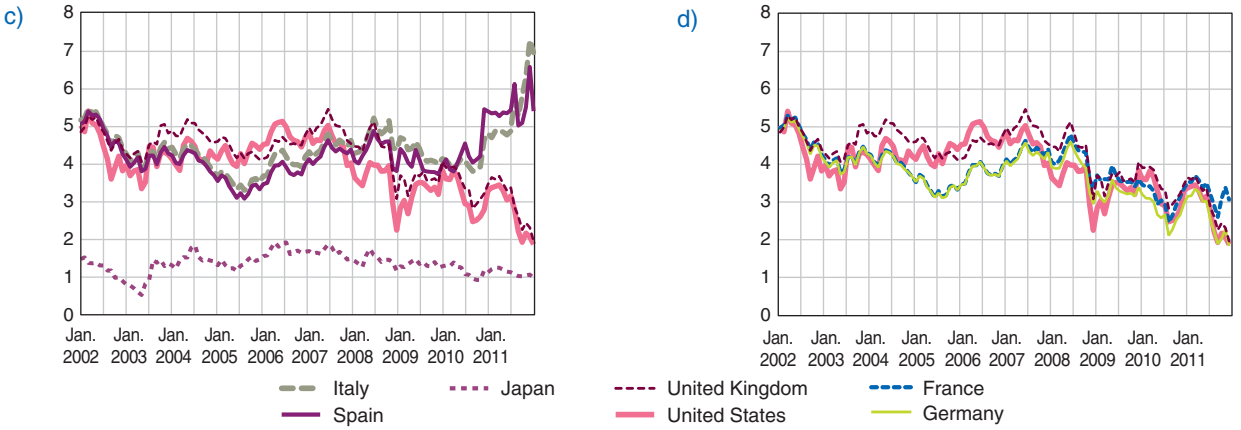
b)



Source: Bloomberg.

Chart 1
The yields on 10-year bonds

(in basis points)



Source: Bloomberg.

For the sake of analytical simplification, we can think of three different sets of dynamics underlying this general development. They are illustrated in Charts 1b, 1c, 1d which, for comparative purposes, also include the yields on the government debt issues by three other advanced economies: Japan, the United Kingdom, and United States.

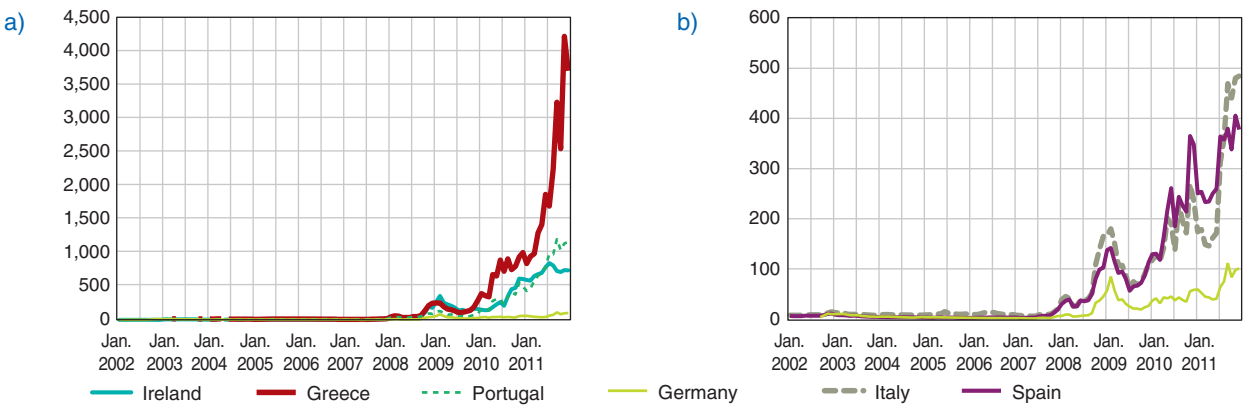
The first disturbance involved a sharp yield explosion in the outer periphery of the euro area – namely, Greece, Ireland and Portugal (Chart 1b). The second pertained to two other euro area economies (Italy and Spain) that are larger in size and more important from both a regional and global systemic perspective (Chart 1c). And the third went a step further in what was previously deemed unthinkable – involving greater differentiation among what are perceived as "core" economies, including between France on the one hand and Germany, United Kingdom and United States on the other (Chart 1d).

1|2 Credit default swaps

The level and volatility of government yields are influenced by a myriad of factors. Chief among them are the growth outlook, market interpretations of the macro policy stance (particularly monetary policy), perceptions of credit and default risks, and relative liquidity and quality standings.

Chart 2
Five year CDS

(in basis points)

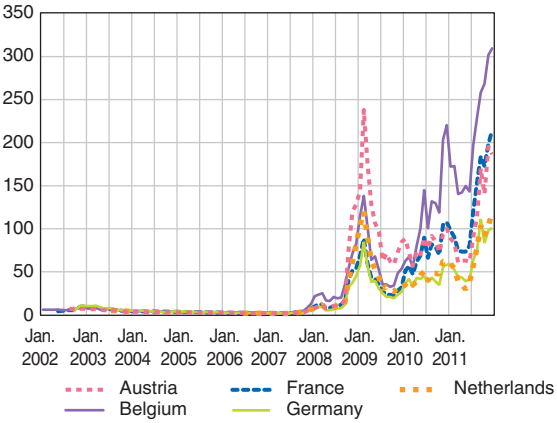


Source: Bloomberg.

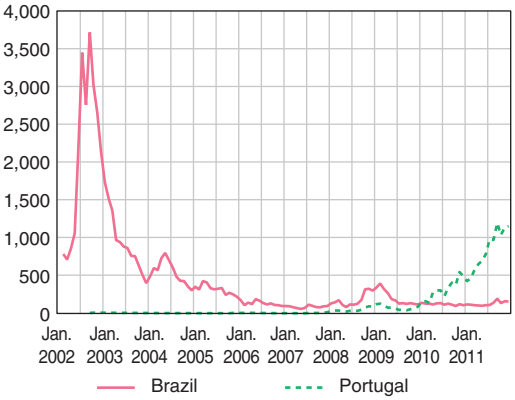
Chart 2
Five year CDS

(in basis points)

c)



d)



Source: Bloomberg.

The last few years have seen important changes in all of these. Yet none was as dramatic as what has happened to market perceptions of credit and default risk. These are captured, albeit far from perfectly, by movements in credit default swaps (CDS). Accordingly, Charts 2a, 2b, 2c illustrate historical movements for the three groups of countries just cited, with Germany included as a comparator: namely, the outer periphery of the euro area, Italy and Spain, and the core countries.

The bottom line is straightforward. The CDS on the outer periphery have moved from pricing very low credit risk to pricing a high probability of outright debt default (Chart 2a). Italy and Spain have evolved from being viewed as "interest rate exposure" to being deemed as involving significant "credit risk" (Chart 2b). And even the core of the euro area has seen dislocations, with a previously homogenous group now being characterised by significant diversion and, therefore, unusual variability in the balance between interest rate and credit risk (Chart 2c).

These CDS movements illustrate the extent to which Western sovereign risks have grown, morphed and become a source of systemic instability. They can also be used for comparison with other countries in the world economy – an analysis that speaks to yet another set of previously-unthinkables becoming reality. Indeed, the relative position of countries has changed to such an extent as to weaken the conventional analytically distinction between "advanced" economies and "emerging" ones.

This is yet another component of the consequential global re-alignments which are transforming the world we live in. Consider Chart 2d as a partial illustration of the paradigm shifts. The ranking between Portugal and Brazil, its former colony, has flipped and done so in a dramatic manner. The market now deems Brazil much less risky than Portugal.

This is not the only unprecedented change. When it comes to market perceptions of credit risk, Russia is seen as less risky than several members of the euro area. Indeed, the changes between advanced and emerging economies have been so notable that, in January 2012, Panama was regarded safer than Japan!

1|3 Access

The consequential changes in Western sovereign risk have not been limited to the levels at which government debt is issued and trades on the secondary market. The last couple of years have also seen unprecedented developments in the ability of some Western economies to mobilise the funds needed to finance budget deficits and to rollover maturing debt. This has also impacted the functioning of government bond markets.

In the last two years, the three outer-periphery euro area countries have lost market access. As a result, and despite budgetary austerity efforts, they are only able to meet their payments obligations

through the receipt of exceptional and massive funding from other European governments (including through the European Union and its new funding facilities such as the European Financial Stability Facility (EFSF), the European Central Bank (ECB) and the International Monetary Fund (IMF). In addition, both Greece and Ireland have had to rely on such funding to maintain the operational standing of their banking systems, albeit in a fragile manner.

Countries such as Italy and Spain have been able to maintain market access, though needing the support of the ECB to counter extremely disorderly yield behaviour. Such support has taken the form of outright purchases of bonds by the ECB, as well as massive de facto financing through various windows, including the recently expanded three-year long-term refinancing operations (LTROs). In the process, the ECB has significantly expanded its balance sheet, taking on both credit and interest rate exposure while de facto assuming functions of a quasi fiscal agency.

These developments have been associated with a series of downgrades of the sovereign credit ratings specified by major agencies (such as Fitch, Moody's and Standard & Poor's). Already, three euro area countries have fallen to junk status, having lost their investment grade ratings, and Greece slipped into "selected default"; and virtually every single country that has not been downgraded has at least one rating subject to a "negative outlook" (implying a material probability of a downgrade unless there is a notable improvement in the debt solvency outlook).

Given all these developments, it should come as no surprise that Europe has witnessed a change in the manner its government bond markets function. Trading liquidity has been undermined in many segments, with bid-offer spreads widening and daily volumes falling; and intermediaries have tended to shift their operational attention to the activities of the ECB.

2| The "why" of Western sovereign risk

All these dramatic changes in Western sovereign risk have not occurred in a vacuum. Rather, they have been accompanied – indeed, caused – by what has been happening in several countries with respect to both budgetary and growth dynamics.

The general context is well known. In the run up to 2007-08, the West embarked on a "great age" of leverage, debt and credit entitlement. This was particularly acute in the finance-dependent Anglo-Saxon economies which experienced a serial contamination of private sector balance sheets (most significantly in housing, the household sector, and the banking system). Ultimately, this unsustainable situation proved massively disruptive, aggravated by policy slippages and inadequate understanding of the underlying financial conditions.

Governments faced a real possibility of a global economic depression in the fourth quarter of 2008. Economic activity was in a free fall and financial intermediation virtually at a standstill as the private sector embarked on a massive disorderly de-leveraging.

Given the risks involved, governments had no choice but to intervene. They did so by massively substituting their balance sheets (and that of their central banks) for the quickly collapsing balance sheets of the private sector.

While the response function was similar across countries, the initial economic and financial conditions were not.

Some governments, such as Greece and Portugal, were particularly ill-equipped to navigate well the global financial crisis. For years, they had been running large deficits and accumulating excessive debt, especially in view of their persistently disappointing growth dynamics. Their situation was aggravated by pronounced weaknesses in public administration and, in the case of Greece, data mis-reporting.

Other countries started with better initial conditions and, accordingly, would have handled the situation better if it were not for some critical decisions that went wrong. This is the case for Ireland where the government agreed to take on the liabilities of its banking system without a sufficiently accurate understanding of the massive magnitude and the implications. Once both became clear, the Irish government (probably influenced by the ECB) shied away from imposing broad-based burden sharing on creditors to these banks. As a result, the hitherto solid public finances were contaminated in a material and consequential manner.

A third group of countries did not face immediate solvency issues yet found it difficult to avoid market pressures given what was happening around them. Indeed, they were a good illustration of the type of financial contagion that, in previous eras, was felt primarily by developing economies.

Due to macro "noise" and technical forces, these countries were unable to signal credibly and loudly their underlying strength. As a result, they were given a lot less credit than they deserved.

Yes Italy had a historically elevated level of debt-to-GDP, but its deficit was modest and its maturity schedule was not onerous. Yes Spain was exposed on account of its real estate bubble and very weak saving banks ("cajas") but its government seemed to have internalised well the lessons from the mistakes of others, particularly Ireland. Yet, as noted earlier, both struggled to contain their borrowing costs. And once disrupted, the deterioration in the financing outlook became path dependent, again reminiscent of the "multiple equilibria" dynamics that prevailed earlier in the emerging world.

Then there is the experience of the core economies. As detailed above, some of them have also suffered deteriorations in market measures of credit risk. Indeed, even the CDS of Germany rose despite the country's solid balance sheet, fiscal discipline, years of deep structural reforms, and vibrant growth, as well as low and declining unemployment.

Notwithstanding their relative and absolute strengths, these countries have also been impacted, albeit to a much lesser extent. They have retained access but not without unusual interest in what used to be totally routine government debt auctions.

What is in play here has to do with the notion of contingent liabilities, or the potential exposure to the difficulties of other European countries. This takes several forms: potential financing claims, including those associated with European funding mechanisms such as the EFSF; the possibility of having to socialise the losses of banks exposed to peripheral economies; the potential need to recapitalise an ECB whose balance sheet is now partially contaminated; and the likelihood of a damper on economic activity on account of lower exports to European neighbours, a credit crunch, and higher risk aversion.

Such concerns will amplify if the euro area continues to experience downgrades; and they will spike if one or more of the remaining AAA euro area countries lose this pristine rating (particularly France which, in January, was downgraded by one rating agency).

The rating downgrades do something else that adds fuel to the Western sovereign debt issues. They contribute to a structural shift in demand for sovereign bonds issued by certain countries, thereby rendering the damage more difficult to reverse.

Investment management companies such as PIMCO are being asked by certain clients to go beyond tactical risk avoidance when positioning their portfolios in Europe. These clients are instructing PIMCO and others to change the benchmark and/or investment guidelines that govern the allocation of this capital in order to exclude certain countries deemed too risky. Consistent with the morphing of a portion of Western sovereigns from pure interest rate to a mix of interest rate and credit/default risk, the result is a structural shift in the demand curve for certain government debt.

3| Some implications

All these developments have placed the stabilisation of sovereign risk at the top of the economic and financial challenges facing a number of countries. Without progress on this front, the growth outlook would be undermined, more jobs would be lost, income and wealth inequality would worsen, and banking sector fragility would increase.

The damage would not be limited to those sectors with fragile balance sheets. Healthy ones would also be impacted.

Households and companies that are able to spend and invest would, instead, increase their "self insurance", thereby sucking out even more growth oxygen and accentuating the global de-leveraging. In turn, this would reduce the potential for vulnerable balance sheets to be brought back to health, as well as increase the risk of contamination for the stronger balance sheets.

In themselves, the nature of these challenges are not new for the global economy. They have featured prominently in the crises faced by emerging markets in the 1980s, mid 1990s, late 1990s and early 2000s. All were associated with contagion winds, and all exposed both good and bad economies to risks of economic disruptions and financial dislocations.

Yet there is something materially different this time around. The sources of contagion originate prominently in Western economies that were once deemed structurally more stable, if not immune to such challenges. In fact, what is happening today is so unthinkable as to severely test the responsiveness of policies, the agility of institutions and the anchors that are critical to the orderly and efficient functioning of the global economy.

It is generally agreed that, so far, the West's policy response has not been up to the challenges posed by the sovereign debt turmoil. Initial denial gave way to only partial recognition and way too much bickering among policymakers, both in Europe and in the United States.

Proper recognition was not the only factor hindering a timely response. Policymakers also faced challenges on account of insufficient policy tools, lack of institutional agility and, therefore, a much more uncertain reaction function for advanced economies in particular.

Political and social factors have also posed complications. In the United States, an often dysfunctional relationship between the executive and legislative branches has undermined any sustained policy initiative. At times, and as exemplified by the debt ceiling debacle last summer, this unfortunate dynamic can also expose both the country and the global economy to new and material risks.

The social dimension is even more complex, and it goes well beyond the opposition to austerity measures. There are widespread questions about the "fairness" and functioning of market systems. These are expressed in terms of specific concerns about trends in income and wealth distributions, as well as in the extent to which Western economies allowed for a massive privatisation of gains followed by an unfathomable socialisation of losses.

The result of all this is to significantly increase the complexity of both the "what" and "how" of policymaking. It is therefore not surprising that even when there has been willingness to take appropriate actions, outcomes have tended to fall consistently short of policy expectations.

As the economies in question are also "core" from a systemic perspective, the implications are potentially far reaching. After all, these economies anchor the international monetary system and account for an important part of global economic activity. They still exercise a disproportionately large influence on the functioning and decisions of key multilateral institutions (such as the IMF). And their banks are interlinked in many ways to other countries.

This leads us to a big "known unknown". It is not clear how the global economy will function over time with a weaker core. Will it simply re-align itself and operate less efficiently – meaning at a lower level of global growth and with greater financial instability; or will multilateral modes of interaction steadily fragment into bilateral and regional ones?

This unknown is part of a much larger shift in the potential distribution of outcomes. If it maintains its current course, the world is transitioning away from the notion of a normal bell-shaped distribution – one in which there is a dominant expected outcome and where the tails of the distribution are thin. Instead, we are living increasingly in a world that is best characterised by a flatter curve with much fatter tails. And, as the experience of the euro area shows, such a distribution can become inherently unstable – so much so that it can tip into a bimodal one.

All this is consequential as the welfare of billions of people is at stake. It is also why a comprehensive effort is urgently needed to stop and reverse the widespread deterioration in Western sovereign risk.

4| Outlook

Where we go from here depend critically on six inter-related questions:

First, can policymakers succeed in immediate stabilisation, including countering a disorderly bank and private sector de-leveraging?

Second, can the provision of official assistance serve as a means of crowding in new private capital as opposed to funding more exiting and disengagement of such capital?

Third, is there a policy mix that can adequately combine debt containment with reinvigorated economic growth, thereby striking a better balance surplus and deficit economies, between rich and poor, and between current and future generations?

Fourth, can banking system fragility be countered decisively through simultaneous and sustained progress on liquidity, asset quality and capital adequacy?

Fifth, can the institutional underpinnings – at the national, regional and multilateral levels – be credibly strengthened?

Finally, can all this be combined with more enabling political, social conditions and environmental conditions?

Providing appropriately documented answers to each of these questions is a task that lies outside the current paper. Yet it is one that we have spent an enormous amount of time analysing and discussing at PIMCO. Our sense is that it is possible to answer affirmatively to each of these, but this should be done with appropriate humbleness.

This is not just a question of design, as challenging as this may be. It is also a question of implementation. And without much better coordination and communication, including greater buy in from the citizens of Western economies, what is operationally desirable could well face enormous socio-political feasibility challenges.

5| Concluding remarks

The serial contamination of Western government balance sheets is fueling significant changes and challenges for the global economy, policymaking and markets. The greater the extent to which Western sovereign risk is in play, the weaker the traditional anchors for global and regional economic and financial interactions.

Wherever you look these days, the international monetary system is trying to tell us something. The world is going through major transformations and re-alignments.

The signals are persistent but they are yet to be sufficiently internalised by those that could – and should – materially improve the outlook for the world economy. Indeed, both the public and private sectors have lagged in both recognition and action. The longer this persists, the higher the risk of a sharp global slowdown, the greater the financial fragilities, and the more worrisome the social costs.

The return of financial repression

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Periods of high indebtedness have historically been associated with a rising incidence of default or restructuring of public and private debts. Sometimes the debt restructuring is more subtle and takes the form of "financial repression"*. Consistent negative real interest rates are equivalent to a tax on bond holders and, more generally, savers. In the heavily regulated financial markets of the Bretton Woods system, a variety of financial domestic and international restrictions facilitated a sharp and rapid reduction or* "liquidation" *of public debt from the late 1940s to the 1970s. The restrictions or regulatory measures of that era had their origins in what would now come under the heading of "macroprudential" concerns in the wake of the severe banking crises that swept many countries in the early 1930s. The surge in public debts that followed during the Great Depression and through World War II only made the case for stable and low interest rates and directed credit more compelling to policymakers. The resurgence of financial repression in the wake of the 2007-2009 financial crises alongside the surge in public debts in advanced economies is documented here. This process of financial "de-globalisation" may have only just begun.*

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NB: *This paper draws on Reinhart and Sbrancia (2011), Reinhart, Kirkegaard, and Sbrancia (2011) and the chapter by Carmen M. Reinhart and Dani Rodrik from "Rethinking central banking", published by the Brookings Institution, in the first annual report of the Committee for International Economic Policy and Reform (CIEPR). The author would like to thank Vincent Reinhart for helpful comments and suggestions.*

This paper raises the issue of how central banks are being pulled into "new" roles by the post-crisis environment and by virtue of the unavailability (or political viability) of alternative, potentially more suitable instruments or policies. The emphasis here is on two sets of issues: the consequences of high public and private debts in the advanced economies and the attendant pressures towards financial repression to ease the burden of debt servicing;[1] and the perceived dangers of currency misalignments and overvaluation in emerging markets, and the attendant pressures towards currency intervention and capital controls – connected to the broader issue of "macroprudential regulation" a part of the evolving trend toward greater financial repression.

The two sets of pressures on central banks, in the North and South, are complementary. While emerging markets may increasingly look to financial regulatory measures to keep international capital "out" (especially as the expansive monetary policy stance of the United States and Europe persists well into the horizons), advanced economies have incentives to keep capital "in" and create a domestic captive audience to facilitate the financing for the high existing levels of public debt. Concerned about potential overheating, rising inflationary pressures and the related competitiveness issues, emerging market economies may welcome changes in the regulatory landscape that keep financial flows at home rather than let them spill across borders. This offers advanced and emerging market economies the common ground of agreeing to increased regulation and/or restrictions on international financial flows and, more broadly, the return to more tightly regulated domestic financial environment – often referred to as "financial repression".

The scenario sketched here entails both financial de-globalisation (the re-appearance of home bias in finance) and the re-emergence of more heavily regulated domestic financial markets. As some of these trends are already unfolding in individual countries, it is a useful exercise to examine these developments as part of a broader global picture.

Box 1

Financial repression defined

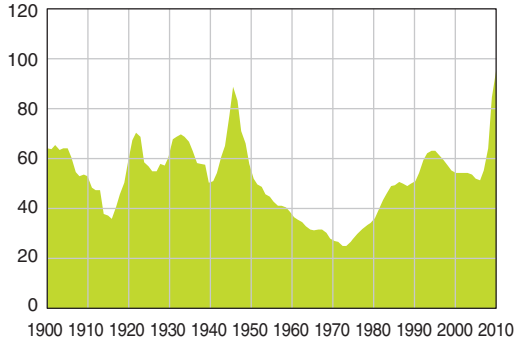
Financial repression includes directed lending to the government by captive domestic audiences (such as pension funds or domestic banks), explicit or implicit caps on interest rates, regulation of cross-border capital movements, and (generally) a tighter connection between government and banks, either explicitly through public ownership of some of the banks or through heavy "moral suasion". Financial repression is also sometimes associated with relatively high reserve requirements (or liquidity requirements), securities transaction taxes, prohibition of gold purchases (as in the United States from 1933 to 1974), or the placement of significant amounts of government debt that is nonmarketable. A large presence of state-owned or state intervened banks is also common in financially "repressed" economies.

In the current policy discussion, financial repression issues come under the broad umbrella of "macroprudential regulation".

I ADVANCED ECONOMIES: THE PUBLIC AND PRIVATE DEBT OVERHANG

Elevated levels of public debt in the United States and elsewhere are likely to prove the most enduring legacy of the post-2007 financial crises. For the advanced economies, public debts had not approached these heights since the end of World War II.

Chart 1
Gross central government debt as a percent of GDP
22 advanced economies, 1900-2011
(unweighted averages)



Sources: Reinhart and Rogoff (2010) and sources cited therein.

1 *Financial repression is defined in Box 1; in essence it involves a tighter connection between government, banks and the central bank. In the current policy discussion, financial repression issues come under the broad umbrella of "macroprudential regulation".*

Table 1
Housing prices, credit, external debt and growth – Selected advanced economies
1997-2010

Country	Banking crisis		Change in real house prices [a]		Change in domestic credit/ GDP		Change in gross external debt/GDP		Average of columns	Median per capita GDP growth		
	Date	Magnitude										
			1997-2007	2007-2010	1997-2007	2007-2010	2003-2007	2007-2010	6 & 8	1950-1996	1997-2010	Difference
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Japan			-30.1	-2.4	-8.9	17.5	8.4	-1.7	-0.3	4.7	1.6	-3.1
Germany	2008	systemic	-11.1	-0.1	-12.4	6.0	17.8	-4.6	2.7	3.2	1.7	-1.5
Austria	2008	borderline	5.6	13.4	-4.9	11.1	54.0	-9.3	24.6	3.3	2.4	-1.0
Finland			51.1	2.3	30.3	13.2	17.8	31.3	24.1	2.7	3.6	1.0
Italy			35.3	0.6	39.6	12.3	24.1	-4.5	31.9	3.4	1.6	-1.8
Greece	2008	borderline	88.6	-9.3	31.5	4.4	41.4	25.1	36.5	3.3	4.0	0.6
Belgium	2008	systemic	101.2	2.3	-7.0	4.5	85.7	68.9	39.3	2.7	2.5	-0.2
France	2008	borderline	111.6	-11.6	21.0	6.1	58.9	5.6	40.0	3.0	1.8	-1.3
Switzerland	2008	borderline	9.9	1.4	7.8	5.9	86.1	-102	47.0	2.3	2.0	-0.3
Denmark	2008	systemic	79.7	-19.8	60.9	18.5	43.3	14.3	52.1	2.0	1.8	-0.2
Sweden	2008	borderline	114.9	2.8	84.8	9.1	39.4	43.7	62.1	2.4	3.0	0.6
Portugal	2008	borderline	n.a.	-5.5	81.4	33.5	44.0	-21.5	62.7	4.2	1.5	-2.6
Netherlands	2008	systemic	74.1	-6.6	54.1	46.4	74.8	29.5	64.4	2.3	2.9	0.6
United States [b]	2007	systemic	86.5	-23.4	21.7	8.5	33.0	-1.3	27.4	2.5	2.1	-0.4
Spain	2008	systemic	118.5	-16.6	95.4	31.3	48.9	14.4	72.2	3.1	3.5	0.4
United kingdom	2007	systemic	150.1	-16.0	66.1	48.0	111.9	8.3	89.0	2.3	2.6	0.3
Ireland	2007	systemic	114.8	-23.1	107.5	31.1	407.2	169.8	257.3	2.8	5.0	2.1
Iceland [c]	2007	systemic	66.9	-32.1	234.2	-66.9	511.0	428.0	372.6	3.1	3.4	0.4
Memorandum items:												
Median			79.7	-6.0	46.9	11.7	46.4	6.9	49.5	2.9	2.4	-0.5
Average			68.0	-8.0	54.4	10.2	94.9	30.0	74.7	3.0	2.6	-0.4

Notes: The data appendix provides a listing of the coverage of real estate prices and domestic credit. The external debt data is through 2010: Q1.
a) For most countries, real housing prices peak in 2007. For the United States the peak is 2006, so the 1997-2006 change is 115.3 percent and the 2007-2010 decline is -33.3 percent.
b) For the United States, we report bank credit but the more relevant concept (as banks do not play nearly as big a role as in other advanced economies) is private debt from the flow of funds. Beginning in 2010: Q1, almost all Fannie Mae and Freddie Mac mortgage pools are consolidated in Fannie Mae's and Freddie Mac's balance sheets and, thus, are included in the debt of government enterprises; this shows up a massive private deleveraging (about 27 percent of GDP) in Q1. Absent this shift inliabilities, the deleveraging since 2007 is closer to 20 percent of GDP.
c) The credit boom ends in 2006, so the changes reported is 1997-2006 and 2006-2009, as no bank credit data for 2010 is available.
Sources: Reinhart and Reinhart (2010) based on Flow of Funds, *Board of Governors of the Federal Reserve,* International Financial Statistics *and* World Economic Outlook, *International Monetary Fund, Laeven and Valencia (2010), Maddison (2004 and website), Reinhart and Rogoff (2009),* Quarterly External Debt Statistics, *World Bank and data appendix for the multiple listings for real estate prices and authors' calculations.*

Chart 1, which traces out the evolution of average gross public debt for the twenty-two advanced economies over 1900-2011 makes plain the magnitude of the policy challenge now facing many (if not most) of the advanced economies.[2] In effect, by limiting the chart to recorded public debt, Chart 1 significantly understates the magnitude of the debt surge in recent years. Record private debts, particularly those of banks remain a major possible contingent liability of governments.

Throughout history, debt/gross domestic product ratios have been reduced by (i) economic growth; (ii) a substantive fiscal adjustment/austerity plans; (iii) explicit default or restructuring of private and/or public debt; (iv) a sudden surprise burst in inflation; and (v) a steady dosage of financial repression that is accompanied by an equally steady dosage of inflation.[3] It is critical to clarify that options (iv) and (v) are only viable for domestic-currency debts (the euro area is a special hybrid case).

2 *The simple arithmetic average shown here does not weigh the public debt ratios by the size of the economy (or its share in the world aggregates).*
3 *The term was coined by McKinnon (1973). Interestingly, he and others subsequently largely applied the term to characterise the financial markets if emerging markets, failing to observe that the advanced economies in the Bretton Woods system and even after the breakdown of fixed exchange rates had: (1) nominal interest rates that were controlled (usually through explicit ceilings); (2) directed credit; (3) pervasive capital controls; and (4) considerable restrictions on the activity of banks. For a discussion of the UK case, see Goodhart (2012, this issue).*

Since these debt-reduction channels are not necessarily mutually exclusive, historical episodes of debt reduction have owed to a combination of more than one of these channels. However, fiscal adjustment is usually painful in the short run and politically difficult to deliver. Debt restructuring leaves a troublesome stigma and is also often associated with deep recessions. Pretending that no restructuring will be necessary will not make the debt overhang disappear. For many, if not most, advanced countries, concerns about those debt burdens will shape policy choice for many years to come.

In this setting, monetary policy in the advanced economies is likely to remain "overburdened" for some time.

Complicating the situation is the fact that the debt overhang is not limited to the public sector, as it was immediately following World War II. There is at present a high degree of leverage in the private sector, especially in the financial industry and households. Table 1 (see above) documents that the surge in domestic bank credit that unfolded in most advanced economies during 1997-2007 has barely begun to unwind. Perhaps of greater note (columns 8 and 9) is that the build-up in external leverage was even greater, with Iceland and Ireland recording gross external debt positions in excess of ten times gross domestic product (GDP). Importantly, the table documents that the debt overhang and its associated financial fragility is a common thread across most advanced economies. Another common thread is stubbornly high unemployment. Concerns that higher real interest rates and deflation will worsen an already precarious situation are likely to impose added constraints on monetary policy.

2| Negative real interest rates during 1945-1980 and again post-2008

One of the main goals of financial repression is to keep nominal interest rates lower than would otherwise prevail. This effect, other things equal, reduces the governments' interest expenses for a given stock of debt and contributes to deficit reduction. However, when financial repression produces negative real interest rates and reduces or liquidates existing debts, it is a transfer from creditors (savers) to borrowers (in the historical episode documented in Reinhart and Sbrancia, 2011, and summarised here – the government).

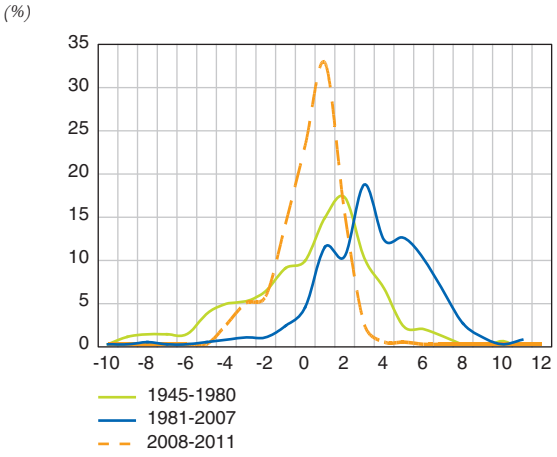
The financial repression tax has some interesting political-economy properties. Unlike income, consumption, or sales taxes, the "repression" tax rate (or rates) are determined by financial regulations and inflation performance that are opaque to the highly politicised realm of fiscal measures. Given that deficit reduction usually involves highly unpopular expenditure reductions and (or) tax increases of one form or another, the relatively "stealthier" financial repression tax may be a more politically palatable alternative to authorities faced with the need to reduce outstanding debts.

Liberal capital-market regulations and international capital mobility reached their heyday prior to World War I under the gold standard. However, the Great Depression, followed by World War II, put the final nails in the coffin of *laissez-faire* banking. It was in this environment that the Bretton Woods arrangement of fixed exchange rates and tightly controlled domestic and international capital markets was conceived. The result was a combination of very low nominal interest rates and inflationary spurts of varying degrees across the advanced economies.[4] The obvious results were real interest rates – whether on Treasury bills (Chart 2), central bank discount rates, deposits or loans – that were markedly negative during 1945-1946.

For the next thirty-five years or so, real interest rates in both advanced and emerging economies would remain consistently lower than the eras of freer capital mobility before and after the financial repression era. In effect, real interest rates were, on average negative. Binding interest rate ceilings on deposits (which kept real ex post deposit *rates even more negative* than real ex post rates on Treasury bills) "induced" domestic savers to hold government bonds. What delayed the emergence of leakages in the search for higher yields (apart from prevailing capital controls) was that the incidence of negative returns

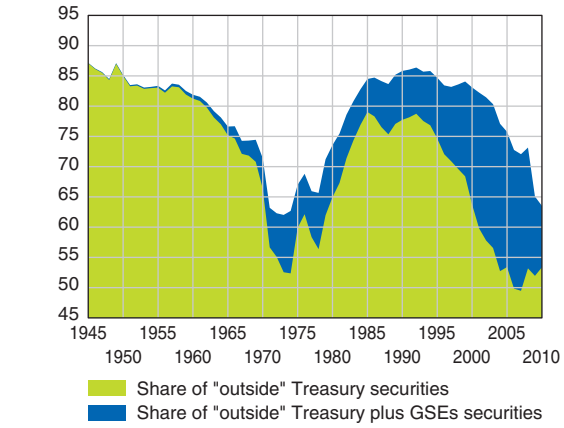
4 *The advanced economy aggregate is comprised of: Australia, Belgium, Canada, Finland, France, Germany, Greece, Ireland, Italy, Japan, New Zealand, Sweden, the United States, and the United Kingdom. Interest rates for 2011 only reflect monthly observations through February.*

Chart 2
Real interest rates frequency distributions: advanced economies
Treasury bill rates, 1945-2011



Notes: The advanced economy aggregate is comprised of: Australia, Belgium, Canada, Finland, France, Germany, Greece, Ireland, Italy, Japan, New Zealand, Sweden, the United States, and the United Kingdom. Interest rates for 2011 only reflect monthly observations through February.
Sources: Reinhart and Sbrancia (2011), IMF, International Financial Statistics, *various sources listed in the data appendix, and authors' calculations.*

Chart 3
Share of "outside" marketable US Treasury securities plus government sponsored enterprises (GSEs) securities
End-of-period, 1945-2010



Notes: The outstanding stock of marketable *US Treasury securities plus GSEs is calculated as Treasury credit market instruments plus GSE issues plus GSE-backed mortgage pools less savings bonds, less budget agency securities. "Outside" marketable securities is defined as marketable securities (as defined above) less official holdings by the rest of the world of US Treasuries and GSEs, less holdings by the Federal Reserve (monetary authority) of US Treasuries and GSEs.*
Sources: Flow of Funds, *Board of Governors of the Federal Reserve and authors' calculations.*

on government bonds and on deposits was (more or less) a universal phenomenon at this time. The frequency distributions of real rates for the period of financial repression (1945-1980) and the years following financial liberalisation shown in Chart 2, highlights the universality of lower real interest rates prior to the 1980s and the high incidence of negative real interest rates.

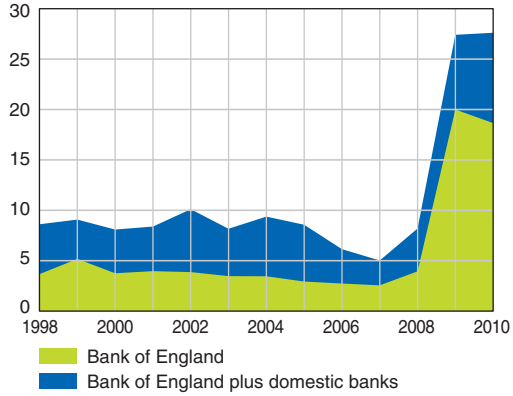
A striking feature of Chart 2, however, is that real ex post interest rates (shown for Treasury bills) for the advanced economies have, once again, turned increasingly negative since the outbreak of the crisis and this trend has been intensifying over time. Real rates have been negative for about one half of the observations and below one percent for about 82 percent of the observations. This turn to lower real interest rates has materialised despite the fact that several sovereigns have been teetering on the verge of default or restructuring (with the attendant higher risk premia). Real ex post central bank discount rates and bank deposit rates (not shown here) have also become markedly lower since 2007.

No doubt, a critical factor explaining the high incidence of negative real interest rates in the wake of the crisis in the aggressively expansive stance of monetary policy (and more broadly, official central bank intervention) in many advanced and emerging economies during this period. This raises the broad question of to what extent current interest rates reflect market conditions versus the stance of official large players in financial markets. A large role for non-market forces in interest rate determination is a key feature of financial repression.

In the US Treasury market, the rising role of official players (or conversely the shrinking role of "outside market players") is made plain in Chart 3, which shows the evolution of the share of "outside" marketable US Treasury securities plus government sponsored enterprises (GSEs) securities from 1945 through 2010.[5] The combination of QE (quantitative easing), QE2 and, more importantly, record purchases of US Treasuries (and near Treasuries-the GSEs) by foreign central banks (notably China, but also emerging Asia and other BRICs) has left the

5 *The outstanding stock of marketable US Treasury securities plus GSEs is calculated as Treasury credit market instruments plus GSE issues plus GSE-backed mortgage pools less savings bonds, less budget agency securities. "Outside" marketable securities is defined as marketable securities (as defined above) less official holdings by the rest of the world of US Treasuries and GSEs, less holdings by the Federal Reserve (monetary authority) of US Treasuries and GSEs.*

Chart 4
Share of UK general government gross debt held by the Bank of England and domestic banks
End-of-period, 1998-2010
(%)



Holdings of both general government loans and securities. Totals do not include government debt holdings by pension funds.
Sources: Bank of England, Kirkegaard and Reinhart (2012) for individual country sources, IMF, World Economic Outlook.

share of outside marketable Treasury securities at nearly 50 percent and when GSE are included below 65 percent. There are the lowest shares since the expansive monetary policy stance of the United States regularly associated with break down of the Bretton Woods in the early 1970s. This was also a period (like the present) of rising oil, gold, and commodity prices, negative real interest rates, currency turmoil, and eventually higher inflation.

Chart 4, which shows the share of UK General Government gross debt held by the Bank of England (and domestic banks) from 1998 until end-2010, presents the complementary image to Chart 3 for the US market. The Bank of England's quantitative easing policies since the crisis, coupled the requirement (since October 2009) that bank hold a higher share of gilts in their portfolios to satisfy tougher liquidity standards have reduced the share of "outside" gilts to about 70 percent. If foreign official holdings (by central banks) were included in this calculus the share of outside gilts would be considerably lower and closer to that of the US Treasury market.

The European Central Bank (ECB) bond purchases of the three troubled sovereigns totaled about EUR 76 billion over May 2010-March 2011 and account for about 12 percent of the combined general government debts of Greece, Ireland, and Portugal.

To summarise, central banks on both sides of the Atlantic (and the Pacific, for that matter) have become even bigger players in purchases of government debt, possibly for the indefinite future. For the United States, fear of currency appreciation continues to drive central banks in many emerging markets to purchase US government bonds on a large scale. In other words, markets for government bonds are increasingly populated by nonmarket players, calling into question what the information content of bond prices are relatively to their underlying risk profile – a common feature of financially repressed systems.

3| The liquidation of government debt: the historical precedent, 1945-1980

In this section, I summarise Reinhart and Sbrancia, 2011 (RS, henceforth), who document how financial repression liquidated mountains of public debts in the advanced economies following World War II by quantifying the "liquidation effect" a key component of the broader financial repression tax on savings. We then move on to document the forms financial repression is taking on in the modern context and speculate about future developments.

Calculating the financial repression tax: concepts and results

A summary measure of the reduction in government debt (relative to income) wrought by financial repression dubbed the liquidation effect is developed. No doubt, the devil lies in the details, as the structure of government debt varies enormously across countries and within countries over time. Differences in coupon rates, maturity and the distribution of marketable and nonmarketable debt, securitised debt versus loans from financial institutions, importantly shape the overall cost of debt financing for the government. The starting point to come up with a measure that reflects the true cost of debt financing is a reconstruction of the government's debt profile over time.

The debt portfolio. The first step is to construct a "synthetic portfolio" for the government's total debt stock at the beginning of the year. This portfolio reflects the actual shares of debts across the different spectrum of maturities as well as the shares of marketable versus nonmarketable debt.

Interest rate on the portfolio. The "aggregate" nominal interest rate for a particular year is the coupon rate on a particular type of debt instrument weighted by that instrument's share in the total stock of debt. RS then aggregate across all debt instruments. The real rate of interest,

$$r_t = \frac{i_{t-1} - \pi_t}{1 + \pi_t}$$

(where i and π are the nominal interest and inflation rates, respectively) is calculated on an ex post basis using Consumer Price Index inflation for the corresponding one-year period. It is a before-tax real rate of return (excluding capital gains or losses).

A definition of debt "liquidation years". Benchmark calculations define a liquidation year, as one in which the real rate of interest (as defined above) is negative (below zero). This is a conservative definition of liquidation year; a more comprehensive definition would include periods where the real interest rate on government debt was below a "market" real rate.

Savings to the government during liquidation years. This concept captures the savings to the government from having a negative real interest rate on government debt. (As noted it is a lower bound on saving of interest costs, if the benchmark used assumed, for example a positive real rate of, say, two or three percent.) These savings can be thought of as having "a revenue-equivalent" for the government, which like regular budgetary revenues can be expressed as a share of GDP or as a share of recorded tax revenues to provide standard measures of the liquidation effect across countries and over time. The saving (or "revenue") to the government or the liquidation effect is the real (negative) interest rate times the "tax base", which is the stock of domestic government debt outstanding.

Results. RS document the high incidence of "liquidation years" (which even by conservative estimates amount to at least one quarter of the years for the United States and considerably more for other countries). The authors now present estimates of the magnitude of the savings to the government (financial repression tax or liquidation effect). These estimates take "the tax rate" (the negative real interest rate) and multiplies it by the "tax base" or the stock of debt. Table 2 reports these estimates for each country. The magnitudes are in all cases non-trivial.

Table 2
Government revenues from the "liquidation effect" per year

Country	Period	Benchmark measure "Liquidation effect revenues"	
		% GDP	% tax revenues
Argentina	1944-1974	3.2	19.5
Australia	1945-1968, 1971, 1978	5.1	20.3
Belgium	1945-1974	2.5	18.6
India	1949-1980	1.5	27.2
Ireland	1965-1990	2.0	10.3
Italy	1945-1970	5.3	127.5
South Africa	1945-1974	1.2	8.9
Sweden	1945-1965, 1984-1990	0.9	6.5
United Kingdom	1945-1980	3.6	26.0
United States	1945-1980	3.2	18.9

Source: Reinhart and Sbrancia (2011).

For the United States and the United Kingdom, the annual liquidation of debt via negative real interest rates amounted on average from 3 to 4 percent of GDP a year. Annual deficit reduction of 3 to 4 percent of GDP quickly accumulates (even without any compounding) in the course of a decade. For Australia and Italy, which recorded higher inflation rates, the liquidation effect was larger (around 5 percent per annum). These estimates (which are arrived at under a conservative algorithm) highlight the significant role played by financial repression on debt reduction in an earlier episode.

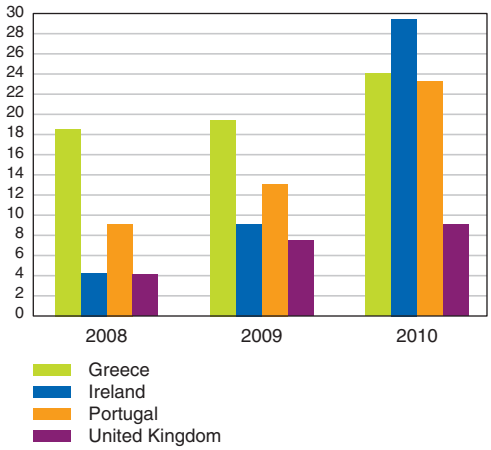
4| "Modern" financial repression 2008-2012

One thing advanced economies do not lack at present is an abundance of government debt, which is accompanied with the attendant common policy challenge of finding prospective buyers for such debt. The role of massive purchases of government debt by central banks around the world in keeping nominal and real interest rates low was already noted in Section II. In addition, Basle III provides for the preferential treatment of government debt in bank balance sheets via substantial differentiation (in favour of government debt) in capital requirements.

Other approaches to creating or expanding demand for government debt may be more direct. For example, at the height of the financial crisis UK banks were required to hold a larger share of gilts in their

Chart 5
Domestic bank holdings of general government debt: Greece, Ireland, Portugal, and United Kingdom
End-of-period, 2008-2010

(as a percent of gross general government debt)



Notes: Holdings of both general government loans and securities. Totals do not include European Central Bank (ECB) bond purchases of the three troubled sovereigns. These purchases totaling about EUR 76 billion over May 2010-March 2011, account for about 12 percent of the combined general government debts of Greece, Ireland, and Portugal. Does not include government debt holdings by pension funds.
Sources: See Kirkegaard and Reinhart (2012) for individual country sources, IMF, World Economic Outlook.

portfolio (see Table 3). Chart 5 documents how Greek, Irish, and Portuguese banks have already liquidated a substantial fraction of their foreign assets and swapped into domestic public debt.[6] Thus, the process where debts are being "placed" at below market interest rates in pension funds and other more captive domestic financial institutions is already under way in several countries in Europe. Spain has recently reintroduced a *de facto* form of interest rate ceilings on bank deposits.[7]

It is difficult to sort out the "true" exact motivation, but as bank deposits have migrated from the periphery countries in Europe to Germany and Scandinavia, among others, the amount of disclosure, red tape and other requirements necessary to effect such a transfer have increased markedly. Even if some of these requirements may be motivated by the government's desire to curb money laundering and tax evasion the measures are beginning to encroach on the well-trodden path of capital controls.

Our discussion has focused primarily on Western Europe but similar trends are emerging in Eastern Europe. Pension reform adopted by the Polish parliament in March of this year has met with criticism from employers' federations and business circles. Polish Confederation of Private Employers Lewiatan say the proposal seeks to hide part of the state's debt by grabbing the money of the insured and passing the buck to future governments. The confederation also points out that moving money from pension funds to ZUS (Social Insurance Institution) will protect the government from having to change the definition of public debt and exceed financial safety thresholds, but will expose future retirees to losses. Struggling with budgetary pressure at home, Hungary has nationalised its pre-funded pension schemes and excluded the cost of the reforms from their public debt figures. Bulgaria has taken measures in the same direction (see also Table 3).

The re-emergence of capital controls in emerging markets

Central banks frequently come under pressure from exporters who complain that their focus on domestic price stability and neglect of the exchange rate comes at the expense of the profitability of these key sectors. A typical pattern in emerging markets is that an upswing in expectations causes a capital inflow and appreciates the exchange rate, which in turn squeezes tradable economic activities.

Traditionally, central banks have responded to capital inflows by a combination of (sterilised) intervention and capital-account management policies. Sterilised intervention which results in a build-up of reserves is costly and ultimately self-defeating when financial markets are open. There has been an increased tendency, therefore, to resort to policies of the second type. As the legitimacy of capital controls has been restored by the IMF, more countries are willing to openly discuss and institute them (e.g., Brazil, Thailand, and Korea). But even when central banks choose to

6 *The role of the ECB's collateral policy in open market operations has been crucial, as it provided peripheral banks with an opportunity to pass on large amounts of domestic government debt. Supra-national pressure from the ECB on peripheral banks to scale back this practice (and thus limit domestic financial repression) was instrumental in pushing the governments of both Ireland and Portugal to request international bail-outs. See also the discussion in the IMF's April 2011 Global Financial Stability Report.*
7 *See Table 3.*

respond through some of these mechanisms, they are reluctant to signal that they are targeting the exchange rate, lest their attachment to conventional inflation targeting come under question.

The use of capital controls for emerging markets concerned about destabilising "hot money" inflows, potential overheating, rising inflationary pressures, and the related competitiveness issues have found far greater acceptance in the international community than at any time since the breakdown of the Bretton Woods system of fixed exchange rates. Many emerging markets have already embarked on various policies with that aim (Table 3).

Table 3
The re-emergence of financial repression
2008-2011

THE ADVANCED ECONOMIES (mostly directing domestic credit to the government)	
FRANCE	
December 2010	**Liquidation of the Fonds de réserve pour les retraites (FRR)** The French government changed the law to shift the EUR 37 billion FFR from providing long-term financial support to the French pension system after 2020 to instead pay an annual EUR 2.1 billion to the Caisse d'amortissement de la dette sociale (CADES) from 2011 to 2024 and at that point transfer all remaining assets to the CADES in one lump-sum payment. This shift in FFR's investment horizon has meant a radical shift in asset allocation from longer-term diversified riskier assets to a short-term liability driven investing strategy dominated by liability matching short-term French government bonds. For the duration of its lifespan the FRR has consequently been transformed into a large captive buyer of French government bonds.
IRELAND	
2010	**Use of the National Pension Reserve Fund to Recapitalise Banks** As a result of the banking crisis, Ireland National Pension Reserve Fund (NPRF) may have to contribute up to EUR 17.5 billion to recapitalise Ireland's banks. The NPRF was originally set up in 2001 to help finance the long-term costs of Ireland's social welfare and public service pensions from 2025 onwards. However, a 2010 law directed the NPRF to invest in Irish government securities and provides the legal authority for the Irish government to fund capital expenditure from the NPRF from 2011-2013.
April 2011	**Levy on pension funds** The Irish government has further recently suggested to fund job creation schemes through a special 0.5% levy on private pension funds.
JAPAN	
March 2010	**Reversal of Post Privatisation and Raising of Deposit Ceiling** The new Democratic Party of Japan (DPJ) government reversed the 2007 plan to privatise Japan Post, the world's largest financial conglomerate with more than JPY 300 trillion in assets. Crucially, the DPJ government with the new law also doubled the deposit cap at Japan Post Bank to JPY 20 million and raised the life insurance coverage limit at Japan Post Insurance Co. from JPY 13 million to JPY 25 million. Given Japan Post's traditional roughly 75 percent asset allocation to Japanese government bonds, and under the assumption that consumers will transfer deposits to a company certain to enjoy a government guarantee, the reversal of the Japan Post privatisation provides additional incentives to a captive customer of Japanese government debt.
PORTUGAL	
2010	**The transfer of the previously privatised Portugal Telecom pension scheme back to the Portuguese government**, which in the process immediately booked EUR 2.8 billion (1.6% of GDP) in extra revenues. This enabled the Portuguese government to improve its budget deficit in 2010 sufficiently to cosmetically appear to be in line with annual EU deficit reduction targets.
SPAIN	
April 2010	**Interest rate ceilings on deposits** The Ministry of Finance (MoF) requires that institutions offering deposit interest rates that are considered to be above market rates (determined by MoF) double their contributions to the Fondo de Garantía de Depósitos.
UNITED KINGDOM	
October 2009	**UK Financial Services Authority (FSA) puts a global regulatory liquidity marker** The proposal by the FSA requires UK banks, investment banks, and subsidiaries or branches of foreign banks operating in the London market to hold more high quality government securities – at least around EUR 110 billion more (at that time), and cut their reliance on short-term funding by 20 percent in the first year alone.
2011	**Announcement ot the privatisation of Royal Mail,** which will see an expected GBP 23.5 billion in assets transferred to the UK Treasury ahead of privatisation (as well as an expected GBP 29.5 billion in liabilities).

…/…

Table 3
The re-emergence of financial repression (continued)
2008-2011

THE EMERGING MARKETS (mostly controls on capital inflows)	
BRAZIL	
March 2008	*Imposto sobre operacões financieras* (IOF) tax (Tobin-type tax on entry) of 1.5% on fixed income investments by foreigners.
October 2008	IOF tax on fixed income investments by foreigners reduced from 1.5% back to zero.
October 2009	2% IOF on stock and bond market purchases.
November, 2009	Tax on the issuance of depositary receipts in international markets.
October 2010	IOF increased to 4% for fixed income investments and equity funds (IOF on individual equities left at 2%). IOF increased to 6% for fixed income investments, and from 0.38% to 6% on margin deposits for derivative transactions. Loopholes for IOF on margin requirements closed.
CZECH REPUBLIC	
2008	40% non-interest reserve requirement for portfolio flows (initial public offerings excluded).
HUNGARY	
2011	The government gave the population "an offer few could refuse" by demanding that pensioners in order to receive any state pension had to return fully to the state pension system, taking their existing private second pillar assets with them. Forcefully coerced the vast majority of Hungarians obliged, providing the Hungarian government with a likely EUR 10 billion (about 9.5% of GDP) in extra revenues in 2011.
INDONESIA	
June 2010	Required holding period on foreign capital inflows and central bank notes were increased to 1 month, and central bank's instruments with longer maturity (6 months and 9 months) were introduced.
PERU	
2009	Foreign purchases of central bank bills were banned, reserve requirements all deposits were increased (local currency deposits held by foreigners raised to 120%), and reserve requirement on other foreign liabilities with maturity less than 2 years were increased to 75%.
2010	Fee on foreign purchases of central bank liquidity draining instruments was increased to 400 basis points. 30% for transactions through a Peruvian broker and 5% for transactions through a foreign broker. Capital gains tax for non-residents' investments in the domestic stock market were imposed. Imposed a 30% tax on foreign investor gains from PEN-denominated futures maturing within 60 days.
January 2010	30% income tax introduced for settlement of derivative contract with offshore banks (imposed on local financial institutions).
February 2010	Banking regulator changed limits on net FX positions: a) Long net FX positions reduced to 75% of net equity from 100%; b) short net FX positions raised to 15% of net equity from 10%.
June 2010	Private pension funds' limit on trading FX imposed at 0.85% of assets under management (for daily transactions) and 1.95% (over 5-day period).
PHILIPPINES	
October 2010	Caps on over-the-counter FX purchases for non-trade purposes by residents without documentation were raised from USD 30,000 to USD 60,000. Cap tourists' purchases upon departure without documentation was increased from USD 200 to USD 5,000. Caps on residents' FX purchases for advance payments of import transactions without documentation increased from USD 100,000 to USD 1 million. No approval required to prepay central bank-registered foreign currency debt of the private sector. For foreign investors' outward remittances, banks are now allowed to convert peso funds. The annual limit on the amount each resident may buy from banks for outward investments and purchases of Philippine offshore debt has been raised from USD 30 million to USD 60 million
POLAND	
2011	Has legislated a more drastic contributions' divergence of five percent of gross wages from private second pillar pension funds and into the public Social Insurance Institution (ZUS).
RUSSIA	
September 2010	In 2011, interest payments on FX borrowing exceeding 0.8 time the refinance rate of the central bank will be subject to corporate profit tax.
SOUTH AFRICA	
February 2010	To encourage outflows, banks were allowed to invest up to 25% of non-equity liabilities in external portfolios.
SOUTH KOREA	
2009	To dampen real estate prices, ceilings on loan-to-value ratios lowered in Seoul.
November 2009	Required domestic banks to fully match mid-to-long-term asset holdings with mid-to-long term funding. Limits on currency forward transactions were lowered from 125% to 100% of real transactions being hedged. Domestic banks are required to manage FX liquidity ratio on a daily basis.
February 2010	Withholding tax of 0-15% on interest, capital gains tax (10% of total selling amount or 20% of net margin), and transaction tax (0.3% of selling price) were removed.
June 2010	Local banks' FX forward positions were limited to 50% of their equity capital. Forward positions for local branches of foreign banks were limited to 250% of capital (with 3 months to meet new ceiling and 2 years to cover existing positions).
November 2010	Tax on profit on government bonds for foreigners: 14%.
THAILAND	
June 2010	Limits on foreign asset accumulation by Thai residents (including outward FDI) were raised.
September 2010	Limits on direct overseas investment were removed, restrictions on lending by Thai firms to foreign borrowers were relaxed, and the cap on offshore property purchase was increased.
October 2010	For new Thai bonds issued by government and government sponsored entities, a 15% withholding tax on foreigners' interest and capital gains was reinstated. Central bank asked brokerages to start submitting daily reports of non-resident clients' outstanding cash assets.
TURKEY	
2010	Withholding tax was cut to 0% for institutional investors and to 10% for retail investors irrespective of residency.

Sources: Kirkegaard and Reinhart (2012) and Magud, Reinhart, Rogoff (2011).

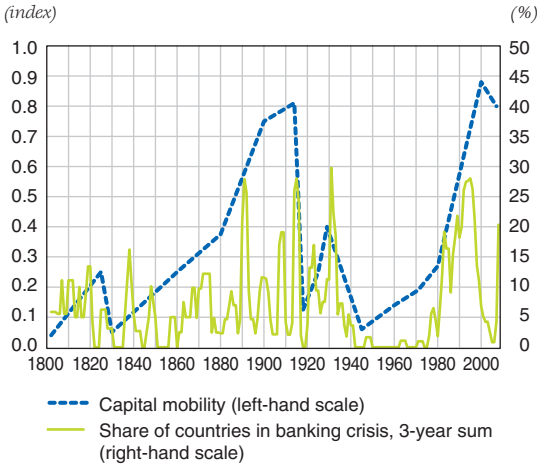
5| Implications and conjecture

As described in Section 3, financial repression via negative real interest rates contributed to the relatively rapid debt reduction following World War II. Reinhart and Sbrancia (2011) quantify the fiscal dimension of the "financial repression tax" and conclude it was quantitatively significant. Their analysis, however, is silent on the welfare, redistributive, or growth consequences of financial repression. The existing empirical literature on financial repression is not likely to be well equipped to answer those queries, as it is skewed to the analysis of emerging economies, usually post-1980. The relative longevity of the financial repression era (1945-1980) importantly owed to the fact that it was pervasive-simultaneously encompassing advanced and emerging markets.

Beyond facilitating debt reduction, however, a salient "macroprudential" feature of the financial repression era is particularly compelling. Systemic financial crises during 1945-1980, when capital mobility was limited, were virtually nonexistent worldwide. Chart 6, reproduced and updated from Reinhart and Rogoff (2009), illustrates this point. To the extent that severe financial crises (as opposed to shorter-lived banking "panics") are associated with deep and prolonged recessions and markedly deteriorating government finances, this cannot be a trivial factor when weighing the relative merits of a less *laissez-faire* global financial system.

At present, the levels of public debt in many advanced economies are at or near uncharted territory; some of these governments face the prospect of debt restructuring. Furthermore, public and private external debts (which are a relatively volatile source of funding) are at historic highs. It seems probable that policymakers for some time to come will be preoccupied with debt reduction, debt management, and, in general, efforts to keep debt servicing costs manageable. In this setting, financial repression (with its dual aims of keeping interest rates low and creating or maintaining captive domestic audiences) will probably find renewed favor and the measures and developments we have described and discussed in this note are likely to be only the tip of a very large iceberg.

Chart 6
Capital mobility and the incidence of banking crises: all countries
1800-2010



*Notes: This sample includes **all** countries (even those not in our core sample of 66). The full listing of banking crises dates are shown in Appendix II. On the left scale, we updated our favorite index of capital mobility, admittedly arbitrary, but a concise summary of complicated forces. The smooth blue line shows the judgmental index of the extent of capital mobility given by Obstfeld and Taylor (2004), back cast from 1800 to 1859 using their same design principle.*
Sources: Updated from Reinhart and Rogoff (2009); based Bordo et al. *(2001), Caprio* et al. *(2005), Kaminsky and Reinhart (1999), Laeven and Valencia (2010), Obstfeld and Taylor (2004), and these authors.*

References

Bordo (M.), Eichengreen (B.), Klingebiel (D.), and Martinez-Peria (M. S.) (2001)
"Is the crisis problem growing more severe?", *Economic Policy* 16, April, pp. 51-82.

Caprio (G. Jr.) and Klingebiel (D.) (2003)
"Episodes of systemic and borderline financial crises", *http://go.worldbank.org/5DYGICS7B0 (Dataset 1)*, January.

Diaz-Alejandro (C.) (1985)
"Goodby financial repression, hello financial crash", *Journal of Development Economics* 19.

Goodhart (C.) (2012)
"Monetary policy and public debt", Banque de France's *Financial Stability Review*, April.

International Monetary Fund (2011)
Global Financial Stability Report, Washington DC: IMF, April.

Kaminsky (G.) and Reinhart (C. M.) (1999)
"The twins crises: the causes of banking and balance of payments problems", *American Economic Review*, Vol. 89, No. 3, June, pp. 473-500.

Kirkegaard (J. F.) and Reinhart (C. M.) (2012)
"The return of financial repression in the aftermath of the great contraction", Forthcoming Peterson Institute *Working Paper*.

Laeven (L.) and Valencia (F.) (2010)
"Resolution of banking crises: the good, the bad, and the ugly", IMF *Working Paper*.

Mc Kinnon (R. I.) (1973)
Money and capital in economic development, Washington DC: Brookings Institute.

Maddison (A.) (2004)
Historical Statistics for the World Economy: 1-2003 AD, Paris: OECD, *http://www.ggdc.net/maddison/*

Magud (N. E.), Reinhart (C. M.) and Rogoff (K. S.) (2011)
"Capital controls: myth and reality – A portfolio balance approach", Peterson Institute *Working Paper* 11-7, February 2011.

Obstfeld (M.) and Taylor (A. M.) (2004)
Global capital markets: integration, crisis, and growth, Japan-U.S. Center Sanwa Monographs on International Financial Markets (Cambridge: Cambridge University Press).

Reinhart (C. M.), Kirkegaard (J. F.) and Sbrancia (B.) (2011)
"Financial repression redux", *Finance and Development*, Vol. 48, No. 2, June.

Reinhart (C. M.) and Reinhart (V. R.) (2010)
"After the fall", forthcoming in Federal Reserve Bank of Kansas City Economic Policy Symposium, *Macroeconomic Challenges: The Decade Ahead* at Jackson Hole, Wyoming, on August 26-28.

Reinhart (C. M.) and Rodrick (D.) (2011)
"Additional pressures on central banks", in *Rethinking central banking*, Brookings Institution, September.

Reinhart (C. M.) and Rogoff (K. S.) (2009)
The time is different: eight centuries of financial folly, Princeton University Press, October.

Reinhart (C. M.) and Rogoff (K. S.) (2011)
"From financial crash to debt crisis", *American Economic Review* Vol. 101, No. 5, August, pp. 1676-1706.

Reinhart (C. M.) and Sbrancia (B.) (2011)
"The liquidation of government debt", *NBER Working Paper* 16893, March.

Financial and regulatory aspects

A tale of two overhangs: the nexus of financial sector and sovereign credit risks

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There has emerged in the Western economies a strong nexus between the credit risks of financial sectors and their sovereigns. We argue that this phenomenon can be understood in the context of two debt overhang problems: one affecting the financial sector due to its under-capitalisation following the crisis of 2007-08; the second, affecting the non-financial sector, whose incentives are crowded out by high sovereign debt and anticipated future taxes. While the desire to resolve the financial sector overhang may make bailouts tempting, they raise the risk of exacerbating the overhang related to sovereign debt. Conversely, reduction of growth prospects due to sovereign debt overhang can make the financial sector riskier as it is highly exposed to sovereign debt both through direct holdings and indirectly through implicit government guarantees. We provide evidence on this important nexus, based on our ongoing research that exploits data on European bank and sovereign credit risks.

From 2007 to 2010, the public debt to gross domestic product (GDP) ratio of the Irish government increased roughly at 20% per annum, from one of the most prudent in 2007, at 25%, to among the highest in 2010, at 96%. Irish banks had looked increasingly vulnerable in the Fall of 2008 with their credit default swap (CDS) spreads – the cost of buying protection against default on their unsecured bonds – having reached a peak (on average across the four largest banks) of over 400 basis points (bps) in September 2008. While Irish bank CDS stabilised to 150 bps following the Irish government's announcement of a blanket guarantee of all creditors of Irish banks on 30th September 2008, the post-bailout period saw Irish sovereign and bank CDS co-move strongly, with both increasing to over 600 bps by the start of 2011.

At the other end of Europe, the Italian government had maintained a debt to GDP ratio of close to 100% even before 2007. While the Italian banks were stable at CDS spreads of close to 100 bps in 2007, the Italian sovereign CDS widened steadily from 2007 to 2010, reaching nearly 600 bps in 2011. By this time, the Italian banks were also assessed in credit markets at a significantly higher risk of over 600 bps. The situation in Greece was similar, indeed worse, with Spain and Portugal sitting somewhere in between the case of Ireland and the cases of Greece and Italy. All of these countries experienced severe growth contractions during 2007-2011.

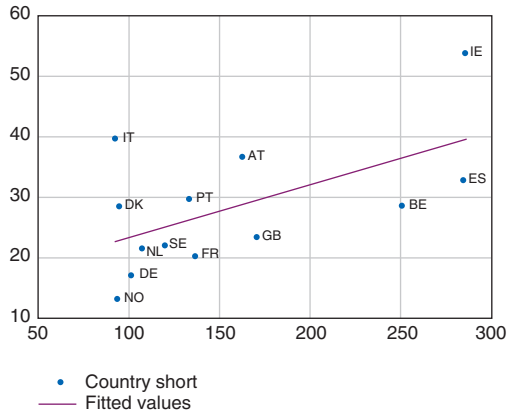
The pan-European patterns were similar: the average pre-bailout quality of the banking sector and the size of government debt predict future sovereign risk. We illustrate these relationships by examining empirical proxies for the quality of the banking sector and the size of the government debt *before* the bank bailouts and their association with the change in sovereign credit risk *after* the bailouts.

Chart 1 pertains to the quality of the banking sector. We measure the quality of the banking sector as the average bank CDS as of September 26th, 2008. We choose this date because it is immediately prior to the first announcement of bank bailouts in Europe and the United States. We thus interpret our measure as a proxy for the quality of the bank sector if investors do not necessarily expect bank bailouts. Consistent with this interpretation, we generally observe a large decline in average bank CDS after the announcement of a bailout. We use sovereign CDS to measure sovereign risk and we analyse the change in sovereign CDS over a short and a long horizon. The short horizon is September 26th until October 21st, 2008, the period when a large group of

Chart 1
Average bank CDS before bailouts predicts sovereign CDS after bailouts

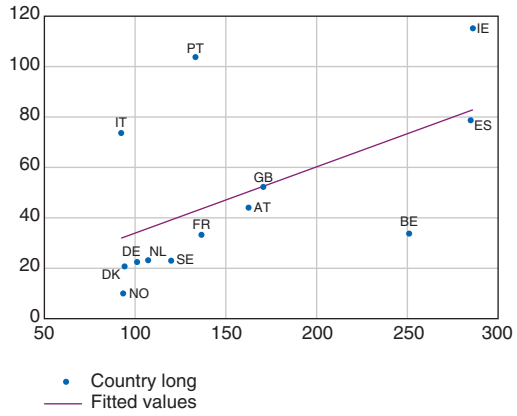
(in basis points, x axis: average bank CDS before bailouts, y axis: change in sovereign CDS during bailouts)

a) Short-run



Note: This chart shows the relation between average bank CDS by country before the bank bailouts (as of September 26th, 2008) and the increase in sovereign CDS after the bank bailouts (from September 26th, 2008 to October 21st, 2008). We include all European countries with available data on sovereign CDS and bank CDS.
Sources: Datastream (bank and sovereign CDS data) and Acharya, Drechsler, Schnabl (calculations).

b) Long-run

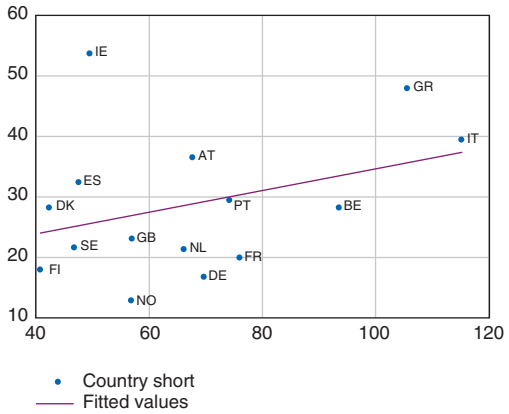


Note: This chart shows the relation between average bank CDS by country before the bank bailouts (as of September 26th, 2008) and the increase in sovereign CDS after the bank bailouts (from September 26th, 2008 to the European bank stress tests on March 31st, 2010). We include all European countries with available data on sovereign CDS and bank CDS.
Sources: Datastream (bank and sovereign CDS data) and Acharya, Drechsler, Schnabl (calculations).

Chart 2
Debt-to-GDP ratio before bailouts predicts sovereign CDS after bailouts

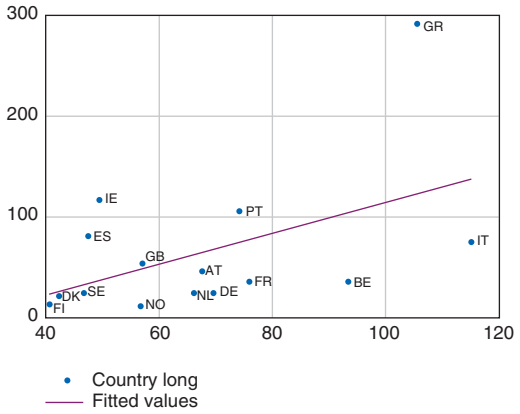
(x axis: debt-to-GDP ratio before bailouts, y axis: change in sovereign CDS after bailouts, in basis points)

a) Short-run



Note: This chart shows the relation between the debt-to-GDP ratio before the bank bailouts (as of July 1st, 2008) and the increase in sovereign CDS after the bank bailouts (from September 26th, 2008 to October 21st, 2008). We include all European countries with available data on sovereign CDS and debt-to-GDP ratio.
Sources: OECD (debt-to-GDP ratio), Datastream (sovereign CDS data) and Acharya, Drechsler, Schnabl (calculations).

b) Long-run



Note: This chart shows the relation between the debt-to-GDP ratio before the bank bailouts (as of July 1st, 2008) and the increase in sovereign CDS after the bank bailouts (from September 26th, 2008 to the European bank stress tests on March 31st, 2010). We include all European countries with available data on sovereign CDS and debt-to-GDP ratio.
Sources: OECD (debt-to-GDP ratio), Datastream (sovereign CDS data) and Acharya, Drechsler, Schnabl (calculations).

Western governments announced their bank bailouts. For the long horizon, we extend this period until the 2010 European bank stress tests (September 26th to March 31st, 2010). The 2010 European bank stress test is a natural cutoff for the long-term measure, but our results are robust to other cutoff dates.

As shown in Chart 1a, there is a positive relationship between the quality of the banking sector and the short-term change in the sovereign CDS. Countries with risky banking sectors, such as Spain and Ireland, had an increase in sovereign CDS of up to 50 bps, whereas countries with safe banking sectors, such as Norway or Sweden, experienced an increase of less than 20 bps. As shown in Chart 1b, the positive relationship survives if we examine the long-term change in sovereign CDS. The fit is quite remarkable given that the 2010 bank stress test were conducted more than 2 years after the Lehman Brothers bankruptcy.

Chart 2 pertains to the size of government debt. We measure government debt as the debt-to-GDP ratio before the Lehman bankruptcy (as of June 2008). As shown in Chart 2a, there is a positive relationship between the pre-bailouts size of debt-to-GDP and the short-term change in the sovereign CDS. Countries with a high debt-to-GDP ratio, such as Italy and Greece, experienced an increase in bank CDS of up to 50 bps, whereas countries with a low debt-to-GDP ratio, such as Finland and Germany, experienced an increase of less than 20 bps. As shown in Chart 2b, the positive relationship survives if we examine the long-term change in sovereign CDS.

Charts 1 and 2 suggest that is important to examine both the quality of the banking sector and the size of government debt. For example, Ireland is prominent in the banking sector chart (Chart 1) but an outlier with regard to the debt-to-GDP ratio (Chart 2). In contrast, Italy is prominent in the debt-to-GDP (Chart 2) but an outlier with regard to the banking sector (Chart 1). Taken together, our analysis shows that some countries, such as Ireland, entered distress due to significant debt overhang in the financial sector, whereas others, such as Italy, entered distress due to sovereign debt overhang.

We therefore argue in Acharya, Drechsler and Schnabl[1] that these relationships between financial and sovereign credit risks, and economic growth, are not accidents, but in fact represent a tale of two debt overhang problems. When financial sectors

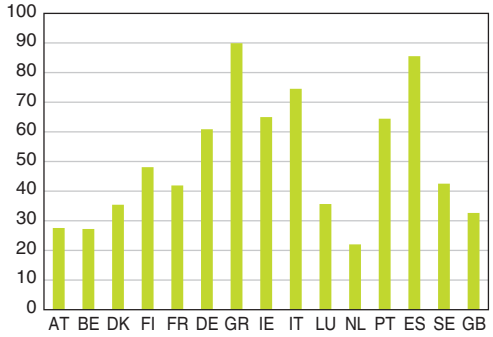
1 *See Acharya (V. V.), Drechsler (I.) and Schnabl (P.) (2010), "A Pyrrhic Victory? Bank bailouts and sovereign credit risk",* Working paper, *NYU-Stern.*

are under-capitalised, as after the losses suffered during the 2007-08 financial crisis, economic growth can collapse as financial intermediaries engage in de-leveraging and a credit crunch ensues. In other words, the resulting debt overhang in the financial sector reduces banks' incentives to provide credit to the real economy. To avoid such a credit crunch and loss of real sector output, governments engage in large-scale, often blanket, financial sector bailouts.

Such bailouts, however, are costly and run the risk of amounting to a "Pyrrhic victory" for the sovereigns. First, bailouts require immediate issuance of additional debt by the sovereign in order to backstop the creditors of distressed or insolvent financial firms. This leads to an immediate increase in the sovereign's credit risk through the liability side of its balance-sheet. Second, and perhaps even more importantly, the sovereign runs the risk of becoming indebted to the point where another debt overhang can take hold in its economy. The private sector – households and corporations – anticipate that the sovereign's additional debt will require higher taxes in the future. This dilutes long-run returns on real-sector and human-capital investments. The resulting under-investment in the economy can cause growth and productivity in the sovereign to slow down, affecting the sovereign's credit risk through the asset-side of its balance-sheet. There is therefore a tradeoff between the two overhangs, and the sovereign many need to "sacrifice" its own creditworthiness in order to alleviate the financial sector's overhang. The resulting rise in sovereign credit spreads induced by this "sacrifice" is consistent with the patterns in Chart 1 and 2, as are downwards revisions in expectations of growth in the Fall 2008.

Chart 3
Home bias in Government debt

(y axis: home share; x axis: country)

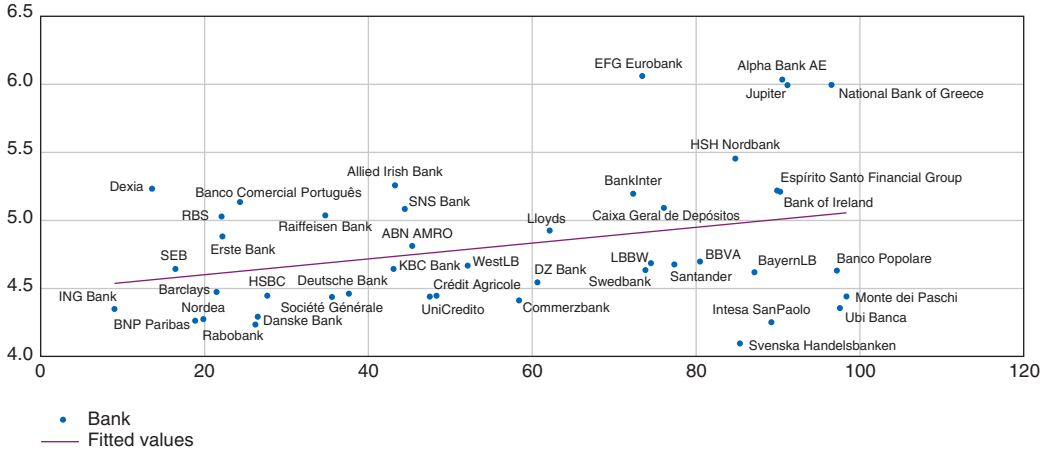


AT = Austria; BE = Belgium; DE = Germany; DK = Denmark; ES = Spain; FI = Finland; FR = France; GB = United Kingdom; GR = Greece; IE = Ireland; IT = Italy; LU = Luxembourg; NL = Netherlands; NO = Norway; PT = Portugal; SE = Sweden.

This chart shows the average holdings of home sovereign debt as a share of total sovereign debt by country as of the European bank stress tests on March 31st, 2010.
Sources: 2010 European bank stress tests (home share and Acharya, Drechsler, Schnabl (calculations)

Chart 4
Home bias in Government debt and bank credit risk

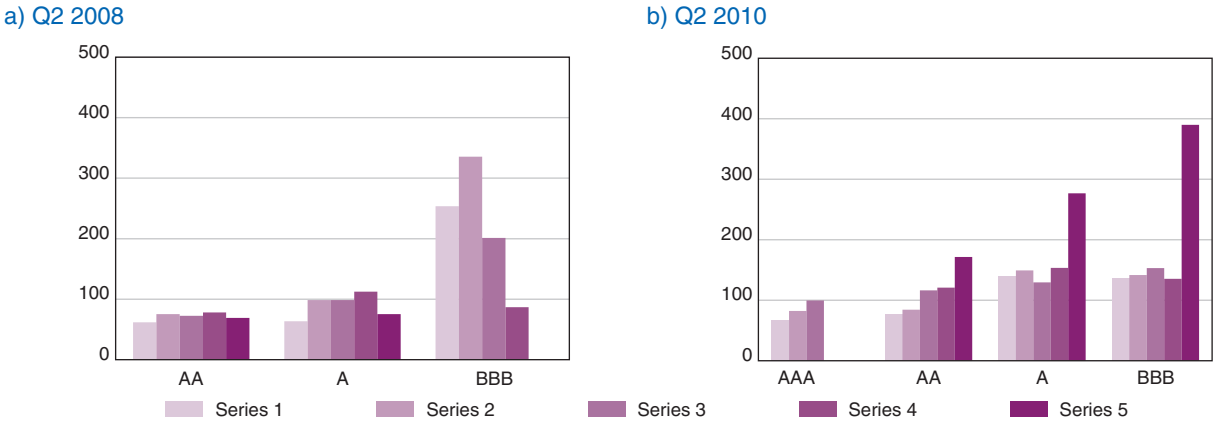
(y axis: log [Bank CDS]; x axis: home share, %)



This figure shows a positive association between home bias in government debt and bank credit risk (proxied for by the natural logarithm of a bank's credit default swap) as of the European bank stress tests on March 31st, 2010. Home bias in government debt is total home sovereign debt as a share of total sovereign debt. We include all banks that are included in the 2010 bank stress tests and that have bank CDS data.
Sources: Datastream (bank CDS data), 2010 European bank stress tests (home share) and Acharya, Drechsler, Schnabl (calculations)

Chart 5
Quarterly bank CDS by credit rating and country CDS for 2Q 2008 and 2Q 2010

(y axis: mean of cds)



This Chart plots average banks CDS by credit rating and CDS country quintile for 2Q 2008 and 2Q 2010. We construct the country quintiles (1 to 5) based on sovereign CDS for each quarter. Next, we average bank CDS for each country quintile and each investment grade credit rating. The left hand panel shows that that was only a weak relationship between sovereign CDS and bank CDS for a given bank credit rating in the second quarter of 2008. The right hand side panel shows that there was a strong and positive relationship between sovereign CDS and bank CDS in the second quarter of 2010.
Sources: Datastream (CDS data) and S&P RatingsXpress (credit ratings data).

Perversely, the deterioration in the sovereign's creditworthiness introduces the risk that its credit problems will feed back adversely onto its financial sector. One channel through which this occurs is the significant direct holdings of government debt by the financial sector. The stress test data revealed by the European regulators in June 2010 (on positions as of 31st March 2010) show that for every six euros of risk-weighted assets, the 91 stress-tested European banks held on average one euro of sovereign bonds. Further, Chart 3 shows the extent of "home bias", the proportion of the sovereign debt that was held by banks in a given country in the form of the country's own bonds. The home bias in government bond holdings is on average close to 60%, and is particularly strong for banks of troubled sovereigns (Greece, Ireland, Portugal, Spain and Italy). This home bias creates one form of reverse feedback from sovereign to the financial sector. As Chart 4 shows, the credit quality of European banks as of the stress tests in March 2010 – by when sovereign problems had begun to fester – was indeed related to the extent of their (respective) home bias.

The second form of reverse feedback arises due to the fact that the financial sector – with or without bailouts – is perceived to have creditor guarantees provided by the sovereign. As the sovereign's creditworthiness declines, the value of these explicit and implicit government guarantees also declines, and this adversely impacts the financial sector's credit quality.

The case of the Spanish Bank Santander provides an example of the increased borrowing costs paid by a bank as the value of its sovereign's implicit guarantees deteriorates. Despite being the most profitable bank in the Euro region since 2007, Santander was in October 2010 paying more to borrow than some of its weaker counterparts in Germany. In particular, on June 1st 2010, Santander had a long-term bond rating of "AA" and was trading at a CDS fee of 207 bps. Its sovereign, Spain, had a sovereign CDS fee of 247 bps. On the same day, the German Bank WestLB had a long-term rating of "BBB+" and traded at a CDS fee of 158 bps. Its sovereign, Germany, had a sovereign CDS fee of 43 bps. Hence, even though credit ratings suggested that the profitability of Santander was significantly higher than the profitability of WestLB, the credit risk of Santander was higher than that of WestLB.[2]

Chart 5 shows that this pattern holds across Europe. We assign each bank the sovereign CDS of the country where the bank is headquartered and groups countries in five quintiles using sovereign CDS.

2 *In another example, Santander sold in September 2010 1 billion euros (USD 1.4 billion) of 4.125 percent, seven-year senior bonds with a AA rating that yielded 156 basis points more than average market rates. In contrast, Germany's Commerzbank AG, which required a government rescue in 2008, issued 1 billion euros of 4 percent, 10-year senior debt with an A rating that yielded 126 basis points more than the benchmark.*

Next, we compute average banks CDS by credit ratings and by country quintile. The chart shows that keeping credit ratings constant, bank CDS monotonically increase in country quintiles, weakly so in the left panel which is before the bank bailouts (second quarter of 2008), and strongly so after the 2010 European bank stress (second quarter of 2010). In particular, banks with credit ratings of "AA" and "A" in the highest country quintile (e.g., Spain in June 2010) had on average higher CDS prices than banks with credit ratings of "BBB" in the lowest four country quintiles.

Alternatively, we can test the strength of the association between sovereign and bank CDS as a function of a bank's credit rating. Specifically, we use daily bank-level data to estimate

$$log(Bank\ CDS_{it}) = \Sigma_k \alpha_k\ Rating_{ikt} + \delta_t \Sigma_k \beta_k Rating_{ikt} * log(Sov\ CDS_{it}) + \delta_t + \varepsilon_{it}$$

where $log(Bank\ CDS_{it})$ is the natural logarithm of the CDS of bank i at time t, $Rating_{ikt}$ is an indicator variable for the S&P Rating k of bank i at time t, $log(Sov\ CDS_{it})$ is the natural logarithm of the CDS of the country in which bank i is based, and δ_t are time fixed effects. We focus our analysis on banks that are based in Europe and the United States with more than USD 50 billion in assets (according to Bankscope) and that have traded bank CDS and sovereign CDS (according to Datastream). We restrict our sample to the period after the bank bailouts and we focus on banks with S&P investment grade ratings (according to S&P RatingsXpress).

Table 1 presents the result. As shown in Column (1), bank CDS is larger for banks with lower ratings. This result is not surprising and suggests that credit ratings are informative about a bank's financial distress. More importantly, Column (2) shows that the relationship between bank and sovereign CDS is positive for all banks and statistically significant for banks with lower ratings such as banks with A or BBB ratings. For banks with a credit rating of AA or higher, a 10% increase in sovereign CDS is associated with a 1.2% increase in bank CDS. For banks with a credit rating of A or BBB the effect increases to 3.1% and 2.6% respectively. Hence, the strength of the association is larger for banks with lower ratings. In short, these results suggest that an increase in sovereign CDS increases bank credit risk even after controlling for bank credit ratings and that the impact of sovereign CDS is larger for bank with lower credit ratings.

Table 1
Bank CDS and sovereign CDS by bank rating

Dependant variable	Log(Bank CDS)	
	(1)	(2)
Rating A	0.454**	-0.317
	(0.098)	(0.542)
Rating BBB	0.724**	-0.007
	(0.148)	(0.610)
Rating (AAA or AA) * Log(Sovereign CDS)		0.122
		(0.111)
Rating A * Log(Sovereign CDS)		0.307**
		(0.100)
Rating BBB * Log(Sovereign CDS)		0.265*
		(0.108)
Constant	4.530**	4.011**
	(0.072)	(0.429)
Time fixed effects	Y	Y
Observations	41,763	40,826
Banks	83	82
R-squared	0.180	0.241

*The table shows regressions of bank CDS on bank credit ratings and sovereign CDS for the period from November 2008 to December 2010 using daily data. The sample includes all banks that have more than USD 50 billion in assets in Bankscope, have an investment grade rating from S&P in RatingsXpress, and have traded CDS in Datastream. The omitted category is Rating AAA and AA. The standard errors are clustered at the bank-level ** 1% significant and * 5% significant.*
Source: Acharya, Drechsler, Schnabl.

Both of these reverse feedbacks – the first due to direct holdings of government bonds by financial firms, and the second due to implicit guarantees of the financial sector by governments – would further result in withdrawal of intermediation by banks, exacerbating sovereign credit risks, and giving rise to severe downward spirals of growth.

The nexus of debt overhangs and credit risks between the sovereign and the financial sectors that we have highlighted has an important policy implication. Sovereign bonds are accorded minimal, often zero, risk-weights in capital requirements for banks as long as sovereigns are well-rated. However, through the nexus of debt overhangs, even small deteriorations in the credit quality of sovereigns can precipitate financial and economic crises. It may therefore be prudent in good times, even when sovereigns are well-rated, to entertain the "stress test" possibility of future credit deterioration, e.g., through non-zero risk weights on sovereign bonds, and to require banks to fund sovereign bond holdings with reasonable quantities of capital. Not doing so can result in excessive funding of sovereigns by banks in good times, but with sharp reversals in bad times, as is being witnessed currently in the euro area.

Banks, moral hazard, and public debts

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Financial Stability Directorate
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In financial crises, private debts typically turn into public debt. In the case of private bank debt, a risk is that sovereign debt may balloon out of control because of actions taken to prevent the collapse of banking systems.

This paper discusses some issues related to this interaction between bank debt and sovereign debt. Specifically, it recalls well-identified stylised facts about the loop between banks and sovereigns. It suggests that, beyond positive reasons, some normative considerations explain the nature and intensity of this loop. From a policy perspective, it assesses the implications of some recent developments in regulation and public policies, points out what could be done to reduce the chances of a negative bank-sovereign feedback loop, and evaluates whether the options to better allocate the costs of crises are mutually consistent.

Clearly, the crisis requires a fundamental rethink of previously commonly accepted views. One was that risky private debt could easily be morphed into high quality and liquid assets. Another was there are intrinsically riskless financial assets. Efforts by policy-makers are underway to create a new normal, where all risks are properly measured and understood, are fully priced in and their quantity better controlled. Moving to a new normal also requires that fiscal rules and discipline are better entrenched through robust and time consistent policy frameworks.

NB: Deputy-Governor Anne Le Lorier, Laurent Clerc, Philippe Mongars, Jérome Coffinet and Marion Sanchez provided useful comments on earlier drafts.

In times of financial crises, private debts usually turn into public debt. This is a regular pattern in the history of financial crises (see e.g. Reinhart and Rogoff, 2011). Four years after its start, the banking crisis has indeed morphed into tensions on sovereign debt and into a sovereign debt crisis in Europe.

Economies now at the epicenter of the turmoil share two features. First, they are those whose sovereign debts used to be considered virtually risk free by private and public stakeholders alike, and as a result widely held by major banking institutions in Europe and in the world. Second, they are those where the largest and most systemic – and as such perceived as most likely to receive public support – financial institutions tend to operate. These two features go a long way in explaining the current joint stress at sovereigns and banking systems in developed economies.

This paper analyses the vicious circle between banks and sovereign debt. The focus is not on solutions to short-term problems. Rather, the analysis puts the inter-linkages between banks and sovereigns into perspective. Three points stand out. First, banking systems and sovereigns are strongly interlinked. Beyond positive reasons, some normative considerations help understand why this is the case. Second, public intervention in a crisis, while rational, creates a range of moral hazard problems, with reverberation on incentives for both banks and sovereigns. Third, to address these problems, there is no easy policy. All options require a fundamental rethinking of several commonly accepted views.

Section 1 discusses empirical evidence on the two-way linkages between sovereign risk and banks' risk, and exposes the main contagion channels. Section 2 relates this feedback loop to some analytical considerations regarding public insurance and moral hazard. Section 3 discusses the challenges faced by potential policy remedies.

1| Selected stylised facts

Throughout history, sovereign debt crises and banking crises have been correlated. Between 1970 and 2000, more than 60% of sovereign defaults were associated with a banking crisis. As Reinhart and Rogoff (2009) document, government debt grew on average by 86% in the major post-World War II banking crises episodes.[1]

Part of this empirical correlation is simply a mechanical consequence of the effects of financial crises on economic activity. Indeed, Reinhart and Rogoff (2009) suggest that "the main cause of debt explosions is not the widely cited costs of bailing-out and recapitalising the banking system, [but] the inevitable collapse in tax revenues that governments suffer in the wake of deep and prolonged output contractions, as well as often ambitious countercyclical fiscal policies aimed at mitigating the downturn."

In addition to this real economy channel, there are two important sources of mutual exposures between banks and sovereigns in modern economies. The first one relates to sovereign debt holdings by banks; the second one to government support to the banking system.

1|1 Sources of mutual exposures

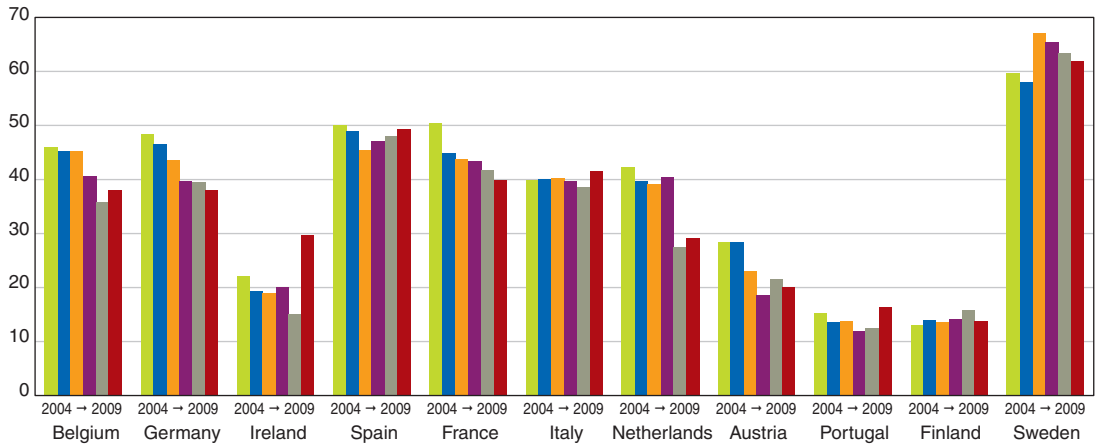
Banks are key and significant investors in sovereign debts

Banks are key and significant investors in sovereign debts, because of both the latter's relatively low-risk status and the services they provide (Chart 1). The need for diversification between risky and non-risky assets, the role played by government bonds (interbank secured funding market, repo operations with central banks) and a favourable regulatory treatment for developed sovereign debt help explain this tendency for banks to lend to sovereigns. Banks also take on sovereign risks through derivatives, notably credit default swaps (CDS), although amounts are typically smaller than for direct exposures.

1 *This analysis is based on a sample comprising 13 post-World War II systemic financial crises episodes, with crises in both developed and emerging countries (Finland, 1991; Chile, 1980 ; Indonesia, 1997; Spain, 1977; Thailand, 1997; Sweden, 1991; Korea, 1997; Philippines, 1997; Norway, 1987; Japan, 1992; Mexico, 1994; Malaysia, 1997; Colombia, 1998).*

Chart 1
Public administration debt held by financial entities

(% of total)



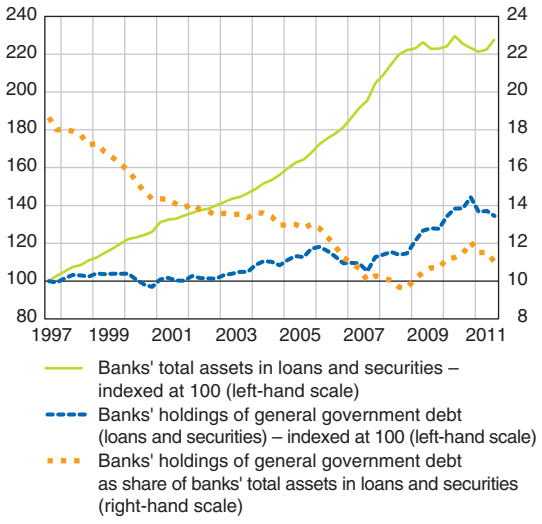
Source: Eurostat.

During episodes of stress, banks tend to increase their exposure to sovereign, to preserve value and liquidity

Since the beginning of 2009 for example, government bonds accounted for 41% of euro area banks' asset purchases (see Chart 2). Beyond domestic sovereign debt, banks have also increased their exposures to foreign sovereigns. For most European Monetary Union (EMU) countries – Greece, Italy, Portugal and Spain being exceptions – foreign (European) government debt represents more than 40% of banks' holdings of government debt as of July 2010. This large scale investment in foreign sovereign debt brings in diversification benefits in good times, but also more contagion in times of stress on sovereign debt markets, a point emphasised by Bolton and Jeanne (2011).[2]

Chart 2
Euro area credit institutions' holdings of euro area general government debt (loans and securities)

(index 100 = 1997Q3) *(%)*



Source: ECB statistics.

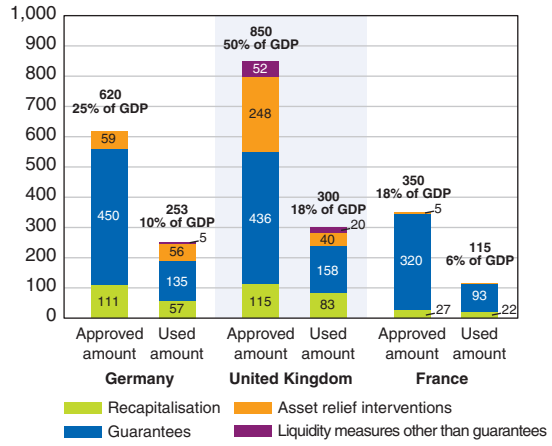
This increased exposure to sovereign has created sizeable tail risk for banks. Developments in Greece are a stark reminder of this.

On the other hand, sovereign debt holdings by banks can also contribute to destabilising sovereigns in time of severe banking stress

A case in point is the recent episode of deleveraging on Italian and Spanish debt by European banks, in a situation where other market participants already had doubts about the sustainability of the associated public debt levels. To illustrate such a deleveraging, the comparison between European Banking Authority (EBA) stress-tests exercises shows that, between end December 2010 and end September 2011, the gross exposure of an unchanged sample of European banks to Italy and Spain decreased by EUR 42 billion (18% of total issuances in 2011) and EUR 14.6 billion (15% of total issuances in 2011) respectively.

2 *In a recent study, Dieckman and Plank (2010) show that sovereign CDS spreads sensitivity to the health of the financial sector are higher for EMU members compared to non-EMU members.*

Chart 3
Bail-out measures
Germany, France and the United Kingdom
(EUR billions)



Sources: Eurostat, BIS, UK Treasury.

Box

Taxonomy of bail-out measures

Ad hoc *or general recapitalisations.* *Public capital injections can help reduce banks' refinancing costs. By raising a bank's loss absorbing capacity and improving its risk profile, they offer protection to its creditors. Also, by relieving balance sheet constraints, they support banks' lending capacity and mitigate risks to the real economy. Economic principles would require that public capital support to ailing banks should be dilutive for shareholders. In practice, a wide range of capital instruments have been used. Most public recapitalisation were non dilutive in terms of voting rights.*

Debt guarantee programmes. *By guarantying a bank's debt and/or other liabilities, the government de facto 'lends' its creditworthiness to the bank, thereby containing its funding costs and mitigating liquidity risk. Modalities vary across crises and jurisdictions. Still, typically, the scope of eligible instruments focus on newly issued, medium-term, senior unsecured interbank debt.*

Assets purchases and guarantees. *Asset guarantees de facto carve out part or all of the risks of troubled assets, thus removing "tail risk" from a bank's balance sheet. Asset purchases contribute to maintaining liquidity in some markets considered crucial for economic activity.*

The second source of mutual exposure derives from public support to the banking system – whereby the government uses its own balance sheet to cushion banks' balance sheets

In principle, non-public solutions can be used to resolve a banking crisis, as in the case of the takeover of Bears Stearns by JPMorgan in March 2008. Private solutions are indeed superior in that they reduce the risks to the taxpayers. Yet, private sector solution may not always be an option or may not be workable in a timely fashion. In such circumstances, the government can take a range of actions to support its banks (see Box). Indeed, between September 2008 and June 2009, large-scale bail-outs took place (Chart 3).

When the sovereign's initial fiscal position is sufficiently strong compared to the size of realised (or expected) support, bailouts mitigate stress in the banking system. In contrast, as discussed in the next section, when the sovereign already faces stress on its debt position, bailouts contribute to the negative feedback between banks and sovereigns.

1|2 Transmission channels in time of stress

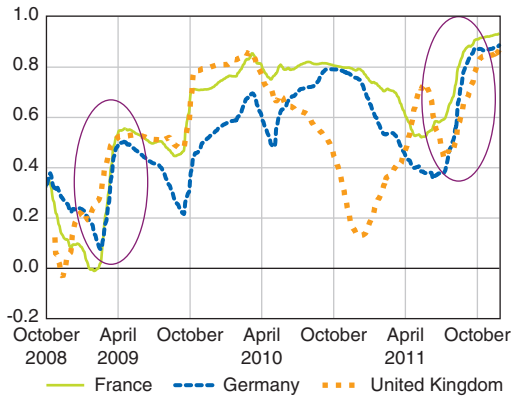
The contagion between the sovereign and banking sectors

Schematically, the contagion between the sovereign and banking sectors works as follows. Tensions on sovereign securities markets impact banks' balance sheets, through holdings of sovereign debt or protections on such sovereigns. Contagion is direct and quick for sovereign securities that are marked-to-market. It can also be slower in case of a default or haircut on sovereign debts accounted for using amortised cost. Indirect exposures through derivatives (credit protection on sovereign default) could become direct losses for banks in case of a credit event. The fall in a bank's asset value negatively affects the bank's liabilities. Depending on applicable accounting rules, equity is hurt directly or through profits and losses. Typically, sovereign stress is associated with increased mistrust towards banks holding such sovereign's debt, which are typically

domestic banks. As a result, such banks' stocks dive and their refinancing costs soar. In parallel, depreciated sovereign debt trigger changes in haircuts and margin calls by banks' counterparties seeking to protect against counterparty risks and sovereign credit risks. Changes in rating can accelerate such processes, and contribute to pushing some sovereign's bonds out of collateral generally accepted in the interbank repo market. The shock on banks' equity, if large, can trigger the need for a bail-out. Contingent on their actual forms, such bail-outs put pressure on public finances, which in turn reinforces doubts on the sovereign's ability to repay or refinance its debt. This can add further stress on banks.

Market participants tend to price in this feedback loop (Chart 4). This is apparent when looking at the evolution of CDS prices for banks and sovereigns in the recent crisis. Initially, the failure of Lehman Brothers created uncertainty on the interbank market, contributing to a sharp increase in banks' CDS premia, but without affecting sovereign premia immediately. Correlation between the bank and sovereign CDSs increased as the various bail-outs programmes were announced (end 2008-2009); it has not abated since then. This increase in correlation between banks and sovereign CDSs before and after the main bailout period is now well documented (Dieckman and Plank, 2010; Acharya *et alii*, 2011).[3]

Chart 4
1-year correlation between banks and sovereign CDS
France, Germany and the United Kingdom

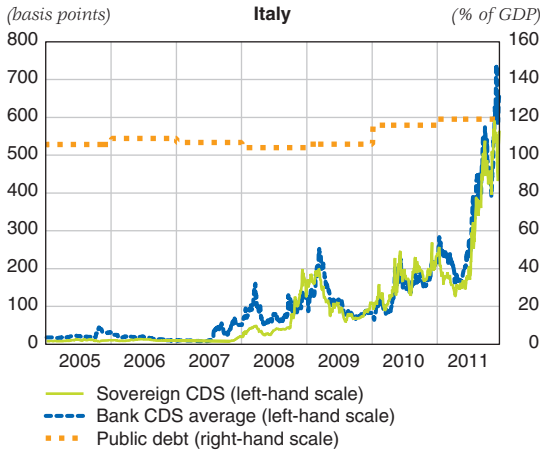


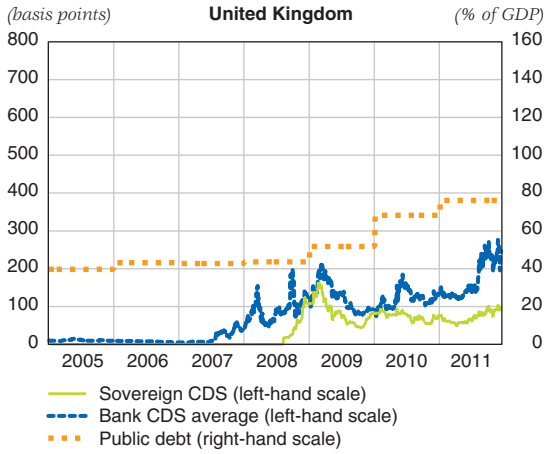
Note: the decrease in correlation between May and November 2010 is associated with the fall in the CDS on UK sovereign bonds, with the United Kingdom being a core country in the wake of tensions and actions about Greece, and additional stress on the interbank market affecting banks' CDS.
Sources: Bloomberg, Banque de France computation.

The intensity of the feedback loop

The intensity of the feedback loop is contingent on the nature, scale and effectiveness of public interventions and the initial fiscal situation of the sovereign (Chart 5). A well-calibrated public support would help banks restart credit extension and avoid

Chart 5
Bank CDS, sovereign CDS, and public debt
Italy and the United Kingdom





Source: Bloomberg.

3 *Precisely, these empirical studies tend to show that correlation was not significant pre-crisis, decreased during the bailout period (which is a sign of a private-to-public risk transfer), and became significant and positive in the post-bailout period.*

or limit a recession in the economy. If however the benefits of public support are only transitory or such support is ill-designed, the risk is that both sectors end up more vulnerable. At the same time, bail-out measures have significantly and abruptly changed the sovereign's financial commitments. Troubles in banks increase pressures on governments' resources, whether through market funding or reduced collected taxes. Still, support measures can weigh on public finances or at least on their perception, since the larger their scale the higher the risk of negative feedback for the sovereign's own financial position.

The final impact of bail outs on sovereign's finances

The final impact of bail outs on sovereign's finances also obviously varies according to the type of bail-out. Not all commitments are actual expenses for the sovereign. For example, in 2008-2009, the UK government's committed financial support to its banking sector exceeded 50% of GDP but the majority was in guarantees. Should guarantees not be exercised, then the final "cost" will be smaller. Besides, governments' supports are typically granted against a fee. For example, at end 2009, the fees paid to the French Government for its guarantee to the French Société de financement de l'économie française (SFEF) amounted for EUR 1.3 billion.[4]

2| Banks, moral hazard, and public insurance

An important normative question, with significant policy implications, is whether and how the interaction between sovereigns and banks is associated with risk-taking that is excessive from a social perspective. Are there fundamental economic reasons for such a strong linkage between banks and sovereigns? What is special about public debt and public intervention? Are all moral hazard concerns with respect to public insurance against aggregate uncertainty in the banking sector warranted?

2|1 The necessity of public intervention

Economic analysis supports the view that part of the public support to ailing banks is warranted from an ex post perspective. Importantly, it also suggests that some public intervention may also be optimal from an ex ante perspective.

Ex post justification for public intervention

Public intervention is justified ex post when there is a risk that the social cost of a bank failure is higher than its private cost. Banks perform maturity transformation, which exposes them to runs, whose consequences exceed private costs. Unobserved interconnection between financial institutions together with uncertainty about the outcome of resolution procedures imply that the failure of a large financial firm can lead to widespread contagion among market participants. This risk has been clearly demonstrated with the collapse of Lehman Brothers. In addition, banks' failure implies irremediable losses of private information on, and relationships with, borrowers that are essential for the financing of the economy. Some financial intermediaries can also be difficult to replace because they act as important market makers, or counterparties in key markets whose impairment may jeopardize the smooth functioning of the financial system. These factors explain why authorities cannot stay idle in a banking crisis.

Ex ante legitimacy

Importantly, by providing insurance against a systemic crisis, public support to banks may also be legitimate from an ex ante point of view. The overall public safety net removes these tail risks from banks' balance sheet and, as a result, allows them to undertake risky activities that may be valuable to the economy at large. Indeed, a policy of zero bailouts – assuming it was credible – could lead financial institutions to self-insure too much and provide insufficient liquidity services from an ex ante point of view (Keister, 2011).

A dilemma with public bailouts is that authorities face a commitment problem. The very factors that justify public support ex post also imply that, when the crisis occurs, authorities will want to intervene more than they should from an ex ante perspective. The difficulty of public authorities to commit creates a typical time inconsistency issue: they would like to commit to a given level of insurance ex ante, for incentive reasons, but could end up in some circumstances providing too much insurance ex post (Kocherlakota, 2010). This leads to excessive moral hazard.

4 *The SFEF was created by the French government in October 2008. It s role is to grant collateralized medium and long term loans to banks, that in return must keep on financing the real economy. The SFEF finances itself by issuing bonds guaranteed by the French government. The total allocated amount was EUR 265 billion.*

2|2 Faces of moral hazard

Public safety nets

Risk-taking incentives created by deposit insurance illustrate the moral hazard induced by public safety nets. Insured depositors have no incentives to factor the bank's risk into their required deposit rate. In theory – unless the deposit premium is fairly priced – banks have therefore an incentive to take on additional risk to maximise the subsidy from the deposit insurance fund. From a practical perspective, however, there are some reasons to consider that this inevitable moral hazard effect may not be a first order concern. First, given that most insured depositors are unsophisticated investors, their ability to exert efficient market discipline on their banks is unclear. Second, deposit insurance is generally paid ex ante, though not necessarily in a risk-adjusted manner. Third, explicit deposit insurance systems can serve as a commitment device (Gropp and Vesala, 2004).[5] Finally, details of the deposit insurance scheme can be fine tuned to limit moral hazard.[6] In the run-up of the current crisis, banks did not increase their leverage through insured deposits, but rather through wholesale funding. This could indicate that moral hazard associated with the former was not an issue.

Support to banks considered being too-systemic-to-fail

In contrast, significant moral hazard concerns arise from the expected government support to banks, especially those considered to be too-systemic-to-fail. Expectations for government support weaken discipline exerted by creditors. Since some of the losses are expected to be borne ex post by taxpayers, those firms have strong incentives to load on excessive risk. Expectation of a bailout may lead to higher exposure to common risk factors as banks choose more correlated portfolios to benefit from public bailout in case of distress at many banks (Acharya and Yorulmazer, 2007 ; Farhi and Tirole, 2012). It can also lead to socially excessive maturity transformation as banks do not sufficiently internalise the consequences of bank runs.

Available evidence confirms that large, too-big-to-fail (TBTF) institutions benefit from a funding cost advantage. For the United States, Baker and McArthur (2009) show that the difference in funding costs between large – that is over USD 100 billion assets – and small bank holding companies averaged 0.29% for the period 2000Q1-2007Q4, and 0.78% for 2008Q4-2009Q2. This cost advantage is reflected in the difference between the "support" and "standalone" credit ratings of banks provided by rating agencies. Exploiting the expectations of public support embedded in those ratings, Ueda and Weder di Mauro (2011) estimate that the average subsidy, for a panel of banks from several countries, was about 0.60% before the crisis (as of end-2007), and had increased to 0.80% by end-2009, after the series of bailouts in the United States and Europe.

The empirical literature tends to confirm that TBTF perception affects firms' incentives. First, TBTF firms tend to be more leveraged. For instance, Nier and Baumann (2006) and Beck *et alii* (2009) find that banks that can expect government support in case of failure tend to hold smaller capital buffers against adverse outcomes. Second, recent studies on banks merger suggest that banks may grow mainly to be considered TBTF. Given the limited evidence on efficiency gains in banking institutions beyond a medium size, one is thus inclined to consider that the magnitude of the moral hazard-induced risk-taking at those institutions offset their benefits in term of financing the real economy.[7] Admittedly, most studies focus on banks' size, for data availability reasons. Yet, clearly, institutions may also be too systemic to fail because of their complexity or inter-connectedness. Hence, firms may also have incentives to become more complex or connected to gain public support. Looking forward, the moral hazard issue at systemic institutions – and the associated long-lasting effect on market discipline – will certainly be one of the most problematic legacy of the current financial crisis, not the least because the events that followed Lehman's bankruptcy have likely destroyed any "constructive" ambiguity about bailouts availability.

5 *Precisely, Gropp and Vesala make the point that the establishment of explicit deposit insurance limits the scope of the overall (i.e. explicit and implicit) safety net and reduce moral hazard, by credibly limiting the implicit coverage of large depositors and other creditors.*
6 *See for instance the discussion in Martin (2003) on the reform of the US FDIC.*
7 *This issue is not settled. As DeYoung (2010) argues, "The standard approaches to measuring scale economies are the least accurate for precisely those firms most relevant to the question at hand: the very largest banking companies". Indeed, recent studies find unexploited scale economies at even the largest financial institutions (Wheelock and Wilson, 2009; Feng and Serletis, 2010).*

Indirect forms of moral hazard

But expectations of public support also generate more indirect forms of moral hazard. In particular, some form of sovereign debtor moral hazard is especially a concern in the context of a highly financially integrated economic area. Such financial integration mirrors for instance in the cross-border holdings of European government debt by European banks. This creates a channel for contagion across countries' banking system. This contagion in turn provides incentives for national authorities to bail out any other country in trouble, especially if this country's debt is held by institutions considered to be systemic in their home country, and weakens fiscal discipline.

Moreover, bailout-induced moral hazard does not operate in isolation, but generally interacts with other factors. Since banks themselves are important private creditors of foreign sovereigns, the two sources of moral hazard may reinforce each other, leading to a form of « moral hazard multiplier ». In certain circumstances, a bank considered too systemic to fail has, in principle, a double incentive to invest into foreign government debt without fully factoring in intrinsic credit risk: either because it expects the sovereign to be bailed out in case of distress, or because it expects to be itself supported by the domestic sovereign in cases of severe losses on its foreign sovereign debt holdings.

Pro-cyclicality in the pricing of sovereign risk

Pro-cyclicality in the pricing of sovereign risk poses a real challenge to public policies. In normal times, when the market perceives sovereign debt to be virtually safe, banks are natural holders of sovereign debts. However, when sovereign risks begin to be priced in the market, banks anticipating public support have also additional incentives to hold government debt to cash in the associated yield. Indeed, until the market starts to perceive public support itself to be limited by banks' risks, it is better to hold sovereign debt indirectly through (protected) banks than directly or through mutual funds. When this is the case, investment in risky sovereign debts may provide a good example of the correlated portfolio effects emphasised by Farhi and Tirole (2012), forcing governments to intervene, and deal with the difficult tradeoff of bailing out banks or maintaining their ratings.

3| Policy considerations

Scaling back the linkages between financial firms and public debt, including those arising out of moral hazard, is a precondition to reduce the risk of extreme financial shocks. Completely breaking these linkages is unrealistic and not necessarily desirable. In practice, this means designing policies that support an optimal pricing of various assets, whether bank debt, capital or sovereign debt.

This section discusses three broad policy questions: What are the implications of the financial crises for the interactions between financial regulation and public debt? What could be done to reduce the risks and need for public bailouts of financial firms? Are options to better allocate the costs of crisis effective and mutually consistent?

3|1 Regulation, public policies and public debt securities

Favorable prudential treatment

Current circumstances challenge the wisdom of a favorable prudential treatment for sovereign debts. Public debt securities have typically enjoyed the most favorable regulatory treatment. A reason for this is that, money aside, they were seen as closest to the definition of risk free assets: in principle, a sovereign can always raise taxes on current and future generations and, depending on the degree of independence of the central bank or the economic principles driving monetary policy, print money to repay or finance its debt. The crisis has served as a reminder that some sovereign debts are neither risk free nor always highly liquid. Recognising this would have several implications for prudential rules. One is that it would be ill-advised to assume in regulation, once and for all, that sovereign debt is the main, if not the only, "high quality, liquid assets". Another is that aligning risk weights on sovereign debt with that on non-sovereigns' might be one option to break the regulatory feedback loop between banks' and sovereigns' position. Also, as far as capital regulation is concerned, this is, to a large extent, what the more sophisticated credit risk approach in Basel II calls for: banks using the internal ratings-based advanced method should value sovereign credit risks using

their own, validated credit risk models similarly as what they do for other credit risks. This introduces a degree of freedom for banks to more accurately and more timely adjust their risk profile. Not all banks have the technological and human capabilities to move towards such standards. This implies that some adjustments may be warranted in the way the standard approach factors in risks attached to sovereign debt securities.

A symmetric treatment

It is crucial that all sovereigns be treated symmetrically in risk regulation. A non symmetric treatment would be to restrict the risk-free/zero-risk weight status to public debt securities issued by sovereigns with domestic control over the money in which its debt is denominated (Turner, 2011). Such a differentiation between "genuine" and "sub-"sovereigns implicitly assumes that the former's monetary authorities will eventually monetise deficits to avoid sovereign default. This institutionalises a form of fiscal dominance and, to some extent, negates the importance of central bank independence. It would also have consequences on the sovereign debtor's and its main creditors' incentives to maintain fiscal discipline. Besides, if eventually sovereign debt is not monetised, precisely because of central bank's independence, such debt would cease to be risk-free, with similar adverse consequences as those currently observed. The option to monetise public debt belongs to high order economic policy choices. It should not be imbedded in prudential regulation.

Central banks' collateral policy

Central banks' collateral policy de facto contributes to confirming, restraining or enhancing the role public debt securities play in the functioning of financial systems. Like prudential regulation, depending on how granular such policy is in terms of credit quality of sovereign issuers, banks are more or less induced to differentiate between sovereign debt securities. The less granular it is, the less it will contribute to supporting price differentiation. From a financial stability perspective, the net benefit of granularity differs on circumstances. In good times, less granular collateral categories may indirectly support banks' appetite for those sovereign debt securities with higher yield for a given haircut, which may unduly support less credit-worthy sovereigns. Conversely, in crisis times, less granularity could help cushion shocks as comparatively riskier securities continue to be accepted. In other words, the net effect for financial stability is ambiguous. From a strictly economic perspective, central banks' collateral policy must certainly be conservative when taking into account its impact on aggregate demand for assets pledgeable in its operations.

3|2 Making banks less systemic

Bailing out systemic banks is likely to destabilise the sovereign's financial position. Reducing banks' systemic importance is thus one critical way to attenuate the loop between banks and their sovereign.

A common identification

To regulate globally active systemic banks and handle their failure, all authorities must agree on who they are. As a result of the crisis, a framework to identify them by relying on 12 indicators has been endorsed by the G20 Leaders Summit in Cannes. While crude, a key benefit from this international framework is that national authorities and global standard setters can now approach the problems created by systemic banks using a common language and screening device. The identification method is not perfect. Still, it anchors at various policy levels the regular monitoring of those few banks that are critical for the global financial system; authorities will be forced to consider regularly which banks are systemic and why, and what to do about it.

Adjusting the incentives to take on larger risks

Such an identification process may in and of itself induce banks not to become systemic in the first place. An instrument of choice to do so is to require global systemic banks to hold more common equity (Breton *et alii*, 2011). Equity being more costly because of structural public policy in favor of debt funding, more equity could help offset the implicit funding subsidy from bailout expectation. Besides, higher levels of common stocks raise the loss-bearing capacity for these systemic firms. Finally, shareholders with a bigger skin in the game are expected to step up their monitoring of banks' managers and adjust the latter's own incentives to take on larger risks and turn their banks into financial giants. While these effects are

serious and go in the right direction, limited liability of banks shareholders de facto put a lid over the efforts they could be expected to devote to better scrutinising banks' managers. Limited liability means that, even at higher level of loss-absorbing capacity, increased leverage and higher volatility in asset returns will yield profits to investors and losses for other stakeholders, including the government. To mitigate this negative side effect of higher capital requirements for systemic banks, there is no way around the need for intrusive supervision. To a large extent, one of the role of supervision is to compensate for incentives that are not aligned with financial stability.

Identifying global systemic banks will help design and implement policies to reduce the social cost of their failure. The issue at stake is about the link between banks' business models and structure on the one hand, and financial stability on the other hand. Is a bank's core economic function to be "*a business whose income is derived chiefly from lending its promises to pay*" (Schumpeter, 1934)? Are other bank activities always conducive to situations where "*the capital development of a country becomes a by-product of the activities of a casino*" (Keynes, 1936)? It is a fact that larger firms tend to run varied and complex business lines. Such mega-banks de facto create internal and organic channels of contagion from one activity to another, at the risk of jeopardising those critical for the functioning of the economy. One possible policy response to this increased risk of spillovers is to weigh on banking groups structure to make their parts detachable – or ring-fenced – and resolvable more easily.

There is a clear benefit to force banks to think through their organisation and assess whether it is a source of resilience or weakness. Yet, the notion of conglomerate does not necessarily equate with that of systemic risks. Only a minority of those financial firms which have created disruptions to the real economy – whether domestically or globally – were large diversified banking groups. To date, those groups offering a broader range of services have managed to go through the crisis less badly than others. The scope of their activity is certainly not the only reasons for this. It is yet clear that it has helped, by ensuring a more stable flow of revenues across different financial and economic situations.

The more important issue is whether policy-makers are equipped to resolve in an orderly fashion any kind of financial firms. Progress has been made on that front. The Financial Stability Board has developed and agreed on common international principles for resolution regimes. These principles need now to be turned into law.

3|3 Bailing-in whose creditors?

Sovereigns will always be under pressure to support their financial system when an extreme, uninsurable shock hits. Similarly, the banking system's stability will always be jeopardised when the sovereign's fiscal position becomes unsustainable. No policy can fully prevent this. Yet, some policies can create incentives for the creditors of banks and/or sovereign to better consider the possibility of losses should the debt of one of the latter become non sustainable.

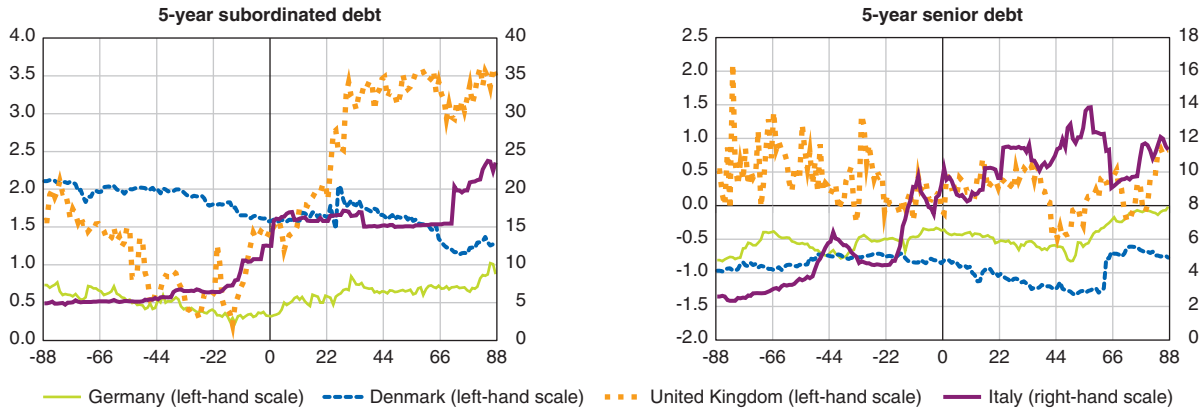
Assessing possible losses and impact

Policies to bail in creditors aim precisely at this. Technically, bailing in creditors can be achieved through different means, but economically the target is the same irrespective of the options: to secure that the negative externalities associated with banks' or the sovereign's failure are priced in by their investors and creditors. For banks, these tools would extend their ex post loss absorbing capacity beyond equity in a gone concern situation. For both the sovereign and banks, they would ideally contribute to making the allocation of losses more orderly and would trigger an ex ante re-pricing of funding conditions, contributing to more accurate pricing of risks and negative externalities.

Practical experience to date with bail-in regimes for banks is limited. Few countries have enacted one; even fewer have actually made use of them. Conclusions from empirical analysis on the actual impact of such regimes on banks' funding cost can only be indicative. Still, investigating the changes in market price for various classes, duration and ratings of bank debts in countries which have either enacted or announced a bail-in regime offers insights (Chart 6). Such investigation suggests that the price impact of bail in regimes can be significant, but may

Chart 6
Impact of bail-in regimes on banks' funding costs
Germany, Denmark, the United Kingdom and Italy

(y-axis: Yield-to-maturity. Percentage points [deviation from control group]; x-axis: nb of days. 0 = date of the bail-in measures)



The graphs plot the difference in the yield of banks' debt in countries that have introduced or implemented bail-in powers and the yield of debt issued by a group of 13 French, Italian and Dutch banks not directly impacted by those bail-in measures.
Bail-in measures refer to: (i) for Germany, the entry into force of the bank restructuring Act which allows imposing losses on subordinated and senior debt in case of failure (January 2011); (ii) for the United Kingdom, the banking Act which creates a special resolution regime (February 2009); (iii) for Ireland, the Credit institutions bill on the basis of which the Minister for Finance can impose losses on subordinated bonds in case of failure of banks which have benefited from State support (December 2010); (iv) for Denmark, the losses imposed on Amagerbanken's creditors, including senior creditors and depositors (Feb. 2011).
Source: Coffinet and Dujardin (2011).

not always be so. It seems stronger for bank securities that are unsecured, of 3 to 5 year duration, and of comparatively lower quality. Whether the impact is permanent is unclear. Looking at bank by bank results, it seems that the impact is comparatively milder for banks that are larger (more systemic). From a policy perspective, this would suggest that bail-in regimes may indeed help offsetting part of the implicit support subsidy to banks. In light of differences in the magnitude of impacts across countries, it would also suggest that design issues are instrumental in actually delivering the intended changes.

Bailing-in banks, bailing-in sovereigns, how the two approaches would interact

A major policy question is how the two approaches to bail-in, for banks and for the sovereigns, would actually interact. Indeed, financial institutions, and banks in particular, are major lenders to governments and hold significant direct or indirect exposures to sovereign credit. Requiring them to take a loss on their sovereign exposures so as to put public debt on a sustainable path could deteriorate significantly banks' capital position. In adverse circumstances, this deterioration could then translate into a bank's creditors being required to shoulder losses through a write-down or a conversion of their claims into common stocks. There could be a clear risk that a dual bail in regime creates a mechanical transmission channel of stress. The net outcome for financial stability would depend on whether, in a crisis and after authorities have taken mitigating actions, expectations from investors converge towards a good or bad equilibrium. In a good equilibrium, investors would expect sovereign debt reduction to restore fiscal space and allow the economy to restart; this in turn could be associated with a less depreciated environment for banks to operate in and, consequently, a reduced chance of failure for them. In a bad equilibrium, losses imposed on sovereign creditors would not credibly or materially affect the sustainability of public debt and leave the outlook for the economy uncertain; this in turn would suggest that banks could face further hardship both directly as sovereign exposures would still be exposed to losses and indirectly as the earning capacity from the rest of their assets could deteriorate further. In such situation, the possibility for bank's creditors to be bailed in could accelerate a run on banks' funding and consequently magnify the crisis.

In terms of policy-making, absent a very robust institutional setup, the mere possibility of expectations converging on a bad equilibrium – which is a genuine concern in heightened uncertainty typical of a sovereign crisis – may well prevent authorities from tackling the problems in a timely fashion and, rather, induce them to buy time.

A MACROPRUDENTIAL PERSPECTIVE

Key to avoiding the risk of paralysis and securing timely actions is the adoption of a macroprudential perspective for financial stability policies. As far as banks are concerned, authorities must seek to raise their risk bearing capacity in synch with the build-up of sources of system-wide instability. This means acting preventively, before actual stress occurs. In a crisis, this means requesting banks to spare capital, by applying conservative profit distribution policies, and to seek support from shareholders. Experience suggests also that central banks can backstop banks and the interbank market to ensure credit continues to be allocated to the economy. As far as sovereign are concerned, fiscal space must be created in good times, preserved through binding rules, and used «efficiently» when needed.

4| CONCLUDING REMARKS

The crisis has shattered two fallacies that were part of the pre-crisis economic and financial wisdom. The first fallacy was that private debts created out of risky assets could be morphed through financial techniques into high quality and liquid assets. The second one was that there are intrinsically riskless financial assets, which were epitomised by advanced countries' sovereign debts.

Financial regulation and policy frameworks need to adapt and create a "new normal", where all risks are properly measured and understood, they are fully priced in and their quantity better controlled. Important steps have been made to correct the externalities associated with private debt. Basel III's capital framework, notably the new treatment of market or securitisation risks, goes a long way towards improving previous rules. Macroprudential policy frameworks are in their infancy. Designing effective institutional setups and identifying efficient tools are not easy tasks.

Dealing with the fallacy about the risklessness of public debt is no less challenging. Extreme financial shocks will occur again and the pressure will be on governments to step in and put their balance sheet at risks. Only creditworthy sovereigns can credibly play that role. Governments must better take into account that their fiscal policy in good times has a bearing on their ability to support the economy in bad (crisis) times. This was what, in 1792, Condorcet called for in an address to the Assemblée Nationale (the French Parliament), when he warned that: "*the situation of our public finances is the only real danger that we must fight*" and suggested some institutional changes to better secure fiscal discipline through the cycle.

Fiscal rules and discipline are sine qua non requirements for a stable financial system across the cycle. At the same time, absent credible safeguards, fiscally stronger sovereigns may also create and reinforce markets incentives to gamble on public support. Fiscal space must be preserved in good times, and used «efficiently» when needed in bad times. Enshrining these principles in robust, time consistent policy frameworks is one of the challenges on the authorities' agenda.

References

Acharya (V.), Drechsler (I.) and Schnabl (P.) (2011)
"A pyrrhic victory? – Bank bailouts and sovereign credit risk", *Working Paper*, NYU Stern.

Acharya (V.) and Yorulmazer (T.) (2007)
"Too many to fail – an analysis of time inconsistency in bank closure policies", *Journal of Financial Intermediation*, 16(1), pp. 1-31.

Attinasi (M.-G.), Checherita (C.) and Nickel (C.) (2009)
"What explains the surge in euro area sovereign spreads during the financial crisis of 2007-09?", *ECB Working Paper* No. 1131.

Baker (D.) and McArthur (T.) (2009)
"The value of the 'too-big-to-fail' big bank subsdidy", CEPR Reports and Issue Briefs 2009-36.

Beck (T.), Hesse (H.), Kick (T.) and von Westernhagen (N.) (2009)
"Bank ownership and stability: evidence from Germany". Tilburg University, mimeo.

Bolton (P.) and Jeanne (O.) (2011)
"Sovereign default and bank fragility in financially integrated economies", *NBER Working Paper* 16899.

Breton (R.), Vardoulakis (A.), Weber (P.-F.) (2011)
"What can be said about higher capital requirements to deal with SIFIs?", Banque de France mimeo.

Brewer (E.) and Jagtiani (J.) (2010)
"How much did banks pay to become too-big-too-fail and to become systemically important", *Federal Reserve Bank of Philadelphia Working Paper* 09-34.

Brown (C. O.) and Dinç (I. S.) (2011)
"Too many to fail? Evidence of regulatory forbearance when the banking sector is weak", *Review of Financial Studies* 24(4), pp. 1378-1405.

Coffinet (J.) and Dujardin (M.) (2011)
"What is the cost of debt associated with 'bail-in' regimes?", Banque de France mimeo.

Condorcet (1792)
"Discours sur les finances prononcé à l'Assemblée Nationale", in *Mémoires et discours sur les monnaies et les finances* (1790-1792), L'Harmattan.

DeYoung (B.) (2010)
"Scale economies are a distraction. The real issue for policy is credible resolution of failing financial firms, not bank size", The Region, September, pp. 14-15.

Dieckman (S.) and Plank (T.) (2010)
"Default risk of advanced economies: an empirical analysis of credit default swaps during the financial crisis", mimeo, Wharton.

Farhi (E.) and Tirole (J.) (2012)
"Collective moral hazard, maturity mismatch and systemic bailouts", *American Economic Review*, February.

Feng (G.) and Serletis (A.) (2010)
"Efficiency, technical change, and returns to scale in large US banks: panel data evidence from an output distance function satisfying theoretical regularity", *Journal of Banking and Finance* 34(1), pp. 127-38.

Gropp (R.) and Vesala (J.) (2004)
"Deposit insurance, moral hazard and market monitoring", *Review of Finance* 8, pp. 571-602.

Keister (T.) (2011)
"Bailouts and financial fragility", Federal Reserve Bank of New York *Staff Report* 473.

Keynes (J. M.) (1936)
The general theory of employment, interest and money, Palgrave.

Kocherlakota (N.) (2010)
"Taxing risk and the optimal regulation of financial institutions", *Economic Policy Paper* 10-3, Federal Reserve Bank of Minneapolis.

Martin (A.) (2003)
"A guide to deposit insurance reform", *Federal Reserve Bank of Kansas City Economic Review* Q1-2003, pp. 29-54.

Nier (E.) and Baumann (U.) (2006)
"Market discipline, disclosure, and moral hazard in banking", *Journal of Financial Intermediation* 15(3), pp. 332-61.

Panetta (F.), Faeh (T.), Grande (G.), Ho (C.), King (M.), Levy (A.), Signoretti (F. M.), Taboga (M.) and Zaghini (A.) (2009)
"An assessment of financial sector rescue programmes", *BIS Papers* No. 48

Reinhart (C.) and Rogoff (K.) (2011)
"From financial crash to debt crisis", *American Economic Review* 101, pp. 1676-1706.

Reinhart (C.) and Rogoff (K.) (2009)
"The aftermath of financial crises", *American Economic Review*, vol. 99(2), pp. 466-472.

Schumpeter (J.) (1934)
The theory of economic development, Transaction Publishers.

Turner (A.) (2011)
"Debt and deleveraging: long term and short term challenges", presidential lecture, Center for Financial Studies, Frankfurt, November 21.

Ueda (K.) and Weder di Mauro (B.) (2011)
"Quantifying the value of the subsidy for systemically important financial institutions", manuscript.

Wheelock (D. C.) and Wilson (P. W.) (2009)
"Are US banks too large?" *Working Paper* 2009-054B, Federal Reserve Bank of St. Louis. Revised December.

Sovereign creditworthiness and financial stability: an international perspective

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Financial stability depends critically on the two-way interaction between banks and governments. Sovereign creditworthiness represents the ultimate source of insurance for the financial system and provides a solid basis for the pricing of assets, by supplying a risk-free security. A sound banking sector ensures the smooth flow of credit to the economy as well as solid revenue and financing for the government. Weakness in either sector can give rise to a vicious circle of uncertainty and distress with highly damaging consequences for the economy. An interconnected global economy means that problems can propagate across borders. The policy recommendation is simple: appropriate buffers should be built in good times to cushion the impact of bad times. Fiscal buffers support the risk-free status of sovereign debt, while capital and liquidity buffers underpin the soundness of the financial system.

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The global economic crisis originated in the financial systems of some advanced economies, but it quickly spread to engulf much of the global economy. Governments have found themselves at the centre of the storm from the beginning. First, they led the efforts to deal with the crisis. Later, many of them took financial hits as a result of it. Most recently, some have become the focal point of a crisis of confidence in their ability to service their debts.

The number of sovereigns that have experienced considerable fiscal difficulties lately is much larger than the number of financial systems that went through significant problems at the start of the crisis. Moreover, concerns about sovereign solvency have seriously affected the health of banking systems, within and across borders. The feedback loop cycles with destructive force.

Why did this happen? Why are governments now battling against bond markets and banks struggling with liquidity and solvency concerns? After all, the ability of the government to build a bridge over troubled waters has always been the ultimate source of the stability of the financial system. Importantly, what are the lessons for policy looking ahead?

The confluence of three *key initial conditions* largely explains the severity and spread of the crisis.

• First, the banking systems of most major developed economies entered the crisis with inadequate capital. Buoyed by exceedingly abundant liquidity in the run-up to the turmoil, financial institutions, large and small, took on greater and greater risks. Neither their internal risk management practices nor external oversight, whether by market participants or public authorities, was able to contain this process. As a result, they went into the crisis poorly capitalised, highly leveraged, and with huge maturity and currency balance sheet mismatches (McGuire and von Peter, 2009). This made them quite vulnerable to the original shocks and exacerbated the perverse feedback effects between banks and sovereigns.

• Second, major sovereigns had not accumulated adequate fiscal buffers during the boom prior to the crisis. Private credit booms had given rise to temporary, unsustainable increases in revenues, over and above the typical cyclical boost driven by the strong economic growth in the 2002–07 period. This lulled many governments into a false sense of security and encouraged them to live beyond their means. As a result, they were unprepared to deal with the consequences of the serious shocks that hit the international financial system in 2007–08 and the subsequent slowdown in economic activity. To be sure, they were able to quickly provide the fiscal resources that were urgently needed for the immediate recapitalisation of their banking systems, for the working of automatic stabilisers and for discretionary fiscal stimulus. But the small reserves meant that the response proved unsustainable, not least given the longer-term unfunded commitments governments faced. All this jeopardised their risk-free status in the later stages of the crisis.

• Third, the unprecedented degree of interconnectedness in the global financial system complicated matters further. The dense international web of connections among sovereigns and financial institutions around the world intensified and propagated the crisis. The benefits and desirability of global financial integration are indisputable. But greater financial integration inevitably carries greater responsibility. On the fiscal front, it strengthens the need for resilient state finances. On the financial system front, it makes a well capitalised and reasonably liquid banking system vital.

We would also argue that, to a considerable extent, the lack of adequate buffers reflects policymakers' failure to internalise the impact of their decisions on the global financial system. And many of them did not realise that their actions, or lack thereof, would trigger a chain of events that would in turn feed back onto their own economies and financial systems.

We next develop this argument in five steps. In the first section, we review the two-way interaction between government finances and banks. In the second, we trace the evolution of that nexus during the expansionary phase that preceded the crisis, outlining how the above initial conditions came to be. In the third, we investigate how they interacted so as to amplify the unfolding crisis. In the fourth, we use the latest data on bank exposures to sovereigns in order to gauge the degree to which weaknesses in bank balance sheets threaten to extend the life of the malign feedback loop between bank and sovereign risk. In the last section, we present our policy prescriptions.

1| The two-way interaction between government finances and banks

How did a crisis that originated in the financial sectors of a small number of economies morph into a sovereign debt crisis which has affected a much larger set of governments? In turn, how did financial institutions that survived the first stages of the crisis relatively unscathed become infected once the crisis engulfed sovereigns? The answers to both of these questions are related to the interaction between the three initial conditions discussed above. In this section, we review the main channels in the feedback loop between bank risk (the first initial condition) and sovereign risk (the second initial condition) in the context of a highly interconnected global financial system (the third initial condition).

1|1 Transmission of financial sector risk to sovereigns

A remarkable feature of Europe's sovereign debt strains is the role played by governments that had spent years apparently on the right side of the Maastricht criteria, keeping a seemingly prudent lid on both deficits and debt. Nevertheless, in several of those countries, weaknesses in financial sector balance sheets infected the sovereign. These weaknesses can be transmitted from banks to sovereigns through three main channels.

- First, credit booms, while masking weaknesses in financial sector balance sheets, can give a one-off boost to governments' fiscal balances over and above that linked to normal cyclical economic expansions. This makes the government's fiscal position appear much stronger than it actually is. In turn, this may unjustifiably give governments the confidence to pursue policies that result in increases in spending that are unsustainable in the long run. As the recent experience of Spain illustrates, such policies may be difficult to reverse once the credit boom and associated revenues come to an end, leaving scant room to manoeuvre.

- Second, any constraints on lending caused by a deterioration in the balance sheets of banks and other financial institutions result in macroeconomic costs that weaken fiscal accounts further. If financial institutions fail to build up sufficient capital and liquidity buffers during the boom, credit constraints tighten over and above any perceived deterioration in borrower quality. This can choke off the credit supply and, unless balance sheets are repaired quickly, lead to serious distortions in its allocation. This further dampens economic activity, which, in turn, causes tax revenues to decline and government expenditures to increase. As a result, the public sector deficit widens and the creditworthiness of the sovereign deteriorates. If sovereigns do not respond in a timely manner to the fiscal deterioration caused by a turn in the credit cycle, they may compound the errors arising from complacency during the credit build-up phase.

- Finally, when large systemically important financial institutions face the threat of bankruptcy in the absence of effective resolution regimes, sovereigns may have little alternative but to provide them with financial support in order to preserve financial stability. Regardless of whether the government support takes the form of liquidity assistance, direct injections of capital, asset purchase programmes or debt guarantees, it is bound to increase the explicit or implicit obligations of the sovereign, and thus weaken its balance sheet. This channel has been most prominent in the case of Ireland during the 2008–11 period.

1|2 Transmission of sovereign risk to the financial sector

In a number of euro area countries, most notably Greece and Italy, weaknesses in sovereign balance sheets have infected banking systems. In general, a deterioration in the perceived creditworthiness of sovereigns can affect the financial sector through five main channels.

- The first channel involves direct portfolio exposures. The higher bond yields (lower bond prices) associated with higher sovereign risk can hurt financial institutions through their holdings of domestic and foreign sovereign debt. In most economies, banks tend to have a strong home bias in their government bond portfolios. Not surprisingly, holdings of domestic government bonds as a percentage of bank capital tend to be larger in countries with high public debt. To be sure, accounting practices typically shield banks from the immediate impact of declines in the market prices of sovereign

bonds. For example, across EU countries, most of the domestic sovereign exposure (85% on average) is held in the banking book (CGFS, 2011). But accounting is one thing, and market participants' assessments are another.

Financial institutions are vulnerable not only through their exposure to the domestic public sector, but also through that to foreign public sectors (recall the third initial condition). As we demonstrate below, many internationally active banks' foreign exposures to the public sectors of the countries currently at the centre of the European sovereign debt crisis (i.e. Greece, Ireland, Italy, Portugal and Spain) were quite sizeable at their peak in 2009.

• The second channel works through funding conditions. Sovereign securities are used extensively by banks as collateral to secure wholesale funding from central banks, private repo markets and covered bond markets. Increases in sovereign risk reduce the availability or eligibility of collateral, and hence banks' funding capacity. There is evidence that in 2010 30% of the spread at launch on bank bonds reflected the conditions of the sovereign, and this figure was as high as 50% for countries for which sovereign strains were most pronounced (CGFS, 2011).

• The third channel is more subtle and relates to the perceived ability of the sovereign to provide a backstop to banks under strain. A government that is perceived by market participants to be in a weaker fiscal position provides less credible and valuable guarantees or financial support to banks in its jurisdiction. This increases the credit risk of these financial institutions. Despite efforts to reduce the safety net through the implementation of orderly resolution mechanisms, as of the second quarter of 2011, rating agencies still reckoned that the prospect of government support justified higher ratings by two to five notches (Hannoun, 2011).[1] Nevertheless, over the second half of 2011 deterioration in the creditworthiness of sovereigns in Greece, Italy, Portugal and Spain led to a decline in the perceived official support for banks in those jurisdictions and, consequently, to a fall in their all-in ratings (Tarashev, 2011).

• The fourth channel relates to the possibility of government debt crowding out private sector debt. Banks have to compete with the sovereign when raising funds from investors. Sovereign distress increases the cost and/or reduces the availability of bank funding through debt. Even though this effect is not limited to banks, it affects them more strongly, given their sizeable funding needs. If the sovereign loses its riskless status, the likelihood of crowding out increases, as the two forms of debt become closer substitutes in investors' portfolios.

• Finally, a loss of market confidence in sovereign debt may trigger fiscal consolidation. This is unambiguously beneficial in the long term. In the short term, however, the net effect is not as easy to predict. On the one hand, fiscal consolidation may weaken aggregate demand and economic activity, weighing further on credit quality and bank profitability. On the other hand, if confidence has deteriorated far enough, fiscal consolidation may actually buoy economic activity.

2| Developments in the pre-crisis period (2002-07)

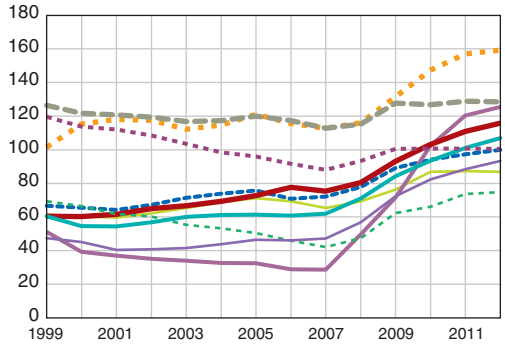
Just as in the run-up to other financial crises, in the 2002–07 period there were no signs that market participants saw the build-up in risks. The debt-to-GDP ratios of most governments in the developed world were within what are typically considered sustainable ranges (Chart 1a). Sovereign bond markets (Chart 1b) and credit rating agencies (Chart 1c) generously rewarded governments' behaviour. Banks, especially large and internationally active ones, would report higher profits year in and year out. Equity investors cheered enthusiastically, and, despite banks' ever increasing leverage, credit rating agencies and financial market participants regarded them as safe (Chart 2). Vulnerabilities kept growing below the radar. Governments cheered alongside market participants. Complacency was the order of the day.

1 *Furthermore, over the past couple of years governments have started providing significant implicit support to non-systemically relevant medium-sized and smaller banks. As of the end of July 2011, the implicit support for these banks in four large EU economies was of similar magnitude to the implicit support provided to large banks (CGFS, 2011).*

Chart 1
Sovereign credit risk indicators

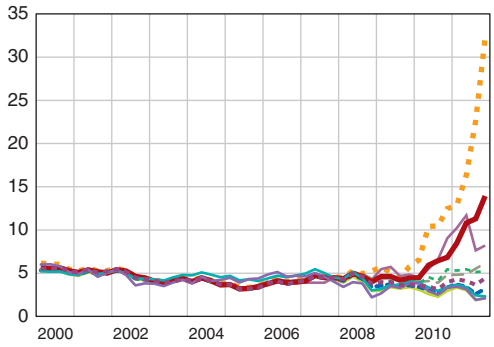
a) General government gross financial liabilities[a)]

(as a percentage of nominal GDP; annual data)



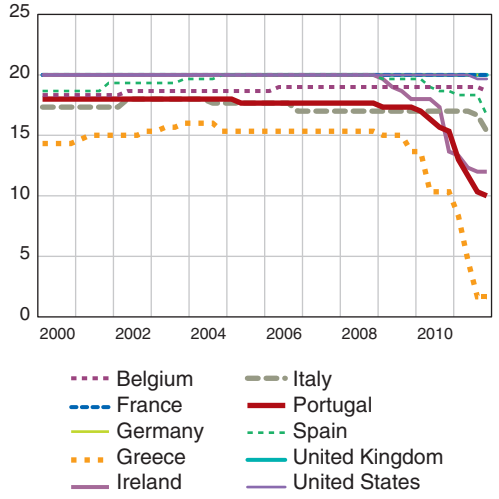
b) Ten-year government bond yields

(in %; quarterly data)



c) Sovereign credit ratings[b)]

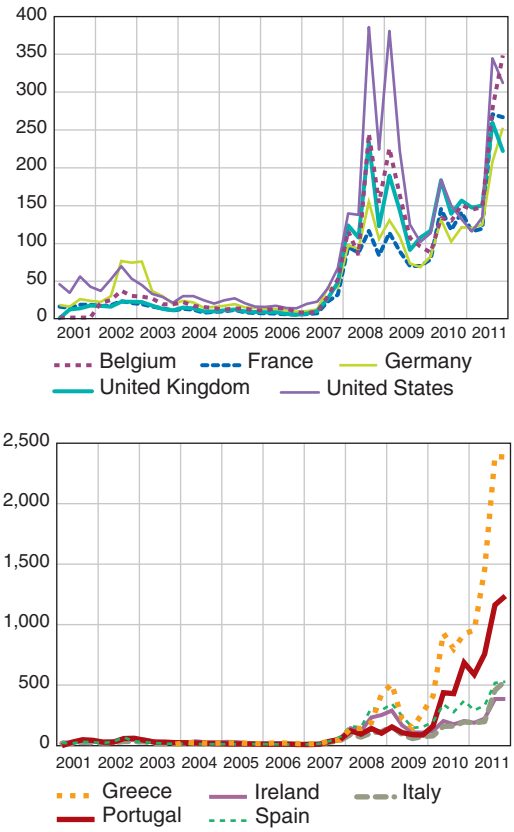
(quarterly data)



a) Belgium includes the debt of the Belgian National Railways Company (SNCB) from 2005 onwards.
b) Average of Fitch, Moody's and Standard & Poor's foreign currency long-term sovereign ratings. Vertical scale is calibrated so that 20 represents the highest possible rating category and each unit represents one notch.
Sources: OECD, Economic Outlook; Bloomberg; BIS calculations.

Chart 2
Bank CDS spreads for selected banks nationalities[a)]

(in basis points; quarterly data)

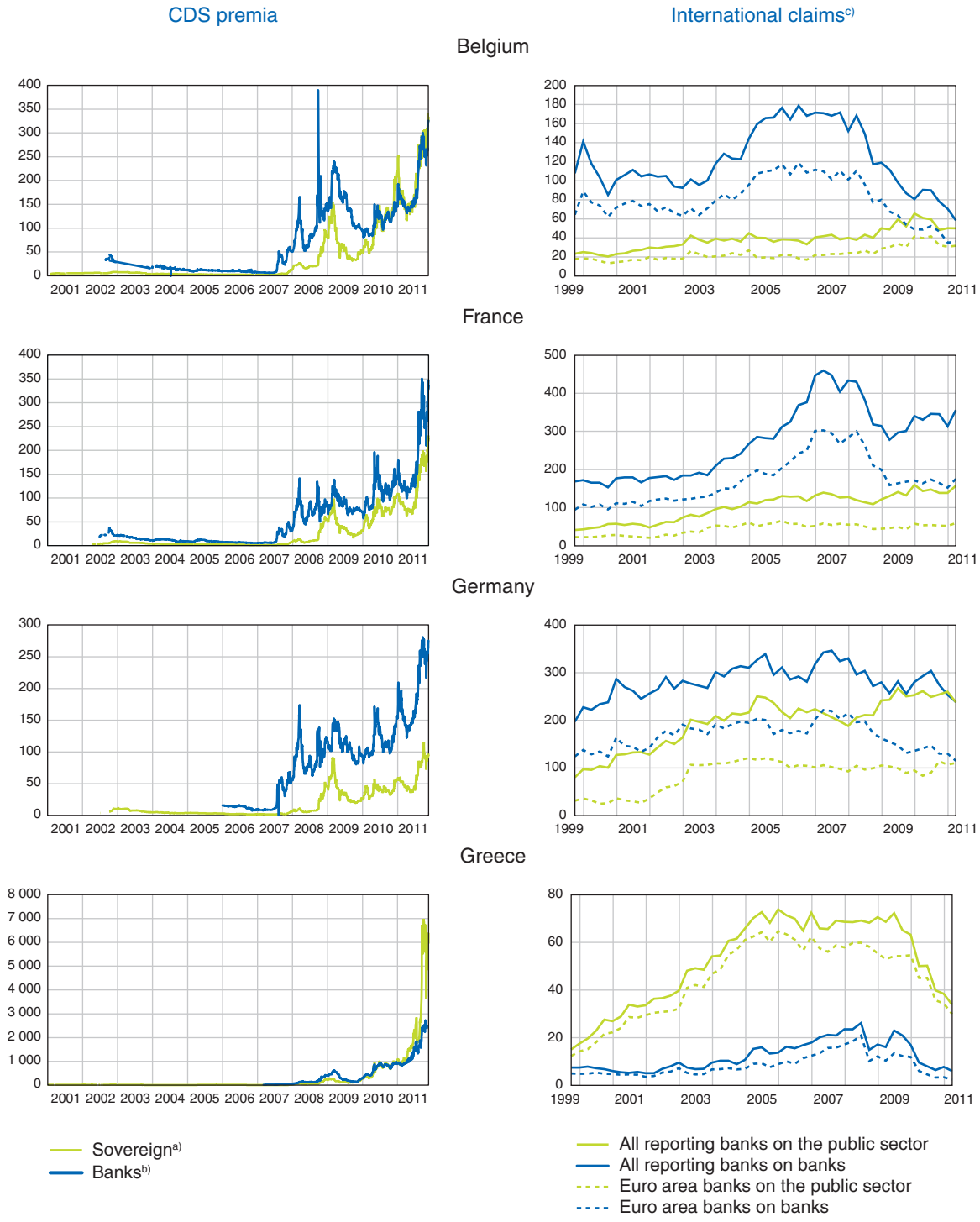


a) Equally weighted average of senior five-year CDS spreads for a sample of domestic financial institutions.
Source: Markit.

Global financial integration played a crucial role in facilitating this leveraging process. On the demand side, in some countries (e.g. Greece and Italy), the main borrowers from abroad were governments that needed to finance their excessive spending. In others (e.g. Spain and Ireland), banks drew on international credit and in turn financed private credit booms in their home economies.

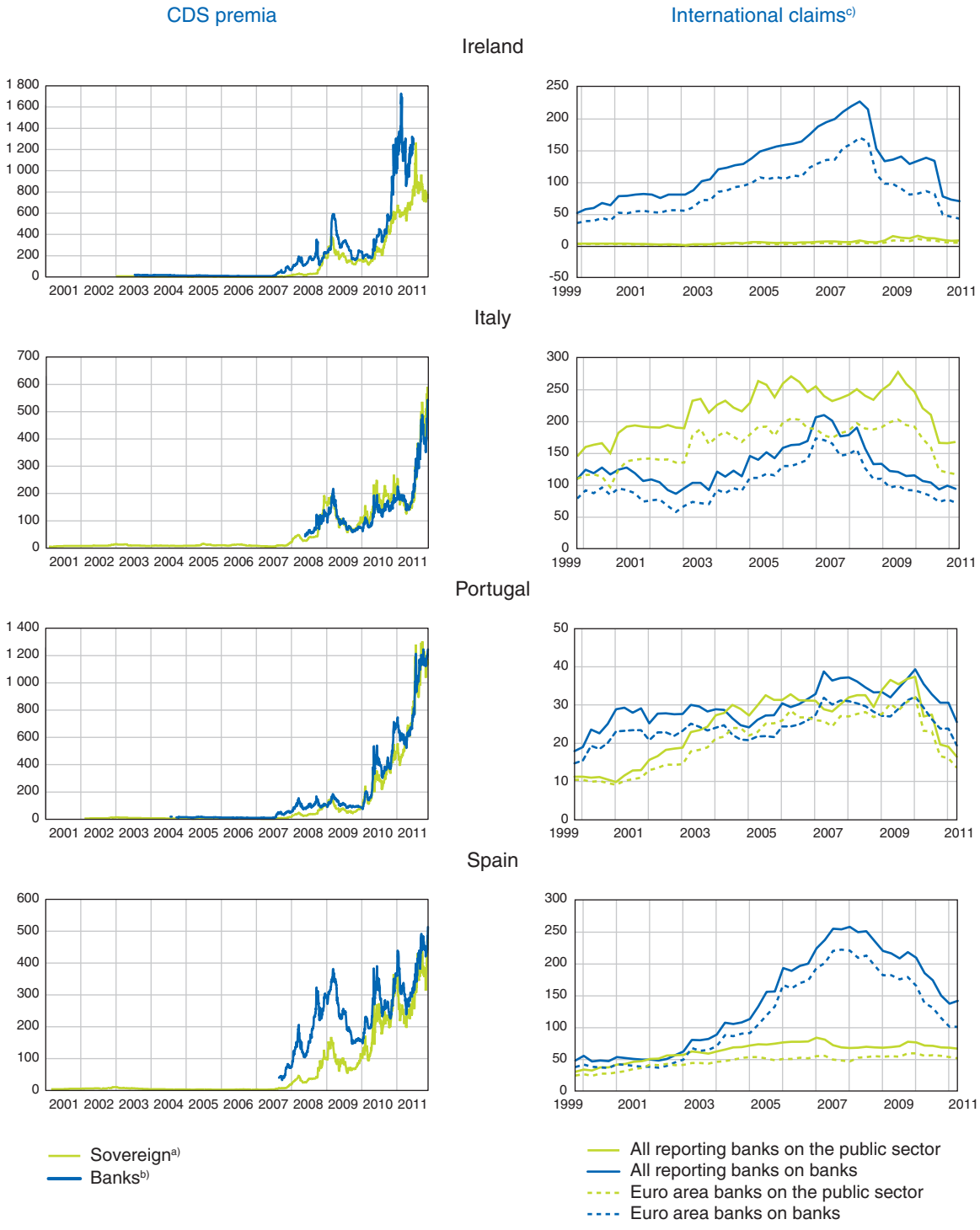
On the supply side, internationally active banks (particularly those headquartered in the euro area) readily accommodated the credit demands of borrowers regardless of their geographical location. Not surprisingly, euro area banks turned into the main suppliers of credit to the euro area sectors whose indebtedness increased the most during the last decade (Chart 3, right panels). More specifically, euro area banks were the main foreign bank lenders

Chart 3
CDS spreads and international claims on selected countries



a) Five-year on-the-run CDS spreads; in basis points.
b) Equally weighted average of senior five-year CDS spreads for a sample of domestic financial institutions; in basis points.
c) By counterparty sector, in billions of euros. All claims are assumed to be denominated in euros. International claims consist of cross-border claims and local claims denominated in foreign currencies. Local claims denominated in local currencies are not included.
Sources: Markit; BIS consolidated banking statistics (immediate borrower basis); BIS calculations.

Chart 3
CDS spreads and international claims on selected countries (cont'd)



a) Five-year on-the-run CDS spreads; in basis points.
b) Equally weighted average of senior five-year CDS spreads for a sample of domestic financial institutions; in basis points.
c) By counterparty sector, in billions of euros. All claims are assumed to be denominated in euros. International claims consist of cross-border claims and local claims denominated in foreign currencies. Local claims denominated in local currencies are not included.
Sources: Markit; BIS consolidated banking statistics (immediate borrower basis); BIS calculations.

to the Greek and Italian public sectors and to the Spanish and Irish banking sectors. Furthermore, euro area banks proved more eager than their peers to finance riskier foreign sovereigns (Chart 4). They had significantly larger shares of foreign claims on the public sectors of the riskier euro area sovereigns (Italy, Spain and Greece) than banks from the rest of the world, who lent primarily to the more solid euro area sovereigns (Germany and France).

Banks were equally complacent about rollover risk in the interbank market. Many became too dependent on cheap, but unreliable, short-term funding and failed to build adequate liquidity buffers. Not surprisingly, under stress, unsecured funding dried up and banks turned increasingly to collateralised borrowing, both short-term (e.g. the repo market) and long-term (e.g. covered bonds). The ECB Euro Money Market Surveys reported a halving in overall volumes in unsecured transactions between early 2007 and early 2010, with longer maturities more than proportionally reduced. Secured transactions rose from less than two thirds of all cash transactions to more than three quarters (CGFS, 2011).

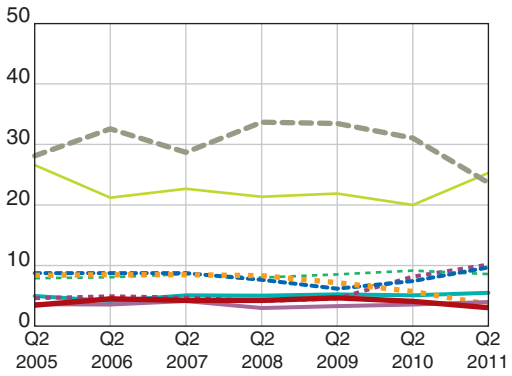
As hubris became pervasive, underneath the surface trouble loomed. First, in some economies private credit-to-GDP ratios and property prices had soared far above their long-term trends. This should have been a crucial warning signal for financial institutions around the world since, as Drehmann *et al* (2011) have shown, the former of these two variables is the most reliable single indicator of the build-up of systemic risk in a given economy and a helpful predictor of impending systemic banking crises (Caruana, 2010). However, financial institutions, unperturbed by such signs of impending danger, kept increasing their leverage. Thus, the first initial condition for the spread of the crisis was in place.

Second, two temporary factors flattered the fiscal balances of most sovereigns in the developed world. For one, the expansionary phase of the business cycle boosted the public sector's accounts (Chart 5). The average overall fiscal balance for the 2005–07 period exceeded its cyclically adjusted counterpart in all but seven OECD economies. In some countries (e.g. Estonia, Sweden, Iceland, Ireland and Hungary) the difference surpassed a full percentage point. In addition, and not accounted for in traditional cyclically

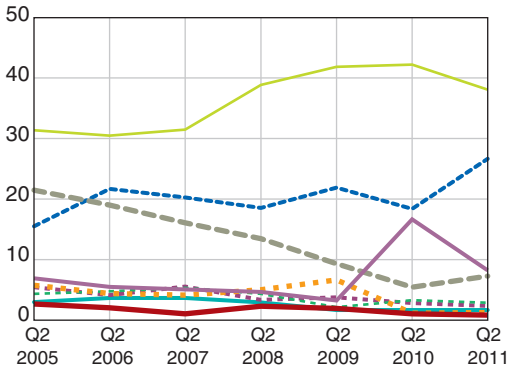
Chart 4
BIS reporting banks' foreign claims on selected euro area public sectors

(as percentage of their foreign claims on all euro area public sectors, by nationality of banks; quarterly data)

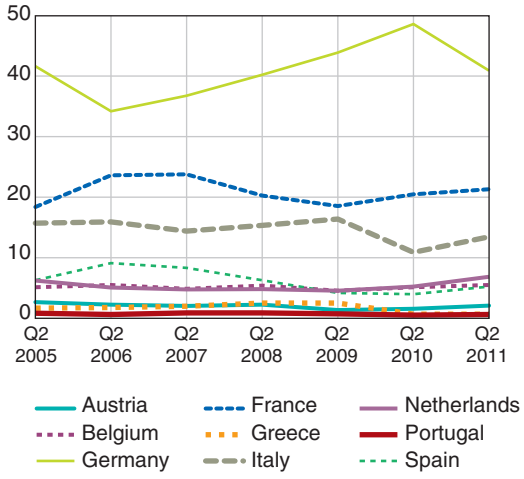
a) Euro area banks



b) European non-euro area banks



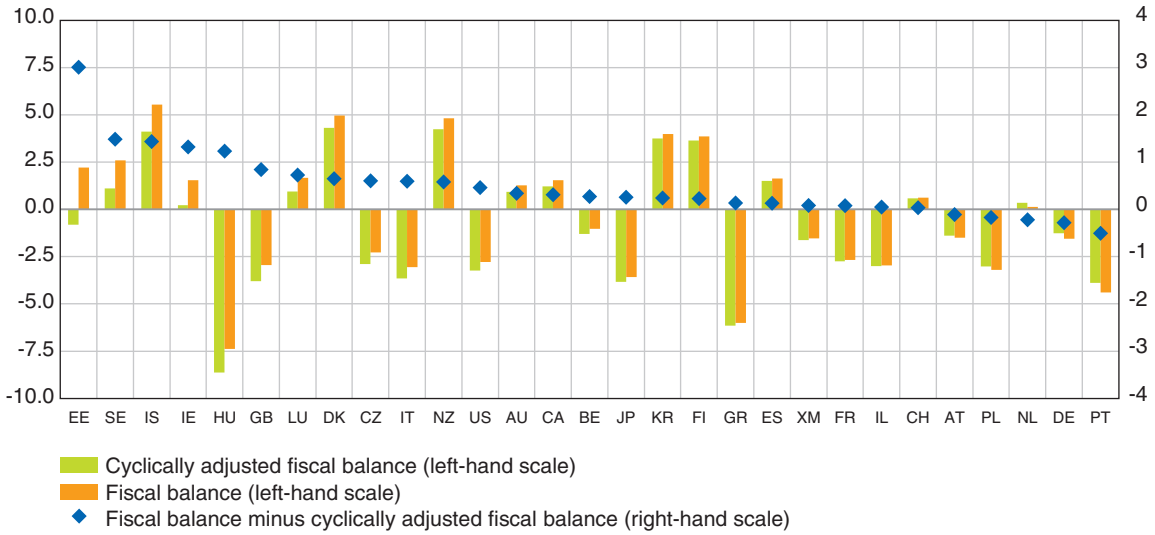
c) Non-European banks



Source: BIS consolidated banking statistics (ultimate risk basis)

Chart 5
General government fiscal balance, selected countries

(Average for 2005–07; as a percentage of GDP)



AT = Austria; AU = Australia; BE = Belgium; CA = Canada; CH = Switzerland; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; ES = Spain; FI = Finland; FR = France; GB = United Kingdom; GR = Greece; HU = Hungary; IE = Ireland; IL = Israel; IS = Iceland; IT = Italy; JP = Japan; KR = Korea; LU = Luxembourg; NL = Netherlands; NZ = New Zealand; PL = Poland; PT = Portugal; SE = Sweden; US = United States; XM = euro area.
Sources: OECD, Economic Outlook; BIS calculations.

adjusted figures, the credit- and asset price-intensive boom made matters worse. All this encouraged the authorities to spend more freely. Thus, the second initial condition for the crisis was in place.

As Governor Honohan of the Central Bank of Ireland so aptly put it (2010):

"The tax revenue generated by the boom came in many forms: capital gains on property, stamp duty on property transactions, value added tax on construction materials and income tax from the extra workers – immigrants from the rest of Europe, from Africa, from China, flooded in as the construction sector alone swelled up to account for about 13 per cent of the numbers at work (about twice the current level, which is closer to what would be normal)."

With the benefit of hindsight, it is clear that both financial stability and fiscal authorities could have been more aware of the build-up of risks – and they would have been, if the experience of previous crises had been heeded. This would have prevented them from adopting policies that were both unsafe and unsustainable. Furthermore, it would have allowed them to detect and react to the first signs of impending trouble much more promptly than they actually did. More concretely, financial stability authorities could have been more alert to the risk that the capital banks had set aside to address sovereign exposures would be insufficient (i.e. that the first of the initial conditions for the spread of a crisis was in place). For their part, fiscal authorities could have taken appropriate actions as soon as the early signs of problems in the financial system began to emerge. This would have put them in a much better position to deal with a major financial crisis (i.e. it would have ensured that the second of the initial conditions for the spread of a crisis was not in place).

3| Banks and sovereigns during the crisis (2007-present)

The first signs of stress in the financial system surfaced in the summer of 2007. In the immediate aftermath, there was little evidence that market participants were aware of the potential for the development of the malign feedback loop between bank and sovereign risk described in Section 1. Data on bond yields (Chart 1b) and CDS spreads (Chart 2 and left panels of Chart 3) for banks and sovereigns between July 2007 and August 2008 confirm this: investors worried mainly about the health of certain financial institutions and little about sovereign creditworthiness.

Indeed, even though sovereign CDS spreads for most developed countries did inch up slightly during the initial phase of the crisis, the increases in the CDS spreads of banks in the same countries were orders of magnitude greater (Chart 6a). For example, while the average bank CDS in Ireland increased by more than 350 basis points between June 2007 and September 2008, the corresponding sovereign CDS rose by less than 30 basis points during the same period. The picture was similar in most other developed economies, with especially large discrepancies in the cases of the United States, Spain and Australia.[2]

The situation changed drastically in September and October 2008, when a large number of sovereigns in the developed world provided support to their financial institutions in the form of asset purchase programmes, debt guarantees and direct equity injections. The financial support programmes were often sizeable, with upfront costs reaching up to 55% of GDP (Borio *et al*, 2010). Had sovereigns built adequate fiscal buffers during the expansionary phase of the economic cycle, the financial assistance would have reduced the tensions in the financial system without significantly affecting their creditworthiness. But this was not the case (Chart 6b). As a result, while the CDS spreads of financial institutions declined, those of the respective sovereigns rose considerably (Ejsing and Lemke, 2009).

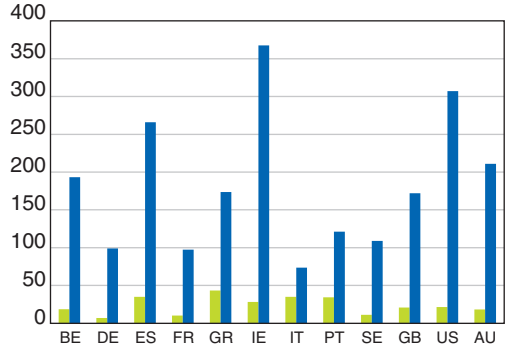
That said, the same period saw the first signs that market participants were beginning to factor in the effects of the indirect channels in the feedback loop described in Section 1. In particular, in September and October 2008 not all the changes in sovereign and bank CDS spreads were negatively correlated. Some countries, such as Greece and Italy, experienced relatively large increases in their sovereign CDS spreads without any noticeable declines in those of their banks.

Despite these early signs, not all investors were differentiating among sovereigns based on the health of their balance sheets. In the first year after the Lehman Brothers bankruptcy, some banking systems, most notably those in the euro area, started rebalancing their foreign portfolios towards the public sector indiscriminately. In particular, and in contrast to banking systems in the rest of the world, they substantially increased the foreign portfolio's share of claims on both relatively safe sovereigns, such as the United States, and relatively risky ones, from countries that would subsequently be at the epicentre of the

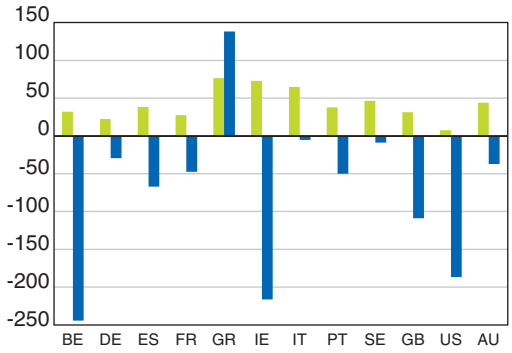
Chart 6
Sovereign and bank CDS spreads for selected nationalities

(in basis points)

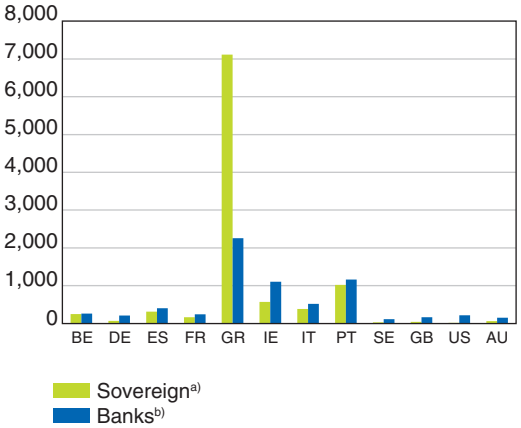
a) Changes between 1 June 2007 and 25 Sep. 2008



b) Changes between 26 Sep. and 31 Oct. 2008



c) Changes between 1 Oct. 2009 and 30 Nov. 2011



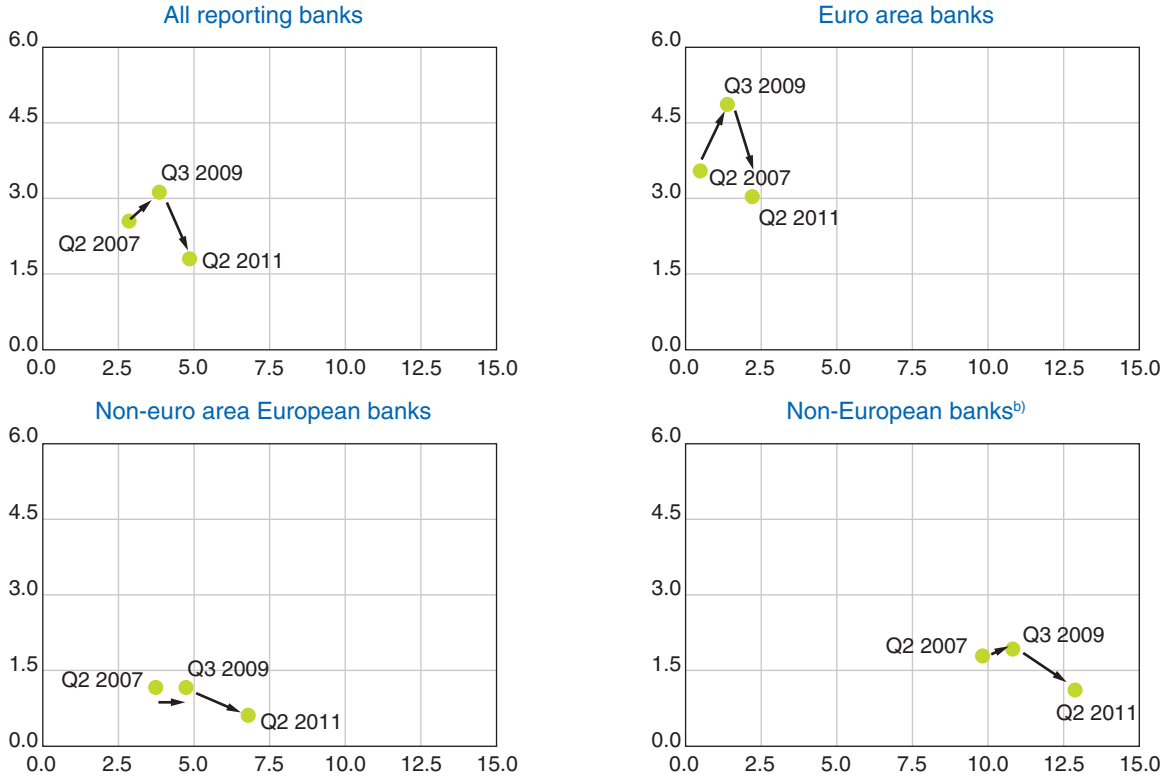
AU = Australia; BE = Belgium; DE = Germany; ES = Spain; FR = France; GR = Greece; IE = Ireland; IT = Italy; PT = Portugal; SE = Sweden; GB = United Kingdom; US = United States.

a) Five-year on-the-run CDS spreads.
b) Equally weighted average of senior five-year CDS spreads for a sample of domestic financial institutions.
Source: Markit.

2 *For further discussion, see Acharya* et al. *(2011).*

Chart 7
Consolidated foreign claims on the public sectors of the GIIPS[a] countries and the United States

(by bank nationality, as a percentage of banks' total foreign claims; x-axis: US public sector; y-axis: GIIPS public sectors)



a) GIIPS = Greece, Ireland, Italy, Portugal, Spain.
b) Excluding US banks.
Source: BIS consolidated banking statistics (ultimate risk basis).

European sovereign debt crisis: Greece, Ireland, Italy, Portugal and Spain (Chart 7).

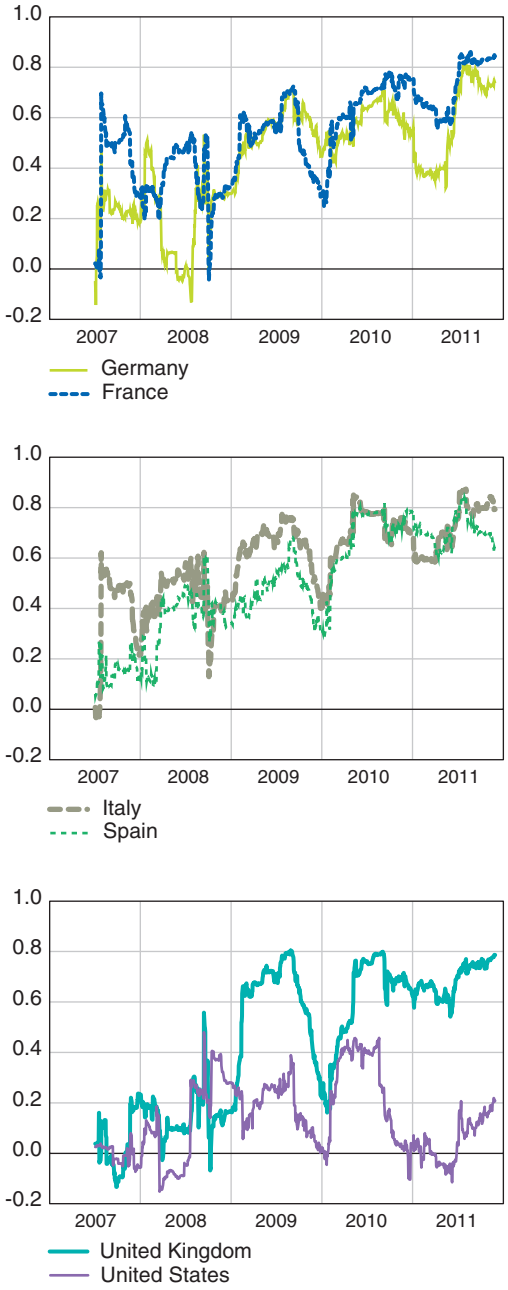
After the fourth quarter of 2009, when the first serious signs of fiscal problems in the euro area began to emerge, investors became much more aware of the possible channels for risk transfer between banks and sovereigns. As a result, they started to price their joint credit risks accordingly. Bank and sovereign CDS spreads became much more positively correlated with each other, both at low (Chart 6c) and high frequencies (Chart 8), and within and across countries. Against this backdrop, internationally active banks, including those headquartered in the euro area, started to rebalance their foreign portfolios away from the riskier sovereigns in the euro area, such as Greece, Ireland, Italy, Portugal and Spain, and towards perceived safer sovereigns, such as the United States (Chart 7) and Germany (Chart 4).

4| Where do we stand now?

The BIS consolidated international banking statistics can shed light on the degree to which the direct exposures of banks to sovereign debt are still a factor in the European sovereign debt crisis.

The combined foreign claims of BIS reporting banks on the public sectors of Greece, Ireland, Italy, Portugal and Spain fell from EUR 568 billion at the end of the third quarter of 2009 to EUR 335 billion at the end of the second quarter of 2011 – a decline of roughly 41% (Chart 9). There are three possible drivers of this decline. First, banks may have marked the value of some of the government debt on their trading books down to its market value or provisioned against future losses on their government debt holdings in the banking book. Second, banks may have let a portion of the government debt on their balance sheets mature without replenishing it. Third, banks

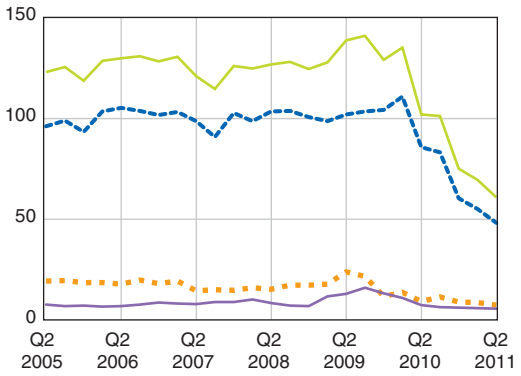
Chart 8
Correlations between sovereign and bank CDS spreads for selected nationalities[a)]



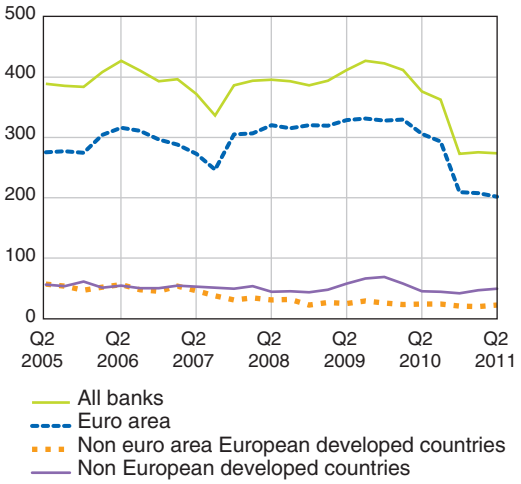
a) 90-day rolling window correlations between daily changes in five-year on-the-run sovereign CDS spreads and daily changes in equally weighted averages of senior five-year CDS spreads for a sample of domestic financial institutions.
Source: Markit.

Chart 9
Foreign claims on selected countries' public sectors
(in billions of euros, by bank nationality)

a) Greece, Ireland, Portugal



b) Italy, Spain



Source: BIS consolidated banking statistics (ultimate risk basis).

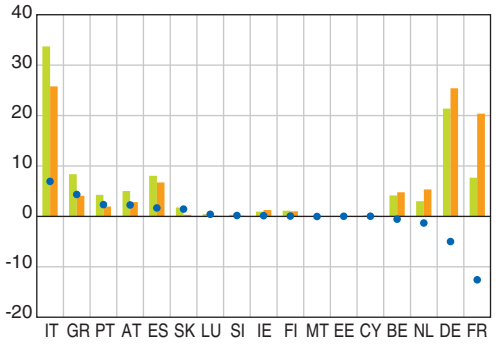
may have sold some of their foreign government debt securities, including to the home banks of the sovereign and to the ECB.

It is impossible to quantify the exact contributions of each of the above factors using the breakdowns currently available in the BIS consolidated banking statistics. However, a substantial part of the decline in claims on the public sectors of Greece, Ireland and Portugal (EUR 79 billion or 56%) may well be accounted for by ECB purchases under the Securities Markets Programme made between the end of the first quarter of 2010 and the end of the first quarter

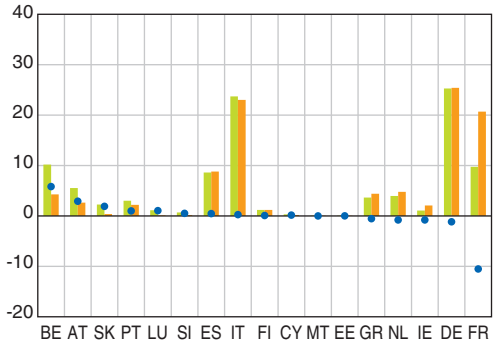
Chart 10
Weights in the euro area foreign public sector portfolios of euro area banks versus shares of outstanding euro area government debt

(in percentage points)

a) Q2 2008



b) Q2 2011



Weights in the euro area foreign public sector portfolios of euro area banks
Shares of outstanding euro area government debt
• Difference

AT = Austria; BE = Belgium; CY = Cyprus; DE = Germany; EE = Estonia; ES = Spain; FI = Finland; FR = France; GR = Greece; IE = Ireland; IT = Italy; LU = Luxembourg; MT = Malta; NL = Netherlands; PT = Portugal; SI = Slovenia; SK = Slovakia.

Source: BIS consolidated banking statistics (ultimate risk basis).

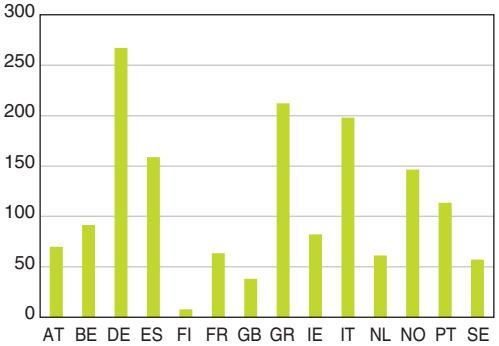
of 2011 (EUR 78 billion). This factor, of course, cannot explain the decrease in claims on the public sectors of Italy (EUR 144 billion or 42%) and Spain (EUR 10 billion or 12%), as ECB purchases of these debts only began in the third quarter of 2011.

Despite the overall decline in exposures to the riskiest euro area sovereigns observed in 2010-11, banks still own sizeable amounts of domestic and foreign sovereign debt. As of June 2011, BIS reporting banks' exposures to foreign public sectors ranged from close to 80% of Tier 1 capital for Italian, US and German banks to over 240% for Swiss, Belgian and Canadian banks. Foreign exposure vis-à-vis the countries most severely affected by the sovereign debt tensions (i.e. Greece, Ireland, Italy, Portugal and Spain) was significantly smaller, but often substantial. For instance, German, French and Belgian banks' combined exposures were equal to approximately 38% of their Tier 1 capital.

Furthermore, the foreign public sector portfolios of euro area banks remain geared towards the riskier euro area sovereigns (Chart 10b). Relative to the average shares of euro area government debt outstanding, euro area banks continue to underweight the safest sovereigns (i.e. Germany and France) and overweight some of the riskier ones (Belgium, Portugal, Italy, Spain). Nevertheless, their bias towards overweighting the debt of riskiest euro area public sectors has decreased since mid-2008, when Italy, Greece, Portugal and, to a somewhat smaller extent, Spain loomed larger (Chart 10a).[3]

Chart 11
Bank exposures to domestic public sectors, by bank nationality

(as a percentage of core Tier 1 capital, end-December 2010)



AT = Austria; BE = Belgium; DE = Germany; ES = Spain; FI = Finland; FR = France; GB = United Kingdom; GR = Greece; IE = Ireland; IT = Italy; NL = Netherlands; NO = Norway; PT = Portugal; SE = Sweden.

Note: Exposures to domestic public sectors are based on data released by the European Banking Authority (EBA) as a part of the stress test results published in July 2011. Inclusion of banks in the EBA stress test varied by country and, as a result, comparisons of exposures across countries should be interpreted with caution.
Source: EBA.

3 *For further discussion, see Bolton and Jeanne (2011).*

In addition, European banks continue to hold large amounts of debt issued by their own sovereigns. Data released by the European Banking Authority in July 2011 as part of its EU-wide stress test results suggest that the domestic sovereign debt holdings of many European banking systems exceeded 100% of their Tier 1 capital as of the end of 2010 (Chart 11). This was true for banks in countries with solid public finances (Germany and Norway) as well as banks in countries experiencing serious fiscal problems (Greece, Italy, Spain and Portugal).

5| A WAY FORWARD

The global financial crisis has once again highlighted the fact that global financial stability depends critically on the two-way link between banks and sovereigns. On the one hand, the fiscal soundness of sovereigns is one of the most important prerequisites for the smooth and efficient functioning of the international financial system. On the other hand, a solid global financial system is crucial for the fiscal health of sovereigns around the world. Weaknesses in either of the two sectors can spread to the other via a number of channels, setting off a dangerous chain reaction. With the global financial system becoming more and more integrated, such a chain reaction can quickly extend across national borders. In order to prevent this from happening, appropriate buffers should be built up in good times – fiscal buffers would ensure that the risk-free status of the sovereign is maintained, while capital and liquidity buffers would underpin the soundness of the financial system.

The main conclusion that policymakers should draw from the crisis is that the interconnectedness of the global financial system makes the prudential approach to policymaking, as it relates to both government finances and financial stability, more important than ever before. What policymakers do in any given jurisdiction affects economic and financial developments elsewhere. As a result, when making their decisions, they should also take these spillover effects into consideration. And they should do so even from a narrow national perspective: any action they take is likely not only to affect the global financial system, but also to set off a chain reaction that may eventually come back and burn them.

The most urgent task facing policymakers today is restoring the risk-free status of sovereigns, together with the confidence it engenders. We are used to living in a world in which the obligations of most governments in the developed world are regarded as risk-free. As a result, the usual practice has been to assign a risk weight of zero to sovereign debt. However, if the deterioration in the credit quality of sovereigns is not stopped and reversed, it will be impossible to avoid the difficult task of reassessing sovereign risk.

Contrary to what is sometimes stated, both Basel II and Basel III require banks to analyse and to discriminate among sovereign risks. The internal ratings-based approach for calculating the amount of capital to be held against credit risk does not imply a zero risk weight. Instead, it calls for a granular approach that allows for a meaningful differentiation of sovereign risk. Moreover, the 3% leverage ratio in Basel III in effect sets a floor on the capital backing of sovereign holdings. That said, assessing sovereign risk and the capital that needs to be held against it is not easy, given the lack of defaults among the better sovereign credits.

This makes it even more critical that governments earn back investors' confidence in the risk-free status of their debt. This complex task calls for a sustained effort, a multi-pronged approach and a strategy that bridges the seemingly contradictory short and long-run goals.

In the long run, a key role for the government budget is to provide a countercyclical policy instrument, be it through automatic stabilisers or discretionary actions, such as providing support for the financial system. A precondition for implementing such a policy is for the government to remain creditworthy at times of stress. This requires it to build up financial buffers in good times. Fiscal profligacy in a boom is doubly damaging. It feeds excesses in private sector behaviour and undermines the capacity of the government to act as a stabiliser during the bust.

In the short run, governments need to address the high levels of indebtedness by designing credible plans for fiscal consolidation and structural reforms that convince market participants that adjustment will occur and that sustainability will follow. Financing backstops will be needed during the adjustment phase. In this process, time is of the essence, and it is vital that the necessary measures are adopted in the correct sequence.

References

Acharya (V.), Drechsler (I.) and Schnabl (P.) (2011)
"A Pyrrhic victory? – bank bailouts and sovereign credit risk", *NBER Working Paper*, No. 17136, June.

Bolton (P.) and Jeanne (O.) (2011)
"Sovereign default risk and bank fragility in financially integrated economies", *NBER Working Paper*, No. 16899, March.

Borio (C.), Vale (B.) and von Peter (G.) (2010)
"Resolving the financial crisis: are we heeding the lessons from the Nordics?", *BIS Working Papers*, No. 311, June, *www.bis.org/publ/work311.pdf*.

Caruana (J.) (2010)
"Macroprudential policy: could it have been different this time?", speech delivered at the People's Bank of China seminar on macroprudential policy in cooperation with the International Monetary Fund, Shanghai, 18 October.

Committee on the Global Financial System (CGFS, 2011)
"The impact of sovereign credit risk on bank funding conditions", *CGFS Publications*, No. 43, July, *www.bis.org/publ/cgfs43.htm*.

Drehmann (M.), Borio (C.) and Tsatsaronis (K.) (2011)
"Anchoring countercyclical capital buffers: the role of credit aggregates", *International Journal of Central Banking*, vol 7, No. 4, December, pp. 189-240.

Ejsing (J.) and Lemke (W.) (2009)
"The Janus-headed salvation: sovereign and bank credit risk premia during 2008–09", *ECB Working Paper*, No. 1127, December.

Hannoun (H.) (2011)
"Sovereign risk in bank regulation and supervision", speech delivered at the Financial Stability Institute High-Level Meeting, Abu Dhabi, UEA, 26 October.

Honohan (P.) (2010)
"Banks and the budget: lessons from Europe", speech delivered at SUERF Conference, Dublin, 20 September, *www.bis.org/review/r100921b.pdf?frames=0*.

McGuire (P.) and von Peter (G.) (2009)
"The US dollar shortage in global banking and the international policy response", *BIS Working Papers*, No. 291, October, *www.bis.org/publ/work291.pdf*.

Tarashev (N.) (2011)
"Different causes for recent bank downgrades", *BIS Quarterly Review*, December, *www.bis.org/publ/qtrpdf/r_qt1112u.htm*.

Stability, growth and regulatory reform

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An enormous effort has gone into banking and financial regulatory reform following the recent financial crisis. The paper is an attempt to describe some key open questions about the relation among stability, growth, and regulatory reform and then raise some concerns about overemphasis on some instruments and underemphasis on others in the ongoing reform process.

An enormous effort has gone into banking and financial regulatory reform following the recent financial crisis. I could not begin to cover a small fraction of the key aspects of the ongoing worldwide debate. Instead, I will try to describe some key open questions about the relation among stability, growth, and regulatory reform and then raise some concerns about overemphasis on some instruments and underemphasis on others in the ongoing reform process. (The next three sections draw heavily on Kroszner forthcoming).

1| Does greater financial depth and development increase or reduce volatility?

As with any time of reform, it is crucial to clearly articulate the goals or objectives of banking and financial regulatory reform, including both public and private forms of regulation. I believe that the goal of banking and financial development and regulation should be to support and enhance sustainable economic growth, consistent with consumer protection that maintains the integrity of the markets. A large body of research suggests that a deep and developed financial system is a driving force behind economic development and growth (see, e.g., the summary in Levine forthcoming that I draw on here). Cross-country evidence suggests that such systems can be particularly helpful for those at the lower end of the income distribution. The primary mechanism for the positive growth impacts appears to be through increasing the efficiency of the allocation of capital to the highest return projects and giving the less affluent access to capital that they would not have in a less developed system.

This line of research, however, generally does not address a fundamental issue: Might there be a trade-off with volatility? (See Kroszner and Strahan, 2011). That is, to obtain a higher growth "return" through financial development, is there a cost in terms of greater "risk" in the system? Following the crisis, this is a critical issue to investigate. For this reason, I included "sustainable growth" rather than simply "growth" as part of the goal of regulatory reform. This issue raises a further and much more vexing question: If there is such a trade-off, then how would we determine the "optimal" size of the financial sector in an economy?

Theoretically, greater financial depth and development could either increase or decrease stability. On the one hand, a larger and more developed financial sector could improve risk sharing and diversification and thereby reduce volatility. On the other, a larger and more developed financial sector could allow greater concentrations of risk and generate interconnections, thereby potentially making the entire system more fragile and vulnerable to shocks. Policy makers engaged in financial regulatory reform need to consider these opposing forces in the financial system.

Unfortunately, little research exists to help guide policy makers. In earlier work with Luc Laeven and Daniela Klingebiel on banking crises (2007), for example, we indirectly addressed this by looking at whether firms that relied more on sources of external finance were hit harder during banking/financial crises than firms that relied more on internally generated cash flows. Not only did we find this generally across countries, we found that this affect was *most* pronounced in countries with the deepest financial systems. (See also Kroszner, 2007). This evidence thus hints at the possibility of a trade-off. The deeper financial system might create more connections between the real and the financial sectors that could make the firms that rely most heavily on the financial system more vulnerable in a banking crisis. Our analysis, however, did not allow us to address in detail the welfare question of whether these types of firms or the economy as a whole was better off in the long run.

The data from branching deregulation across US states, however, suggests that there is no trade-off but that deepening of the financial sector is a "win-win." The evidence suggests that state growth rates tend to increase following branching deregulation. Examining the quarter century during which states removed barriers that had prevented banks from branching across states, Morgan, Rime, and Strahan (2004) and Kroszner and Strahan (forthcoming) find that measures of state economic volatility fell as the banking system integrated across state lines. The variability of state employment growth and the growth of gross state product, for example, decreased after interstate branching was permitted. Interestingly, both growth shocks and

trend growth rates become more alike across states as the degree of commonality of the ownership of banks in those states increased.[1]

The relationship between the financial sector and volatility, thus, is an open question that more work on the most recent financial crisis may help to shed light upon.

2| How to judge the costs and benefits of financial innovation?

Although I believe that financial innovations are crucial in a dynamic, growing economy, in some cases these innovations may be Janus-faced. The "good" face of credit default swaps (CDS), for example, is that they are brilliant innovations that permit market participants to hedge default risk and give supervisors one metric to measure market perceptions of a firm's or a sovereign's risk in real time. The "bad" face of CDS, however, is that they can permit astonishing risk concentrations (e.g., AIG) that can generate fragile interconnections and systemic risk when such contracts are traded over-the-counter and not centrally cleared (see Kroszner and Shiller, 2011).

The possible two-faced nature of innovation raises the question of how a supervisor (or market participant) can determine in advance the risks associated with a new instrument or the market structures that would be necessary to reduce those risks. Obviously, with a new instrument, it is difficult – if not impossible – to undertake the empirical testing to assess the two faces that such an innovation may have. The cost of stopping all types of financial innovation due to insufficient data, however, seems too great. Developing a framework for evaluating the costs and benefits of innovation is another crucial issue raised by the recent crisis. How to do this, however, remains a fundamental challenge.

Even in cases where we do have relatively long data sets, it is possible that the innovation itself can change the historical correlations and risks – that is, they may be endogenous to the innovation (see Kroszner, 2010a). For most of the 20th century, for example, the mortgage market in the United States was relatively fragmented geographically, so geographic diversification of a mortgage portfolio could reduce risk. Interstate banking as well as geographically diversified pools of mortgage-backed securities (MBS) helped to provide a national source of financing. In principle, banks could then diversify away from local housing risk concentrations and individual home owners could tap a national rather than localised market for financing their mortgages.

These innovations, however, changed the historical correlations and risks by helping to increase the integration, hence correlation, of housing markets across the country. Thus, the benefits of geographical diversification waned precisely as instruments such as MBS rose to provide that diversification. As this example shows, trying to assess the faces of a financial innovation is a particularly vexing task but one that deserves much attention.

3| Could high capital requirements provide a false sense of security?

The crisis revealed that both the quantity and quality of capital held by banking and financial institutions were clearly inadequate to deal with shocks to the system. I want to state unambiguously that I believe that imposing higher capital requirements following the crisis is the right response. My concern, however, is that raising capital requirements is not a cure-all and in some cases seems to be relied upon as a substitute for directly addressing fragilities in the system.

High capital requirements, I worry, can provide a false sense of security to regulators and to the public about the safety and soundness of the financial system and lead to complacency in crucial areas of regulatory reform (see also Tucker, 2012). A high capital requirement, for instance, is not a substitute for developing orderly resolution procedures, both domestically and cross-border, or for improving market infrastructure, such as central-clearing of over-the-counter derivatives (see Kroszner and Shiller, 2011). I believe that it is best to address problems and vulnerabilities directly rather than indirectly in order to reduce the likelihood of unintended consequences.

1 *In more recent work, however, Loutskina and Strahan (2011) find that financial integration raised the sensitivity of local economies to housing price shocks during the 1990s and 2000s, thus amplifying volatility.*

Relying too heavily on any one instrument, such as capital requirements, may not be a prudent approach for regulators and supervisors – much as we would not want banks to put too many of their eggs in one basket! Very high capital requirements can generate incentives to the owners of the financial institution to try to take on more risk in order to reach return on equity goals (see Levine forthcoming). More generally, the higher the requirement, the more incentive there is to find ways around it. These incentives can lead to a number of unintended consequences.

A very high capital requirement, for example, can lead to more off-balance-sheet activity and risk exposures by a regulated institutions that may be harder for supervisors and the public to detect. Second, it can push activities off into the "shadows," to markets and institutions that are not directly regulated but that may be closely interconnected to the regulated institutions, e.g., borrowers, funders, and counterparties. Third, it can channel efforts in financial innovation to create instruments that may evade particular capital requirements but not reduce risks to an individual institution or to the system as a whole. It is quite difficult for the Basel Committee as well as national regulators to get the risk pricing "right" in a dynamic market. Thus, rather than conserving supervisory resources and providing greater cushions against shocks, very high capital requirements could paradoxically require greater vigilance by supervisors, generate more fragile interconnections, and thereby potentially reduce the overall safety and soundness of the system.

I will draw an analogy with the Maginot Line: the more heavily you rely on any one instrument, the more incentive there is to evade it and the fewer resources may be allocated to other instruments of defense (or offense). Following the large losses of life in Word War I, the French debated the most effective way to prevent a repeat of that tragedy. Charles de Gaulle argued that France should invest in new types of armored mobile vehicles, airpower, and the training of large standing army to deter a German invasion and allow a rapid and flexible response if one did occur. André Maginot countered that resources would be more effectively used to build a heavily fortified barrier to deter and slow a German invasion. If an invasion were to begin, he argued, this defense would give sufficient time for France to mobilise and call up reserves, thereby substituting for a large standing army and investment in new means of rapid response.[2] Maginot of course won the argument, and France built what came to be known as the Maginot Line along its eastern border in the 1930s.

In response, the Germans naturally tried to find ways around the fortification and invested heavily in innovative armored mobile vehicles (Panzer Divisions) and airpower (Luftwaffe). The Germans made a lightning fast strike (Blitzkrieg) through the Ardennes forest, the weakest point of the Maginot Line. Given the denseness of the forest and their fortifications, however, the French military did not believe that a quick invasion through the Ardennes was possible.[3] Obviously, they were wrong and soon the Maginot Line was surrounded, and France fell to Germany two months after the initial invasion.

In regulatory reform, it is important to try to avoid the false sense of security and excessive reliance on one instrument. Capital "barriers" can be helpful but they can also create strong incentives to find innovative ways to evade them. As the crisis demonstrated, what may have been seen as a well-capitalised institution can have this "fortification" erode extremely quickly in tumultuous market conditions. "Prompt corrective action" relied on capital layers above the regulatory minimum to provide sufficient time for remedial action, but the rapid decline of Washington Mutual's capital ratios, for instance, demonstrates that the capital "fortification" may not give supervisors sufficient time to act. In addition, activities that were thought to be relatively low risk, such as housing (as evidenced by low Basel I risk weights), could actually be the places of greatest vulnerability, much like the Ardennes.

The lesson for supervisors and regulators is not to rely on very high capital as a substitute for dealing with fragilities and vulnerabilities throughout the system. The unintended consequences of doing so

2 *The purpose of the Maginot Line "was to halt a German attack long enough for the French Army to mobilise and then to serve as a base for a counteroffensive" (Romanych and Rupp 2010, p. 8).*

3 *"Believing permanent defenses would compensate for shortcomings in training and equipment, the divisional commander [in the Ardennes where the Germans first invaded] emphasised the construction of fortifications rather than training" (Romanych and Rupp 2010, p. 33).*

have the potential to reduce, rather than enhance, stability of the system. Capital requirements should be understood as a complement to supervisory vigilance and not a source of complacency. I am concerned that so much emphasis in the supervisory community has been put on capital that other reforms, such as cross border resolution and moving OTC derivatives onto centrally cleared platforms, have not been receiving the priority they deserve.

4| Will macroprudential approaches be effective?

Supervisors and central banks around the world are being asked to do more, and being given more authority, to engage in "macroprudential" policy. In particular, central banks are being asked to act not only in their traditional role as "fire extinguishers" as the flames of a financial crisis have begun to burn but also to act as macroprudential "smoke detectors" before the flames appear. (The following draws on Kroszner, 2010b and 2011, and Kroszner and Strahan, 2011).

The "fire extinguisher" role is the classic one that central banks have played as lenders of last resort and liquidity creators in times of financial stress and tumult. Once the flames of the crisis appear, the central bank can then douse them with liquidity to prevent the fire spreading from one institution or market to another in order to avoid a system-wide conflagration. By moving beyond institution-specific regulations, this "macroprudential approach" may lead to less regulatory arbitrage.

The "smoke detector" or "macroprudential" role emphasises that the central bank has a fundamental responsibility to act early to prevent the tinder from igniting into flames. Being proactive in monitoring individual institutions and interconnected markets for signs of froth and fragility is what macroprudential policy should focus upon. In some cases, it make involve effective credit allocation but raising the costs of funding in some sectors relative to others. The macroprudential role certainly does not conflict with the more traditional "fire extinguisher" role, but it requires a much expanded set of authorities and activities on the part of the central bank.

The macroprudential approach, however, has at least three challenges. First, what metrics of financial stability or systemic risk will trigger macroprudential actions? Following the financial and currency crises in the 1980s and 1990s, academics and researchers at the International Monetary Fund and World Bank tried to develop "early warning" systems to anticipate where a crisis might occur. This exercise has proved difficult, and there are no generally accepted early warning indicators to allow authorities to act early enough to avoid the next crisis.

In addition, can financial economics provide a straightforward and theoretically grounded benchmark to assess if risks are being improperly managed or priced? Reasonable people could disagree about appropriate assumptions about or shifts in risk aversion, discount rates, "tail risks," and other factors in asset pricing. Regulators thus may face criticism of being arbitrary and attempting to substitute their judgment for those of investors who are putting their own money on the line. Such assessments are particularly difficult in new and innovative areas where data histories are short.

Finally, will a central bank's independence be challenged if it engages in macroprudential policymaking?[4] In the case of housing in the United States, many programmes subsidise home ownership, by lowering down payments or subsidising securitisation. The large costs of these subsidies have become clear as losses at Fannie Mae and Freddie Mac mount. Yet neither the 2010 Dodd-Frank Act nor any subsequent acts have been taken to address these issues. If a central bank again becomes concerned about "frothiness" in housing, policies to reduce loan-to-value ratios, restrict securitisation, or raise capital might run into political headwinds. The unelected body of the central bank could be accused of overruling an elected body. This certainly could put the central bank in the political cross hairs and lead to questions about its judgments and demands for greater political oversight. Effective macroprudential policies thus may involve risks for central bank independence and good governance.

4 *Charles Goodhart (2010) suggests that "the combination of operational independence to set interest rates and liquidity management together with prospective macroprudential regulation just vests too much power in a non-elected body."*

5| Will restrictions on bank activities, such as the Volcker Rule, improve stability?

In response to the financial crisis of the early 1930s, the United States adopted a separation between investment banking and commercial banking with the Glass-Steagall Act. This Act prohibited a commercial bank or commercial bank holding company from having any affiliates engaged in a variety of activities such as securities underwriting. The 1999 Gramm-Leach-Bliley Act relaxed parts of the Glass-Steagall Act to allow bank holding companies to have separately incorporated and capitalised subsidiaries engage in investment and merchant banking activities, even though the commercial bank itself is still prohibited from doing so directly or through its own subsidiary. During the last decade, a few large US banks have become significant global players in, for example, market making and securities underwriting through their investment banking subsidiaries.

In response to the most recent crisis, the Dodd-Frank Act included a form of activities restriction called the Volcker Rule. The Volcker Rule strictly limits commercial bank activities in proprietary trading, private equity, and hedge funds. The prohibitions on private equity and hedge funds have not created much controversy because these activities are relatively easy to define and had not become an important part of commercial bank operations. Propriety trading, however, involves much greater challenges to define and implement. The recent notice of proposed rulemaking from the US regulatory agencies ran more than two hundred pages and asked for comments on 383 questions!

Depending upon what the regulators choose to define as "proprietary" (the Dodd-Frank legislation provided little concrete guidance and, hence, the long list of questions), the Volcker Rule has the potential to reduce rather than increase risk at the banks in the markets. First, natural hedging activities of banks could be curtailed. Second, the role that banks play as market makers in key global markets, such as those for government securities, could be reduced or eliminated. The unintended consequence could be to reduce liquidity and increase bid-ask spreads. A number of international regulators, in addition to the banks, have raised the concern that the Rule may make important markets less liquid and less stable.

In addition, it is difficult to find systematic evidence from the recent crisis that involvement in proprietary trading increased the risk of failure.[5] In the United States, the major banks that collapsed did so primarily because of high exposure to mortgages, not due to proprietary trading. Internationally, "universal" banks did not fare worse than their more "traditional" brethren and in many cases benefitted from the diversification of income sources that are associated with engagement in a wide variety of activities (Kroszner and Melick, 2011).

As we have experienced from earlier episodes of regulatory arbitrage, restrictions that apply to one set of institutions may just move risks to other institutions or markets and may, at the same time, increase inter-linkages and market opaqueness. Depending upon what constitutes "proprietary" trading, pushing risk-taking activities just outside of the commercial banking system could have the unintended consequence of making the entire system more, rather than less, fragile. Making markets more, not less, robust is crucial for the stability of the financial system and must be an important factor taken into account in the debate over activity restrictions on banks (see Kroszner, 2010c and Kroszner and Strahan, 2011).

6| Concluding remarks

The relation among stability, growth, and regulation is crucial for assessing reform proposals and priorities. I have sketched a framework for thinking about these issues and touched on a few specific reforms. Policy-makers should clearly articulate goals and trade-offs, avoid overreliance on any one regulatory instrument, and be sensitive to potential unintended consequences of regulatory reforms. Identifying fragilities and then addressing them as directly as possible would be an effective way to enhance the robustness of the financial system.

5 *The historical evidence also does not support an argument in favour of the Glass-Steagall separation (see for instance, Kroszner and Rajan, 1994 and Kroszner, 1996).*

References

Goodhart (C.) (2010)
"The changing role of central banks," BIS Annual Research Conference, June.

Kroszner (R. S.) (1996)
"The evolution of universal banking and its regulation in twentieth century America", pp. 70-99 in Anthony Saunders and Ingo Walter, eds., Universal Banking: Financial System Design Reconsidered, Chicago: Irwin.

Kroszner (R. S.) (2007)
"Analysing and assessing banking crises," speech at Federal Reserve Bank of San Francisco, Conference on the Asian Financial Crisis Revisited, September 6.

Kroszner (R. S.) (2010) (a)
"The paradox of financial innovation," *Working Paper*, February.

Kroszner (R. S.) (2010) (b)
"What should central banks do? A comment on Goodhart," BIS Annual Research Conference, June.

Kroszner (R. S.) (2010) (c)
"Interconnectedness, fragility, and the financial crisis", Financial Crisis Inquiry Commission, February.

Kroszner (R. S.)
"Volatility, innovation, capital, and macroprudential policy: A comment on Ross Levine," Federal Reserve Bank of Kansas City, Jackson Hole Symposium Proceedings, forthcoming.

Kroszner (R. S.) (2011)
"Challenges of macroprudential policy," in Claassens (S.), Evanoff (D.), Kaufman (G.) and Kodres (L.), eds., Macroprudential regulatory policies: the new road to financial stabilty?, Hackensack, NJ: *World Scientific Publishers*, pp. 379-86.

Kroszner (R. S.), Laeven (L.) and Klingebiel (D.) (2007)
"Banking crises, financial dependence, and growth," *Journal of Financial Economics*, April, 84(1), pp. 187-228.

Kroszner (R. S.) and Melick (W.) (2011)
"The response of the Federal Reserve to the recent banking and financial crisis", in Jean Pisani-Ferry, Adam Posen, and Fabrizio Saccomanni, eds., An Ocean Apart? Comparing Transatlantic Response to the Financial Crisis, Brussels: Bruegel Institute and Peterson Institution for International Economics.

Kroszner (R. S.) and Rajan (R. G.) (1994)
"Is the Glass-Steagall Act justified? A study of the US experience with universal banking before 1933", *American Economic Review*, pp. 810-32, September.

Kroszner (R. S.) and Shiller (R. J.) (2011)
Reforming US financial markets: reflections before and beyond Dodd-Frank, Cambridge, MA: MIT Press.

Kroszner (R. S.) and Strahan (P. E.) (2011)
"Financial regulatory reform: challenges ahead," *American Economic Review*, *Papers and Proceedings*, May, 101(3), pp. 242-46.

Kroszner (R. S.) and Strahan (P. E.)
"Regulation and deregulation of the US banking industry: causes, consequences, and implications for the future," forthcoming in Nancy Rose, ed., *Studies in Regulation*, Chicago: NBER and University of Chicago.

Levine (R.)
"Regulating financial markets and institutions to promote growth," Federal Reserve Bank of Kansas City, Jackson Hole Symposium Proceedings, forthcoming.

Loutskina (E.) and Strahan (P. E.) (2011)
"Financial integration, housing, and economic volatility," *Working Paper*, Boston College, November.

Morgan (D.), Rime (B.), and Strahan (P. E.) (2004)
"Bank integration and state business cycles," *Quarterly Journal of Economics*, 119, pp. 1555-85.

Romanych (M.) and Rupp (M.) (2010)
Maginot Line 1940: Battles on the French Frontier, Oxford: Osprey Publishing.

Tucker (P.) (2012)
"Banks must reclaim their proper role," *Financial Times*, January 30.

Is sovereign risk properly addressed by financial regulation?

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The treatment of sovereign risk in banking and insurance regulations has been highlighted by the sovereign debt strains affecting most advanced economies. In particular, it has become key to assess whether these regulations require from financial institutions to hold adequate regulatory capital associated with sovereign exposures. More broadly, although the main issue raised by the sovereign debt crisis is related to fiscal policies and consolidation, one crucial question is to determine how and to what extent financial regulation can help to mitigate and prevent vulnerabilities of the financial sector to sovereign risk.

From this perspective, it appears that current regulatory framework does not require from financial institutions to hold significant regulatory capital against sovereign risk, inadequately assuming sovereign debt as a low-risk and even a risk-free asset class. Furthermore, some regulatory initiatives, while globally enhancing standards, could create further incentives to encourage financial institutions to hold sovereign debt. In addition to considering better reflection of sovereign risk in financial regulation, supervisory practices also appear as a crucial tool to address the issue of heightened sovereign risk and its potential impact on financial stability.

1| Sovereign debt has been largely regarded by financial regulation as low-risk or risk-free asset

1|1 Banking regulation (Basel II and CRD): An internationally agreed framework

Basel II allows banks to make a choice between two broad methodologies for calculating their prudential capital requirements for credit risk: the standardised approach and the internal ratings-based approach.

The standardised approach is based on the same general principle as Basel I: banks classify their exposures according to the type of counterparty (sovereign, bank, corporate or retail) of transaction. However, one of the major improvements is that banks are permitted to risk-weight exposures in the sovereign, bank and corporate portfolios as a function of ratings issued by external credit assessment institutions (ECAI).

The internal ratings-based approach allows banks to use their internal rating systems. Banks internally estimate three parameters[1] relating to their credit exposure to counterparty: the probability of default (PD) associated with the bank's internal rating of the counterparty, the exposure at default (EAD) and the loss given default (LGD). These parameters are then entered in a formula provided by the Basel Committee that calculates the regulatory capital charge for the exposure.

Both methodologies result in relatively low regulatory capital charges against sovereign risk and may to some extent encourage banks to accumulate sovereign debt.

Under standardised approach

Under the standardised approach, the risk weights on sovereigns have two variants depending on the currency in which the debt is denominated, either in foreign or domestic currency.

The risk weights applicable to sovereign debt denominated in foreign currency is based on the sovereign credit rating, using the following regulatory matrix:

Credit assessment	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to B-	Below B-	Unrated
Risk weight	0%	20%	50%	100%	150%	100%

This approach replaces the Basel I risk weights that were not reflecting the level of risk: only claims on sovereign from the OECD Group countries were assigned a zero per cent risk weight while claims on central governments of countries which do not belong to the OECD Group and which are not denominated and financed in the local currency were assigned a 100% risk weight. Under the Basel II standardised approach, the level of risk is better captured thanks to the consideration of external ratings but sovereigns still have a preferential treatment compared to other categories of counterparties. A same bucket of external rating on corporate or banks attracts generally a risk weight that is less favourable than that assigned to claims on sovereigns. For instance, AAA sovereign exposures attract a zero per cent risk weight while AAA corporate exposures attract a twenty per cent risk weight.

The risk weight for sovereign debt denominated in domestic currency is based on national discretion and is often in practice zero as allowed in Basel rules.[2] In Europe, the capital requirement directive (CRD), transposing Basel II into EU legislation, then allows for a zero risk weight.

From a prudential perspective, sovereign domestic local currency debt is then viewed as risk-free under the standardised approach and attracts no capital charge that has become more and more questionable.

Under internal ratings-based approach

Internationally active banks have in large majority implemented the IRB approach in which the risk weighted assets for sovereign exposures are derived from a regulatory formula. This derivation is dependent on estimates of PD, LGD, EAD and M (Maturity) and achieved through risk weight functions based on a specific model developed by the Basel

1 *Only the probability of default under the foundation IRB approach.*
2 *See § 54 of Basel II (comprehensive version published in June 2006): "At national discretion, a lower risk weight may be applied to banks' exposures to their sovereign (or central bank) of incorporation denominated in domestic currency and funded in that currency. Where this discretion is exercised, other national supervisory authorities may also permit their banks to apply the same risk weight to domestic currency exposures to this sovereign (or central bank) funded in that currency."*

Committee on Banking Supervision (cf. Gordy, 2003). The resulting risk weights are the following:

Basel II illustrative IRB risk weights and capital charge for sovereign exposures[a)]

(in %)

Probability of default	Risk weight	Capital charge
0.01	7.53	0.60
0.02	11.32	0.91
0.03	14.44	1.16
0.05	19.65	1.57
0.10	29.65	2.37
0.25	49.47	3.96
0.40	62.72	5.02
0.50	69.61	5.57
0.75	82.78	6.62
1.00	92.32	7.39
1.30	100.95	8.08
1.50	105.59	8.45
2.00	114.86	9.19
2.50	122.16	9.77
3.00	128.44	10.28
4.00	139.58	11.17
5.00	149.86	11.99
6.00	159.61	12.77
10.00	193.09	15.45
15.00	221.54	17.72
20.00	238.23	19.06

a) Assumes loss-given-default of 45% and maturity 2.5 years.

For sovereign exposures, the PD is the one-year PD associated with the internal borrower grade to which that exposure is assigned. The IRB approach so requires banks to differentiate their sovereign risk by assessing the credit risk of individual sovereigns through granular probabilities of default. While this approach does not then result automatically in producing zero risk weight, it allows nevertheless banks to use a PD of zero for sovereigns. Indeed, the PD for sovereigns is not subject to the floor of 0.03% contrary to the PD for corporate and banks exposures. As a result, as in the standardised approach, well rated sovereign exposures may attract very low or no regulatory capital charge.

Furthermore, banks may be authorised, under some conditions and to a various extent across countries, to implement the standardised approach for sovereign exposures – applying then a zero risk weight – and the IRB approach for other exposures. The rationale behind this partial use possibility is that the estimation of credit risk parameters, notably the PD but also LGD, for sovereigns is particularly challenging. Indeed, the accuracy of outputs of statistical models is usually conditioned by the size, representativeness and quality of the statistical sample. All these conditions are difficult to meet for sovereigns and could, although being compensated by an in-depth qualitative analysis, result in the use of external ratings. Credit rating agencies are arguably facing the same challenges to assess the quality of public finances in advanced economies.

1|2 Insurance regulation: no internationally agreed framework

A rather heterogeneous set of rules still prevail in Europe despite Solvency I

Solvency I is the name given to a European framework of directives regulating the exercise of "non-life insurance" and "life insurance" in Europe. These directives set principles that are widely interpreted in the Member States, and a rather heterogeneous set of rules still prevail in Europe.

The capital requirements for insurance undertakings in Solvency I are not directly sensitive to asset risks:

- for non-life insurance activities they are based on premium and claims volume measures;
- for life insurance business they are based on technical reserves and capital-at-risk.

In so far as the assets volumes will usually also be in proportion to premiums and provisions, the capital requirements will also be in proportion of the asset size, but not directly in proportion to the assets risks. As a particular type of assets, sovereign debt is no exception: the capital requirements for insurance undertakings in Solvency I are not directly sensitive to sovereign risk.

Qualitative and some quantitative rules however constrain the freedom of investment for insurance undertakings under Solvency I

While some rules such as the principle of the safety of the matching assets and rules for categories of authorised assets[3] can constrain the freedom of investment,

3 *Established by Directive 2002/83/CEE for "Life" respectively by article 22 ("The assets covering the technical provisions shall take account of the type of business carried on by an assurance undertaking in such a way as to secure the safety, yield and marketability of its investments, which the undertaking shall ensure are diversified and adequately spread") and article 23 3 (ii) ("Loans, whether to undertakings, to a State or international organisation, to local or regional authorities or to natural persons, may be accepted as cover for technical provisions only if there are sufficient guarantees as to their security, whether these are based on the status of the borrower, mortgages, bank guarantees or guarantees granted by assurance undertakings or other forms of security").*

quantitative rules about asset diversification also exist but do not affect sovereign exposures.[4] In this respect Solvency I can be seen as an encouragement to hold sovereign debt. However, prudential regulation also limits the risk of "financial repression" (i.e. the use of regulation by the government to provide incentive to hold public debt) as it does not constrain insurance undertakings to invest in government bonds, or any other assets. It also does not prescribe any rules as to the choice of the assets that need not be used as cover for the technical provisions.

Required solvency margin and available solvency margin

As noted above, the calculation of the required solvency margin is not affected by the quality or the nature of the assets. Regarding the available solvency margin, its determination is typically set at amortised cost. Consequently, changes in interest rates have no impact on either assets or liabilities. However, the supervisor has the ability to accept as additional own funds with supporting evidences provided by the undertaking, any hidden net reserves arising out of the valuation of assets (including unrealised profits or losses arising of sovereign debts), in so far as such hidden net reserves are not of an exceptional nature.

2| Regulatory initiatives could create further incentives for financial institutions to purchase sovereign debt

2|1 Banking regulatory changes (Basel 2.5 and III / CRD III and IV)

On the capital side

Basel III will undoubtedly create more robust standards but does not address as such the issue of sovereign debt since the regulatory treatment of sovereign risk in the banking book does not change and notably still allows a zero risk weight on sovereign domestic local currency debt. The status of sovereign debt as the lowest-risk asset has been maintained.

However, ongoing regulatory reform for reducing reliance on credit rating agency (CRA) ratings[5] will require financial institutions to enhance their risk management capabilities notably for better assessing creditworthiness of the financial instruments they are exposed to. This implies in particular that large and sophisticated banks are expected to assess the credit risk of everything they hold (either outright or as collateral), whether it is for investment or for trading purposes, including the creditworthiness of all their sovereign exposures.

Furthermore, new trading book rules, known as Basel 2.5, will introduce an incremental risk charge (IRC) to capture losses due to both default and credit rating migrations for all trading positions, including government bonds, with the capital charge calculated individually for each issuer, including sovereigns. Default risk will represent the risk of potential losses due to a counterparty default while credit rating migration risk will represent the risk of potential losses due to a downgrade of counterparty. The IRC will require from banks to measure and hold capital against default and credit rating migration risks that are incremental to the specific risk captured in the banks' value-at-risk models. It was incorporated into the trading book capital regime in response to the increasing amount of exposure in banks' trading books to credit-risk related products whose risk is not properly reflected in value-at-risk. In Europe, banks will be subject to the new rules from end 2011. The IRC will then help to better capture sovereign risk in the trading book. In the opposite, sovereign exposures located in banks' banking books may only attract capital charges against default risk and subject in practice to the above-mentioned limitations.

On the liquidity side

Through the introduction of the liquidity coverage ratio (LCR), Basel III will require banks to build larger buffers

4 *Established by article 24 ("5% of its total gross technical provisions in shares and other negotiable securities treated as shares, bonds, debt securities and other money- and capital-market instruments from the same undertaking, or in loans granted to the same borrower, taken together, the loans being loans other than those granted to a state, regional or local authority or to an international organisation of which one or more Member States are members. This limit may be raised to 10% if an undertaking invests not more than 40% of its gross technical provisions in the loans or securities of issuing bodies and borrowers in each of which it invests more than 5% of its assets").*

5 *In October 2010, the FSB published principles for reducing reliance on credit rating agency ratings, and G20 Leaders endorsed these principles at the November 2010 Seoul Summit (see* http://www.financialstabilityboard.org/publications/r_101027.pdf*). Standard setters and regulators are considering next steps that should be taken to translate the principles into more specific policy actions.*

of liquid assets to meet their liquidity needs (net cash outflows) for a 30 calendar day time horizon under a liquidity stress scenario specified by the supervisor.

Liquidity coverage ratio (LCR)

$$\frac{\text{Stock of high-quality liquid assets (Level 1+Level 2)}}{\text{Cash outflows – min [inflows; 75\% outflows] over the next 30 calendar days}} \geq 100\%$$

In the stock of liquid assets, Level 1 liquid assets, principally comprising government bonds (as well as cash and central bank reserves), can be included without limit while Level 2 liquid assets are limited to 40% of the stock of liquid assets. As a consequence, banks will need to hold a sufficient amount of Level 1 liquid assets and will therefore be encouraged to purchase sovereign debt. Furthermore, as the inflows are limited to 75% of the outflows, banks will have to hold a stock of liquid assets at least equal to 25% of their outflows, even if their liquidity risk profile is perfectly balanced. Coupled with the cap of 40% of Level 2 assets in the stock of liquid assets, this will constitute another incentive for banks to purchase sovereign debt.

However, in order to address unintended consequences, the Committee is prepared to make revisions to specific components of the new liquidity standards if this proves necessary in light of the analyses conducted and the data collected during an observation period which began in 2011.While the observation period for the LCR extends until mid-2013, the Committee agreed at its September 2011 meeting to accelerate its review to decide upon any adjustments in key areas well in advance of the mid-2013 deadline. This accelerated process should provide greater market certainty about the final technical details and calibration of the LCR. The remainder of the observation period could still be used to ensure that these and any other outstanding issues relating to the LCR are fully addressed. The LCR, including any revisions, will be introduced as a minimum standard on 1 January 2015.

2|2 Insurance regulatory changes (Solvency II)

Solvency II is being developed along the "Lamfalussy" process of three levels of European legal texts. The first level has been adopted under the form of a directive.[6] Amendments to this directive are still under discussion ("Omnibus 2" Directive). The second level is still under discussion and should take the form of regulatory and/or implementing technical standards, developed by EIOPA (European Insurance and Occupational Pensions Authority) and adopted by the European Commission, and guidelines developed by EIOPA (still to be confirmed when the "Omnibus 2" Directive is adopted).

Capital requirement

Solvency II will introduce more risk-sensitive solvency requirements across EU Member States, thus enabling a better coverage of the real risks run by any particular insurer. Solvency requirements will also be more comprehensive: whereas at the moment Solvency I concentrates mainly on the liabilities side (i.e. insurance risks), Solvency II will also take account of the asset-side risks: solvency capital requirement (SCR) is based on a value-at-risk measure calibrated to a 99.5% confidence level over a one-year time horizon. The SCR covers all risks that an insurer faces (e.g. insurance, market, credit and operational risk) and will take full account of any risk mitigation techniques applied by the insurer (e.g. reinsurance and securitisation). The SCR may be calculated using either a standard formula or an internal model validated by the national supervisory authorities (NSAs). For SCR calculation purposes, sovereign bonds would be exempted – at least when using the standard formula – from the "spread risk" and "concentration risk" modules, that may be also questionable. Credit default swaps (CDS) on sovereign bonds could be included as "structured" products but treatment is still to be determined.

In the Level 1 Directive, the structure and design of the standard formula for the calculation of the Solvency Capital Requirement are set by articles 103, and 104 at a high level, whereas article 105 ("calculation of the SCR") sets the minimum content of the various calculation modules of the standard formula. In the "market risk module", it specifically requires the calculation of the capital requirement for "the sensitivity of the values of assets, liabilities and financial instruments to changes in the level or the volatility of credit spreads over the risk-free interest rate term structure (spread risk)",[7]

6 *Directive 2009/138/CE) on the 25th November 2009.*
7 *Article 105.5.(d).*

and "additional risks to an insurance or reinsurance undertaking stemming either from lack of diversification in the assets portfolio, or from large exposure to default risk by a single issuer of securities, or a group of related issuers (market risk concentration)".[8] The treatment of bonds issued by Members States (sovereign bonds) is not specifically addressed at the granularity level of the Level 1 Directive.

As the Level 2 regulation has not been adopted, it is still not yet possible to formally describe what will be the treatment for Member States' sovereign bonds in the standard formula, but at this stage it is however possible to indicate that so far the project has always been to exempt the Member States' sovereign bonds from any capital charge stemming from either "spread risk" or "concentration risk". This is what was tested in the five successive quantitative impact studies, and this is what has been proposed by the European Commission in its Level 2 text proposal, and so far approved by Member States in the preliminary discussions, under articles relating to "specific exposures".

This exemption is a clear encouragement to invest in sovereign bonds issued by the Member States. However this exemption leads to some unsolved technical issues:

- in the validation process of internal models, the issue is still opened as to whether insurers will be able to leverage on the precedent created by the exemption in the standard formula in order to have a similar exemption validated in their internal model;

- the treatment of sovereign bonds included as underlying more complex financial products (CDS, structured products, etc) in the standard formula is still an opened issue;

- could the specific exposure profiles of some insurers to sovereign risks lead some supervisors to consider that in some circumstances, the conditions of triggering a "capital add-on" be met?

It is possible that the solution to some of these issues be provided in the "Implementing technical standards" ("Level 3"), still under development.

Eligible own funds

According to the Solvency II requirements, the assessment of the financial position of the insurance undertakings should be based on an economic valuation of their whole balance sheet. In this context, the undertaking should make an optimal use of the information provided by financial markets, as well as generally available data on insurance technical risks.

It should be noted, that for the solvency purposes the insurance undertakings are required to carry out a specific balance sheet that is distinct from their financial statements:[9]

- "Valuation of assets and liabilities (other than technical provisions)". The undertakings should value (except where otherwise specified) assets and liabilities recognised in the solvency balance sheet as follows:

  – assets shall be valued at the amount for which they could be exchanged between knowledgeable willing parties in an arm's length transaction;

  – liabilities shall be valued at the amount for which they could be transferred, or settled, between knowledgeable willing parties in an arm's length transaction. When valuing these liabilities, no adjustments shall be made to take into account of the own credit standing of the insurance or reinsurance undertaking.

- Regarding the technical provisions:[10] the value of the technical provisions shall be equal to the sum of

  – a best estimate: the probability-weighted average of future cash-flows, taking account of the time value of money (expected present value of future cash-flows), using the relevant risk-free interest rate term structure;

  – a risk margin: margin such as to ensure that the value of the technical provisions is equivalent to the amount that insurance and reinsurance undertakings would be expected to require in order to take over and meet the insurance obligations.

8 *Article 105.5.(f).*
9 *Article 75 of Directive 2009/138/CE.*
10 *Article 77 of Directive2009/138/CE.*

Theoretically, in the same currency, if the investment in government bonds are correctly matched with the cash flows arising from the insurance obligations, the change in the value of the assets related to the fluctuation of the risk free rate are offset by the changes in the valuation of the insurance liabilities.

The insurance undertaking being invested in euro zone government bonds during the current sovereign crisis that is affecting the euro area is showing that this theoretical balance is illusory. In fact, the difficulties encountered by some countries have led to the emerging of a gap between the swap rate used to discount the insurance liabilities and the yield arising from the investment in the euro area government bonds. This gap between the rates and consequently on the changes in the valuation of the assets and liabilities might potentially have a serious impact on the valuation of the Solvency II basic own funds.

However, Omnibus II Directive (the draft of the amended Solvency II directive) is introducing two new concepts that, in most cases, should alleviate the valuation of the liabilities and therefore the capital requirements:

• a matching premium that could be applied only for a limited amount of the liabilities : where the insurance undertaking has assigned a portfolio of held to maturity bonds to cover the best estimate of the portfolio of insurance obligations, the insurance liabilities, which cannot be exposed to any lapse risk, could be discounted – as an exception to the general rule where assets and liabilities are valued separately and independently – at the yield of the backing assets minus a fundamental spread (portion of the spread which reflects the actual default risk of the bond) instead of the risk free rate in the general case;

• a countercyclical premium: in times of stressed market conditions all insurance liabilities – except those valued according to the "matching premium" method mentioned above – could be discounted at a rate higher than the risk free rate by including the countercyclical premium.

The natural consequences of these above additional rules would be that the insurance undertakings could have incentives to invest in euro area government bonds. Considering that the European sovereign bonds are exempt from any capital charge stemming from either "spread risk" or "concentration risk", there is clearly an encouragement to invest in these type of bonds whatever the risks (credit, illiquidity,..) since a large part of the decrease in value due to these risks will be compensated by the introduction of one or the other premium. The advantages for the governments issuing these bonds are obvious but the future consequences on the solvency of the European insurance sector have not been measured yet.

Governance and risk management

Own Risk and Solvency Assessment (ORSA) is also introduced by Solvency II and will require insurers also to think about any future developments which might affect their financial standing, including for instance heightened impact of sovereign risk. As part of their risk management system, all (re)insurance undertakings must have a regular practice of assessing their overall solvency needs with a view to their specific risk profile. Insurance undertakings, even if they are exempted from quantitatively taking into account the sovereign risk in the calculation of the capital requirement within the standard formula, have nevertheless to take this risk into account as part of their ORSA.

3| Supervisory initiatives such as stress tests should be used in managing and mitigating sovereign risk

3|1 EBA and EIOPA stress tests

A risk management and supervisory tool

Stress testing is an important risk management tool which alerts bank or insurer management to adverse unexpected outcomes related to a variety of risks and provides an indication of how much capital might be needed to absorb losses should large shocks occur.

Moreover, stress testing is a tool that supplements other risk management approaches and measures.

The European Banking Authority (EBA)[11] has issued guidelines on stress testing for an appropriate use of this tool by the institutions. It also gives practical principles to supervisors. In particular it encourages the NSAs to review institutions exercises and to undertake their own stress tests on an individual institution-specific basis as well as on the overall system. However, it does not give an exhaustive list of scenarios and shocks that should be tested. Indeed, stress tests have to be constantly renewed regarding the current and the future threats identified. Until recently, sovereign risk was not always considered as a major issue in stress scenarios.[12]

Lessons learnt from European stress test exercise

Stress tests aim at restoring confidence but could become a double-edged sword without an appropriate communication.

Two types of recent exercised tried to capture sovereign risk:

- bottom-up European stress tests with a sovereign module based on haircut on the sovereign debt (EBA and EIOPA);
- top-down supervisor's simulations on banks and insurers sovereign exposures. Various results were used as an input to discussions with firms.

Sovereign risk may have appeared insufficiently reflected in the European stress tests. However, there is a difficulty from supervisors to communicate on a sovereign default scenario, especially six months in advance. It would also be technically very complicated to go beyond first-round effects, i.e. haircut on sovereign debt, and to assess the spillover effects of the failure of a sovereign state and its consequences on financial markets, liquidity and general risk aversion.

Regarding the EBA stress tests, disclosure was also part of the exercise in itself and partly compensated this insufficiency. Very detailed data were published so that any analyst or investor could update the results or elaborate their own scenario and simulate a larger shock on sovereign spreads. In particular, banks have been required to publish detailed disclosures about their sovereign debt risk exposures through breakdowns of portfolios by geographical areas.

On the other hand the importance given to the disclosure in this exercise makes communication and timing a crucial point of the stress test.

Box 1

Methodology for sovereign risk treatment in EBA stress test

In the trading book, the adverse macroeconomic scenario involved a widening of credit spreads in the EU countries that was reflected in valuation haircuts. These haircuts were updated at the end of the exercise to reflect the deterioration of sovereign condition, up to 33% according to the country in question.

In the banking book, the market risk haircuts didn't apply but the institutions had to estimate the credit risk. On this subject, internal ratings-based approach for calculating credit risk capital does not imply a zero risk weight, even for highly rated sovereigns. However, additional provisions for losses based on movements in PDs and LGDs were added for each of the EEA countries. In particular PDs had to be consistent with rating agency assuming a severe notch downgrade (down to CCC rating for some countries). LGD was set to a conservative 40%.

Some contagion effects were also simulated on the funding side. In particular interest rates on funding should increase according to banks' own credit spreads, which were assumed to be subject to the same negative evolution as sovereign credit spreads.

11 http://www.eba.europa.eu/documents/Publications/Standards---Guidelines/2010/Stress-testing guidelines/ST_Guidelines.aspx.
12 *EBA gives 7 examples of risks: market, securitisation, counterparty, operational, liquidity, interest rate, concentration.*

The transparency aims at restoring confidence but without an appropriate communication it could induce unintended reactions from the banks or from the market. In particular it is very difficult to focus the exercise on the sovereign risk without triggering more aversion and turning the stress test into a self-fulfilling prophecy. For this reason, even if the disclosure was well received by market participants, the opportunity of publishing the stress test results has to be reassessed for each exercise.

Anyhow, the stress tests carried out in mid-2011 were not the only analysis done by supervisors and further analysis have been carried out by supervisors, including the ones in order to take into account markets developments. More recently, the EU plan to strengthen banks' capital positions is not a stress test itself since it is based on current and not stressed market prices. But the approach[13] can be compared given that the assessment of the temporary capital buffer against sovereign debt exposures takes into account hypothetical losses on parts of the sovereign portfolio – sovereigns in the HTM (held to maturity) and L&R (loans and reserves) portfolios – that are not under the current accounting standards marked-to-market – contrary to sovereigns in the AFS (available for sale) portfolio. Results of bank recapitalisation plan undertaken by EBA[14] indicate that around 40% of this "sovereign buffer" can be attributed to the marking-to-market sovereigns in the HTM and L&R portfolios, an approach which can be considered as conservative.

Box 2

Methodology for sovereign risk treatment in EIOPA stress test

In the core scenarios (baseline and adverse scenario), a widening of sovereign spread was applied to sovereign bonds of countries outside the EEA according to their ratings.

In a separate sovereign scenario, a spread widening was applied to EEA sovereign bonds. Country specific yield curve movements were defined on the basis of macroeconomic assumptions and affect the pricing of sovereign bond holdings.

The increase in sovereign spreads was not assumed to have an impact on the discount rate curve and therefore on the valuation of the liabilities.

3|2 Other supervisory practices

Supervisory review process (Pillar II)

Pillar II (supervisory review process) helps to extend the monitoring of sovereign risk and its impact on firms' risk profile/policy. Pillar II exists both in the Basel framework (banks) and the Solvency II framework (insurance).

In the Basel framework, Pillar I is based on uniform quantitative rules and result in minimum capital requirements. However, no set of uniform rules can capture all aspects of a firm's risk and some of them (such a 0% risk weight for sovereign exposures in domestic local currency in banking regulation) could lead to an underestimation of regulatory requirements.

Risks that are not fully captured by the Pillar I process might be then particularly suited to treatment under Pillar II. Sovereign risk is not flagged as such but given the recent market developments supervisors could consider specific measures notably when credit risk and concentration risk are deteriorating and exceeding manageable levels.

The prudential measures in Pillar II that supervisors can apply for sovereign risks are not fundamentally different from the range of measures established for other risks. They cover a broad scope of interactions with institutions starting from the dialogue with the senior management to the most intrusive or preventive actions such as the adjustment of the valuation of exposures, applying a specific provisioning policy to the assets or imposing more severe prudential requirements by requiring to strengthen its capital base. These measures could be envisaged to addressed any deteriorating risk and, if necessary, sovereign risk.

13 http://www.eba.europa.eu/cebs/media/aboutus/News%20and%20Communications/Sovereign-capital-shortfall_Methodology-FINAL.pdf.
14 http://www.eba.europa.eu/capitalexercise/2011/2011-EU-Capital-Exercise.aspx.

Review of provisioning practices and disclosures

Provisioning practices retained for the general purpose financial statements

The primary responsibility for the preparation and presentation of the financial statements is that of the management of the entity, with oversight from the auditors. In this regard, management should ensure that the financial statements portray the financial position and performance of the entity, and provide a true and complete view of risks to which entities are exposed, notably credit risks. Those credit risks should be adequately and properly covered by provisions in accordance with the accounting framework used.

For the largest banks and insurance companies, the consolidated financial statements are prepared in accordance with the International Financial Reporting Standards (IFRS). As those standards are principles based, they require banks and insurance companies to exercise judgment in selecting and applying appropriate accounting policies and in making accounting estimates that are reasonable. With regard to credit risk, the current IFRS rules for impairment require the occurrence of a loss event (payment delinquency, financial difficulties experienced by the borrower, etc.) before provisions can be recognised ("incurred loss model"). Where objective evidence exists, an entity must charge an impairment loss through the P&L. However the impairment accounting rules are more complex than this; in particular assessing the existence of objective evidence and the methods for determining the quantification of the impairment loss – which depend upon the category assigned to the asset-require exercising professional judgment. Regarding sovereign debt exposures, these judgments have been made in the context of the current market conditions (i.e. appreciation of the level of activity in the market for the public debt instruments), the special circumstances concerning sovereign risk in the countries which have received support under a European plan (i.e. the various aspects of the European support plan finalised on 21 July 2011whose terms leads to recognition of an initial discount of 21%, the intention to participle in the plan, etc...) and according to the more or less optimistic assessment of the situation of these countries by the financial institutions. This leads inevitably to different interpretations and accounting treatments.

Having said that, in a European context where all entities are exposed to the same risk, harmonised practices between banks and insurers are highly desirable. The Governor of the Banque de France has therefore called for greater harmonisation of provisioning practices regarding sovereign risk. At national level, exchanges of views on provisioning practices regarding sovereign risk have taken place with audit firms and also between public authorities (national standard setter, market supervisory authority) to ensure that financial entities accurately reflect the actual risk exposures of sovereign debts and notably take into account all available information. Accordingly, in the context of the financial communication as of 30 September, financial institutions have been encouraged to review accounting treatments in light of the increasing uncertainties relating to sovereign credit risk in Greece, materialised by difficulties in restoring public deficits and recent declarations to increase participation by private investors. It is of crucial importance that financial institutions send to the markets a clear and consistent message within Europe concerning sovereign risk.

Beyond the issue of sovereign risk, the current IFRS rules for impairment have been largely criticised during the recent financial crisis for being too restrictive, and ultimately not prudent enough. As a specific event must trigger the provision, the incurred loss model leads to account for losses at a fairly late stage of a loan. This means that provisions fail to reflect a loan book's true inherent risk, which in economic terms exists from the date of inception. In order to respond to these concerns, the international standard setter (IASB) proposes to move towards a model based on expected losses which should enable to address the "too little, too late" issue. Under such a model, entities could recognise credit risk as soon as possible in their financial statements without waiting for the risk to be crystallised by a specific event, hence anticipating the risk and spread the cost over a longer period. Covering risk as early as possible is fundamental to sound supervision. Therefore prudential supervisors work closely with the IASB to find the most appropriate model that would address the deficiencies of the current impairment model and overcome operational challenges.

Disclosures

The recent crises have underlined the need for full and comprehensive disclosures of the risks to which entities are exposed. Banks and insurance companies have been encouraged to provide market participants with enhanced disclosures on their sovereign exposures, notably on the size and type of their exposures. Prudential supervisors regard transparency as an important tool to restore market confidence and to promote financial stability. This was notably the case for stress tests as indicated above.

Given the special circumstances concerning sovereign credit risk in certain countries and the principles-based nature of IFRS, it is of crucial importance that financial institutions give clear disclosures explaining the underlying rationale behind the accounting treatment retained and assumptions used. This would help users of financial statements understand the judgments made in determining provisioning and measuring fair value and as a whole, would facilitate comparability and achieve greater transparency in financial information.

4| Conclusion

Recent developments in financial markets should lead to consider a review of the adequacy of the regulatory framework on sovereign risks. More capital charge against sovereign risk and less incentives for the purchase of sovereign debt should especially be considered in a context where this asset class can no longer be considered as a low-risk or risk-free asset class. There is a need to have a better understanding of the sovereign risk and assess the need for regulatory reform in that regard, in particular to consider regulatory capital charges differentiated according the respective credit quality of sovereigns.

Beyond regulation, supervisory practices could further contribute to increase the monitoring of sovereign risk and its impact on financial institutions and financial stability. In particular, stress tests, such as those carried out in Europe in 2011, which required institutions to apply haircuts to their sovereign exposures and make further impairment provisions for such exposures, should help to move in the right direction.

References

Basel Committee on Banking Supervision (2011)
"Basel III: A global regulatory framework for more resilient banks and banking systems", June.

Basel Committee on Banking Supervision (2011)
"Revision to the Basel II market risk framework", February.

Davies (M.) (2011)
"The rise of sovereign credit risk: implications for financial stability", *BIS Quarterly Review*, September.

European Banking Authority (2011)
"2011 EU-wide stress test – Methodological note", March.

European Insurance and Occupational and Pensions Authority (2011)
"Specifications for the 2011 EU-wide stress test in the insurance sector", March.

European Parliament and Council (2010)
"Directive 2006/48/EC and 2006/49/EC or "CRD" as amended by Directive 2009/111/EC or "CRD II" and Directive 2010/76 or "CRD III"", July.

European Parliament and Council (2009)
"Directive 2009/138/EC or "Solvency II", November.

European Parliament and Council (2002)
"Directive 2002/13/EC amending Directive 73/239/EEC as regards the solvency margin requirements for non-life insurance undertakings", November.

European Securities and Markets Authorities (2011)
"Sovereign debt in IFRS financial statements", November.

Financial Stability Board (2010)
"Principles for reducing reliance on CRA ratings", *Report of the Financial Stability Board*, October.

Hannoun (H.) (2011)
"Sovereign risk in bank regulation and supervision: Where do we stand?", Financial Stability Institute High-Level Meeting, Abu Dhabi, UAE, October.

International Monetary Fund (2010)
"Sovereigns, funding, and systemic liquidity", *Global Financial Stability Report*, October.

Strauss-Kahn (D.) (2011)
"Financial crisis and sovereign risk: Implications for financial stability", opening remarks, *IMF high-level roundtable*, March.

Monetary policy focus

Contagion and the European debt crisis

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The financial and economic crisis that started in August 2007 is a clear case of the materialisation and propagation of systemic risk. The banking crisis reached a climax in September 2008 with the demise of Lehman Brothers and the subsequent support to the financial system. In spring 2010, it turned into a sovereign debt crisis. Widespread instabilities repeatedly reached new heights since the summer of 2011. This article addresses a phenomenon which is at the very centre of what we are experiencing in the euro area, the phenomenon of contagion. Contagion is one of the mechanisms by which financial instability becomes so widespread that a crisis reaches systemic dimensions. The article argues that contagion phenomena play a crucial role in exacerbating the sovereign debt problems in the euro area. As a consequence, crisis management by all competent authorities should focus on the policy measures that are able to contain and mitigate contagion. Several of the European Central Bank's (ECB) interventions have been motivated by the need to address contagion.

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The financial and economic crisis that started in August 2007 is a clear case of the materialisation and propagation of systemic risk. The banking crisis reached a climax in September 2008 with the demise of Lehman Brothers and the subsequent support to the financial system. In spring 2010, it turned into a sovereign debt crisis. Widespread instabilities repeatedly reached new heights since the summer of 2011.

In this article, I would like to address a phenomenon which is at the very centre of what we are experiencing in the euro area, the phenomenon of contagion.

Contagion is one of the mechanisms by which financial instability becomes so widespread that a crisis reaches systemic dimensions. The other two mechanisms that constitute sources of systemic risk are the unwinding of financial imbalances and the occurrence of severe macro shocks.[1] Without denying that imprudent fiscal behaviour and lack of effort to maintain the competitiveness of countries are the deep origins of the European sovereign debt crisis, I will argue that contagion phenomena play a crucial role in exacerbating the problems. As a consequence, crisis management by all competent authorities should also focus on policy measures that are able to contain and mitigate contagion. Several of the ECB's interventions have been motivated by the need to address contagion, which impairs our ability to maintain price stability in the euro area. By focusing on contagion in this article, I do not mean to say that other sources of systemic risk are less important for the instabilities we are currently experiencing. Quite the contrary; an important role is also played by the unravelling of widespread financial imbalances, which contaminated fiscal balances, and the lack of structural reforms ensuring countries' competitiveness that I already mentioned above.

The article first looks at contagion conceptually. I will discuss its meaning from a policy maker's perspective against the background of the academic literature. I shall then dwell in some depth on the evidence of contagion phenomena and risks in the euro area government debt crisis. Next, I shall look at some historical episodes where sovereign contagion also played some role and see what we can learn from them. Finally, before concluding I will refer to the ECB's policy responses, and more broadly European policy responses, to contagion.

1| The phenomenon of contagion: from research to policy

Broadly speaking, financial contagion refers to a situation whereby instability in a specific market or institution is transmitted to one or several other markets or institutions. There are two ideas underlying this definition. First, the wider spreading of instability would usually not happen without the initial shock. Second, the transmission of the initial instability goes beyond what could be expected from the normal relationships between markets or intermediaries, for example in terms of its speed, strength or scope.

Contagion is crucial for policy-making. This is in particular the case because it usually constitutes an externality, in the economic meaning of the term. The actions of economic agent A adversely affect the situation of economic agent B. These effects are external to the economic agent A but the economic agent B cannot make A pay for them. Hence, the price mechanism will not solve the problem. There is a market failure that policy should try to address. In particular in financial markets, where many agents interact at high frequency, it is difficult for economic agents to get together and negotiate a contractual solution to the externality problem, as Nobel Laureate Ronald Coase has suggested in other contexts.[2] In the heat of a financial crisis this will undoubtedly be impossible.

Contagion, as I have just defined it, is in principle distinct from other forms of systemic instability, notably the unravelling of widespread imbalances and aggregate shocks causing simultaneous failures or crashes. But if imbalances or aggregate shocks already weaken the system, then the different transmission channels can interact and contagion may well become much stronger than in the absence of such additional vulnerabilities.[3] This is likely to be relevant in the present context, where many financial intermediaries have not as yet overcome their problems, fiscal deficits and debt levels are relatively high and some countries have lost competitiveness.

It is probably fair to say that an inherent problem in the extant literature is that it is difficult to identify empirically the presence of pure forms of contagion.

1 *ECB (2009).*
2 *Coase (1960).*
3 *For example, Chen (1999) develops a model in which the presence of aggregate shocks makes bank contagion more likely.*

This identification problem is not unexpected, as there are so many factors that could also cause the follow-up problems observed and it is so difficult to control for all of them.

Criteria that have been used in the literature to identify contagion include:[4] (i) the transmission is in excess of what can be explained by economic fundamentals;[5] (ii) the transmission is different from regular adjustments observed in tranquil times;[6] (iii) the events constituting contagion are negative extremes;[7] and (iv) the transmission is sequential, for example in a causal sense. But there is no agreement about which ones of these four criteria are necessary or sufficient to characterise a contagion event.

Against this background, ECB staff has developed and is using a series of state-of-the-art analytical tools to assess contagion risks. But these tools often face the same identification problem as the previous literature. Nevertheless, policy makers should act to stem pure contagion risks if data or analytical tools show sizeable spillover risks and there is no convincing evidence that this is caused primarily by economic fundamentals or common shocks. At the same time, of course, weak fundamentals need to be addressed as well. But their correction will usually take time.

2| Evidence of contagion from the ongoing government debt crisis

Let me now turn to the evidence from the ongoing debt crisis. I will start by reviewing evidence of contagion across euro area government debt markets and then move to the relationships between sovereign and bank instabilities.

2|1 Sovereign-sovereign contagion

When the sovereign crisis became more severe again and Moody's downgraded Portugal on 5 July 2011, it cited – among other factors – developments in Greece. Moody's believed that contagion from a default of Greece made it more likely that Portugal would require a second round of official financing.[8]

Moreover, referring to Greece as a precedent, Moody's indicated that a second round of official financing would entail private sector participation also in Portugal.[9]

Unfortunately, this was not the end of the story. The downgrade of Portugal and, above all, the continuing fears of a Greek default apparently triggered a sell-off in Spanish and Italian government bonds. There had not been adverse data releases concerning the Spanish and Italian economies or budgetary situations around that time. By 18 July 2011 Italian government bond yields had increased by almost 100 basis points, while Spanish ones had increased by more than 80 basis points.[10]

What mechanism triggered these market moves? I believe it is fair to say that contagion played a major role. The initial rises in bond yields can be largely explained by the concerns raised by the scope and possible extent of the "private sector involvement" in Greece, which was set as a condition for a second programme at the euro area summit of 21 July.[11] Some investors may find it rational to start shortening sovereign debt and others simply to reduce their exposures to countries in the currency union, since market concerns about government debt sustainability can become self-fulfilling if not tackled. Some other investors may also prefer to withdraw from some market segments in view of high volatility.

4 *See Hartmann, Straetmans and de Vries (2006). For a broader survey of the contagion literature and discussions of particular channels through which financial contagion emerges, see De Bandt and Hartmann (2000), Pritsker (2001), ECB (2005) or ECB (2009).*
5 *See Eichengreen, Rose and Wyplosz (1996) or Bekaert, Harvey and Ng (2005).*
6 *Forbes and Rigobon (2002) capture this through increased correlations during times of stress.*
7 *See, for example, Longin and Solnik (2001) or Hartmann, Straetmans and de Vries (2004).*
8 *According to Moody's, "the growing risk that Portugal will require a second round of official financing before it can return to the private market, particularly if the country were to suffer contagion from a disorderly Greek default, or merely from the growing likelihood of a default. Such contagion would meaningfully change the risks for investors that currently hold Portuguese bonds given the increasing possibility that private sector creditor participation will be required as a prerequisite for any further finance".*
9 *Moody's noted that "European policymakers have grown increasingly concerned about the shifting of Greek debt held by private investors onto the balance sheets of the official sector. Should a Greek restructuring become necessary at some future date, a shift from private to public financing would imply that an increasingly large share of the cost would need to be borne by public sector creditors. To offset this risk, some policymakers have proposed that private sector participation should be a precondition for additional rounds of official lending to Greece."*
10 *Negative news regarding developments within the Italian government surfaced on 7 July and could have contributed to the narrowing of the yield gap between Italy and Spain, but they could not have triggered the joint sell-off.*
11 *Chen's model,* op.cit., *explains in a banking context how a combination of information and payment externalities can trigger contagious runs.*

Reduced demand leads to falling prices, which in turn reduces the value of bonds held by other investors. Investors may prefer to reduce exposures while their positions are still in positive territory, or to take small losses early, so as not to be exposed to potentially large losses or high volatility later. Markets may then also become illiquid, which can further increase the downward pressure on bond prices. Falling bond prices translate into higher yields, which worsens debt sustainability prospects for those governments which have significant funding needs, thus validating investors' expectations.[12]

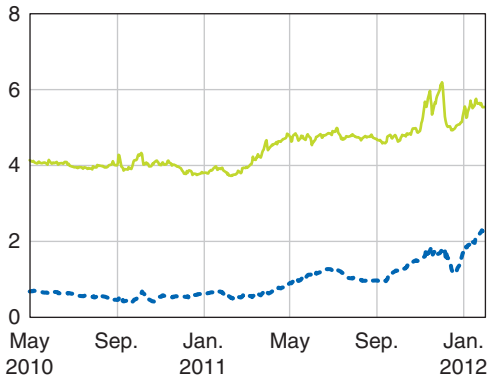
This is merely anecdotal evidence of contagion. I therefore would like to consider next some elements of the ECB staff's analytical toolkit in order to take a more systematic look at the data. Broadly speaking each of the tools estimate to which extent measures of the sovereign risk of a given euro area country affects the sovereign risk of other euro area countries, controlling for different features of the data that do not constitute contagion. Of course, a particular point of attention is whether countries in severe difficulties to finance their public budget deficits, for example one of the three countries with a stabilisation programme supported by the European Union and the International Monetary Fund – Greece, Ireland and Portugal –, contaminate countries that do not have as large public deficits. Since each result and its interpretation may be dependent on the specific model used, let me consider three different approaches that have found their way in the ECB's developing toolkit in this area.

The first approach is a state-space model performing, in real time, multivariate frequency decompositions.[13] In a first step the movements in daily government bond yields of specific countries are ascribed to high-frequency shocks (or disturbances), whose effects wane in few days, medium-frequency shocks whose effects last for a few weeks, and long-lasting shocks whose effects describe the trends in the yields. In a second step, the shocks extracted from the frequency decomposition of one or several countries' government bond yields are used as additional explanatory variables in otherwise the same model as in step 1 for one or several other countries' yields. If the inclusion of these cross-country terms leads to a statistically significant improvement in the forecast accuracy for yields over a 100-day horizon, I will regard this as evidence of spillover or contagion effects.

Chart 1
Frequency decomposition approach: Contagion and spillover effects from Greece, Ireland and Portugal to Italy and Spain

(percentage points)

a) Italy



b) Spain

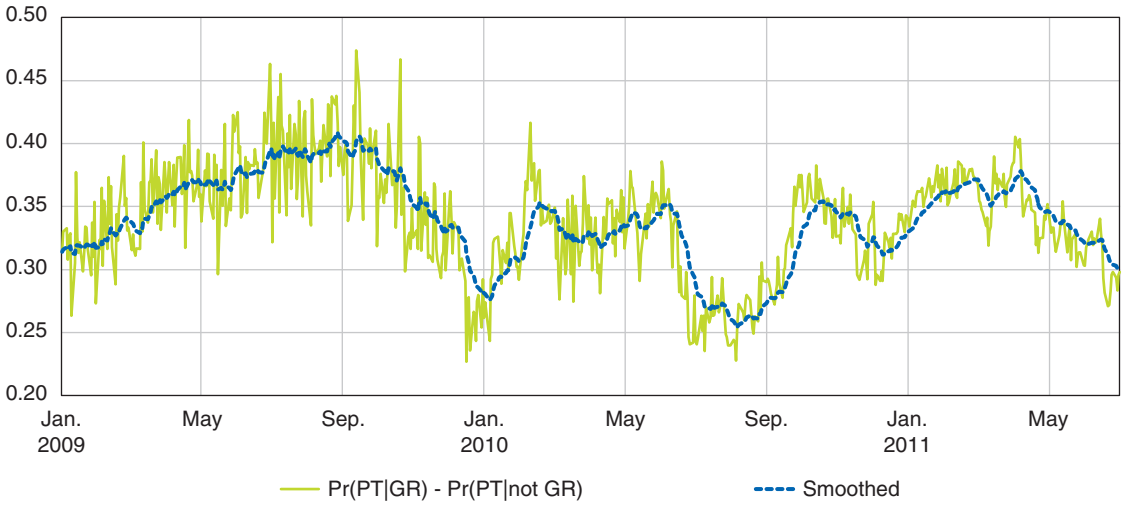
10-year government bond yields
Estimated spillover effects from Greece, Ireland, Portugal

Note: The two panels show the 10-year government bond yields of Italy and Spain (green line) and the estimated joint spillover effects from Greek, Irish and Portuguese 10-year government bond yields on them (blue dashed lines). The model is estimated with daily data from May 2010 to early February 2012.
Source: Donati (unpublished).

In the two panels of Chart 1 I display the results for the joint contagion or spillover effects from the 10-year government bond yields of Greece, Ireland and Portugal to those of Italy and Spain, respectively. According to this approach, contagion from Greece, Ireland and Portugal (blue dashed lines) explains

12 *Calvo (1988).*
13 *Donati (unpublished). Originally such methodologies were developed in the engineering literature on automatic controls. This literature shares similarities with the unobserved components approach proposed in the economics literature by Harvey (1985), Clark (1987) and, more recently, Creal, Koopman and Zivot (2010).*

Chart 2
Credit risk approach: Contagion and spillover effects from Greece to Portugal



Note: The Chart shows the estimated probability over a year that Portugal experiences a credit event on its government bonds given that Greece experiences a credit event on its government bonds. The probabilities are derived from daily data on credit default swaps insuring government debt for all maturities over a 5-year horizon. Only the incremental effect of a Greek credit event is measured, because the conditional probability of a Portuguese credit event, given no Greek credit event, is deducted from the above conditional probability. The blue line shows the increments in the conditional probability, whereas the pink line is smoothed using an exponentially weighted moving average. The model is estimated with data from September 2008 to June 2011.
Source: Zhang, Schwaab and Lucas (2011).

a significant share of Italian (panel a) and Spanish (panel b) government bond yields (green lines). In 2011, for example, these effects accounted on average for about 38% of the variability of Italian sovereign yields and around 33% for Spanish sovereign yields. As of July 2011, the time of the worsening of the sovereign debt crisis, the contagion or spillovers measured trended upwards, suggesting long-lasting effects.[14] The situation improved by the end of 2011, although contagion from the three programme countries remained significant by January 2012.

The second approach builds on recent advances in credit risk modelling. The model at hand estimates the effect of an increased probability of a credit event (e.g. a default) for one country on the likelihood of a credit event for other countries.[15] The probabilities are estimated from premiums of sovereign credit default swaps (CDS) traded in the market, irrespective of whether the probabilities priced-in by the market are in line with the assessment made by official institutions. The multivariate conditional probabilities are derived taking into account the fat-tailed and skewed distributions of CDS premiums and controlling for the time-varying nature of relationships between CDS premiums of different sovereigns as well as volatility clustering.

One example from the results of this multivariate approach is displayed in isolation in Chart 2. It shows how the difference between the estimated probability that Portugal experiences a credit event given Greece would experience such an event and the estimated unconditional probability that Portugal would experience a credit event evolved during the two preceding years. It turns out that the "contagion effects" from a Greek credit event (say a default) to Portugal ranges – according to this model – between 25 and 45 percentage points. The impact of Greece on Ireland is of a similar magnitude but not reported in this article.

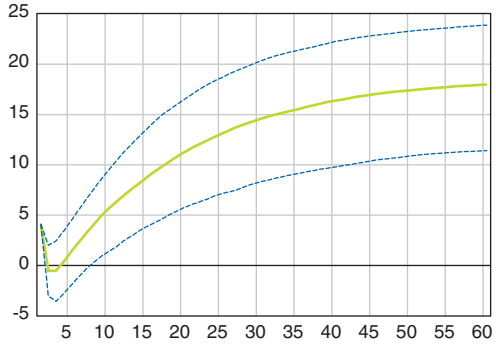
In order to further broaden the basis for identifying sovereign contagion in the euro area, let us now move from more statistically oriented approaches

14 *The fact that the spillovers have a trend – as opposed to fluctuate around a zero mean – indicates that they are of a persistent, long-lasting, nature and that their effect is likely to dissipate only slowly, even in the presence of favourable developments. When the spillover effects move in parallel with the yields of the affected country, in the logic of the model, it means that contagion from the three peripheral countries has contributed to drive the underlying trend of the yields, as for example in the case of Italy – and to a lesser extent of Spain – from early August 2011 (in the wake of the first announcement of private sector involvement in the Greek public debt negotiations) to end December 2011. Certainly, Italian and Spanish yields responded to several additional factors, whose effects may have enhanced or offset those stemming from Greek, Irish and Portuguese 10-year government bond yields.*

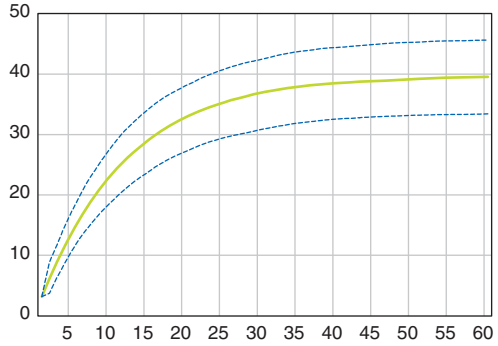
15 *Zhang, Schwaab and Lucas (2011). Other approaches measuring spillovers among banks based on conditional default probabilities are in Huang, Zhou and Zhu (2009) or Segoviano and Goodhart (2009). Ground work in a portfolio risk management context was done by CreditMetrics (2007).*

Chart 3
Structural vector error correction approach: Contagion from Greece to six euro area countries
(basis points)

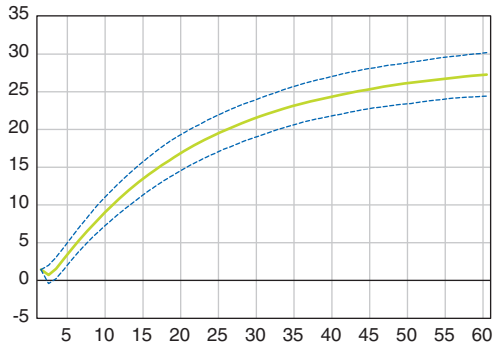
a) Ireland
10-year IE-DE sovereign spreads



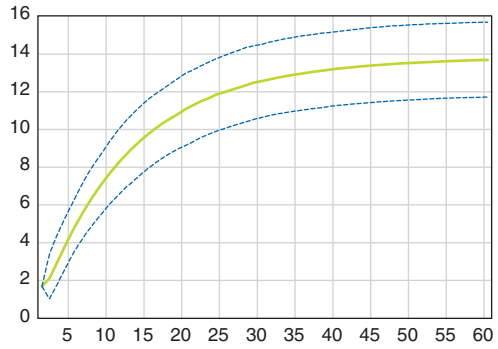
b) Portugal
10-year PT-DE sovereign spreads



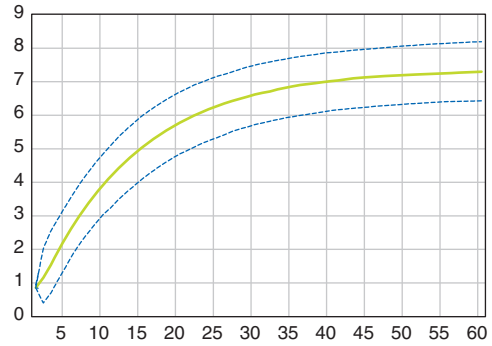
c) Spain
10-year ES-DE sovereign spreads



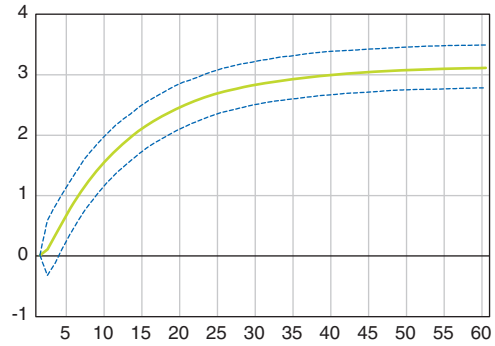
d) Italy
10-year IT-DE sovereign spreads



e) Belgium
10-year BE-DE sovereign spreads



f) France
10-year FR-DE sovereign spreads



Note: The six panels show the accumulated impulse response functions (green lines) of a one-notch rating downgrade shock for Greece on the 10-year government bond spreads over Germany for Ireland, Portugal, Spain, Italy, Belgium and France, respectively. The blue dashed lines are 68% confidence intervals. The horizontal axes are counting days over which the adjustments take place. The model is estimated with data from September 2008 to August 2011.
Source: De Santis (2012, Figure 9).

to an approach that controls for additional economic factors. It estimates a panel of sovereign yield spreads over German yields for many euro area countries using a structural vector error correction model.[16] The model controls for aggregate factors affecting all country yield spreads together (such as changes in global risk aversion), country-specific factors (in particular individual country default risk (as measured by credit ratings) and for persistence in yields through the error correction mechanism. Contagion is identified with the impulse response function of the yield spread of each country to an unanticipated shock in the Greek credit rating.

The results confirm that besides general risk aversion and own credit risk also the Greek credit rating affected other euro area countries' bond spreads in a statistically significant way over the period September 2008 to August 2011. These contagion effects are economically small for some countries, such as France, and large for other countries such as Ireland, Spain, Italy or Portugal (see impulse response functions in Chart 3). Contagion is more pronounced for countries with comparatively weak economic fundamentals. The findings are also consistent with the observation that CDS spreads of each euro area country have recently been higher, in some cases markedly, than the CDS spreads of other countries with the same ratings.[17]

2|2 Sovereign-bank contagion

Let me now turn to the evidence on contagion between government debt markets and banks. In July 2011 sovereign tensions spread not only to Italy and Spain, but also to banks exposed to the sovereign debt of these countries.

The sovereign crisis has clearly affected funding availability and funding costs for individual banks in the euro area. The coincidence of the sovereign debt problems and banks' funding problems constitutes only anecdotal evidence. Additional evidence can be obtained by applying the frequency decomposition model, the first one of the three models I described earlier, to bank CDS spreads. This shows that from the beginning of April 2011 onwards developments in the CDS spreads of Greece, Ireland, Portugal, Italy and France explain an increasing share of the variability in the CDS spreads of, for example, Société Générale and Crédit Agricole, whose CDS spreads doubled from early July up to mid-August. However, the two banks' exposures to Greece or any other of the programme countries did not increase during these months. In other words, contagion effects from government debt markets to banks, as defined in the model, have become more important in the euro area during the second half of 2011.[18]

Overall, there seems to be significant evidence of actual contagion effects during the European sovereign debt crisis,[19] despite the policies aimed at containing the spreading of instability. Note, however, that there may also be latent contagion risks that have not yet materialised. It is quite likely that if the various crisis management measures had not been taken, contagion would be much more severe than presently observed.

3| Looking back in history

Before turning to the ongoing European policy responses to contagion I would like to look back and consider what one can learn from history.

3|1 Fiscal stability in successful monetary unions

A first step is to consider the relationship between fiscal developments across countries in monetary unions when accompanied by political integration, although differences to the present European situation are still large. Michael Bordo and co-authors observe a common pattern in the experiences of the United States, Canada, Germany, Argentina and Brazil during the 19th and 20th centuries.[20] Successful fiscal federalism seems to have been associated with "explicit or implicit

16 *De Santis (2012). The methodology is similar to Sims' (1980) standard vectorautoregression approach, except that the structural vector error correction model imposes an additional long-run restriction.*
17 *The ECB has more than these three approaches under development for assessing sovereign contagion risk. Amisano and Tristani (2011), for example, not only control for economic fundamentals but also introduce nonlinearities in the contagion analysis. But the preliminary results could not be reported in this article.*
18 *Acharya, Drechsler and Schnabl (2011) as well as Alter and Schüler (2011) provide further discussions of the links between banking instabilities and sovereign debt problems.*
19 *Using again different methodologies, staff of the International Monetary Fund has found related evidence; see Caceres, Guzzo and Segoviano (2010) or Arezeki, Candelona and Sy (2011).*
20 *Bordo, Jonung and Markiewicz (2011).*

no-bail-out clauses, constitutional restrictions and through discipline exercised by financial markets for government debt".[21] In the cases of the United States and Canada, the adoption of fiscal federalism entailed a shift of state debt onto federal hands. For the United States this was achieved in the aftermath of the Revolutionary War through a plan developed and executed by Alexander Hamilton. Hamilton's plan transferred state debts accumulated during the Revolutionary War to the federal budget. In addition, it also converted state debts into bonds and established a "sinking fund", in which revenues were collected to finance bond purchases on the open market. In this way the United States created an efficient mechanism to smooth fiscal revenues over time and managed to tap into the bond market at reasonable rates.

Another interesting experience, albeit again different in terms of environment, is the Italian unification in 1861, when the Kingdom of Sardinia integrated various previously independent states. One of the first decisions of the newly constituted Finance Ministry of the Italian Kingdom was to underwrite all the outstanding debt of the integrated states.

The insight that may be gained from these historical examples is that a well functioning monetary union requires strong and innovative approaches to deal with regional fiscal problems. This includes appropriate incentives for keeping public deficits under control, also in a low-interest rate environment, and effective means for dissipating contagious sovereign solvency concerns.

But also a word of caution is needed. All of the historical cases I have just mentioned are ones in which the political union was in place at the time of the monetary union. This implies that changes to the fiscal framework were more straightforward in these cases.

3|2 Central banks' role in containing the spreading of instability

Another relevant historical episode of significant contagion risks is the Russian sovereign debt default of August 1998. This event started a dramatic chain reaction, which included the subsequent failure of the hedge fund Long-Term Capital Management (LTCM). As Russia defaulted and its currency collapsed so did its domestic banking system. The stress spread across the globe, and a number of international investors, in particular financial institutions, made large losses. Stock prices dropped sharply across emerging markets and the developed world. As security prices fell, the capital of investors and financial firms was eroded, liquidity withdrew from markets, volatility increased, and credit spreads for sovereign debt widened globally, abruptly and simultaneously.

The Russian crisis did not lead to a financial meltdown. First, central banks around the world provided ample liquidity to market participants, in various ways. Second, central banks helped in coordinating the actions of market participants, such as the eventual bailout of LTCM by the private sector. Arguably, central banks' action in the fall 1998 prevented the worst.[22]

4| Key euro area policy responses to contagion risks

I now turn more specifically to policy actions in the euro area addressing the sources and propagation of the debt crisis. I start with the ECB and then move to the responsibilities of other public authorities.

4|1 ECB policies

In order to secure the working of the monetary policy transmission mechanism, which is essential for the ability of the European Central Bank to maintain price stability over the medium term, the ECB drew on a number of non-standard monetary policy measures introduced over the course of the financial crisis that had started in the summer of 2007. The measures taken have overall contributed to stabilising financing conditions and the flow of credit to the economy, all with the view to maintaining price stability.

Following the outbreak of the crisis in August 2007 and its dramatic worsening in September 2008, the ECB provided liquidity in more varied ways and at longer terms in order to address dysfunctions in the money market. It also cooperated with other central banks to contribute to an international response to an international money market problem.

21 *Bordo* et al., op.cit., *p. 26.*
22 *For more discussion on this and other contagion episodes, see for example Kaminsky, Reinhart and Vegh (2003) or Dungey, Fry, González-Hermosillo and Martin (2002).*

The joint provision of US dollar liquidity by initially three central banks, including the ECB, and later by many more central banks, was labelled by some observers as the Plaza Accord for money markets.

In the aftermath of the failure of Lehman Brothers, the ECB launched its policy of "enhanced credit support", a series of measures to enhance the flow of credit above and beyond what could be achieved through policy interest rate reductions alone. These measures include the unlimited provision of liquidity through "fixed rate tenders with full allotment"; the provision of liquidity at lengthened maturities of up to one year; and the provision of more liquidity in foreign currencies to euro area banks and of euro liquidity to other central banks for them to provide to their local banks; and a programme of purchases of covered bonds. As banks can only make use of the ECB liquidity-providing facilities if they have sufficient collateral, the ECB also extended the list of assets it accepts as collateral. As it had been the case in the years before the crisis, we also adjusted collateral eligibility criteria in view of market developments in order to remedy evolving inconsistencies and avoid possible abuses.

The total value of eligible marketable collateral is very large. It equals about EUR 13.5 trillion, which amounts to about 150 percent of euro area GDP. From this total, the euro area banks have in their balance sheets EUR 2.1 trillion already approved for utilisation (including also non-marketable collateral). It creates the necessary room for manoeuvre in our liquidity provision that amounts to about EUR 900 billion.

Facing the repercussions of the euro area government debt crisis, the ECB established in May 2010 the Securities Markets Programme (SMP). Under the SMP, which is in full compliance with the prohibition of monetary financing, the Eurosystem buys securities in dysfunctional debt market segments in order to safeguard the transmission of monetary policy to all parts of the monetary union. Sovereign contagion is one of the mechanisms by which the transmission of monetary policy through interest rates can be disabled. In this sense SMP interventions also lean against sovereign contagion.

Particularly as of the summer of 2011 the European debt crisis reached new heights. The ECB reacted to the disorderly conditions in euro area debt securities markets by resuming on 8 August 2011 the active implementation of the SMP. The relative size of the programme, representing just 2.3% of the euro area GDP against the 13.7% of GDP that has been bought by the Bank of England or the 11.4% purchased by the Federal Reserve, makes it easier to sterilise its liquidity impact.

At the Governing Council meeting of 6 October 2011 the ECB took a further series of decisions in response to market stresses: to conduct two further one-year longer term refinancing operations; to continue to apply fixed rate full allotment procedures in all monetary policy liquidity-providing operations for as long as needed and at least till the middle of 2012; and to engage in a second Covered Bond Purchase Programme (CBPP2) with an intended purchase amount of EUR 40 billion over a period of one year starting in November 2011.

On 30 November the Bank of Canada, the Bank of England, the Bank of Japan, the Federal Reserve, the Swiss National Bank and the ECB undertook coordinated action to ease US dollar funding strains. In particular, the price of the existing US dollar liquidity swap arrangements was lowered by 50 basis points. Moreover, temporary bilateral liquidity swap arrangements have been established, which enable each central bank to provide liquidity in the currencies of the other participants.

On 8 December 2011 the ECB has decided to conduct two very long-term refinancing operations with a maturity of three years. These operations intend to ease the pressures banks are currently facing when they seek funding at longer-term maturities. They help banks avoid rebalancing the maturities of assets and liabilities by scaling down lending to the real economy. The first operation attracted unprecedented demand of EUR 489.2 billion, which in itself underlines the usefulness of this measure. Its effectiveness is also illustrated by a downward shift of euro area bond yields across the maturity spectrum.

The three year refinancing operations was complemented with increasing the pool of eligible collateral. Though on average the pool of eligible collateral is very large, individual banks may have insufficient collateral to cover their funding needs, for example when the credit assessments of asset-backed securities deteriorate. First, the ratings threshold for certain asset-backed securities was reduced. Second, national central banks were allowed to temporarily accept performing credit claims as

collateral. Moreover, the minimum reserve ratio was halved from two percent to one percent, which increases liquidity provision to the banking sector by an additional EUR 100 billion.

All of these actions had clear positive impacts in line with their objectives. If we look at the past experience, the ECB's measures have enabled the monetary policy transmission mechanism to continue operating relatively well at the level of the euro area, containing also contagion, although it should be recognised that the transmission mechanism remains severely disrupted in some euro area countries.

4|2 Policies by other European and national authorities

ECB action was fast, targeted and decisive. But we cannot shoulder the burden of solving the problems alone. The euro area governments have to live up to their responsibilities, which entails action at both the level of the member states and the euro area. It is of paramount importance that member states continue implementing policies that put their public finances on a sustainable path. At the same they need to engage in structural reforms that raise the growth potential of their respective economies. Moreover, obviously, EU/IMF programme countries need to stick particularly closely to the commitments made. Only in this way can the fundamental factors and imbalances at the origin of the crisis be removed.

At the European level, the ECB very much welcomes the progress made in re-designing fiscal governance. On 9 December 2011 EU Heads of State or Government agreed on a new fiscal compact that limits structural deficits to 0.5 percent of nominal GDP. Contrary to the rules of the Stability and Growth Pact, this balanced budget rule will be enshrined in primary legislation. Importantly, this rule foresees automatic corrections in case it is violated. Its transposition into national law is subject to verification by the European Court of Justice. Taken together, these measures significantly strengthen the preventive arm of the European fiscal governance framework and thereby limit the ground for sovereign contagion in the future.

As effective crisis prevention cannot cover for all eventualities, it is important to have a credible firewall in place that limits contagion risks between different sovereign debt markets. Following the intensification of the euro area government debt crisis in May 2010, the euro area member states decided to create the European Financial Stability Facility (EFSF). The EFSF enables financing of euro area member states in difficulty, where financing is subject to conditions negotiated with the troika, consisting of the EU Commission, the IMF, and the ECB. The adjustment programme over time improves economic fundamentals and thus dissipates solvency concerns, which in turn enables the country to return to the markets.

The ECB welcomes the decisions recently taken by the euro area Heads of State or Government that strengthen the EFSF and its successor, the European Stability Mechanism (ESM). First, euro area leaders have committed to review the size of the backstops facilities by March. Second, the ESM will enter into force by July 2012, earlier than originally foreseen. Third, as regarding private sector involvement the euro area will adhere to established IMF practice, which will help reassuring investors. Finally, an emergency voting procedure will be introduced into the rules of the ESM, which facilitates effective decision making especially in crisis situations. Nevertheless it is crucial that the EFSF will be made operational as soon as possible. In view of this objective, we have decided that the ECB – jointly with some national central banks – will act as an agent for the EFSF in its market operations.

Finally, it is essential that the affected governments do not see the implementation of the new stabilisation tools as incentives to weaken their efforts of strengthening their financial positions. Rather it is crucial that all support measures – be it in the form of loans or security purchases – are subject to strict conditionality regarding fiscal budget measures and structural reforms to increase the economic growth rate that is so essential to stabilise the debt ratio. Imbalances in the fiscal, real and financial sectors should not be allowed to emerge again.

5| Concluding remarks

I conclude by reiterating a few main messages that I wanted to convey in this article.

First, long historical experience suggests that central banks have an important role to play in contributing to financial stability, including containing contagion risks. They can do so by providing an anchor for stability through delivering on their primary objective of price stability, by providing as much liquidity as quickly and widely as needed in a crisis situation, and by providing analysis and coordination to other policy makers and market participants.

Second, in the context of its systemic risk surveillance the ECB spends significant resources, not only for identifying imbalances and weak fundamentals early, but also for identifying and assessing contagion risks. No matter how difficult it is to collect all the relevant information and to design the appropriate analytical tools, most pieces of evidence point to the existence of very significant financial and sovereign contagion risks in the euro area over the time of the ongoing crisis.

Third, containing such contagion is of great importance for overcoming the ongoing European debt crisis. There would be enormous economic and social damage if the ECB and other competent authorities do not respond appropriately and decisively within their respective mandates.

Fourth, whilst the ECB's action has been decisive and effective this alone is not enough. All parties need to live up to their responsibilities. It is of utmost importance that the agreements of the Heads of State or Governments of the euro area and EU institutions of 21 July and 9 December 2011 are honoured and rigorously implemented. This concerns particularly the swift implementation of the operational strengthening of the EFSF agreed and an early implementation of the ESM. Moreover, all countries should meet their fiscal targets and introduce structural reforms that restore competitiveness and growth potential where they have been lost over the last decade. Widespread imbalances and weak fundamentals should not be allowed to emerge again.

If all parties honour their commitments, then the combination of preventive governance and ex post support mechanisms will contain contagion and Europe will successfully weather these difficult times.

References

Acharya (V.), Drechsler (I.) and Schnabl (P.) (2011)
"A Pyrrhic victory? – Bank bailouts and sovereign credit risk", *NBER Working Paper*, 17,136, June.

Alter (A.) and Schüler (Y.) (2011)
"Credit spread interdependencies of European states and banks during the financial crisis", mimeo., University of Konstanz, June.

Amisano (G.) and Tristani (O.) (2011)
"The euro area sovereign crisis: Monitoring spillovers and contagion, *ECB Research Bulletin*, 14, Autumn, pp. 2-4.

Arezeki (R.), Candelona (R.) and Sy (N.) (2011)
"Sovereign rating news and financial markets spillovers: Evidence from the European debt crisis", *IMF Working Paper*, WP/11/68, March.

Bandt (O. de) and Hartmann (P.) (2000)
"Systemic risk: A survey", *ECB Working Paper Series*, 35, November.

Bekaert (G.), Harvey (C.) and Ng (A.) (2005)
"Market integration and contagion", *Journal of Business*, 78, pp.39-70.

Bordo (M.), Jonung (L.) and Markiewicz (A.) (2011)
"A fiscal union for the euro: Some lessons from history", *NBER Working Paper*, 17,380, September.

Caceres (C.), Guzzo (V.) and Segoviano (M.) (2010)
"Sovereign spreads: Global risk aversion, contagion or fundamentals", *IMF Working Paper*, WP/10/120, May.

Calvo (G.) (1988)
"Servicing the public debt: The role of expectations", *American Economic Review*, 78, pp. 647-661.

Chen (Y.) (1999)
"Banking panics: The role of the first-come, first-served rule and information externalities", *Journal of Political Economy*, 107, pp. 946-968.

Clark (P.) (1987)
"The cyclical component of US economic activity", *Quarterly Journal of Economics*, 102, pp. 797-814.

Coase (R.) (1960)
"The problem of social cost", *Journal of Law and Economics*, 3, pp.1-44.

Creal (D. D.), Koopman (S. J.) and Zivot (E.) (2010)
"Extracting a robust US business cycle using a time-varying multivariate model-based bandpass filter", *Journal of Applied Econometrics*, 25, pp. 695-719.

CreditMetrics (2007)
"CreditMetrics (TM) - Technical document", RiskMetrics Group, *www.riskmetrics.com/pdf/dnldtechdoc/CMTD1.pdf.*

De Santis (R. A.) (2012)
"The euro area sovereign debt crisis: Save haven, credit rating agencies and the spread of the fever from Greece, Ireland and Portugal", *ECB Working Paper*, 1419, February.

Donati (P.) (unpublished)
"Modelling spillovers and measuring their impact and persistence: Application to CDS spreads during the euro area sovereign crisis", internal ECB's unpublished manuscript.

Dungey (M.), Fry (R.), González-Hermosillo (B.) and Martin (V.) (2002)
"Contagion in international bond markets during the Russian and the LTCM crises", *Journal of Financial Stability*, 2, pp.1-27

Eichengreen (B.), Rose (A.) and Wyplosz (C.) (1996)
"Contagious currency crisis: First tests", *Scandinavian Journal of Economics*, 98, pp. 463-484.

European Central Bank (2005)
"Financial market contagion", *Financial Stability review*, December, pp. 142-149.

European Central Bank (2009)
"The concept of systemic risk", *Financial Stability Review*, December, pp.134-142.

European Central Bank (2010)
Annual Report.

Forbes (K.) and Rigobon (R.) (2002)
"No contagion, only interdependence: Measuring stock market comovements", *Journal of Finance*, 43, pp. 2223-2261.

Hartmann (P.), Staetmans (S.) and de Vries (C. G.) (2004)
"Asset market linkages in crisis periods", *Review of Economics and Statistics*, 86, pp. 313-326.

Hartmann (P.), Straetmans (S.) and de Vries (C. G.) (2006)
"Banking system stability: a cross-Atlantic perspective", in M. Carey and R. Stulz (eds.), *The Risks of Financial Institutions*, National Bureau of Economic Research and Chicago University Press, pp. 133-188.

Harvey (A.) (1985)
"Trends and cycles in macroeconomic time series", *Journal of Business and Economics Statistics*, 3, pp. 216-27.

Huang (X.), Zhou (H.) and Zhu (H.) (2009)
"A framework for assessing the systemic risk of major financial institutions", *Journal of Banking and Finance*, 33, pp. 2036–2049.

Kaminsky (G.L.), Reinhart (C.M.) and Vegh (C.A.) (2003)
"The unholy trinity of financial contagion", *Journal of Economic Perspectives*, 17, pp. 51–74.

Longin (F.) and Solnik (B.) (2001)
"Extreme correlation of international equity markets", *Journal of Finance*, 56, pp. 649-676.

Pritsker (M.) (2001)
"The channels for financial contagion", in S. Claessens and K. Forbes (eds.), *International Financial Contagion*, Kluwer Academic Publishers.

Segoviano (M. A.) and Goodhart (C. A. E.) (2009)
"Banking stability measures", *IMF Working Paper*, WP/09/4, January.

Sims (C. A.) (1980)
"Macroeconomics and reality", *Econometrica*, 48, pp. 1-48.

Zhang (X.), Schwaab (B.) and Lucas (A.) (2011)
"Conditional probabilities and contagion measures for euro area sovereign default risk", *Duisenberg school of finance – Tinbergen Institute Discussion Paper*, TI 11-176/2/DSF29, December.

Monetary policy and public debt

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When the public sector of a country becomes so indebted that its fiscal sustainability is potentially at risk, then monetary policy has to be, perforce, closely integrated with debt management and fiscal policy. This was the case in the United Kingdom in the decades after World War II. By the 1980s, however, debt ratios had fallen and fiscal policies were sufficiently controlled to allow for a separation principle to be adopted whereby each policy mechanism, i.e. setting interest rates, debt management, fiscal (budgetary) policy were separately and independently run according to their own set of individual objectives. As fiscal policies have recently been compromised, and debt ratios become much enlarged, that separation principle is becoming subject to increasing stress. We are reverting to the more complex conditions which faced the Bank of England after each of the World Wars.

1| Historical introduction: the UK experience

When I first entered the Bank of England in 1968, as an economist on secondment from the London School of Economics (LSE), the relative roles of the Bank of England and the Treasury (HMT) in the conduct of monetary policy, of debt management, and of financial stability were very different from what they are now. There were no required ratios for capital adequacy then – the ratios that were applied related to liquid assets and cash – these were required not only for financial stability purposes, but also seen as a fulcrum for the potential control of monetary growth (Sayers, *Modern Banking*, 1967). The main control on bank lending, and hence monetary expansion, was, however, direct ceilings on bank lending to the private sector. These were argued over, and decided, between HMT, and the Chancellor, and the Bank, with HMT generally asking for tougher limits, to protect the exchange rate, reduce inflation, etc., and the Bank, which had to administer the ceilings, seeking more flexible ceilings.

This was still a period of pessimism about the inelasticity of domestic expenditures in response to interest rates. The main determinants of such domestic expenditures were held to be fiscal policy and various forms of direct controls, including the lending ceilings. The main role for interest rates was seen as being their influence on international capital flows. So, they were raised at times of balance of payments and exchange rate weakness, and lowered during stronger times, in order to lower the cost of capital, and hence promote fixed investment and growth.

Interest rates were set, and varied, by the Chancellor in consultation with both HMT and the Bank. While general macroeconomic, especially balance of payments, considerations were the primary focus of concern, there was a secondary issue of considerable importance, though primarily affecting the tactics and timing of interest rate changes, rather than their level. This concerned the relationship between interest rate changes and public sector debt management.

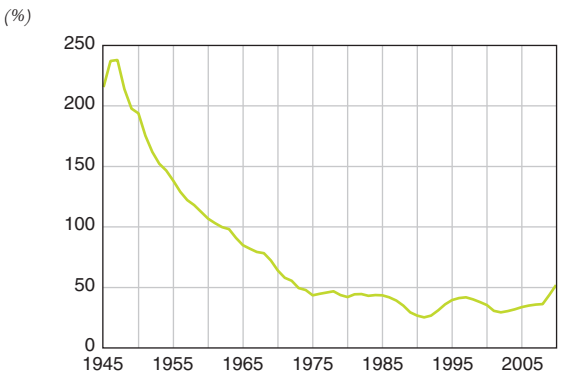
The Bank (rather than HMT) had managed the government's public sector debt, ever since its foundation in 1694. Frequently, especially in the aftermath of wars, the ratio of such debt to GDP had been extremely high (see Chart 1), and in 1968, though it had been steadily reduced from 1945, was still quite high at 78%.

Moreover the financial system in the United Kingdom was still national, rather than international, in character, and relatively small compared to the national debt. In 1968 the debt stood at 34.19 billion sterling, whereas the total sterling deposits of the London Clearing Banks amounted to 10.74 billion sterling.

The mechanism for selling such debt was peculiar in the United Kingdom. All such government debt was sold through a small number (three main ones) of gilt-edged jobbers, (including the Government Broker). These were far too small to absorb the scale of new issues involved from their own resources. Given the scale of necessary debt issues, relative to the limited capacity of the financial system to absorb them, the authorities, especially the Bank, were fearful that, except during propitious conditions, a new issue would often not be fully subscribed, or only at "unacceptable" prices/yields. Hence any proportion of a new debt issue, which was not fully subscribed, (often a large proportion), was taken onto the Bank's balance sheet, (technically into the Issue Department, in exchange for Treasury bills, leaving the Bank's overall asset size unchanged). Such holdings in the Issue Department were now treated as a Tap issue, and doled out to the gilt-edged jobbers as demand expanded. On all this, see Goodhart (1999).

The continuing volume of rolling-over maturing debt, plus the, often larger but much more volatile, Central Government deficits (see Table 1), were sufficiently large to be termed 'The Flood' by one of the leading monetary economists at that time, Brian Tew, (e.g. in his 1969 paper in *The Banker*). It was the Bank's job to dam that "flood". It was never entirely clear what would be the consequences of failing to do so, and monetising

Chart 1
Ratio of public sector net debt – total to GDP



Sources: GDP data, "Measuring worth – UK GDP", Public net debt data, B.R. Mitchell, "British historical statistics", 1988; HM Treasury, DMO (Debt Management Office).

Table 1
UK government financing requirement

(million sterling)

	Annual redemptions government debt (1)	CGNCR [a] (2)	Financing requirement (1 + 2)	Monetary base (MO) (end March)	Broad money (M3) (end March)	Financing requirement as % of M0	Financing requirement as % of M3
1963	9	125	134	2,901	11,250	4.6	1.2
1964	995	420	1,415	3,061	11,888	46.2	11.9
1965	1,169	553	1,722	3,263	12,529	52.8	13.7
1966	1,174	574	1,748	3,416	13,117	51.2	13.3
1967	16	1,150	1,166	3,514	13,333	33.2	8.7
1968	1,524	751	2,275	3,705	14,500	61.4	15.7
1969	868	-895	-27	3,839	14,787	-0.7	-0.2
1970	1,296	-864	432	3,834	15,786	11.3	2.7
1971	1,549	516	2,065	4,289	17,483	48.1	11.8
1972	1,407	1,423	2,830	4,316	21,190	65.6	13.4
1973	1,374	2,272	3,646	4,888	26,576	74.6	13.7
1974	611	3,594	4,205	5,420	31,990	77.6	13.1
1975	1,333	8,160	9,493	6,285	34,987	151.0	27.1
1976	1,855	6,807	8,662	6,956	37,249	124.5	23.3
1977	2,105	4,452	6,557	7,700	40,172	85.2	16.3
1978	2,931	8,297	11,228	8,898	45,869	126.2	24.5
1979	1,700	10,315	12,015	9,989	52,147	120.3	23.0
1980		10,431	10,431	10,994	69,672	94.9	15.0
1981	1,599	10,449	12,048	11,755	83,923	102.5	14.4
1982	1,878	8,322	10,200	11,728	102,379	87.0	10.0
1983	2,285	13,951	16,236	12,431		130.6	
1984	3,487	10,202	13,689	13,030		105.1	
1985	4,046	11,984	16,030	13,738		116.7	
1986	4,061	8,648	12,709	14,305		88.8	
1987	6,401	4,273	10,674	14,809	270,049	72.1	4.0
1988	5,189	-4,523	666	15,751	312,780	4.2	0.2
1989	8,282	-4,959	3,323	16,815	367,824	19.8	0.9
1990	6,906	-3,566	3,340	17,600	438,838	19.0	0.8

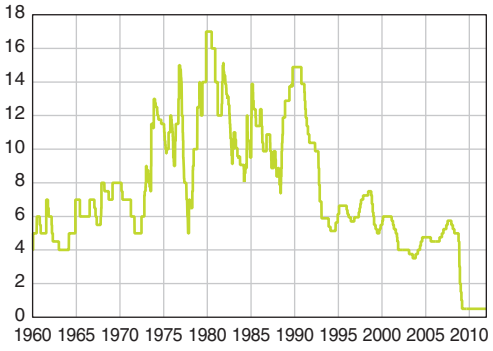
a) CGNCR: Central Government Net Cash Requirement.
Sources:
Annual Redemption: 1963 to 1979 data from CSO Financial Statistics; break in the data in 1980; 1981 to 1990 data from ONS.
CGNCR: 1963 to 1990 data from ONS.
*M0: 1963 to 1969 data from Mitchell, "*British historical statistics*", 1988; 1970 to 1990 data from Bank of England.*
*M3: 1963 to 1979 data from CSO Financial Statistics; 1980 to 1982 data from Mitchell, "*British historical statistics*", 1988; break in the data from 1983 to 1986; 1987 to 1990 data from Bank of England.*

it instead. But some combination of falling exchange rates, rising risk spreads and worsening inflation would probably ensue. In this, rather limited, sense the Bank was innately, but inarticulately, monetarist.

The Bank generally believed that most traders or investors were subject to momentum trading. So, if there was bad news around, the best response was to get it out of the way quickly, to establish a new bottom for the market, from which it could rise again. Conversely good news was best trickled out, bit by bit, to keep the upwards momentum, and hence sales, moving ahead. While this idiosyncratic view of the market was not shared by academics, and the Bank was closely questioned by Sayers and Cairncross in the course of the Radcliffe Report (see Minutes of Evidence, 1960), it continued to be the Bank view until the late 1980s. In consequence, Bank rate was generally raised (when bad news hit) in large jumps, and lowered (after good news) in small steps (see Chart 2); note how this

Chart 2
UK official bank rate

(%)



Source: Bank of England.

practice disappears after 1990. In this sense the tactics of interest rate adjustment were strongly influenced by debt management considerations.

Moreover when the Conservatives came to power in 1979, they placed great weight on achieving a target rate of growth for broad money, M3, notably in the medium term financial strategy (MTFS). There were, however, political and other, limits on the extent that the money stock could be controlled by variations in Bank rate, or by fiscal policy (see Goodhart, 1989). So, for a time in the mid-1980s there was a conscious attempt to hit a desired monetary target by adjusting the extent to which public sector debt sales overfunded, (or more rarely underfunded), the need to finance the "flood" of maturing roll-overs, plus deficit; it was, to use modern terminology "reverse quantitative easing (QE)".

That ceased, around 1987, because of growing doubts about monetary targetry, and of the value and efficacy of using over-funding (reverse QE) as a technique. The Chancellor, Nigel Lawson, moved on to using an (unannounced initially) peg to the Deutschemark as his monetary anchor. Besides disillusion with monetary targetry, "Big Bang" in the City in 1985 had brought in the large international banks to London, who proceeded to swallow up the (relatively tiny) gilt-edged jobbers; and (unexpected) inflation in the 1970s had much diminished the debt ratio. The balance between the financial fire-power of the buy-side and the needs for debt sales swung sharply in favour of the sell-side of public sector debt. New techniques and new instruments of a variety of kinds made it much easier to be confident of (almost always) selling gilts without disturbing the market on a regular (pre-announced) schedule.

Essentially what then happened was a divorce from the previous marriage between monetary policy and debt management. Now monetary policy was to focus, almost entirely, on varying short-term official rates so as to achieve a specified inflation target, without hardly a second's thought for how that might affect debt management. Similarly debt management was now put on automatic, providing full finance of roll-overs plus deficit, with the aim of minimising overall interest costs while sustaining the general structure of the market, but with no concern for monetary growth or liquidity more generally. So complete was the divorce that when one of the couple (debt management) was moved out of the nuptial home (the Bank) into new quarters, at the Debt Management Office, hardly anyone even noticed (except the present author)!

2| The divorce is over

2|1 Debt management and quantitative easing

Quantitative easing is much the same as having a programme for underfunding the Public Sector Net Borrowing Requirement, in order to make monetary policy (plus debt management) more expansionary. Admittedly QE was not brought into operation in early (March) 2009 until nominal interest rates had been lowered to as near zero as seemed operationally workable. But most of the channels through which QE (or over/under funding) might work are independent of the level of nominal interest rates. Thus the portfolio rebalancing effect, which takes pride of place in the Bank of England *Quarterly Bulletin* article by Joyce *et al.* (2011), in David Miles' subsequent presentation (October 2011), and in (various guises in) the *NBER Working Paper* by Krishnamurthy and Vissing-Jorgensen (2011), would seem (to me) to be entirely independent of the accompanying level of nominal interest rates. One point that is all too often omitted from quantitative studies of QE is that the rebalancing process depends on the net combined effects of the central banks QE *and* the new issue policy of the debt management office (DMO in United Kingdom, UST in United States). If the central bank is trying to shorten maturities, the DMO can in principle completely negate that by correspondingly raising the duration of its new issues. Studies of the effect of QE should, but rarely do, examine the overall change in the structure/duration of public sector debt, not just of QE by itself.

One channel (for QE/underfunding) that may not be independent of the level of nominal interest rates is that for signalling the future course of such policy rates, and, perhaps, of inflation. Thus Krishnamurthy and Vissing-Jorgensen wrote (p. 4):[1]

"Eggertson and Woodford (2003) argue that non-traditional monetary policy can have a beneficial effect in lowering long-term bond yields only if such policy serves as a credible commitment by the central bank to keep interest

1 *Joyce* et al., *wrote much the same (op cit, p. 201).*

rates low even after the economy recovers (i.e., lower than what a Taylor rule may call for). Clouse et al. *(2000) argue that such a commitment can be achieved when the central bank purchases a large quantity of long duration assets in QE. If the central bank raises rates, it takes a loss on these assets. To the extent that the central bank weighs such losses in its objective function, purchasing long-term assets in QE serves as a credible commitment to keep interest rates low. Furthermore, some of the Federal Reserve announcements regarding QE explicitly contain discussion of the Federal Reserve's policy on future federal funds rates. Markets may also infer that the Fed's willingness to undertake an unconventional policy like QE indicates that it will be willing to hold its policy rate low for an extended period."*

Yet, there are several reasons for doubting the efficacy of such signalling effects. There are many other methods by which a central bank can indicate its expectations for the future path of official interest rates. The ability of central banks to forecast the time path of their own official rates, beyond six months ahead, is weak to non-existent (Goodhart and Wen Bin Lim, 2011) and the market knows this (Goodhart and Rochet, 2011, appendix 2). When the United Kingdom began QE, the governor emphasised that the risks (of both gain and loss) rested with HMT, *not* the Bank. In the United States, the Fed transfers profits (seigniorage) to the US Treasury after deducting its operational expenses, so once again the risk effectively lay with the Treasury. So the incentive effect on the central bank thereby to keep rates lower for longer is generally minimal.

When interest rates are *not* near the zero lower bound, the use of over-funding to restrict monetary growth may reflect an unwillingness on the part of the politicians to raise interest rates. Thus, on this latter count also, the signalling effect of QE/funding as a monetary instrument may differ depending on circumstances, so that QE *may* be more effective than equivalent underfunding at positive interest rates.

On the other hand there are two further channels that might make an equivalent amount of underfunding at positive interest rates more potent than QE. These are the market liquidity and money channels (see Figure 1, p. 201, of Joyce *et al.*, *op. cit.*). Almost by definition liquidity will be more abundant at zero, than at positive, interest rates, so the effect of an equivalent amount of underfunding will be greater than QE.[2] Perhaps more important, it was initially hoped that QE might lead to a (multiple) increase in both the money stock and bank lending, via an expansion of the monetary base. As has been the experience of all QE attempts so far, in Japan, United Kingdom and United States, such a secondary monetary expansion has not happened. Instead, in the depressed and uncertain conditions which led to the triggering of QE, the banks have preferred to amass huge holdings of base money deposits with their central bank, well in excess of statutory requirements. By contrast if underfunding was unleashed in more normal times, with positive interest rates and stronger confidence (amongst both banks and borrowers), the presumption is that there could be a significantly stronger monetary channel, than with QE recently.

Thus the conclusion of this survey, I believe, is that if QE has been effective in recent circumstances, then its equivalent counterparts (under/over-funding) would be just as effective under more normal conditions with positive interest rates. At the very least this should lead to a reconsideration and reinterpretation of the overfunding episode in the United Kingdom in the 1980s.

But one can argue that once the zero lower bound for interest rates is hit, then the attempt to provide more expansionary policy must imply unconventional measures, such as QE. Once normality is restored, however, then interest rate variations are, so it may be argued, a superior method for the central bank to use, rather than over/under-funding, in order to achieve its inflation (or monetary) target, partly because their effects are better calibrated and partly because they are conventional. On the whole this is probably the case; but there are circumstances where variations in domestic interest rates may be somewhat constrained by other considerations, such as unwelcome international capital flows or political pressures. We discuss why we may, indeed, be entering such circumstances now in the next sub-section. In such instances the case for taking part of the strain on debt management techniques cannot be dismissed out of hand.

So, to conclude this sub-section, to the extent that QE is held to be effective once interest rates hit the zero lower bound, this should raise the question whether similar debt management techniques might not also be a potentially useful additional instrument under more normal times.

2 *But, you will have asked, will not the central bank have to mop up such extra liquidity to hold nominal interest rates to their given positive level? Yes, but by issuing shorter dated liabilities, so underfunding at positive interest rates involves making the whole debt structure of shorter duration and more liquid.*

2|2 Interest rate setting: the fiscal theory of the price level

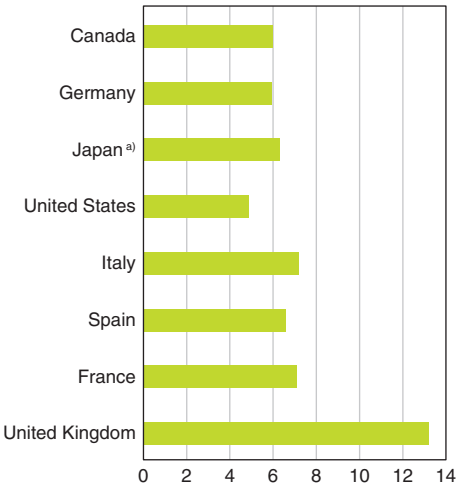
The amount of (government) debt outstanding automatically grows each year by the scale of necessary interest payments, unless it can be repaid from a primary surplus of (tax) receipts over expenditures. If all debt was single-period short debt, then the automatic increase in debt (assuming a primary balance) each period would be equivalent to the single period short rate, multiplied by the outstanding stock. Of course, most debt has a much longer maturity, so the automatic increase is a function of average interest rates over a period of years; but those countries where the average maturity is quite low are more sensitive to spikes in their immediate borrowing costs (see Chart 3).

On the other hand, the debt will automatically decline, as a ratio to income, as income rises. Moreover, if the elasticity of tax revenues to increases in income is, or can be made to be, greater than the elasticity of government expenditure to such increases, then the capacity to increase the primary surplus, and hence to pay off the debt directly rises, as a positive function of growth.

So, the key relativity in assessing debt sustainability is that between interest rates and growth, either in nominal or real terms. If growth is low and depressed, relative to interest rates, then the debt will become unsustainable, unless there is a commensurately large primary surplus. But trying to achieve a large primary surplus, via austerity, especially when everyone else is trying to do the same thing, is likely to reduce growth still further, and just add unemployment and further political and social tensions to an already unhappy condition.

Chart 3
Average maturity for total debt (major developed countries)

(years, as of 2010)



a) Japan as of 2009
Sources: For United Kingdom, Debt Management Office; for the rest, OECD.

Indeed if one makes a number of assumptions, (e.g. that the government cannot just default on its (domestic) debt, that current expectations and real interest rates are given, and the scale of the public sector surplus is bounded), then the price level has to rise sufficiently to make the general public prepared to absorb the stock of public sector debt that must be sold, (in effect a mechanism for raising g relative to i). This is, in brief, the guts of the "fiscal theory of the price level", and that way quickly leads to hyperinflation, as expectations adjust fast.

While there are several aspects of the necessary assumptions of the formal theory that are not very realistic, the key point remains, which is that, when debt sustainability becomes questionable, increases in nominal interest rates, relative to growth, if maintained for any long period of time are likely to force the debtor either to default, or, perhaps consciously, to inflate the debt away. This was set out in a rigorous fashion by Sargent and Wallace in their famous paper (1981), "Some unpleasant monetarist arithmetic". The relevance to the travails now of the peripheral countries of the eurozone are all too obvious.

The implications are both simple and stark. Unless growth can be raised significantly, which appears increasingly difficult, the only hope to prevent debt explosion in the peripheral countries is to keep interest rates for them as low as possible. Charging high interest rates on bail-out funding, for moral hazard or because Bagehot was thought to have prescribed it, is counter-productive. If there must be a penalty for the politicians that allowed their country to get into this state, then think of something else (the Middle Ages use of the stocks, plus ripe tomatoes, comes to mind?).

More generally, as deficits and public sector debt rise again, the concern of the monetary authorities for the effect of interest rates, and of interest rate strategy and tactics, on fiscal sustainability and the interest rate burden of the public sector, will inevitably resurface again. Most countries are now moving smartly back to the condition that pertained before the 1970s in the United Kingdom when

debt management and interest rate policies were closely intertwined. Interest rate policies have fiscal implications which can no longer be disregarded, and debt management and monetary policy will increasingly have to be integrated.

When the debt ratio, and fiscal deficits, rise to the point that bring questions of sustainability into the offing, the level of the official short-term interest rate inevitably becomes a matter of great fiscal consequence to the Minister of Finance. Monetary policy, fiscal policy and debt management then become joined at the hip. The separation of these policies into separate compartments, that has largely ruled for the last three decades, may soon be seen as a fortunate, and perhaps temporary, consequence of a period in which public sector finances were broadly under control. When public finances are *not* under control, there will be pressure to achieve desired target levels for inflation and monetary growth by means other than raising short-term interest rates. This brings us back to various methods of financial control, now termed financial repression, and the active use of debt management techniques, such as over-funding. Welcome back to the world of monetary and debt management as it appeared in over-indebted countries, such as the United Kingdom, in the decades immediately after World War II.

3| Bank taxation and financial stability

In the aftermath of the 2008 financial crisis, central banks are giving much more weight to their financial stability objective. At the same time, however, politicians are discussing, and introducing, a variety of taxes on banking. Since banks (bankers) had become unpopular, largely blamed for the crisis, and since their rescue (bail-out) had been often responsible for much of the increased public sector deficit/debt, this was almost inevitable. Nevertheless such taxes will impact on the economic conditions and incentives of the banks and will, therefore, affect both financial stability and monetary growth and macroeconomic conditions.

Central banks and regulators have been reluctant, at least in the past, to discuss pecuniary sanctions and/or taxes on banks as a way of influencing their risk-taking behaviour, though in other fields Pigovian taxes have been employed as a means of dealing with externalities, and seeking to align private incentives with social objectives. This was partly because taxes are inherently fiscal, and hence subject to political decisions. Central banks/regulators wanted to keep financial regulation as a technical field, largely independent of political involvement. Hence they focussed on quantitative measures, e.g. capital or liquidity ratios, rather than using the price mechanism, e.g. via taxes/subsidies, to influence bank behaviour.

Central banks/regulators are still hesitant about becoming involved with fiscal measures that have a bearing on bank behaviour, conditions and resilience. Willy-nilly (proposals for) such taxes are on the way. The proposal for a financial transaction (Tobin) tax is a recent example. While central banks/regulators may prefer not to get drawn into discussions of primarily fiscal issues, given their role as guardians of financial stability, it may become increasingly difficult for them to avoid expressing opinions on the implications of such taxes for their banking and financial systems.

This is yet another channel through which central banks will have to become much more closely involved with fiscal policies than in the past.

4| Conclusion

When the public sector of a country becomes so indebted that its fiscal sustainability is potentially at risk, then monetary policy has to be, perforce, closely integrated with debt management and fiscal policy. This was the case in the United Kingdom in the decades after World War II. By the 1980s, however, debt ratios had fallen and fiscal policies were sufficiently controlled to allow for a separation principle to be adopted whereby each policy mechanism, i.e. setting interest rates, debt management, fiscal (budgetary) policy were separately and independently run according to their own set of individual objectives. As fiscal policies have recently been compromised, and debt ratios become much enlarged, that separation principle is becoming subject to increasing stress. We are reverting to the more complex conditions which faced the Bank of England after each of the World Wars. Dennis Robertson once likened economics to beagle-hounds pursuing a hare. If the observer stood in one place long enough, the process would circle around and eventually come back to the observer's initial position.

References

Eggertson (G.) and Woodford (M.) (2003)
Brookings Papers on Economic Activity, (1), pp. 139-233.

Goodhart (C. A. E.) (1989)
"The conduct of monetary policy", *Economic Journal*, 99 (396), pp. 293-346.

Goodhart (C. A. E.) (1999)
"Monetary policy and debt management in the United Kingdom: some historical viewpoints", in *Government debt structure and monetary conditions*, ed. Chrystal (Bank of England; proceedings of a conference organised by the Bank of England, 18-19 June 1998).

Goodhart (C. A. E.) and Wen Bin Lim (2011)
"Interest rate forecasts: a pathology", *International Journal of central banks*, 7 (2), pp. 135-171.

Goodhart (C. A. E.) and Rochet (J.-C.) (2011)
Evaluation of the Riksbank's monetary policy and work with financial stability 2005-2010, (Reports from the Riksdag 2010/11: *RFR5*, The Committee on Finance).

Joyce (M.), Tong (M.) and Woods (R.) (2011)
"The United Kingdom's quantitative easing policy: design, operation and impact", *Bank of England Quarterly bulletin*, Q3.

Krishnamurthy (A.) and Vissing-Jorgensen (A.) (2011)
"The effects of quantitative easing on interest rates: channels and implications for policy", *NBER Working paper* No. 17555, October.

Miles (D.) (2011)
"Monetary policy and financial dislocation", Bank of England speech given to the Royal Economic Society, London, October 10.

Radcliffe Committee (1960)
Committee on Working of Monetary System, Minutes of evidence, London: HMSO.

Sargent (T. J.) and Wallace (N.) (1981)
"Some unpleasant monetarist arithmetic", *Federal Reserve Bank of Minneapolis Quarterly Review*, Vol. 5, pp. 1-17.

Sayers (R. S.) (1967)
Modern banking, Oxford, Oxford University Press, 7th Edition.

Tew (B.) (1969)
"The implications of Milton Friedman for Britain", *The Banker*, 119 (522),August.

Does monetary cooperation or confrontation lead to successful fiscal consolidation?

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Accommodation of fiscal authorities by monetary policy is controversial, as can be seen in current euro area discussions. Some go further and suggest that confrontational enforcement by central banks taking a hard line on adjustment is critical to inducing longer-term fiscal stabilisation. Others suggest that fiscal commitment must come first. This article steps back to look at the historical record of central bank behaviour vis-à-vis fiscal authorities, at least until the current crisis period, and whether cooperative approaches ahead of consolidations have proven as dangerous as some would suggest.

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Active accommodation of fiscal consolidations by monetary policy is controversial, as can be seen in current euro area discussions. While many observers acknowledge that there is usually a place for monetary accommodation in response to fiscal consolidation, there is a sequencing argument often heard today that fiscal commitment must precede any loosening. Some analysts go further to suggest that toughness by central banks taking a hard line on adjustment is critical to inducing sustained fiscal stabilisation. This article steps back to look at the recent historical record of central bank behaviour vis-à-vis fiscal authorities, at least until the current crisis period, and whether accommodative approaches ahead of consolidations have proven dangerous or helpful. We also try to assess the market credibility of fiscal consolidations as a function of the central banks' monetary stance prior to fiscal consolidation. We find clear evidence of positive associations between the degree of monetary ease in advance of fiscal consolidation programmes, and both those programmes' success and their market credibility.

1| How should monetary policy respond to the need for fiscal consolidation?

As fiscal policies become unsustainable, monetary policy becomes irrelevant at best. Under extreme fiscal conditions, even if central banks resist direct monetisation of excessive government debt, inflation or collapse will ultimately result. Markets would decline to buy the debt, raising long-term interest rates, and the currency would depreciate, importing inflation, irrespective of the monetary stance. So there is no question that price and financial stability depend upon the maintenance of fiscal stability.

What role monetary policy should play in achieving that stability, however, is far from evident. Theoretical analyses of fiscal-monetary coordination have not yet produced clear general results.[1] Even under normal economic conditions, it is unclear from the literature whether coordination is superior to fiscal and monetary policymakers each setting policy independently, or which of monetary or fiscal authorities should move first in achieving a coordinated outcome. Sargent and Wallace (1981) and Woodford (2003) influentially argue for a form of "monetary dominance" whereby central banks pursue inflation stabilisation irrespective of fiscal policy moves.

Policymakers' more informal discussions in recent decades also usually have come to the conclusion that monetary policy should pursue price stability – in an inflation targeting Taylor-rule framework – without direct reference to fiscal policy, except insofar as it affects the medium-term inflation forecast. The reasons given usually stress four arguments why monetary authorities should take fiscal policy as given, and set policy in response to it without attempting to influence fiscal policy directly:

- fiscal policy is the end result of a political sausage-making process, while monetary policy reflects decisions made (more) coherently in near real-time;

- fiscal policy is inherently political, about distributional issues, while monetary policy attempts to be non-partisan and without a direct distributional agenda;

- fiscal policy is best constrained in counter-cyclical terms to automatic stabilisers, while monetary policy has more room for discretionary use in response to shocks;

- fiscal policy tends to be asymmetric in practice, with expansionary programmes persisting beyond their cyclical needs, and only rarely running surpluses in booms, while monetary policy is (closer to) balanced over the cycle.

This approach would imply that when fiscal policy is forecast to tighten with impact over the central bank's time-horizon for policymaking, monetary policy should loosen in anticipation, taking into account lags of monetary policy's effect and fiscal policy's implementation. Even fully anticipated fiscal policy movements that cut spending or raise taxes will have a short-run contractionary effect on output and thus on inflation, though multipliers and lags will vary.[2] Currency effects from fiscal consolidation could go either way, depending upon the relative interest rate and confidence effects[3] – most central banks will

1 *See Sargent and Wallace (1981), Blinder (1983), Nordhaus (1994), Dixit and Lambertini (2003), and Woodford (2003) for the most cited model-based analyses.*
2 *See Auerbach, Gale, and Harris (2010), Fatas and Mihov (2009), and Kuttner and Posen (2001a), among many others. Fantasies of expansionary consolidation must be dismissed by any responsible policymaker, except under very rare conditions unlikely to apply to major economies with independent central banks.*
3 *See the debate between Ball and Mankiw (1995) and Greenspan (discussion thereof) on the exchange rate impact of a budgetary consolidation.*

monitor futures markets for the home currency to make their forecast, however, rendering such an *a priori* assessment moot. Sometimes there will be a political complication, in that a central bank should not be seen as forecasting the outcome of an election, let alone endorsing a particular party position, by explicitly stating its fiscal forecasts. This can often be partly finessed by taking the sitting government's announced fiscal policy as given, and preparing to update rapidly upon political resolution. The basic result that monetary policy should loosen in anticipation of fiscal tightening, *ceteris paribus*, is robust from the practitioner's perspective in normal times.

Should that monetary policy guidance change if an economy has headed down an arguably unsustainable fiscal path? This situation could arise through a series of negative shocks, a political breakdown, ongoing expansion of entitlements, erosion of tax collection, and/or demographic change. We say "arguably" because there is no one strict definition of fiscal sustainability, but a government needs the sum of discounted future revenues to be at least equal to the sum of discounted future expenditures. Meeting this condition will depend in part on financial markets' confidence in future fiscal plans and growth prospects, as expressed in the price and availability of credit to fund deficits.[4] Exiting an unsustainable path will require a policy of *fiscal consolidation*, meaning a multi-year programme to reduce budget deficits (and often run primary surpluses) requiring sustained austerity efforts.[5] As noted previously, once such a programme is under way and looks likely to be fulfilled, most central banks would loosen monetary policy absent inflationary shocks.

The more pressing and controversial question is the appropriate action of monetary policy in the run-up to such a consolidation, when its being undertaken or credibly sustained as long as needed is in doubt. An influential body of opinion arising out of the euro crisis holds that only a tough approach by monetary policy will induce the necessary fiscal consolidation actions by politicians.[6] While starting from the indisputable idea that large-scale monetisation of government deficits will lead to (hyper)inflation, these arguments move well beyond it. Some suggest that tactically putting the reward before the commitment will reduce the necessary pressure on politicians to make commitments; others emphasise the fundamentals that, until a fiscal consolidation is credibly, and, thus, likely well under way, the central bank's own ability to anchor inflation expectations and deliver on price stability will be eroded. These are not mutually exclusive reasons for believing in "tough love" for politicians from monetary authorities. Believers in both views might expect delayed consolidation to prompt rises in long-run interest rates or depreciation of the currency. Both would justify monetary policymakers taking the path of fiscal policy into account beyond its direct effect on aggregate demand and through that channel to the medium-term forecast for inflation.

In the recent past, what approaches have monetary policymakers taken in the periods preceding fiscal consolidations: confrontation or coordination? What have been the results in terms of the success of consolidations and of impact on market credibility? Are there any virtues to monetary "tough love" when fiscal consolidation is called for? The empirical investigation of these questions is the topic of our paper.

Some might be concerned with a potential identification problem. Since worsening economic conditions are thought to often precede fiscal consolidations, what monetary easing we might find would perhaps be prompted on average by such conditions or the expectation thereof. We would note, however, that we are less interested in the stance of monetary policy *per se* than in the relationship between changes in monetary policy and the success/credibility of subsequent fiscal consolidations. While it is reasonable to argue that a common factor (e.g. macroeconomic outlook) may be driving the monetary loosening and the subsequent fiscal consolidation, it is not equally obvious that a common factor explains both the degree of monetary loosening and the success/credibility of the subsequent consolidation.

4 *A good example of a multi-faceted fiscal sustainability assessment is given by Cline (2012).*
5 *See Alesina and Ardagna (2010) and Leigh, et al (2010) for more detailed definitional discussions.*
6 *See Bergsten and Kirkegaard (2012), Bogenberg Declaration (2011), De Grauwe (2011), Domfret (2012), Lerrick (2011), Stark (2011), Weber (2011), and Weidman (2011) for expressions and discussions of this point of view.*

2| Analysing the available catalog of fiscal consolidation efforts

Over the past thirty years, a large number of economies, both advanced and developing, have undertaken fiscal consolidation programmes. Thanks to the efforts of Daniel Leigh and colleagues at the International Monetary Fund (IMF) (Leigh *et al*, 2010), there is now a comprehensive dataset of these policy events, their timing, and associated macroeconomic data (Leigh *et al*, 2010, Devries *et al,* 2011). The dataset includes 173 episodes from 17 advanced countries over the period 1978-2009. Each successive year of fiscal consolidation is treated as a separate observation. The events are identified through a narrative method, inspired by the work of Romer and Romer (1989) on monetary policy.[7] We find this method a persuasive and useful approach, especially given the political economy concerns often expressed about the dependence of governments' willingness to consolidate on economic conditions which puts a premium on intentions.[8]

That said, the data as published are annual, so we are unable to pinpoint precisely the date when fiscal consolidations are implemented. This prevents us from looking at the success or failure of truly tactical short-term interactions between central banks and fiscal authorities.[9] Such high frequency interactions are unlikely to make a sustained difference to monetary or fiscal policy, however, unless the meaningful policy settings are changed (which takes time to deliver) and those changes are sustained (which takes time to become evident). Moreover, the dataset measures the implementation of fiscal policy actions rather than the announcement thereof (which may already weed out some less than credible consolidation efforts).

Within the fiscal consolidations dataset there is significant variation in experience. Some of these consolidations were undertaken in response to outright crises or to the requirements of IMF programmes, while others were more pre-emptive ahead of extreme market pressures. Within each of those subsets, consolidation efforts can be designated as successful and unsuccessful (more on that definition in the next section). This is where the narrative approach becomes critical for answering the questions that we raise, in that it allows for identification of intended and attempted consolidations, rather than reasoning backwards from the realised ex post movements in fiscal stance, which to some degree assumes the result.

On the monetary side, Leigh *et al* (2010) has already established that, in this sample, monetary ease following the start of consolidation efforts increases their likelihood of success. The interaction of fiscal and monetary policy prior to consolidation, however, is to our knowledge unaddressed in the empirical literature, despite its prominence in the current discussions in the euro area and elsewhere. We measure monetary accommodation by the amount of change in the central bank's instrument interest rate between January and December in the year of, or the year prior to, a consolidation period (since we do not include the consolidation efforts begun in 2010, quantitative easing and other non-interest rate monetary policy measures are not an issue). That means we are not using the narrative method to identify monetary policy intentions the way we rely on the IMF dataset to do for fiscal policy. We believe this is justified for independent central banks which control their policy instruments and for which there are no implementation issues.[10]

3| The relationship between prior monetary ease and success of consolidations

The analysis below distinguishes fiscal consolidations along two dimensions: success and credibility. It seems natural to define the success of a fiscal consolidation in terms of its impact on key fiscal variables, the government debt and deficit as a share of gross domestic product (GDP), and the extent to which these improvements are sustained beyond the

7 *The methodology identifies fiscal policy actions motivated by deficit reduction (as opposed to a desire to restrain domestic demand for cyclical reasons) by examining accounts and records including IMF and OECD reports and country-specific sources. For more detail see Devries, et al (2011).*
8 *Alesina and Ardagna (2010) offer a different approach to identification of fiscal consolidation episodes.*
9 *An example of that kind of short-term bargaining would be the press characterisations of the ECB 'withholding' the buying of Italian government debt through its Securities Markets Programme in November 2011 when the Berlusconi government was seen as 'backtracking' on its fiscal commitments.*
10 *Also, justifiably or not, it is rare to find in recent history instances of any monetary policy committee reversing the direction of policy in a given year without an extended pause at a particular level of monetary conditions.*

immediate period of tight policy.[11] Thus, we have defined a successful consolidation as one where the average increase in the cyclically adjusted primary budget balance (CAPB) between the year of the consolidation and each of the subsequent three years is at least 80% of the size of the consolidation, as measured by the Leigh *et al* (2010) methodology. The 80% threshold was chosen to split the full sample roughly in half between successful and unsuccessful consolidations.[12]

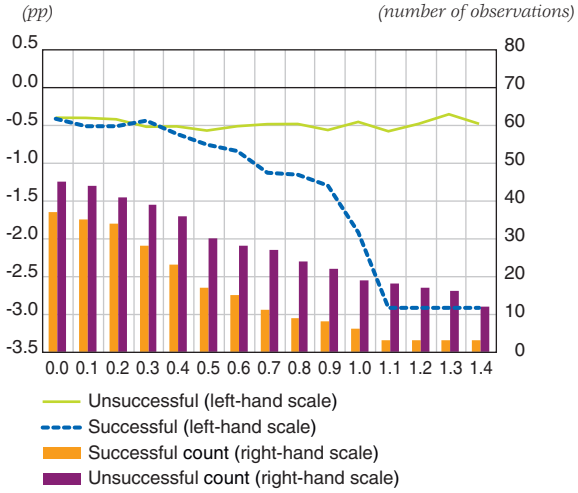
Since we are interested in analysing the interaction between monetary and fiscal policy where the central bank can choose the degree to which it accommodates fiscal consolidations, we restrict the sample to periods and countries where the central bank is independent. We make use of the classification of Kuttner and Posen (2001) and restrict our sample to periods of full central bank autonomy as measured therein.[13] To boost the sample size a little, we also include Canada and Australia post 1991 even though they are classified as only partially autonomous by Kuttner and Posen (2001).[14]

The figures below compare the average change in the policy rate in the year preceding or year of successful consolidations (calculated as the difference between the policy rate in December and January of that year) with the average change preceding unsuccessful consolidations. We are looking to see whether successful consolidations have tended to be preceded by looser monetary policy relative to unsuccessful consolidations. To assess whether the degree of monetary policy accommodation becomes more important as the size of the consolidation increases, we repeat the exercise for different subsamples where we successively drop the smallest consolidations remaining in the sample.

Chart 1 is based on our benchmark sample of fiscal consolidations when the central bank is independent. Along the x-axis is the minimum size of consolidations in a given sample. When this is 0, it means that all consolidations are included. At 0.1 on the x-axis, only

Chart 1
Mean policy change in the year preceding consolidation

(x-axis: Minimum size of consolidation, % of GDP)



Sources: Bloomberg, IMF, National Sources, OECD and Bank of England calculations.

consolidations larger than 0.1% of GDP are included, and so on, as we move to the right. The bars in the chart show the number of observations for successful and unsuccessful consolidations respectively. There are eighty-two observations in the sample as a whole split between thirty-seven successful and fourty-five unsuccessful consolidations (see height of the two bars at 0). As the minimum size of consolidation increases, the sample size decreases, as indicated by the shrinking bars. Notably and unsurprisingly, the number of successful consolidations falls faster than the number of unsuccessful consolidations as the minimum size of the consolidations left in the sample increases. Only three consolidations larger than 1.4% of GDP in the sample are successful, while twelve are unsuccessful.

The two lines in Chart 1 show the mean monetary policy change in the year preceding successful and unsuccessful consolidations, and how this mean changes as the minimum size of consolidation in the sample is increased. The green line shows

11 *Alesina and Ardagna (2010) define a successful fiscal consolidation as:* "A period of tight fiscal policy is successful if a) in the three years after the tight period, the ratio of the cyclically adjusted primary deficit to GDP is on average at least 2 per cent of GDP below its value in the year of tight policy, or b) three years after the tight period, the ratio of the debt to GDP is 5 percent of GDP below its level in the year of the tight period." *This, however, depends on* ex post *results (as does their definition of consolidations), rather than being in the spirit of the fiscal intentions from the narrative approach.*

12 *Given the tenet of faith in modern monetary economics that monetary policy has no lasting impact on real variables the three year horizon seems appropriate for the analysis of monetary-fiscal interaction. We recognise, however, that the success of a fiscal consolidation depends also on various structural factors such as the elasticity of fiscal bases to taxation and so a complementary assessment would take these longer-term conditions into account.*

13 *See Kuttner and Posen (2001b) for the definition and coding of central bank independence, as well as evidence on the spread of central bank independence across economies. An updated dataset is available upon request. See also Arnone,* et al *(2006).*

14 *These two central banks are deemed independent over the period by Arnone,* et al *(2006). Our results do not, however, depend on the inclusion of these cases.*

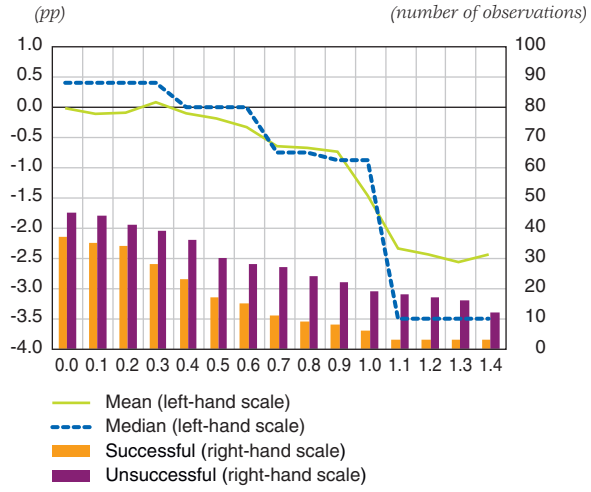
that unsuccessful consolidations are on average preceded by a reduction in the policy rate of around 0.5 percentage point (pp) between January and December of the preceding year, and this does not vary much by the size of the consolidation. The blue line shows that, over the whole sample, successful consolidations tend to be preceded by similar falls in the policy rate as unsuccessful ones. But when the smaller consolidations are excluded from the sample, the degree of monetary policy accommodation of successful consolidations is much larger (right hand part of the chart).

For consolidations in excess of 1.1% of GDP, the monetary policy rate in the year preceding successful programmes has been reduced on average by around 2.5 pp more than the average reduction of the policy rate in the year preceding unsuccessful consolidations. Chart 1 is thus revealing with regards to the potential endogeneity of monetary loosening to a common cause with fiscal tightening. One could think that the size of consolidation attempted would be related to the size of the preceding macro shock, and that of course would also affect the monetary policy pursued. Yet, the fact that the proportion of *successful* consolidations in the sample *falls* as the minimum size of attempted consolidation is increased is consistent with our interpretation that what matters is the monetary policy setting beyond common response of fiscal and monetary policy to a preceding shock. What is striking is that monetary policy preceding unsuccessful consolidations does not loosen by more when the average consolidation in the sample is large and by implication the size of the macro shock is large as well.

Chart 1 shows the mean change in the policy rate in the year preceding the consolidation. We can also repeat the exercise for the median. In order to avoid showing too many lines, in the charts we show the difference between the blue and the green lines – that is, the difference between the average change in the policy rate in the year preceding successful consolidations and the change in the average policy rate in the year preceding unsuccessful consolidations. This can be seen in Chart 2. The green line in Chart 2 corresponds to the difference between the green and the blue lines in Chart 1. Points on the lines below 0 indicate that successful consolidations tend to be preceded by greater loosening of monetary policy than unsuccessful consolidations. And the downward slope of the green line indicates that the difference in the degree of monetary policy accommodation in the year preceding successful and unsuccessful consolidations is getting larger as the minimum size of the consolidation left in the sample increases. The blue line in Chart 2 repeats the same exercise using the median change in the policy rate in the year preceding the consolidation, and shows a similar pattern.

Chart 2
Policy change in the year preceding consolidation (successful – unsuccessful)

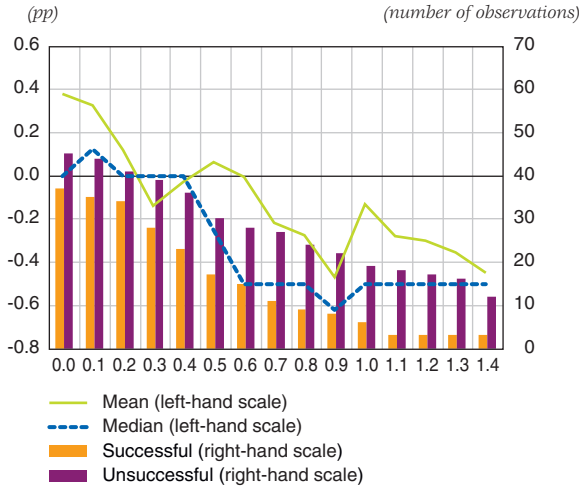
(x-axis: Minimum size of consolidation, % of GDP)



Sources: Bloomberg, IMF, National Sources, OECD and Bank of England calculations.

Chart 3
Policy change in the year of consolidation (successful – unsuccessful)

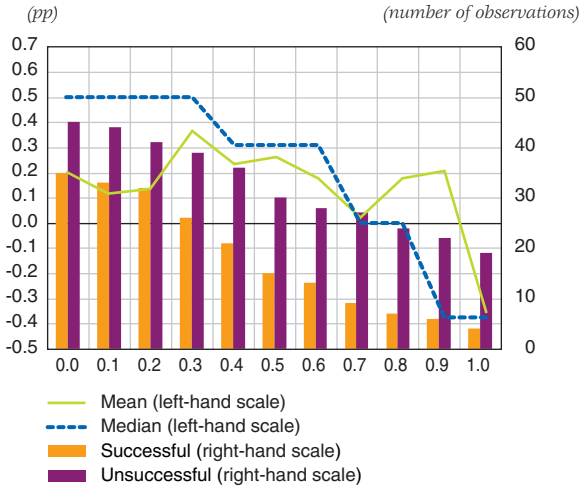
(x-axis: Minimum size of consolidation, % of GDP)



Sources: Bloomberg, IMF, National Sources, OECD and Bank of England calculations.

Chart 4
Policy change in the year preceding consolidation (successful – unsuccessful) excluding Italy and Spain in 1994

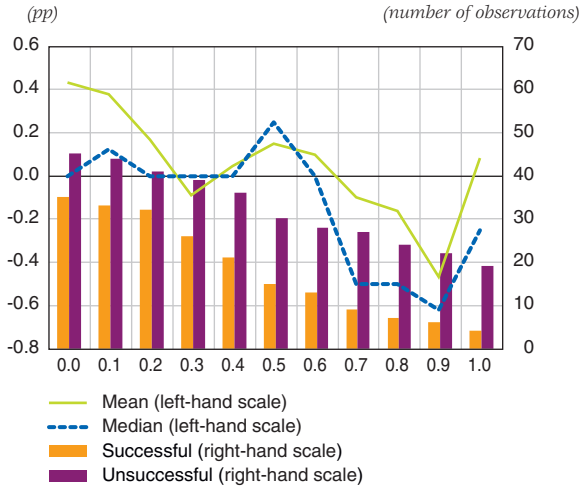
(x-axis: Minimum size of consolidation, % of GDP)



Sources: Bloomberg, IMF, National Sources, OECD and Bank of England calculations.

Chart 5
Policy change in the year of consolidation (successful – unsuccessful) excluding Italy and Spain in 1994

(x-axis: Minimum size of consolidation, % of GDP)



Sources: Bloomberg, IMF, National Sources, OECD and Bank of England calculations.

Charts 2 and 3 thus show that successful consolidations tend to be preceded (Chart 2), or accompanied just before or from the start (Chart 3), by greater loosening of monetary policy than unsuccessful consolidations, especially as the size of the consolidation increases.

As a further robustness check, Charts 4 and 5 reproduce, respectively, Charts 2 and 3, but excluding the fiscal consolidations implemented by Italy and Spain in 1994. We have decided to exclude these observations because the large cuts in policy rates seen in Italy (–4.0 pp) and Spain (–4.25 pp) in the year preceding the 1994 fiscal consolidations were prompted by the widening in 1993 of the margins under the Exchange Rate Mechanism (ERM). Insofar as the ERM had distorted domestic monetary policy setting, a relaxation of its terms triggered an abrupt adjustment of monetary policy stances in some of its members, which might not constitute an autonomous decision on monetary policy settings, whether with respect to the forecast or to fiscal policy. These two consolidations are classified as successful according to our definition and their exclusion makes the difference between the degree of monetary accommodation of successful and unsuccessful consolidations somewhat less striking. Nevertheless, when the size of the attempted fiscal consolidation is large, the results continue to suggest that successful consolidation programmes tend to be preceded or accompanied from the start by greater loosening of monetary policy than unsuccessful consolidations.

4| The relationship between prior monetary ease and credibility of consolidations

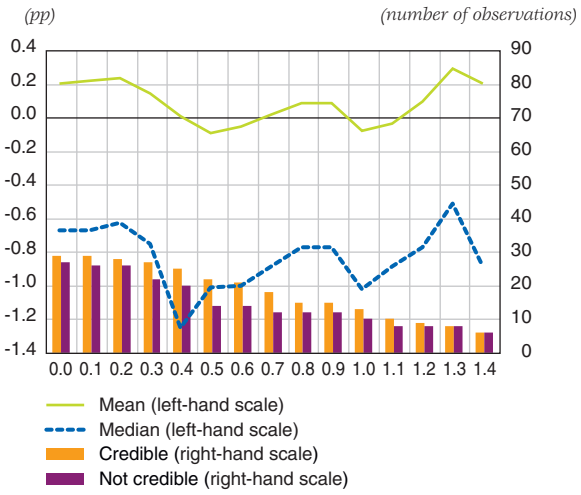
Policy credibility is usually defined in terms of the extent to which private sector actors believe that the stated objectives of the policymaker will be pursued and achieved. In the case of fiscal consolidations, the primary objective of policy is to reduce cyclically-adjusted deficits and thereby put public finances on a sustainable path. In assessing the credibility of fiscal consolidations it is therefore natural to look at market perceptions regarding the sustainability of public finances and the likelihood of a sovereign default. These perceptions can be captured by the excess return that investors demand for holding government debt relative to a risk-free rate of return (which may vary over time as a result of changes in investors' risk appetite, for example).

In the analysis below, we proxy the risk-free return using the government bond yields on German bunds which are considered a very safe asset by investors. Again, our sample ends before 2010, and thus avoids

the distortions in the market for lower-risk government securities and for bunds in particular that emerged in recent years. Thus, we measure the credibility of a fiscal consolidation by its impact on the spread of similar duration public debt of the respective government over German bunds. In particular, we once again split the sample roughly down the middle into those consolidations accompanied by a fall in the spread to bunds (between January and December of the year of consolidation – labeled "credible") and those accompanied by a rise (labeled "not credible"). For obvious reasons we exclude Germany from the credibility analysis, and we also exclude the United States given that the special role of the US dollar as a reserve currency might make US yields less responsive to fiscal consolidation programmes or their failure.

Chart 6
Policy change in the year preceding consolidation (credible – not credible)

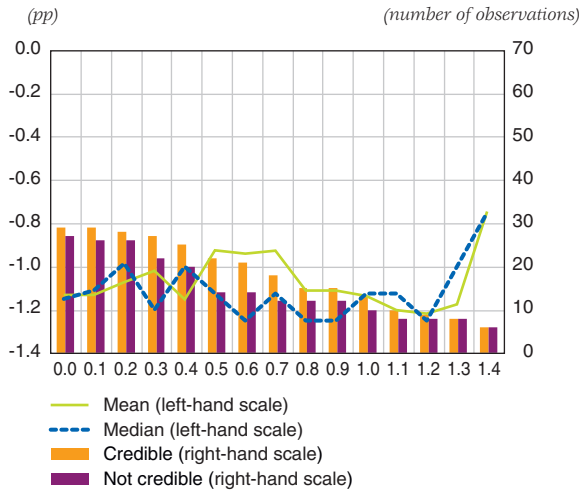
(x-axis: Minimum size of consolidation, % of GDP)



Sources: Bloomberg, IMF, National Sources, OECD and Bank of England calculations.

Chart 7
Policy change in the year of consolidation (credible – not credible)

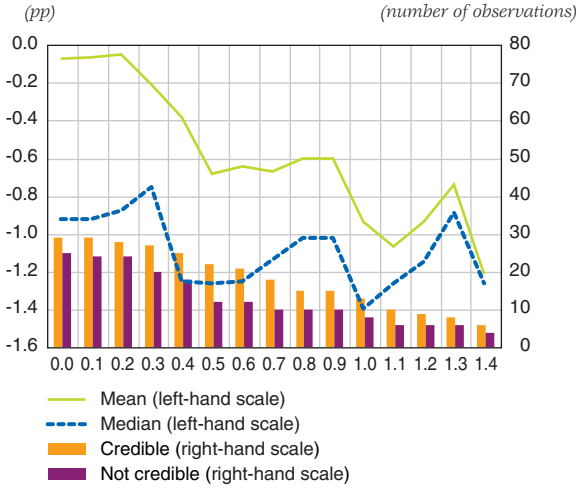
(x-axis: Minimum size of consolidation, % of GDP)



Sources: Bloomberg, IMF, National Sources, OECD and Bank of England calculations.

Chart 8
Policy change in the year preceding consolidation (credible – not credible) excluding Italy and Spain in 1994

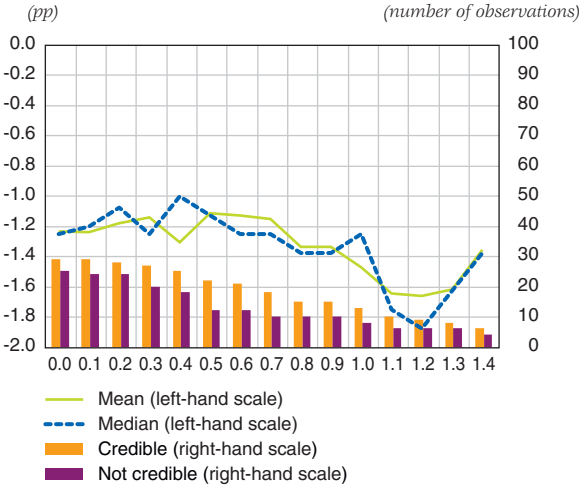
(x-axis: Minimum size of consolidation, % of GDP)



Sources: Bloomberg, IMF, National Sources, OECD and Bank of England calculations.

Chart 9
Policy change in the year of consolidation (credible – not credible) excluding Italy and Spain in 1994

(x-axis: Minimum size of consolidation, % of GDP)



Sources: Bloomberg, IMF, National Sources, OECD and Bank of England calculations.

Charts 6 to 9 repeat the exercise from the preceding section, this time looking at the change in the spread of countries' sovereign bond yields over German bund yields. The lines on the charts show the difference between the average change in the policy rate associated with credible consolidations and the average policy rate associated with consolidations that were not credible as determined by markets. Chart 6 shows that the results for policy changes in the year prior to the consolidation differ greatly, depending on whether the mean or median change in policy is used. It turns out that this reflects the inclusion of the Italian and Spanish fiscal consolidations in 1994, which were undertaken in partial reaction to the ERM realignment as previously noted. These consolidations are not credible according to our definition.

When the ERM realignment cases are excluded from the sample (Chart 8), the mean policy rate cut associated with "not credible" consolidations falls, and credible consolidations are found to be preceded by greater monetary loosening. Chart 7 shows that credible consolidations also tend to be accompanied by much greater monetary policy loosening in the year of the consolidation than those consolidations that are not credible. In contrast to the success measure, however, the difference between credible and non-credible consolidation efforts does not vary much according to the size of the consolidation. Chart 9 suggests that these results are not sensitive to the exclusion of Italy and Spain in 1994.

5| Further robustness checks

As a robustness check we have reproduced our experiments based on two alternative samples, regardless of the independence status of the central banks: (a) covering 1990-2009; and (b) covering the full post 1978 sample (this part has only been done for programme's success because we do not have government bond yields data going back before 1990). These results, available upon request, corroborate the finding that successful consolidations tend to be preceded or accompanied from the start by greater loosening of monetary policy than unsuccessful consolidations, especially as the size of the consolidation increases. This result continues to hold for both samples when the Italian and Spanish consolidations of 1994 are excluded (more so than in our benchmark sample restricted to independent central banks). In the 1990-2009 sample analyses which focus on the credibility of fiscal consolidations, the same sensitivity to the inclusion or exclusion of the 1994 Italian and Spanish episodes is displayed. Once these are excluded, we again find that credible consolidations tend to be preceded or accompanied by greater monetary loosening than non-credible consolidations.

6| The revealed case for accommodation

Examining the historical record of fiscal consolidations in advanced economies over the period 1978-2009, we find clear evidence that successful fiscal consolidations tend to be preceded or accompanied from the start of implementation by greater monetary easing (as measured by change in the instrument interest rate) than unsuccessful ones. Furthermore, we find that this difference in the extent of monetary accommodation between successful and unsuccessful consolidations is greater, the greater the ambition of the consolidation undertaken. This result is robust to analysis of a sub-sample limited to consolidation cases where independent central banks face fiscal authorities. More credible fiscal consolidation efforts – as measured by the decline (or not) in sovereign spreads over bunds – are also clearly associated with greater monetary accommodation preceding or accompanying from the start those efforts' implementation. Again, this holds for a sub-sample including only independent central banks setting monetary policy. There is no clear evidence, however, of an increasing relationship between the ambition of the consolidation programme and the extent of monetary easing with respect to its credibility impact, the way there is for programme success.

Thus, in terms of the choice between confrontation and coordination of monetary and fiscal policy ahead of fiscal consolidations, or at least between confrontation and non-confrontation, set out at the start of this paper, our analysis shows that central banks have generally come down against the former. In fact, our study suggests that central banks actively ease monetary policy more ahead of or contemporaneous with the start of successful and credible fiscal consolidations. This record is in direct contradiction of the arguments put forward for "tough

love" or a hard constraint imposed by monetary policymakers on elected officials as an incentive for the implementation of successful, credible fiscal consolidation programmes.

This is not to say that monetary policymakers in recent decades have repeatedly engaged in a form of positive inducement to engender episodes of greater fiscal discipline, at least not consciously. Our analysis does not allow us to distinguish between monetary policy simply set taking fiscal policy as a given among other forecast economic conditions and policy set as a positive incentive to politicians.[15] What our analysis does rule out is any visible benefits from, and shows very few cases of, central banks tightening monetary policy as an incentive to credibly and successfully implementing fiscal consolidation.

7| Concluding remarks

We would emphasise that the interesting result from our analysis is not just that monetary policy tends to loosen prior to fiscal consolidation on average, but that there is evidence of a difference in the degree of accommodation between successful/credible and unsuccessful/not credible consolidations. We would argue that a severe macroeconomic shock would both tend to call forth a greater degree of monetary loosening and simultaneously reduce the likelihood of success and credibility of the subsequent fiscal consolidation efforts. This is because a large shock leads to a more severe deterioration in public finances such that the chances of a negative feedback loop developing from austerity to weak growth and weak tax revenues increase (as is currently happening in Greece). If this were the case, then controlling for the size of the shock (or declining outlook) might be expected to lead to a greater difference between the degree of monetary accommodation in successful/credible consolidations and in unsuccessful/not credible ones than we have estimated. We believe the potential endogeneity bias is less severe in the latter case and if anything biases our results towards finding less difference in the degree of accommodation between successful/credible and unsuccessful/not credible consolidations. In any event, our results do demonstrate that for a wide range of cases of fiscal consolidation, monetary policymakers did not hesitate to pursue accommodative policies, and try to improve economic conditions, ahead of those programmes' implementation.

15 *In the abstract, one could either through narrative or statistical means separate out whether the cuts in interest rates in our sample were in line with the monetary policymakers' standard reaction function, or whether they went beyond, perhaps then signifying easing with an eye to influencing fiscal policy. In practice, given the limitations on the estimated precision and robustness of empirical monetary reactions, this would be impossible.*

References

Alesina (A.) and Ardagna (S.) (2010)
"Large changes in fiscal policy: taxes versus spending," *Tax policy and the economy*, Volume 24, The University of Chicago Press.

Arnone (M.), Laurens (B.J.) and Segalotto (J- F.) (2006)
"Measures of central bank autonomy: empirical evidence for OECD, developing, and emerging market economies", IMF *Working Paper* No. 06/228, October.

Auerbach (A.), Gale (W.) and Harris (B.) (2010)
"Activist fiscal policy", *Journal of Economic Perspectives*, 24 (4): 141-163.

Ball (L.) and Mankiw (N. G.) (1995)
"What do budget deficits do?", *Budget deficits and debt: issues and options*, Federal Reserve Bank of Kansas City, pp. 95-119.

Bergsten (C.F.) and Kirkegaard (J.) (2012)
"The coming resolution of the European crisis", *PIIE Policy Brief* 12-1, January.

Blinder (A.) (1983)
"Issues in the coordination of monetary and fiscal policy", in *Monetary Policy Issues in the 1980s*, pp. 3-34, Kansas City: Federal Reserve Bank of Kansas City.

Bogenberg Declaration (2011)
"Sixteen theses on the situation of the European Monetary Union", available on *http://www.cesifo-group.de/portal/page/portal/ifoContent/N/pr/pr-PDFs/ifo_2011_bogenberg_declaration.pdf*, October.

Cline (W.) (2012)
"Interest rate shock and sustainability of Italy's sovereign debt", *PIIE Policy Brief* 12-5, February.

De Grauwe (P.) (2011)
"Why the ECB refuses to be a lender of last resort", VOXEU.org, 28 November.

Devries (P.), Guajardo (J.), Leigh (D.) and Pescatori (A.) (2011)
"A new action-based dataset of fiscal consolidation", IMF *Working Paper* No. 11/128, June.

Dixit (A.) and Lambertini (L.) (2003)
"Interactions of commitment and discretion in monetary and fiscal policies", *American Economic Review*, 93(5).

Dombret (A.) (2012)
"New year, old problems – Europe's sovereign debt crisis", Speech to the International Bankers' Club in Luxembourg, 6 February.

Fatas (A.) and Mihov (I.) (2009)
"Why fiscal stimulus is likely to work," *International Finance*, 12 (1): 57-73.

Leigh (D.) *et al* (2010)
"Will it hurt? Macroeconomic effects of fiscal consolidation", Chapter 3, *World Economic Outlook*, IMF, October.

Kuttner (K.) and Posen (A.) (2001a)
"The Great Recession: lessons for macroeconomic policy from Japan," *Brookings Papers on Economic Activity*, 32(2): 93-186.

Kuttner (K.) and Posen (A.) (2001b)
"Beyond bipolar: a three-dimensional assessment of monetary frameworks", *International Journal of Finance and Economics*, 6(4): 369-387.

Lerrick (A.) (2011)
"How to save the euro", *Wall Street Journal*, 06 December.

Nordhaus (W.) (1994)
"Policy games: coordination and independence in monetary and fiscal policies", *Brookings Papers on Economic Activity*, 1994:2, 139-199.

Romer (C.) and Romer (D.) (1989)
"Does monetary policy matter? A new test in the spirit of Friedman and Schwartz", *NBER Macroeconomics Annual*, 4:121-184.

Sargent and Wallace (1981)
"Some unpleasant monetarist arithmetic", Federal Reserve Bank of Minneapolis Quarterly Review, 5(3): 1-17

Stark (J.) (2011)
"Economic situation and fiscal challenges", Speech at the Forecasters' Club of New York, 2 December.

Weidman (J.) (2011)
"The crisis as a challenge for the euro area", Speech at the Verband der Familienunternehmer (Association of Family Enterprises), 13 September.

Weber (A.) (2011)
"The Euro: opportunities and challenges", Ragnar Nurkse-Lecture in Tallinn, 07 January.

Woodford (M.) (2003)
Interest and prices: foundations of a theory of monetary policy, Princeton Univ Press.

Fiscal challenges to monetary dominance in the euro area: a theoretical perspective

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The government debt and banking turmoil that persists in several euro area countries begs the question of why countries such as the United States or Japan, which do not have less debt, have not been affected by the same problems. To shed light on this question, two forms of monetary dominance should be distinguished. According to the first (soft, or preventive) form of monetary dominance, the government adjusts its fiscal policy so as to avoid having to choose between a default or debt monetisation. In the second case (hard form of monetary dominance), in the extreme situation where this choice has to be made, the monetary authorities let the government default rather than monetising the debt. We show that hard monetary dominance may reduce the probability of fiscal adjustment and, if it is not perfectly credible, may increase the probability of inflation.

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Based on the fiscal fundamentals, it might come as a surprise that government debt problems arose in the euro area rather than in other parts of the world. Chart 1 shows the ratio of the primary balance to GDP (on the horizontal axis) and the ratio of net government debt to GDP (on the vertical axis) for the euro area, the United States, Japan and the United Kingdom in 2009.[1] The fiscal fundamentals were bad everywhere, but they were worse in the United States, Japan and the United Kingdom than in the euro area on average. Chart 2 shows that the fiscal fundamentals of the United States, the United Kingdom or Japan were comparable to those of Greece, Portugal, Ireland or Spain, the euro area economies that were the most affected by the crisis.

Several differences between the euro area and the rest of the world can explain this puzzle. The euro area deprives its members from certain margins of flexibility, such as exporting their way out of low growth by depreciating their currencies. Euro area countries do not enjoy the benefits of issuing a reserve currency to the same extent as the United States, and most of them cannot rely on a high domestic saving rate to the same extent as Japan. Finally – and this is the difference that I will focus on in this note – the relationship between monetary policy and fiscal policy is not the same in the euro area as elsewhere.

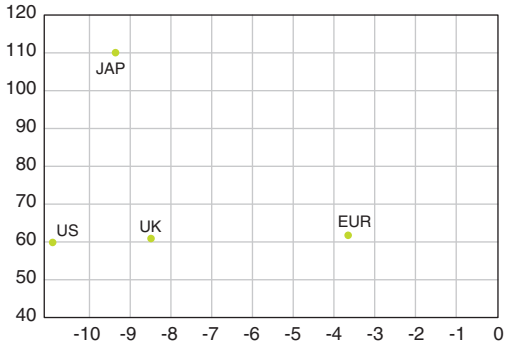
The euro area was explicitly designed to minimise the risk of monetisation of government debts, that is, to enforce the maximum degree of "monetary dominance" (Sargent and Wallace, 1981). The risk of monetisation is perhaps not zero, because it is not certain what the European Central Bank (ECB) would do in a large-scale government debt rollover crisis that would threaten the existence of the euro. But it is certainly more likely that the monetary authorities would let the fiscal authorities default in the euro area than elsewhere.[2]

If this is what makes the euro area special, then in order to study the European debt crisis one would need a theoretical framework in which monetary dominance can be challenged, and the monetary authorities have a choice between monetising government debt or letting the government default. I present a simple model with those features below.

The model has somewhat unconventional implications, but it sheds an interesting light on the current debates on European policies. This debate often takes the form of an opposition between two seemingly irreconcilable views that – at the risk of oversimplifying – one might call the "Northern view" and the "Southern view". The Northern view is that the interest rate spreads associated with the threat of default may be a normal and even desirable feature of the equilibrium, to the extent that they give euro area governments incentives to keep their fiscal house in order. This view is defended by the ECB and the German government.

Chart 1
Ratio of fiscal primary balance and net government debt to GDP in the United States, Japan, the United Kingdom and the euro area
(2009)

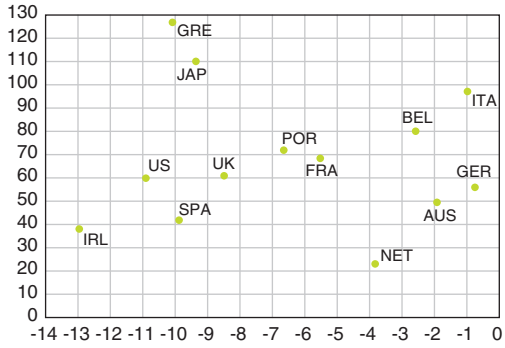
(%; x-axis: Prim. balance/GDP; y-axis: Net debt/GDP)



Source: IMF, World Economic Outlook.

Chart 2
Ratio of fiscal primary balance and net government debt to GDP in the United States, Japan, the United Kingdom and the euro area economies
(2009)

(%; x-axis: Prim. balance/GDP; y-axis: Net debt/GDP)



Source: IMF, World Economic Outlook.

1 *The data come from the World Economic Outlook (October 2011). The data for the euro area are the GDP-weighted average of the 11 largest euro area economies.*
2 *Martin Feldstein puts it in this way in his recent piece "The French don't get tt": "When interest and principal on British government debt come due, the British government can always create additional pounds to meet those obligations. By contrast, the French government and the French central bank cannot create euros." Project Syndicate at* http://www.project-syndicate.org/commentary/feldstein43/English

The Southern view is that the spreads are harmful, and that their presence in the euro area (and not elsewhere) comes from the ECB's failure to play its role of "lender of last resort" (De Grauwe, 2011). According to that view, the spreads reflect a vicious circle in government debt dynamics and market expectations—with high spreads leading to exploding debts, which in turn justifies the expectation of a default. By standing ready to buy government debt at the right price, the ECB could ensure that the economy stays in the good equilibrium with low interest rates. And like in the Diamond-Dybvig model, the commitment to lend would imply that lending-in-last-resort is not necessary in equilibrium.

One theme of this paper is that those two views are a bit too simple. On the one hand, the proponents of the Southern view make their lives too easy by simply assuming that government solvency would be ensured by low spreads. It is true that, other things equal, lowering spreads to zero would reduce the probability of default, but this does not mean that the probability of default would be reduced to zero. And a positive residual probability of default implies that the monetary authorities might be called to "lend in last resort" to an insolvent government in equilibrium. Debt monetisation, thus, is not a purely notional out-of-equilibrium risk, it is a real risk that has to be weighted against the benefits from low spreads.

One the other hand, it is not obvious either that high spreads necessarily provide the appropriate incentives for fiscal adjustment. They could as well discourage fiscal adjustment by making the dynamics of debt unsustainable and reducing the probability that fiscal efforts eventually pay off. By reducing the likelihood of a successful fiscal adjustment, high spreads might actually make inflation more (not less) likely, as I will show in this note. In the long run, furthermore, it might be necessary to accept a small risk of debt monetisation (occurring, say, once every century on average) in order to establish a relationship between fiscal policy and monetary policy that is sustainable – i.e., one that does not generate a government debt crisis every ten years.

Relationship to the literature

The distinction between monetary dominance and fiscal dominance was originally made by Sargent and Wallace (1981). There is monetary dominance when the monetary authorities are entirely focused on controlling inflation, whereas the fiscal authorities adjust fiscal policy to stay solvent conditional on an exogenous flow of seigniorage. Fiscal dominance, conversely, occurs when monetary policy is subject to the constraint of providing enough seigniorage to the government to ensure solvency. This distinction appears under different guises in the literature that looks at monetary and fiscal policy rules in recursive models. In Leeper's (1991) terminology, monetary dominance corresponds to the case where monetary policy is "active" and fiscal policy is "passive". In the analysis of Woodford (2003), monetary dominance results when the monetary rule follows the "Taylor principle" and the fiscal rule is "locally Ricardian".

The approach in this paper is related to other contributions that explore the grey area between pure fiscal dominance and pure monetary dominance. For example, Davig and Leeper (2007) study an environment in which the monetary policy rule switches between an active stance and a passive stance. Davig, Leeper and Walker (2010) use a rational expectations framework to assess the implications of rising debt in an environment with a "fiscal limit", i.e., a point where the government no longer has the ability to finance higher debt levels by increasing taxes, so that either a fiscal adjustment or inflation must occur to stabilise debt. Those papers, however, do not consider *default* as an alternative to fiscal adjustment or inflation.

Other papers introduce the possibility of government default in dynamic optimising models of monetary and fiscal policy. Uribe (2006) makes the point that if fiscal and monetary policy are both "active", then the only way that the government can satisfy its intertemporal budget constraint is by sometimes defaulting. He shows that the equilibrium behaviour of default and rates and risk premiums may be quite sensitive to the specification of the monetary rule. Bi (2011) presents an intertemporal optimising model in which default is an alternative to fiscal consolidation. However, Uribe's model does not have fiscal adjustments and Bi's model does not have monetary policy. This paper, by contrast, embeds the three options of default, inflation and fiscal adjustment in the context of a single framework.[3]

3 *This paper is in part based on Jeanne (2012). The difference is that the model in Jeanne (2012) is in continuous time and features learning about the government's type, thus yielding richer and more realistic dynamics than the two-period framework presented here.*

The paper is structured as follows. Section 1 presents the assumptions of the model. I then study lending-in-last resort (Section 2) and the trade-off between inflation and default (Section 3).

1| A SIMPLE MODEL

The model has two periods, $t = 1,2$. Period 2 represents the long run: it is a reduced form for an infinite-time steady state.[4] Fiscal policy and monetary policy are implemented by the government and the central bank respectively. The central bank targets an inflation rate, which for convenience is normalised to zero. The government must roll over its debt between period $t = 1$ and period $t = 2$. It is not certain in period 1 that the fiscal primary balance will be high enough in the long run (period 2) to make the government solvent conditional on zero inflation. If the primary balance is not high enough, there is a solvency crisis, following which either the government defaults, or the central bank comes to its rescue by increasing seigniorage.

The model can be summarised in three equations. The first equation describes the evolution of government nominal debt between period 1 and period 2,

$$(1 + i)d_1 = d_2, \qquad (1)$$

where i is the nominal interest rate between the two periods. The government has a zero primary balance in period 1 so that its debt at the beginning of period 2, d_2, is simply equal to its debt at the beginning of period 1, d_1, times the nominal interest factor. The initial level of debt, d_1, is exogenous.

The second equation is the budget constraint of the government in period 2,

$$rd_2 = b + s(\pi), \qquad (2)$$

where r is the riskless real interest rate, b is the long-run real primary balance excluding seigniorage, and $s(\pi)$ is real seigniorage revenue, which is increasing with the rate of inflation, π. This is the budget constraint for the steady state with constant real debt that prevails from period 2 onwards. For the level of real government debt to remain constant, the interest payment on the debt must be equal to the primary balance including seigniorage.[5] Equation (2) applies if the government does not default in period 2. If the government defaults, the left-hand-side is multiplied by $(1 - h)$, where h is the "haircut" that creditors must bear in a debt restructuring.

The level of the long-run primary balance b is not known in $t = 1$ and is observed in period 2. It is expected in period 1 that the government will do a fiscal adjustment, i.e., will increase the primary balance to the level that is required to avoid a default conditional on zero inflation – given by $b = rd_2$. However, for political or economic reasons the government may be unable to set the primary balance at that level. The ex ante probability (i.e., viewed from period 1) that the government will fail to implement the fiscal adjustment is an increasing function of b, which will be denoted by $P(b)$. That is, a fiscal adjustment is less likely if it is larger. The probability $P(b)$ is a measure of the fiscal risk.

It will be convenient to assume that there are two thresholds $\underline{b}$ and $\overline{b}$ such that the fiscal adjustment is implemented with probability one if b is lower than $\underline{b}$ and with probability zero if b is larger than $\overline{b}$. Thus, if $rd_2 \leq \underline{b}$, the fiscal adjustment is implemented with certainty, and if $rd_2 > \underline{b}$, there is a positive probability that the government fails to implement the adjustment. If the adjustment is not implemented, the primary balance is set to a level that is at most $\underline{b}$.

If the government does not implement the fiscal adjustment, there is a solvency crisis in period 2. Then, one of the following two things happens:

- **inflation, no default:** the central bank rescues the government from a default by increasing seigniorage to $s(\pi) = rd_2 - \underline{b}$;
- **default, no inflation:** the central bank sticks to its zero inflation target and let the government default.

In the second case, the government sets the primary balance to the level that ensures solvency after default, $b = r(1 - h)d_2$. The haircut is assumed to be large enough that this is always possible.

4 *The details of the infinite-time model underlying the analysis presented here are available upon request to the author.*
5 *The price level in periods 1 and 2 is normalised to 1, so that* d_2 *is the real level of debt at the beginning of period 2. To be exact,* r *should be defined, in this equation, as the real interest rate divided by one plus the real interest rate.*

To sum up, if there is a solvency crisis in period 2, the government cannot roll over its debt. The central bank is faced with a choice between increasing inflation and letting the government default subject to the constraint that the primary balance b cannot exceed $\underline{b}$.

The public does not know, ex ante, how the central bank will respond to a solvency crisis. I assume that conditional on a solvency crisis, the central bank sticks to its inflation target (and let the government default) with an exogenous probability denoted by μ. The public knows μ and forms rational expectations based on this knowledge. Parameter μ, thus, is a measure of the central bank's reputation for enforcing monetary dominance ex post, in a crisis.

Note that the kind of monetary dominance that is measured by μ is not exactly the same as monetary dominance as defined by Sargent and Wallace. In Sargent and Wallace (1981), monetary dominance is the assumption that the government sets the fiscal balance to a level that ensures solvency, taking the seigniorage as given. This is captured in my model by $1 - P(b)$, the probability that the government does the fiscal adjustment. But μ is something different: it is the probability that the central bank will let the government default if the fiscal adjustment is not implemented. It is a measure of what one might call "ex post" (or "hard") monetary dominance – the fact that monetary dominance is implemented when it is fiscally challenged.[6] It is useful to distinguish the two notions since, if $P(b)$ were equal to zero, the model would feature monetary dominance in the sense of Sargent and Wallace (1981) but this would say nothing about μ. For example, one can imagine situations where $P(b)$ and μ are both low, i.e. monetary dominance is strong ex ante but weak ex post.

Finally, the model is closed by an interest parity condition. I assume risk neutrality, implying that the expected return on the government debt between period 1 and period 2 must be equal to r,

$$(1 + i)[1 - P(b)\mu h] = 1 + r. \qquad (3)$$

The nominal interest factor, $(1+i)$, is multiplied by one minus the probability of a default times the haircut. Note that the nominal interest rate entails a default risk premium but no inflation risk premium because inflation is equal to zero between time 1 and time 2 (if the government rolls over its debt).[7]

Using that the primary balance ensuring no default is $b = rd_2 = r(1+i)d_1$, equation (3) can be rewritten

$$1 + i = \frac{1 + r}{1 - \mu h P(r(1+i)d_1)}. \qquad (4)$$

This equation links the nominal interest rate to the exogenous variables of the model. All the results will be derived, in one way or another, from this equation.

2| Lending in last resort

Both sides of equation (4) are increasing with i, which may lead to multiple equilibria. The intuition behind this multiplicity is the same as in Calvo (1988): high interest rates can be self-fulfilling because they increase the burden of repayment and so the probability of default.

The equilibrium multiplicity is illustrated in Chart 3. To construct this chart I assume that the probability of not implementing the fiscal adjustment is increasing linearly from zero to one in the interval $(\underline{b}, \overline{b})$, that is

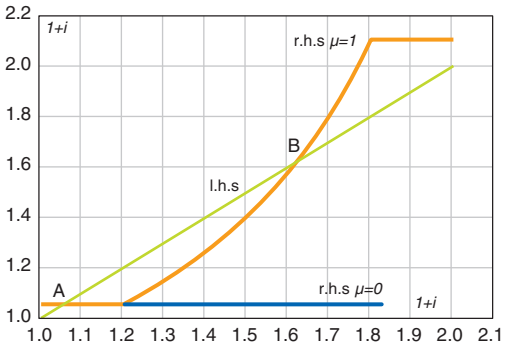
$$F(b) = \frac{b - \underline{b}}{\overline{b} - \underline{b}}. \qquad (5)$$

The parameters are set to the following values: the riskless real interest rate is equal to 5 percent ($r = 0.05$), the debt-to-GDP ratio is 100 percent ($d_1 = 1$), the haircut is equal to 50 percent ($h = 0.5$), the central bank never monetises ($\mu = 1$) and $(\underline{b}, \overline{b}) = (0.06, 0.09)$.

6 *The term "hard" is meant to evoke the distinction between "hard" and "soft" power that is made in the study of international relations. Soft monetary dominance means that the fiscal authorities do everything possible ex ante to reduce the risk of an open conflict between monetary dominance and fiscal dominance. Hard monetary dominance means that the monetary authorities enforce monetary dominance ex post when the conflict has not been avoided.*

7 *I assume that if there is debt monetisation, the rate of inflation increases from period 2 onwards, but the period-2 price level remains the same. Thus, government debt is not inflated away. This assumption can be relaxed but it is important for my argument that the premium for the risk of inflation be lower than the premium for the risk of default.*

Chart 3
Left-hand-side and right-hand-side of equation (4)



Source: author's computations

With those parameter values there are two equilibria, as shown by the chart. In the good equilibrium (point A), the default probability is zero and the government can roll over its debt at the riskless interest rate of 5 percent. As a result it needs a fiscal balance of $d_1(1+r)r = 5.25$ percent of GDP in period 2, which is achieved with certainty since it is lower than $\underline{b} = 6$ percent.

In the bad equilibrium (point B), the default probability is 70 percent. The government has to pay an interest rate of 62 percent to roll over its debt. The larger debt requires a larger primary balance of 8.1 percent of GDP in period 2, which is implemented with a probability of 30 percent.

Note that the bad equilibrium can be removed by decreasing μ, if this lowers the right-hand side of equation (4) sufficiently that it no longer crosses the left-hand side in point B. This is obvious if one sets μ to zero: then the right-hand side becomes the horizontal line $i = r$, so that only the good equilibrium remains. By promising to monetise the debt if the government is insolvent, the central bank ensures that the government can roll over its debt at a low interest rate, so that the government is solvent in period 2. This is a free lunch since the central bank does not need to monetise in equilibrium.

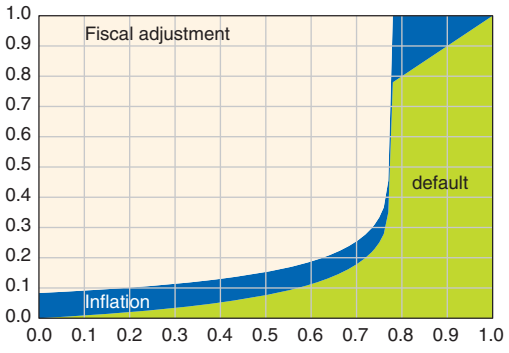
More generally, the case for pure lending-in-last resort arises if $P(rd_1) = 0$, that is, if it is known with certainty that the government will do the fiscal adjustment conditional on a zero default risk premium. This may be a reasonable assumption under some circumstances but there is no reason to assume that it is always satisfied. If the government has to roll over a large amount of debt d_1, then the probability that the government will fail to adjust may be positive even with a zero premium. In this case, it remains true that lowering μ may remove the bad equilibrium (if there is one), but this is no longer a free lunch. There is a nonzero probability that debt will have to be monetised and that the rate of inflation will have to increase in equilibrium.[8]

3| Trade-off between inflation and default

The more realistic case is where $P(rd_1)$ is positive. To explore this case, I keep the same model specification and numerical values as in the previous section, except that I lower $\underline{b}$ and $\overline{b}$ by one percent, to respectively 5 and 8 percent. As a result, the probability of insolvency conditional on a zero risk premium is no longer zero: it is $P(rd_1) = 8.3$ percent.

I then compute how the equilibrium probability of each possible outcome (fiscal adjustment, default, inflation) varies with μ. If there are multiple equilibria I pick the good one. The results are reported in Chart 4.

Chart 4
Variation of probability of fiscal adjustment, inflation and default with μ



Source: author's computations

8 *Another problem with the lending-in-last-resort view is that the underlying theory of equilibrium multiplicity has loose ends. The government, as a large agent, should be able to pick the good equilibrium, as emphasised by Chamon (2007).*

Several results are worth highlighting. First, the fiscal adjustment is possible only if the hard monetary dominance index, μ, is lower than a threshold of about 80 percent, that is if conditional on a solvency crisis the central bank monetises government debt with a probability of at least 20 percent. If μ is larger than 80 percent, there is no interest rate at which the government can roll over its debt in period 1, so that the debt rollover crisis (and the hard choice between inflation and default) comes up in period 1 rather than period 2. If $\mu = 1$, the central bank never opts for monetisation so that the government defaults with probability 100 percent in period 1.

Second, the probability of inflation may be *increasing* with hard monetary dominance, μ. When μ crosses the 80 percent threshold from below, the probability of inflation jumps up from about 10 percent to about 20 percent. This is because a situation where the government can roll over its debt and a fiscal adjustment is still possible is replaced by an immediate rollover crisis in which the central bank has to choose between inflation and default – and chooses the former with a twenty percent probability. From the point of view of inflation, intermediate levels of μ may bring about the worst of both worlds: μ is too high to leave time for a successful fiscal adjustment, but not high enough to guarantee that a solvency crisis will not be followed by inflation.

Third, if $\mu = 0$, the probability of inflation is not zero (there is no free lunch) but, at about 8 percent, it is not very high either. The probability of a fiscal adjustment is more than ten times larger than the probability of inflation. That is, the commitment to provide a monetary backstop to a government debt rollover crisis is not implemented very often in equilibrium. To illustrate, if the need for the fiscal adjustment described in the model arose every ten years in average, full monetary backstop ($\mu = 0$) implies that debt is monetised less than once every hundred years on average. Hard monetary dominance ($\mu = 1$), by contrast, implies that the government defaults every ten years on average. It is not clear, on the face of it, that the latter is preferable to the former.[9]

4| Concluding remarks

I have looked at the impact of "hard monetary dominance", i.e., a commitment by the monetary authorities to let the fiscal authorities default rather than raise inflation, on the probabilities of three possible equilibrium outcomes – fiscal adjustment, default and inflation – in the context of a simple model. Although the model is very stylised, the relationship between monetary dominance and the outcomes is perhaps more subtle than would be suggested by the existing literature on the benefits of monetary dominance. Hard monetary dominance may come at the cost of making fiscal adjustment more difficult and default more likely. It can even make inflation more likely. Providing a monetary backstop for government debt crises may be a necessary condition for an orderly and sustainable policy mix in which governments are not defaulting too often, although it may come at the cost of a nonzero (but not necessarily very high) probability of debt monetisation.

The analysis presented in this short paper certainly misses important aspects of the problem. For example, I did not look at the impact that the risk of default might have on the incentives to invest more effort in fiscal adjustment. One might surmise that governments have stronger incentives to improve their fiscal prospects (summarised by function F in the model) if a failure to adjust is punished by a costly default. However, the analysis in Jeanne (2012) shows that the incentive effects of high default risk are ambiguous. High spreads, by making default more likely independently of the government's fiscal efforts, may undermine the incentives to fiscal effort. It will be important in future research to go beyond the realm of theoretical possibilities and develop a range of realistic dynamic models that can yield more quantitative insights on the impact of hard monetary dominance in the real world.

9 *Another way to put it is that the levels of government debt that are sustainable under hard monetary dominance are much lower than if there is full monetary backstop. The problem of the euro area, if one takes this perspective, is that it inherited levels of government debt that were inconsistent with the hard monetary dominance that was embedded in the new monetary regime.*

References

Bi (H.) (2011)
"Sovereign default risk premia, fiscal limits and fiscal policy", *Bank of Canada Working Papers* 11-10.

Calvo (G. A.) (1988)
"Servicing the public debt: the role of expectations", *The American Economic Review*, pp. 647-661.

Chamon (M.) (2007)
"Can debt crises be self-fullling?", *Journal of Development Economics*, 82(1): pp. 234-244.

Davig (T.) and Leeper (E. M.) (2007)
"Generalizing the Taylor principle", *American Economic Review*, 97(3): pp. 607-635.

Davig (T.), Leeper (E. M.) and Walker (T. B.) (2010)
"Inflation and the fiscal limit", *European Economic Review*, 55(1): pp. 31-47.

De Grauwe (P.) (2011)
"Only a more active ECB can solve the euro crisis", *The Centre for Economic Policy Studies Policy Brief*, 250: pp. 1-8.

Jeanne (O.) (2012)
"Monetary dominance and government default", *Manuscript*, Johns Hopkins University.

Leeper (E. M.) (1991)
"Equilibria under `active'and `passive' monetary and fiscal policies", *Journal of monetary Economics*, 27(1): pp. 129-147.

Sargent (T. J.) and Wallace (N.) (1981)
"Some unpleasant monetarist arithmetic", *Federal Reserve Bank of Minneapolis Quarterly Review*, 5(3): pp. 1-17.

Uribe (M.) (2006)
"A fiscal theory of sovereign risk", *Journal of Monetary Economics*, 53(8): pp. 1857-1875.

Woodford (M.) (2003)
"Interest and prices: foundations of a theory of monetary policy", Princeton Univ Press.

Central bank independence and sovereign default

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This article relaxes the assumption usually assumed in the existing literature that the fiscal authority will never default on obligations issued on its own currency. It shows that a sufficiently tough central bank does have the ability to control the price level, regardless of the behaviour of the fiscal authority. In order to achieve independent control of the price level where the debt of the fiscal authority is defaultable, the central bank should be willing to allow the fiscal authority to default on its debt. However such a commitment to letting the fiscal authority default may expose the country to risks of short-term and medium-term output losses. How this trade-off should best be resolved deserves further research. But it may turn out to be optimal for central banks to guarantee fiscal authority debts in some situations.

NB : This essay is based on remarks that the author gave on April 1, 2011, in Philadelphia, and on September 26, 2011, in Chicago. The author thanks Marco Bassetto, V. V. Chari, Ron Feldman, Futoshi Narita and Juan-Pablo Nicolini for their comments. The views expressed here today are his own, and not necessarily those of his colleagues in the Federal Reserve System.

Sargent and Wallace published their classic "Some Unpleasant Monetarist Arithmetic" in the Minneapolis Fed's *Quarterly Review* in 1981. Since that date, there has been a growing appreciation of the role of fiscal policy in the determination of the price level. The idea is a simple one. Consider a government that borrows only using non-indexed debt denominated in its own currency. Then, the intertemporal government budget constraint implies that the current real value of the government's liabilities – including the monetary base – must equal the present value of future real surpluses. Because the liabilities are nominal and non-indexed, there is a linkage between the public's assessment of future real tax collections and government spending and the current price level.

I find John Cochrane's analogy to be helpful here.[1] He thinks of money and government bonds as being like stock in a company. Just like a firm's stock, money and bonds implicitly represent claims to the ownership of the government's stream of surpluses. And just like with financial assets, the variations in their prices are fundamentally linked to variations in the present discounted value of government profits – that is, surpluses. This simple insight has rather profound consequences for how we think about inflation. Inflation is no longer "always and everywhere a monetary phenomenon." Instead, even apparently independent central banks may not have control of the price level. Thus, if the public begins to think that the fiscal authority is behaving irresponsibly, that belief will push upward on the price level.

However, the above discussion follows the bulk of the existing literature by assuming that the fiscal authority will never default on obligations issued on its own currency. In this essay, I relax this assumption. Once I do so, it will become clear that a sufficiently tough central bank does have the ability to control the price level, regardless of the behaviour of the fiscal authority.[2] I will argue that its ability to do so hinges on the nature of its response to the possibility of default on the part of the fiscal authority. I will talk about some of the short-run versus long-run tensions involved in that response.

Throughout, I will refer to the central bank as CB and the fiscal authority as FA. I will refer to the currency as being dollars, but that should not be viewed as suggesting that I am talking about the United States – or Australia.

1| Central bank independence and defaultable debt

In this section, I discuss how a central bank can maintain independent control of the price level, when the debt of the fiscal authority is defaultable.

Let me start by describing a simple CB policy: a commodity price peg. Suppose the central bank holds X ounces of gold. It commits to being willing to buy and sell p dollars for each ounce of gold and has a monetary base of pX *dollars*. This policy successfully ties the price level to variations in the price of gold, *regardless of the behaviour of the FA*.

What impact does this policy have on the FA? Now, when the FA borrows in dollars, it is essentially borrowing in a real commodity: gold. All of the FA's debt is essentially indexed to the price of gold, and it is certainly conceivable that various shocks could lead the FA to default on those obligations. In particular, the price of gold, relative to other goods, is subject to many kinds of shocks. For example, suppose that fast growth in emerging markets leads to a sharp increase in the demand for, and price of, gold relative to other goods. The CB's commodity price peg will translate into deflation, as the price of goods in terms of dollars falls. To repay dollar-denominated obligations, the FA will have to increase its net surpluses (by raising taxes or cutting expenditures). If it is unable to do so, then it will have to default.

Of course, as I have discussed elsewhere, a commodity price peg is generally viewed as suboptimal by macroeconomists.[3] In contrast, suppose that the CB commits to a particular inflation target (for example, 2% per year). In order to fulfill that commitment, it follows an aggressive Taylor rule when determining the path of the short-term interest rate. (By an "aggressive" Taylor rule, I mean that the CB responds to deviations of inflation from the target of 2% by adjusting its target interest rate in the same direction, but by a larger magnitude.) The aggressive Taylor rule ensures that the inflation rate will equal to 2% per year, regardless of the FA's fiscal plans.[4] However, given that inflation path, the FA's nominal debt is now actually real. Suppose that

1 *See Cochrane (2005).*
2 *See Bassetto (2008) for a related analysis.*
3 *See Kocherlakota (2011).*
4 *Note that Atkeson, Chari and Kehoe (2010) and Cochrane (2011) argue that an aggressive Taylor rule is not sufficient to determine inflation.*

a recession occurs, so that the FA's net tax collections fall sharply. If the recession is sufficiently deep and persistent, the FA will be forced to default.[5]

2| Fiscal solvency and central bank independence: trade-offs

In the previous section, I described how a CB can retain considerable control over the price level as long as it is willing to allow the FA to default on its debt. In this section, I'll illustrate the trade-offs between CB independence and fiscal solvency, by discussing the CB's response to a particularly critical situation.

Suppose that the CB has targeted an inflation rate of 2%, and that the FA owes 10 billion dollars on a given Friday. The FA plans to repay that loan by auctioning new debt on the preceding Monday. However, when it auctions off the new debt, it finds that it can only raise 5 billion dollars. The FA is now in danger of defaulting on its Friday obligation of 10 billion dollars.

It is at this stage that the level of commitment of the CB to its chosen inflation target will be severely tested. The FA may well ask the CB to take some action that will allow the FA to raise an additional 5 billion dollars on Wednesday. There are many possible actions. The FA might ask the CB to intervene by setting a floor on the price of debt in the Wednesday auction. But there are less overt approaches. For example, the CB can commit to a price peg for the FA's debt in the secondary market for that debt.

In any event, if the CB does intervene in some way to ensure the FA's solvency, the CB no longer can be said to have independent control over the price level. If the CB's intervention was largely unanticipated by markets, expected inflation will rise after the CB's intervention. Then, incipient fiscal insolvency has triggered inflationary pressures. Of course, markets may well have already assigned a positive probability to the possibility that the CB might intervene in this kind of scenario. If so, then past inflation was already influenced by the markets' expectations of this fiscal policy scenario.

Should the CB be required to never intervene in this sort of insolvency scenario? I've argued that a ban on these interventions will give the CB more independence in its control over the price level. For those who think of CB independence as being a foundational element of macroeconomic policy, that pretty much settles the question.

But I see a couple of reasons for caution here. It is certainly conceivable that FA insolvency can be triggered by shocks that are well outside the control of the FA itself. And, empirically, FA insolvency is associated with large short-term and even medium-term declines in output. Should the CB be prepared to drive the FA into insolvency given the possible adverse economic impact on the country?

More subtly, regardless of the FA's solvency, sovereign debt issues can fail simply through a coordination failure among investors. If I, as an investor, don't anticipate that others will buy into the debt issue, I won't either. In this sense, sovereign debt issues may be susceptible to suboptimal "runs." The CB can eliminate this possibility by ensuring the nominal promises of the FA whenever the FA is threatened with default.[6]

Thus, I see trade-offs. On the one hand, if the CB is known to be willing to intervene to keep the FA solvent, then inflation is necessarily shaped by fiscal considerations and by the short-run incentives of elected officials. We know from many years of theoretical and empirical research that this effect is not a desirable one. On the other hand, if the CB is fully committed to allow the FA to default if necessary, then even optimal debt management by the FA may end up exposing the country to troubling risks, like sovereign debt runs.

3| Concluding remarks

In this essay, I have argued that, even if the fiscal authority borrows exclusively in its country's own currency, the central bank can retain a large amount of control over the price level. But the central bank can only achieve that control if it is willing to commit to letting the fiscal authority default. Such a commitment may expose the country to risks of short-term and medium-term output losses. How this trade-off should best be resolved awaits future research. But it may turn out to be optimal for central banks to guarantee fiscal authority debts in some situations. If so, we again have to think of price level determination as something that is done jointly by the fiscal authority and the central bank – just as Sargent and Wallace taught us 30 years ago.

5 *As modeled, for example, by Eaton and Gersovitz (1987).*
6 *These observations parallel Blanchard (2011)'s comments about using liquidity provision as a way to eliminate undesirable equilibrium outcomes.*

References

Atkeson (A.), Chari (V. V.) and Kehoe (P. J.) (2010)
"Sophisticated monetary policies", *Quarterly Journal of Economics* 125, pp. 47-89.

Bassetto (M.) (2008)
"Fiscal theory of the price level", in Lawrence Blume and Steven Durlauf (eds.), New Palgrave: A dictionary of economics, 2nd edition.MacMillan: London.

Blanchard (O.) (2011)
"Four hard truths", International Monetary Fund blog, December 21.

Cochrane (J. H.) (2005)
"Money as stock", *Journal of Monetary Economics* 52, pp. 501-28.

Cochrane (J. H.) (2011)
"Determinacy and identification with Taylor rules", *Working paper*, University of Chicago, Booth School of Business.

Eaton (J.) and Gersovitz (M.) (1987)
"Country risk and the organization of international capital transfer", NBER *Working Paper* 2204, April.

Kocherlakota (N.) (2011)
"It's a wonderful Fed", Speech, St. Paul, Minn, *http://www.minneapolisfed.org/news_events/pres/speech_display.cfm?id=4619*.

Sargent (T.) and Wallace (N.) (1981)
"Some unpleasant monetarist arithmetic", Federal Reserve Bank of Minneapolis *Quarterly Review*, Fall, pp. 1-17.

The sovereign debt crisis and monetary policy

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Since Lehman Brothers' filing for Chapter 11 bankruptcy on September 2008, and as a result of the ensuing financial crisis and worldwide recession, policymakers all across the globe responded with a policy mix to better withstand the potential nefarious effects expected by experts and financial markets alike. The series of unprecedented phenomena since World War II[1] resulted in a combination of automatic stabilisers and swift discretionary measures on the fiscal side, and accommodative policy on the monetary front.

Yet, over three years later, Europe does not seem more "off the hook" than any major advanced areas; and another crisis has emerged: the sovereign debt crisis. Because most euro area governments failed to abide by the Stability and Growth Pact rules prior to 2008, public indebtedness in the euro area countries has reached such a high level that sustainability and even solvency concerns have emerged, triggering a severe confidence crisis for the euro area periphery. At the same time, monetary policy is now close to its zero lower bound, so that there is little room for maneuver on this front.

These are exceptionally dangerous times because the euro area monetary policy now stands at a cross road. On the one hand, the legacy of the Lehman Brothers recession entails inflation risks due to fiscal dominance, central bank losses and the ensuing loss of credibility. On the other hand, it generates severe deflationary risks. Indeed, financial turmoil triggered by increased sovereign default risks has been conducive to a risk of credit crunch and might have impaired the monetary policy transmission mechanism.

NB: The authors thank Stefan Krause for his much appreciated input.

1 See Reinhart and Rogoff (2010).

1| Exceptional circumstances, macroeconomic policies and their legacy

If one looks at OECD countries together, the 2008-2009 recession has been nothing less than the deepest collapse in economic trade and activity for three generations, basically since the Great Depression. Both monetary policies and fiscal policies have had to adjust to such exceptional circumstances.

Automatic fiscal stabilisers have cushioned the collapse in demand by letting public expenditure untouched while fiscal revenues declined more than proportionally with output.[2] Furthermore, most OECD countries increased their cyclically adjusted deficits. Hence, between 2008 and the 2011, fiscal deficits accumulated, resulting in an increase of public debt of over 20% of gross domestic product (GDP) in most OECD countries. For the countries that already had elevated levels of public debt in 2008, including some of the euro area member states, the post-crisis levels of debt are now beyond a threshold where investors question their sustainability and start requesting compensation for default risk. While for the euro area as the whole, public debt, amounting to 85% of GDP, is much smaller than that of Japan, and significantly smaller than those of the United States, public debt is much larger in Italy, Belgium, Ireland and Greece.

Public debt increased to unprecedented levels in times of peace, leading investors, since 2010, to question the ability of governments, especially at the periphery of the euro area to repay their debt. Greece, Ireland and Portugal have been cut off from market financing and Italy and Spain have to pay large risk premia with respect of the interest rates on German debt. These risk premia reflect either the fear of investors that these countries may have to default or that the euro would break up. Or, they reflect the fear that other investors may have such fear and that a run of these assets may arise.

The depth of the recession also had its toll on monetary policy. First, by the second quarter of 2009, most OECD central banks slashed their main monetary policy instrument, the nominal short-term interest rate, to close to its *physical* minimum, i.e. zero. Indeed, negative nominal interest rates are hardly viable because investors can always have recourse to cash, which offers a zero interest rate. With no more room for reaching a more accommodative monetary policy stance through lowering the short-term interest rate, central banks have aimed at reducing other interest rates which, beyond the level of the short-term interest rate, also have an effect on the supply of savings and aggregate demand.

In the United States and in the United Kingdom, the central bank has acquired financial assets to weigh on longer-term interest rates. In both countries, quantitative easing (QE) programmes aimed at lowering the interest rate on long maturity Treasury bonds, which is usually a floor for other interest rates of similar maturities. In the United States, the Federal Reserve has also initially acquired mortgage back securities in order to lower the interest rate paid by US households on their mortgage and commercial paper at a stage of the crisis where investors required particularly high interest rates to be compensated for credit risks.

In the euro area, where bank lending represents the bulk of the total credit to the economy, the Eurosystem expanded its refinancing operations by lending liquidity at fixed interest rates in *a priori* unlimited and unprecedented amounts. This policy contributed to alleviate the stress on the interbank market that had dried up, because of a sudden lack of trust in counterparties.[3]

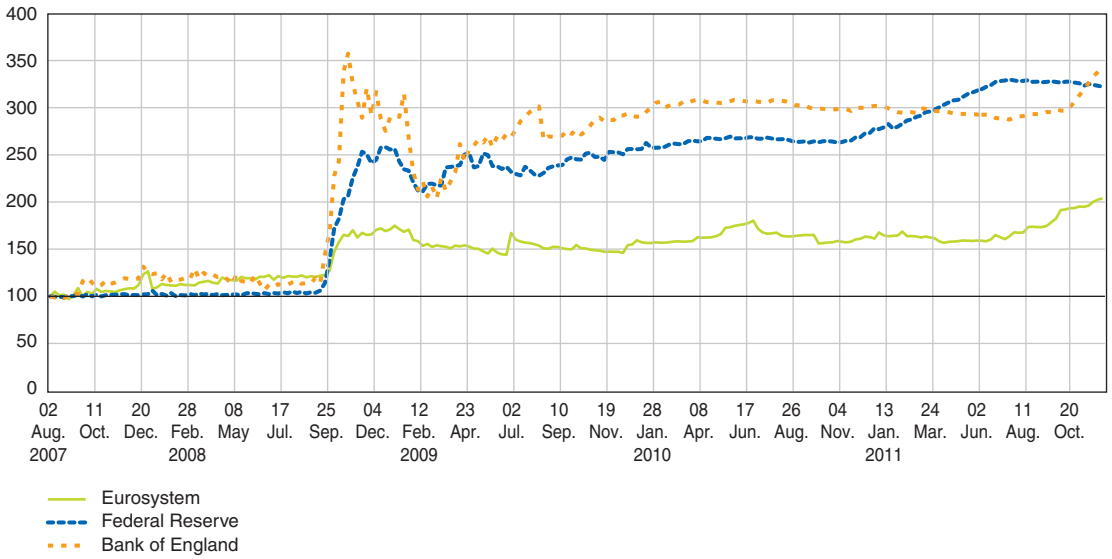
A consequence of these unconventional monetary policies that is common to the euro area, the United States and the United Kingdom is that the balance sheet of their central banks has considerably expanded (Charts 1 and 2), by nearly 10% of GDP, and in some case more than doubled. Furthermore, in the case of the United States and the United Kingdom, this expansion took the form of piling up public debt on their asset side. In the case of the euro area, the Eurosystem increased its lending to banks, though a large share of the collateral pledged by banks against this liquidity is also public debt.

2 *In the case of Ireland, it is the blanket guaranty by the state to the banking system that led to an explosion of public debt. To some extent, this is also true when it comes to the United Kingdom.*

3 *Between May 2010 and August 2010, and again since August 2011, the central bank has acquired public debt from euro area periphery countries to preserve the transmission of its monetary policy from the perturbing volatility of sovereign interest rates. However, the scale of these operations is much smaller than the QE programmes of the United States and the United Kingdom.*

Chart 1
Central banks' balance sheet

(index, 08/02/2007 = 100)



Sources: Datastream, authors' calculations.

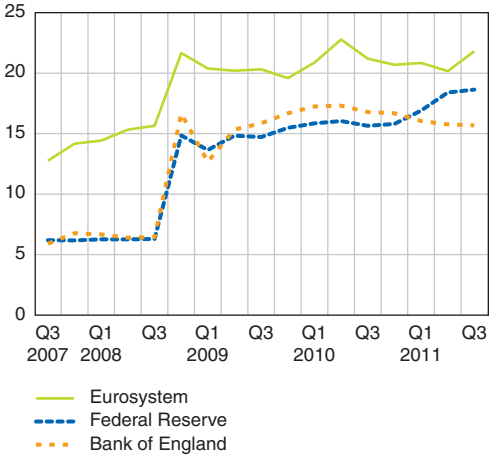
Hence, the legacy of the exceptional depth of the Lehman recession for macroeconomic policies is threefold:

- near zero short-term interest rate and hence no room for conventional monetary policy to react to downward risks to price stability;

- very high level of public debt, with sizable default risk premia for the most indebted countries of the euro area;

Chart 2
Central banks' balance sheet in % of GDP

(total CB assets/nominal GDP, in %)



Sources: Datastream, authors' calculations.

- mounting balance sheet of central banks, through increased issuance of reserves (the main liability of central banks) to either acquire public debt (in the United States and the United Kingdom) or expand the central bank refinancing of the euro area banks.

The combination of exceptionally low interest rates and very high levels of public debt, as well as the monetary financing of public debt, induces inflation risks. There is first a risk of fiscal dominance in case the primary objective pursued when setting interest rates and the creation of central bank reserves is to avoid sovereign default. Second, in the event the default of a sovereign triggers a large loss on the asset side of the central bank, the latter may be in a weak position vis-à-vis government if it needs to be recapitalised. Economic agent may start questioning the independence of the central bank and its commitment to stabilise inflation. An even worse scenario is one when agents question the purchasing power of money, and the economy gets into a hyperinflation equilibrium because everybody tries to get rid of money balances.

These tail risks to price stability warrant further scrutiny. We first review, in Section 2, the reasons why economists consider that high levels of public debt entail inflation risks. We then assess in Section 3 whether the confidence crisis on euro area sovereign periphery impairs the transmission of euro area monetary policy.

2| Could the current levels of public debt be a threat to price stability in the euro area?

This section lays out a brief overview of the most often-mentioned mechanisms through which public debt and fiscal policy can jeopardise the price stability objective of monetary policy and assess its relevance for the euro area.

2|1 Analytical insights on fiscal dominance

In which circumstances can monetisation of public debt lead to high inflation? The classic starting point to answer this question is the famous *unpleasant monetarist arithmetic*.[4] In a setting where sovereign default is excluded, governments that have accumulated public deficits and that cannot or are not willing to enforce fiscal surpluses can in principle have recourse to monetary financing of deficits.

From a monetarist perspective, however, increasing the monetary base leads to inflation.

Specifically, in an economy that meets the monetarist assumptions, the monetary base is closely tied to the price level and the private sector demand for government bonds constrains government in two ways. It sets a limit to fiscal policy by imposing an upper limit to the ratio of bonds to the size of the economy and it affects the interest rate at which the government can borrow. Against this background, authorities can coordinate monetary and fiscal policies in one of two polar ways.

First, if monetary policy dominates fiscal policy, the level of interest rate is geared toward price stability. The government takes it as given and adapts its budget to secure the sustainability of public debt. In contrast, if fiscal policy dominates monetary policy, then the budget can be exogenously determined, and monetary policy must adjust the amount of seignorage to finance the budget. The supply of money, and hence the level of interest rate aim at keeping public debt sustainable. Thus, the control of inflation is subordinated to this fiscal objective and revenues from the inflation tax help balance the government budget.

The consensus view is that the *monetarist arithmetic* is mainly relevant where and when seigniorage revenues can constitute a large amount of fiscal revenues i.e. when inflation is high and financial innovation is little developed. For countries with low inflation, the relationship between average inflation and the growth rate of money is tenuous at best.[5] Since the mid 1990s, inflation has been low and stable in all OECD countries as well as in many emerging and low income countries. This may be largely accounted for the independence of central banks and the focus of their monetary policy mandate on price stability, e.g. through explicit or implicit inflation targeting. Moreover, in countries with independent central banks, the government no longer controls the supply of money. In the euro area case, article 123 of the Lisbon Treaty forbids explicitly monetary financing of public debt. This explains in part why interest rates at the periphery of euro area countries now imbed a credit risk premium.

In the event of a large recourse to monetary financing, the increase in the monetary base and the perception that monetary policy is diverted from its price stability focus could result in a de-anchoring of inflation expectations and an inflation surge. Such a regime shift toward fiscal dominance of monetary policy could mark the return of the quantity theory in the data[6] as money and prices would accelerate in tune.

Another popular analytical framework of the interplay between monetary and fiscal policies was developed in the 1990s under the heading of the *Fiscal Theory of the Price Level* (FTPL). In this framework, monetary policy does not necessarily control inflation, and fiscal policy influences prices even in countries where the central bank is independent. In particular, expectations by the private sector of future government deficits can lead to a complete determination of the price level by fiscal policy.

4 *See Sargent and Wallace (1981).*
5 *See Teles and Uhlig (2010).*
6 *See, in particular, Sargent and Surico (2011) who extend the empirical analysis of Lucas (1980).*

For example, in case of positive expected deficits, the price level will increase up to the point where devalued current government nominal liabilities[7] exactly match the expected value of future government revenues. This ex post ensures government solvency[8] in a framework, which, as in the case of the unpleasant monetary arithmetic, excludes the possibility of default. Monetary policy passively accommodates the outcome of fiscal policy and the latter sets deficits without concern for public debt. In the economic jargon, monetary policy is said to be passive while fiscal policy is said to be active. As a consequence, it is the economic agents' expectations of future primary deficits that force the price level to adjust.

This hardly relates to the way we are used to thinking about monetary and fiscal policies. In the standard theoretical setup that has predominated over the last two decades or so, agents expect that the central bank implements a monetary policy designed to ensure price stability. It adjusts interest rates to close the output gap and stabilise inflation. Fiscal policy takes interest rates and their effects on the dynamics of public debt as given so that it needs keep a deficit level that ensures the solvency of the state.

In the fiscal theory of the price level, financial markets price the resulting supplies of government bonds. To do so, they take a view about future inflation and set interest rates and bond prices accordingly. More precisely, they will set bond prices so that the government's solvency is assured in equilibrium. Future inflation is therefore expected whenever private agents forecast lower government surpluses in the future. Indeed, if the bonds were priced at excessive value, i.e. a value higher than the expected discounted stream of future government surpluses, then consumers would have wealth to spend, in that their bonds would be worth more than their future tax liabilities. This would generate excess demand which would drive up inflation. But this mechanism would only come into play out of equilibrium. Thus, we never actually observe such forces in action because markets anticipate it and so drive expected inflation up in advance.

The strength of this theory is its logical consistency. Why would investors hold debt if its real value is not sustainable? The FTPL serves a useful role when reminding us of the importance of imposing fiscal constraints on governments. Such fiscal constraints, credibly enforced, help limit governments' desire to generate inflation as a result of unsound fiscal behaviours.

Perhaps more importantly, both the FTPL, and, for that matter, the *unpleasant monetary arithmetic*, rule out government default. In the monetarist arithmetic, this is done by letting inflation tax receipts keep the government's budget balanced; in the fiscal theory of the price level, variations in the price level ensure the governments' solvency. Yet, default has always been one resolution of debt overhang both for the private and the public sector. Default is very costly because it implies a cut off from any debt issuance, at least for several years and hence a brutal reduction in public expenditure. Perhaps because no advanced economy has defaulted on its debt in the last half century,[9] investors have taken for granted that this would not happen.

As of today, we lack a well established theory that analyses how allowing for sovereign default would change the way fiscal and monetary policies interact. Kocherlakota, in his contribution to this volume, argues that such a theory would essentially come up with a refined arbitrage between inflation and financial runs. Basically, either monetary policy steps in to ensure fiscal solvency, in which case the economy is struck by an increase in inflation, or it does not and instead commits to letting the fiscal authority default if necessary, in which case the economy is exposed to risks of sovereign debt runs, ensuing financial instability, and in turn debt deflation risks. A third possibility might be the sequence where the government defaults once the central bank has bought a significant amount of public debt. This could lead to inflation either because the central bank needs to be recapitalised by the government and this weakens its independence from the government and its credibility to stabilise inflation. Or the implied losses on the central bank assets lead the public to question the value of the central bank debt, which is currency and reserves.

As a result of the sharp increase in public debt levels legated by the Lehman brothers recession and of the

7 *The price level is also the inverse of price of public debt which is typically incarnated in nominal bonds.*
8 *See Leeper (1991), Woodford (2001), and Cochrane (2001).*
9 *See Reinhart and Rogoff (2009), table 6.4.*

Greek crisis, default risk has clearly become one of the concerns of investors who discriminate between sovereign debts in the euro area. This development is also the result of false design and weak implementation in the macroeconomic surveillance (mainly but not only) of fiscal policies in the euro area, a point we develop further in the next section.

2|2 Issues specific to monetary unions

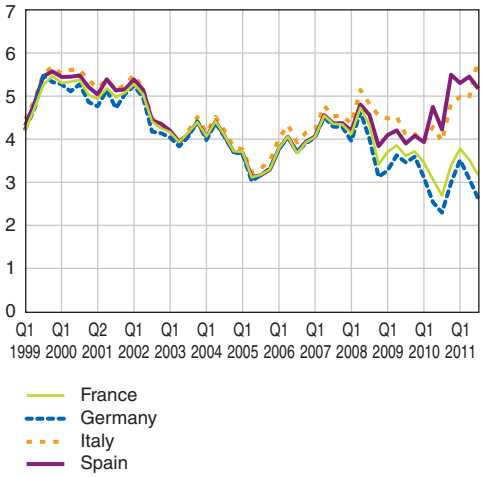
A monetary union adds one more layer of coordination in the interplay between monetary policy and fiscal policy. Fiscal policies, which are decided by nation states, imply the issuance of national debts in a single currency. As mentioned above, it is only following the sharp increase in public debts in all major advanced countries that financial markets began to discriminate between sovereign debts labeled in euros.

Some consider that higher interest rates on sovereign debt at the periphery reflect the fact that such states lack control of monetary issuance. In fact this situation is not specific to a monetary union. Any country the central bank of which is independent from the state has foregone the possibility to inflate its public debt away. It is a deliberate choice to prioritise the value of the currency, even at the cost of having to raise primary fiscal surpluses or of defaulting on public debt. Indeed, money is an asset that serves many purposes in the economy, well beyond being used to facilitate the budget constraint of government.

The true weakness of the European Monetary Union is the lack of effective fiscal coordination. This induces free riding risks and coordination failures. Under normal circumstances, individual countries have an incentive to self insure for rainy days, for instance by limiting their deficits to secure access to increased borrowing in the event of an adverse shock. However, in a monetary union, the collapse of an individual economy endangers other member countries, implying the setting up of some kinds of solidarity mechanisms. In turn, the expectation of such solidarity devices (that may be interpreted as bailouts plans) weakens ex ante fiscal discipline and reduces the incentive to self-insure.[10]

Chart 3
Sovereign interest rates

(%)



Source: Datastream.

It is to limit these free riding risks that fiscal binding rules have been agreed upon in the design of the Maastricht Treaty, which justified the setting up of the Stability and Growth Pact. With hindsight and although the depth of post Lehman collapse in economic activity was truly exceptional, the implementation of the Pact, which was breached by most members including Germany and France, proved very weak. To a large extent, this fiscal profligacy, in a regime where the market proved unable to rightly discriminated across sovereign bonds until 2008 (see Chart 3), matches well the prediction of the above free riding theories. And as explained above, the higher the level of public debts, the more likely would expectations factor in fiscal dominance.

If the central banks were not independent, governments could resort to inflation once the debt levels of member countries had grown too large, say after a series of bad economic outcomes. The resulting inflation would then act as a union-wide tax which, thus spreading out the costs of lax fiscal policies on all the member countries citizens.

With an independent central bank, monetary policy is expected to credibly commit to a price stability objective, without paying attention to fiscal

10 *See Beetsma and Bovenberg (1999, 2001) and Cooper, Kempf, and Peled (2010).*

developments only insofar as they influence inflation developments. If this is indeed feasible, no special fiscal constraints are theoretically needed on top of the solvency constraint. However, in real life, there is a need to buttress the central bank commitment to price stability by imposing fiscal constraints on governments participating to a monetary union in order to eliminate or at least limit ex ante the incentive to monetise public debt.[11]

The free rider problem specific to monetary unions without clear and stringent fiscal rules helps rationalise why at least some euro area countries had too much debt up until 2008. However, the increase in sovereign default risk premia since 2008 can be seen as the effective rejection of this approach. If investors fully trusted the ex post possibility of bail outs, spreads would not have increased across sovereign bonds in the euro area because of assumed fiscal solidarity. Instead, interest rates would have increased across the board.

The growing perception of sovereign default risk in the euro area sanctions the credibility of the no bail out rule. But this does not go without costs. Government debts account for a large share of financial assets and have long been considered risk-free assets. With the emergence of default fears, the revision of this perception has undermined confidence in financial markets. This is so because, as any financial crisis, a sovereign default crisis can spill over across countries and to a broader class of financial assets. Shocks which initially only affect a few institutions or a particular country of the economy, can spread out to the rest of the financial sector and then infect the larger economy. The flip side of the financial integration that has been achieved in the euro area, in part thanks to the monetary union, is that the propagation of a shock is more likely.

Overlapping claims that different countries or sectors of the banking system have on one another are one channel of contagion, particularly relevant in the current European situation.[12] For instance, when one country suffers a bank crisis, the other countries suffer a loss because their claims on the troubled country fall in value. If this spillover effect is strong enough, it can cause a crisis in the adjacent countries.

Such a mechanism can also be at play when regional financial intermediaries hold large portfolios of unsustainable regional debts. Indeed, local default creates failure risk for financial intermediaries, implying a scope for monetary policy interventions through liquidity provision.[13] In turn, risks of failure trigger fire sales of large parts of financial intermediaries' portfolios; debt prices decrease even further, reinforcing risks of sovereign default in other countries. One can then have a situation, where the default in one country triggers the default of some financial institutions, which in turn have to sell their assets, depressing prices for all bonds and thus increasing the default probabilities for other financial institutions as well as for other countries.[14]

3| The European sovereign debt crisis and monetary policy effectiveness

In normal times, the main monetary policy instrument is the level of the short-term nominal interest rate. However, when the short-term interest rate reaches the zero lower bound (ZLB), the central bank can still further loosen its monetary policy stance by increasing the supply of reserves. Furthermore, whether or not the interest rate has hit the ZLB, the central bank can influence the prices of financial assets by purchasing them provided these financial assets are imperfect substitutes both for other financial assets and for central bank reserves.

However, the current crisis exerts a drag on monetary policy. In this section drawing on the previous literature review, we try to assess the risks and to find evidence on inflationary pressures.

3|1 Assessing the risks

In the current context of financial fragility, investors require higher interest rates from sovereign issuers and, if risk premia reach a threshold where investors expect they might induce snowball effects, cut their

11 *See Chari and Kehoe (2007).*
12 *See Allen and Gale (2000).*
13 *See Allen, Carletti, and Gale (2009).*
14 *See Roch and Ulhig (2011).*

exposure to such issuers. The ensuing financial instability impairs the transmission of changes in the monetary policy stance on financial conditions. We document this impairment by focusing on financial conditions in the euro area big four: France, Germany, Italy and Spain, which together account for roughly 80% of the euro area economy.

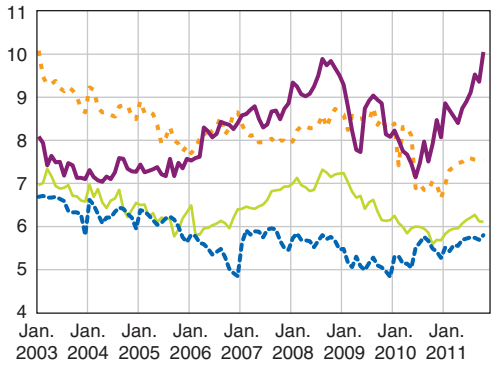
The first place to look at is retail bank interest rates. Indeed bank finance dwarf market finance for the euro area as a whole and for a majority of its member states. Chart 4 reports retail bank interest rates on loans to non financial corporations and for housing purpose since 1999. The conditions of bank lending remain different from one country to another, even though one cannot observe any marked or growing divergence up to very recent developments. Since 2011, the cost of bank credit to businesses has suddenly increased in Spain and Italy. This coincides with the increases in the sovereign spreads on the Italian and Spanish debt with respect to the German one (Chart 3).[15] Credit default swap (CDS) premia on governments and non financial corporate debt is further evidence that a contagion of financial instability from public debts to the broader economy is underway (Chart 4 for rates and chart 5 for CDS).

Beyond diverging costs of finance across countries, a situation of financial fragility may escalate into a credit crunch. Currently, the sovereign debt crisis worsens the financing conditions of the banking system as is shown by the co-movement of bank and sovereign CDSs (Chart 5), the decline in the market value of banks, and the difficulty for banks to issue bonds. Refinancing difficulties in the banking system might also lead banks to reduce the size of their balance sheets, by selling securities and reducing the supply of credit. *A priori*, credit spreads reflect different risks of issuers and thus exert market discipline on them. In that regard, a recent Banque de France study shows that sovereign spreads in the euro area are proportional to the anticipated change in ratio of public debt to GDP, at least until 2010.[16] Thus, the question raised by spreads in the euro area is not that of divergent macroeconomic dynamics in a "steady state". Different interest rates for different issuers would simply reflect normal economic forces triggered by imbalances.

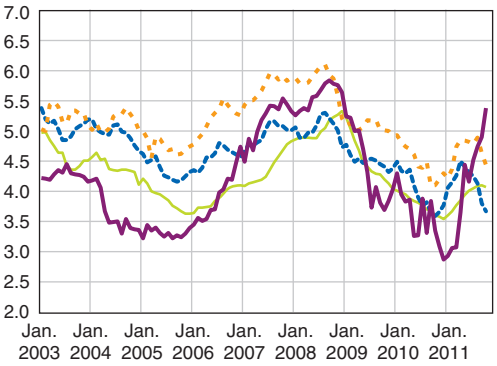
Chart 4
Credit rates

(%)

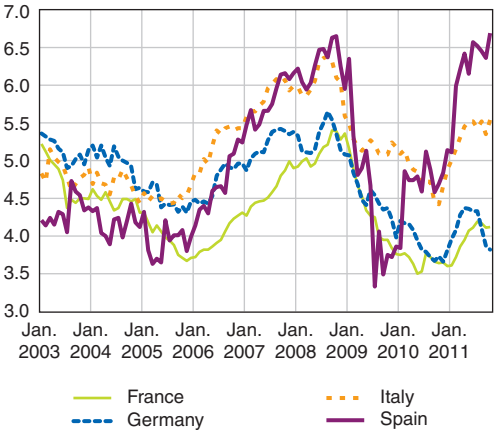
Panel A Consumer credit rates



Panel B Housing credit rates



Panel C Non-financial corporations credit rates



Source: Datastream.

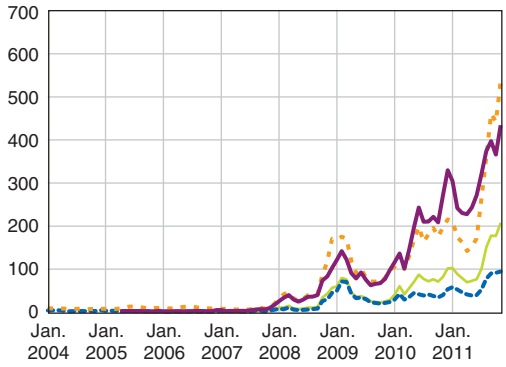
15 *An econometric analysis allows us to test the effect of sovereign spreads from the Bund on the rate of bank credit to households and businesses, for data up to October 2011. See Barthélémy and Marx (2011).*

16 *See Borgy* et al. *(2011).*

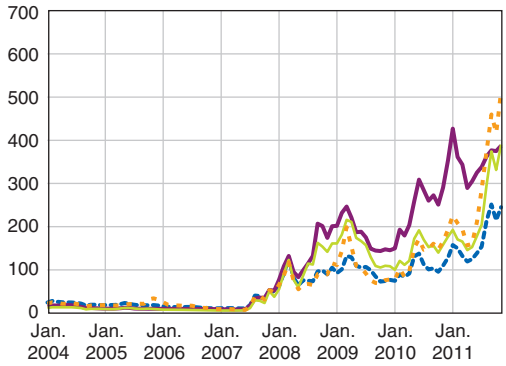
Chart 5
Credit default swaps

(%)

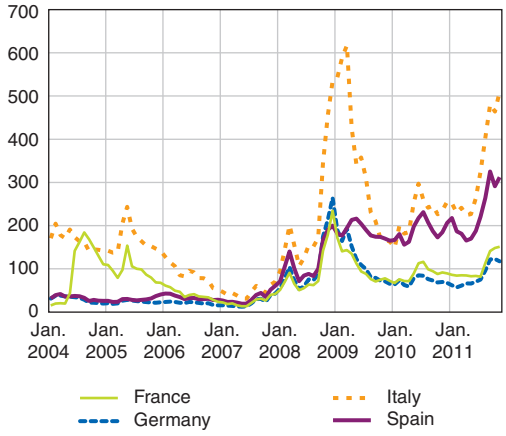
Panel A Sovereign



Panel B Banking sector



Panel C Non-financial corporations



Source: Datastream.

A more problematic point concerns the impact of increased interest rate spreads or credit rationing. We can consider these differences as abnormal when they reflect a contagion not justified by economic fundamentals. Beyond a threshold considered sustainable for the public debt, these spreads are likely to fuel a self-fulfilling spiral. Then, the risk is that of very pronounced differences in the cost and availability of financing activity in the area. Such discrepancy could lead to abnormal heterogeneity of monetary conditions with regard to the relative situations of the economies of the euro area, signalling a tendency to the "re-nationalisation" (or even a risk of dislocation) of the single monetary policy.

In such circumstances, wherein an increase in the debt burden, if perceived as permanent, would by itself (i.e. with no reference to economic fundamentals) create the risk of a sovereign default, it might be considered appropriate to resort to unconventional tools, in an attempt to bring borrowing rates and volatility back to sustainable levels.

Among the possible measures, an intervention by the central bank to stabilise the interest rate at levels compatible with fiscal sustainability does not seem possible unless governments commit to strict fiscal adjustments. This indeed appears a pre-condition to limit moral hazard and thus the ensuing losses of confidence in the currency.

3|2 The credibility of the monetary policy regime

Our analysis leads us to three main conclusions on the effects of large public debts on the euro area monetary policy.

First, public debt overhang through-out the OECD and the discrimination of euro area governments by investors lay the seeds of tail risks to price stability. A default of a large OECD country sovereign could be a major trauma for financial markets and economic agents. On the other hand, history tells us that in many instances, debt overhang has been resolved by recourse to inflation.

Second, euro area institutions, while having proven weak for fiscal coordination, are a protection against the direct financing by the central bank of fiscal expenditure. And actually, the very credit spreads that marks the periphery of the euro area is the living proof that institutional preference for monetary stability are credible. The recourse to massive purchasing of sovereign debt, in other parts of the world, while currently innocuous for inflation, could very well lead a sudden and yet persistent increase in long term interest rates.

Third, sovereign risk premia within the euro area are effectively a drag on the transmission of the single monetary policy. This impairment warrants vigilance and the need to avoid that it escalates into a destabilising credit crunch.

Looking forward, the tail risks to price stability due to the sovereign debt crisis should be monitored very closely. As explained above, most theories of the interaction between fiscal policy and monetary policy call on expectations by private agents. Thus, if one wishes to assess whether inflation risks described in the previous sections should finally materialise, it is of prominent importance to closely monitor inflation expectations.

To this end, central banks have at their disposal a wealth of more or less direct measures of inflation expectations by private agents, ranging from survey of forecasters to market-based expectations extracted from inflation-indexed interest rates. The fact is that all our measures of long term inflation expectations concur to indicate a solid anchoring of price stability and the confidence of investors in the value of the euro. This is a major asset to sustain confidence along the way out. The bottom line of the preceding analysis is now clear: up to now, inflation expectations display no evident signs of de-anchoring. Thus, concerns raised by the theories reviewed in Section 2 might be partly misplaced.

To some extent, monetary policy has proven successful because the Eurosystem enacted unconventional measures aimed at avoiding a credit crunch and ensuring the correct financing of the economy. In turn, be it in the euro area, the United Kingdom or in the United States, unconventional measures raise new challenges.

4| Challenges of unconventional measures

The advent of the unconventional measures era has raised a number of issues, among which three seem particularly challenging.

First, unconventional measures may spur the perception of fiscal dominance risks. The basic mechanism is simple: when an economy gets into a liquidity trap, monetary policy resorts to unconventional measures to counter deflation expectations in an attempt to prevent a deflationary spiral from taking off. Some could consider that the US macroeconomic policy mix boils down to the Federal Reserve financing government expenditures to stimulate demand. An obvious limit to this strategy is a potential loss of confidence in money in case of extreme fiscal dominance. Turning to the United Kingdom, the ongoing fiscal consolidation constitutes a powerful deflationary force. The Bank of England large purchases of government bonds pushed through money issuance constitute an inflationary force. Overall, this policy mix may have contributed to pulling inflation well above the inflation target of the Bank of England for already several quarters. Beyond their effects on current inflation, it is important to stress that risks taken by these central banks on their balance sheets may ultimately question their actual mandate vis-à-vis inflation-prone treasuries.

The second challenge raised by non-conventional measures is to uncover their long run effects on welfare. These measures are supposed to affect the willingness of private agents to spend by affecting the long term part of the yield curve. By lowering the latter, they provide incentives to consume more, which is what is needed in a liquidity trap. However, little is known on the enduring effects of these measures. By reducing savings, they also contribute to delaying investment, which might end up in permanent, negative effects on real activity. Indeed, unconventional measures affect directly the distribution of wealth between lenders and borrowers. However, the associated long-run effects are uncertain.

Last but not least, little is known or said on the international dimension to unconventional measures. Indeed, while various studies assess the effectiveness of such policy tools, whether in the United States,

the United Kingdom or the euro area, we know next to nothing on their international spill over. A first risk, clearly pointed out to by the resentment and criticisms from emerging economies toward the US policy pertains to the potential loss of value of the assets accumulated in dollars. A second risk is rather seen in the volatility of commodity prices at a time when OECD countries increase their monetary base. A third risk is related to enhancing large capital inflows in (more specifically) emerging economies where the risk/return ratio may seem more attractive, but having limited capacities of absorption (underdeveloped capital markets). This issue has been discussed within the G20, which led to the adoption of a code of conduct on the management of capital flows.

What lessons should be drawn when it comes to the euro area?

The recent thirty six months long term refinancing operations constitute a significant commitment by the Eurosystem to resolving the debt crisis in the euro area, giving banks the means to providing credit to the economy and to playing their role on public debt markets, and giving them much-needed time to restructure/deleverage without incurring too much market pressures.

Indeed, recent studies suggest that the length of time during which monetary policy is at the zero lower bound depends strongly on the policy commitment embedded in unconventional measures. Basically, unconventional measures are meant to anchor inflation expectations when the economy undergoes powerful deflationary forces. If these measures lack a strong commitment, they may fail to anchor private inflation expectations at small yet positive values, as, some argue, was the case in Japan (see Eggertsson and Woodford, 2003). A key to success is a clear statement of the underlying exit strategy, making the commitment credible and well understood by the private sector. However, such a strategy may take a long time to effectively undo the deflationary pressures of a liquidity trap. At this stage, practical questions arise as to the best way to eliminate the extra liquidity when the deflation is (well) over. Unwinding repos could be easier and more natural than selling assets under a timeline to be defined and communicated appropriately.

However, in the present case, the exit strategy also depends on member countries governments' willingness to enact swift fiscal consolidations. While governments were responsible in the first place for the negative spiral triggered by lax fiscal policies, they also recently showed their commitment to reducing public debt and deficits. Lessons drawn from the *Fiscal Theory of the Price Level* suggest that this move toward more fiscal discipline is the first building block of a successful exit strategy.

References

Allen (F.) and Gale (D.) (2000)
"Bubbles and Crises", *The Economic Journal,* Royal Economic Society, Vol. 110(460), pp. 236-55, January.

Allen (F.), Carletti (E.) and Gale (D.) (2009)
"Interbank market liquidity and central bank intervention", *Journal of Monetary Economics*, Elsevier, Vol. 56(5), pp. 639-652, July.

Arghyrou (M. G.) and Kontonikas (A.) (2011),
"The EMU sovereign-debt crisis: fundamentals, expectations, and contagion", *Economic Papers* 436, European Commission, Economic and financial Affairs.

Barthélémy (J.) and Marx (M.) (2011)
"Impact of sovereign rates on lending rates", Internal Note.

Beetsma (R.M.W.J.) and Bovenberg (A. L.) (1999)
"Does monetary unification lead to excessive debt accumulation?", *Journal of Public Economics,* Elsevier, Vol. 74(3), pp. 299-325, December.

Beetsma (R.M.W.J.) and Bovenberg (A. L.) (2001)
"The optimality of a monetary union without a fiscal union", *Journal of Money, Credit and Banking,* Blackwell Publishing, Vol. 33(2), pp. 179-204, May.

Borgy (V.), Laubach (L.), Mésonnier (J.-S.), and Renne (J.-P.) (2011)
"Fiscal sustainability, default risk and euro area sovereign bond spreads markets", Banque de France *Working Paper* 350.

Catão (L.), Fostel (A.) and Rancière (R.) (2011)
"Sudden stops and sovereign defaults", *mimeo*, George Washington University & International Monetary Fund.

Chari (V.V.) and Kehoe (P.) (2008)
"Time inconsistency and free-riding in a monetary union", *Journal of Money, Credit and Banking,* Blackwell Publishing, Vol. 40(7), pp. 1329-1356, October.

Chari (V.V.) and Kehoe (P.) (2007)
"On the need for fiscal constraints in a monetary union", *Journal of Monetary Economics,* Elsevier, Vol. 54(8), pp. 2399-2408, November.

Cochrane (J.) (2001)
"Long-term debt and optimal policy in the fiscal theory of the price level", *Econometrica,* Econometric Society, Vol. 69(1), pp. 69-116, January.

Cooper (R.), Kempf (H.) and Peled (D.) (2010)
"Regional debt in monetary unions: is it inflationary?", *European Economic Review,* Elsevier, Vol. 54(3), pp. 345-358, April.

Eggertsson (G.) and Woodford (M.) (2003)
"Optimal monetary policy in a liquidity trap", NBER *Working Paper* 9968.

Hatchondo (J.-C.), Martinez (L.) and Sosa Padilla (C.) (2011)
"Debt dilution and sovereign default risk", Federal Reserve Bank of Richmond *Working Paper* 10-08R, May.

Leeper (E.) (1991)
"Equilibria under 'active' and 'passive' monetary and fiscal policies", *Journal of Monetary Economics,* Elsevier, Vol. 27(1), pp. 129-147, February.

Lucas (R.) (1980)
"Two illustrations of the Quantity Theory of Money", *American Economic Review,* American Economic Association, Vol. 70(5), pp. 1005-14, December.

Reinhart (C.) and Rogoff (K.) (2010)
"From financial crash to debt crisis", *NBER Working Paper 15795.*

Reinhart (C.) and Rogoff (K.) (2009)
"This time is different: Eight centuries of financial folly", Princeton, NJ: Princeton University Press

Roch (F.) and Ulhig (H.) (2011)
"The dynamics of sovereign debt crises in a monetary union", *mimeo*, University of Chicago.

Sargent (T.) and Surico (P.) (2011)
"Two illustrations of the Quantity Theory of Money: breakdowns and revivals", *American Economic Review,* American Economic Association, Vol. 101(1), pp. 109-28, February.

Sargent (T.) and Wallace (N.) (1981)
"Some unpleasant monetarist arithmetic", *Quarterly Review*, Federal Reserve Bank of Minneapolis, issue Fall.

Teles (P.) and Ulhig (H.) (2010)
"Is quantity theory still alive?", NBER *Working Paper 16393*, Inc.

Woodford (M.) (2001)
"Fiscal requirements for price stability", *Journal of Money*, Credit and Banking, Blackwell Publishing, vol. 33(3), pp. 669-728, August.

Sustainability of government debt: preconditions for stability in the financial system and prices

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In Japan's case, the drop in the potential growth rate and concerns about the future tax and pension burden have given households and firms the incentive to spend less and save more. This has led to deflationary pressures and low interest rates. However, this situation is not sustainable in the long-run. A combination of measures to improve the longer-term fiscal outlook and to enhance potential growth needs to be implemented aggressively. The social costs of implementing such measures are large. However, if the government's fiscal outlook loses credibility, the costs would become even greater.

Since the global financial crisis began in 2008, fiscal balances have deteriorated and central banks' policy interest rates have fallen to almost zero in many advanced economies. While both fiscal and monetary policies have approached their limits, unemployment rates have plateaued and growth remains sluggish. These economies also face a medium to long-term threat to their fiscal balances, namely, population aging. These conditions leave the advanced economies vulnerable to an additional negative shock, and the challenge confronting all of them is to act firmly to restore both financial system and price stability.

The euro area faces severe sovereign debt problems, and in the context of efforts to restore financial system stability, debate has been taking place on the role of central banks. Even if the situation in the euro area does not develop into a sovereign debt crisis, a cumulative increase in government debt could seriously affect the conduct of monetary policy aimed at price stability in the medium to long term. In this regard, an interesting case is Japan, where fiscal deficits have continued, raising the ratio of outstanding government debt to gross domestic product (GDP) to a high level in an international comparison, but inflation has not taken place and long-term interest rates have remained stable at low levels. The real world, as this indicates, is highly complex.

Taking into account the current state of the advanced economies as just described, this paper considers the potential impact of a cumulative increase in government debt on financial system stability and price stability as well as the role of central banks. Section 1 reviews the conceptual framework of government solvency, and Section 2 describes how government debt has snowballed in recent years. Section 3 explains the mechanism through which a cumulative increase in government debt eventually threatens financial system stability in the form of a sovereign debt crisis and discusses the potential roles a central bank could play in dealing with such a crisis. Section 4 discusses the possibility that a cumulative increase in government debt may threaten price stability in the medium to long term, and Section 5 presents the paper's conclusion.

1| Review of the conceptual framework of government solvency

As a starting point, this section looks at the conceptual framework of government solvency. In essence, the source of funds for redemption of issued government bonds is tax revenue and social security contributions from the public. As the government pays social security benefits, including pension and health care benefits, and provides public services such as defence and education, the available funds for redemption are the fiscal surplus, defined as "tax revenue plus social security contributions minus social security benefits minus government expenditure". As long as the amount of government debt outstanding is below the expected present discounted value of the future fiscal surplus, government solvency is maintained, or in other words, the government has the capacity for repayment.

If, however, the discounted present value of the fiscal surplus falls below the amount of government debt outstanding, that is, if the government is expected to lack sufficient capacity for repayment, there are theoretically three possibilities.

- The first possibility is a default. This effectively means the reduction of the value of outstanding government bonds until it becomes equal to the present value of the fiscal surplus, at the expense of government bond holders. However, because government bonds are widely held by financial institutions as safe and convenient financial assets, a default would damage financial institutions' capital positions and may subsequently destabilise the financial system. Instability in the financial system would trigger a negative feedback loop in which the adverse impact on the real economy would invite a further deterioration in the fiscal balance and the state of the financial system.

- The second possibility is inflation. This essentially aims to compensate for a decline in the government's repayment capacity by increasing seigniorage associated with a significant increase in currency issuance, or in other words, fiscal monetisation by the central bank.[1] In this scenario,

1 *Sargent and Wallace (1981) describe the mechanism in which inflation takes place as a central bank being forced to engage in fiscal finance because the government does not make efforts to reduce the fiscal deficit in the face of a rising outstanding government debt to GDP ratio. The mechanism is called "unpleasant monetarist arithmetic".*

government default is avoided by reducing the real debt burden through inflation while supplementing funds for the redemption of government bonds by increasing seigniorage. However, it must be noted that giving up on price stability as a policy goal will impair the basis for sustainable growth and social stability.

• The third possibility is to increase the present value of the fiscal surplus by improving the fiscal balance, which also requires efforts to strengthen growth potential. Needless to say, this is the most desirable option. However, in a democratic society it requires a difficult process of forming a nationwide consensus on the need to take the necessary steps, such as cutting fiscal expenditure, increasing tax rates and social security contributions, and implementing institutional reforms to strengthen growth potential.

Conceptually, issues related to government solvency can be explained as above. To sum up, when government solvency is undermined, unless necessary economic and fiscal structural reform measures are taken, the economy will inevitably face a harsh trade-off between financial system instability and inflation. While the essence of the problem can be summarised in this way, the actual economic outcome could vary significantly depending on several factors, such as the public's assessment on whether government solvency has been undermined, how a central bank should act when the financial system is on the verge of a crisis, and how private agents anticipate responses by the central bank. Taking into account the relationship between actions taken by private agents and responses from the central bank, the next section describes the background to cumulative increases in government debt and explains how it destabilises the financial system.

2| A CUMULATIVE INCREASE IN GOVERNMENT DEBT IN ADVANCED ECONOMIES

As can be seen in the experiences of Japan since the 1990s and of many advanced economies since the collapse of Lehman Brothers, declines in the growth trend due to the bursting of bubbles and population aging cause persistent increases in fiscal deficits both from the revenue and expenditure sides, which leads to increases in the supply of government bonds. There are also demand-side factors contributing to increases in government bonds outstanding, including rising financial surpluses in the private sector and the attractiveness of government bonds as safe assets.

2|1 Decline in the growth trend and increase in supply of government bonds

Among the various reasons for a decline in the growth trend, the following two factors are important.

• First is the effect of the bursting of a bubble. The negative shock caused when a bubble bursts is so significant that the room for cutting interest rates is soon exhausted. This then forces the government in question to conduct discretionary fiscal policy as well, as automatic stabilisers alone are no longer sufficient, which in turn widens the fiscal deficit. After a bubble bursts, the associated financial system instability creates the need for a large amount of fiscal resources, including for injection of public capital into financial institutions. Furthermore, the bursting of a bubble not only causes a plunge in output but also exerts downward pressure on economic activity for a long period through balance sheet repair. Therefore, it takes time to reduce the increased fiscal deficit and government debt increases in a cumulative manner.

• Second is the effect of population aging, a structural factor which has a longer-term impact on the growth trend. Population aging reduces labour supply, which lowers the marginal product of capital and consequently subdues business fixed investment by firms.[2] Moreover, growth potential could be further undermined if the supply side of an economy does not have sufficient flexibility to respond to changes in the structure of demand brought about by demographic changes. In this way, population aging acts as a persistent pressure to increase the issuance of government bonds by restraining economic growth and tax revenue through a range of channels, while increasing government expenditures, particularly social security benefits.

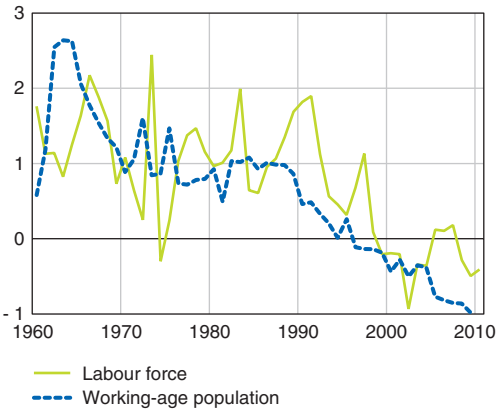
2 *If the labour supply constraints induce technological innovation to save labour inputs, however, the economy may see capital deepening through an increase in business fixed investment.*

In the case of Japan, the working-age population started to decline in the mid-1990s, with the share of the labour force in the total population also beginning to shrink as a result (Chart 1). The bubble burst and unprecedentedly rapid population aging began to occur at roughly the same time in Japan, resulting in continued increases in government debt from the 1990s onward. Given that population aging is also expected to proceed in the United States and Europe (although not as rapidly as in Japan), there is a possibility that, in addition to the widening fiscal deficits resulting from measures taken after the collapse of Lehman Brothers, demographic factors could also continue to exert pressure to increase fiscal deficits over the medium term.

Chart 1
Demographic trends in Japan

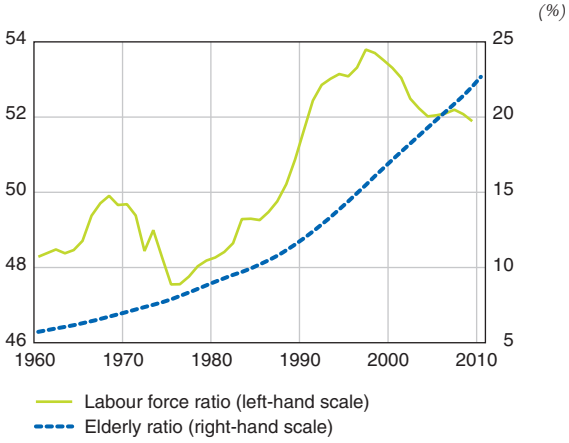
Labour force and working-age population

(year on year change, %)



Labour force ratio and elderly ratio

(%) *(%)*



Note: Labour force ratio = labour force/total population; Elderly ratio = population of age 65 or older/total population.
Sources: OECD; United Nations, "World Population Prospects: the 2010 Revision".

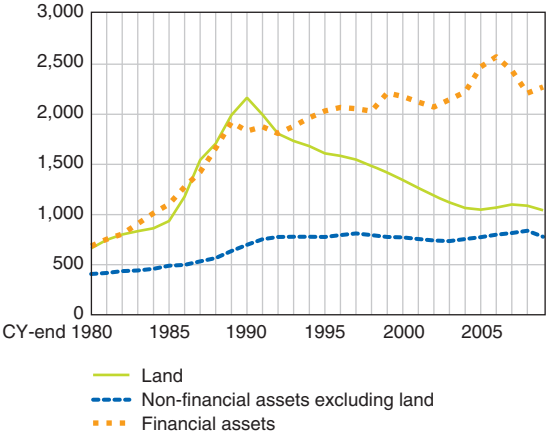
2|2 Private demand for government bonds arising from a financial surplus and risk aversion

Although the bursting of a bubble and population aging put pressure on governments to increase the supply of government bonds, this does not simply translate into upward pressure on government bond yields. This is because private sector demand for government bond increases for the following four reasons.

• First, financial institutions become more cautious about risk taking, while borrowing demand from the private non-financial sector declines. The balance sheet of the private non-financial sector in Japan shows that, after the bubble burst, investment in land began to decline and investment in non-financial assets other than land rose only modestly, which created a continuing financial surplus, i.e. an increase in financial assets (Chart 2). Looked at from the financial institution side, outstanding loans stopped increasing and a trend of decline set in, while deposits continued to climb almost without interruption (Chart 3). The financial surplus at financial institutions that arose due to the decline in the loan-to-deposit ratio was invested in government bonds, whose issuance had increased in response to the widening fiscal deficit. This is because, in an economy with a low growth rate, especially when downward pressures from balance sheet repair are at work after a bubble bursts, financial institutions become more risk-averse and

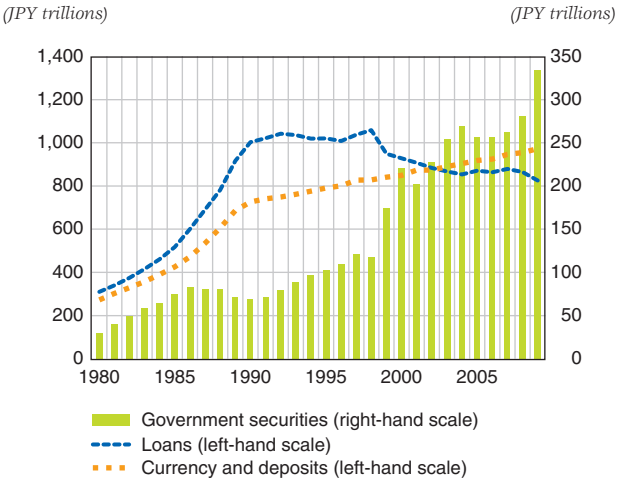
Chart 2
Private non-financial sector's assets in Japan

(JPY trillions)



Note: The private non-financial sector consists of households (including private unincorporated enterprises), private non-financial corporations and non-profit institutions serving households.
Source: Cabinet Office, "National accounts".

Chart 3
Balance sheets of Japan's private financial institutions



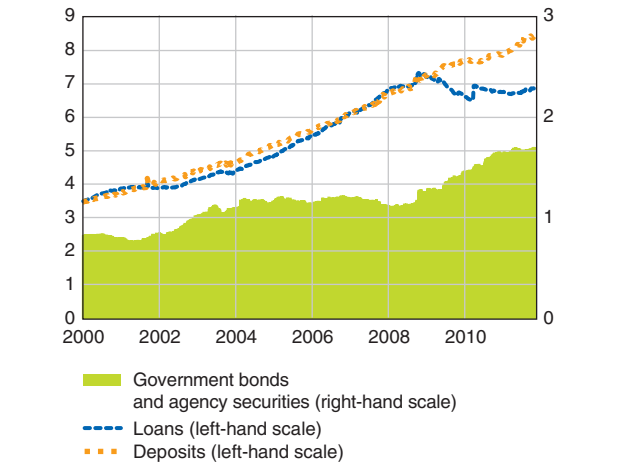
Source: Cabinet Office, "National accounts".

government bonds become more attractive as relatively safe assets. Since the collapse of Lehman Brothers, financial institutions in the United States and Germany have also had relatively slow growth in lending compared to deposits and have expanded their holdings of government bonds as a result (Chart 4).

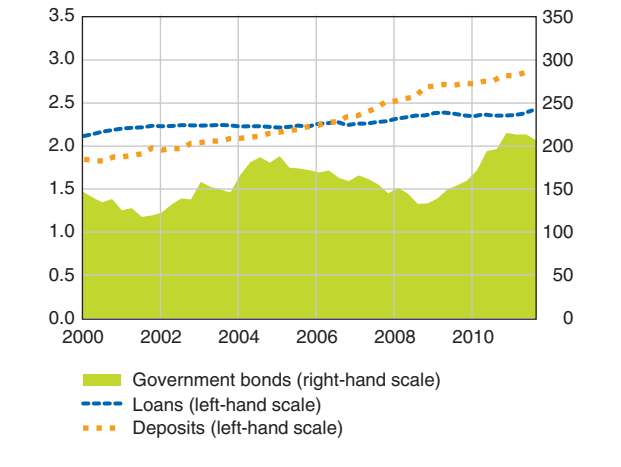
• Second, regulation and supervision have played some role in incentivising financial institutions to hold government bonds. Capital requirements for banks and solvency requirements for life insurance companies often allow them to treat the credit risk of government bonds as zero.[3] Also, from the perspective of liquidity risk, the regulatory and supervisory authorities assume that government bonds are a very liquid asset. Given such a regulatory and supervisory situation, when macroeconomic conditions deteriorate, financial institutions pay more attention to both credit and liquidity risk and become increasingly inclined to hold government bonds as safe and liquid assets.[4]

Chart 4
Balance sheets of US and German banks

US commercial banks



German monetary financial institutions



Notes: 1 Data for the amount of outstanding loans for US commercial banks was discontinued between March and April 2010 due to a change in accounting rules regarding the treatment of off-balance-sheet assets.
2 The Bundesbank is excluded from German monetary financial institutions.
Sources: Federal Reserve, "Assets and liabilities of commercial banks"; Bundesbank, "Monthly report".

3 According to the Basel II standardised approach, the risk weight for government bonds would be basically determined based on credit ratings. But, for banks' exposures to sovereign debt denominated in local currency, a lower risk weight, including a zero risk weight, may be applied at the discretion of the country's supervisory authority. Banks that have received supervisory approval to use the internal ratings-based approach and apply their own risk weights based on their own estimates of risk components may also be allowed to apply a zero risk weight to government bond holdings, because, unlike corporate exposures, there is no stipulation with regard to the minimum probability of default for sovereign exposures. For the treatment of sovereign risk and accounting practices by banks, see Hannoun (2011).
4 Reinhart et al. *(2011) have described the current situation – in which capital requirements and liquidity regulations for banks as well as solvency requirements for insurance companies depress government bond yields by boosting holdings of government bonds by financial institutions – as a modern version of "financial repression".*

• Third, another factor related to regulation and supervision is that financial institutions' incentives to hold government bonds are affected also by the risk management methods they adopt. Let us take the example of financial institutions that adopt a method which emphasises historical data analysis to assess the interest rate risk of government bonds. When government bond yields remain low in a stable manner, reflecting an increasing preference for safe assets, the decline in historical volatility in itself enhances the credentials of government bonds as safe assets and gives an additional incentive for financial institutions to increase their holdings.

• Fourth, monetary easing by central banks also contributes to the increase in demand for government bonds. Central banks utilise government bonds by purchasing them and/or accepting them as collateral when providing funds to financial institutions. When monetary easing continues to be strengthened to deal with a prolonged period of stagnant growth after the bursting of a bubble, financial institutions have a greater incentive to hold more government bonds in order to secure access to funds from central banks.

As explained above, the reason why government bond yields in advanced economies have not risen despite an increase in the supply of government bonds is related to not only a financial surplus in the private sector but also the perception that government bonds are safe assets, free of credit risk and highly liquid. However, no entity, including governments, can continue borrowing beyond its repayment capacity. Therefore, if governments continue to do so, there is a critical point beyond which investors will focus increasingly on the credit risk of government bonds. In that sense, like debt of other economic entities, a cumulative increase in government debt could result in an unsustainable financial phenomenon, or in other words a "financial imbalance".

3| How a cumulative increase in government debt threatens financial system stability

While government solvency can be defined clearly on a conceptual basis as in section 1, in the real world it is difficult to judge objectively whether a government is solvent, because the present value of a fiscal surplus could vary depending on expectations about future economic developments formed by private agents. One possible method of assessment is to consider how much room remains for revenue increases and cuts in government spending in the future, based on the existing tax rates and structure of government expenditures. For example, in an economy where tax rates are already high, a further tax increase may give the private sector less incentive to generate income and thus have the opposite effect of causing tax revenue to decline. Another example is a situation in which a further cut in government expenditure is politically extremely difficult. Such a situation is called the "fiscal limit" – the point beyond which taxes and government expenditures can no longer be adjusted to stabilise the value of government debt. Government solvency is undermined when the economy hits the fiscal limit. However, it is still not possible to identify the precise level of the "fiscal limit".

3|1 Runs on the market and the sovereign debt crisis

As such, a judgment of government solvency always involves uncertainty, and when market participants begin to become concerned that a government could possibly be insolvent, the progression to a sovereign debt crisis through a plunge in government bond prices – including the timing – depends on the often volatile factor of investors' "beliefs". In this case, changes in investors' beliefs may lead to a "coordination failure" in the government bond market.

More specifically, for investors holding government bonds, their decision to continue holding the bonds depends in part on whether they expect other investors not to sell them. Even if some doubt exists about government solvency, it is rational for every investor to keep holding government bonds if he/she expects that other investors will hold government bonds to maturity as they believe government solvency will be restored. However, market turmoil often increases fears that many investors may soon start selling bonds, which causes every investor to sell bonds. This then leads to a rise in government bond yields, and rising funding costs for the government increases the probability of default. In this situation, investors who initially had few concerns about government

solvency become alarmed and sell more government bonds, which results in a further rise in yields. Once this self-fulfilling process starts, a negative feedback loop will continue to operate and could lead to a run on the market unless the loop is broken by an exogenous force that is sufficiently powerful to reverse investors' expectations.

Four factors can accelerate the process by which a run on the market occurs or contagion spreads to a wider range of financial markets. First, since government bonds are widely used as collateral for financial transactions including repo transactions, once their prices start declining liquidity in funding markets is reduced through a rise in haircut rates, which can induce further selling of government bonds to secure liquidity. Second, if financial institutions rely significantly on historical data in their risk management, a sharp rise in the volatility of government bond prices will lead to automatic selling.[5] Third, once the price of one country's government bonds starts declining, government bonds of other countries perceived to be in a similar situation are more likely to be sold, such as countries subject to some doubt, however small, about their solvency. In other words, psychological contagion sets in. Fourth, in order to cover the losses arising from a decline in the prices of their government bond holdings, investors who diversify their portfolios across several countries' government bonds could sell other government bonds to realise capital gains. In the real world, there is a feedback loop among the four factors which reinforces rational behaviour by individual financial institutions in terms of loss-cutting and placing priority on securing liquidity. As a result, panic could occur across a number of financial markets.

To sum up, as the judgment on whether a government is solvent involves a significant degree of uncertainty, there is a possibility that a sovereign debt crisis will occur without warning in the form of self-fulfilling panic by investors. In other words, there could be an abrupt shift from one equilibrium to another.

3|2 The central bank's role in restoring financial system stability

The materialisation of a sovereign debt crisis undermines the capital positions of financial institutions and destabilises the financial system. In general, when financial system stability is threatened, a central bank provides abundant liquidity to financial markets and acts as the "lender of last resort" for solvent financial institutions that are having temporary difficulty with funding liquidity.[6] On the other hand, providing capital to insolvent financial institutions is the role not of the central bank but of the government. In the event of a sovereign debt crisis, however, the solvency of the government itself is thrown into doubt and debate sometimes takes place whether the central bank should be the "lender of last resort" to the government. The following two cases may be useful for discussing this subject.

- In the first case, despite a high probability of maintaining solvency at the initial stage, a government could become insolvent due to a self-fulfilling panic with a significant rise in government bond yields as a result of coordination failure in the market. In this case, some argue that the central bank's demonstration of its willingness to support government bond prices works as a "coordinating device".[7] According to this argument, calm can be restored in the government bond market even if the central bank does not actually purchase a very large amount of government bonds. However, it should be noted that a central bank itself is also faced with uncertainty when it comes to judging whether or not a government is solvent. Careful consideration is also needed about whether it is possible and correct for central banks to make such a judgment in a democratic society. Furthermore, what causes coordination failures in the market in the first place is investor concerns about government solvency. Therefore, governments need to ensure that investors have trust in their fiscal soundness, but government

5 *In mid-2003, when global interest rates started to increase reflecting the correction of market views on global disinflation, government bond yields in Japan rose sharply due to position adjustment by financial institutions. During that time, large Japanese banks adopted relatively similar interest rate risk management methodologies based on historical value at risk (VaR), which resulted in their simultaneous sale of government bonds when interest rates turned around and volatility increased as a result. This interest rate rise was called the "VaR shock".*

6 *See Bagehot (1873) for details.*

7 *See Freixas* et al. *(2000) for the role of central banks as a coordinating device which prevents a coordination failure among market participants.*

bond purchases by the central bank could lead to a moral hazard by discouraging the necessary efforts to ensure fiscal soundness.

• The second case is where there is a high possibility that the government is already insolvent. As described before, when financial institutions become insolvent, their solvency can be restored by injection of capital by the government. In order to restore the solvency of a government, however, it is necessary to proceed with fiscal consolidation and to increase growth potential to support it. When it is difficult to regain market confidence in government solvency in a short period of time, the financial system could further destabilise. In such a case, it is sometimes argued that stopgap measures to "buy time" are necessary until the required resources to stabilise the financial system are secured through various measures such as strengthening of growth potential. One such stopgap measure is international financial support. However, the conditions attached to such support often take time to negotiate, and a framework for dealing with the insolvency of large economies does not exist. Some argue that another possible stopgap measure is government financing by the central bank. They say that this could be an option in the case where no other measures are available to secure financial system stability, as long as it is conducted only as a temporary operation to buy time.

4| How a cumulative increase in government debt threatens price stability

As shown in the two cases just described, although central bank measures could help to stabilise financial markets temporarily, a fundamental solution to a sovereign debt crisis is not possible unless the government in question secures funds for repayment by pursuing fiscal consolidation. What will happen, however, if the government fails to proceed with fiscal consolidation? As shown in section 1, if a central bank is engaged in government financing in such a situation, it will result in inflation. If the primary balance continues to register a deficit and the central bank purchases additionally issued government bonds, its balance sheet will continue to expand. Such an expansion of the central bank's balance sheet will not necessarily lead to inflation immediately because the velocity of money tends to decline in a low interest rate environment. Nevertheless, it will cause significant uncertainty with regard to the outlook for prices.

4|1 Trade-off between financial system stability and price stability

History is full of examples of government financing by central banks resulting in inflation. For example, government financing by the central bank caused hyperinflation in Austria, Hungary, Poland, and Germany in the first half of the 1920s, and inflation in Japan from 1945 to around 1950.[8] Such historical experience gave root to the idea that central bank independence is important, and government financing by the central bank is now prohibited in many countries. However, despite the independence of central banks and their strong commitment to price stability, if government solvency is undermined and the financial system is destabilised, a central bank may inevitably have to choose between financial system stability and price stability. That is, it is highly likely that a cumulative increase in government debt will ultimately make it difficult to achieve financial system stability and price stability simultaneously.[9]

Furthermore, if the public strongly expects that the central bank will do its utmost to secure financial system stability when government solvency is not restored, inflationary pressures could materialise through expectations about government financing, even without present monetisation. This is because firms' pricing behaviour changes to reflect the expectation that, when a government can no longer maintain solvency, if it does not default and fiscal consolidation does not take place, the only remaining option of the three discussed earlier is inflation. Actually, concerns about a government's solvency may

8 *Sargent (1982) called the inflation experienced in these four European countries in the first half of the 1920s "the four big inflations" and explained that it was caused by government financing by central banks and that hyperinflation ended when government financing was ended and fiscal consolidation was successfully achieved.*
9 *Uribe (2006) theoretically shows a dilemma in which, when a government adopts non-Ricardian policy, it will inevitably default if the central bank tries to achieve price stability, and price stability will be undermined if the central bank acts to avoid government default. Kocherlakota (2011) also argues that it is difficult to achieve both price stability and financial system stability at the same time when government discipline is lost.*

not necessarily make the public form such a specific expectation immediately, but we should be aware of the potential risk that a cumulative increase in government debt will gradually undermine the credibility of a central bank's commitment regarding price stability.

4|2 How to interpret the persistent deflationary pressure in Japan

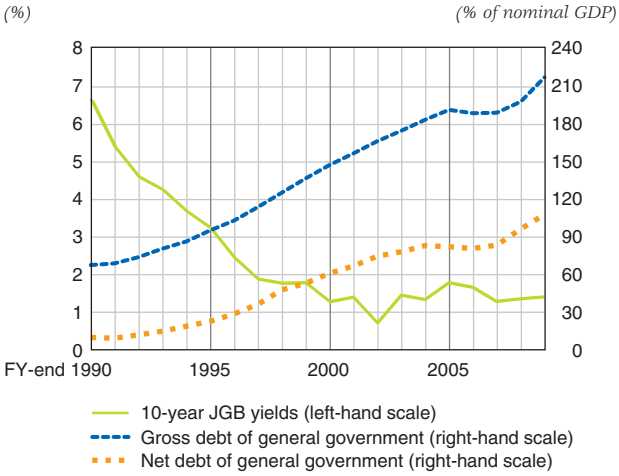
So far this paper has considered the possibility that a cumulative increase in government debt increases inflationary pressures when the public expect that the government will fail to achieve fiscal consolidation. However, even when government debt increases, if the public perceive that the economy is far from the "fiscal limit" given the large room remaining for future revenue increases and expenditure cuts, they will not form inflation expectations and inflationary pressures will not materialise. If the public expect that fiscal consolidation will be achieved not through the strengthening of growth potential but through expenditure cuts and tax increases under the constraint of limited resources, households could restrain their spending, which will result in deflationary pressures.

There is a possibility that such a mechanism has been working in Japan in recent years. In Japan fiscal deficits have continued for nearly two decades since the bubble burst, and the ratio of gross government debt outstanding to GDP is now the highest among advanced economies, exceeding two hundred percent (Chart 5).[10] Nevertheless, long term government bond yields have remained stable at low levels and inflation has not taken place. This phenomenon can be explained from two angles: the public's expectations about growth and about fiscal consolidation.

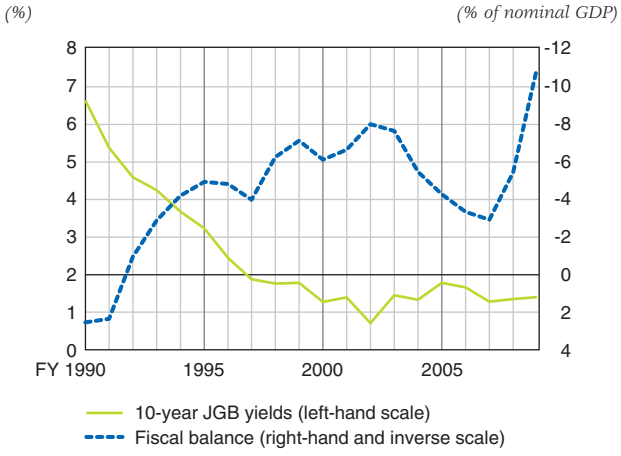
- First, Japan's growth rate of real GDP per capita has declined from around four percent in the 1980s to around one percent in recent years against a backdrop of rapid population aging and stagnant productivity growth (Chart 6). It is highly likely that such a decline in growth rates, together with private agents' expectation that population aging will intensify in the coming decades, has lowered medium to long-term growth expectations. Although a decline in potential growth itself depresses supply capacity, a decrease in growth expectations reduces the permanent income of households and hence their consumption. This results in a persistent shortage of aggregate demand, which causes deflationary pressures. Such a view is consistent with the fact

Chart 5
10-year Japanese government bond yields and fiscal conditions

10-year JGB yields and government debt



10-year JGB yields and fiscal balance

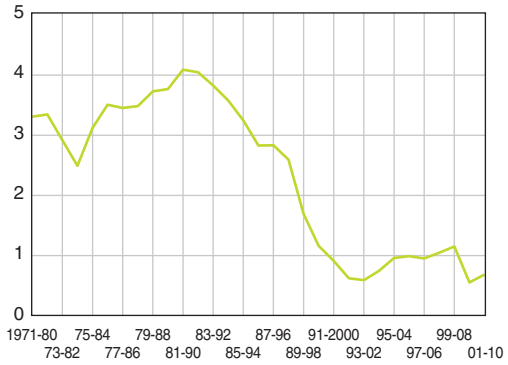


Note: Figures for 10-year JGB yields are on a fiscal year-end basis (FY-end). The general government consists of the central government, local governments and social security funds. Figures for fiscal balance are estimated by the Research and Statistics Department, Bank of Japan.
Sources: Bank of Japan; Cabinet Office, "National accounts"; Bloomberg.

10 The ratio of net government debt to GDP was 107.3 percent as of the end of fiscal year 2009.

Chart 6
10-year average growth rate of real GDP per capita in Japan

(year on year change, %)



Sources: Cabinet Office, "National accounts"; United Nations, "World population prospects: the 2010 revision".

that, in Japan, medium to long-term inflation expectations have been on a declining trend together with a slowdown in growth rates of potential GDP per capita (Chart 7).

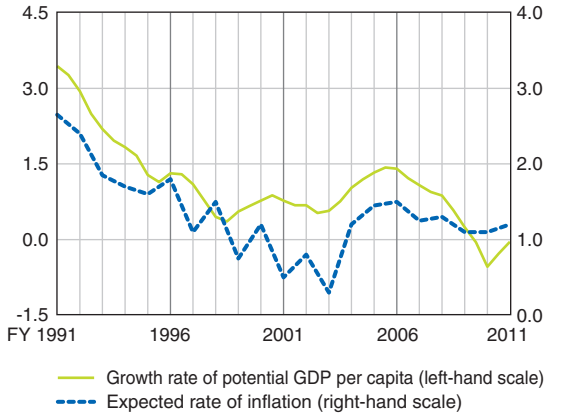
• Second, given the lower ratio of taxation and social security burdens to the national income in Japan than in other advanced economies, the public may perceive that there is room remaining for future structural reforms for fiscal consolidation. In addition, the size of the fiscal deficit has remained below the level of domestic savings and the current account balance has continued to register a surplus (Chart 8). Also, more than ninety percent of government bonds outstanding are held by domestic investors. Compared to the case where many foreign investors participate in the government bond market, a coordination failure is less likely to happen. These factors appear to have helped Japan to avoid a rise in government bond yields.

As explained above, in Japan, the public are more likely to form the expectation that "fiscal consolidation will ultimately take place" because of the distance to the fiscal limit and the structure of government bond ownership. At the same time, for that very reason, a cumulative increase in government debt, unless it is accompanied by the strengthening of growth potential, is likely to induce private economic entities to restrain their spending to prepare for future tax increases and a reduction in pensions.

To sum up, a cumulative increase in government debt may result in either inflationary pressures or deflationary pressures, depending on the public's expectations about how it will be dealt with. Therefore, in order to secure price stability in the medium to long term, it is necessary to ensure the sustainability of government debt, not to mention the independence of the central bank and its capability to provide accurate economic assessment.

Chart 7
Potential growth rate and expected rate of inflation over the medium to long term in Japan

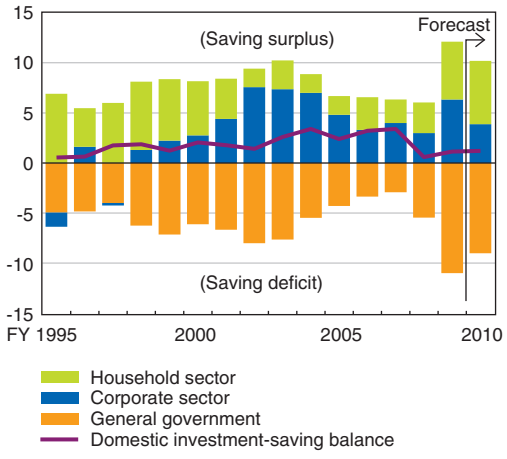
(year on year change, %) *(year on year change, %)*



Notes: 1 Figures for potential growth rate are semiannual. The potential GDP growth rate is estimated by the Research and Statistics Department, Bank of Japan.
2 The expected rate of inflation denotes the average of April and October survey results about Japan's CPI inflation forecast six to ten years ahead, published by Consensus Economics Inc.
Sources: Bank of Japan; Consensus Economics Inc., "Consensus forecasts"; Ministry of Internal Affairs and Communications "Population estimates"; OECD.

Chart 8
Japan's investment-saving balance

(% of nominal GDP)



Note: Figures for general government are estimated by the Research and Statistics Department, Bank of Japan.
Sources: Bank of Japan; Cabinet Office, "National accounts", "Economic and fiscal projections for medium to long term analysis".

5| Conclusion

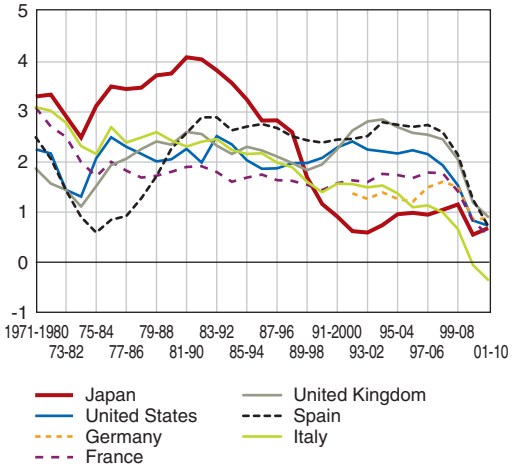
The cumulative increase in government debt in the developed world in recent years has been largely caused by a decline in the growth trend brought about by the bursting of bubbles and population aging. In fact, in many developed countries, per capita GDP growth rates have been declining, and it is difficult to think that this fact and the cumulative increase in government debt are unrelated (Chart 9). A decline in the growth trend causes a cumulative increase in government debt because there tends to be a lag before the authorities recognise such a change in the growth trend. It is also painful to reform an already established fiscal structure based on high growth to one consistent with a low-growth economy. According to a recent empirical analysis, there is a possibility that the amount of outstanding government debt relative to GDP may push down the economic growth rate once a certain threshold is exceeded.[11] In other words, there might be a negative feedback loop between a cumulative increase in government debt and a decline in growth rates, and if this is the case, it will not be easy to stop the cumulative increase in government debt. However, given that it is not possible to increase government debt *ad infinitum*, the negative feedback loop will eventually cause problems.

The most typical way such problems materialise is that concern about a government bond default creates financial system instability. If there are no good prospects for restoring government solvency through fiscal consolidation, it becomes difficult to achieve financial system stability and price stability at the same time. Moreover, if such difficulty is expected in advance, inflationary pressures may heighten during the process of a cumulative increase in government debt. Conversely, concern about future tax increases may cause deflationary pressures when growth expectations are weak. Standard economic theories indicate that price stability can be achieved if independent central banks conduct appropriate monetary policy. However, given the various issues discussed so far, even if the independence of a central bank and its capability to provide accurate economic assessment are secured, a cumulative increase in government debt may increasingly threaten price stability in the medium to long term.

As such, a cumulative increase in government debt could cause a significant disturbance to macroeconomic stability in the medium to long term, but warnings about the sustainability of government debt may not be signaled until the financial system is on the verge of a crisis. In Europe, during the period from the introduction of the euro until the current problems emerged, long-term yields of government bonds issued by peripheral countries stayed at low levels approaching those for German government bonds (Chart 10). However, once market confidence regarding fiscal sustainability was undermined, yields

Chart 9
10-year average growth rates of real GDP per capita in advanced countries

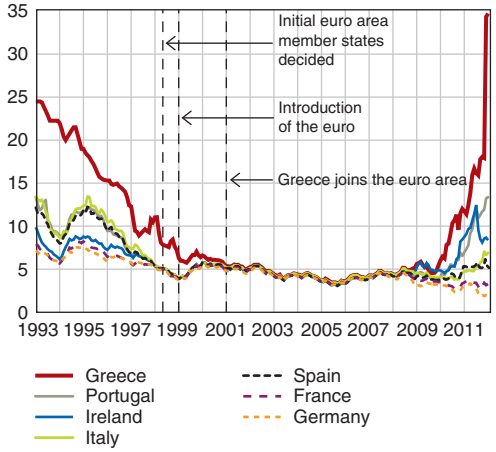
(year on year change, %)



Sources: United Nations, "World population prospects: the 2010 revision", etc.

Chart 10
10-year government bond yields in Europe

(monthly average, %)



Note: Figures for Ireland are 9-year government bond yields from December 2011 onward.
Sources: IMF; Bloomberg.

11 *See Reinhart and Rogoff (2010) and Cecchetti* et al. *(2011) for details.*

of these government bonds rose in a discontinuous way. Given the possibility that it is too late to take the appropriate measures once the market has started to press for them, it is necessary to stop a cumulative increase in government debt at as early a stage as possible. More specifically, it is indispensable to make steady progress in reforms on both the revenue and expenditure fronts and to strengthen growth potential to generate tax revenues.

Monetary policy conducted with a high degree of independence and transparency has become the global standard over the past two decades, and central banks had established a relatively good track record in the period until 2007. Their independence and transparency, however, are *necessary* – not *sufficient* – conditions for achieving price stability together with financial system stability. Putting an end to the cumulative increase in government debt, and thereby restoring unwavering confidence in fiscal sustainability while strengthening growth potential, is the most pressing issue currently facing many advanced economies in the conduct of their macroeconomic policy.

References

Bagehot (W.) (1873)
Lombard street: a description of the money market, London, H. S. King.

Cecchetti (S. G.), Mohanty (M. S.) and Zampolli (F.) (2011)
"The real effects of debt", prepared for the "Achieving maximum long-run growth", symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming.

Freixas (X.), Parigi (B. M.) and Rochet (J-C.) (2000)
"Systemic risk, interbank relations, and liquidity provision by the central bank", *Journal of Money, Credit and Banking*, Vol. 32, No. 3, pp. 611-638.

Hannoun (H.) (2011)
"Sovereign risk in bank regulation and supervision: where do we stand?", Speech at the Financial Stability Institute High-Level Meeting, Abu Dhabi, UAE.

Kocherlakota (N.) (2011)
"Central bank independence and sovereign default", Remarks at the Sovereign Debt Seminar, Chicago, Illinois.

Reinhart (C. M.), Kirkegaard (J. F.) and Sbrancia (M. B.) (2011)
"Financial repression redux", *IMF Finance & Development* 48, No. 1, pp. 22-26.

Reinhart (C. M.) and Rogoff (K. S.) (2010)
"Growth in a time of debt", *American Economic Review: Papers & Proceedings* 100, No. 2, pp. 573-578.

Sargent (T. J.) (1982)
"The ends of four big inflations", in Robert E. Hall (ed.) *Inflation: causes and effects*, University of Chicago Press: pp. 41-97.

Sargent (T. J.) and Wallace (N.) (1981)
"Some unpleasant monetarist arithmetic", *Federal Reserve Bank of Minneapolis Quarterly Review*, pp. 1-17.

Uribe (M.) (2006)
"A fiscal theory of sovereign risk", *Journal of Monetary Economics* 53, No. 8, pp. 1857-1875.

Regional and international dimensions

The importance of confidence in macroeconomic stabilisation efforts

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The intensification of the fiscal and financial problems in advanced economies, mainly in Europe, has deteriorated the prospects for global economic activity. In order to break the adverse feedback loop between the low economic growth, the fiscal crisis and the financial fragility, restoring confidence among economic agents is key. To this end it is crucial to adopt credible and comprehensive measures to consolidate fiscal accounts, to recapitalise troubled financial institutions and to repair private agents' financial positions. The recent agreements reached by European authorities move in this direction, but additional measures might be needed, which may require a greater participation of the International Monetary Fund. Latin America is a region that for decades suffered from recurring financial crisis that brought about hovering economic, political and social costs. The region learned its lesson and this time around has been able to sail through this period of world financial turbulence relatively unscratched. I claim that there are useful lessons that Europe could learn from Latin America´s experience in dealing with crises and setting the ground to avoid recurrences.

NB: The arguments presented here are solely the responsibility of the author. He is grateful to Ana María Aguilar for her comments.

During the last four years, the financial crisis, which started in advanced economies and then spread to the rest of the world, has captured the attention of policymakers and market participants around the globe. Given the magnitude and severity of the crisis and its adverse impact on economic activity, it has been characterised as the worst financial crisis since the Great Depression. Unfortunately, the world economy has not been able to pull out of it and authorities' capacity to use traditional policy instruments to support economic activity has diminished over time.

In this context, during the second half of 2011 two unprecedented events led to a period of heightened uncertainty in financial markets and significantly deteriorated global economic prospects: first, the downgrade of the US sovereign debt by one credit rating agency in early August, and second, the worsening of the sovereign debt crisis in Europe, followed by the increasing risk of contagion across markets and countries. These events, along with authorities' inability to implement credible policies to address the fiscal and financial problems in advanced economies, led to a significant deterioration in confidence among economic agents.

Therefore, the perceived risk of a catastrophic event, such as a sovereign default episode in Europe with great disruptions in financial markets and economic activity, sharply increased. This situation has led firms in advanced economies to postpone or even cancel investment projects and households to further reduce consumption expenditures. Under these circumstances, the absence of confidence has contributed to decreasing the growth prospects for most advanced countries. In turn, weak economic dynamism has further deteriorated fiscal positions and financial conditions, leading to an even worse situation, generating an adverse feedback loop. Moreover, given increased trade and financial linkages across countries there is no decoupling between advanced and emerging economies.

Under this scenario, in order to break the adverse feedback loop between the deterioration of economic activity and the fiscal and financial conditions, it is crucial mostly for European authorities to implement policy actions aimed at restoring confidence among economic agents. In particular, it is necessary to adopt credible measures in order to consolidate fiscal accounts, to assure the sustainability of public debt levels, to recapitalise troubled financial institutions and to facilitate the deleveraging of private agents' financial positions. This would generate a virtuous circle, where firms would be more willing to invest, households would increase their spending, and investors would renew their interest in European sovereign debt and bank issued debt, leading to stability and a rebound in economic activity. In turn, a strong economic recovery would further strengthen fiscal positions and improve financial conditions, reinforcing confidence among market participants. The real issue is how we can transit from a vicious cycle in expectations to a virtuous one.

For decades, Latin America suffered from recurring financial crises that brought about hovering economic, political and, above all, huge social costs. These recurring crises have proven to be devastating for affected nations. Recurrence undermines the hopes of generations, causing discouragement and, if the basic solutions are postponed or applied only partially, the end result is a downward spiral of mistrust and confusion. A hesitant attitude increases the costs related to adjustment, often exponentially. Over the years many Latin American countries have come to understand that the recurrence of financial crises has its roots in the fact that the governments tried to avoid the costs of having adopted fundamental solutions at critical times.

Financial crises usually involve fiscal dislocations, restrictions on bank lending and/or imbalances in the balance of payments, all of which reflect, in one way or another, an overspending in the economy financed in an unhealthy way. The measures to solve the crisis will definitely imply generating a new balance between spending and financing, which indeed means reducing both. The unavoidable remedial measures in the short term can deepen the impact of the crisis over economic activity, unemployment and poverty, but these costs tend to be much higher if the adjustment measures are postponed or adopted only partially. This is a fact for countries in crisis.

Political costs originated by the financial crises usually result from the fact that state intervention is required to protect the integrity of the financial system, and in particular the savings of the population, and to avoid condemning a country to a chronic economic recession of larger magnitude than the one currently being experienced. State intervention tends to increase the public debt with nothing to show in return, at least in the immediate term. That is, the increase in public

debt generated by bailouts of the financial system does not produce tangible benefits for the public, such as schools, roads or hospitals. This is why adjustment measures in such circumstances, especially tax increases, irritate so much society. Unemployment and poverty tend to rise. As I said before, this huge political cost lies in the fact that governments, despite truly knowing that such measures are unpopular, have to implement them because their duty is to look after the country's welfare in the medium and long term. Under such conditions, society usually polarises and people frequently blame the medicine of the evils that were indeed caused by the original disease. Such a political environment further complicates making decisions that are painful but necessary.

Socially, the costs of dealing with this type of financial crises are even more overwhelming and painful: unemployment, poverty, lesser assistance programmes. In short, social safety nets are stressed as the result of the financial crisis, a phenomenon that affects most severely the most vulnerable population groups.

Precisely because of the huge costs involved it is necessary for all countries to devote themselves immediately to resolve the crisis and lay solid foundations to prevent new crises from taking place. This latter has been crucial in the case of countries such as Mexico. Having laid the foundations for the past 15 years to offset the crises is what has allowed it to grow in a stable financial environment, despite the magnitude and intensity of the external shocks that has faced, as those that have extended and gone into global markets from 2008 to date.

Mexico and other Latin American countries not only overcame that stage of great economic and financial vulnerability during the seventies, eighties and part of the nineties, but also focused on creating institutional arrangements capable of preventing and avoiding the reemergence of those crises.

These arrangements serve to the imperious need to maintain both sound public finances and the prudence and autonomy that must guide monetary policy, as well as the proper regulation and supervision of financial institutions and markets, all of this accompanied by the proper structural reforms that gradually help boost economic growth on solid foundations.

Every financial crisis is particularly different; however, there are certain stylised facts inherent to each one that can help us identify some elements that are part of the resolution of most crises. Let me turn to the presentation of those lessons drawn from the Latin American crises, as they can represent guidelines which can be extremely useful for solving the current crisis in Europe.

1| Stylised facts of the resolution of financial crises

• First, during financial crises, expectations must be stabilised as soon as possible. In other words: the immediate goal should be to move from a vicious to a virtuous cycle in expectations in financial markets. For example: buying now medium-term debt of a country in crisis at rates of 7-8 percent can be very unattractive, but it can be quite the opposite if the country puts forward a credible adjustment programme. If the country proceeds in this way, destabilising expectations might disappear rapidly, thereby inducing significant reductions in interest rates.

Lower interest rates stimulates GDP growth, which in turn facilitates the stabilisation process by increasing tax collection and payment capacity of debtors, and consequently reducing the social and political costs inherent to the adjustment. By improving the fundamentals of the economy, expectations keep improving, thus strengthening the virtuous circle.

• Second, building on the above, in order to adjust expectations the necessary measures must be adopted in a credible way. The perception of markets and society must be that the effort is not only serious but that it will be enough to reverse the situation. I return to the example of interest rates on sovereign debts which, in view of a credible adjustment programme that provides certainty in the results, are transformed from being insufficient to being very attractive for investors. In order to achieve this it is essential to:

– rely on an intellectually honest diagnosis;

– respond quickly and decisively;

– be aware – and know how to convey this conviction to society – that the stabilising measures are inevitable;

– assure that we do not fall short on the adjustment, as it would seriously damage its credibility and, consequently, the costs would grow exponentially.

• Third, once a country is immersed in a crisis, governments often lack the necessary credibility, thus making it imperative to "import" such credibility. At the beginning of a crisis, it would be very difficult for the government in charge to have the credibility needed to make a strong economic adjustment if it failed to prevent the crisis when it had the opportunity to do so. How can this be achieved in the short term without changing the government? The answer lies in mobilising the external financial support and accepting that this support be subject to conditionality. Credibility indeed increases directly according to the amount of financial support, which is recommended to be plentiful, and to the quality of conditionality, which normally consists of corrective measures the country must adopt in any case. Credibility would continue to increase to the extent that the adjustment programme is implemented in a timely fashion.

It is for this need to import credibility that it would be useful at this time to strengthen international and multilateral cooperation bodies, such as the International Monetary Fund (IMF), and that currently being built by Europe, for the time being represented by the European Financial Stability Fund.

• Fourth, in full consistency with the adjustment effort and with external support, it is very important to implement various programmes to mitigate, to the extent possible, the social consequences of adjustment. These programmes should seek to maintain a basic support network, for instance in health and education, focusing specifically on the most vulnerable and poorly equipped population to withstand shocks and adjustments. Consistency and transparency in these mitigation programmes are crucial because nothing causes more damage to the credibility of the adjustment process that the perception that privileges prevail or that there is an unjustified, evident abuse of the benefits that society pays with great sacrifice.

• Fifth, an adjustment programme without subsequent economic growth is ephemeral, especially if the country is not able to do a correction in the exchange rate regime. Therefore, the adjustment programme should be accompanied by structural reforms that generate rapid advances in productivity and foster a more rapid recovery of competitiveness.

Certainly, these general principles are applicable to Europe today. They are principles stemming from experience, which work even though each crisis has its own singularities and the political and social environment is different in each country. Indeed, one could say that swift, forceful and rapid measures by Europe are urgent, given the great importance of the region in the global economy.

2| How to avoid recurrent crisis

A financial crisis involving fiscal imbalances, debt overhangs, the need to bail out financial institutions, and which require non-conventional monetary policies to help the stabilisation process, generate long-lasting weaknesses in the economy. In addition, the remedial measures deepen the adjustment costs in the short term, which, together with the political weaknesses that a crisis produce, tend to diminish through time the determination of governments and the tolerance of society to go all the way to bring the nation to a sustainable path. Given this, it is not surprising that many countries fall into a pattern of recurrent crisis, which further deteriorate its economic, political and social fabric. This is what happened in Latin America in the seventies, eighties and part of the nineties, as nine countries experienced three crisis episodes each in such periods. During the last fifteen years the region has managed to break the pattern, and to a large extent has established the basis for sustainable recovery and for a resilient economic structure.

Let me illustrate this, by considering the type of measures that Mexico has undertaken in recent years to break the harmful tendency of recurring financial crises that suffered in the past.

• Reassuring markets and society that fiscal discipline will be maintained. Mexico has been more than five years under a Fiscal Responsibility Law, which requires balanced budgets under normal circumstances. As a result Mexico has had very low fiscal deficits in recent years, keeping the ratio of public debt to GDP at levels just above 30%, a third of the ratio observed now in most advanced countries.

• Maintaining an active and prudent management of the public debt. Together with fiscal discipline,

public debt must be managed in a way to optimise maturities and costs. In particular, it is essential to avoid a concentration of maturities, imbalances between domestic and foreign debt, and encourage that sovereign debt instruments are held in steady hands. In this area, Mexico has adopted the best practices and is leader among many advanced and emerging countries. Today the average duration of Mexico's public internal debt is longer than that of the United States, something unimaginable a decade ago.

• Having full central bank independence in conducting a monetary policy geared to achieving an inflation objective. The autonomy of Banco de México is well established, and has allowed us to get inflation below 4 percent, among the lowest in emerging countries. In addition, financial stability has prevented Banco de México from engaging in quasi-fiscal support operations.

• Having a flexible exchange rate, with a well-developed foreign exchange market. For a very open and relatively small economy as the Mexican, exchange rate flexibility is very important to absorb external shocks. The Mexican peso is one of the three emerging countries' currencies most traded, and Mexico has the most liquid foreign exchange market in Latin America.

• Maintaining an adequate level of international reserves. Through mechanisms designed to preserve a consistent floating regime, Banco de México has built up reserves to cover twice the external public debt and the entire foreign debt of the country, without considering the flexible credit line it contracted with the IMF.

• Avoiding protectionist measures, which at best provide ephemeral relief and certainly produce perverse incentives that do not favor the country's competitiveness. In recent years Mexico not only has not adopted protectionist measures, but has also accelerated the opening of the economy.

• Ensuring adequate supervision and financial regulation. Mexico learned its lesson after the 1994-1995 crisis and over the years the authorities have implemented a strict system of financial regulation and supervision. Mexico will be among the first countries to fully embrace later this year the new international standards embodied in Basel III.

3| The role of the IMF

In light of the magnitude of the fiscal and financial problems in advanced economies, mainly in Europe, and the interconnections across markets and financial institutions around the world, there is an increasing risk of contagion inside the euro area and from the euro area to other regions. In this setting, resolving the crisis in advanced economies and preventing it from spreading to the rest of the world requires a high degree of coordination among all the countries involved. However, authorities usually focus on domestic issues when designing and implementing policies, without taking into account all the possible implications for other economies. In this context, the role of multilateral institutions, particularly the IMF, is crucial in promoting the needed coordination and cooperation among authorities from different countries.

Moreover, given the magnitude and gravity of the current difficulties in Europe, it is also essential to use all the available resources to combat them and to prevent the materialisation of a risk tail event. With respect to this point, the IMF is a multilateral institution created precisely to contribute to the resolution of crises. However, the intensification of the sovereign debt crisis in Europe during the second half of the year and the associated increase in uncertainty among investors, suggest that we may have not made the most of the IMF's potential to address the current financial crisis. In this context, it is important to strengthen the role of the IMF in the crisis resolution process.

In particular, the IMF can actively participate on two fronts. First, the design of the policy response to the crisis, along with a strict surveillance and supervision of members' policies. Second, the IMF can also contribute to improve confidence and credibility mainly through the conditionality of financial support. Namely, it can act as a credibility enhancer, which would help break the adverse feedback between the real economy and financial conditions, paving the way for a solid economic recovery. Unfortunately, these issues have not been fully incorporated into the policy discussion and, consequently, are not yet an important part of the menu of solutions proposed for the euro area.

Nevertheless, even if a greater role is assigned to the IMF in the resolution of the fiscal and financial

difficulties in Europe, there are two issues that have to be addressed in order to strengthen the IMF ability to deal with these problems.

First, IMF resources depend on quota subscriptions and its capacity from the New and General Arrangements to borrow. Thus, given the magnitude of the current problems in advanced economies, it may be the case that IMF resources could be insufficient if many countries need financial support simultaneously. Under these circumstances, this is the right moment to further strengthen the IMF's financial position by an additional quota increase.

Second, for the IMF policy recommendations to be entirely accepted and followed by its members, it is necessary to further enhance the legitimacy of this multilateral institution, which may require a new governing structure. In this sense, it may also be the right time for reforming IMF governance, increasing the voice and representation of emerging market economies in accordance to the increasing importance of these countries within the global economy.

4| Concluding remarks

By sharing these ideas born from experience, the ultimate objective is to convey a message of optimism and hope: the problems many European countries are facing today have a solution, if they act decisively on time. If this is done, sooner rather than later we will see a promising future in the global economy. No one wants the crisis from dragging on indefinitely, or that every time expectations of solution emerge they are quickly refuted by new shocks or setbacks. In order to reach as soon as possible a definite solution, the countries must first take strong, painful but necessary actions, as indeed they have been doing in many cases, and second, the international community must join these efforts, support them, and thereby facilitate the solution.

It is this spirit of collaboration and cooperation in solving global problems that Mexico wants to build and consolidate during its period of leadership in G20. These are no times to be enclosed behind borders, waiting illusory for the end of the storm. It is a time for collaboration and cooperation, for free trade, and for enhancing globalisation.

An essential condition for sustainable economic growth in advanced economies, mainly in the United States and the euro area, is the recovery of confidence. Therefore, these economies should invest their energy and political capital in pursuing macroeconomic stabilisation in the short run through well designed and decisive measures. To the extent that confidence among economic agents is reestablished the negative feedback loop between the low economic growth, the deterioration of fiscal accounts, and the fragility of banking systems, will be broken.

In this context, the agreements that authorities have recently reached move in the right direction. Unfortunately, in light of the complexity of the problems in Europe they may not be sufficient and additional efforts are needed, which may require a greater involvement of the IMF. In particular, given the interconnections among economies and the high risk of contagion, multilateral institutions should play an important role in this process. Furthermore, emerging market economies, Mexico included, should also focus on preserving an environment of confidence in order to increase their resilience to adverse external shocks.

Policies on sovereign debt

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This paper seeks to convey four main messages.

Because sovereign debt in advanced countries has reached unprecedented levels, there is more uncertainty than before on its future dynamics, and its impact on growth. As with any debt, it also creates the potential for increased financial fragility.

However, uncertainty does not translate into unsustainability. A "yes or no" approach to the question of sustainability will only lead to misapprehension and mistakes. In most cases, sustainability is fully endogenous to the set of policies implemented by governments themselves.

Policy frameworks, therefore, are even more important than before to anchor expectations and ensure financial and monetary stability. There should be no doubt or ambiguity about the willingness of the governments of advanced countries to pay their debts. And nor should there be any ambiguity on the preservation of monetary policies aimed at price stability. Clarity of purpose is especially important when central banks are still implementing exceptional non-standard measures and taking broader responsibility for financial stability.

Finally, there is an international dimension to public debt sustainability. Improving the international financial architecture will help the world reach a high growth equilibrium despite asymmetries in public debt levels and financial development. This should be a major priority on the international agenda.

NB: *The author wishes to aknowledge the support of the Julis-Rabinowitz Center for Public Policy and Finance, Woodrow Wilson School, Princeton University, where he was Visiting Professor when writing this paper.*

Sovereign debt is the most pressing and difficult policy challenge confronting advanced economies. According to the OECD it will, in total, exceed 100% of their combined GDP in 2011, a level that has never before been reached in peacetime.

Debt is a legacy of the past and, somehow, it prevents us from thinking positively about the future. High levels of debt have a corrosive effect on the social fabric of our societies. Debt fuels anxiety and erodes confidence. Debt also amplifies existing concerns on fairness and income distribution. Political compromises on fiscal adjustments become more difficult to reach and, overall, the willingness to repay debts diminishes as the sums accumulate.

In this environment, the challenge is twofold. Politically, our societies must learn to live with debt while looking optimistically to the future and maintaining a sense of progress. Economically, advanced economies have to define a sustainable path for public debt, which keeps it under control while preserving growth and avoiding disruptive episodes of financial instability. Because there is no precedent, history can only give partial guidance. This paper presents a number of ideas, starting with basic analytics and moving to more debatable and controversial issues and reflections. All the views expressed here are, of course, personal.

1| The functions of sovereign debt

The primary function of sovereign debt is to help finance the Government. Public budgets do not always balance, and nor should they. It makes sense to let the budget fluctuate with the economic cycle as part of the so-called automatic stabiliser effect. This introduces a cyclical element into the dynamics of public debt, which ultimately cancels out. When the budget is structurally balanced, the nominal amount of debt does not change over the cycle and the debt/GDP ratio decreases over time. For the euro area, the structural balance rule is enshrined in the new Treaty. This Treaty provides an effective anchor for a steady reduction in debt/GDP ratios over the long run and represents a firm assurance for market participants as to the sustainability of euro area debt.

Debt may also exhibit an increasing trend beyond the cycle, as it has done over the last decade, with most advanced countries running structural deficits. There may be good or bad reasons. Both on grounds of efficiency and fairness, it is justified to make future generations pay for the infrastructures, knowledge, and technologies they will inherit from current generations. However, it is not justified, as many countries have done, to postpone paying for current public consumption or build up claims on future output because health and pension commitments are unfunded.

A second function of sovereign debt is to serve as a store of value. Government bonds are backed by the power to tax and therefore, uniquely placed to park and transfer wealth from one period (or one generation) to another. They fulfill an essential function as the ultimate riskless asset. Also, the debt markets of advanced economies are the most liquid in the world and, for the short end of the curve, Treasury bills act as very close substitutes to money. Only the government bonds of advanced economies jointly possess these two characteristics of safety and liquidity.

Such safe and liquid assets are absolutely necessary in a modern economy. They serve as benchmarks and references for pricing and valuing financial instruments. All financial systems depend on the existence of a riskless asset as a pillar on which all asset pricing can be built, including the derivatives market. Without a risk-free rate, things are much more complicated.

Third, there is a very strong demand for such assets. They are used as collateral for private transactions between financial intermediaries. They serve as the primary support for monetary policy operations in many countries. In times of uncertainty and financial stress, they provide the ultimate safe haven. And, lastly, most foreign exchange reserves are held in the form of government bonds (or equivalent securities such as, in the United States, the so-called Government Sponsored Agencies securities).

From a financial stability perspective, the supply of government bonds has, therefore, deep implications, long recognised by the literature. Turner (2011) mentions the necessity of "official accommodation of private liquidity preference", quoting Keynes' recommendation that debt issuance "should accommodate the preferences of the public for different maturities". Such preferences are shifting

and, therefore, the Government should be prepared to issue short-term, highly liquid paper in amounts sufficient to meet any private demand. Government bonds are the main, if not sole, source of "outside liquidity", which is absolutely necessary if a shock to aggregate liquidity demand occurs (Tirole 2008). In the absence of an adequate supply, liquidity shortages may lead to disruptions in financial intermediation, a fall in asset prices and a decrease in effective demand for goods.

The supply of adequate liquidity instruments is also essential for the international monetary and financial system.

According to the «asset shortage» theory (Caballero, 2006), the world suffers from a relative scarcity of financial assets that are both liquid and risk-free. And there is a strong and permanent asymmetry in the ability of different countries to create and manufacture them. Global imbalances may be partially explained by the unique ability of some countries, essentially the United States, to provide a sufficient supply of such assets. Those countries act as magnets for capital inflows.

The search for safe "parking spaces" may lead to an unrestricted demand for assets whose value is perceived as protected, hence fueling bubbles and creating financial fragility. Accordingly, the financial crisis is interpreted as resulting from misguided attempts to manufacture such riskless assets through the process of securitisation.

If that view is correct, the world may be facing a dilemma in the future. On the one hand, economic uncertainty in advanced countries and excess savings in emerging economies are increasing the demand for safe and liquid assets. On the other, higher debt levels create doubts about the solvency of sovereigns in some advanced economies. Fiscal consolidation will further restrict the net supply of such assets. This is very reminiscent of the Triffin dilemma which affected the supply of dollars in the 1960s through the US balance of payment deficits. In our contemporary world, we face a Triffin dilemma on sovereign debt, as identified by Obstfeld (2011) regarding foreign exchange reserves: "How will the demand for reserves be satisfied if the richer countries actually succeed in the fiscal consolidation to which they currently aspire?". To meet demand, Governments have to issue additional amounts of debt, but in so doing, they undermine the riskless character which makes them an effective store of value. The latter part of this paper examines this paradox in more detail and offers some tentative solutions.

2| Debt sustainability and financial stability

With debt reaching unprecedented levels, questions about sustainability have dominated the policy debate. In the recent past, much attention has been focused on the situation in Greece and various other Euro area countries. But other countries are also engaged in vigorous internal discussions about their future fiscal prospects.

Any reader of economic or market literature cannot help but notice an almost universal tendency of analysts to look for clear, binary answers to the question of sustainability. Either debt is sustainable or it is not; and, in the latter case, the sooner recognition takes place (through default or restructuring) the better. Uncertainty almost never enters the picture.

Reality, of course, is more complex, and three points are worth making:

- Almost any debt is fully sustainable in certain "states of the world" and unsustainable in others. The standard approach for assessing sustainability compares the level of debt with the discounted value of primary surpluses over an infinite horizon. This calculation involves many parameters, all of them subject to a good degree of uncertainty.

- Projecting that uncertainty in a complex financial environment may give rise to different financial market dynamics, with possible multiple equilibria, some of them conducive to financial stability and sustainability, others more disruptive.

- Sustainability, therefore, is largely endogenous to the set of policies implemented by the authorities. Obviously, the credibility of fiscal consolidation is crucial when debt is high. Other policies, however, such as the legal treatment of debt and the willingness to repay will determine how the fundamentals of debt interact with financial markets to produce – or not – a sustainable and stable equilibrium.

According to standard analysis, debt dynamics can easily be described by a formula where the outstanding stock moves according to three parameters: the primary fiscal balance, the real growth rate and the real interest rate. This apparent simplicity can be misleading as it masks a very complex reality.

First, getting an idea of the underlying primary balance is not easy. In the past, tax elasticities have been seriously underestimated in many countries. The temporary boost to tax revenues during bubble periods has been treated as structural, opening the way to an equivalent increase in permanent expenditures. Contrary to public perceptions, the main fiscal slippages in advanced economies occurred prior to the crisis, not in reaction to it. Most countries entered the crisis with a structurally deteriorated fiscal balance, the true extent of which was only revealed when revenues collapsed. This is well documented by the IMF. Such mistakes can be avoided in the future by creating strong fiscal rules and sound institutional frameworks to obtain neutral assessments of the fiscal stance. These assessments should include implicit liabilities linked to future pension and health expenditure commitments.

Deeper questions must be asked when looking at the second parameter: potential growth. Debt dynamics are especially sensitive to growth assumptions. The impact of the crisis on future potential GDP and its evolution is highly uncertain. Public debate today is strongly influenced by the work of Reinhart and Rogoff (2008). Looking at a vast array of historical data, their study suggests that there may be non-linear effects of public debt on growth, with adverse output effects tending to rise as the debt/GDP ratio approaches the 100% threshold. This is a crucial contribution and it is rightly seen as a warning signal against "business as usual" fiscal policies. However, its utility in the future remains to be proven. To what extent should the historical references used serve as benchmarks for today's policies? According to the IMF, stabilising debt-to-GDP ratios at their current level for the group of advanced economies would involve an improvement in their primary balance (cyclically adjusted) by approximately 6% of GDP.

The third parameter, interest rates, raises even more complex and interesting questions.

Interest paid on sovereign debt is determined by market forces. The crisis has raised many questions about the efficiency of financial markets. And those questions apply to government bond markets themselves. Risk premia were obviously too low for a long period before the crisis. Markets failed to discipline spendthrift governments.[1] Conversely, over-reaction does occur from time to time, with adverse implications for countries' borrowing costs and debt dynamics.

There is a substantial endogeneity in the way markets assess sovereign risk. The perception of insolvency can create insolvency, because it leads to unsustainable interest rate levels. Ultimately, sustainability depends on beliefs and a debt crisis – whether private or public – is basically a discontinuous shift in beliefs.

The normal regime for a sovereign in advanced economies is when there is no credit risk attached to public debt. That was the situation prevailing for all advanced economies prior to the recent crisis. If and when sovereign debt is perceived as risky, then liquidity may dry up, adding further to risk premia and fueling increasing doubts about sustainability.

The conjunction of credit and liquidity risk creates powerful feedback loops and the possibility of multiple equilibria. In times of trouble, sovereigns, like financial institutions can be either illiquid, or insolvent, or both. In many cases, the distinction is blurred. When uncertainty is high, sovereigns face liquidity shortages, and they can only issue new debt at constantly higher interest rates. This, in turn, creates doubts about their ultimate solvency, triggering a negative spiral. In short, sovereign solvency is partly endogenous. Good fundamentals are an absolute necessity, but not always a sufficient condition. Liquidity spirals, when allowed to develop, can lock a country, just like a financial institution, into a negative equilibrium.

As Europe has experienced, two other powerful amplification mechanisms may be at work. First, "pure contagion" – when difficulties in one economy

1 *Awareness of this potential failure in market discipline was instrumental in the creation of the Growth and Stability Pact.*

lead to a reassessment of risk for other sovereigns perceived as similar or belonging to the same asset class – and, second, a strong feedback loop between sovereign and banking risks leading at the extreme, to a total market freeze.

In this environment, financial and legal infrastructures matter enormously for debt sustainability. Should, for instance, the possibility of default be explicitly acknowledged when sovereign bonds are issued? Europe has struggled with this question before deciding to incorporate collective action clauses (CACs) in all future bond issuances. Such clauses have been commonplace for bonds issued under British law for many decades. So the change may be perceived as minor by bondholders. Explicitly providing for default or restructuring has many advantages: it reduces moral hazard and makes any default orderly. It creates a better environment to price credit risk. On the other hand, it changes the structure of incentives facing the sovereign and may make default more likely.

Those incentives matter. When the burden of debt is high, default appears as a tempting option. A cursory reading of basic sustainability formulae may seem to give it a rationale. It is also attractive politically. Making lenders pay for their past mistakes (and reckless lending) is appealing. And it is easy for taxpayers to forget (excluding non-resident holders of the debt) that their savings and pension accounts are loaded with those same government bonds whose value would be impaired in the event of restructuring or default.[2] The possible contagion and consequences for financial stability can also be easily overlooked.

Ultimately, when the fundamentals of sustainability become unclear and uncertain, the perceived willingness to pay becomes the key determinant of credit risk. The decision to introduce private sector involvement (PSI) for the treatment of sovereign debt in Europe was immediately followed by a broad widening of spreads. Casting doubt publicly about countries' willingness to pay carries a high price, especially in an environment where solvency doubts create liquidity squeezes and can ultimately develop into a "run" on sovereign debt (see Shirakawa in this issue of the *Financial Stability Review*).

3| A NOTE ON SOVEREIGN RATINGS

Part of the negative feedback loop affecting sovereign debt is often attributed to ratings. The overall issue of ratings is well beyond the scope of this paper. Sovereign rating however, raises specific questions which may call for specific reforms.

Ratings are a solution to information failures and asymmetries which prevail on developed financial markets. To overcome those informational inefficiencies, investors use an agent whose function is to collect, process and disseminate information. By doing so, rating agencies contribute to market efficiency. They allow most investors to dispense with the efforts and costs of performing due diligence on their investments.

Ratings are not perfect. They oversimplify information by collapsing a whole set of variables into a single rating. They may also involve discontinuities and conflicts of interest. But these are difficulties we have to live with. There is no way to dispense with ratings in modern financial markets.

That is for private ratings. Sovereigns are different. There is no information asymmetry to deal with. Actually, it is quite the reverse: there are hundreds of institutions in the world which know more about public finances in Spain or the United Kingdom than rating agencies and have more resources to devote to examining those sovereigns. While rating agencies have an informational advantage with regard to corporates, they are at a disadvantage on sovereigns. This is, basically, why they lack legitimacy. The relative paucity of their resources makes them vulnerable to technical mistakes, undermines their credibility in economic assessment and creates suspicion as to their ultimate motivations.

An easy solution would be to use existing expertise to produce information. Central banks and governments are used to measuring consumer sentiment, inflation expectations and credit conditions. The ECB conducts a survey of professional forecasters which plays an important role in assessing the prospects for growth and inflation

2 *Ultimately government bonds are a claim by the society on itself, although with important inter-generational transfers.*

All these surveys are based on the same intellectual process: the collection and processing of information from a large number of participants to produce a synthetic and forward looking assessment.

The same methodology could be transposed to the provision of credit ratings for the 30 or 40 major sovereigns in the world. Hence a broad selection of institutions could be asked to provide anonymous quantitative assessments which would then be aggregated, filtering out the outliers, with the results published on a regular basis. The sample of institutions would be very large and include both private market participants and public institutions (all of which currently generate their own assessments and publish them separately). In addition to the "central" rating, the probability distribution could be published and various measures (disagreements, doubts) could be extracted. The costs would be minimal.

4| Debt, monetary policy and fiscal dominance

Over the last decades, all advanced (and most emerging) economies have adopted a monetary regime based on central bank independence with price stability as a central objective.

This regime relies on the ability of central banks to effectively control prices and inflation. More significantly, it relies on the perception that they will be able to do so in all circumstances. «Monetary dominance» implies that fiscal policy can always be adjusted to meet the government's inter-temporal budget constraints, whatever action the central bank may have to take.

With moderate levels of debt, there is no threat to monetary dominance: the inter-temporal budget constraint can be satisfied in all possible states of the world. When public debt reaches high levels there is more uncertainty. First, high primary surpluses are needed, which may prove difficult or even impossible to achieve. Second, any monetary tightening, in the form of higher interest rates, will aggravate the debt service burden and make it less likely that the budget constraint will be met. At very high debt levels, there is no "state of world" where the budget constraint and the objective of price stability can be satisfied simultaneously.

This scenario has long been recognised in the literature. Two broad theories are available. The first, and universally accepted, is based on the «unpleasant monetary arithmetic» by Sargent and Wallace (1981): "When the public reaches its limit and is no longer willing to hold public debt, the government would have to resort to monetisation. The result, consistent with the quantity theory of money, is inflation". (Cecchetti, 2010). The second, more controversial, is the Fiscal Theory of the Price Level (FTPL). It posits that, given the nominal debt outstanding, the price level must adjust so as to bring the real debt to a sustainable level (i.e. compatible with the budget constraint). How this is achieved, and through which mechanisms, is not perfectly clear and this is one reason, amongst others, why the theory remains highly contested.

It is not necessary to fully adhere to the analytics of FTPL to appreciate the central message common to the two approaches. Long run inconsistency between monetary and fiscal constraints will result in either inflation or sovereign default. So, if default is to be avoided, «fiscal dominance» of monetary policy becomes a real possibility. The existence of such a dilemma might be sufficient to trigger expectations of future inflation which in turn, could translate into higher inflation today.

Intuitively, such an outcome is more likely if the monetary regime is perceived to be weak. Expectations of inflation in advanced economies have remained remarkably stable and this is a testimony to the robustness of our current monetary regimes. This robustness, however, may be tested over the coming period. In all countries, central banks have been active, to various degrees, in buying significant amounts of government debt.

Analytically speaking, there are four reasons why central banks might want to purchase public bonds:

- To implement non-standard monetary policies in a Zero Lower Bound environment. Once policy rates have reached the zero level, bond purchases may contribute to further monetary stimulus by reducing risk premia and long-term interest rates.

- To compensate for a liquidity squeeze and acting as lender of last resort if markets become so dysfunctional that, for instance, the transmission mechanism of monetary policy is severely impaired. This could happen both in the public and private debt markets.

• To fight against deflation. This is a situation where private demand for goods is inhibited by expectations of further price decreases and where, inversely, demand for money may become infinite. In that case, financing public demand through deliberate money creation may appear as a solution (although there are doubts about its efficiency).

• Pure monetisation, i.e. fully succumbing to fiscal dominance and ensuring the solvency of the sovereign.

All these policy actions involve the same technical operation, i.e. the purchase of public bonds. But they have very different purposes and carry very different consequences. The outcome will ultimately depend on how economic agents interpret central banks' behaviour. Depending on the perceptions, non-standard policies based on large-scale purchases of public debt may appear as a temporary and necessary departure from normality or, on the contrary, signal a shift to a new longer-term monetary policy designed to accommodate high levels of public debt.

Central banks are unambiguous: all of them have reaffirmed their commitment to price stability, emphasising the temporary nature of their non-standard measures and they have all outlined exit strategies to be implemented when the time comes. Some of them have recently strengthened their framework and communication strategy by setting and announcing quantified inflation targets.

Sentiments and opinions expressed by market participants, analysts and economists are more diverse. Evidence suggests that confusion between the above-mentioned objectives is a real possibility.

Many would welcome central banks' active engagement in buying public debt as an insurance against default. Professor Sims puts the argument most elegantly in this issue of the FSR by arguing that (temporary) inflation provides the necessary flexibility to absorb exceptional shocks on national budgets. But this raises important time consistency issues. Once central banks have signaled that they are prepared to accept some dose of fiscal dominance, there is no guarantee that they will go back to their pre-crisis objectives regarding price stability. There is very little left to anchor inflation expectations in the long run. This is the essence of the time inconsistency problem. Flexibility may appear optimal in the short run, but has permanent costs in the longer run: in this case, most likely, the appearance of an inflation bias. I do not believe that there is right now, in most of our countries, any choice to be made between inflation and default. Fiscal dominance is not a threat, provided credible consolidation occurs and no ambiguity appears on the willingness to pay. But suppose such a trade-off were to develop; then each policy option would need to be assessed by taking full account of all its cost and benefits. The costs of default, in terms of overall welfare, should be weighed against the costs of permanently higher inflation and the loss of central bank credibility.

A similar argument is frequently made with a different presentation. It goes as follows: central banks should act as "lenders of last resort to governments" in order to prevent or attenuate liquidity squeezes on sovereign bond markets. The insurance against default does not come, here, from tolerance of higher inflation, but from acceptance of unlimited liquidity provision to the government. According to this theory, only those governments which benefit from that liquidity insurance can be considered as "full sovereigns". Others, including those, in the euro area which do not control their central bank, are considered "sub sovereigns"; they run a higher risk of default and their debt should be treated with stricter prudential requirements.

This argument is flawed. It presupposes that there is no limit to the liquidity that a "full sovereign" can draw from its central bank. If there is a limit, of course, the full sovereign is no different from the sub-sovereign: both could default as a result of a temporary lack of liquidity. But if there is no limit, then the central bank has de facto accepted full fiscal dominance. It's only a matter of time before the markets realise this and inflation expectations start creeping up. Sub-sovereigns are sometimes defined as "having the power to tax but not to issue currency". That definition implies that the power to issue currency is seen permanently as a complement or a substitute to the power to tax. This is a different policy environment from the world we have been living in for several decades.

What is really at stake is the monetary regime. It would be dangerous, for central banks, when deciding on policy actions, to ignore the high debt environment in which they will operate over the next decade and the risk that their actions could be misinterpreted as acquiescing implicitly to a shift towards fiscal dominance.

5| Debt and global imbalances

The international economic agenda is predicated today on one major objective: reducing current account imbalances, which are seen as a source of potential financial instability and a threat to future growth. This focus on current account imbalances may be misguided.

In the short run, a reduction in emerging countries' saving rates would push real interest rates higher, further complicating debt sustainability in advanced economies. That effect might well over-compensate any boost on global demand that would result from increased consumption and investment in surplus countries.

In the long run, the imbalances that count are imbalances *in stocks*. In the next decade, we will live in a world with numerous asymmetries. Two stand out. First in the area of financial development and, essentially, the ability to produce safe and risk-free assets. And second in public debt levels: 30% on average in emerging economies as compared to 100% in advanced countries. It turns out that those two asymmetries complement each other well. Provided they preserve their ability to manufacture safe assets for savers in emerging economies, advanced countries can find suitable paths to debt sustainability and growth. And emerging economies may find it convenient to park their wealth in safe assets in advanced economies.

The benefits of such arrangements could extend well beyond capital markets themselves. Many oil and commodity producers face an inter-temporal choice between extracting resources and keeping them on or under the ground. According to standard economic reasoning (the Hotelling rule), one important determinant is the return earned on financial assets, to be compared to the expected commodity price increase over the long run. Providing producers with safe stores of value would eliminate or reduce the possibility of large losses. It would make it less optimal to reduce the rate of extraction in periods of uncertainty and reduce the risk of durably lower supplies of oil and other commodities (Landau, 2009).

The long-run solution of course, is to eliminate first the asymmetries and second the stock imbalances. But it will take time. There is no real appetite in emerging economies for running high budget deficits, and stabilising debt/GDP ratios in advanced countries already looks like a significant challenge. Financial development in EMEs would imply significant changes, starting with full capital account convertibility. Acceptance of new financial instruments denominated in emerging currencies will further depend on their liquidity, a process subject to delays and discontinuities, as network effects would come into play in an unpredictable fashion. In the interim period, countries may have to bear the constraints of financial opening without getting the benefits.

So, most likely, some imbalances in current accounts are here to stay as a permanent, even necessary, feature of the world economy. Policies should internalise that "state of the world", instead of trying to change it, and they should try to make it sustainable and stable. Excess demand for safe assets will persist in the future. A major question, however, is how that demand can be met.

Credible fiscal consolidation in advanced economies is certainly a prerequisite, but only part of the solution. It would avoid "depreciating" existing debt and further shrinking the pool of available risk-free assets. But, by itself, it may not provide a sufficient supply to meet future needs. How can advanced economies fulfill that responsibility while preserving the soundness of their public finances, thus overcoming the Triffin dilemma? First, they should eliminate forever any doubt on their willingness to pay. This has deep implications on the legal structure of public debt, as well as on the workings of the political process. Both the introduction of CACs in Europe and the periodic uncertainties on raising the debt ceiling in the United States may have created additional uncertainty which should be removed. Action is needed to strengthen the legal and political infrastructures.

Simultaneously, there is room for meaningful and positive financial innovation to create new classes of risk-free assets. This may be a controversial statement to make right now: one of the causes of the financial crisis may have been misguided financial innovation aiming, precisely, at manufacturing, through complex securitisation, assets that appeared to possess risk-free characteristics, but that carried hidden tail risks, which materialised with lethal effects. This was, however, a disorderly process that was poorly supervised and inadequately monitored and whose development was distorted by skewed incentives. A different approach, promoted by public authorities themselves,

in full transparency, would be very different and use financial innovation for the public good.

Many avenues could be explored. Two could be particularly productive:

First, instruments based on real – physical or productive – assets (including land) and partially replicating their risk/return profiles. If they do not transfer ownership of those assets, they could help circumvent the political obstacles attached potentially to a substantial expansion in foreign direct investment flows from emerging to developed economies.

Second, instruments based on a diversified portfolio of sovereign risk. Most current thinking revolves around the idea of pooling and sharing sovereign risk (through Eurobonds, for example), a step which would create both strong solidarity but impose a high degree of common coordination and discipline on national fiscal policies. Political obstacles, however, are enormous and may prevent the emergence of such instruments for a very long period.

The same objective could be achieved, without such political constraints, by seeking safety and liquidity not in the sharing of risk but in the structure of the instrument itself. At the European level, one proposal is to create European safe bonds (or "ESBies") obtained by extracting a senior tranche from a diversified portfolio of Government bonds. Properly implemented, and closely managed and supervised, those instruments could provide a much needed supply of safe euro-denominated assets (as witnessed by the appetite of non-euro investors for European Financial Stability Facility – EFSF – issuances).

6| Conclusion

This paper seeks to convey four main messages.

Because sovereign debt in advanced countries has reached unprecedented levels, there is more uncertainty than before on its future dynamics, and its impact on growth. As with any debt, it also creates the potential for increased financial fragility.

However, uncertainty does not translate into unsustainability. A "yes or no" approach to the question of sustainability will only lead to misapprehension and mistakes. In most cases, sustainability is fully endogenous to the set of policies implemented by governments themselves.

Policy frameworks, therefore, are even more important than before to anchor expectations and ensure financial and monetary stability. There should be no doubt or ambiguity about the willingness of the governments of advanced countries to pay their debts. And nor should there be any ambiguity on the preservation of monetary policies aimed at price stability. Clarity of purpose is especially important when central banks are still implementing exceptional non-standard measures and taking broader responsibility for financial stability.

Finally, there is an international dimension to public debt sustainability. Improving the international financial architecture will help the world reach a high growth equilibrium despite asymmetries in public debt levels and financial development. This should be a major priority on the international agenda.

References

Brunnermeier (M.) *et al.*
"European safe bonds (ESBies): executive summary", *http://scholar.princeton.edu/markus/files/06h_esbies_exec_summary.pdf*

Caballero (R.) (2006)
"On the macroeconomics of asset shortages", *http://economics.mit.edu/files/2732*

Caballero (R.) (2010)
"A caricature model of the world economy", *Working Paper*, 10-17, November 23.

Cecchetti *et al.* (2010)
"The future of public debt: prospects and implications", *BIS Paper*, No 300, March.

Kocherlakota (N.) (2011)
"Central bank independence and sovereign default", Chicago, September 26.

Landau (J.-P.) (2009)
"Some thoughts on International Monetary Reform". Remarks at the G20 Workshop on the global economy, "Causes of the crisis: key lessons", Mumbai 24–26, May2009, *http://www.g20.org/Documents/g20_workshop_causes_of_the_crisis.pdf?bcsi_scan_7B04035E3E2807B8=1*

Obstfeld (M.) (2011)
"The International Monetary System: living with asymmetry", *NBER Working Paper*, 17641, December.

Obstfeld (M.)
"International liquidity: the fiscal dimension".

Reinhart (C.) and Rogoff (2008)
"This time is different: a panoramic view of eight centuries of financial crises", *NBER Working Paper*, No. 13882, March.

Sargent (T. J.) and Wallace (N.) (1981)
"Some unpleasant monetarist arithmetic", *Federal Reserve Bank of Minneapolis Quarterly Review*, 5(3): pp. 1-17.

Shirakawa (M.) (2012)
"Sustainability of government debt: preconditions for stability in the financial system and prices", Banque de France, *Financial Stability Review*, No. 16, April.

Sims (C. A.) (2012)
"Gaps in the institutional structure of the euro area", Banque de France, *Financial Stability Review,* No. 16, April.

Tirole (J.) (2008)
"Liquidity shortages: theoretical underpinnings", Banque de France, *Financial Stability Review*, *Special issue on liquidity*, No. 11, February.

Turner (P.) (2011)
"Fiscal dominance and the long-term interest rate", *Special Paper Financial Markets Group, Special Paper Series*, 199, LSE, May.

Hazardous tango: sovereign-bank interdependence and financial stability in the euro area

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The strong interdependence between banking and sovereign crisis has emerged as a salient feature of euro area crisis. This interdependence, for sure, is not a specific feature of the euro area. But as pointed out by several authors the vicious cycle seems to be extremely strong in the euro area. The reason why euro area banks and sovereigns seem to be indissolubly tied together is twofold. On one hand, in the absence of a supranational banking resolution framework, member states keep individual responsibility for the rescue of their national banking system. Given the size of the banking systems across the euro area, this implies that the fiscal consequences of rescuing banks are potentially very large and explains how stress in the banking system can spill over to sovereigns. On the other hand, domestic banks hold on their balance sheets a considerable share of the debt issued by their domestic government. Any doubt about sovereign solvency immediately therefore affects domestic banks. This two-way bank-sovereign interdependence constitutes one of the specific features of the euro area that renders it especially fragile. In spite of this demonstrated weakness there has been surprisingly little policy action to remedy this state of affairs. Proposals for giving the European Union or the euro area responsibility for rescuing banks, or at least backstopping national authorities, have been consistently rejected.

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The strong interdependence between banking and sovereign crisis has emerged as a salient feature of euro area crisis. This interdependence, for sure, is not a specific feature of the euro area. Research on financial crises has highlighted time and again that historically, banking crises tend to be followed by sovereign crises (Laeven and Valencia, 2008, Reinhart and Rogoff, 2009). But as pointed out by several authors (De Grauwe, 2011, Alter and Schueler, 2011, Acharya *et al.*, 2011) the vicious cycle seems to be extremely strong in the euro area.

The reason why euro area banks and sovereigns seem to be indissolubly tied together is twofold. On one hand, in the absence of a supranational banking resolution framework, member states keep individual responsibility for the rescue of their national banking system. Given the size of the banking systems across the euro area, this implies that the fiscal consequences of rescuing banks are potentially very large and explains how stress in the banking system can spill over to sovereigns. On the other hand, domestic banks hold on their balance sheets a considerable share of the debt issued by their domestic government. Any doubt about sovereign solvency immediately therefore affects domestic banks. This two-way bank-sovereign interdependence constitutes one of the specific features of the euro area that renders it especially fragile.

In spite of this demonstrated weakness there has been surprisingly little policy action to remedy this state of affairs. Proposals for giving the European Union or the euro area responsibility for rescuing banks, or at least backstopping national authorities, have been consistently rejected. If anything, the large-scale three-year provision of liquidity to banks by the European central bank (ECB) at the end of 2011 may have served as an incentive to increase even further the banks' exposure to their sovereign. Data do not allow yet to document this effect, known as the "Sarkozy carry trade", but evidence suggests that already by the Autumn of 2011 this exposure had increased in the most vulnerable countries. So the euro area's fragility is still there, it has possibly even been made worse.

In this paper we first document the extent of bank-sovereign interdependence in the euro area. Second, we explain why it is more pronounced than elsewhere. Third, we examine how the situation has evolved since the emergence of tensions in the sovereign bond markets. Fourth, we discuss policy responses.[1]

1| The evidence

The evolution of sovereign and bank credit default swaps (CDSs) illustrates graphically the correlation between sovereign and bank solvency. As indicated in Chart 1, the cases of Spain and Italy are especially

Chart 1
Sovereign and bank CDSs, Spain and Italy
2008-2011

(5 years CDS premia on sovereign and banks, daily data)

a) Spain

b) Italy

Note: The index for banks' CDS is constructed as a weighted average of individual banks' CDS, according to risk-weighted assets reported in the EBA stress test.
Sources: Datastream, European Banking Authority.

1 *This paper partially draws on evidence presented in Pisani-Ferry (2012) and Merler and Pisani-Ferry (2012).*

telling: the two series have consistently moved in tandem since 2008 for Italy and since 2010 for Spain. Whenever perceived solvency risks for either the state or the banking system have increased, there has been a noticeable effect on the other one. Similar evidence can be found for other countries in the euro area.

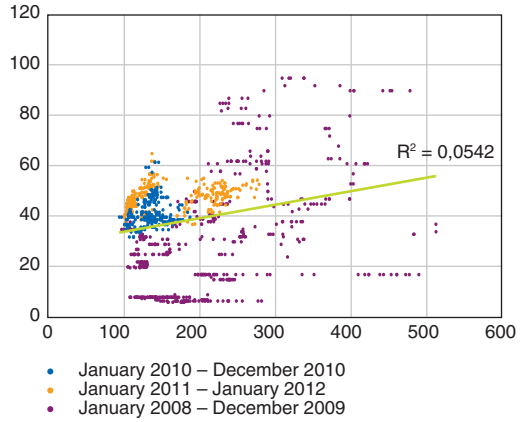
This high degree of correlation cannot be found in the United States (Chart 2). In 2009 there was a brief period of concern over the situation of banks but it did not affect materially the perceived solvency of the federal government: the safe-haven role of the Treasuries remained unaffected by changing conditions in the banking system. Nor did it last. In the euro area, by contrast, the relationship is clearer and has the slope of the regression line has increased between the December 07-December 11 period.

Chart 3 documents this correlation in more detail, going to country level. Again, a pattern of strong and increasing interdependence between bank and sovereign CDSs is found for both Spain and Italy, as well as for other countries not reported here.

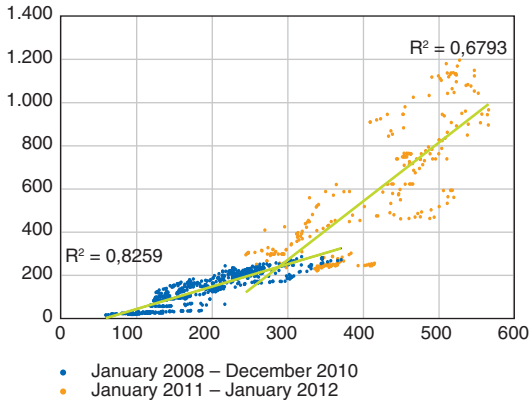
Chart 2
Correlation of sovereign and banks CDS in the United States and the euro area
January 2008 to January 2012

(x axis = banks CDS index 5 years; y axis = sovereign CDS 5 years)

a) United States



b) Euro area

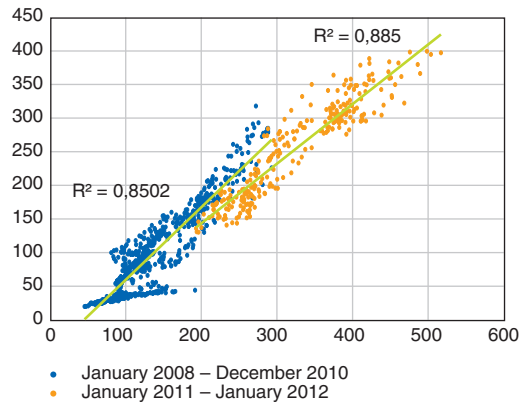


Sources: Datastream (5 years sovereign CDS for the United States) and Thomson Reuters (5 years sovereign CDS Index for the euro area and 5 years CDS Indexes for North America and euro area banks).

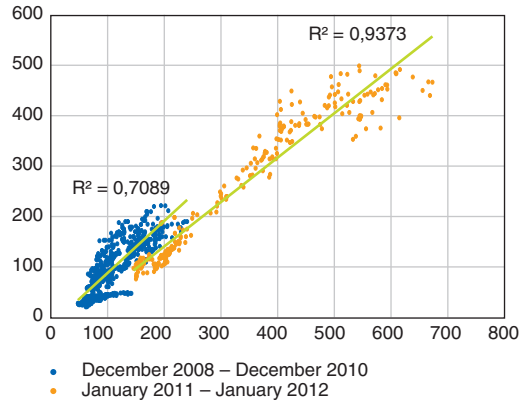
Chart 3
Correlation of sovereign and banks CDSs, Spain and Italy
January 2008 to January 2012

(x axis = average 5 years banks' CDS; y axis = 5 years sovereign CDS)

a) Spain



b) Italy

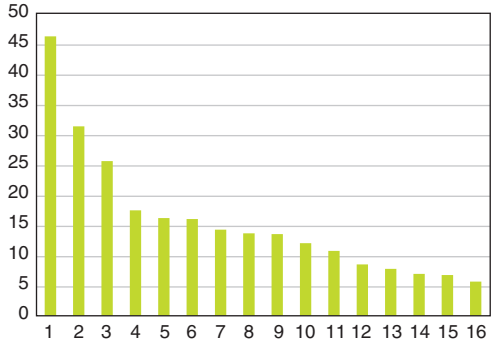


Sources: Datastream, EBA.

2| Channels of interdependence: banks to sovereigns

The most immediate way in which pressure on the banking system can spill over to sovereigns is through the perceived cost of bank rescue. In a context of generalised stress and uncertainty, the anticipation by markets of such cost is immediately translated into doubts on the future sustainability of the sovereign's public finance position and on its creditworthiness. Member states of the European Monetary Union (EMU) are vulnerable to the cost of banking crises because despite the strong degree of monetary integration reached in the euro area, states remain individually responsible for rescuing banks in their jurisdiction. The European Financial Stability Facility (EFSF), can help them with loans earmarked for that purpose but it is not entitled to inject capital directly into the banking system. The cost of recapitalising banks remains with the individual states and it can be very high, especially for countries that are home to large banks with significant cross-border activities. Indeed the degree of leverage reached by euro are banking systems before the crisis is striking: still in 2010, total bank assets amounted to *45 times* government tax receipts in Ireland, and the ratio was very high also in several other countries (Chart 4).

Chart 4
Ratio of bank assets to government tax receipts
2010



Source: Pisani-Ferry (2012).

The consequences of this situation became apparent when Ireland had to rescue its banking system after the latter underwent heavy losses in the credit boom of the 2000s. Ireland at the end of 2007 was a fiscally virtuous and apparently super safe country, with a debt-to-GDP as low as 25 percent. At the end of 2011 – after the public support was extended to the financial system – its debt ratio was evaluated at 108 percent and the country had had no alternative than to file for an IMF-EU (International Monetary Fund – European Union) conditional assistance programme. Not all the increase in the debt ratio was directly attributable to the banking crisis but according to IMF (2011) it nearly amounted to 40 per cent of GDP, in other words about half of the increase in the debt ratio. The other half corresponded to indirect economic costs, especially the collapse in tax revenues.

A recent IMF paper (Mody and Sandri, 2011) identifies the rescue of (globally or locally) important banks in 2008/2009 as the trigger of a regime shift in the dynamics of euro area countries' sovereign spreads. Until mid-July 2007, sovereign spreads are found to have behaved essentially random. During the first phase of the subprime crisis (until the rescue of Bear Stearns in March 2008) a pattern emerged, but spreads remained mostly related to global factors like flight to quality and heightened global risk aversion. Starting with the rescue of Bear Stearns, however, *domestic* factors like the prospects of the financial sector started becoming important for the differentiation of spreads in the euro area and this trend was further reinforced by the nationalisation of Anglo-Irish – a relatively small bank but that was perceived as systemically important for Ireland. These events led financial market to familiarise with the idea that important banks would be bailed out by government if needed, while at the same time clearly showing how relevant the fiscal implications of such rescues could be. Ireland is however only an extreme case: in fact, all western European sovereigns in the euro area (but much less so the new member states, where banks are largely foreign-owned) are heavily exposed to the risk of having to rescue domestic banks. In a detailed assessment of the two-way sovereign-banking feedback loop, Acharya *et al.* (2011) present evidence that the announcements of bailouts in Western Europe coincided with a generalised "shift" of credit risk from banks onto sovereign, evident in the contemporaneous decrease in banks CDS and increase in sovereign CDS. Moreover, they also find both banks and sovereign CDS to increase in the post-bailout period,

moving together. Similarly, Alter and Schueler (2011) find that before government intervention the credit risk spills over to sovereigns, whereas after the intervention (when government contingent liabilities are realised) the contagion tends to go from sovereigns to banks.

3| Channels of interdependence: sovereigns to banks

Unlike banks-to-sovereign, sovereign-to-banks contamination does not directly arise from regulatory requirements but from the mere fact that banks in the euro area still hold high and often disproportionate amounts of bonds issued by their own sovereigns (something that persists in spite of single market regulation that prohibit discriminating according to the nationality of the issuer). This implies that stress on the sovereign bonds market can very easily spill over to the national banking system.

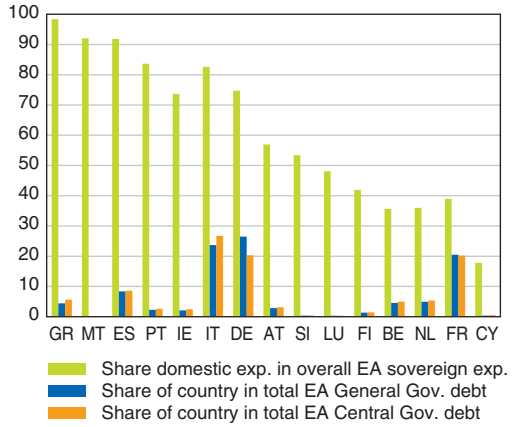
As a matter of fact, prior to the crisis domestic banks in several countries of the euro area were holding large proportions of total government debt. This proportion was close to 30 per cent in Germany, about 20 per cent in Spain, around ten per cent in France, Greece, Italy, the Netherlands and Portugal. By contrast it was negligible in the United States, the United Kingdom and Ireland (Merler and Pisani-Ferry, 2012).

Government bonds were appealing to banks because they can be easily used as collateral (both on the interbank markets in normal times and for central banks emergency lending in troubled times) and because the Basel regulatory framework allowed for the zero-risk weighting of bonds issued by euro area governments. Furthermore, banks in the euro area exhibited a strong home bias in the composition of their sovereign bond portfolios (Chart 5). This bias diminished after the introduction of the euro eliminated currency risk and regulations that treated foreign euro-denominated bonds differently from national bonds were scrapped. As pointed out by Lane (2006) and Waysand, Ross, de Guzman (2010), EMU in fact triggered a significant increase in cross-border bond investment within the euro area, over and above the overall diversification of portfolios resulting from financial globalisation. Nevertheless, the home bias has persisted to a surprising degree. The right panel of Chart 5 shows that the domestic bias in the sovereign portfolios persisted between the first and the second wave of tests performed by the European Banking Authority (EBA) in 2011, especially in troubled countries.

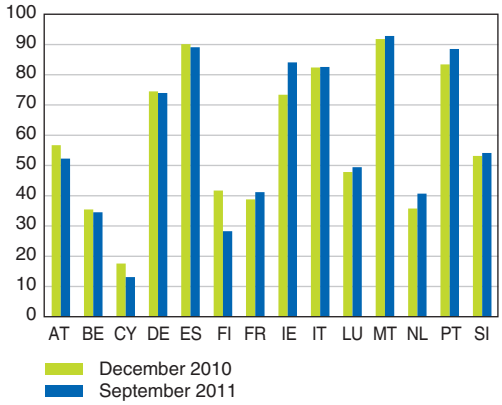
Chart 5
Indicator of home bias in the banks' holdings of government debt
2010

(%)

a) Home bias (gross exposure)



b) Domestic exposure as % of total EA exposure (selected banks)



AT = Austria; BE = Belgium; CY = Cyprus; DE = Germany; ES = Spain; FI = Finland; FR = France; GR = Greece; IE = Ireland; IT = Italy; LU = Luxembourg; MT = Malta; NL = Netherlands; PT = Portugal; SI = Slovenia; EA = euro area.
Note: The two figures are not entirely comparable: in the occasion of the December capital exercise, EBA disclosed data only on a subset of the 91 banks covered in the stress test of July (in particular, data for many Spanish banks and all Greek banks are not available). So the percentages in the left panel are computed considering all the 91 banks, whereas percentages in the right panel were computed over the same (narrower) sample available in December.
Sources: Pisani-Ferry (2012); EBA.

Table 1
Indicators of sovereign exposure of euro area banks

(%)

Country	Total banks sovereign exposure as % of total banks RWA	Total banks sovereign exposure as % of total banks CT1	% of net exposure in AFS banking book	% of net exposure in FVO banking book	% of net exposure in the trading book
Austria	21.6	262.9	14.0	1.9	11.6
Belgium	42.6	374.7	52.7	8.0	5.3
Germany	41.5	444.1	26.8	8.7	20.1
Spain	17.7	240.4	46.2	0.0	12.5
France	21.6	256.1	59.0	0.0	22.4
Greece	26.1	254.6	20.2	0.1	3.1
Ireland	8.5	136.9	38.7	0.0	0.8
Italy	19.8	268.0	37.0	6.7	23.5
The Netherlands	22.8	214.8	66.6	0.5	10.9
Portugal	13.1	183.0	49.5	0.5	21.5
Slovenia	15.5	271.4	65.8	0.0	0.0

AFS: available-for-sale; FVO: fair-value-option.
Source: EBA Stress Test July 2011 (data as of December 2010).

The impact of the deterioration in the sovereign creditworthiness depends also on the way banks accounted for government bonds in the balance sheet. Variations in the price of securities held at market value (in the trading book, available-for-sale and fair value option books) impact directly the profit and loss statement or the equity of banks, whereas securities held in the banking book at amortised costs only become relevant when they are impaired (Bank for International Settlements, 2011). Table 1 shows that the percentage of exposure recorded at market value was substantial, but the part in the trading book was small, thus limiting the immediate effect on operating impact of changes in the value of securities.

Large holdings of government securities imply that when government securities start being considered risky assets, banks holding them will likely face difficulties to access liquidity. This has been the case in the euro area since early summer and it is mirrored in the latest ECB bank lending survey (January 2012), according to which about 30% of euro area banks attributed the deterioration in financing conditions to the sovereign debt crisis, mostly via the collateral channel. The ECB has intervened with extraordinary liquidity measures and the broadening of the collateral pool in the attempt to ease these constraints, but effect is not evident yet.

This two-way interdependence creates the preconditions for a negative feedback loop. Government guarantees to banks, either implicit or explicit, increase the stress on sovereigns and in turn lower the value of such guarantees for banks, thereby adding to the banks' stress. Implicit guarantees (i.e. perception that a "too-big-to-fail" banks would be supported by the government even in the absence of an explicit commitment ex ante) are likely to enter the sovereign-to-banks channel, as they are more difficult to be granted if the sovereign itself is under pressure. On the other hand, explicit guarantees (e.g. government guarantees on bank bonds) are likely to enter the banks-to-sovereign channel, as they are more likely to become actual liabilities for the government if the banking system is in trouble.[2]

Macroeconomic channels are also relevant. Reinhart and Rogoff (2009) have pointed that only part of the huge debt increase observed in the aftermath of financial crises is directly related to the bank rescue, while a considerable part of it reflects the collapse in tax revenues in the wake of the slowdown in economic activity associated with banking crises.[3] Analysing systemic banking crises over the period 1970-2007, Laeven and Valencia (2008) document that on top of the fiscal cost banking crises had a significant real effect.[4] The banking system obviously plays a crucial role here: when the banking system is illiquid/or pushed to deleverage, credit to the other sectors tend to be cut, threatening growth prospects and public revenues and casting further doubts on public finances. Some evidence that this

2 *The size of government guarantee can be substantial. Panetta* et al. *(2009) document that just over the period October 2008-May 2009 banks in nine euro area countries issued about EUR 300 billion of government guaranteed bonds.*
3 *Looking at the cycle of real GDP per capita around the crises, Reinhart and Rogoff (2009) find that historically the decline has been of 9.3% on average.*
4 *They find output losses of systemic banking crises (in terms of deviation from trend GDP) to be around 20% of GDP on average over the first four years of the crises. Furceri and Mourougane (2009) also present evidence for the OECD countries suggesting that financial crisis lower potential output by 1.5% to 2.4% on average.*

may be a substantial risk for the euro area comes from the ECB Bank Lending Survey (January 2012), according to which euro area banks tightened credit standards for loans to non-financial corporations and households considerably in the fourth quarter of 2011[5] and expect a further tightening for the first quarter of 2012. On top of the generalised difficulties to access market financing, one third of respondents cited adjustment to new regulation and capital requirements as one of the factors contributing to the tightening of credit standards on loans to large enterprises[6] and they expect a further tightening due to regulatory pressure in the first half of 2012.

4| From bad to worse?

The euro area was caught unprepared by the sovereign crisis. Ad-hoc responses were initially devised without much consideration for their longer-term implications. Two years on, however, time has come to determine whether the euro system has grown stronger or weaker in consequence.

To this end we report in Table 2 the evolution between 2007 and 2011 of the share of different holding sectors in the total holdings of government securities issued by the main euro area countries as well as the United States and the United Kingdom. It suggests that the vulnerability of the euro area as far as it concerns the banks-sovereign interdependence was to some extent related to inherited patterns of debt holdings, but also that these traits have in fact accentuated since 2007.

Comparing 2011 to 2007, some important changes are evident. First of all, holdings of government debt by non-residents have diminished in proportion for all the countries in trouble (Greece, Ireland, Portugal, Spain and to a lesser extent Italy), have remained more or less stable for France and the Netherlands and have increased for Germany. It is worth reminding that these data only cover end-Q2 or Q3

Table 2
Breakdown by sector of holdings of government securities
2007 and 2011

(billions of national currency and, in parentheses, percent of total stock)

Country	Domestic banks		Central bank		ECB		Other public		Other residents		Non-residents		Total	
	2007	2011	2007	2011	2007	2011	2007	2011	2007	2011	2007	2011	2007	2011
Greece	23.9 [10.6]	35.5 [19.4]	3.2 [1.4]	4.8 [2.62]	… …	42.0 [22.9]	25.4 [11.3]	18.5 [10.1]	6.5 [2.9]	11.9 [6.5]	166.1 [73.8]	70.5 [38.5]	225.1	183.2
Ireland	0.8 [2.6]	15.1 [16.9]	n/a	n/a	… …	14.4	0.1 [0.3]	0.8 [0.9]	1.2 [3.9]	2.2 [2.4]	28.8 [93.1]	57.1	30.9	89.7
Portugal	10.6 [9.1]	36.0 [22.4]	0.0 [0.0]	1.2 [0.8]	… …	18.0 [11.2]	… …	… …	17.3 [15.0]	21.7 [13.5]	87.7 [75.9]	83.5 [52.1]	115.6	160.5
Italy	159.9 [12.1]	267.9 [16.7]	60.3 [4.6]	76.5 [4.8]	… …	103.4 [6.4]	… …	… …	450.7 [34.2]	471.6 [29.3]	647.1 [49.1]	687.5 [42.8]	1,317.9	1,606.9
Spain	74.3 [21.2]	173.1 [27.0]	9.2 [2.6]	20.8 [3.2]	… …	34.5 [5.4]	26.5 [7.6]	65.3 [10.2]	73.3 [20.9]	128.4 [20]	166.7 [47.7]	219.3 [34.2]	349.9	641.4
Germany	456.9 [29.7]	404.2 [22.9]	4.4 [0.3]	4.4 [0.3]	… …	… …	0.5 [0.03]	0.5 [0.03]	317.1 [20.6]	249.2 [14.1]	761.5 [49.4]	1,105.0 [62.7]	1,540.4	1,763.3
France	83.3 [13.0]	123.3 [14.0]	n/a	n/a	… …	… …	… …	… …	205.0 [32.0]	255.5 [29.0]	352.4 [55.0]	502.2 [57.0]	640.7	881.0
The Netherlands	18.7 [8.9]	33.3 [10.7]	n/a	n/a	… …	… …	0.9 [0.4]	3.4 [1.1]	44.7 [21.4]	66.4 [21.4]	144.6 [69.2]	207.1 [66.8]	209.0	310.1
United Kingdom	-7.9 [-1.6]	114.9 [10.7]	2.4 [0.5]	207.9 [19.4]	… …	… …	0.8 [0.2]	1.5 [0.1]	337.3 [68.5]	423.5 [39.5]	160.2 [32.5]	323.5 [30.2]	492.8	1,071.2
United States	129.8 [1.4]	284.5 [2.0]	754.6 [8.2]	1 617.1 [11.3]	… …	… …	4,616.5 [50.0]	5,087.7 [35.5]	1,375.1 [14.9]	2,853.0 [19.9]	2,353.2 [25.5]	4,500.8 [31.4]	9,229.2	14,343.1

Source: Merler and Pisani-Ferry (2012).

5 *The net percentage of banks contributing to tightening standards rose to 35% from 16% in previous quarter. This was higher than anticipated by survey participants at the time of the previous survey (22% expected).*
6 *21% said it contributed to the tightening for SMEs.*

at the latest, so the situation may well have changed since (especially for Italy, which has been undergoing considerable stress from September onwards). This drop in the proportion of non-resident holdings is evidence of portfolio rebalancing away from risk and the increase for Germany illustrates to the safe-haven role of the Bund (as well as the US T-Bond).

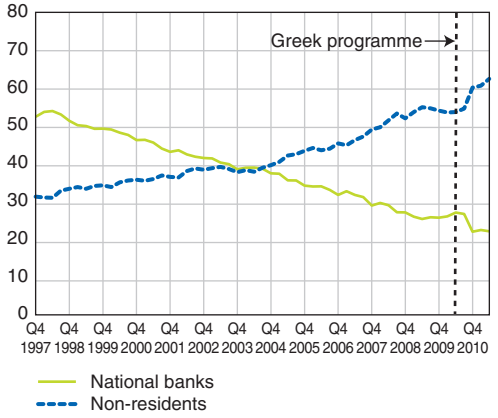
Second and conversely, the share of domestic banks in total holdings of domestic sovereign debt has increased significantly between 2007 and 2011 in all countries whose bonds have been shun by non-residents (Greece, Ireland, Portugal, Spain and Italy), it has remained roughly stable in France and the Netherlands, and it has decreased in Germany. In terms of GDP, holdings of domestic debt by Italian banks amounted to more than one-third of GDP in Italy, one-fifth in Portugal, Spain and Greece, and one-sixth in Germany in mid- to late-2011.

To find out when these changes took place and what may have triggered them, we report in Chart 6 the evolution from the late 1990s until now of the shares of domestic banks and non-residents in total holdings of government debt for Germany, Greece, Spain, and Ireland. Consistent with the effects of the euro documented in the literature, the graphs first provide evidence of portfolio diversification prior to 2009. After 2009, however, they indicate that a reversal has taken place in all countries in trouble. In most countries the evolution of the share of non-residents almost mirrors that of domestic banks, suggesting that the latter substituted the former when they started to shun government bonds.

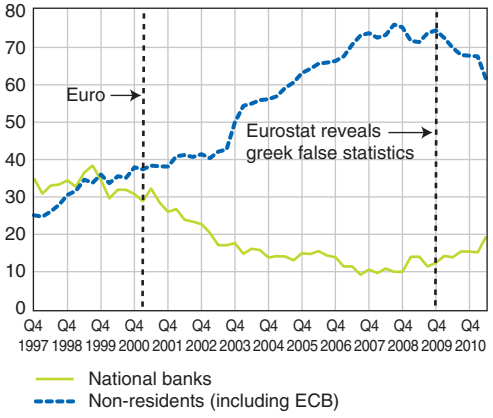
Chart 6
Shares of domestic banks and non-residents in total holdings of government debt for Germany, Greece, Ireland and Spain

(%)

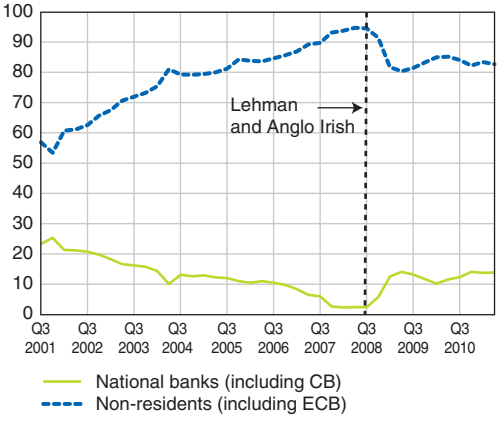
a) Germany



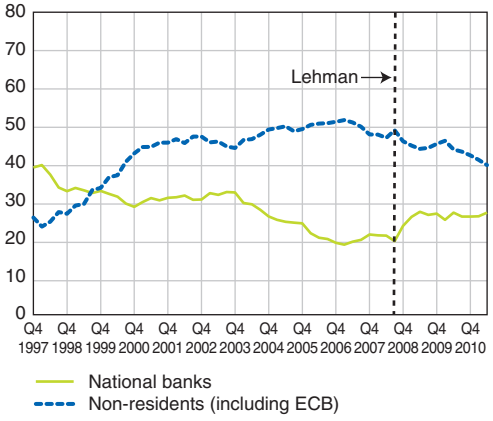
b) Greece



c) Ireland



d) Spain



Source: Merler and Pisani-Ferry (2012).

5| Policy implications

In the previous sections we have shown that the exposure of governments to 'their' banks and of banks to 'their' governments put public finances in the euro area at the mercy of self-fulfilling liquidity crises and exposes them to solvency crises. As seen in Section 1, since 2008-2009 markets have been pricing the risk that governments go further into debt as a consequence of bank weaknesses, or that banks incur heavy losses as a consequence of their sovereign holdings into CDS spreads.

In Section 4 we have shown that developments since 2007 have indeed increased the structural vulnerability of euro area countries, reinforcing the sovereign-banking crisis vicious cycle. All countries where concerns about state solvency arose in recent years have seen a reversal in the previously steady increase of the share of non-residents in total holdings of government debt and domestic banks have become *even more* creditors of 'their' sovereigns, at a time when sovereigns are exposed to increasing pressures.

In the short term, these observations lead to question the effectiveness of ECB provision of liquidity to banks as a means to alleviate the sovereign crisis. In a moment in which government bonds are considered risky assets, banks whose exposure to their domestic sovereign has increased markedly are faced with both a balance sheet and a reputational risk in comparison to non-euro area counterparts, and may prove reluctant to increase this exposure even further. Assuming it is nevertheless effective, one may wonder whether it is appropriate, as alleviation of tensions in government bond markets may be obtained at the cost of making banks even more exposed to domestic sovereign risk.

In the longer term, the question is whether and how regulators and supervisors in the euro area create incentives for banks to reduce exposure to their own sovereign. Until recently regulation did not consider the issue. On top of the zero-risk-weighting of government bonds, there were no limits to exposure to a particular sovereign and as a consequence, banks and insurers were not given incentives to diversify. Consistent with the recognition that sovereign bonds are not risk-free, a case can therefore be made for reforming prudential regulation in order to limit bank (and insurance) exposure to a single borrower. Such a reform would however amount to a fundamental transformation of the (mostly bank-based) financial systems of euro-area countries. Altering the "safe asset" status of government bonds would entail a chain of transformations of major significance – affecting for example the entire structure of pension funds assets – and this process is unlikely to be quick.

An alternative to letting banks reduce their exposure to specific sovereigns would be to supply them with a euro area reference safe asset. This is one the rationale for creating Eurobonds, either in the form of the Blue Bonds of Delpla and von Weizsäcker (2010), or in the form of one of their possible variants (the redemption bonds of the German Council of Economic Experts, 2011, the Eurobills of Hellwig and Philippon, 2011, or the synthetic ESBIEs of Brunnermeier *et al.*, 2010). The difficulties raised by these proposals are well known, but it is straightforward that they would offer a solution to the transmission of the solvency risk from sovereigns to banks.

Turning to the bank-sovereign channel, a possibility for banking reform would be to move both the supervision of large banks and the responsibility for rescuing them to European level, as advocated for several years by many independent observers and scholars (see for example Véron, 2007, 2011). Such a mutualisation would end the mismatch between tax revenues and the States' potential responsibilities, would help reduce states' vulnerability in the face of banking crises, and would therefore alleviate concerns about sovereign solvency. The feasibility of the latter reform depends however on the willingness of Member States to accept the pooling of budgetary resources, even to a limited extent. Until now they have consistently refused to contemplate such an option, both at the time of the global crisis in 2008 and after the European crisis erupted in 2010. The more ambitious versions of the proposal envision creating a permanent European Deposit Insurance Corporation financed by banks but benefitting from a backstop provided by the creation of a limited taxing capacity at EU level (Marzinotto, Sapir and Wolff, 2011).

Policy discussions on these issues, however, have not yet gained momentum, perhaps because each of the proposed solution requires going beyond the current script and contemplating the pooling of commitments and/or resources.

References

Acharya (V.V.), Drechsler (I.) and Schnal (P.) (2011)
"A Pyrrhic victory? Bank bailouts and sovereign credit risk", *NBER Working Paper*.

Alter (A.) and Schueler (Y.S.) (2011)
"Credit spread interdependencies of European states and banks during the financial crisis", University of Konstanz Dep. Of Economics *Working Paper* 2011/34.

Bank for Iinternational Settlements (2011)
"The impact of sovereign credit risk on bank funding conditions", CGFS Papers No. 43.

Brunnermeier *et al.* (2010)
"European Safe Bonds (ESBies)", Euronomics.

De Grauwe (P.) (2011)
"The governance of a fragile eurozone", *Discussion Paper* 2011.

Delpla (J.) and von Weizsäcker (J.) (2010)
"The blue bond proposal", Bruegel Policy Brief 2010/3.

European Central Bank (2012)
"Euro area bank lending survey", 1st February 2012.

Furceri (D.) and Mourougane (A.) (2009)
"The effect of financial crises on potential output: new empirical evidence from the OECD countries", OECD Economic Department *Working Paper* No. 699.

German Council of Economic Experts (2011)
"A European redemption pact", (available at *http://www.sachverstaendigenrat-wirtschaft.de/233.html?&L=1*).

Hellwig (C.) and Philippon (T.) (2011)
"Eurobills, not eurobonds", VoxEU 2nd December 2011.

International Monetary Fund (2011)
Fiscal Monitor, September.

Laeven (L.) and Valencia (F.) (2008)
"Systemic banking crises: a new database", IMF *Working Paper*/08/224.

Lane (Ph.) (2006)
"The real effect of EMU", *Journal of Economic perspectives*, 20:4, pp. 47-66.

Marzinotto (B.), Sapir (A) and Wolff (G) (2011)
"What kind of fiscal union?", Policy Brief, 2011/6, Bruegel.

Merler (S.) and Pisani-Ferry (J.) (2012)
"Who is afraid of sovereign bonds?", Bruegel Policy Contribution No. 2012/02.

Mody (A.) (2009)
"From Bear Stearns to Anglo Irish: how eurozone sovereign spreads related to financial sector vulnerability", IMF *Working Paper*/09/108.

Mody (A.) and Sandri (D.) (2011)
"The eurozone crisis: how banks and sovereigns came to be joined at the hip", IMF *Working Paper* /11/269.

Panetta (F.) *et al.* (2009)
"An assessment of financial sector rescue programs", *BIS Papers* No. 48.

Pisani-Ferry (J.) (2012)
"The euro crisis and the new impossible trinity", Policy contribution, 2012/1, Bruegel.

Reinhart (C.) and Rogoff (K.) (2009)
"The aftermath of financial crises", AER, AEA Vol. 99(2), pp. 466-72.

Reinhart (C.) and Rogoff (K.) (2011)
"From financial crash to debt crises", AER, AEA Vol. 101(5), pp. 1676-1706.

Véron (N.) (2007)
"Is Europe ready for a major banking crisis?", Policy Brief, 2007/03, Bruegel.

Véron (N.) (2011)
"Testimony on the European debt and financial crisis", Policy Contribution, 2011/11, Bruegel.

Waysand (C.), Ross (K.) and de Guzman (J.) (2010)
"European financial linkages: a new look at imbalances", IMF *Working Paper*/10/295.

Wolff (G.) (2011)
"Is recent bank stress test really driven by the sovereign debt crisis?", Bruegel policy contribution No. 2011/12.

Rebuilding growth and optimism in a new fiscal era

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We risk an unravelling of globalisation and its benefits, if we do not address with clarity the twin challenge of inclusive growth and sustainable public finances. Prolonged fiscal deleveraging in the advanced world is now inevitable, but it also greatly complicates the task of achieving inclusive growth. We have to build such growth, to bring back a sense of optimism in the advanced economies, and confidence in the global economy that they constitute the largest part of.

Fiscal policies therefore have to be renewed in purpose and scope. We have to move beyond the legacies of both the left and right. We need activist states, intervening boldly but on fewer tasks. The most important task must be to sustain social mobility by improving the breadth and quality of opportunities from young, and to help workers develop the skills and expertise that keep them in demand in a global market. Broadening opportunities, rather than entitlements, has to be the defining purpose of the activist state.

Demand management remains critical in the current context, but will be most effective if focused on strengthening the supply-side capabilities that will spur longer term growth. We must keep the political narrative focused on the long term, on the social benefits of sustainable public finances, and on the need for a fair deal for our children.

Four years after it began, the shadow of the Global Financial Crisis still looms over the world economy. Much has been done to avert catastrophe in the financial system. Recent efforts in the euro area have reduced the risks of implosion in sovereign debts. However the level of borrowing remains unsustainably high among both home-owners and governments in most of the advanced world.

The unwinding of these debts, or deleveraging, is necessary for any vision of sustained growth for the long term. But even in the most orderly of scenarios, this deleveraging will mean the prospect of sub-par growth today and for some years to come.

Also troubling is the self-reinforcing nature of this dynamic, as deleveraging and slow economic growth feed into each other. We face a real risk of prolonged stagnation in the advanced economies, repeated financial shocks, a lack of confidence amongst both citizens and markets, and levels of unemployment that will challenge any social and political system.

We need new solutions to avoid this, and recreate a sense of optimism in the advanced world. We cannot sustain confidence in the global economy without this optimism in the future of the economies that comprise by far its largest segment, and account for most of its sophisticated demand.

Any lasting solution must address the underlying problems, which go back much earlier than the Global Financial Crisis. Median incomes have either stagnated or fallen in real terms for two decades in much of the advanced world. Inequality has widened virtually everywhere, as globalisation and technological advances have favoured those with high skills and depressed pay for low skill jobs in manufacturing and other tradable sectors.

Some of the earlier responses to these trends not only obscured the underlying structural problems, but played a role in leading up to the crisis. Consumer spending in the United States grew faster than incomes as households borrowed against the value of their homes, with little attention paid by financial markets or regulators to their ability to service their loans once the housing bubble ended. Governments in several advanced countries ran persistent and growing deficits well before the crisis hit, in the faith that investors would be undeterred by their growing debts.

Deregulated markets and plain mismanagement among both financial institutions and their regulators magnified the problems and brought global finance to the brink of disaster. But the misdoings of the financial sector were not where the crisis originated. And the task of restoring resilience in the financial sector by mandating higher capital and liquidity standards, itself both necessary and complex, is not our most difficult challenge.

1| Meeting the twin challenge of inclusive growth and sustainable public finance

The most critical challenge to the global economy lies in sustaining growth and preserving social compacts in an era of fiscal consolidation in the advanced world. It requires making tough social choices, such as in fiscal policy and labour markets. It will also require strong political consensus, so that sacrifices can be made today in order to achieve growth and benefits in the future.

The emerging economies too face this challenge of achieving inclusive growth whilst ensuring sustainable public finances. New strategies are needed to ensure that their growth brings benefits to all, and to ensure adequate social security for the poor and elderly. China, which will be the first country to begin ageing while most of its population remains poor, has made this a critical priority.

There is much at stake. I do not think it is alarmist to say that we risk seeing an unravelling of globalisation and its benefits, if we do not address with clarity the twin challenge of inclusive growth and sustainable public finances. Already, we are seeing politics fragmenting and turning inward in several advanced societies.

2| Long term keynesianism: demand management must support the supply-side agenda

Macroeconomic policies aimed at stabilising demand remain relevant in the current context, to avoid cumulative declines and reduce what is still a significant risk of financial instability. There is scope for the large surplus economies to help expand demand, and for deficit economies to avoid disproportionate front-loading of fiscal consolidation. We should avoid collective austerity, all at the same time. Excessive declines in output will complicate the task of sustaining tough structural reforms.

What we need however is a long term version of Keynesianism, not traditional demand cycle management. Policies that aim merely at injecting a fiscal stimulus or slowing the pace of fiscal consolidation over the short term are likely to be less effective than those that focus expenditures on areas that build up the supply-side capabilities that support longer term growth. We are not in a normal cycle, or recovery from a normal crisis. Policies for the short term have to anticipate and be part of the longer term agenda for growth and rebuilding the social compact.

It goes to the heart of the type of anxieties that people have – they worry not just about a job for now or the next year, but about what life will be like 5-10 years from now, and whether their children would have a future 20 years from now. They need the confidence that if they work hard, life will get better – like how it happened in the few decades after the war.

So there is a scope for initiatives to boost demand, but we must bring the longer term agenda into today's tax and spending policies. In many economies, public spending on partnerships with the private sector to renew or build infrastructure for the future and invest in reskilling workers have been assessed to offer good returns in productivity and economic growth.

People and businesses need the longer term narrative. And markets need to be convinced that fiscal reforms will ensure sustainable public finances over the longer term. There can otherwise be no return of confidence, and no lasting recovery.

3| Evolving our political culture

It requires an evolution in the political culture of most of our societies, just as current-day political cultures are vastly different from where they were a half century ago. In Europe, for example, the dominant political culture today is very different from that which inspired the 'social market economy'.

At risk of oversimplification, what we have seen happen over time in many advanced societies has been the constant extraction of short term political gains at the expense of long term economic costs. Governments from across the political spectrum have committed themselves to continually expanding social entitlements with each electoral term – in social security, healthcare, and unemployment – without the ability to pay for them. Their large public debts have now resulted not just in a financial crisis, but a social crisis, with citizens being forced to make painful adjustments in living standards and future working generations facing an increased burden of servicing debts.

The task is now in reverse. Governments have to find ways to secure long term economic benefits, without easy political gains. There are ways forward. But more than at any time in the last few decades, bold leadership and a stronger political consensus built on honesty about the future will be needed.

4| Strategies for inclusive growth

Building a fair and inclusive society must be at the heart of the role of Government, if we are to stay engaged in global markets and sustain their benefits for our societies.

It is about both social and economic strategies, as they are bound inextricably together. The first question we must always ask ourselves is: how do our people make a living in the world? How do we distinguish ourselves, in industry and services, and what value do we bring? Critically too, how can we ensure that those who do well are not just those in the top but also the average citizen and those at the bottom end of the income ladder?

The story of how the entry of China and other emerging countries in global markets has depressed wages for low-skilled jobs all over the world is well-known. But the next chapter has also begun. China is once again the game changer. Its coastal provinces are reaching a turning point, where considerably higher wages are needed to match the supply of labour to demand. More workers are staying behind in the central and northeastern provinces, and a new generation of migrant workers in the coastal cities is no longer content with extremely low wages and poor working conditions. Wages, which have long lagged productivity, are now rising quickly.

The implication, however, is not a loss of competitiveness in China. Instead, labour-intensive manufacturing is moving to more provinces. Globalisation is spreading inward, aided by a good transport infrastructure and China's high quality of basic and middle-school education compared to other emerging countries. Further, the coastal provinces are moving up, into higher value tasks.

India and several other emerging economies are adding to this new phenomenon, although in smaller numbers. When we add it up, it means over the next decade the entry of a large number of people from the emerging world into medium to high skill jobs in the global marketplace. Outsourcing patterns are already shifting, in both manufacturing and services. American legal firms, for example, have begun outsourcing work to India.

Technology is compounding this shift, as information technology in particular takes over many more jobs. Across the mature economies and in the more advanced developing economies, pressure is therefore shifting to the broad middle band of the workforce. More white-collar jobs are replaced by technology or cheaper competition.

An inclusive society therefore starts with strategies to compete in the global economy in a way that everyone gets pulled up. It must mean putting greater effort and resources into raising the skills and expertise of every worker, and giving them the confidence that they will be able to stay in demand. It must also mean an environment that supports innovation and R&D, so that companies can take full advantage of global opportunities.

Second, we have to deal with the challenge of inequality. Growth and jobs are a precondition, but they do not on their own assure us of cohesive societies. We have to try to contain inequality, and ameliorate its effects on our society.

The role of the state will inevitably change. Each of our societies has to adapt to a new phase of globalisation and technology, spur growth and find ways to preserve a social compact within new fiscal constraints. The idealogical premises of the state will inevitably reflect our histories, and the triumphs and failures of the past. But the most effective ways of the future will likely move beyond the legacies of both the left and the right. Whether social democratic or conservative, the old strategies will not recreate jobs for the large base of citizens, and give everyone the realistic hope of better incomes and better lives.

We need flexible labour markets. Europe's two-tier labour markets, leading to high unemployment among the young and minorities, are now widely recognised to be socially unsustainable. The labour market reforms being undertaken by the new governments in Spain and Italy are courageous, and among the most important changes taking place for Europe's future well-being.

We also need to rebuild a culture of work and self-reliance, and reduce dependence on entitlements. But we will not achieve social equity if we leave everything to the marketplace. A *laissez-faire* strategy will lead to widening wage dispersion, as well as reduced opportunities for those who start off with less in life. It will sap the morale of our societies.

5| An activist state, focused on broadening opportunities

There is therefore a critical role for an activist state, focused on intervening boldly but in limited areas. Its most essential task must be to help keep up social mobility, by improving the breadth and quality of opportunities from young and to help citizens upgrade and renew their skills throughout their working lives.

A broadening of opportunities, rather than entitlements, has to be the defining purpose of the activist state.

It becomes more difficult to sustain mobility in mature societies. But that is also why we have to

do more, and especially to do more 'upstream', earlier in children's lives. We must find every effective way to help those who start off with disadvantages to catch up and do well; every way to prevent disadvantage from repeating itself across generations.

This is a key priority in Singapore, and a determined, multi-year effort. Although our education system does relatively well in international comparisons of achievement levels across a broad spectrum of students, there is more to be done to sustain social mobility. We are investing in better quality early childhood care, specialised intervention to help those with learning difficulties, and more after-school care in the primary school years. We are also broadening education so that every student can gain confidence and find their strengths, in and out of the classroom. We are intervening more actively to help them in their teens, when some inevitably find themselves losing interest in school – by getting them engaged in learning and activities they enjoy, and giving them responsibilities. We all know that it is less costly and more effective when we intervene upstream than wait for problems to surface later.

We are also doing more to help lower-income families overcome the deeper and more complex problems that many of them face – those that go through early family break-ups, or where a parent is incarcerated and the children lack the normal sense of a family. These are still micro trends in our society, but we want to prevent them growing, do all we can to help the kids stay on track, and prevent a permanent underclass from forming.

We also have to redistribute. That is a key task of an activist state, committed to preserving the social compact.

The key question is how we do this. How do we maintain a progressive slant in fiscal policies, do more to support those at the lower end, while ensuring that we remain a society where at its core, people have a deep sense of responsibility for their families, they want to work hard to improve themselves, and they take pride in being part of a society where everyone moves up together that way? And just as important, how do we preserve a sense of obligation on the part of those who are doing well, to help others in their own society? We cannot build an inclusive society on government policies to redistribute resources alone.

Progressive-minded people have to be deeply concerned about preserving this culture of responsibility, not just social conservatives.

We must therefore intervene boldly to help lower income families, but focus on the right areas. Education, skills and jobs are the springboards for success. The state has to maximise opportunities in these areas.

In countries like the United States and the United Kingdom, there is growing recognition of the negative impact of large parts of the public school system, on the abilities and aspirations of children from ordinary backgrounds. That must be a major priority for investment.

All our societies also have to give more priority to active labour market policies. Negative income taxes for lower income workers have generally proved their worth, as have subsidies to help them upgrade their skills to stay relevant to a changing job market through their lives. In societies that have seen a large increase in middle-aged unemployment following the recent crisis, such as the United States, there are well-considered proposals for state and private sector partnerships to enable massive retraining programmes.

In Singapore, a small society but highly exposed to global competition, we are learning from experiences elsewhere and seeking the most effective ways to uplift those with lower incomes. We supplement wages for lower income workers and subsidise employers for hiring older workers, as our main social safety net. Workers get automatic employment benefits, instead of automatic unemployment benefits. Their employers get nearly full funding for training expenses.

We couple this jobs strategy with grants to enable widespread home ownership among lower and middle income families. It gives them a savings asset that can appreciate with economic growth and stay protected against inflation.[1] We are now focused on helping older Singaporeans to monetise part of the value of these assets, for use as retirement income.

1 *We have avoided subprime problems, by sizing loans to ensure affordability and allowing individuals to service their loans by drawing on a portion of their savings in a mandatory, defined contribution savings scheme.*

However, healthcare costs remain the elephant in the room in every advanced society, and in emerging ones like China where social security systems are undeveloped. They present the biggest challenge to fiscal sustainability as each of our societies ages.

In the advanced societies, governments' healthcare spending commitments are projected to rise rapidly, at the same time that fiscal consolidation has to take place to bring debts to sustainable levels. The arithmetic leaves no option but to either raise significant new revenues or accept that entitlements will at some point have to be restructured, with subsidies being refocused on the needs of the lower and middle income elderly. This is a large, unfinished project in every advanced society. In the United States for example, no credible plans to either contain or fund the rise in federal healthcare spending have been put to serious debate.

6| No avoiding tough choices on taxes

There is therefore no escape from difficult choices on taxes. We need pro-growth tax strategies, and in particular adequate incentive for businesses to invest for the long term. Few governments of any stripe are therefore considering higher corporate taxes, and several are considering reductions. However, most advanced economies, including the more advanced developing economies, will also have to find ways to raise tax revenues. We must do so while preserving and indeed enhancing a progressive fiscal system, one that provides adequate redistributive support to help citizens with lower incomes to lift themselves up.

In many countries, it will mean asking tough questions about whether taxes on wealth should be raised, to avoid higher taxes on income. In the United States, the case for consumption taxes is gaining ground amongst thoughtful and non-partisan observers, who believe it can be part of a fair and efficient tax system. It also deserves calm and honest debate everywhere. But whether a fiscal system is both efficient and progressive depends on the total effect on individuals of the taxes that the state collects and the benefits it provides – not whether each and every tax is a progressive tax, favouring the poor. The consumption tax, in Economics 101, is a regressive tax when viewed on its own. In Economics 401, and in real life fiscal systems, it all depends on what the revenues collected are used for. A consumption tax, plus enhanced redistribution targeted at the poor, and particularly targeted at boosting jobs and skills, can be an integral part of the fair and sustainable fiscal strategies of the future.

7| Conclusion

We need new strategies for spending and taxes in an era of fiscal responsibility. Major adjustments will be required in many of the advanced economies. New revenues will also be needed in emerging economies that are building up their social safety nets, and extending public services to underserved rural areas.

There is a depressing quality about current-day adjustments. But there is upside too. Broad sacrifices are necessary in the advanced societies, but they lay the basis for long term growth. We can and must renew a sense of opportunity and optimism in the future.

Short political horizons are never helpful. It is how many societies built up public spending in excess of revenues even during their youthful and rapid growth years, and now find themselves with unsustainable debts just as their societies age. We have to keep the political narrative focused on the long term, on the social benefits of sustainable public finances, and on a fair deal for our children.

Gaps in the institutional structure of the euro area

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The euro was created at a time when the conventional view was that a central bank could control inflation by controlling the money supply and that fiscal policy's interaction with monetary policy took the form of attempts to get the central bank to finance government debt. With a sufficiently firm and independent central bank, this view considered that financial markets would force discipline on fiscal policy. By creating a strong, independent central bank at the european level, facing multiple country-level fiscal authorities, the threat of political pressures for inflationary finance would be lower than with individual country central banks.

We are learning that this formerly conventional view was largely mistaken. In particular, the euro as originally structured seemed to require the elimination of national-level lender of last resort functions for central banks, without creating as strong a replacement at the european level. Having discovered these gaps through experience, what options are there going forward for the euro area? A solution would be to fill in the institutional gaps in the original euro framework. At a minimum, this would require a new institution with at least some taxing power, able to issue debt and to buy, or not buy, the debt of euro area governments. Such an institution would of course have to be subject to democratic control.

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We are learning that this formerly conventional view was largely mistaken. Here are three aspects of central banking and inflation control that this view missed.

Essential fiscal backing

An independent central bank charged with controlling inflation will take actions that require responses from the fiscal authorities. If those responses are not forthcoming, the central bank cannot control inflation. A fragmented collection of fiscal authorities has less incentive than a unified fiscal authority to recognise the actions required of it and respond appropriately.

Inflation as a cushion

While there are historical examples of uncontrolled hyperinflation and episodic high inflation that represent institutional failures, moderate inflation and deflation can play an important role as fiscal shock-absorbers. They in fact regularly play such a role in advanced economies. The euro institutions as originally constructed entailed abandonment of this shock-absorber at the country level, with outright default the only potential replacement.

The fiat money lender of last resort

The combination of a treasury that issues fiat-currency debt and a central bank that can conduct open market operations provides a uniquely powerful lender of last resort. The euro as originally structured seemed to require the elimination of national-level lender of last resort functions for central banks, without creating as strong a replacement at the european level.

Having discovered these gaps through experience, what options are there going forward for the euro area? Few at the time of the euro's creation realised, in my view, that they were abandoning an effective lender of last resort function and accepting periodic outright government default on debt as part of the new monetary regime. One way forward would be to require people to recognise that these are the consequences of the euro. Proceeding in this direction would entail changes in European Central bank (ECB) operational methods and would require harsh measures in countries struggling with temporary fiscal problems. It would amount to reproducing the essential features of the gold standard. It is not clear to me that, once these consequences were fully and widely understood, continued adherence to the euro would remain politically viable.

An alternative would be to fill in the institutional gaps in the original euro framework. At a minimum, this would require a new institution with at least some taxing power, able to issue debt and to buy, or not buy, the debt of euro area governments. Such an institution would of course have to be subject to democratic control. This is a daunting prescription from a political point of view. It obviously cannot be done overnight, yet financial markets may not wait for such institutional change to evolve.

I elaborate these points in what follows. Most of what I say below has been said before by other commentators, as well as by me, and I do not try to cite them systematically.

1| Fiscal-monetary interactions

In papers in the 1990's several authors[1] put forth macroeconomic models in which government interest-bearing debt was treated explicitly as denominated in domestic currency. This framework brought out the symmetry in the roles of monetary and fiscal policy in determining the price level. At the time it was seen as in conflict with mainstream views and considered controversial. These models did not treat the case of multiple fiscal authorities and one central bank directly, but from their perspective, problems with the European Monetary Union (EMU) framework were clear (Sims, 1999).

1 *Woodford (1995), Leeper (1991), Sims (1994, 1997), Cochrane (1998), among others.*

One of the main insights from this approach is that every monetary policy action has fiscal implications and requires a response from the fiscal authorities if it is to be effective. For example, when a central bank raises interest rates, attempting to restrain spending and inflation, it automatically increases the interest expense component of the government budget, so that if there is no change in other expenses or in tax revenue, the deficit increases. This results in new debt being issued to cover the deficit, thus more debt, thus even larger interest expense. Unless there is at least eventually a fiscal response, reducing non-interest expenditures or increasing taxes, the result is increased inflation, the opposite of the effect the central bank was trying to achieve. In countries where inflation is high and interest expense a large proportion of the budget, this need for a fiscal response to monetary tightening is apparent to policy-makers and may, where fiscal inertia is inescapable, lead to monetary policy that is passive or ineffective. In most rich countries, though, deficits arising from interest rate changes have, historically, eventually produced the needed fiscal response.

In a monetary union the inflationary impact of a failure of fiscal policy to respond to monetary tightening is, in any one country, diluted. A deficit that is large relative to a country's own economy, may be small relative to the monetary union as a whole, so that its inflationary impact is not so apparent to the country's lawmakers. The fragmented fiscal authority therefore weakens the incentives for fiscal response to monetary policy actions. Furthermore, *every* country in the union must make the appropriate fiscal response to monetary policy actions if monetary policy actions are to be effective.[2]

It was in recognition of this potential problem that the Maastricht treaty included limits on countries' debts and deficits at the outset of euro area membership. These limits were extended to ongoing members in the Stability and Growth Pact, with provisions for penalising failure to heed the limits. These provisions were an effective sanction against a country deliberately trying to pass its fiscal burden onto other countries. But it should have been clear from the start that countries usually run large deficits when unpredictable events depress their economies, and that monetary union would not eliminate such unpredictable events. It was implausible that countries in economic distress due to events beyond their control would be "punished" by the euro area, and in fact many of the member countries have been in violation of the criteria without facing sanctions.

Now several large EMU members are facing such fiscal distress that financial markets are pricing their debt to include substantial default risk. New attempts are being made to enforce fiscal discipline, aiming to convince markets that default risk is minimal. But the fact that previous measures meant to eliminate default by enforcing fiscal discipline have proved ineffective makes it difficult to convince markets that this round of disciplinary measures will be different.

2| The inflation cushion

Based only on debt and deficit accounting, several countries outside the EMU appear in worse shape than those inside the EMU that are facing default-risk discounts on their debt, yet these outside countries (the United States and the United Kingdom, for example) are not facing large default-risk discounts. This is not a mystery. A country that issues mainly domestic-currency-denominated interest-bearing debt and that has a fiat-money currency need never default. Its interest-bearing debt promises delivery only of government-created fiat money, which is always available. This does not mean that there is no risk to the debt, only that there is no risk that the issuing government cannot deliver what it has promised to pay. The value of the promised payments may be higher or lower than expected if inflation is higher or lower than expected over the term of the debt. This is sometimes thought of as partial default, but it is quite different. When default is in prospect, the contract terms of the debt are going to be violated. Investors do not know how much of the value of their investment they will lose, or when, and the loss in value is likely to be sudden. Furthermore, it may be unclear which investors will lose. A government may, for example, simply postpone payment of principal on a particular issue of debt that comes due at an inconvenient time, or it may instead announce changed payment terms on many or all outstanding debts. In the same configuration of current debt and expectations about future taxes and expenditures, a country with fiat-money debt presents much less uncertainty to

2 *This assumes that countries pay attention only to their own debts and deficits. If some country were (implausibly) to tax and spend so as to control the union-wide level of debt rather than the country's own debt, then monetary policy could be effective even if some other countries did not respond.*

investors than a country issuing debt in a currency it cannot itself produce.

Fluctuating fiscal conditions therefore tend to produce fluctuating price levels and exchange rates in countries that issue own-currency denominated debt. In an earlier paper (2001) I calculated the yearly unanticipated gains and losses to holders of US debt during 1950-1990.[3] These fluctuated between losses of USD 40 billion and gains of USD 60 billion – non-trivial as a proportion of budget deficits at the time – and between plus and minus 6% as a percentage of the debt's value. Substantial losses to debt-holders cushioned the effects of the oil crises of the 1970's, for example.

In the United States as in other countries there is a single central bank and multiple sub-national governments with their own powers to tax, spend, and issue debt. But there are substantial flows of resources between United States via the federal government's budget, and much of this flow offsets local economic shocks. Federal taxes rise and fall with local incomes, while most federal expenditures do not, and some, like unemployment insurance and Medicaid, tend to increase when local income declines. The corresponding cross-national fiscal flows in europe are much smaller and probably less cyclically sensitive.

Joining the euro meant that countries gave up the cushion of country-specific inflation impacts on debt burden, without replacing that cushion with any corresponding europe-wide system of fiscal transfers. Outright default on government debt can at least partially replace the inflation cushion, but it is a clumsy and costly replacement.

3| Lender of last resort

We know from historical experience that asset markets occasionally undergo liquidity crises. Financial contracts, especially loan contracts, are never complete. That is, they specify payment obligations that in some circumstances are impossible, without specifying in detail what those circumstances are or what payments will be made when those circumstances arise. When individual contracts run into such circumstances, they are renegotiated or are taken to bankruptcy court. But some assets – bank accounts, treasury bills, AAA-rated private short-term debt for example – and some credit markets interbank – lending, for example – are relied on for liquidity. People assume these assets can be sold or these credit markets can be drawn on at very short notice without penalty. When widespread doubts arise about these sources of liquidity, payments can not be made on time, and doubts about ability to pay promptly become contagious, to the point where formerly liquid markets cease to function. In such situations, a large institution with unquestioned ability to pay may be able to step in, lending freely and undoing the panic and contagion. Sometimes large private banks have played such a role, but a private entity, no matter how large, cannot be totally immune to doubts about its own solvency. A central bank that issues fiat money can make loans denominated in fiat currency without any risk that its liabilities (reserve deposits and currency) might not be payable on demand, since they are only promises to pay fiat money.

Many commentators on the current situation in the euro area have argued that the default premia on interest rates paid by southern european countries reflect a confidence crisis that could be ended if the ECB set a floor on the value of sovereign debt from those countries. Nonetheless some other commentators, often from Germany, argue against such an ECB action, on the grounds that it would be inflationary. The US Federal Reserve system more than doubled the size of its balance sheet in late 2008 without creating, as yet, any substantial inflation. Most (though not all) monetary economists do not believe this creates much inflation risk. If above-target inflation were to emerge, the Federal Reserve could dampen it by raising the interest it pays on reserve deposits as well as by selling off some of its more liquid assets. Probably most of the German critics of the notion of the ECB as lender of last resort for euro area sovereign borrowers see this as inflationary for the same reason that some critics of the US Federal Reserve policy worry about a threat of inflation in the United States. The balance sheet expansion "creates money", which is seen as inherently inflationary. Those who see the US policy as not posing much inflation risk rely on the fact that the reserve deposit liabilities that the policy has created pay interest, and

3 *The method for calculating these gains and losses was simple. Using the Federal Reserve Bank of Dallas data on the market value of debt in the hands of the public, I calculated a total return based on the beginning of the year one-year interest rate on treasury debt. The gap between that and the sum of the year's change in market value of debt and primary surplus (from national income accounts) , minus unanticipated inflation, represents unanticipated real returns. This assumes an expectational theory of the term structure, and is distorted by the presence of debt of term less than one year.*

can be made to pay higher interest if necessary. This makes them quite different from non-interest-bearing "money". When non-interest-bearing money in the hands of the public expands beyond what people desire to hold for transactions purposes, there is a strong incentive to spend down the excess balances in an attempt to exchange them for assets that provide a return. But interest-bearing reserves may themselves be an attractive investment. They can expand without creating inflationary pressure.

Nonetheless, the German skeptics of a lender of last resort role for the ECB have a point, because the Federal Reserve has clearer fiscal backing than does the ECB. If it becomes necessary to raise interest rates on reserve deposits, the cash flow of net central bank earnings is likely to decline or even become negative. This would not happen if the Federal Reserve had a balance sheet like what it had before 2008, with assets mainly short term treasury obligations. Those are such close substitutes for reserve deposits that their rates are likely to move closely with reserve deposit interest rates. But with the expanded balance sheets of the central banks, returns on their assets will no longer necessarily move in parallel to the rate on reserve deposits. In the case of the ECB, sovereign debt assets could default. For both these reasons, future monetary tightening could require the central bank to ask for a capital injection from the treasury. For the ECB, there is no one treasury to respond. There is a formal "capital key", a set of proportions according to which countries of the euro zone are required to share in providing capital to the ECB when needed. But if this were required, Germany would bear a large part of the burden, and it would be clear that German fiscal resources were being used to compensate for ECB losses on other countries' sovereign debts.

So an ECB initiative to set a ceiling on rates paid on some countries' sovereign debts would not necessarily be inflationary. But for it not to be inflationary, there would have to be a commitment from the euro area as a whole, and from Germany in particular, to provide fiscal backing for the ECB if necessary. The backing might not need to be invoked if the commitment were perceived to be there, but if it were invoked, it would be an implicit fiscal transfer, which might be politically unpopular and would raise moral hazard issues. It could not be left as a precedent that an insolvent country gets bailed out by the ECB, which in turn is bailed out by the Treasuries of the rest of the EMU. Some form of cross-europe fiscal discipline would be needed.

4| The path forward

Most central banks are active in the market for their own countries' government debts. The Federal Reserve until recently treated the interest rate on Federal Funds (interbank loans of reserve deposits) as its target and implemented the target by buying and selling US treasury securities in the open market. The ECB has also used an interest rate target. At first it implemented the target not through buying and selling sovereign debt, but by offering loans with such debt as collateral, in repurchase agreements. It did not attempt to set separate rates on the debt of different countries, and since banks could use all such debt as collateral on similar terms, interest rates on the debts of different countries converged. This was a convenient way to make monetary policy in terms of a single target rate, while obeying the letter of the treaty restriction that the ECB not buy EMU government debt. But this led banks to put large amounts of such debt on their balance sheets, threatening financial stability, and as default premia on these debts have emerged, the ECB has intervened more directly, lending freely to banks to avoid fire sales of the bank debt holdings and taking some euro area sovereign debt onto its own balance sheet.

Thus the ECB is already in a position where its balance sheet could be affected by default of a large euro area country, already in a position where politically difficult fiscal backing could be required to avoid an inflationary outcome. The vision of some of the original signers of the Maastricht treaty was that sovereign debt default of euro area members would invoke no ECB response and that market discipline, without ECB intervention, would force fiscal responsibility on euro area governments. To implement this vision, ECB operational procedures would have had to be different. They would have had to avoid providing euro liquidity on euro area debt collateral. Their open market operations would have had to take a different form, using other assets.

It is true that the EMU and the ECB could revert to this vision, making clear to all its members that sovereign default will generate no ECB reaction and that there is no lender of last resort in the euro area. To moderate the effects of defaults, the EMU would then be likely to set itself up as a kind of bankruptcy court, as is already happening in the case of Greece. But this seems an unlikely resolution of the current crisis, for two reasons. One is that this vision would

return europe to something akin to the gold standard, with no lender of last resort, no inflation cushion against extreme shocks, and an implicit euro area bankruptcy court exacting sacrifices from delinquent debtors. It is not clear that the member nations thought this was what they were signing up for, or that, once the implications of this regime become apparent, that nations now in fiscal and economic distress would see it as worthwhile to stick with the euro. The other reason is that reverting to this vision will not help with the current crisis, because of the situation of the ECB and the european banking system. The implicit fiscal commitments and/or implicit inflation threats are already there.

My own best guess is that the ECB will in the end support the value of the debt of the large southern tier countries. If so, the earlier this commitment is made clear, the less costly it is likely to be. It is possible, though not at all certain, that such a commitment would in itself allow the southern tier countries to stabilise their fiscal situations, so that the commitment would in the end require little or no fiscal backing. But whether or not the ECB requires explicit fiscal backing, this episode will have made clear that to be viable the EMU requires euro area fiscal coordination to avoid free-rider problems and inflationary pressures. It should also be clear, though, that the fiscal coordination should include at least the beginnings of a mechanism to share the consequences of adverse shocks across euro area members.

If the ECB is not to be put in the position of enforcer of fiscal discipline, there needs to be a euro bond market where it can undertake country-neutral monetary policy open market purchases and sales. An expanded euro stability fund, empowered to purchase (or decline to purchase) euro area sovereign debt, financed by the issue of euro bonds, could provide the needed bond market. Ideally it should have some taxing power, perhaps via a surtax on the value added tax (VAT). An alternative arrangement would have the fund backed by capital injected by euro area governments, but this would raise the prospect of political negotiation over new capital injections in future crises. In either case, this would be a powerful institution and would need some form of democratic political accountability.

So there is some reason for optimism. If the ECB does continue to intervene strongly enough to prevent an attack on the debt of the large southern tier countries, it will force confrontation of the need for fiscal coordination. Though confronting the need will not automatically lead to the necessary institutional change, it seems to me that there is reason to hope that the political effort and innovation required will be forthcoming.

References

Cochrane (J. H.) (1998)
"A frictionless view of US inflation," *NBER Macroeconomics Annual*, 13, pp. 323-384.

Leeper (E. M.) (1991)
"Equilibria under 'active' and 'passive' monetary and fiscal policies," *Journal of Monetary Economics*, 27, pp. 129-47.

Sims (C. A.) (1994)
"A simple model for study of the determination of the price level and the interaction of monetary and fiscal policy," *Economic Theory*, 4, pp. 381-99.

Sims (C. A.) (1997)
"Fiscal foundations of price stability in open economies," *Discussion paper*, Department of Economics, Princeton University, *http://www.princeton.edu/~sims/*.

Sims (C. A.) (1999)
"The precarious fiscal foundations of EMU," *De Economist*, 147(4), pp. 415-436, *http://www.princeton.edu/~sims/*.

Sims (C. A.) (2001)
"Fiscal consequences for Mexico of adopting the dollar," *Journal of Money, Credit, and Banking*, 33(2,part2), pp. 597-616.

Woodford (M.) (1995)
"Price level determinacy without control of a monetary aggregate," *Carnegie-Rochester Conference Series on Public Policy*, 43, pp. 1-46.

The euro crisis: some reflexions on institutional reform

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The debate on the euro crisis understandably has had a strong short-term focus. Avoiding short-term disaster has been tantamount and the long-term sustainability issue sometimes neglected; yet, the institutional failure of the euro area forces us to reconsider current arrangements in order to restore credibility and sustainability. The article discusses various paths for the reform of the overall governance, from fiscal management to banking regulation, through the recent proposals to mutualise and repackage part of the sovereign debts into a supranational one or to introduce joint-and-several liability.

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To reflect on the future of the euro area and monetary unions more generally, it is useful to return to two well-known, but key observations about the causes of the euro area crisis.

Dual debt and competitiveness crisis

Short of an integrated global economic strategy, the euro area countries have not grown in tandem. Having failed or just not tried to implement reforms (labor market, pensions, pro-competition policies, tax collection infrastructure…) and having let wages increase much faster than productivity, Southern European countries have seen their competitiveness substantially reduced over the last decade. While the euro area is roughly in external balance, GIIPS countries (Greece, Ireland, Italy, Portugal and Spain) lost 20-30% competitiveness relative to Germany over the last decade.[1] As much trade is intra-European, substantial current account imbalances in Southern European countries emerged, leading to a concern about the sustainability of their debt.

Options are few. A *nominal devaluation* (high inflation and devaluation), the standard way for countries to restore competitiveness and avoid "default" (or at least formal default, as inflation is a form of expropriation) when over-indebted, is ruled out in a monetary union.[2] A *competitive disinflation*, with a substantial reduction of prices and wages, would require much coordination within each country and is rather unlikely to happen in Southern Europe. Finally, a *fiscal devaluation* (for instance in the form of an increase in VAT and a decrease in payroll taxes) would require a drastic increase in taxation in countries that are often already prone to fiscal evasion.[3]

At the same time, it would be hard for a country to abandon the euro; in the short run, this move would trigger an immediate run on banks;[4] furthermore, the state might have trouble paying pensions and salaries even if it defaulted. In the longer term, the country would forego the benefits of being pooled with countries perceived as more trustworthy.

Weak european institutions

The European Treaty's Excessive Deficit Procedure put the European Commission (with a needed backing from Commissioners) in charge of monitoring country compliance with the ceilings of 3% for the budget deficit and of 60% for public debt. The real power however lies with the EcoFin Council, which decides whether a deficit is indeed excessive.[5] The EcoFin Council does not exert sufficient pressure. In contrast with, say, the IMF, the EcoFin council is too political, and therefore judge and party. As an outcome, no sanction has ever been applied.[6]

The political bias toward *laissez-faire* is understandable. First, there is little for a country to gain by insisting on imposing discipline on another country that does not comply with common rules; the former is unlikely to be pivotal in the 17-member euro area decision-making process while it can get into the latter country's bad books by taking an adversarial stance. Second, political benefits may dominate reputational concerns; a case in point is Europe's deliberate ignorance of Greece's and Italy's accounting gimmicks (well-documented by Eurostat and others) in order to allow these countries to join the euro area. Third, enforcers may feel that they will be granted a similar favor when their turn comes. Interestingly, France and Germany themselves violated the rules in 2003. Thus, free riding, political agendas and quid pro quos all concur to make sanctions an empty threat.

Ex post sanctions require not only courage, but also some thinking. Financial sanctions often are inappropriate, as they increase financial pressure at a time at which the country is already in financial straits.[7]

1 *A prescient view on the likely consequences of this evolution (finally published as Blanchard 2007) was Olivier Blanchard's analysis of the Portuguese case.*
2 *This "smoother default" is one of the reasons why the United Kingdom, the United States, and Japan, which also have fragile public finances, currently have an easier time refinancing than distressed European countries.*
3 *See Farhi* et al. *(2011) for a general result on the feasibility of fiscal devaluations.*
4 *Introducing a new currency takes time and cannot be achieved overnight. Optimally the decision needs to be secret and a banking holiday be declared.*
5 *Very recently, though, the Commission regained a bit more power through the new EU governance measures (the so-called «Six Pack»).*
6 *There have been so far 97 violations (year/country) of the 3% rule, including 68 outright violations (29 corresponded to allowed violations linked to a recession).*
7 *The Stability and Growth Pact specifies a fine of 0.2% of GDP for each year, but the first, in which the deficit exceeds 3%; financial sanctions have been extended to encompass debt level violations as well under the third version of the Stability and Growth Pact.*

In this spirit, De Grauwe (2011a) criticises the ESFS penalty rate lending policy.[8,9] One can understand the willingness to discourage excessive borrowing in the first place. However, just like (never enforced) Stability and Growth Pact (SGP) sanctions aggravate deficits at a time distressed countries have difficulties controlling them, so do high interest rates on loans.

This difficulty of imposing monetary sanctions is familiar from the prudential regulation realm as well, as troubled banks are not asked to pay fair-value deposit insurance or exorbitant rates at the discount window; it is understood that high deposit insurance or interest rates would compound the banks' solvency problem rather than solve it. Instead, troubled banks optimally see their discretion reduced and their balance sheet downsized; a case in point is the 1991 FDIC Improvement Act in the United States, which specifies reduced degrees of operating freedom as the banks become less capitalised.

Similarly, and as is indeed standard practice for IMF programmes (as well of the "Troika – EC, ECB and IMF –" programs in Europe), troubled countries should see their sovereignty reduced rather than face monetary sanctions: their budget should be carefully monitored and structural reforms promoting competitiveness required, while protecting the poorest inhabitants. Needless to say, such interference is politically difficult and often successfully resisted, except when the country is about to fall off the cliff and accepts IMF-type conditionality.

European institutions also have had a bad record in the current crisis. Leaving aside attempts at shifting the blame (blaming rating agencies and speculators, which does not enhance investor confidence), lenient stress tests for banks (for example, Dexia was deemed solvent just before it defaulted),[10] and a loss of credibility stemming from some confusing announcements proclaiming an inflexible determination to honor fully sovereign commitments and ruling out private sector involvement prior to Greece's default[11] on July 21, 2011, two recurrent problems are worth discussing:[12]

Buying time

Larry Summers[13] reminds us of Daniel Ellsberg' use of Pentagon Papers to document the US administration indecisive approach during the Vietnam War *"At every juncture [policymakers] made the minimum commitments necessary to avoid imminent disaster – offering optimistic rhetoric, but never taking the steps that even they believed could offer the prospect of decisive victory. They were tragically caught in a kind of no-man's-land – unable to reverse a course to which they had committed so much, but also unable to generate the political will to take forward steps that gave any realistic prospect of success."* and aptly points at the similarity with European decision-making with regards to the Euro crisis. The December 9, 2011 meeting was the 15th in the last 22 months. All – at least in their resulting decisions – have been mainly preoccupied by the short-run goal of avoiding an imminent collapse. As we will discuss later, though, some headway was made at that meeting.

Allocating risk in an ambiguous manner

Another area where European policymakers have been indecisive concerns who will foot the bill in case of sovereign default. Should the official sector cover the losses or rather impose private sector involvement (PSI)?

The perceived or implicit promise until Greece defaulted on July 21, 2011 was the absence of default,

8 *The European Financial Stability Facility (EFSF) was created in 2010, and will become a permanent rescue fund in July 2012 (the European Stability Mechanism). Its remit is to provide loans to euro area countries in trouble.*

9 *Ireland borrowed from the EFSF at almost 6% for example; its risk premium was scaled back at the July 21, 2011 summit. The future ESM will lend at 2% above its funding rate.*

10 *Stress tests were published by the European Banking Authority in July 2011 for 91 European banks. 8 flanked and 16 were warned to be insufficiently capitalised. Dexia, which went bust early October, was in the healthy group.*

11 *Technically Greece is not "in default", as default is defined as a lack of repayment. The European Union twisted the arms of European banks to "voluntarily" forego some of the value of their assets.*

12 *Another institutional handicap of European institutions is the speed of reaction. For example the July deal took 3 months to ratify. In the meanwhile the ECB had to fill the gap. To be certain, ECB had already become a fiscal authority anyway. It had become a lender of last resort by substantially expanding the size of its balance sheet in the last few years (through its EUR 180 billion securities market programme), and this expansion had accelerated in the recent months. Since then, on December 8, 2011, the ECB announced measures to support bank lending and money market activity; in particular it decided to conduct refinancing operations (LTROs) with a maturity of 36 months and the option of early repayment after one year. On December 21, 2011, euro area banks rushed to take out the corresponding low (1%) interest rate, three-year loans and borrowed 489 billion euros. At the time, it was unclear whether banks would use this money to buy sovereign debt (as was suggested by France) or just use it to boost their balance sheets. But so far, ECB interventions have not led to inflationary pressures.*

13 *Summers' op-ed was published in the September 18, 2011* Financial Times.

as Europe was widely expected to bail out troubled countries; in effect, until last July Europe was ruled by an implicit full joint-and-several liability. The preservation of the sovereign risk-free regulatory tag by prudential supervisors further reinforced financial institutions' belief that euro area countries' sovereign debt was perfectly safe. Greece's default, like Lehman's in 2008, was the wake-up call that the widespread perception of full guarantees may have been erroneous after all. PSI still is an object of intense debate.

Who foots the bill is not solely a redistributive matter between public and private sector. First, ambiguity creates large gambling opportunities. Spreads of 6 or 10% create substantial gain opportunities if PSI is indeed excluded ex post, while country risk exposes financial intermediaries to large losses if policymakers instead opt for PSI. This creates a large-scale conundrum for banking regulators in their determination of the risk weights to be applied to bank holdings of sovereign bonds. In particular the zero or low risk weights currently applied may encourage banks in trouble to use risky sovereign bond investments to gamble for resurrection.

Second, the discussions on who should bear the burden of sovereign default are unstructured. They mention valid arguments but generally lack the "big picture". Arguments include the "ex post view" that private sector involvement makes it difficult for a troubled country to roll over its debt in the marketplace; and the "ex ante view" according to which ex post solidarity among countries to bail out each other when distressed creates moral hazard.

Section 3 will develop a couple of frameworks that bear on the allocation of country risk between the market and the international community. Economics teaches us that the key driver of an optimal allocation of risk should be the incentives it creates. The most familiar theory in this respect is the monitoring theory: who foots the bill also determines who monitors. Regardless of one's view as to who (international community, market) is a better monitor, one will agree that the recent *no-man's land* has proved rather unsatisfactory: governments have imposed no discipline on each other and markets have long thought that their lending to weak sovereigns would go unpunished. Put differently, no-one felt accountable.

1| A BROADER REMIT FOR THE STABILITY PACT?

It has long been understood that Europe, with its limited labor mobility and its quasi-absence of an automatic redistribution mechanism (a federal budget), is not an optimal monetary zone. Even though one should not take institutions as cast in stone,[14] it seems unlikely that fiscal federalism will come about, as it would presumably involve large and predictable transfers across countries.

Short of fiscal federalism, European countries will still have to accept a substantial loss of sovereignty if they are to continue living together. Fortunately, there is still some scope for making institutions more compatible with the existence of a monetary union. Two reforms come to mind:

1|1 Regulating the banking sector at european level

Financial regulation by and large still operates according to the country-of-origin rule: national regulators supervise the financial institutions chartered in their country. There are at least two rationales for centralising prudential regulation at the European level and creating an independent supervisory authority. First, it is unlikely that all 27 financial regulation authorities in Europe (17 in the euro area) are sufficiently well-staffed to match the sophistication of private banks.

Second and more to the point for the focus of this paper, there is growing awareness that private debt is now public debt; the banking fragility following the construction booms in Ireland and Spain is a case in point; Ireland and Spain did not have extravagant public deficits and debts to start with. But banking bailouts threatened to take a heavy toll on public finances. More generally, many exchange rates and sovereign debt crises start with a credit expansion and a real estate bubble that authorities treat leniently.[15]

Europe does have supranational financial authorities such as the European Systemic Risk Board (ESRB)

14 *Taking US history as a precedent, then the first step was balanced budget amendments ("golden rules") introduced in the 19th century. The growth of the Federal Government came much later.*
15 *See Reinhart-Rogoff (2009).*

and the European Banking Authority (EBA). But these do not have the prerogatives of ordinary regulators. For example the ESRB can go and see national regulators and suggest some change of course. It can ask the domestic regulator to "comply or explain"; while the threat of embarrassment always has some impact, there is only so much that can be expected from such an approach; for, to make it public that the national regulator is putting the domestic financial sector at risk, the ESRB must voice concerns about the country's financial sector and thereby run the risk of unsettling markets and triggering a run on the country. For good reasons, crying wolf is not part of central bankers' culture.

1|2 Fiscal rules and independent fiscal policy councils[16]

There has been much discussion lately about using golden rules specifying a (cyclically adjusted) target for the budget deficit.[17] As with all constraining rules, they are resisted for two reasons: the reduced freedom left to those whom they constrain, and the need for the population to come to terms with the notion that those who govern are not necessarily to be trusted and just like everybody else react to the incentives that there are confronted with.[18]

Design issues

Golden rules raise complex design and enforcement issues and are no panacea.[19] These difficulties are not a fundamental flaw and golden rules should be strongly endorsed. In this respect, the December 9, 2011 summit's project[20] is encouraging, as it calls for a binding golden rule (specifying a maximum primary deficit – i.e. gross of debt service – below 0.50% over the cycle),[21] automatic sanctions (reverse qualified majority voting),[22] and enforcement by the European Court of Justice.

Designing good fiscal rule features, such as for example cyclical adjustments principles, is not straightforward. Furthermore, capturing debt sustainability through a single cap requires converting contingent liabilities and revenues into current recommendations. In theory, investments that will improve tax revenue or the current account in the future should not be treated as current consumptions and therefore not be subject to cash accounting (which fully charges investments to the budget).[23]

The issue is mainly a practical one of where to draw the line, as most public policies can always claim the existence of some benefit down the road; in practice, this is doable primarily for investments that produce tangible revenues, although one can rapidly grasp the difficulties involved in defining revenues: a one-shot compensation to owners of taxi medallions against a (credible) introduction of competition reducing taxis fares by half is obviously an investment, although it creates no revenue for the government. Investments in higher education or in creating efficient labor markets generate similar accounting difficulties. Or to take a topical example, the recapitalisation of a bank through public capital, financed by public debt, raises the question of which part is an investment (restructuring) and which part is "consumption" (political benefits or capture).[24]

Likewise, a number of policies transform contingent assets or liabilities into cash (privatisation, tax amnesties against one-shot payment, public-private partnerships[25]...) or the reverse (lending to corporations or countries in trouble). Even traded assets (say, gold, oil or gas reserves) raise accounting

16 *For description of the institutions and performance of existing fiscal councils, see e.g. Debrun-Takahashi (2011), von Hagen (2010) and Wren-Lewis (2011).*
17 *Traditionally, a golden rule refers to the constraint that current taxes cover current expenditures (borrowing being allowed for long-term investments), but we will use the term more broadly to describe rules that constrain budget deficits and borrowing.*
18 *For a discussion of how the electorate's motivated beliefs shape public policy, see Bénabou-Tirole (2011).*
19 *For this reason, it is often proposed to err on the conservative side, by requiring that fiscal adjustments take the form of a surplus reserve fund that can be tapped into in a recession, but no deficit ever.*
20 *On January 29, 2012, 25 of the European Union's 27 countries signed up to the treaty enshrining the tougher fiscal rules (the United Kingdom and the Czech Republic did not sign).*
21 *This golden rule is largely inspired by the German one, which among other things prescribes (from 2016 on) a maximum deficit of 0.35% of GDP in the absence of output gap, is cyclically adjusted (except for the possibility of a natural disaster), mandates the use of external measurements and intertemporal recordkeeping. The German golden rule also gives a prominent role to the Constitutional Court in Karlsruhe in enforcing the rule.*
22 *The adoption of a reverse majority rule has been recommended many times earlier, including in the van Rompuy report in 2010.*
23 *The UK government reports public net borrowing. Since 1997, it is in principle obliged to borrow only to finance capital (over the cycle). In this spirit, Blanchard and Giavazzi (2003) have proposed that the budget be balanced for operational purposes and that debt be employed solely to finance public investments.*
24 *These behaviours do not exhaust possible government behaviours in bank bailouts: see Hertig (2012) for taxonomy and an empirical analysis.*
25 *See Maskin-Tirole (2008) for references on accounting issues in public-private partnerships and for an attempt at modeling the relevant trade-offs in an environment in which politicians may try to funnel hidden future rents to contractors or pander to special interests.*

issues, such as fair value versus historical cost or the choice of a depreciation rate for investments, which are familiar in private sector accounting.

Defined benefit pensions loom particularly large in the mis-measurement of public debt. They usually are off-balance-sheet and thus not treated as public debt on the ground that they are only contingent liabilities. To be sure, and as we observe now in some southern European countries, pensions can be reduced; the scope for adjustment remains rather limited, though. In the United States, the main loophole seems to have been state pension commitments; unfunded liabilities (USD 3.23 trillion out of a total of USD 5.17 trillion pension liabilities of the 50 states) are not counted as debt. Total state debt with pension liabilities included is actually almost 4.5 times the value of outstanding state bonds (Novy-Marx and Rauh, 2009).

Debt sustainability is a complex phenomenon and the detection of accounting tricks requires expertise; regardless of the institutions in charge of enforcing them, golden rules require the public sphere to boost its economic analysis capability. The need for technical expertise and the prevention of manipulations calls for the creation of independent fiscal councils endowed with professional bodies.[26] These independent bodies must include not only economists, but also members (coming from the ministry of finance/budget or the general accounting office) with expertise on all the gimmicks that are employed to conceal deficits and debt. Their composition, independence and processes could be audited by the IMF, as suggested by Rogoff (2011).

Enforcing fiscal discipline is also complex: in practice independent fiscal councils issue reports and forecasts; their forecast may need to be used by governments when preparing their budget. They may have a broader remit than issuing independent forecasts; for instance, the Swedish fiscal council looks at the consequences of government policies.

But fiscal councils do not enforce compliance. Constitutional courts, such as the one in Karlsruhe for Germany, do.[27] But these courts' economic expertise must be beefed up.

A fiscal rule is only one element of a set of good practices for fiscal policy. John Hassler argues[28] that the Swedish success in the matter (spending ceilings have been respected) owes not only to a successful Fiscal Policy Council with a broad remit and a fiscal rule specifying a 1% surplus target over the business cycle,[29] but also to complementary features: a top-down approach to budget planning (starting with decisions on aggregate spending and income, and disaggregating), three-year decisions on spending ceilings, prespecified budget buffer for unexpected expenses, and balanced budget requirement on local governments.

Political economy of balanced budget rules

Another key factor for the success of golden rules is a political and popular support for budget discipline. Countries such as Sweden, Germany or Chile benefit from a broad consensus in the matter and reforms have by and large been bi-partisan.[30] A serious concern in countries like France and some other countries in Southern Europe is that golden rules are the objects of maneuvering and clashes within a political establishment rather unkeen to see its prerogatives reduced. This absence of bi-partisanship, together with the recent concerns about the United States (driven mainly by a political inaptitude to come to terms with budget realities), serves as a reminder that institutions cannot deliver optimal outcomes if they do not gather a minimum level of political consensus.

The history of the United States provides an interesting case study for the development of balanced-budget rules (see for example Henning-Kessler 2012 for an excellent discussion). Following the Revolutionary war and under Treasury secretary Hamilton, the

26 *In Council Directive 2011/85/EU (8 November 2011) on requirements for budgetary frameworks of the Member States, it is also envisioned that Member States compare their forecasts with those of the Commission and of independent bodies; and that fiscal rules be equipped with well-specified targets together with effective monitoring by independent bodies (or at least bodies that are of the fiscal authorities of the Member State). According to the Commission proposal of 23/11/2011 (currently under discussion in Council and Parliament), euro area Member States would be required to have in place independent fiscal councils and to base their budgets on independent forecasts.*

27 *In the United States, balanced budget rules are better enforced when the state's Supreme Court judges are elected rather than nominated by the governor and confirmed by the legislature (Bohn-Inman 1996).*

28 *Presentation at the Banque de France-Toulouse School of Economics conference held at the Banque de France on December 19, 2011.*

29 *By contrast, no budget in France was balanced since 1974!*

30 *There has been some recent bickering in Sweden, but amusingly it was the opposition that proposed a bit more stimulus.*

Federal Government assumed all state debts in 1790. Federal bailouts became the norm until the 1840s. Congress then rejected assumption petitions by bankrupt states (this was facilitated by the facts that financially sound states were a majority, that the economy was less dependent than earlier on foreign capital, and that the United States had little stake in state bonds). During the 1840s and 1850s the states voluntarily adopted budget-balance rules. The complete absence of bailout of states by the Federal Government has been the norm since, despite the fact that regularly some states got into fiscal trouble; the one exception is the bailout of District of Columbia in the 1990s, and this bailout involved Congress managing the state's budget for 4 years. Similarly, municipalities and counties have not been able to benefit from bailouts by higher authorities; there has been a single instance of state bailout of a municipality in the entire US history.

The Federal Government in the United States plays an important stabilising role through automatic stabilisers and countercyclical policies. Furthermore, discretionary policies, such as the 2009 stimulus package, are often directed toward covering shortfalls of revenues at the state level (up to 75% of the stimulus package was used to finance state deficits rather than fund new projects).[31] Nonetheless, states are fully accountable for their debts.

These observations raise the question of whether the euro area should mandate the adoption of balanced-budget rules. Obviously, the credibility of such rules would be much enhanced if the euro area countries appropriated these rules (ownership). Yet, the spontaneous adoption of rules in the United States in the mid-19th century followed a strict no-bailout policy, which in Europe would probably prove very costly.

2| Banking reforms

In the wake of the 2008 financial crisis, there is a widespread recognition that prudential regulation and supervision require a substantial revision. This is not the place to discuss reforms that were or likely will be put in place.[32] But some of these reforms interact with institutions that might emerge from the euro crisis, and so I should at least touch on the issues.

With some caveats, I feel that banking reforms on the whole go in the right direction: enhanced capital requirements (in the medium term, to avoid running the risk of a massive credit crunch in the midst of a recession); introduction of a countercyclical buffer[33] and of stricter liquidity requirements (while recognising our yet limited knowledge as to how to properly measure the cycle and the notion of liquidity); stricter rules on pay (in Europe, the United States has still some way to go); increased attention to systemic factors; better risk measurement.[34]

I have more reservations concerning opposition to the use of ratings for regulatory purposes (as the Dodd-Franck Act suggests). To be certain, one could regulate rating agencies more tightly whenever their ratings are used by the official sector for prudential purposes or to determine the quality of collateral accepted by central banks. One might also reduce the sensitivity of capital requirements to the ratings. But shooting the messenger could prove a grave mistake. First, arguments against ratings usually focus on their shortcomings, without pondering about the alternative. In the absence of ratings, rumors and privy information in the markets would take center stage.

Second and especially, it is not clear how officials in government and central banks would assess

31 *See Henning-Kessler (2012) for more details.*

32 *There are many articles and surveys about the causes of the recent crisis and their implications for policy reforms. My own views can be found in Dewatripont* et al. *(2010).*

33 *See also Bolton-Samama (2010) for a proposal involving contingent bonds. By contrast, Bolton* et al. *(2011) look at the cyclical implications of using ratings as a prudential tool.*

34 *Improving risk measurement has always been a concern since the introduction of risk weights in Basel I regulations in 1988. Some Basel II reforms were unfortunate. For instance the risk weight on mortgages was reduced from 50% to 35%; that on the trading book was widely acknowledged to be too lenient; etc…The new regulations have corrected some of these mistakes. Still there is a widespread feeling that proper risk weights are hard to design. Because of this, regulators have introduced a non-risk-based additional constraint, the leverage ratio. The leverage ratio, though, is a very poor statistic for the riskiness of a bank.*

the riskiness of financial institutions and assets. One alternative approach would consist in using internal assessments made by regulators and central banks. This approach might be most appealing in the case of sovereign bonds, for which it is often argued that rating agencies have no specific information (by contrast with corporate bonds). On the other hand, this gives much discretion to regulators, who may use their assessment to exert forbearance.

Another alternative to ratings in prudential supervision is the use of internal risk based (IRB) models for qualified banks. While these models are monitored by supervisors, they leave much discretion to the institutions and would leave even more discretion in the absence of ratings. Regulators have substantial bargaining power vis-à-vis rating agencies, which derive much profit from their role as auxiliaries of prudential regulation; and even though regulating credit rating agencies is no easy task (e.g., Coffee 2007), regulators can use their leverage to have some control over process and deontological rules adopted by the rating agencies.

I also have mixed feelings concerning the tax on Systemically Important Financial Institutions (SIFI).[35] I am concerned that supervisors, who are already struggling to keep up with the traditional regulated sphere (commercial banks, insurance companies, pension funds) will lack the staff to monitor a much broader financial sector. The ease with which financial activities can migrate toward new players (energy companies for instance) and the difficulty in measuring who is "systemically important" (would LTCM or AIG have been deemed to be systemically important?) are causes for concern. An alternative is to protect the regulated sphere against defaults of non-regulated players. In this respect, the proposals on the use of clearinghouses (to assess and contain systemic risk) and of standardised products (to be able to measure clearinghouse solvency and thereby prevent them from reaching a stage in which they would invariably be deemed too big to fail) seem well-taken.

Returning to a point made in the introduction, another area where risk measurement needs to be improved is sovereign risk. The European Banking Authority in October 2011 recommended the use of a temporary capital buffer by European banks, so as to reflect current market prices.[36] At the BIS, Hannoun (2011) argued in favor of removing the risk-free sovereign tag. According to a recent IMF study,[37] European banks had EUR 339 billion exposure to GIIPS.[38] Not all was measured at market value: sovereign holdings by European banks decompose into 12% in the trading book (fair value), 49% available for sale (fair value; unrealised losses reduce equity, not profit), and 39% held to maturity (no recognition of losses).

Banking regulators have traditionally been generous with the assessment of sovereign risk, considering since Basel I that OECD countries could not default. Under current Basel rules, risk weights for sovereign debt rated AAA to AA– are still 0% (furthermore, Europe uses 0-risk weight for euro area countries for the purpose of stress tests.[39] The United States continues to apply 0 risk-weights to OECD countries). The low capital requirement, together with a new demand for "liquid" assets to satisfy the liquidity coverage ratio, creates a strong incentive for banks to hold sovereign debt.

Finally, efficient cross border resolution mechanisms are widely acknowledged to be a key issue for the future of regulation.

3| The eurobond debate

Solidarity among euro area countries has taken center stage in the policy discussions about the current crisis. Should solidarity take the form of Eurobond issues, a stability fund, a mechanism in which euro area countries are jointly liable for each other's default, or more informally an ex post bailout policy? While these questions make daily headlines,

35 *On October 11, 2011, the US Financial Stability Oversight Council (FSOC) voted to monitor large hedge funds, asset managers, mutual funds, insurance companies, and other financial institutions whose failure might jeopardise the financial system. The FSOC's criteria are: debt level, derivative liabilities, leverage ratio, short term debt, CDSs written against the company. By contrast, the Basel Committee proposes the following equal-weighting indicators: size, interconnectedness, lack of substitutes for their services, cross-jurisdictional activities, and complexity.*

36 *Of course, market prices may be socially meaningless if guarantees and bailouts are expected. But from the point of view of banks they are relevant.*

37 IMF Global Financial Stability Review, *September 2011*.

38 *Euro area countries are particularly exposed to European risk: for example, foreign claims (cross-border and local claims of affiliates) on the public sector of Italy were, according to the same study, EUR 105 billion for France, 51 billion for Germany, 13 billion for the United Kingdom, and 13 billion for the United States.*

39 *The Capital Requirements Directive in the European Union based on Basel II, in its annex, specifies that exposures to Member States' sovereign debt and to the ECB receive a risk weight of 0%.*

few elements of analysis are available. The purpose of this section is to shed some light on the relevant considerations.

3|1 Allocation of risk between the sovereign and its creditors

To put the proposals in perspective, it may be useful to remind ourselves of some economics of sovereign borrowing. This section focuses on the allocation of risk between the borrowing country and its foreign creditors, which has been the focus of the economic literature.

Liquidity vs. solvency

Economists distinguish between liquidity and solvency problems. A solvency problem arises when the primary deficit and competitiveness problems make the path of sovereign debt unsustainable. A "pure liquidity problem" (*à la* Calvo 1988) arises when a country is actually on a sustainable path, but self-fulfilling realisations force it to pay very high interest rates, making its debt grow fast (especially if the sovereign debt has a short maturity) and in the end making it indeed difficult to reimburse the debt. The liquidity view of sovereign crises thus emphasises self-fulfilling realisations of insolvency; the country's fundamentals are such that the debt could be sustainable, and indeed there is another market equilibrium in which the country maintains an easy access to the international debt market.

Whether a country is suffering from a liquidity crisis or from a solvency problem is often hard to tell; both lead to high interest rates and ultimately a lack of access to international capital markets. My hunch is that both are at work in Europe today, except for Greece whose insolvency under the *laissez-faire* path was transparent.

Unfortunately, desirable policies depend radically on the diagnostic. Illiquidity problems call for widespread guarantees against country default, while insolvency problems require interference with country policies and acceptance of a potential default.

Insurance/moral hazard tradeoff

Countries understandably want to be insured against adverse shocks; on the other hand, insurance reduces accountability and countries can avail themselves of many ways to "expropriate" foreign investors: through default, devaluation, or extractive activities (taxation, straight asset expropriation). Policies leading to such expropriations fall into two groups:[40]

- policies leading to a lack of competitiveness: labor laws, investments in non-tradable – real estate typically – rather than competitiveness-enhancing investments, protection of specific professions...;

- policies leading to public debt concerns: high public spending and low taxes – or insufficient tax collection efforts –, lax banking supervision, failure to reform the pension system...

High costs of devaluation or default counter the insufficient internalisation of foreign investors' welfare and create a commitment to repay foreign investors. This may explain why untrusted countries often exhibit the "original sin": emerging countries' (public and private) liabilities to foreign investors are often debt liabilities, which are short-term and denominated in foreign currency (the dollar, say). Original sin liabilities limit foreign investors' exposure to country moral hazard by making their claim less sensitive to bad country policy; but they expose the country to more risk.[41]

Symptoms of concern about such moral hazard are many. As we just saw, countries that are not trusted must issue debt that is short-term and denominated in a foreign currency. To assess whether a country is trustworthy, foreign investors scrutinise not only economic fundamentals, but also domestic political economy features. They thereby try to understand whether policies that protect investment are likely to be implemented; for example, such policies are more likely to be adopted, the more evenly distributed

40 *The discrepancy in behaviour before and after accession to the euro area is an illustration of potential moral hazard in our context.*

41 *An interesting issue is whether unregulated market lending to the country's private sector is optimal. In a pure moral hazard context, the answer is no; the country actually ends up being exposed to too* little *risk; for, private lender-borrower relationship do not internalise the disciplining effect on the government of risky forms of liabilities and therefore their impact on other lender-borrower relationships (Tirole, 2003). Two arguments operating in the other direction – excessively risky equilibrium borrowing – will be given shortly.*

security ownership is in the domestic population (say, because pensions are funded rather than pay-as-you-go). Similarly, it is understood that a home bias in portfolio investment, despite substantial costs in lack of diversification, makes it more likely that investor-friendly policies be adopted. Yet another symptom of the existence of moral hazard is the routine use by the IMF of stage financing (i.e. making tranches contingent on progress made) when implementing a restructuring of a country's debt.

Concerns over moral hazard also loom large in the legal debate on sovereign debt restructuring. Sovereign debt contracts often are written under New York law (the most common relevant law for sovereign borrowing), and include clauses such as the unanimity rule and the pari passu clause. It is well-known that such clauses favor holdouts and thereby create difficulties for restructuring debt;[42] and so there have been widespread calls for including collective action clauses (CACs), which incidentally will be the case in the euro area starting in 2013.[43]

There has been much debate among economists and among lawyers as to whether collective actions clauses are desirable; for, while they definitely improve the countries' ability to restructure when in trouble, they do not come for free: lenders' protection is reduced and the higher likelihood that they will have to incur losses makes them less eager to lend in the first place. So CACs, while offering undeniable benefits, should not be viewed as a panacea.

Bolton and Skeel (2004) argue that short-run political incentives introduce a bias toward hard-to-restructure sovereign borrowing. Borrowing with high restructuring costs bring a short-term benefit – borrowing at a cheaper rate – at the cost of a delayed and uncertain costlier default if the country gets into trouble.[44]

Adverse selection and stigma

Signaling provides another reason why countries may choose to make default excessively costly. Interestingly, the same features that make countries more accountable for their misbehaviour (debt that has short maturity and is denominated in foreign currency) can be also explained by posturing/signaling concerns. To avoid stigma, countries may bend over backwards to demonstrate that they are confident that they will not encounter debt problems (so may do multilateral institutions or central banks, as was the case when Greece was deemed able to repay its debts). To this purpose, they take on dangerous forms of debt. Thus while dangerous forms of debt are vindicated by moral hazard problems, excessive dangerosity can also be observed due to adverse selection.

More generally signaling concerns are ubiquitous in foreign borrowing. They explain for instance the unfortunate experience with what a priori was a good idea: IMF's contingent credit lines (CCL), which gave countries an automatic access to a credit line support and thereby reduced the risk of illiquidity. CCLs were never used.

Renegotiation and soft budget constraint

Commitment is not easily achieved in the international finance realm. In fact, debt contracts are routinely restructured in ways that were not planned ahead. This is understandable: private creditors prefer to cut their losses and strike a deal than confront the possibility of a full-fledged default. Commitment is also hard to achieve when creditors are (directly, or indirectly through exposures of their banking system to the troubled country) sovereigns themselves. As is well-known, the EU treaty had ruled out bailouts, but Europe reneged on this commitment.

42 *A well-known case in point is Argentina, which defaulted in 2001 on sovereign debt without collective action clauses. Argentina succeeded over the years in getting 93% of bondholders on board for an offer reimbursing 35 cents on the dollar (a low offer by historical standards). At the date of this writing, holdouts still create difficulties for Argentina to return to international capital markets (for an account, see "Gauchos and Gadflies",* The Economist, *October 22, 2011, pp. 82-83).*

43 *Under a collective action clause, a supermajority of bondholders (often 75%) can agree on a debt restructuring with the Sovereign. That agreement is then legally binding on all other holders of the bond. Collective action clauses will be introduced for new bond issues starting in 2013. Collective action clauses much facilitate the restructuring of sovereign debt ex post, but they also make it harder to issue debt ex ante. De Grauwe (2011a) notes that euro area bond spreads went up when Germany proposed to introduce such clauses in October 2010. Already about ten years ago the IMF proposed to introduce an automatic stay mechanism, the "Sovereign Debt Restructuring Mechanism" (SDRM), in which a debtor-creditors negotiation was meant to lead to an agreement that would come into existence if voted by a supermajority in each class.*

44 *Bolton and Skeel move on to argue in favor of the use of first-in-time absolute priority rule in SDRMs (as a baseline).*

3|2 Allocation of country risk between the market and the international community

While a rich literature analyses the sharing of risk between a sovereign borrower and its creditors, much less is known concerning the optimal allocation of risk among creditors: official sector vs. private investors; and among countries within the official sector.[45]

Who, of markets and governments, should bear the burden of default? In the current context, who foots the bill also determines who monitors. If *markets* are to monitor countries by removing their access to financing when bad policies are selected, then the private sector should be made accountable: banks should bear the burden for losses they incur when lending to the country; and prudential regulation should treat risky sovereign debt as a risky asset when computing capital adequacy requirements. If the *official sector* is in charge of controlling debt sustainability, then it should foot the bill and also intervene whenever a country's indebtedness path may not be sustainable. As we noted above, none of these alternatives prevailed in the euro area crisis.

As for the allocation of risk within the official sector, it is generally assumed in the European context that other euro area countries are the natural providers of insurance. This assumption, which is reflected in negotiations and current bailout policies, is at first sight startling. After all, insurance economics points at the desirability of spreading risk broadly, and not allocating it to a small group, which moreover may well face correlated shocks. Indeed, alternative cross-insurance mechanisms (taking the form of liquidity provision to countries) already exist, that do not involve insurance among countries within a monetary zone. We already noted that the IMF introduced in 1999 the CCL (replaced in 2009 by the Flexible Credit Line, with qualification criteria, but no pre-disbursement conditionality).The Chiang Mai Initiative, launched in 2010, is a multilateral currency swap arrangement pooling USD 120 billion. It encompasses the ten members of the Association of Southeast Asian Nations (ASEAN), the People's Republic of China, Japan, and South Korea. Crucially, this scheme involves insurance among countries with different currencies, unlike the euro area scheme.

This raises the question of comparative advantage in the provision of official sector insurance to a sovereign. Insurance can be non-contracted-for/spontaneous/ex post, as in the case of a bailout, or contractual, as in the case of joint-and-several liability. Bailouts are driven by the fear that spillovers from the distressed country's default negatively affect the rescuer. In this sense, countries that are deeply intertwined within a monetary zone may be more natural providers of insurance than less connected countries. Collateral damages of a country's default are de facto collateral for the country.

Joint-and-several liability mobilises further collateral. In effect, a country's default becomes its guarantor's default if the latter fails to abide by its obligation to stand by the defaulting country. So the guarantor's incentive to pay is larger than in the absence of joint liability. But joint liability also makes domino dynamics more likely.

3|3 Mixing solidarity and market discipline

Introduction

Starting with a proposal by Delpla and von Weizsacker, three proposals mixing solidarity with a market mechanism have attracted wide attention in policy circles:

- "Blue bonds/red bonds" (Delpla-von Weizsacker, 2010)
- "Eurobills" (Hellwig-Philippon, 2011)
- "European safe bonds" (Euro-nomics group, 2011).

A first caveat: my understanding of the implications of these three innovative proposals is still very imperfect, and so the following notes are to be taken with a grain of salt and are only meant to stimulate further thinking on them. Furthermore, formal analyses will in the future substantially clarify their properties.

Second, despite the prominence of these three academic proposals, we should note the existence

45 *The official sector comprises governments and their agencies, central banks, government controlled institutions and international institutions. For the purpose of an economic analysis, banks that are likely to be bailed out by their government can also be considered as part of the official sector.*

of related institutional suggestions. For instance, the German Council of Economic Experts, in its November 2011 report, argues for a "European redemption pact" in which national debt caps are binding and joint-and-several liability applies to 60% of country GDP and countries pledge collateral: 20% of loans in currency reserves, and earmarking of national tax revenue to further guarantee repayment.

In a Green Paper, the European Commission (2011) discusses various options for "Stability Bonds", which would be jointly issued by Member States and accompanied by a substantially reinforced fiscal surveillance; these bonds' guarantee structure could range from the absence of joint liability (each Member State is liable for its share of liabilities) to joint-and-several liability (Members are liable not only for their own share, but also for the others' share in case the latter default), with an intermediate arrangement consisting of an absence of joint liability but some seniority and collateral enhancement (seniority status for Stability Bonds, partial collateral in gold or other assets, earmarking of specific revenues). Finally, there have also been multiple proposals made by leading European politicians.[46]

The Euro-nomics group proposal (ESBies) on the one hand and the Delpla-von Weizsacker and Hellwig-Philippon proposals (joint-and-several liability) on the other hand offer different forms of solidarity. To some extent the distinction can be seen as one between "ex ante solidarity" (the pooling of interest-rate conditions among countries) and "ex post solidarity" (the obligation for healthy countries to stand by and foot the bill for a fraction of troubled countries' debt). The Euro-nomics group requires no joint-and-several liability while the other two do. As I earlier argued, the purpose of joint-and-several liability is to increase the size of a guarantor country's credible pledge: if the country does not honor its guarantee, it itself defaults and therefore incurs a cost that is much larger than just the spillover externality of the other country's default. Put differently, joint-and-several liability leads to higher refinancing capability, but also to more contagion.

Joint-and several-liability proposals

First, we consider the joint-liability proposals (Delpla-von Weizsacker, Hellwig-Philippon).

The Delpla-von Weizsacker blue bonds-red bonds proposal goes as follows:

"Euro-area countries should divide their sovereign debt into two parts. The first part, up to 60 percent of GDP, should be pooled as 'blue' bonds with senior status, to be jointly and severally guaranteed by participating countries. All debt beyond that should be issued as purely national 'red' bonds with junior status…The blue debt is the senior tranche (repaid before any other public debt – excepting only the IMF which enjoys super seniority) of the sovereign debt of the euro area participating countries…The annual allocation of blue bonds would be proposed by an independent stability council staffed by members who would enjoy a similar degree of professional independence to the board members of the European Central Bank (ECB). This allocation would then be voted on by the national parliaments of participating countries, having the ultimate budgetary authority required to issue the blue bond mutual guarantees. Any country voting against the pro-posed allocation would thereby decide neither to issue any blue bonds in the coming year nor to guarantee any blue bonds of that particular vintage."

Hellwig and Philippon propose that the safe debt be Eurobills (common debt with maturity under a year); Eurobills would enjoy joint-and-several liability, just like the blue bonds described above. No country could have more than 10% of its GDP in Eurobills outstanding at any point of time. Benefiting from Eurobills issues would be conditional on sound long-term fiscal policy. Importantly, countries would not be able to issue short-term debt of their own. Eurobills would also benefit from a special prudential treatment in that they would be the favored asset for European banks to satisfy their Basel III liquidity ratios. Finally, all countries are meant to participate in the programme, so as to avoid stigma and unraveling.

46 *One of the most famous proposals, the Tremonti-Juncker proposal, was made by the then finance minister of Italy and prime minister of Luxembourg in a* Financial Times *article (December 5, 2010). This proposal, which allowed countries to issue up to 40% of their debt in the form of Eurobonds and up to 100% in harsh times, was promptly rejected by France and Germany.*

Common features

Because the two proposals went through similar lines of economic reasoning as above, they share a number of features:[47]

• None proposes an (unrealistic) full-fledged fiscal integration.

• Building on the observation that the implicit solidarity that prevailed over the last ten years led to disaster,[48] none of the proposals argues in favor of an extended solidarity.[49] Rather, both create (at least) two classes of debt: a safe senior tranche (respectively, blue bonds, Eurobills) and a risky junior tranche (respectively, red bonds, long-term claims). Both recognise the existence of both moral hazard and stigma avoidance strategies. They address the stigma problem through automaticity/ comprehensiveness. To mitigate the moral hazard problem, they call for the use of complementary policies to limit profligacy.[50] Relatedly, they acknowledge the existence of both a liquidity and a solvency problem, and therefore trade off insurance (provided by other sovereigns on the senior tranche) and market-based discipline (e.g. for borrowing above 60% of GDP).

• Both discuss the benefit associated with safe bonds' substantial liquidity premium, i.e. the "exorbitant privilege" of low interest rates (especially given new Basel III liquidity requirements and the concomitant high demand for risk-free assets).

• Both insist on reforming banking regulation so as to sever the link between banks and sovereigns and to reduce the risk of country bailouts motivated by the need to rescue banks. The proposals suggest a strong differentiation in regulatory weights between junior and senior tranches:

  – The safe tranche would receive a 0-risk weight and be accepted by the ECB in repo operations.

  – Delpla and von Weizsacker have the harshest prudential treatment of junior tranches: they suggest that European banks not be allowed to hold red bonds, and the ECB not to be allowed to accept them as collateral in repo operations.

  The junior tranche in the two proposals is meant to be held by unregulated high-leverage entities such as hedge funds. The proposals are right in fearing that European banks' ownership of the junior tranche raises concern about Europe' pledge not to implicitly guarantee the reimbursement of that tranche. Note though that there is no free lunch here: the holding of the junior tranche outside the euro area reduces European countries' incentive to impose discipline and to repay that tranche.

Differences

Besides their shared features, the Delpla-von Weizsacker and Hellwig-Philippon joint-and-several liability proposals exhibit some differences. While agreeing on making the guaranteed debt (blue bonds, Eurobills) senior to other debt, they differ in their views as to how to make it senior: Delpla and von Weizsacker opt for a contractual solution,[51] while Hellwig and Philippon view short maturities as the only way to enforce seniority.

Hellwig and Philippon argue that guarantees on long-term debt encourage "asset substitution": under long-term sovereign debt guarantees, the country has particularly low incentives to undertake reforms, such as a pension reform, that boost long-term debt sustainability. They want the European Union to be able to look at long-term market spreads of countries, which rules out long-term guarantees. By contrast, the rollover of short-term debt allows continuous monitoring by the guarantors.

Note that the Delpla-von Weizsacker and Hellwig-Philippon proposals' emphasis on making

47 *This description about what blue bonds and eurobills have in common is applicable to ESBies (which we will later discuss) as well. The Euro-nomics group proposal also has a safe senior and a risky junior tranche. It does not propose full integration. It also recognises moral hazard and shares with the other proposals a two-pillar strategy to deal with it – market discipline must complement EU level authority. Finally, it also insists on reforming banking regulation.*

48 *There may also have been a misperception that risk had disappeared.*

49 *Recall that we de facto had (the perception of) a full solidarity until Greece defaulted.*

50 *Or they impose conditionality on a country's access to senior tranche financing. For example, Delpla-von Weizsacker suggest that a "blue committee" make a proposal as to the amount (bounded above by 60% of GDP) of bonds that can be issued as blue bonds; this proposal must then be ratified by all parliaments.*

51 *That is not an easy thing to do in practice. Establishing a seniority rule for sovereigns might require major legal changes.*

official sector debt senior can be justified by the desire to prevent dilution of that debt through excessive issuing of other debt in the international financial market.[52]

Discussion

The proposals consider a limited set of instruments and of course cannot by themselves constitute a comprehensive policy to re-build a euro area (as they willingly acknowledge). Some remaining concerns relate to the applicability to the resolution of the current crisis, others to steady-state environments.

Short-term/transition

Cross-subsidy concern: Standard liquidity provision/risk sharing models presume that accord is reached behind veil of ignorance; this hypothesis is not realistic in our context and suspicion of a cross-subsidy from Northern to Southern Europe may thwart efforts to reach a consensus on these proposals.[53] This point is important because, once the veil of ignorance is lifted, healthy countries have no incentive to accept obligations beyond the implicit ones that arise from spillover externalities. Put differently, it is not in the self-interest of healthy countries to accept joint-and-several liability, even though they realise that it will be in their interest to ex post offer *some* solidarity in order to prevent spillovers of sovereign default; an ex ante transfer from distressed countries to healthy ones to compensate them for, and make them accept the future liability is ruled out as it would just add to the distressed countries' indebtedness and thus the compensation would be in funny money.

Joint-and-several liability emerges more naturally in an environment in which countries are behind the veil of ignorance and therefore are not necessarily reluctant to take on risky liabilities to create mutual insurance. The current reality is that Germany is on the hook, and any reform proposal has to address the question: what is in it for Germany?

No free lunch: as is recognised by the authors, the creation of a safe tranche implies that the leftover tranche is riskier than previous debt, implying a short-term problem: how would it be rolled over? Rolling over sovereign debt is currently difficult; presumably rollovers would be more difficult to arrange under the new schemes unless there is a default on existing debt or relatedly existing debt is, unlike new debt, deemed "restructurable". The Hellwig-Philippon Eurobills proposal suggest a substitution of existing short-term debt by the Eurobills; in this configuration the priority of long-term liabilities remains the same, and their spreads might even be reduced a bit if the short-term spreads are reduced by the joint liability. On the other hand, this substitution strategy limits the feasible scope of the Eurobills programmes.

Legal aspects: both proposals find a way around standard clauses of treating creditors equally. The senior tranche–junior tranche feature implements the possibility of a selective default. Such a feature might face a risk of litigation whenever existing sovereign debt contracts include a *pari passu* clause or other provisions promising equal treatment of creditors. To be sure, European countries are quite different from emerging countries in that a sizeable fraction of their debt is issued under local law, and so selective default is easier. Nonetheless, this is a concern for the fraction of the debt issued under foreign law. And this may become an even bigger concern in the future if European countries other than Greece default, making it more difficult for sovereign debt to be issued under local law.

Steady state

Soft budget constraint: both proposals assume that the need to issue the junior tranche at market-determined terms will discipline countries, and that a no-bail-out clause will ensure that that tranche will not be rescued. However, the European Financial Stability Facility (EFSF) was not meant to exist, and the ECB was not meant to purchase the debt of troubled European countries. One argument for why this would change is that European banks would be prohibited from holding the risky part, making it less attractive for other European countries to bail out a distressed country

52 *IMF credits routinely enjoy seniority. There is some debate as to whether the ESFS credits should similarly benefit from seniority. The first Greek rescue package in early 2010 had only IMF seniority; the ESFS was on* pari passu *terms with other claims. Gros (2010) criticises the later change in policy making European rescue funding senior to private debt (but subordinated to IMF lending) on the ground that this might reduce the willingness of the private sector to continue financing distressed countries; he argues that short-term debt should be rescheduled; finally he discusses the likelihood that ECB could ex post negotiate a seniority privilege for its very sizeable holdings of sovereign debt.*

53 *The following discussion draws from Tirole (2012).*

(see, e.g., the discussion in Delpla-von Weizsacker). Also, to create better incentives, the Hellwig-Philippon and Delpla-von Weizsacker proposals create possibilities for exit, for instance through votes in parliaments and the payment of a fee for exiting (Hellwig-Philippon). For example the Finnish Parliament could decide that countries are not doing enough and quit. This would introduce market-like discipline at the expense of some solidarity/stability.

Domino effects and non-monitoring of buffer: the Delpla-von Weizsacker and Hellwig-Philippon schemes rely on ex post solidarity. The perception of a possible joint-and-several liability today starts raising concerns about the quality of even German bonds. Making this official policy might accelerate this process. Furthermore, joint-and-several liability, like average-cost-pricing, raises the spectrum of snowball effects associated with a shrinking tax base. As more countries default, each country is more tempted either to default, or to exit the scheme, in effect destroying it.

Relatedly, the schemes are designed mainly from the perspective of profligate countries, offering them a mix of insurance and accountability. But countries that are not in trouble may be called to insure large amounts of sovereign debts if either a large country or multiple countries in the euro area simultaneously are in trouble. An analogy with large payment systems may be useful here. Such systems when they allow for mutual credit lines require collateral in an amount sufficient not to create perturbations in the payment system if one bank fails.[54] Multiple bank failures by contrast are meant to be covered by a lender of last resort.

Returning to the euro area, by focusing on bad pupils, the proposals do not address the possibility that even Germany may not prepare itself adequately to its role as insurer. Somehow, either Germany needs to be monitored and become "super solvent", or some second defense that involves non euro area parties must be planned: substantial credit line from the IMF or (with all associated hazards) ECB-led devaluation.

3|4 The sovereign debt repackaging proposal

Finally, consider the ESBies (Euro-nomics Group proposal) which is rather different from the other two. It works as follows:[55]

"A European debt agency would buy on the secondary market approximately 5.5 trillion euros of sovereign debt (60% of the euro area's GDP). The weight of each country's debt would be equal to its contribution to the euro area's GDP. Hence, each marginal euro of sovereign debt beyond 60% of GDP would have to be traded on a single bond market, where prices would reflect true sovereign risk, sending the right signal to the country's government. To finance its 5.5 trillion purchases, the debt agency would issue two securities. The first security, the ESBies, would be senior on interest and principal repayments of bonds held by the agency. The second security would receive the rest – it is therefore riskier and would take the hit if one or more sovereigns default. European banking regulation and ECB policy would be adjusted so that banks face incentives to invest in safe ESBies instead of risky sovereign debt… Because they are a pure repackaging of existing debt, [ESBies] do not require additional funding by member states. They do not involve joint liability; if one member-state defaults, the junior tranche will take the hit."

Note that there is no joint issuing and that there is no need to change existing treaties. To boost the demand for ESBies, the Euro-nomics group proposes that ESBies be treated as fully safe for bank regulation and ECB haircuts. By contrast, national bonds' treatment would now be based on ratings: national bonds rated AAA would still be treated as perfectly safe; but as a rule, national bonds would no longer be deemed risk-free. This would incentivise euro area banks to hold mainly ESBies rather than risky national bonds.

To create the ESBies, a "European Debt Agency" or EDA would buy national debts at secondary market prices and repackage them. The Euro-nomics group argues that the private sector could not as efficiently achieve the repackaging by bundling the debt of

54 *See Rochet-Tirole (1996b) for a description of the CHIPS system and related ones.*
55 *Vox-EU, "ESBies: A realistic reform of Europe's financial architecture".*

multiple countries: the idea is that the private sector would have difficulty achieving the scale and degree of standardisation that the EDA could achieve. It might further fail to achieve standardisation of ESBies issues over time and produce regular issues of ESBies and junior bonds with the same composition for different maturities.

A key objective of ESBies is thus to allow Italy and Spain to earn part of the safety premium from a safe asset denominated in Euros – and that premium is high in the current crisis. The value-adding aspect of ESBies is the creation of a liquid asset in large supply and high degree of standardisation. The group further proposes to strengthen the ESBies (but not the junior bond) using a limited credit enhancement in the form of paid-in capital to the EDA by the European governments. This would spread any residual default risk equally across ESBies cohorts, homogenising them further and increasing their liquidity. While the credit enhancement would be used with low probability, its size would be too large for any private securitising entity to offer. The credit enhancement would not apply to the junior bond.

4| Concluding notes

This paper's objective was to identify long-term institutions that could restore the sustainability of the euro area. Because we do not stand behind the veil of ignorance, and cultures and institutions are not shared, the prospect of sizeable, well-identifiable cross-subsidies hampers solidarity among countries. For this reason, and also because of moral hazard concerns, fiscal integration or full-fledged Eurobonds are not really on the agenda. Short of these, countries must draw the lessons of the failures of the Stability and Growth Pact. Countries must accept some loss of sovereignty in two respects: they must devolve powers to independent fiscal councils, and when push comes to shove, they must accommodate further interference in the management of their economy. More discipline in turn increases the scope for solidarity.

While we are moving toward more effective balanced budget requirements, much work is still required to make them work. A weakness of golden rules is that they very imperfectly capture a country's efforts to build its long-term competitiveness. Cleaning up over-indebted countries' debt and controlling fiscal deficits is insufficient if the countries continue suffering steady balance of payments difficulties. Economic research should pay much more attention than it currently does to a proper accounting of sovereign debt sustainability.

Formally, we have not discussed the potential role of the central bank in indirectly monetising sovereign debts. A breakthrough of the last decades has been the successful fight against inflation; a return to inflation, even temporary, would be a setback. This comeback of inflation will however become unavoidable if the sovereign crisis spreads to large European countries; put differently, the ECB will have to stand by as lender of last resort on an even larger scale than today. Hopefully the required institutional reforms will occur sufficiently soon to reestablish trust in Europe and thwart such a contagious spiral, and if they are insufficient to prevent such an adverse development, to ensure that inflating will be a "once in a lifetime event".

References

Allen (F.), Carletti (E.) and Corsetti (G.), eds. (2011)
Life in the eurozone with or without default, FIC Press Wharton Financial Institutions Center.

Bénabou (R.) and Tirole (J.) (2011)
"Laws and norms", *mimeo*, Princeton and TSE.

Blanchard (O.) (2007)
"Adjustment within the euro: the difficult case of Portugal", *Portuguese Economic Journal*, 6-1, pp. 1-22.

Blanchard (O.) and Giavazzi (F.) (2003)
"Improving the SGP through a proper accounting of public investment" *CEPR Discussion Paper* No. 4220.

Bohn (H.) and Inman (R.) (1996)
"Balanced-budget rules and public deficits: evidence from the United States", Carnegie-Rochester *Series on Public Policy* 45: pp. 13-76.

Bolton (P.), Freixas (X) and Shapiro (2011)
"The credit ratings game", *Journal of Finance*, forthcoming.

Bolton (P.) and Samama (F.) (2010)
"Contingent capital and long term investors: a natural match?" forthcoming *Economic Policy*.

Bolton (P.) and Skeel (D.) (2004)
"Inside the black box: how should a sovereign bankruptcy framework be structured?" *Emory Law Journal*, 53: pp. 761-841.

Calvo (G.) (1988)
"Servicing the public debt: the role of expectations", *American Economic Review*, 78: pp. 647-661.

Coffee (J.) Jr (2007)
Gatekeepers: the professions and corporate governance, Oxford University Press.

De Grauwe (P.) (2011a)
"The governance of a fragile eurozone", *mimeo.*

De Grauwe (P.) (2011b)
"Financial assistance in the euro zone: why and how?" *CES-ifo Dice Report*, volume 9, No. 3, pp.26-30.

Delpla (J.) and von Weizsacker (J.) (2010)
"The blue bond proposal", Bruegel Policy Brief 420.

Debrun (X.) and Takahashi (K.) (2011)
"Independent fiscal councils in continental Europe: old wine in new bottles?", *CES-ifo Dice Report*, volume 9, No. 3, pp. 44-49.

Dewatripont (M.), Rochet (J.C.) and Tirole (J.) (2010)
Balancing the banks: global lessons from the financial crisis, Princeton University Press.

Euro-nomics group – Brunnermeier (M.), Garicano (L.), Lane (P.), Pagano (M.), Reis (R.), Santos (T.), Van Nieuwerburgh (S.) and Vayanos (D.) (2011)
"ESBies: a realistic reform of Europe's financial architecture", VoxEU.org, October 25.

European Commission (2011)
"Green paper on the feasibility of introducing stability bonds", November 23.

Farhi (E.), Gopinath (G.) and Itskhoki (O.) (2011)
"Fiscal devaluation", *mimeo*, Harvard University.

Gros (D.) (2010)
"The seniority conundrum: bail out countries but bail in private short-term creditors?", VoxEU.org, December 5.

Hannoun (H.) (2011)
"Sovereign risk in bank regulation and supervision: where do we stand?", Financial Stability Institute High-Level Meeting, Abu Dhabi, UAE, October 26, mimeo, Bank for International Settlements.

Hellwig (C.) and Philippon (T.) (2011)
"Eurobills, not eurobonds", VoxEU.org, December 2.

Henning (R.) and Kessler (M.) (2012)
"Fiscal federalism: US history for architects of Europe's fiscal union", *Working Paper* 12.1, Peterson Institute for International Economics.

Hertig (G.) (2012)
"Governments as stakeholders of last resort", IAST presentation, February 3.

Maskin (E.) and Tirole (J.) (2008)
"Public-private partnerships and government spending limits", *International Journal of Industrial Organisation*, vol. 26, No. 2, pp. 412-420.

Novy-Marx (R.) and Rauh (J.) (2009)
"The liabilities and risks of state-sponsored pension plans", *Journal of Economic Perspectives*, 23: pp. 191–210.

Poterba (J.) and von Hagen (J.), eds. (1999)
Fiscal institutions and fiscal performance, University of Chicago Press.

Reinhart (C.) and Rogoff (K.) (2009)
This time is different: eight centuries of financial folly, Princeton University Press.

Rochet (J.C.) and Tirole (J.) (1996a)
"Interbank lending and systemic risk", *Journal of Money, Credit and Banking*, vol. 28, No. 4, pp. 733-762.

Rochet (J.C.) and Tirole (J.) (1996b)
"Controlling risk in payment systems", *Journal of Money, Credit and Banking*, vol. 28, No. 4, pp. 832-862.

Rogoff (K.) (2011)
"A cure for fiscal failure?", *www.project-syndicate.org*, April 1.

Summers (L.) (2011)
"The world must insist that Europe act",Op-ed, *The Financial Times*, September 18.

Tirole (J.) (2003)
"Inefficient foreign borrowing: a dual-and common-agency perspective", *American Economic Review*, vol. 93, No. 5, pp. 1678-1702.

Tirole (J.) (2012)
"Country solidarity, private sector involvement and the contagion of sovereign crises", in preparation.

von Hagen (J.) (2010)
"The scope and limits of fiscal councils", *Working Paper*, Bonn University.

Wren-Lewis (S.) (2011)
"Fiscal councils: the UK office for budget responsibility", *CES-ifo Dice Report*, volume 9, No. 3, pp. 50-53.

Published articles

Below are listed all of the articles published in the *Financial Stability Review* since its inception. These studies are available on the Banque de France's website (*www.banque-france.fr*).

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Risks and return of banking activities related to hedge funds
Indirect supervision of hedge funds
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