

FSR

**FINANCIAL
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8

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In an international environment marked by solid growth, relatively subdued inflation in spite of rising commodity prices, and still accommodating monetary and financial conditions, in 2005 French and European banks once again posted significantly improved earnings. This healthy assessment can also be applied to the other components of the financial system. The insurance sector demonstrated its resilience in the face of a series of disasters. The investment fund industry again posted very good results. Regarding infrastructures (clearing, payments systems, etc.), amid competitive pressures spurring consolidation, the assessments carried out by the supervisory authorities in their areas of competence reveal a satisfactory level of robustness. However, the state of the financial sector and markets and their macroeconomic environment continue to pose numerous risks that are accumulating and becoming entrenched, which may affect financial stability. These vulnerabilities are analysed in the **Overview** and, in some cases, are explored in greater depth in the series of articles featured in this eighth issue of the *Financial Stability Review*.

In global terms, the key development remains the deterioration of the US current account deficit, the financing of which must not be allowed to lead to the disruption of financial and exchange rate markets. While the surge in oil prices and those of other commodities has helped to fuel international capital transfers, a consensus is emerging about the need to combine several approaches to reduce global imbalances. These constitute: increasing savings in the United States; developing the absorption capacity of its main trading partners; and making exchange rate regimes and financial structures in Asia more flexible. This was reaffirmed by the **Round table of the international symposium held by the Banque de France on 4 November 2005** on the topic "Productivity, competitiveness and globalisation", with the contributions of **Roger Ferguson and Jacob A. Frenkel**, reproduced here, shedding some light on the implications for financial stability of developments in productivity and competitiveness. Regarding Asia's contribution to the reduction in global imbalances, the article on **Recent developments in monetary and financial integration in Asia suggests that the Asian vertical model of production appears to have reached its limit**. Production in that region is expected to shift towards a more "horizontal" model. In this context, the introduction of more flexible exchange rate regimes would require the strengthening of regional monetary co-operation in order to curb intra-regional exchange rate fluctuations.

Financial institutions have taken advantage of the unusual market configuration in place since 2001: persistently low long-term yields; continuing low volatility; abundant liquidity; and a decline in risk premia (credit spreads) with as a result little discrimination between issuers. Over the past few months, however, several signs have indicated that interest rates and volatility may increase to levels more in line with what is generally observed. Particular attention should be given to interest rate rises given their impact on the valuation of financial assets. This is what is suggested by the analysis of the correlations carried out in the study **Productivity and stock prices**. Its findings tend to point to the existence of a positive correlation between variations in the cyclical component of stock prices and current and future variations in the cyclical component of productivity.

The strong profitability posted by the financial sector reflects both the growth of fees and the concentration of revenues on investment operations on highly dynamic segments such as alternative investment, capital investment and credit derivatives. This profitability stems in large part from greater risk-taking for example in real estate, with the attempt to increase transaction volumes to offset shrinking margins, or on complex financial instruments, which constitute a growing proportion of investment flows. The trading books of the major internationally active banks have thus broadened to include products such as credit derivatives and the riskiest tranches of collateralised debt obligations (CDOs). This has given rise to a growing share in the trading book of instruments that combine credit risk and market risk. The article **Better capturing risks in the trading book** reflects the concerns of banking supervisors in this respect. It describes the efforts made by banks to improve their risk assessment and control systems for trading book activities, but also the work carried out by the banking supervisory authorities to enhance their oversight, notably by means of the mechanism known as "Basel 2.5".

At the same time, banks' provisioning has reached historically low levels and it may be difficult to rebuild it in the future, especially in the light of the International Financial Reporting Standards (IFRS), which are restrictive in this regard. Another very topical concern is the difficulty encountered by major banks in the capturing and administrative or accounting treatment of derivatives or products linked to hedge funds (monitoring methods too cursory, build-up of pending transactions, valuation problems, etc.). The fragility of liquidity of products marketed as part of ever more complex investment strategies should also be underscored: the concentration of positions on structured products could therefore be problematic should very large players decide to withdraw rapidly from certain markets. The sophisticated techniques in place to adjust positions to take account of market developments are based on conditions (constancy of the hypotheses in the models used, market liquidity always guaranteed) that are probably not always met. The article on **Market liquidity and its incorporation into risk management** recalls that an overly optimistic assessment of market liquidity risk may put the banks concerned in a vulnerable position and, *via* contagion effects, impact financial stability. It suggests and describes a number of tools aimed at incorporating the different aspects of liquidity risk in the risk assessment and management systems used by market participants.

Furthermore, analysis of the debt of the companies constituting the major stock indices points to the beginning of an upsurge on both sides of the Atlantic in the second half of 2005, at the same time as there has been sharp growth in the payment of dividends and an increase in share buybacks, thus contributing to denting companies' equity capital. The article on **Corporate equity and financial stability: An approach based on net worth at risk** takes a look at the crucial role of equity capital as a buffer and aims, by means of statistical analysis, to assess the situation in four European countries. Using central balance sheet office data, it attempts to determine what might be an appropriate level of minimum capital requirements to cope with the risk of a crisis occurring by drawing on Value-at-Risk methodology.

In sum, markets, financial institutions and non-financial corporations should guard against excessive confidence regarding the lasting nature of the current benign environment.

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1 | SUMMARY

1|1 International environment and market

Since autumn 2005, advanced economies have experienced vibrant growth on the whole (2.7% on average in 2005). The rise in commodity prices has undoubtedly had an impact on inflation, but has not given rise to a build-up of marked second-round effects. However, inflationary pressures are expected to continue, especially on the oil market due to the inertia of productive capacities in the face of strong demand and the high degree of uncertainty at the geopolitical level.

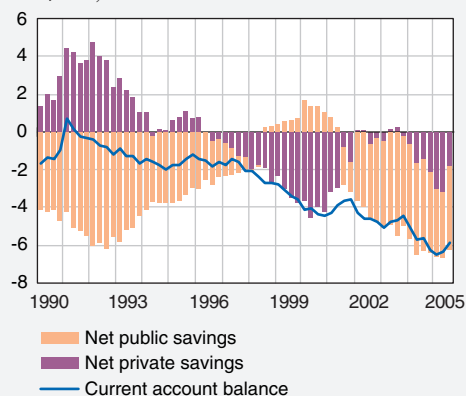
Current account imbalances have further worsened. The US current account deficit reached a record high of 6.4% of GDP in 2005. Although it has been easily financed by capital inflows from emerging economies, it continues to entail a risk of disorderly movements on financial and foreign exchange markets.

In 2005, financial markets were characterised by relatively low levels of nominal and real interest rates and volatility, a sharp decline in risk premia and a significant increase in the value of certain assets (residential real estate and, more recently, equities). This ongoing pattern continues to give rise to an intense search for higher yields and greater risk-taking. At the same time, monetary policy tightening has become widespread. While global transaction balances appear to be growing at a slower pace, a further tightening of financial conditions is likely to affect the situation of the weakest debtors. It could also contribute to heightening international investors' risk aversion and subsequently result in portfolio shifts. These shifts appear to have occurred since the start of 2006, often with a significant impact on foreign exchange markets, through the unwinding of carry trades which had been on the increase since 2001.

These developments give particular cause for concern as a number of major market participants seem to underestimate the cyclicity of financial markets and tend to reduce the buffer provided by the level of their own funds in favour of financial operations with shorter time horizons, such as LBOs, payment of exceptional dividends and share buybacks. In the current context, it is necessary to remain vigilant in view of the deterioration in the financial situation of certain credit market participants.

US net savings and current account balance

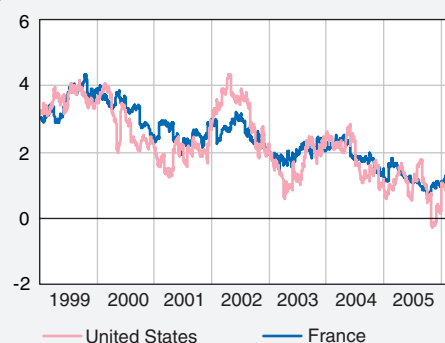
(as a % of GDP)



Source: US Department of Commerce

Real yields on 10-year government bonds

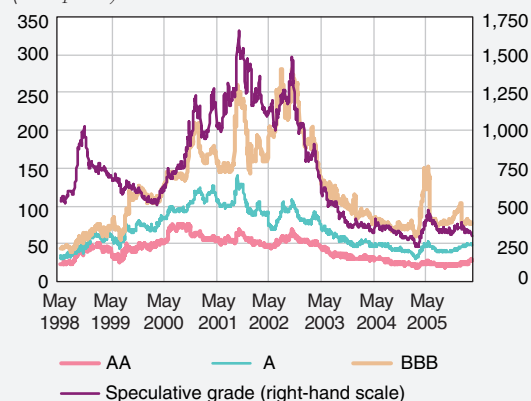
(%)



Source: Bloomberg

OAS spreads on corporate bonds in the euro area (adjusted for embedded options)

(basis points)



Source: Merrill Lynch

1|2 Financial sector

The gradual tightening of monetary policy, the onset of a tightening of credit standards on certain markets, and therefore the turnaround in the credit cycle that could follow, are likely to affect the quality of the banking industry's exposures *vis-à-vis* its corporate and individual clients. Furthermore, the search for higher yields may have encouraged credit institutions to increase their positions on relatively shallow and illiquid markets or on segments where liquidity providers are in small numbers (leveraged buy-outs, credit derivatives, alternative funds). Should interest rates and credit premia rise to an unexpectedly large extent, the banking industry could incur major losses on its investment and trading portfolios. Admittedly, French credit institutions posted very high earnings in 2005, against the backdrop of a favourable international environment. However, this good performance also reflects a drop in provisioning allocated to risk coverage. It is therefore important that French credit institutions maintain a sound financial base and appropriate risk control.

After the considerable losses recorded in 2005, the solvency of the insurance and reinsurance sector does not appear to be jeopardised in the short run, although the likelihood of an avian flu pandemic constitutes a factor of uncertainty. Changes in regulatory, accounting and prudential requirements should lead companies to review their asset and liability management with a view to better keeping their portfolio risk under control.

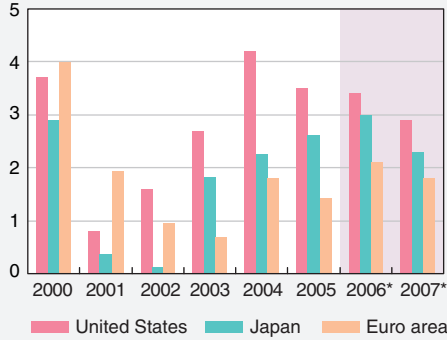
In parallel, the modernisation drive in the investment sector continued with a view to improving control procedures and risk management, while the rules governing investment in risky instruments were relaxed.

More generally, a number of significant initiatives in the field of financial system regulation have been either launched or extended, in particular in the context of European harmonisation and cooperation between financial authorities on the matter of business continuity. These include the publication of a White Paper on the EU's financial services policy for the next five years, the implementation of the directive on the capital adequacy of investment firms and credit institutions (Capital Requirements Directive –CRD), the adoption of high-level principles for business continuity and the conclusion of cooperation agreements on the exchange of information between financial authorities.

Lastly, as regards infrastructures, the free-play of market forces has continued to engender a concentration of activities. In this respect, the Paris financial centre has continued to adjust to the changes underway, as shown by the robust growth in stock market capitalisation but also the strong presence of foreign investors. In the context, the oversight of market infrastructures should not be let up on.

Gross domestic product

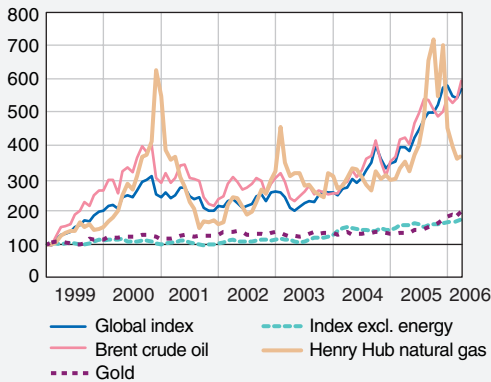
(constant prices, annual % change)



Note: * 2006 and 2007: forecasts by Consensus Forecasts (May 2006)
Sources: US Department of Commerce, Japan ESRI-CAO, Eurostat, Consensus Forecast

Commodity prices in euro

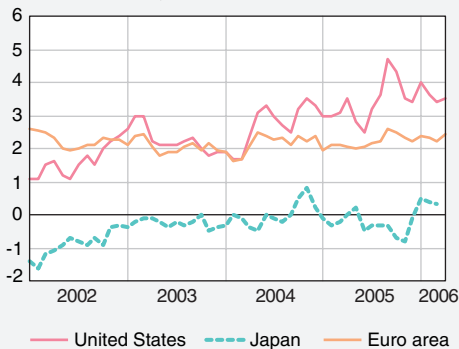
(1 January 1999 = 100)



Sources: Datastream, Banque de France

Consumer prices

(year-on-year % change)



Sources: Bureau of Labor Statistics, Ministry of Public Management, Eurostat

2 | INTERNATIONAL ENVIRONMENT AND MARKETS

2|1 Macroeconomic and financial balances in advanced economies

ROBUST GROWTH AND RELATIVELY CONTAINED INFLATION

On the whole, advanced economies experienced robust growth in 2005. GDP in the United States, which continued to be shored up by private consumption, grew at a rate of 3.5%, close to its potential growth. This rate was nonetheless slightly down from 2004 due to the impact, albeit moderate, of hurricanes Katrina and Rita and the rise in petrol prices. Annual GDP growth in Japan climbed to 2.7%, as the smaller contribution of net exports was more than offset by the upturn in investment. At 1.3% in 2005, euro area GDP growth remained below its potential, with contrasting patterns across the countries of the area.

Overall, forecasters expect these performances to remain strong or even improve in 2006. According to findings published by Consensus Forecasts last May, growth should stand at 3.4%, 3.0% and 2.1% in the United States, Japan and the euro area respectively.

Continuing pressures on the commodity markets have had a direct impact on inflation, but have not as yet given rise to a build-up of marked second-round effects. After a lull in the fourth quarter of 2005, oil prices picked up significantly and Brent crude sold at USD 72.8 a barrel at the end of April 2006, compared with USD 55.5 (its last low point) in November 2005. At the same time, advanced economies maintained relatively good inflation performances thanks to a combination of factors: increased credibility of monetary policies, deflationary pressures linked to globalisation and wage moderation in particular.

Japan's emergence from deflation appears to be firmly established; this is directly linked to the fact that output has shifted back to its potential level. The underlying consumer price index has therefore again been rising year-on-year since the end of 2005. It is in this context that the Bank of Japan decided in early March to put an end to its quantitative monetary easing policy and return to a strategy based on interest rates.

In the euro area, annual growth in consumer prices has remained above 2.0% since June 2005. However, the latest available figures for wages (fourth quarter of 2005) show a still moderate 2.4% rise in total hourly wages year-on-year in nominal terms, compared with 2.3% the previous quarter.

In the United States, consumer prices have constantly increased by over 3.0% year-on-year since May 2004. Excluding food and energy, the annual increase in retail prices has been more moderate. Inflationary pressures could be exacerbated as a result of the rise in capacity utilisation, with unemployment, in particular, edging down towards the Non-Accelerating Inflation Rate of Unemployment (NAIRU), the slowdown of productivity gains (in annual average terms), or even the possibility of a lagged adjustment of wages to previous productivity gains, as observed at the end of the 1990s. However, the profit margin of US non-financial corporations has increased over recent quarters and its current level may enable these corporations to absorb higher production costs without passing them on to consumers in full.

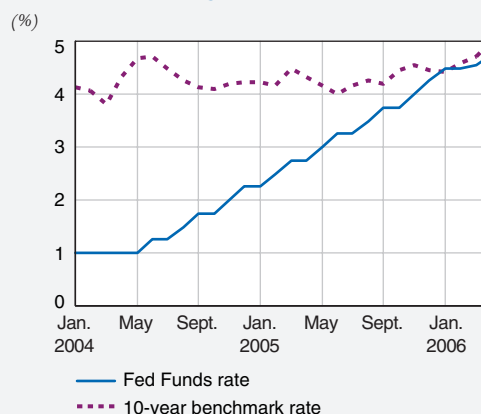
PRESSURE ON OIL PRICES AND RISING INTEREST RATES

Prices on oil futures markets appear to be governed by the pressures stemming from the discrepancy between robust demand and productive capacity that has reached its maximum level. In this context, the geopolitically-induced uncertainty surrounding oil supplies is a major hazard to economic agents' confidence and growth prospects. According to the US Federal Reserve System, the increase in energy prices has already cost the US economy one percentage point of annual growth in 2005 and might cost an additional 0.5 point in 2006.

Regarding risk-free interest rates, 10-year US government bond rates have risen by approximately 60 basis points since October 2005. Several factors could contribute to curbing future increases: central bank credibility, less volatile macroeconomic activity, improved risk management, massive purchases of US securities by non-residents and especially Asian central banks, a savings glut in certain areas or weak investment in others.

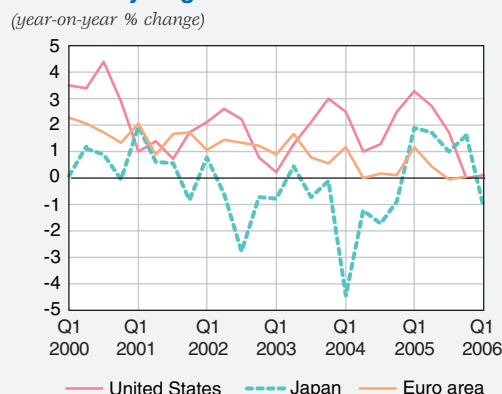
Credit standards for non-financial US corporations may still be considered accommodating. However, interest rates on long-term loans to companies have continued to rise: for initial maturities of over five years, they climbed on average from 6.4% in the fourth quarter of 2005 to 7.5% in the first quarter of 2006.

US short and long term rates



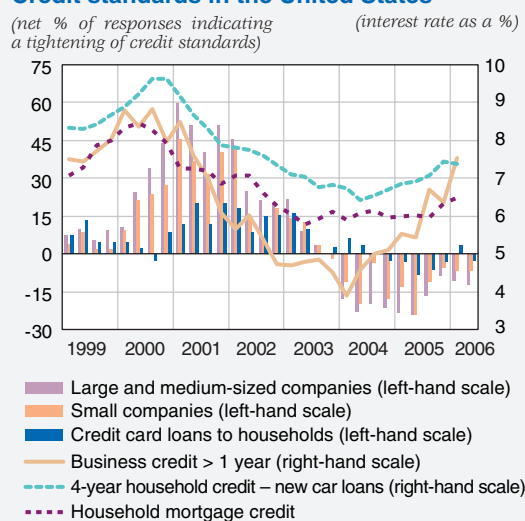
Source: Datastream

Real hourly wages



Sources: Bureau of Labor Statistics, Ministry of Health, Labour and Welfare, Eurostat

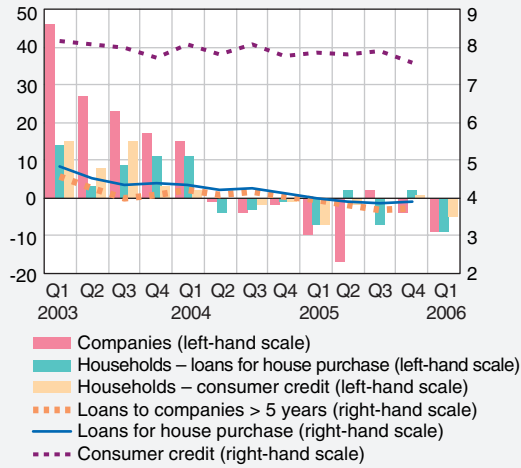
Credit standards in the United States



Source: US Federal Reserve System

Credit standards in the euro area

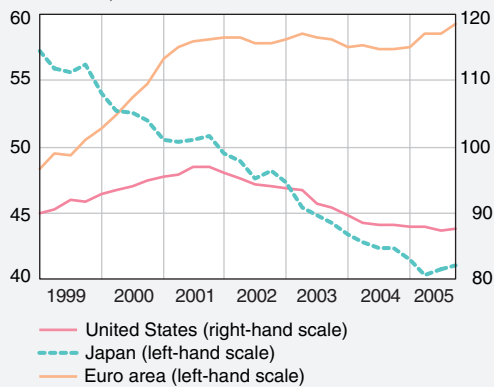
(net % of responses indicating a tightening of credit standards) (interest rate as a %)



Source: Eurosystem

Debt of non-financial corporations

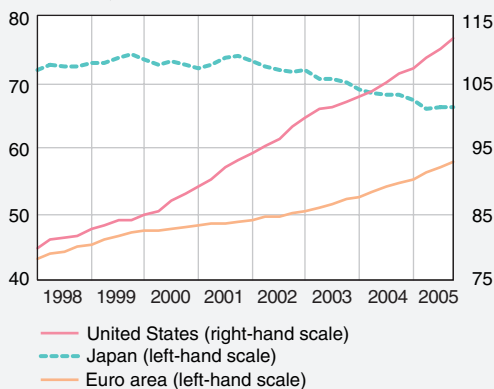
(as a % of GDP)



Sources: ECB, Bank of Japan, US Federal Reserve System

Household debt

(as a % of GDP)



Sources: US Federal Reserve System, Bank of Japan, Eurosystem

In the euro area, the bank lending survey conducted by the Eurosystem indicates that banks tightened their credit standards for housing loans and consumer credit at the end of last year. Credit standards then eased for both categories of lending in the first quarter of 2006.

MOUNTING DEBT

The strength of the threat posed by the acceleration in the rise of long-term interest rates varies depending on the region and the sector.

As a ratio of GDP, debt financing by non-financial corporations edged down from 87.1% in 2004 to 83.2% in 2005 in Japan. This ratio was stable at 43.8% in 2005 in the United States where, overall, the sector posted positive net savings, high profits and moderate financial charges. Conversely, it rose slightly in the euro area to stand at 58.2%, *i.e.* above its long run average, particularly in France where corporations' borrowing requirements were mainly covered by an increase in their debt flows.

Household debt levels remain a matter of concern. As a ratio of GDP, they continued to increase in parallel with dynamic property markets in all advanced economies except Japan. In the United Kingdom, household debt levels increased further from the second quarter of 2005, alongside a slight acceleration in property prices and loans. In the euro area, household debt rose from 53.5% of GDP in 2004 to 55.9% in 2005. In France, in particular, this upward trend was fuelled by persistently firm property prices, which once again rose by an average of 15% over 2005. The recent slowdown in these prices is welcome as it should prevent a sharp turnaround in the property market that would put a damper on French household consumer spending, even though the wealth effects are not as strong in France as they are in the United Kingdom and the United States, given the lack of mechanisms that enable mortgage equity withdrawal against the value of property held.

US household debt rose from 104.3% of GDP in 2004 to 109.2% in 2005; households' savings rate has thus been negative since June 2005 (this had not been the case since October 2001) and the share of mortgage loans in GDP expanded from 61.7% in 2004 to 65.9% in 2005. The rise in debt has gone hand in hand with the development of products such as deferred amortization loans, negative amortization loans, etc., that are more exposed to interest-rate and price risk than traditional 30-year fixed rate loans. Certain households have in fact resorted to these loans in order to maintain their home ownership affordability

in a context of soaring property prices. The dampening effect of a rise in interest rates should be put into perspective and is expected, in any case, to be gradual because these products often entail a period of fixed interest rates. Nevertheless, the rise in mortgage rates in the last six months has already caused a slowdown in transactions and could contribute to an easing-off of US household debt.

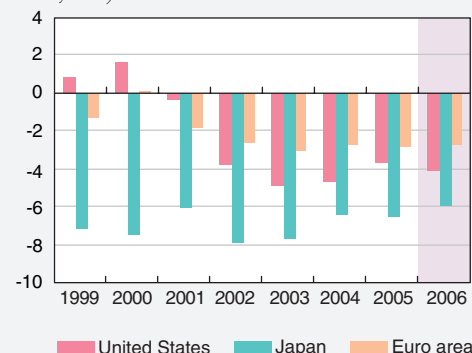
In addition, a continued rise in long-term interest rates would make it even more necessary to consolidate primary fiscal positions, bearing in mind that public finances are still very much in deficit in the main economic areas. In the United States, the improvement that began to take shape in 2005 is very fragile, due in particular to the unforeseen expenditure arising from the hurricanes. Moreover, the government's desire to maintain tax cuts could have a substantial negative impact.

Regarding the external accounts, the increase in interest rates has already contributed to the deterioration of the US income balance, which was negative for two out of four quarters in 2005. Overall, in 2005, the US current account deficit reached a record high of 6.4% of GDP. Hitherto, US borrowing requirements had been easily financed by capital inflows. The latest available data show in particular that the recycling of surpluses posted by the oil-producing countries (see Box 1) has taken over from the purchase of US securities by the Asian official sector.¹ However, due to its size and persistence, the US current account deficit continues to entail a risk of disorderly movements on financial and foreign exchange markets.

¹ The data from the Treasury International Capital System survey on which this observation is based must be treated with caution. Due to the statistical sources used, they are not exhaustive and breakdowns between non-resident sectors and by geographical area are imprecise.

General government deficit

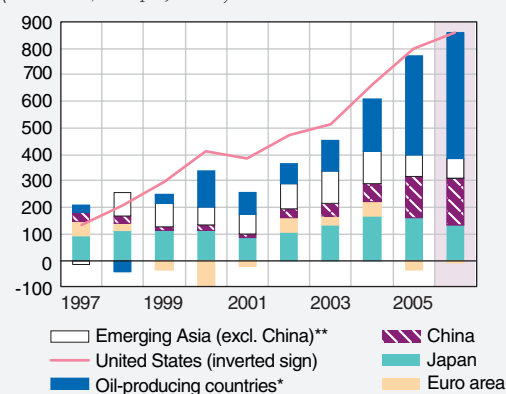
(as a % of GDP)



Sources: OECD, Reports of the European Commission (euro area up until 2004)

US current account deficit and major surpluses

(US billions, IMF projections)



Note: * 10 major oil producers (Algeria, Iran, Kuwait, Mexico, Nigeria, Norway, Russia, Saudi Arabia, United Arab Emirates, Venezuela)

** Hong-Kong, India, Indonesia, South Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand

Source: IMF, World Economic Outlook (WEO)

Box 1

Recycling oil revenues

The rise in the price of oil has led to an increase in the oil export revenues of the oil-producing countries. These revenues climbed from USD 500 billion in 2004 to USD 740 billion in 2005. The extra receipts have been partly spent on financing increased imports, thus reducing the oil-producing countries' current account surplus. However, these countries' marginal propensity to import, defined as the ratio of the growth of net imports to that of oil exports, appears to have dropped in 2005 (0.20 compared with an average of 0.24 between 2002 and 2005), suggesting increased recycling via the financial channel.

Trade channel

The geographical and sectoral structure of trade in the euro area enables it to benefit, more than the other industrialised economies, from the increased demand for imports from the oil-producing countries. Its share of the market has expanded since its low point in 2000, amounting to 30% in 2004, compared with 33% in 1980 and 27% in 2000. The United States' share is much smaller; it stood at 7.2% in 2005 compared with 15.4% in 1980, while China (7.1%) has overtaken Japan (5.9%). Therefore, 28 out of 100 additional oil exports from the oil-producing countries go to the euro area, which in parallel manages to export 7 of goods and services to the oil-producing countries, i.e. 25% of the amount of additional imports. This is more than for Japan (14%) and the United States (12%).

However, net transfers to the oil-exporting countries are higher for the euro area than for the United States or Japan because the euro area imports relatively more oil.

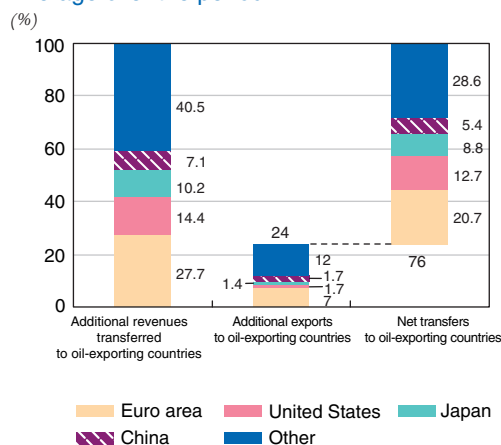
Financial channel

Oil-exporting countries traditionally recycle their oil revenues on the US markets, as the dollar is the main invoicing currency. The data published by the US Treasury show an increase in the amount of US securities held by the oil-exporting countries between January 2005 and January 2006: 16% for OPEC, 17.6% for Mexico and 22% for Norway. The increase is particularly spectacular in the United Kingdom (142%), most probably due to the indirect recycling of oil revenues via banks operating in the City of London and also hedge funds.

According to the Bank for International Settlements, deposits held by residents of oil-exporting countries in international banks amounted to USD 82 billion in the third quarter of 2005, i.e. the largest outstandings since 1977. Deposits held by residents of OPEC countries amounted to an equivalent of USD 46 billion (the share of total dollar-denominated outstandings stood at 72%) and those by non-OPEC oil exporting countries USD 36 billion (with 61% of total dollar-denominated outstandings). In particular, the share of total outstandings of deposits held by residents of non-OPEC oil-exporting countries with British banks has increased from 22% in 2002 to over 35%.

In addition, the investment behaviour of oil-exporting countries vis-à-vis foreign assets presents certain particular features, notably in comparison with that of the main holders of dollar assets, China and Japan. Their strategies appear to be more diversified: for example, while Norway prefers a large degree of diversification with explicit benchmarks, Russia and Saudi Arabia do not appear to have clear and stable benchmarks. They appear to have a wider range of investments (government or corporate bonds and shares) while most of China and Japan's external investments are government bonds. Lastly, investments by oil-producing countries appear to be more sensitive to prices and to yield spreads between different currencies. This desire for diversification however appears to be associated with a greater appetite for risk, which is reflected in their purchases of riskier assets and their less stable investment policies.

Recycling of oil revenues 2002-2005
Average over the period



Source: IMF (2004 data); Banque de France calculations

2|2 Financial market developments

MONETARY TIGHTENING AND PORTFOLIO SHIFTS

Since autumn 2005, financial markets have been characterised overall by historically low levels of risk-free interest rates and volatility, a decline in risk premia and an attendant sharp rise in the value of certain assets (residential real estate, equities, etc.). The global economy continued to enjoy very favourable monetary and financial conditions, whose corollary is abundant liquidity. This ongoing configuration has resulted in a reduction in risk aversion, a more intense search for yield and an increase in risk-taking.

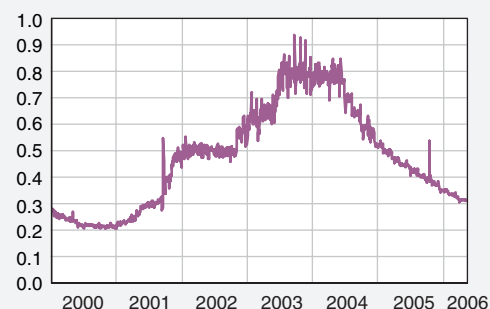
However, since the start of the year, a number of signs have appeared to indicate a possible correction in interest rates, which are out of line with fundamental variables (GDP, inflation, current account balances), and in volatility.

First, for the past six months, monetary tightening has been underway in a number of industrialised countries: the US Federal Reserve and the Bank of Canada have implemented further hikes in key rates; the European Central Bank has raised the interest rate on its main refinancing operations by 50 basis points in two increments; central banks in Switzerland and Norway have also tightened monetary policy. For its part, on 9 March 2006, the Bank of Japan announced an end to its quantitative easing policy, which has been in place for five years. It plans to mop up 80% of the excess liquidity in the banking sector, bringing it to JPY 6 trillion over the next few months. Following this, markets expect that the Japanese economy will be sufficiently robust to bear a rise in interest rates.

Against this backdrop, yields firmed as of the last quarter of 2005 on US bond markets and above all in the euro area. The five-year swap rate, considered to be representative of corporate financing conditions on capital markets, rose by around 90 basis points in the euro area, and by 60 basis points in the United States and Japan, even though it still remains at moderate levels.

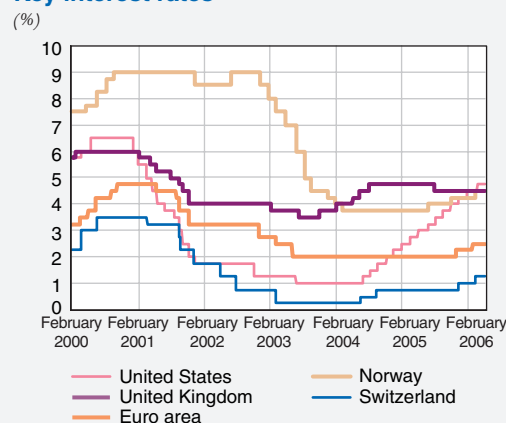
This tightening of monetary policy, which creates less favourable conditions for the growth of global liquidity, should contribute to curbing investors' appetite for risk and prompt them to revise their portfolio choices. Portfolio shifts, at times of a significant nature, appear to have taken place at the start of the year. In a survey of 197 institutional investors, Merrill Lynch noted a decrease in risk-taking, with 20% of fund managers stating that they were overweighted in cash in March 2006, compared with 4% in January.

Global liquidity indicator



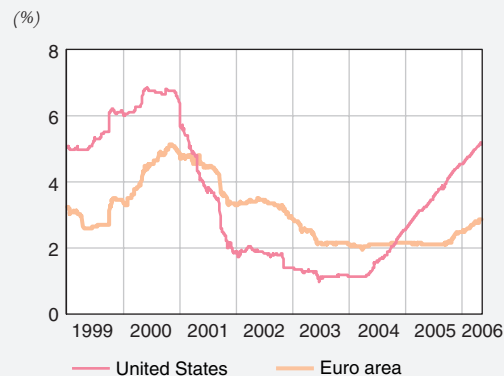
Note: 25-day moving average of the inverted sum weighted by 2000 GDP of the short-term interest rates (3-month) of the United States, the euro area, Japan and the United Kingdom.
Source: Bloomberg; Banque de France calculations

Key interest rates



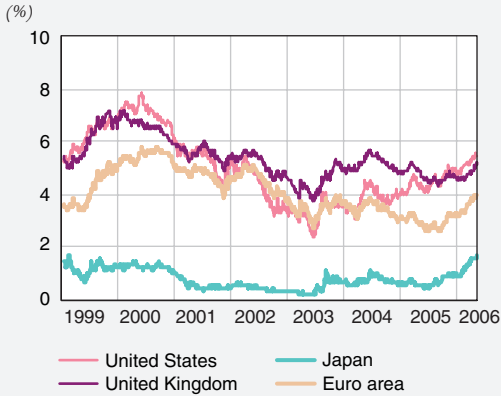
Source: Bloomberg

United States and euro area: 3-month interbank rates



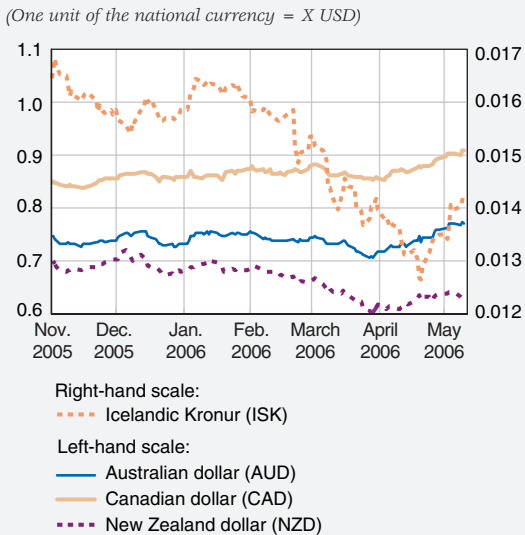
Source: Bloomberg

Five-year swap rates



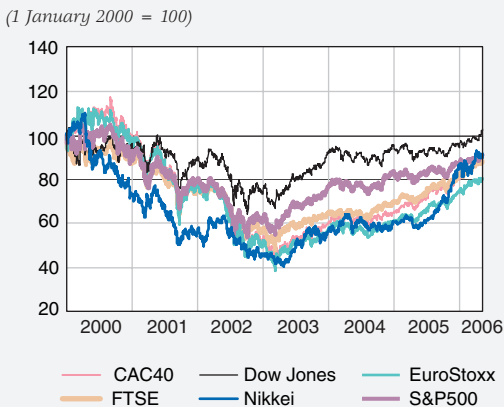
Source: Bloomberg

Exchange rate against the US dollar



Source: Bloomberg

Stock market indices



Source: Bloomberg

This change may reflect concerns on their part that certain assets may be overvalued.

Another sign of international portfolio shifts is that, between December 2005 and January 2006, Japanese investors, which are the largest creditors of the United States, have greatly reduced their net holdings of US treasuries (by over USD 16 billion).

Recent trends in foreign exchange markets also reflect the impact of portfolio shifts. The influence of yield spreads on the conduct of foreign exchange transactions could decline in favour of that of macroeconomic fundamentals, which could affect the exchange rates of certain currencies. The most exposed currencies appear to be those of countries with large current account imbalances, which have to keep interest rates high to attract non-resident investors. Two examples of this are the sharp depreciation of the currencies of New Zealand, where the current account deficit stands at 9% of GDP, and Iceland, where it is even higher, *i.e.* 15% of GDP. Emerging economies could also be affected and the contagion effects could amplify exchange rate adjustments usually caused by changes in economic fundamentals. The increase in exchange rate volatility that would result from this, and may already be observable in certain currency pairs (in particular EUR/HUF, NZD/JPY), would speed up the unwinding of carry trades, which had been on the increase since 2001, in line in particular with Japan's "zero" interest rate policy.

INCREASING LEVERAGE

The main stock market indices have generally gained ground on the back of strong world growth and the high profit margins generated by companies in 2005. Earnings per share grew by 23.6% in 2005 in the euro area (according to earnings data on the DJ Eurostoxx 50) and 14.8% in the United States for the S&P 500 index.

These earnings generated significant cash flows in addition to the high availability of external funds and accommodating credit conditions. The analysis of the debt ratios of Dow Jones and CAC 40 companies shows that debt financing by large companies on both sides of the Atlantic stopped decreasing, and, to some extent, even started increasing once again in the second half of 2005.

Thanks to their relatively strong financial positions, firms have been able to pay exceptional dividends to shareholders or initiate share buyback programmes.

There were significant share buybacks particularly in the United States. Federal Reserve data show that net share issuance was significantly negative in the United States in 2005 (around USD -350 billion, compared with USD -157 billion in 2004).

Large companies also used their own funds to finance external growth. M&A activity exceeded USD 1,800 billion worldwide between January and September 2005, compared with USD 1,300 billion for the whole of 2004. In the third quarter of 2005, M&A transactions totalled USD 302 billion in Europe and USD 247 billion in the United States. They were mainly cash financed (65%) and not through share exchanges, which is the opposite of the configuration observed in the 1998-2000 period.

In certain cases, especially in Europe, the debt burden has started to increase again, even though the level of debt remains high.

Trends in the leveraged buy-out (LBO) market must be noted in this regard. In 2005, LBO funds raised USD 134 billion worldwide, *i.e.* twice that of 2004. As they were able to increase their leverage significantly and inexpensively, large amounts of capital could be raised, and LBOs funds were of an unusually large size. The LBO structures initiating many of these transactions have become increasingly complex and risky for lenders (with the narrowing of credit spreads and the lengthening of loan maturities). The escalation of refinancing and secondary LBOs (sale of a target firm to another LBO fund), or even tertiary LBOs, weaken these structures even further as they are based on increasingly high leverage and involve mechanisms that contribute to pushing up expected sale and purchase prices. There are also more qualitative signs of excesses, such as the speed at which certain transactions have been carried out, which may lead to an oversimplification of controls and hasty investment decisions.

Credit rating agencies consider that all these transactions (LBOs, share buybacks and the payment of exceptional dividends) can significantly erode the quality of balance sheets, by increasing the companies' debt burdens or by reducing cash flows. This may result in the detrimental downgrade of ratings, *i.e.* from investment to speculative grade.

To date, this scenario has been limited. In 2005, Standard & Poor's downgraded the ratings of 10 large companies for such reasons. More generally, credit spreads are still historically tight,

S&P500: Growth in stock prices and earnings per share

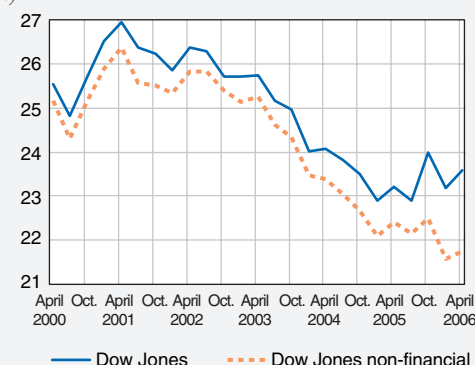
(1 January 2003 = 100)



Note: Stock prices and earnings per share are deflated by the HICP.
Source: Bloomberg

Average debt ratio/total assets of Dow Jones companies

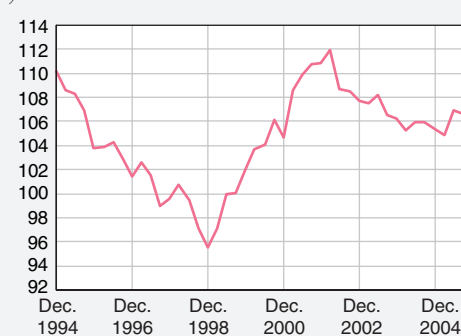
(%)



Source: Bloomberg

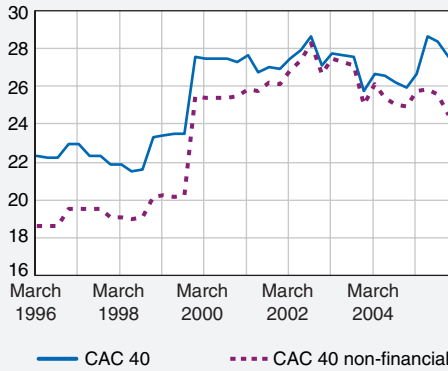
Debt/value added ratio of non-financial corporations

(%)



Sources: INSEE, Banque de France

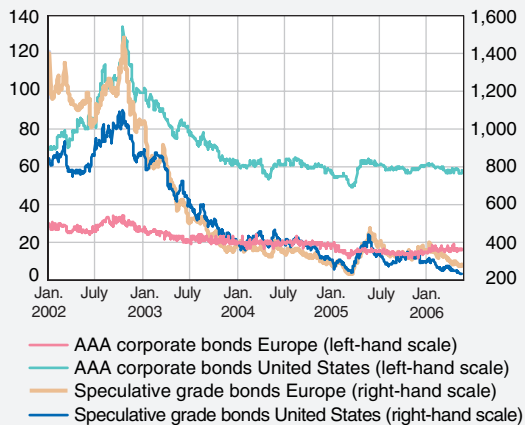
Average debt/total assets ratio of CAC 40 companies



Source: Bloomberg

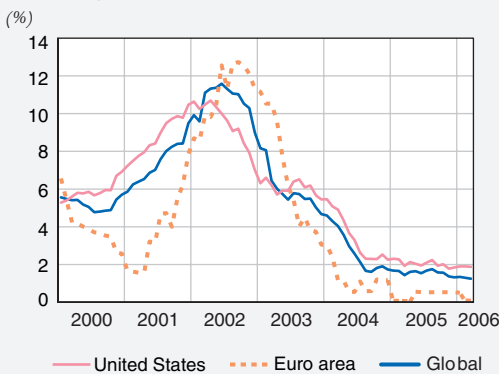
Credit spreads

(basis points)



Source: Merrill Lynch

Default rate of speculative grade companies
Year-on-year



Source: Standard and Poor's

corporate default rates are very low and, in 2005, upgrades outstripped downgrades.

AN INCREASING PROPORTION OF RISKY ISSUERS

However, increasingly risky issuers are entering the market. Speculative grade issuers accounted for 19% of the population of rated issuers in Europe at end-2005, compared with 17% at end-2003 and, in flow terms, they accounted for 40% of new ratings in 2005, compared with 34% in 2003 and 13% in 1996. Moody's also stressed that the Caa category had seen record growth in 2005 (32%) and, as a consequence, the default rate of European private issuers could reach 3.3% in 2006, compared with 1.9% in 2005. If this trend were to accentuate, risk premia may rise as investors would realise that they were insufficiently protected against a possible rise in credit risk.

Following the downgrade of General Motors' and Ford's corporate debt to speculative grade in May 2005, the default of the equipment manufacturer Delphi in October 2005 and Dana Corp. in March 2006 sparked further tensions in the automotive industry. Such *a priori* confined credit events create a potential systemic risk, due to the chain reactions that could result from the default of issuers when credit derivative outstandings are high. In the case of Dana Corp., the number of credit derivatives (in particular CDOs) in which this issuer is present seems disproportionate to its debt outstanding of only USD 2 billion. This was also the case for Delphi (see Box 2).

Box 2

Delphi: An illustration of operational risk associated with credit derivatives

The bankruptcy of the US automobile manufacturer Delphi in October 2005 highlighted the operational risk associated with the rapid growth of the credit derivatives market. Vulnerabilities stemming from both the internal dysfunctions of financial institutions (the market developing at a faster pace than support and control functions), and the global capacity constraints of the market (the volume of credit derivatives increasingly outweighing the volume of available underlying instruments).

Confirmation backlogs that create legal uncertainty which regulators are endeavouring to reduce

In August 2005, the publication of the second report of the Counterparty Risk Management Policy Group (CRMPG II)¹ had already brought to the attention of the authorities and market participants the significant backlog of derivatives trades whose confirmations are not signed within a reasonable timeframe. Even though it did not give rise to legal proceedings, the bankruptcy of Delphi brought to the fore the legal uncertainty generated by such backlogs, i.e. one of the parties may refuse to honour its obligations if the trade is not confirmed. In the United States, a joint initiative between the 14 international banks with the largest credit derivative outstandings, together with the Federal Reserve Bank of New York, succeeded in reducing by 54% delays of over one month for confirmations of transactions carried out between September 2005 and June 2006. In parallel, the share of electronic confirmations rose from 46% in September 2005 to 62% in January 2006. In France, the Commission bancaire closely monitors the backlogs of French banks and has demanded quantitative targets for reducing backlogs and progress reports for this operational risk.

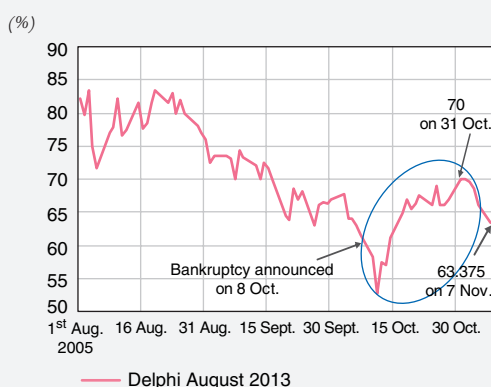
Settlement procedures still ill-suited given the relative outstanding amounts of credit derivatives and underlying bonds

In the case of Delphi, credit derivative outstandings in various forms (single-name default swaps, default swap indices, CDOs, etc.) stood at over 10 times the amount of outstanding underlying bonds. In the wake of its bankruptcy, the need for the physical settlement of contracts, stemming from credit default swaps' initial hedging purpose, triggered a rise in the price of Delphi bonds on the market, even though the company was already in default. It was only thanks to the implementation by the International swaps and derivatives association (ISDA) of an ad hoc multilateral protocol mechanism facilitating a switch in delivery terms from physical settlement to cash settlement for CDS index trades (the price for cash settlement is established by virtue of an auction) that the price of Delphi bonds returned to levels more in line with the recovery rate usually observed on this type of issuer. The credit event auction set a final settlement price of 63.4%, just above the historical average recovery rate of 40% on speculative grade issuers but below its peak of October 2005.

.../...

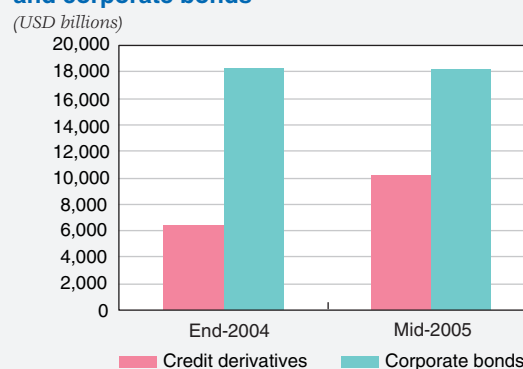
¹ Chaired by Gerald Corrigan, former president of the Federal Reserve Bank of New York, the CRMPG is comprised of senior officials from the 14 most active financial institutions on the New York market: Bank of America, Barclays Capital, Bear Stearns & Co Inc., Citigroup, Credit Suisse First Boston, Deutsche Bank, Goldman Sachs Group Inc., HSBC, JP Morgan Chase, Lehman Brothers Inc., Merrill Lynch & Co Inc., Morgan Stanley, UBS, and Wachovia.

Price of Delphi bonds due in August 2013



Source: Bloomberg

Outstanding amounts of credit derivatives and corporate bonds

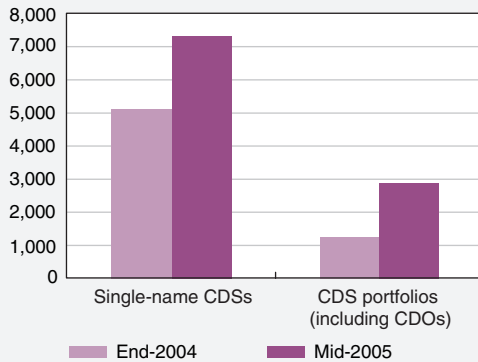


Source: BIS

Even though the Delphi episode highlighted the resilience of the financial system, it did not bring a lasting solution to settlement problems. Erratic (or even contradictory) price movements, resulting from the fact that the credit derivatives markets is developing much faster than that of the underlying bonds and the inappropriateness of settlement procedures, could jeopardise financial stability in the future if the number of defaults were to increase. Admittedly, the notional outstanding amount of derivatives contracts (estimated at USD 10.2 trillion in June 2005 according to the BIS) is rapidly approaching that of corporate bonds, even though it still has a long way to go. However, differences in outstandings of derivatives and underlying bonds may be very pronounced in the case of certain individual issuers. In this context, recent efforts, under the aegis of the ISDA, regarding cash settlement procedures in the event of a default are an important step towards enhancing the resilience of the financial system.

Notional amounts outstanding of credit derivatives

(USD billions)



Source: BIS

THE MANAGEMENT OF RISK SPECIFIC TO CREDIT DERIVATIVES ²

The credit derivatives market has expanded rapidly over the past few years: according to BIS statistics, in June 2005, notional outstanding amount of contracts stood at USD 10.2 trillion, rising by over 60% relative to end-2004, with *credit default swaps* (CDS) accounting for 70% of the market. This sharp rise in CDS transactions may indicate that these instruments have good liquidity, which is useful for hedging risks. A sign of this is the reduction in the volatility of the bid ask spread over the past two years, in particular on CDS indices.

Nevertheless, certain characteristics of the CDS market, recapped in the latest annual survey conducted by Fitch Ratings on credit derivatives, raises questions as to the liquidity of this instrument:

- market making on the CDS market remains highly concentrated: 15 international banks and brokers-dealers account for 75% of gross sales and 81% of gross purchases of protection. Consequently, the market liquidity of CDSs is sensitive to the financial difficulties that could affect any of these market makers;
- the number of issuers for which CDSs are liquid is limited (between 500 and 1,000). The liquidity is above all available on standard CDS indices (iTraxx, CDX);
- one-way markets remain possible in periods of market stress (it may not be possible to hedge against certain defaults in the event of a lack of protection sellers);
- the lack of transparency concerning the positions of financial institutions on the CDS market complicates the management of liquidity risk to which all their counterparties are exposed. This mainly concerns hedge funds, which account for 25% to 30% of the CDS market according to Fitch.

² See Bervas (A.) (2006): "Market liquidity and its incorporation into risk management", Banque de France, Financial Stability Review, May

Lastly, in the case of credit derivatives markets, further progress in terms of both transparency and the management of all types of risk remains necessary.

2|3 Emerging market risks

OVERALL IMPROVEMENT IN MACROECONOMIC FUNDAMENTALS

The following developments, already seen in Autumn 2005, continued to be observed, except in Asia (as regards inflation) and emerging Europe (as regards the current account balance and the fiscal position): consolidation of external accounts, control of inflation and improvement of public finances.

Thanks to an improvement in their terms of trade due to the rise in commodity prices and stronger world growth, most Latin American countries have recorded trade and current account surpluses, with the exception of Mexico which faces competition from China on the US market. The rise in prices remained moderate across the board, except in Venezuela and Argentina. In Venezuela, inflation is still high, albeit on the decline, while in Argentina, it has recorded a sharp increase despite the recent hikes in key interest rates. Tax revenues increased thanks to higher GDP growth, in particular in Chile and Venezuela. This has contributed to lowering government deficits and stabilising, or in some cases reducing, the ratio of public debt to GDP.

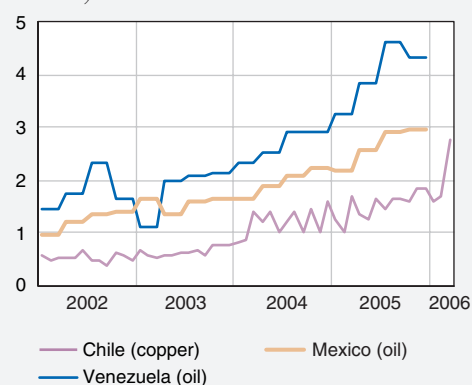
In Asia, the contribution of net exports to growth has been strongly positive in China, but relatively weak in the rest of the area. In order to contain the inflationary pressures generated by the oil price increase and the strength of economic activity, Asian central banks tightened their monetary policy during the second half of 2005. In Indonesia, the rise in key rates was also aimed at containing the speculative attacks against the rupiah and curbing credit growth. However, lowering (in Indonesia) or withdrawing (in Thailand) subsidies for domestic oil products contributed to fuelling inflation while reducing government deficits.

AVAILABILITY OF HIGHLY FAVOURABLE FINANCING CONDITIONS

Thanks to their sound economic fundamentals, emerging economies continued to benefit from large capital inflows and enjoy favourable financing conditions. According to the Institute of International Finance, net flows of official capital reached a historical low in 2005, at USD -65 billion,

Commodity exports from Latin America

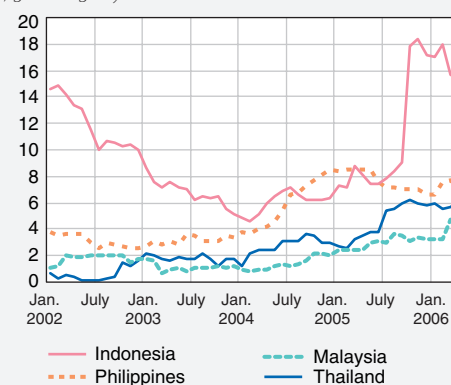
(USD billions)



Sources: National data

Inflation rates in Asia

(%, year-on-year)



Sources: National data

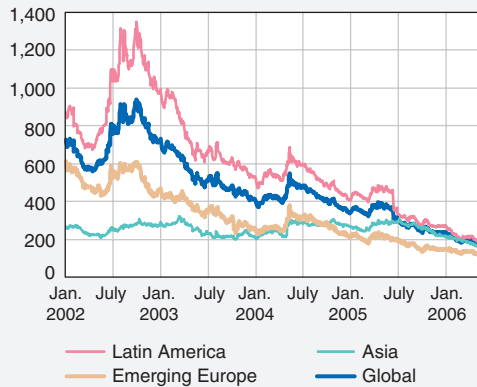
External bond financing of emerging economies in 2006

	Scheduled	Carried out at end-February 2006	% carried out
Brazil	4,830	4,500	93
Mexico	2,900	2,900	100
Philippines	2,150	3,100	144
Turkey	6,000	3,630	61
Venezuela	4,215	3,000	71

Source: JP Morgan

EMBIG spreads

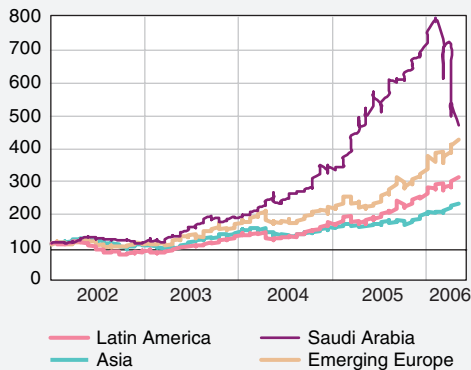
(basis points)



Sources: Bloomberg, JP Morgan

Emerging market stock indices

(1 January 2002 = 100)



Note: MSCI composites indices, national index for Saudi Arabia

Sources: Morgan Stanley, Bloomberg

in particular on account of the repayments made by Poland and Russia to the Paris Club and by Brazil to the IMF. However, net flows of private capital to emerging economies amounted to USD 358 billion in 2005, exceeding the 1996 record. A large number of countries are already able to cover a significant share of their bond financing scheduled for 2006.

The ratings of emerging market sovereign bonds continued to improve over the past six months. Investment grade debt now accounts for roughly 40% of the capitalisation of the EMBIG Diversified index calculated by JP Morgan (compared with only 20% at mid-2004). Risk premia on emerging bonds declined further, reaching historical lows. For example, risk premia on BB-rated emerging bonds actually dropped below BB-rated US corporate bond spreads. For emerging economies on the whole, the EMBIG spread stood at less than 200 basis points in early March 2006.

In this context, emerging economies started to adopt a more active debt management strategy, such as foreign currency-denominated debt buybacks in Mexico and Brazil (see Box 3) or the issuance of international bonds in local currency in Mexico. At the same time, large capital inflows contributed to boosting emerging equity markets, in particular in the Middle East and Europe. These nevertheless continue to be faced with the risk of a sudden turnaround in investor confidence, as shown by the stock market downturns in the Persian Gulf in March 2006 (-5% in Saudi Arabia, the highest capitalisation in the Arab world and -12% in Dubai, compared with an average rise of 92% in 2005).

TOWARDS GREATER DISCRIMINATION ON THE BASIS OF THE QUALITY OF FUNDAMENTALS?

A sudden drying up of world liquidity, which could result from a rise in interest rates in the United States and the euro area, is likely to result in a widening of emerging market spreads, with a greater degree of differentiation, and, potentially, a decrease in private capital inflows. This situation would contribute to increasing the debt burden in the most highly indebted countries.

Initially, the impact of the increase in energy prices had partly been offset by government subsidies. However, should oil prices continue rising, they would weight particularly heavily on domestic demand in countries where the energy balance is in deficit.

Box 3

Proactive debt management in emerging countries: The case of Brazil

Thanks to strong world growth over the past three years, emerging countries have been able to improve their financial situation, and in particular reduce their external vulnerability. According to the IMF, the ratio of foreign currency-denominated sovereign debt to GDP dropped from 44% in 2002 to 39% in 2004.¹ This ratio is still higher than that recorded prior to the Asian crisis of 1997 (27%), but contrary to the situation at the time, outstandings of government debt in emerging economies are now mainly denominated in local currency. This is particularly the case in Latin America, where foreign currency-denominated debt only accounted for 30% of sovereign debt in 2004, against 40% in 1996. Overall, this external debt reduction fits into a proactive strategy aiming at optimising the debt profile and reducing its overall cost.²

In this respect, Brazil has adopted a particularly active strategy. Its external debt now accounts for less than 15% of its public debt and the government plans on cutting back this proportion even further. Brazil's debt with the IMF –amounting to USD 15.5 billion– was entirely repaid in advance at end-2005, by using the accumulated foreign exchange reserves. Its debt with the Paris Club was redeemed in January 2006. Brazil also announced that it would buy back USD 16 billion to USD 20 billion worth of debt on the markets in 2006 (of which USD 6.6 billion worth of Brady bonds). Furthermore, the government decided to open up the domestic market to non-resident investors by offering them the possibility of swapping their foreign currency-denominated securities for long bonds in local currency and by withdrawing the 15% income tax on Brazilian securities held by non-residents (February 2006). This measure should contribute to increasing the liquidity of the country's domestic debt and its average maturity, which now amounts to roughly 30 months, against 80 months for the external debt. However, this could give rise to upward pressures on the exchange rate associated with the inflow of foreign capital.

In sum, Brazil has embarked on a gradual process of improving its public debt management, with the aim of implementing the OECD's best practices. The OECD recommends financing in the form of fixed-rate, long-term and local currency-denominated domestic debt, underpinned by a large base of domestic investors. The Brazilian government has issued local currency-denominated international bonds on the one hand, and inflation-linked securities on the other. The latter accounted for over 30% of domestic debt at the start of 2006, compared with only 10% at end-2003. It has also committed itself to reducing its debt indexed to the overnight rate, which represents over half of its domestic debt and generates large interest payments. In the medium term, Brazil must also foster the development of a base of domestic institutional investors, such as pension funds, mutual funds, insurance companies, that is sufficiently broad to significantly and lastingly reduce the country's external vulnerability.

¹ IMF, *Global Financial Stability Report, Chapter III, May 2006*

² Debt is considered to be external when it is issued on international markets.

Indicator of international investors' risk aversion



Note: The indicator is derived from a principal component analysis of several 5-year credit risk premia; the higher the indicator, the greater the risk aversion.

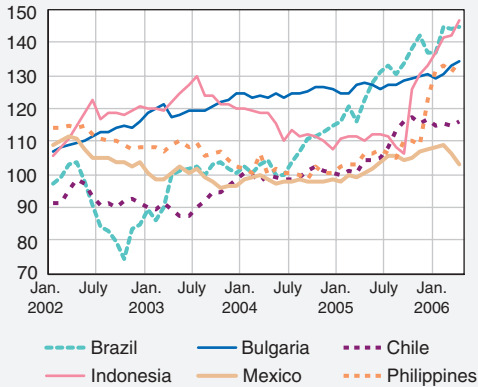
Sources: JP Morgan, Merrill Lynch, Bloomberg; Banque de France calculations (Principal component analysis of several 5-year credit risk premia).

The general tightening of monetary policy has led to an appreciation in real effective exchange rates since the end of 2005. If protracted, this upward movement could affect the price competitiveness of those countries concerned.

In some cases, the structure of government debt could constitute a source of fragility. In this respect, the process of convergence towards the euro area clearly contributes to stabilising the markets, but the presence of vulnerabilities should not be disregarded (see Box 4), as shown by the persistence of large fiscal imbalances in a number of countries. The efforts made in terms of public finance consolidation and public debt management must thus be pursued.

Real effective exchange rates

(Year 2000 = 100)



Source: JP Morgan

Box 4

Credit growth in Central and Eastern Europe

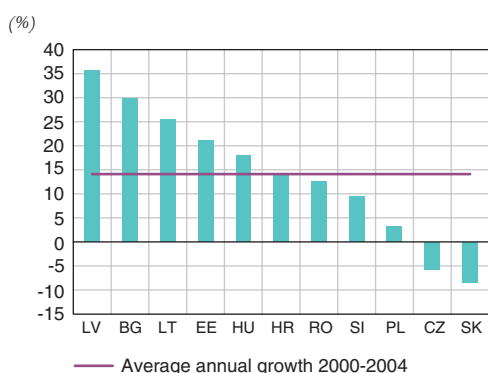
The real annual growth rate of private sector credit in the New Member States and Accessing Countries stood on average at 14.1% over the 2000-2004 period but growth patterns were highly contrasted. Credit growth was above average in five out of the eleven countries in the sample (Latvia, Bulgaria, Lithuania, Estonia and Hungary), but was moderate, or even negative, in a number of others (Poland, Czech Republic, Slovakia).

Credit growth in the New Member States and Accessing Countries reflects the catching-up process with the euro area, which involves reforming the banking sector and developing the financial sector. This relation is borne out for a large number of countries by running a regression of the level of financial development (measured by the ratio of credit to GDP) on the level of economic development (measured by per capita GDP).¹ This estimated relation enables us to place the different countries relative to the "equilibrium level": three countries (Croatia, Latvia and Estonia) post a credit-to-GDP ratio slightly above the equilibrium level, whereas the others appear to be lagging behind in terms of financial development (in particular Romania). This suggests that the rise in the credit-to-GDP ratio is a natural phenomenon, which should continue with the economic catching-up process.

However, the pace of credit growth in certain countries that have benefited from a fall in interest rates prior to their expected membership of the euro area could jeopardise their macroeconomic stability. Credit growth can be considered as "excessive" if it exacerbates a country's financial vulnerability through the distribution of low-quality credit or if it generates macroeconomic imbalances, such as a large current account deficit. The New Member States and the Accessing Countries whose credit growth is above average are also those with the largest current account deficit: on average, over the 2000-2004 period, the current account deficit amounted to 9.2% of GDP in Estonia, 8.6% in Latvia, 8% in Hungary, 7% in Bulgaria and 5.9% in Lithuania.

A large current account deficit can generate downward pressures on the domestic currency. This contributes to increasing the vulnerability of the banking sector in view of the significant amount of foreign currency-denominated loans issued by commercial banks. In the event of an exchange rate adjustment, the debt burden for households and firms posting a substantial foreign currency-denominated debt would rise, with a greater default risk for the most vulnerable ones. Now, the New Member States and Accessing Countries that have displayed strong credit growth and large current account deficits are indeed those that have recorded a large amount of foreign currency-denominated loans (80% of total loans in Estonia, 63.5% in Lithuania, 59.2% in Latvia, 46.5% in Bulgaria and 44% in Hungary). Particular attention should therefore be paid to their situation.

Real growth of private sector credit



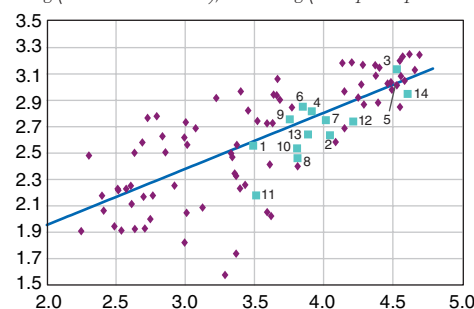
Source: IMF

NB: The sample is made up of the following countries: Czech Republic (CZ), Slovakia (SK), Hungary (HU), Poland (PL), Slovenia (SI), Latvia (LV), Lithuania (LT), Estonia (EE) for the New Member States; Bulgaria (BG), Romania (RO), Croatia (HR) for the Accessing Countries.

¹ The equation of the estimated relation is: $y = 1,105 + 0,425x$ with $R^2 = 0.55$. The sample comprises 95 countries in 2004. The coefficients are significant at a 1% level of significance.

Growth in bank lending and level of economic development in 2004

[y-axis: log (credit to GDP ratio); x-axis: log (GDP per capita in USD)]

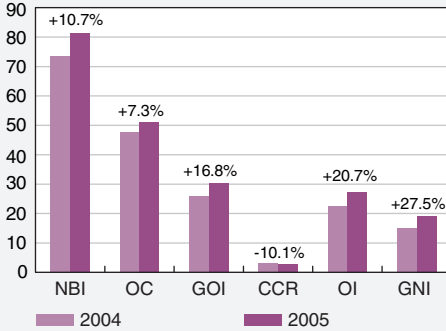


1 : BG, 2 : CZ, 3 : DE, 4 : EE, 5 : FR, 6 : HR, 7 : HU, 8 : LT, 9 : LV, 10 : PL, 11 : RO, 12 : SI, 13 : SK, 14 : US

Sources: Datastream, IMF

Earnings of French banks

(EUR billions, annual change under IFRS*)

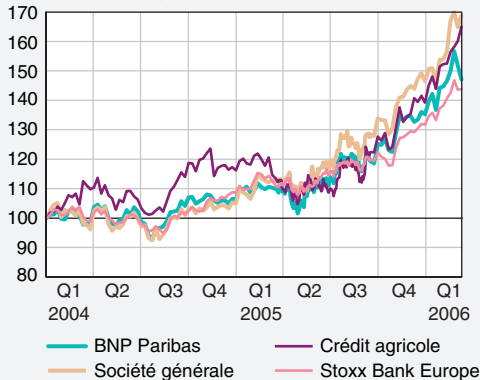


NBI: net banking income
OC: operating costs
GOI: gross operating income
CCR: cost of credit risk
OI: operating income
GNI: group net income

* BNP Paribas, Société générale, Groupe Banque populaire, Groupe Crédit agricole, Crédit mutuel Centre-Est Europe -CIC
Source: Data published by banks that adopted the IFRS in 2005.

Share prices of French banks and European banking index

(2 January 2004 = 100)



Source: Reuters

Five-year CDS premia on senior debt of European and French banks

(basis points)



Source: Credit Trade

3 | FINANCIAL SECTOR

3|1 Situation of financial institutions

THE BANKING SECTOR

For the major French credit institutions, 2005 was marked by the release of significantly improved earnings and solvency ratios that remained at satisfactory levels. Nonetheless, this highly favourable financial situation should not mask the fact that the sector is subject to a number of risks. Indeed, in the light of the gradual tightening of monetary policy in the industrialised countries, French banks could be vulnerable to a turnaround in the credit cycle associated with an economic downturn. Such developments would contribute to a deterioration in the quality of the banking industry's exposures.

Moreover, with long-term interest rates remaining relatively low, the search for yield seems to have continued to spur credit institutions to increase their positions on relatively illiquid market segments or financial instruments whose valuation is uncertain. Under these circumstances, it cannot be ruled out that a sharp rise in risk aversion might result in a significant increase in risk premia and bring about a deterioration in the risk profile of credit institutions' banking and trading books.

It should also be noted that the very good performances boasted by French credit institutions in 2005 were partly secured thanks to a drop in provisioning allocated to risk coverage. It is important that French credit institutions maintain a sound financial base and appropriate risk control, particularly given the recent upsurge in large-scale external growth operations.

Developments in the quality of banks' exposures

Household credit risk

Banks remain exposed to a deterioration in the creditworthiness of households notably on account of downward pressures on the margins on some intermediation segments.

According the quarterly survey of bank lending in France, credit standards applied to housing loans continued to ease in the second half of 2005 (see Box 5). In addition, some banks reported a significant increase in loans with maturity of over 15 years, an upsurge in lending without a down payment and further renegotiation of loans, encouraged by the continuing fairly low level of interest rates.

Box 5

Quarterly survey of bank lending in France

Introduced in the fourth quarter of 2002, this quarterly survey, conducted in France as in the other countries of the euro area, is aimed at gaining a better understanding of the role of credit in the transmission of monetary policy impulses. The qualitative information compiled also makes it possible to track the credit cycle and to identify potential risks of a credit crunch at an early stage.

Housing loans to households

Having eased somewhat in the last quarter of 2005, credit standards applied to housing loans were virtually unchanged in the first quarter of 2006.

Over the last two quarters, a larger number of survey respondents reported a sharpening of competition between lending banks, with this regarded as the main factor contributing to the easing of credit standards.

In addition, for the first time since the survey's introduction, the cost of funds and balance sheet constraints contributed to the easing of credit standards in the first quarter of 2006.

Banks' margins on loans declined more than during the previous three quarters. Some banks that had expressed the wish to stabilise their margins were nonetheless obliged to further reduce them in order to retain their market share. Conversely, as in the previous quarter, margins on riskier loans hardly changed at all.

All in all, the supply of housing loans remained significantly accommodating in the first quarter of 2006. While there was generally little change in credit standards, banks' margins on housing loans continued to decline as a result of competition.

Loans to enterprises

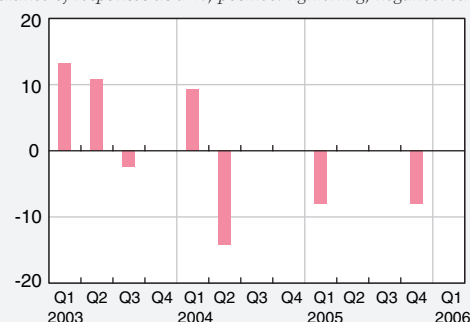
The charts opposite present the survey's results on credit standards to large enterprises and small and medium-sized companies (SMEs) in France, the main factors contributing to changes in these standards and the variations in the margins on the loans granted by banks.

In the first quarter of 2006, credit standards to enterprises eased slightly overall, whereas in the last quarter of 2005 they had been virtually unchanged for SMEs and had even tightened for large enterprises.

.../...

Credit standards on housing loans to households

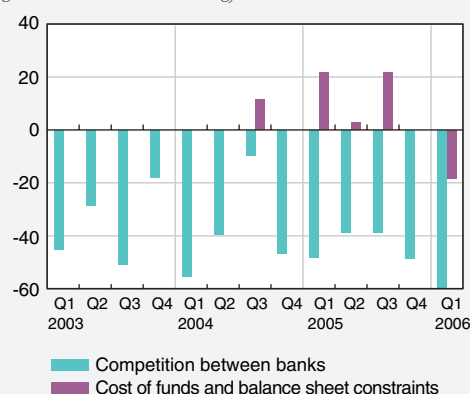
(balance of responses as a %; positive: tightening; negative: easing)



Source: Banque de France

Contribution to the change in credit standards on housing loans

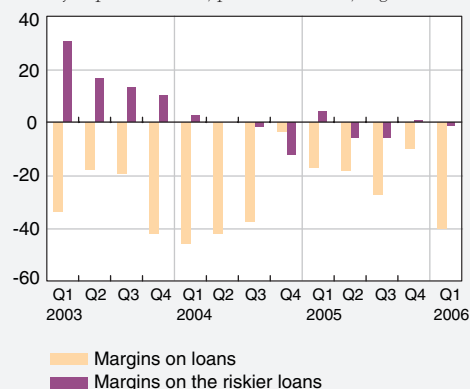
(balance of responses as a %; positive: contribution to tightening; negative: contribution to easing)



Source: Banque de France

Margins on housing loans

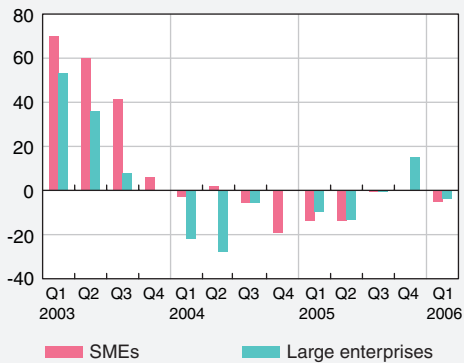
(balance of responses as a %; positive: increase; negative: decline)



Source: Banque de France

Credit standards to enterprises

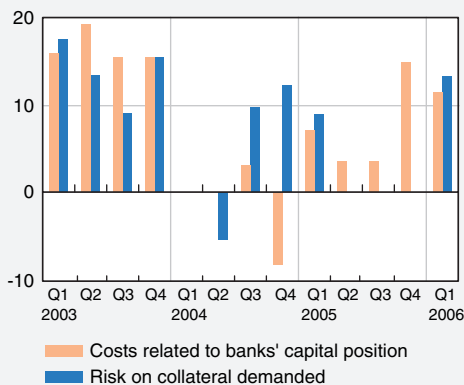
(balance of responses as a %; positive: tightening; negative: easing)



Source: Banque de France

Contribution to the change in credit standards to enterprises

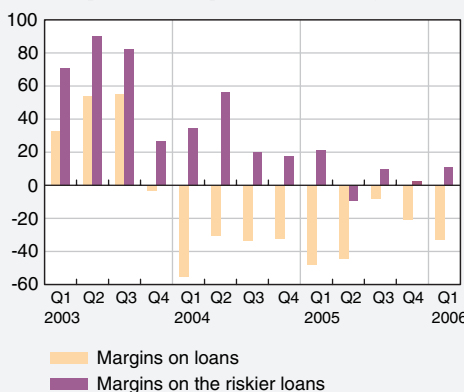
(balance of responses as a %; positive: contribution to tightening; negative: contribution to easing)



Source: Banque de France

Margins on loans to enterprises

(balance of responses as a %; positive: increase; negative: decline)



Source: Banque de France

According to the majority of responding banks, although a smaller majority than in previous quarters, competition between lending institutions was again the main factor contributing to the easing of credit standards.

Conversely, the general and industry-specific outlook remained factors contributing to the tightening of standards, although to a lesser degree than at the end of 2005.

Lastly, costs related to banks' capital position appear to have placed greater constraints on credit distribution during the last two quarters. Similarly, risk on collateral demanded, which was hardly cited in the second half of 2005, appears to have contributed to a tightening of credit standards in the first quarter of 2006.

The trend decline in banks' margins on loans to enterprises continued and even intensified in the first quarter of 2006 compared with the end of 2005. This overall development however masks a relative improvement in the margins on riskier loans.

All in all, the corporate lending market is still characterised by strong competition, which continues to spur bank lending, but also to weigh on lending institutions' margins.

Against this backdrop, lending to households continued to expand at a robust pace in France.³ In spite of the slowdown in their growth in the second half of the year, variable rate loans once again constituted a considerable proportion of new lending in 2005 (around one-third).

A downturn in economic growth and/or higher interest rates could have a significant adverse impact on the risk profile of borrowers, especially for specialised banks. It may be noted, however, that poorer households have already been crowded out of the housing loan market by the steep rise in property prices.

Corporate credit risk

Loans to non-financial companies were up by 6.8% in 2005 after 6% in 2004. Unlike in the case of households, credit standards for companies tightened slightly in the second half of 2005. However, some banks appear to have taken excessive risks. In particular, interest margins on the syndicated loan market –which has become very competitive– reached their lowest level for eight years, especially in respect of investment grade counterparties. This may not be sufficient to protect the exposed banks from the impact of potential corporate failures.

³ 11.2% year-on-year overall at end-December 2005 (compared with 9.6% in December 2004); 14.6% for housing loans (13.6% in 2004) and over 5% for cash loans.

The scale of some credit institutions' exposures regarding leveraged buy-outs (LBOs) should also be highlighted, with the volume of these transactions reaching record levels in 2005. According to *European Buyout Review*, these transactions totalled EUR 21 billion in France (20% of the European market), up by 91% compared with 2004. These banks appear vulnerable to an upturn in corporate failures, especially since the growth in LBOs has been accompanied by a general increase in leverage –particularly in the form of syndicated loans– and a generalised deterioration in the quality of debt. Moreover, the size of transactions has grown significantly, with the French market seeing five LBOs involving amounts over EUR 1 billion in 2005.

In 2005, annual growth in corporate failures slowed a little to 1.3%, after 2.4% the previous year. The number of legal proceedings stood at 48,846, after 48,196 in 2004. In addition, the impact on banks of the initiation of legal proceedings, measured by the share of failing companies in banks' outstanding loans to enterprises, diminished. This reassuring development indicates that, over the recent period, there has been a slight improvement in the quality of French credit institutions' corporate portfolios. Nevertheless, according to the credit insurance company Euler Hermes SFAC, the increase in corporate failures is expected to continue in 2006.

Factors relating to overall interest rate risk

The rise in short-term and to a lesser extent long-term interest rates associated with the tightening of monetary policy, is liable to adversely affect bank margins. If there were further rises, this could dampen new lending and bring about an increase in non-performing loans.

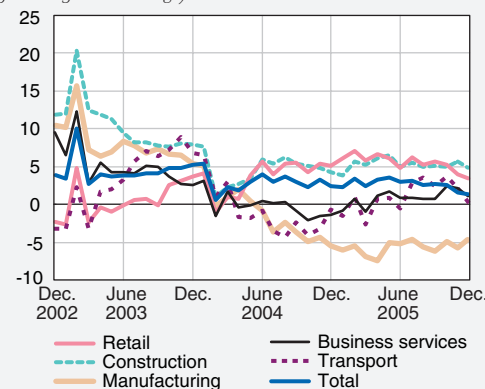
At the same time, if current developments persisted with a marked flattening of the yield curve, this would undoubtedly weigh on banks' transformation activities. Indeed, the "stress tests" conducted by the General Secretariat of the *Commission bancaire* to assess the resilience of the French banking system highlight the sector's vulnerability to such a distortion of the yield curve.

Country risk

Over the recent period, French banks have initiated significant acquisition policies on a number of emerging markets whose environment is characterised by strong economic growth and bank intermediation margins that continue to be high. This is particularly the case, for example, in Ukraine with the BNP Paribas (BNPP) acquiring a 51% stake in Ukrsibbank, and Russia, where the two groups –Société générale and BNP Paribas– have increased their presence. Given that

Number of corporate failures in France Cumulated over 12 months

(year-on-year % change)



Source: Banque de France

Share of non-performing bank loans resulting from failures

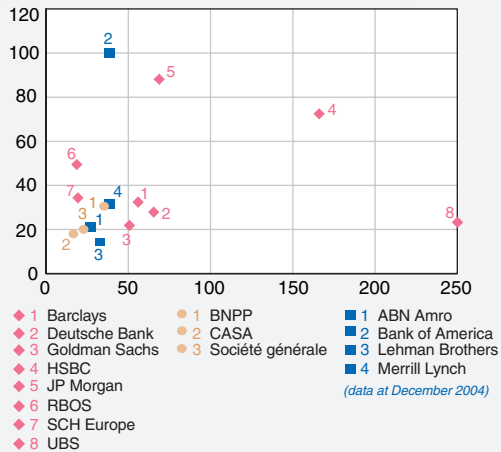
Year-on-year



Source: Banque de France

Average Value-at-Risk (VaR) and equity capital at June 2005

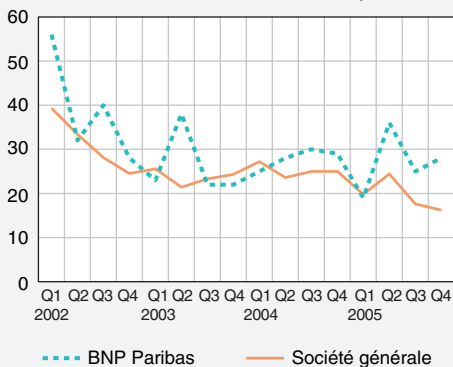
(VaR in EUR millions, equity capital in EUR billions)



Source: Banks' published data.

Average Value-at-Risk (VaR) of French banks

(EUR millions, 1-day VaR at 99% confidence level)



Source: Banks' published data.

a deterioration of the situation in these countries cannot be ruled out in view of the persistence of a number of sources of vulnerability (see section 2|3), French banks are therefore exposed to this type of risk. This, however, remains proportionately small relative to their overall activity.

Market and illiquidity risk on some innovative instruments

The Value-at-Risk (VaR) of the main French banking groups at the end of 2005 stood at similar levels as at end-2004. In many cases, this relative stability reflects the decline in volatility on some market segments. It is crucial that this approach be complemented by crisis scenarios. Nevertheless, a comparison of average VaR with these groups' equity capital demonstrates their smaller appetite for risk than that of some foreign banking groups.

Nevertheless, some credit institutions significantly increased their positions on particularly high-yielding, but relatively illiquid market segments such as the credit derivatives market and above all multi-name instruments such as collateralised debt obligations (CDOs). These positions led them to greatly increase their risk associated with underlying assets and counterparties. Moreover, some banks that are arrangers of CDOs are sometimes forced to keep the riskiest tranches because of the difficulty in selling them.

These developments bear out the concerns of the supervisory authorities and of market professionals themselves as to the need to foster and strengthen risk control techniques, especially with regard to complex products (see section 2|2 on the report of the Counterparty Risk Management Policy Group II).

Lastly, French banks continue to have significant exposure to hedge funds. The fees generated by activities developed with these types of funds thus remains fairly substantial, particularly in terms of brokerage. Nonetheless, a fall in the returns provided by these investment vehicles was observed in the last quarter of 2005. These may consequently seem less attractive given the risk they appear to generate. This segment of activity should therefore continue to be the subject of particular vigilance. Hedge fund failures would weaken the banks directly exposed on this sector, and even more so given that these funds have themselves substantial positions on the relatively illiquid market segments already referred to such as capital investment and CDOs.

Earnings of the main French banks in 2005

In Europe as a whole, 2005 was marked by the implementation of the International Financial Reporting Standards (IFRS)⁴ standards applied for the first time to a whole year. The relative heterogeneity of the 2004 base for comparison resulting from the options provided for in IFRS 1 calls for a degree of caution when analysing year-on-year changes for this transition year. Putting these accounting issues to one side, the major trends seen in 2004 continued or even intensified. The group net income of the main European banks⁵ increased significantly (by over 27% on average), in part as a result of weak growth in the cost of risk (averaging 8, but excluding British banks, there was a fall of more than 18%).

Contribution of the different business areas to income

Retail banking (including specialised financial services and foreign retail banking) remains the main source of profit for French banks. Its contribution has nevertheless declined (59.5% of NBI at end-2005, compared with 61% one year earlier), due to the relatively small rise in NBI generated by retail banking activities in France and the further narrowing of margins, in particular in the very competitive housing loan sector.

The strong performance of financial savings instruments (in particular life insurance products,⁶ partly underpinned by flows out of housing savings plans) contributed to the increase in the share of fees in NBI. Income from asset management activities also rose by over 17% on average, especially for the Crédit agricole group following its acquisition of a 65% stake in Nextra (the former asset management subsidiary of Banca Intesa) last December.

The rise in equity markets since 2004 and the ongoing low level of interest rates have, in France like elsewhere, given a fillip to corporate and investment banking activity (LBOs, structured products, equity derivatives, trading). French banks participated in the global recovery in M&A activity, which, in 2005, reached levels comparable to those of 1999-2000 (over USD 1,100 billion in Europe, and USD 2,900 billion worldwide according to Dealogic), and generated a significant volume of fees (USD 6.3 billion worldwide for all banks, up by 43% on 2004).

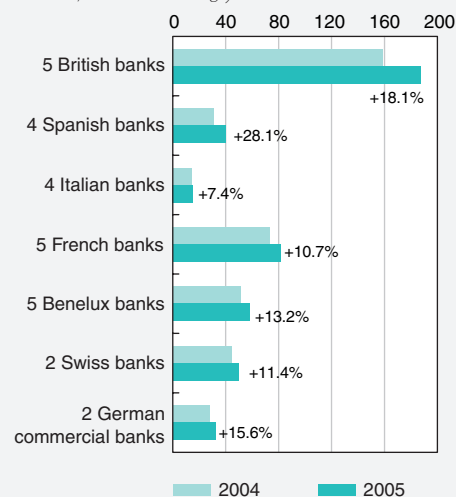
⁴ The International Financial Reporting Standards (IFRS) are the new accounting standards drawn up by the International Accounting Standards Board (IASB).

⁵ The sample comprises the following: Lloyds TSB, Royal Bank of Scotland, Barclays, HSBC, ABNAMRO, Dexia, Fortis Bank, KBC Bank, ING Bank, UBS, Crédit Suisse, Deutsche Bank, Commerzbank, Banca Intesa, Capitalia, Banco Popular, BBVA, La Caixa, SCH, Société générale, Groupe Banque populaire, BNP Paribas, Groupe Crédit agricole, Crédit mutuel Centre-Est Europe.

⁶ Financial investment flows of households picked up in 2005 to EUR 115 billions, compared with EUR 105 billions in 2004.

Net banking income of the main European banks

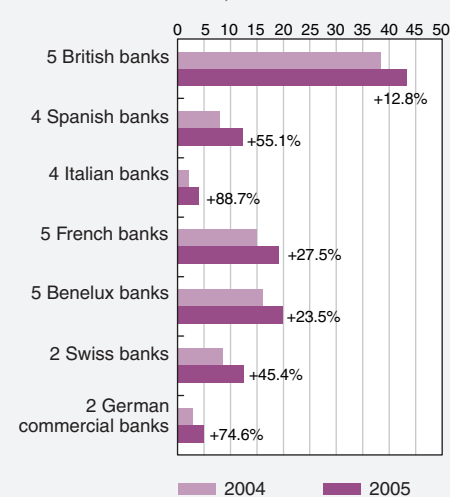
(EUR billions, annual % change)



Source: data published by banks in the sample.

Group net income of the main European banks

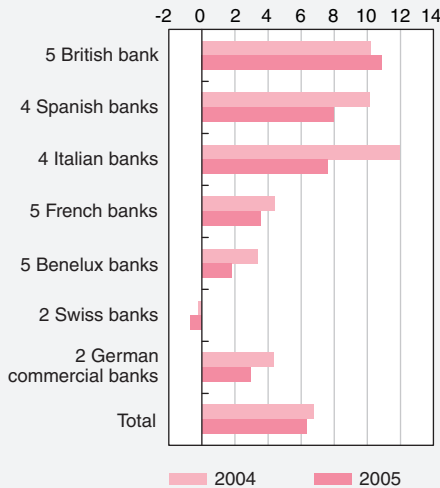
(EUR billions, annual % change)



Source: data published by banks in the sample.

Cost of credit risk of the main European banks

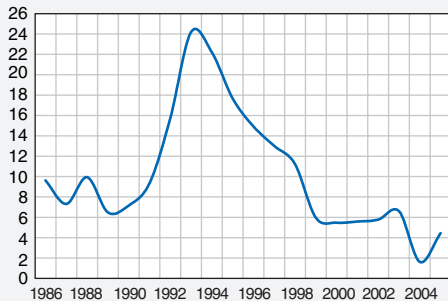
(as a % of net banking income)



Source: Banks' published data.

Cost of risk/net banking income
All credit institutions – all business lines

(%)



Source: Commission bancaire.

Low cost of risk

French banks squarely focused on controlling their operating expenses in 2005. Cost to income ratios therefore improved in all groups, averaging 62.9%, compared with 64.9% in 2004. These levels remain higher than those of UK and Spanish groups (around 50%), but are lower than those of Swiss, German and Benelux groups (almost 70%). Alliances between French groups on certain segments (implementation of common electronic trading platforms) testify to their efforts to achieve economies of scale.

The cost of risk has declined in all European groups with the exception of UK groups, which were affected by defaults on personal loans and credit card debt following a series of interest rate hikes since November 2003 and the slowdown in economic growth in the United Kingdom.⁷ For French banks, in particular, the level of provisioning reached a historically low level. This configuration can partly be attributed to the slower rise in the corporate failure rate. French banks also refocused their lending activity on categories seen as less risky, which is reflected by the fact that the predominant share of housing loans are backed by sound collateral, guarantees or mortgages.

The cost of risk varied according to the different business areas, declining most significantly in the corporate and investment banking sector. However, in specialised financial services, it rose by over 21% on average.

⁷ The cost of risk also rose in 2005 in the United States, with the provisioning rate reaching 7.1% of NBI, compared with 5.8% in 2004.

The financial soundness of the French banking sector

At the prudential level, the Tier One ratios of French banks calculated under IFRS were stable from one year-end to the next.⁸

From an economic point of view, the return on equity (ROE) of French banks had, in 2004, reached levels comparable to those of their European counterparts (18% on average). However, since January 2005, share prices of French banks have slightly outperformed the European bank sector index, reflecting the fact that French banks are slightly overvalued relative to their European peers. At the same time, the strength of banks' earnings helped bring French banks' credit default swap (CDS) premia to historically low levels. Such levels seem inappropriate in view of the medium-term vulnerabilities that could arise from underprovisioning for increases in banks' risky positions.

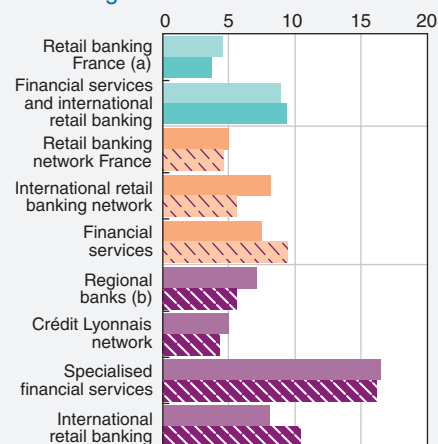
Against this backdrop, French banks are continuing to develop an active targeted acquisition strategy in order to diversify their sources of income. The friendly takeover bid by BNP Paribas in February 2006 for Banca Nazionale del Lavoro and the recent merger talks between Caisses d'Épargne and Banque populaire group to create a single listed entity Natixis illustrate this consolidation trend, which also underlies the cross-border mergers between other large European groups (bids by ABN AMRO on Antonveneta, and by Unicredit on Hypovereinsbank).

While this consolidation trend calls for the close monitoring of these banks' solvency ratios, the diversification of income streams of banking groups should promote their financial soundness.

Costs of credit risk by business line

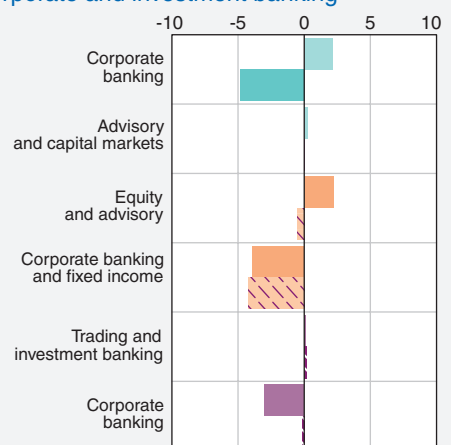
(as a % of net banking income)

Retail banking



(a) Included 2/3 of private banking data (sum of quarterly results).
(b) Aggregate data of the 42 regional banks.

Corporate and investment banking



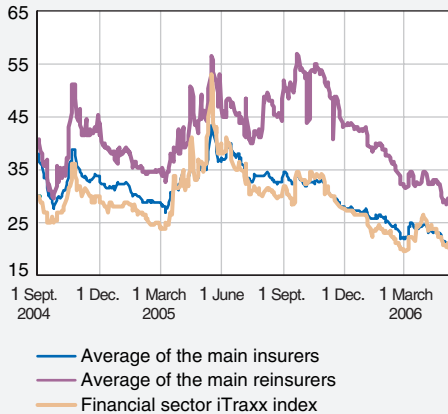
2004 2005 BNP Paribas
Société générale
Groupe Crédit agricole

Source: Banks' published data.

⁸ It may be recalled that the complete transition to IFRS in 2005 brought about an instant decline of around 60 basis points in Tier One ratios on 1 January 2005 for the three main French banks relative to ratios calculated under French standards, which at 31 December 2004 stood at 8.54% for Société générale, 8.1% for BNPP and 8% for the Crédit agricole group.

CDS premia of European insurers and reinsurers

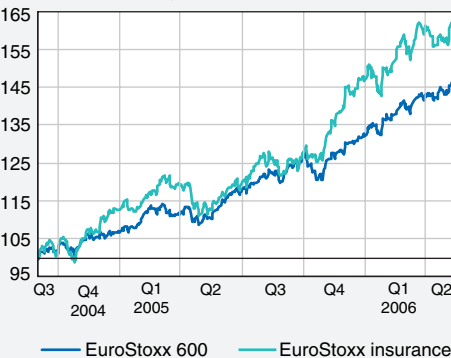
(basis points, CDS premia on subordinated debt)



Sources: JP Morgan, Bloomberg

EuroStoxx and insurance sub-indices

(1 September 2004 = 100)



Source: Bloomberg

THE INSURANCE SECTOR

General trends

With losses estimated at USD 40 billion, Hurricane Katrina was the most costly catastrophe in history for insurers, far more than the attacks on the World Trade Center in 2001 (around USD 26 billion). In total, in 2005, US insurers and reinsurers registered catastrophe losses of around USD 57 billion according to the Insurance Services Office (ISO).

However, the solvency of the sector, which had been strengthened by profits generated between 2003 et 2005, does not appear to be jeopardised. This is reflected by the overall stability of the ratings assigned by credit rating agencies and the path of CDS premia. Furthermore, the increase in insurance premia could contribute to improving profitability in 2006. At this time horizon, the consequences of a potential avian flu pandemic constitute a factor of uncertainty, even though the agency Fitch Ratings recently deemed that life insurance companies should generally be able to absorb claims arising from such an event.

With a view to improving asset and liability management (ALM) and curbing the increase in volatility that may result from changes to the existing regulatory and prudential framework (see Box 6), insurance companies appear to have sought to extend the duration of their assets to better match that of their liabilities, by investing in very long-dated bonds. The success of 50-year government bonds issued by a growing number of states (France, the United Kingdom, and Italy) and the revival of the 30-year US Treasury bond are examples of this phenomenon.

In parallel, insurance companies have increasingly turned to financial markets to manage their risk, as a supplement to reinsurance and, where necessary, to reduce their regulatory capital requirements. For instance, issuance of catastrophe bonds (cat bonds) rose by 74% in 2005 according to Standard & Poor's, to reach USD 2 billion. Some reinsurers, such as Swiss Re, have issued securities allowing them to transfer to the market the risk of an increase in mortality, which could be brought about by the advent of an avian flu pandemic for example. Insurance securitisation has also extended to property and casualty insurance risks such as those relating to motor insurance policies (see Box 7). In this respect, the Group of Thirty's (G30)⁹ report entitled "Reinsurance and International Financial Markets" recognises the growing usefulness of the securitisation of insurance risk, but stresses that a number of challenges remain to be met, such as the robustness

⁹ The Group is made up of high-level representatives of internationally active public and private financial institutions and aims to improve the functioning of financial markets.

Box 6

IAS/IFRS and the insurance sector: An update

The difficulties raised by the fair value measurement of insurance liabilities were such that studies undertaken in 1997 failed to define suitable models within the specified timeframe. Indeed, there is no liquid market for insurance liabilities that could act as a benchmark, and the complexity of the products makes the construction of measurement models particularly difficult. The project was therefore divided into two phases.

- Phase I provides for the application as of 1 January 2005 of transitional provisions, IFRS 4, which have only a limited impact on local accounting policies applied to insurance liabilities. Listed European companies have therefore applied IFRS 4 to their financial reporting as of this date.
- Phase II, set to come into effect after 2008,¹ should see the complete implementation of fair value accounting for insurance companies.

1| IFRS 4, transitional requirements

In particular, IFRS 4 sets out a stricter definition of insurance contracts, makes limited changes to the valuation of insurance liabilities and provides for the fair value measurement of assets in accordance with IAS 39.

A stricter definition of insurance contracts

Henceforth, insurance contracts are no longer defined vis-à-vis the entity issuing the contract but in terms of specific criteria relating to the transaction. IFRS 4 applies to: contracts under which one party (the insurer) accepts significant insurance risk from another party (the policyholder) by agreeing to compensate the policyholder if a specified uncertain future event adversely affects the policyholder, as well as to investment contracts containing discretionary participation features. The majority of French life insurance contracts still come under IFRS 4, i.e. contracts whose annuity rate is set at inception and contracts with profit-sharing features. Conversely, investment contracts without discretionary participation features and, in particular, unit-linked policies are subject to IAS 39.

Furthermore, embedded derivatives and “deposit” components in insurance contracts must be accounted for separately (unbundled), at fair value or at amortised cost respectively, when they can be separated from their host contract, which is frequently not the case.

Limited changes to methodologies for the valuation of insurance liabilities

IFRS 4 does not authorise equalisation and catastrophe reserves, nor does it impose changes to local accounting methods. However, when an insurer decides to implement a change, it must be in line with the approach recommended by the IASB. For example, an insurer may not introduce a method for measuring reserves on an undiscounted basis. However, an insurer may introduce methods for adjusting the measurement of designated insurance liabilities to reflect changes in interest rates and may, when it changes its accounting policies for provisions, fair value some or all of its financial assets.

Valuation of assets at fair value under IAS 39

Among the three portfolios under IAS 39,² two do not appear to be very suited to insurance activity: the widespread use of the held for trading portfolio would be difficult to conceive in view of the predominance of long-term liabilities and the need to hedge them using assets of the same maturity. Furthermore, having to adapt the investments to the policyholders’ requirements rules out classification as held-to-maturity as, if an entity sells a held-to-maturity investment, all of its other held-to-maturity investments must be reclassified as available-for-sale for the current and next two financial reporting years.

.../...

NB : The International Financial Reporting Standards (IFRS) are the new international accounting standards drawn up by the International Accounting Standards Board (IASB). International Accounting Standards (IAS) is the previous name given to the standards drafted by the IASB. They remain in force as long as they are not superseded.

¹ According to the schedule updated in March 2006 by the IASB, an exposure draft is slated for 2008.

² Held for trading at fair value through profit or loss, available-for-sale financial assets with changes in the fair value recognised directly in equity, and held-to-maturity investments, measured at amortised cost.

Consequently, the available-for-sale financial assets portfolio is expected to be favoured, with unrealised gains and losses recorded in equity. This may result in increased volatility in equity, which should be mitigated by the use of “shadow accounting”. The latter, introduced in IFRS 4, makes it possible to account for both unrealised gains and losses in the same way relative to the measurement of insurance liabilities. The impact on equity (or the profit and loss account) is therefore offset.

What next?

Work continues to identify the most suitable fair value measurement models for insurance liabilities to be used in Phase II. A number of paradoxes have been highlighted: for example, assessing the default risk specific to an insurer could result in an artificial reduction in the liabilities of some insurers. The choice of discount remains difficult: should it or should it not include a risk premium? Furthermore, an allocation of profit or loss must be found to replace that which is currently applied and contested by the IASB (in particular deferred acquisition costs and provisions for unearned premiums).

2| Risks for financial stability?

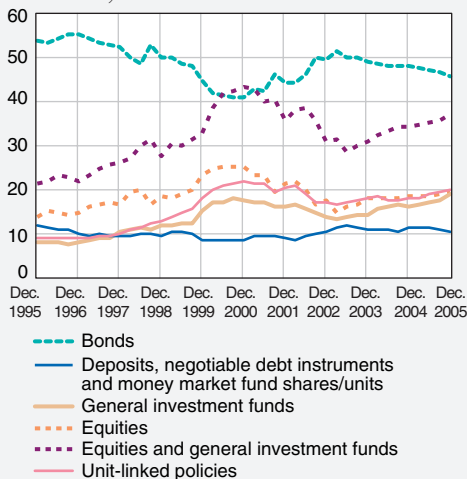
The main risk is that the fair valuing of assets may result in increased equity and earnings volatility. In Phase I, this volatility will be even greater as liabilities are not fair valued. In Phase II, it should however decline if assets and liabilities are affected in the same way, for example by changes in interest rates.

This volatility may push up the cost of financing if investors require a risk premium in return, result in wariness on the part of policyholders, who may then terminate their contracts, and prompt insurers to reduce the share of equities in their asset portfolios (which stands at 20% for French insurers, compared with 5% for US insurers, whose assets are already subject to market value accounting). However, it should be noted that, under the 1991 Insurance Directive, European insurers have to report assets at market value and, to date, the disclosure of this information has not had any negative consequences.

Another risk for financial stability could stem from undermining the different mechanisms currently implemented on the basis of the principle of prudence (equalisation and catastrophe reserves, provisioning, not discounting reserves, estimating unrealised gains on assets at the lower of market value or historical cost). These mechanisms, which put the principle of pooling at the heart of the insurance business and result in provisioning, have to date helped strengthen the financial position of French insurers. The dismantling of these mechanisms, without implementing others in parallel, could worsen the solvency of the insurance sector and increase the risks for policyholders. For this reason, European supervisors are currently working on the adoption of new prudential rules adapted to these new accounting principles (Solvency II).

Structure of insurance companies' investments^{a)} and unit-linked policies^{b)}

(a: as a % of total investments; b: as a % of total life insurance policies collected)



Sources: Banque de France and Fédération française des sociétés d'assurance (FFSA)

of pricing models and the accurate assessment of the quantity of risk transferred to the markets. In particular, the report noted that the use of markets will only significantly develop if there is a concomitant improvement in the transparency of the sector.

Developments in the French insurance sector

According to the quarterly financial accounts drawn up by the Banque de France, insurance companies as a whole (i.e. life insurance firms, property and casualty insurance firms, reinsurance firms, and mutual funds and provident institutions) have continued to collect a significant share of household savings. Life insurance products in particular received almost half of household savings flows in the fourth quarter of 2005.¹⁰ Flows channelled into this type of product stood at EUR 77.3 billion, compared with EUR 67.6 billion one year earlier.

¹⁰ In terms of flows cumulated over four quarters to smooth developments and adjust for any seasonal effects.

Box 7

**Securitisation of property and casualty insurance:
A new risk transfer instrument**

In December 2005, AXA IARD launched the first securitisation of its motor insurance portfolio by setting up the special purpose vehicle FCC¹ Sparc. Securitisation techniques have already been used in the area of life insurance and catastrophe risk (see Box 6 on catastrophe bonds in the Banque de France's Financial Stability Review of November 2005, p. 37), but they had not yet been tailored to traditional property and casualty insurance, which focuses on high frequency, low severity risks. The deal aims to protect AXA IARD against the increase in claims on its motor insurance policies, in that investors lose, to AXA's benefit, all or part of their initial investment if claims exceed a certain percentage of earned premiums.

Benefits

A securitisation deal of this nature has a number of benefits, both from the point of view of the insurer, which transfers all or part of the risk originally borne by it into the capital markets, and from that of the investor, which agrees to carry the risk.

For the insurer

- *Reduce the cost and the counterparty risk associated with the transfer of risk through reinsurance.*
- *Improve asset and liability management in the same way as banks, in the run-up to the Solvency II reform.*
- *Improve internal control, as securitisation requires reliable, in-depth reporting.*
- *Free up regulatory capital (subject to approval by the supervisory authority).*

For the investor

- *Increase portfolio diversification due to the low correlation between the expected rate of return on securitised insurance risk and that of other financial asset classes.*
- *Achieve a spread pick-up over corporate bonds (Euribor + 15 basis points for the AAA tranche of the FCC Sparc, compared with Euribor for a Pfandbriefe and Euribor + 2 basis points for AAA corporate paper).*

Implications for financial stability

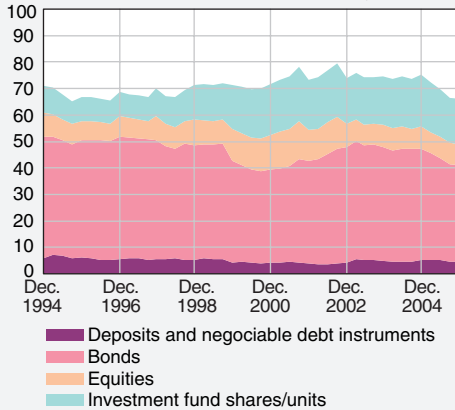
The securitisation of property and casualty insurance reallocates risk within the financial system by transferring to capital markets a type of risk that until now has been confined to the balance sheets of insurers and reinsurers, which in principle makes these players less vulnerable. However, this transaction could facilitate the transmission of strains in the insurance sector of a given country to other sectors or to other geographic areas.

Furthermore, as is the case for many financial innovations, uncertainties remain as to the reliability and the robustness of the statistical models used to value shares in the FCC, especially due to the lack of historical data and the fact that credit rating agencies seem less capable of valuing this instrument. Investors, even qualified, are also less well-equipped to correctly assess the risk attached to this type of transaction and to manage it, in particular because of its lack of transparency, with certain underlying parameters known only to the management teams of the insurers. In the case of FCC Sparc, for instance, AXA will revise each year in a discretionary manner the loss ratio above which investors will not be fully reimbursed, based on its own internal calculations, with the only constraint being that it must observe a minimum threshold. However, the complexity and innovative nature of such securitisation mechanisms should call for greater transparency vis-à-vis investors, which could then develop their own tools for assessing the underlying risk.

¹ FCC stands for fonds commun de créances, a specific type of special purpose vehicle under French law.

France: relative weight of life insurance companies' investments

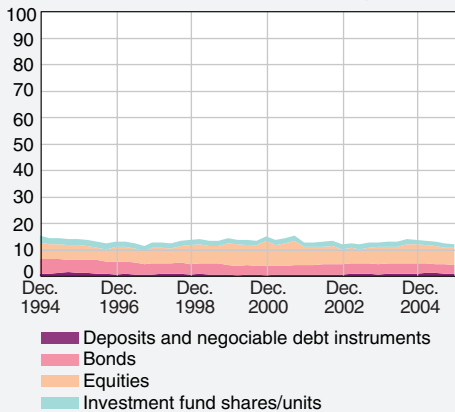
(as a % of insurance companies' total investments)



Source: Banque de France and Autorité de contrôle des assurances et des mutuelles (ACAM)

France: relative weight of property and casualty insurance companies' investments

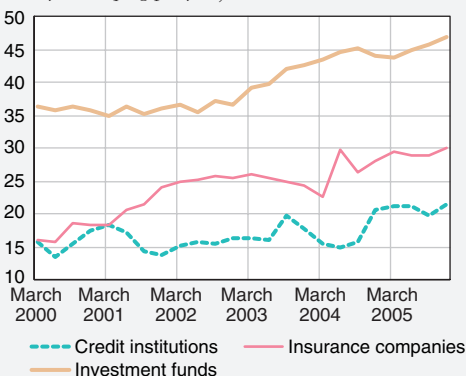
(as a % of insurance companies' total investments)



Source: Banque de France and Autorité de contrôle des assurances et des mutuelles (ACAM)

Holdings of foreign shares by French institutional investors

(as a % of their equity portfolio)



Source: Banque de France

Bonds continued to make up the bulk of insurance companies' portfolios at 45.6% of total assets, compared with 19.5% for equities and 18.9% for general investment funds. The share of the most liquid products (deposits, negotiable debt instruments and money market fund shares/units) stood at 10.5%.

The investment portfolio of life insurance companies reflects this clear preference for bonds, which accounted for 36.5% of total assets of these companies. Investment fund shares/units also made up a significant share (17.3%). Life insurance companies' exposure to directly-held equities has remained stable over the past quarters (7.8%), having declined from the peak reached in Q3 2001 (14.6%).

However, for property and casualty insurance companies, the weight of bonds in the sector's total assets is negligible (3.4%). Equities only account for a slightly higher proportion (6.6%), but also lower than the peak reached in Q4 2000 (9.5%).

Overall, insurance companies' exposure to equity risk is relatively limited. Nevertheless, since 2003, the weight of equities and general investment funds increased slightly, as a result of the development of unit-linked policies in the area of life insurance. These policies transfer the risk to the policyholder. Outstanding contracts rose by 22.8% year-on-year in the fourth quarter of 2005, compared with 7.5% a year before.

THE INVESTMENT FUND SECTOR

In France, investment of other sectors channelled into general investment funds stood at EUR 218.9 billion (outstanding amounts at end-September 2005), up by 9.7% in year-on-year terms. This trend was accompanied by an increase in the weight of equity investment funds in the total net assets of retail investment funds, to 21%. The net assets of alternative funds, which have relaxed investment rules, reached EUR 17.2 billion, significantly up on end-2004 (EUR 10.9 billion), even though they still account for a small fraction of total net assets of general investment funds (scarcely 1%).

These developments are set against the background of a regulatory framework that has been evolving for several years. These changes facilitate funds' investment in risky instruments – e.g. purchases of foreign securities – while introducing improvements in risk management and control procedures. This drive towards modernisation and openness has recently been demonstrated by new initiatives regarding collective investment in the real-estate sector (see Box 8).

Box 8

Real-estate collective investment schemes (OPCI)

Pursuant to the Economic Confidence and Modernisation Act relative to non-listed French real-estate investment schemes, a new instrument (OPCI) was created by Order 2005-1278. The latter, published in the Journal officiel of 13 October 2005, lays down the legal regime for this instrument. The tax regime was defined in the supplementary budget act for 2005. The implementing texts –decree of the Conseil d'État, ordinary decree and Autorité des marchés financiers (Financial Market Authority –AMF) General Regulation– should be published by the end of the first half of 2006.

The OPCI will take the form of a limited liability real-estate company with variable capital (SPPICV), or a real-estate investment trust (Fonds de placement immobilier — FPI), administered by a management company. OPCIs may be created with less stringent operating rules. The creation, transformation, merger, spin-off or liquidation of an OPCI shall be subject to AMF approval.

The purpose of the OPCI is:

- first, to invest in rental properties, or properties constructed solely for rental purposes, which it holds directly or indirectly including those under construction, all operations required for their use or their resale, any work on these properties, in particular relating to their construction, their renovation and their refurbishment for rental;*
- second, to purchase stakes in partnerships whose assets mainly consist of property, and manage financial instruments and deposits. Real-estate assets may not be purchased solely for resale.*

OPCIs shall consist of at least 60% real-estate assets (buildings, stakes in partnerships) and at least 10% deposits, liquid financial instruments and cash. OPCIs may borrow up to 50% of the value of their real-estate assets.

Two independent experts, acting in accordance with the AMF General Regulation, shall be appointed to value in turns the real-estate assets on a regular basis. They shall then draw up jointly, under their own responsibility, a summary report on completion of their duties. These experts shall be responsible vis-à-vis the SPPICV and the FPI's management company as well as the depositary for any negative consequences arising from errors or negligence on their part in the conduct of their duties. In fine, the value of the real-estate assets shall remain the responsibility of the management company, in accordance with the conditions laid down in the decree.

The depositary shall be independent from the OPCI, the management company and the real-estate experts. Its status shall be that of a credit institution or an investment firm and its headquarters shall be located in France. It shall carry out custody and monitoring of the financial assets of the OPCI, with the exception of real-estate assets.

OPCIs will offer savers, including those with small amounts, the possibility of investing in property, while pooling the risks, as is the case with real-estate investment companies (SCPIs), whose capitalisation stood at EUR 13.2 billion at 31 December 2005 according to the Institut de l'Épargne immobilière et foncière. OPCIs management regimes will nevertheless be less stringent than those of SCPIs and they will have better liquidity. By creating these funds with sufficient liquidity, they will be, like real estate investment funds (EUR 4.1 billion at 30 June 2005), eligible for placement with institutional investors (in particular insurance companies). A number of specific measures will be taken to organise the conversion of SCPIs into OPCIs.

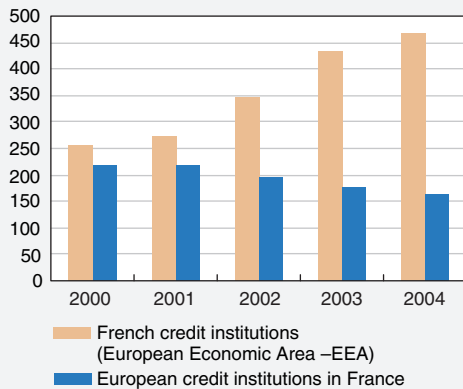
OPCIs will offer a real-estate investment product, comparable to those that already exist abroad, in particular in Germany, Luxembourg and Italy. However, it is important to avoid massive redemptions that would undermine the value of shares in OPCIs, as seen in Germany over the past few months, in the event of the property market, which is very buoyant at present, undergoing a sudden turnaround. All precautions should thus be taken to ensure that OPCIs are presented to the public as long-term investment products and not money market products.

3|2 Regulation and resilience of the financial system

Over the past six months, a number of significant initiatives in the field of financial system regulation have been either taken or extended, in particular in the context of European harmonisation and cooperation between authorities on the matter of business continuity.

Presence of French credit institutions in the EEA and European credit institutions in France

(number)

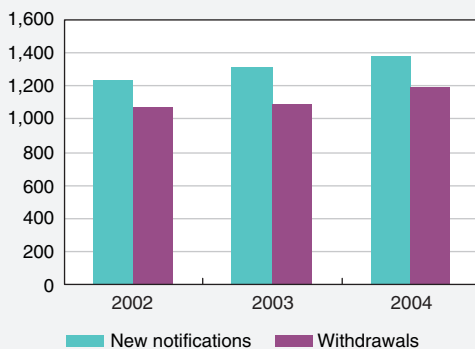


Source: CECEI reports

Notifications of freedom to provide services in France

Credit institutions and investment firms

(number)



Source: CECEI reports

FINANCIAL SERVICES POLICY

On 5 December 2005, the European Commission published a White Paper on the EU's financial services policy for the next five years. While highlighting the progress made thanks to the successful completion of the Financial Services Action Plan (FSAP), it concludes that the EU financial services sector (banking, insurance, securities and asset management) still has a large untapped economic and employment growth potential. The Commission's new strategy consists in enabling both this industry and consumers to reap greater benefits from financial integration. It is based on five priorities:

- consolidate the progress made and ensure the sound implementation of existing rules;
- rigorously apply regulation principles to improve policy making;
- enhance convergence of supervisory practices;
- strengthen competition between service providers, in particular on retail markets;
- expand the EU's external influence on global capital markets.

The White Paper also sets out the operational aspects –in particular an implementation timetable– of the broad guidelines laid down in the consultative Green Paper released by the Commission on 3 May 2005. The Banque de France and the *Commission bancaire* had both contributed to this consultation.

ADVANCES IN HARMONISATION

The Capital Requirements Directive (CRD)

The Council Directive on the capital adequacy of investment firms and credit institutions, the so-called Capital Requirements Directive (CRD), was adopted in October 2005 after the Ecofin Council had approved the European Parliament resolution. This Directive will make it possible, as from 1 January 2007 (and 1 January 2008 for the most advanced approaches for measuring risk), to implement within the European Economic Area, a new framework for measuring capital requirements based on the new Basel Accord.

Work conducted by the Level 3 Committees under the “Lamfalussy” process

The work of the Committee of European Banking Supervisors (CEBS) has largely focused on the implementation of the CRD. In January 2006, it published guiding principles on the implementation, validation and assessment of advanced measurement (AMA) and internal ratings based approaches. A working group made up of banking supervisory authorities and banking sector representatives continued to prepare the transposition into French law of the CRD.

Since autumn 2005, the CEBS, whose role is mainly to promote the convergence of supervisory practices and foster the common implementation and consistent application of Community legislation, has also completed several projects aimed at speeding up the convergence of supervisory practices: the definition of a common procedure for the recognition of External Credit Assessment Institutions (ECAI); the setting-up of a common prudential reporting framework (COREP) and financial reporting framework (FINREP); the definition of guiding principles regarding prudential supervision in the framework of the CRD. The CEBS also worked on promoting greater international cooperation and a more effective exchange of information between national authorities. In particular, it drew up a set of guidelines on the cooperation between European supervisors for the supervision of cross-border groups and adopted a harmonised framework for improving supervisory disclosure. The latter, which is due to come into force at end-2006, envisages publication in a common format of a range of information on the new capital adequacy framework.

Since 1 January 2006, the CEBS has been chaired by the General Secretariat of the *Commission bancaire*.

The Committee of European Securities Regulators (CESR) organised three consultations:

- consultation on the clarification of definitions concerning eligible assets for investments of UCITS, with a view to providing the European Commission with technical advice in January 2006;
- consultation on the establishment of a mediation mechanism;
- consultation on implementing measures concerning the transparency directive (following the mandate the CESR received from the European Commission on the storage and filing of regulated information) for which the closing date was 31 March 2006.

In February 2006, the three level 3 committees (CEBS, CESR and the Committee of European Insurance and Occupational Pensions Supervisors CEIOPS) published a common work programme, following the protocol they had signed last November.

ACTIONS RELATING TO THE RESILIENCE OF THE FINANCIAL SYSTEM

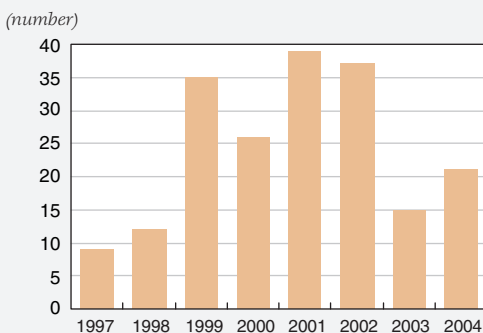
International cooperation between financial system authorities led to the adoption of a set of high-level principles for business continuity (see Box 9) at end-2005.

At its March 2006 meeting, the Financial Stability Forum (FSF) discussed the possible consequences of an avian flu epidemic for the economic and financial system. While stressing the numerous uncertainties surrounding this type of crisis, the FSF called on the financial authorities to adapt their business continuity plans and improve their communication and cooperation channels both at the national and international level.

At the European level, cooperation between financial authorities is conducted through specific committees.

Last summer, the Banque de France and the French banking federation set up a high-level working group charged with examining all issues of common interest relating to business continuity of the Paris financial centre in the event of a major disruption. The group is made up of representatives of major financial institutions, market infrastructures and regulatory and supervisory authorities. It is expected to release a series of common analyses on typologies of crisis scenarios, network-related issues, crisis communication and market-wide tests by end-2006.

Cross-border mergers in the banking sector



Source: ECB

Box 9

High-level principles for business continuity: Work of the Joint Forum

Based on the findings of a symposium on business continuity organised jointly by the Bank of England and the Financial Stability Forum in summer 2004, the latter asked the three international standard-setting bodies (the Basel Committee, the International Organisation of Securities Commissions and the International Association of Insurance Supervisors) to consider whether it would be appropriate to draw up high-level principles for business continuity that could be applied across the financial system.

A working group was set up at end-2004 within the framework of the Joint Forum, which brings together these three bodies. The G10¹ Committee on Payment and Settlement Systems, which has acquired some experience in this field, also took part in the group's work. The group published its report and submitted it for consultation at end-2005 with a view to releasing a final version by mid-2006.

These principles will have to be tailored to national circumstances, depending on the responsibilities of the respective supervisory authorities and the regulations that already exist in each area. They highlight the fact that business continuity measures should be proportionate to both incurred risks and generated risks.

Out of the seven principles, six apply to both supervised institutions and supervisory authorities.

These principles emphasise the ultimate responsibility of the board of directors and senior management; the need to take into consideration a new degree of risk, i.e. major operational disruptions (as the French Banking and Financial Regulations Committee did for France in early 2004); the need to develop recovery objectives and business continuity plans that are proportionate to the level of risk; the need to address crisis communications and cross-border communications; the necessity of testing business continuity plans to validate the measures taken; lastly, the supervisory authorities' responsibility for reviewing the application of these principles by the supervised institutions in the framework of on-site inspections.

The final document shall be available on the Banque de France website (http://www.banque-france.fr/fr/supervi/supervi_banc/publi/publi.htm) both in English (original version) and in French (translation by the General Secretariat of the Commission bancaire).

The seven principles for business continuity are the following.

1) Board and senior management responsibility. *Financial industry participants should have effective and comprehensive approaches to business continuity. An organisation's board of directors and senior management are collectively responsible for the organisation's business continuity.*

2) Major operational disruptions. *Financial industry participants and financial authorities should incorporate the risk of a major operational disruption into their approaches to business continuity management. Financial authorities' business continuity management should also address the way in which they should respond to a major operational disruption that affects the operations of financial industry participants or the financial system for which they are responsible.*

3) Recovery objectives. *Financial industry participants should develop recovery objectives that reflect the risk they represent to the running of the financial system. As appropriate, these recovery objectives may be established in consultation with, or by, the relevant financial authorities.*

4) Communications. *Financial industry participants and financial authorities should include in their business continuity plans procedures for communicating within their organisation and with relevant external parties in the event of a major operational disruption.*

5) Cross-border communications. *Financial industry participants' and financial authorities' communication procedures should address communications with financial authorities in other jurisdictions in the event of major operational disruptions with cross-border implications.*

.../...

¹ The G10 is made up of the 11 industrialised countries that cooperate in the economic, monetary and financial fields: Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom and the United States.

6) Testing. Financial industry participants and financial authorities should test their business continuity plans, assess their effectiveness and update their business continuity management, as appropriate.

7) Business continuity management reviews by financial authorities. Financial authorities should incorporate business continuity management reviews in their programmes for the ongoing assessment of the financial industry participants for which they are responsible.

3|3 Market infrastructures

In the field of market and post-market infrastructures, the free-play of market forces tends to bring about a restructuring of activities. In this respect, it is important that the single market function as smoothly as possible, in particular in those sectors subject to the supervision of financial authorities. Over the last six months, the Paris financial centre has continued to adjust to the changes underway, as shown by the strong growth in stock market capitalisation but also the significant presence of foreign investors. Against this background, the oversight of market infrastructures should not be let up on.

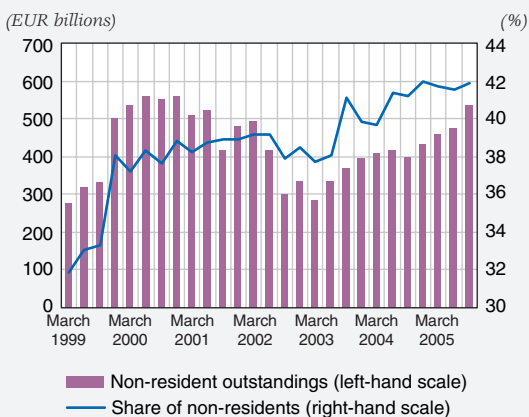
MODERNISATION AND RESTRUCTURING OF STOCK MARKETS

In a context of fierce competition, stock exchanges have been looking at different avenues of adjustment: consolidation, opening of new organised markets, new partnerships and provision of innovative products. It is worth pointing out that all these developments have taken place in the framework of the transposition of the Markets in Financial Instruments Directive (MiFID) at end-January 2007 and its implementation at end-October 2007.

Over the recent period, initiatives aiming at greater consolidation have multiplied, but have not necessarily succeeded. The takeover bids made by the Australian bank Macquarie and the US Nasdaq for the London Stock Exchange (LSE) were rejected, just like the previous OMX and Deutsche Börse AG offers. In March 2006, the British competition authorities agreed to Euronext's acquisition of the LSE, under certain conditions. However, other options are possible given the large number of actors involved in the process (shareholders, issuers, investors, etc.) and the strategic issues at stake. In May, Euronext has received proposals regarding a combination from each of Deutsche Börse AG and NYSE Inc. It is also worth mentioning a few limited agreements, in particular those between Euronext and Borsa Italiana for the acquisition of the MTS platform and between Euronext and Luxembourg Stock Exchange for the use of the NSC trading system.

The search for new opportunities has resulted in the opening of new markets, in particular for small and medium-sized

Non-resident holdings of listed French shares

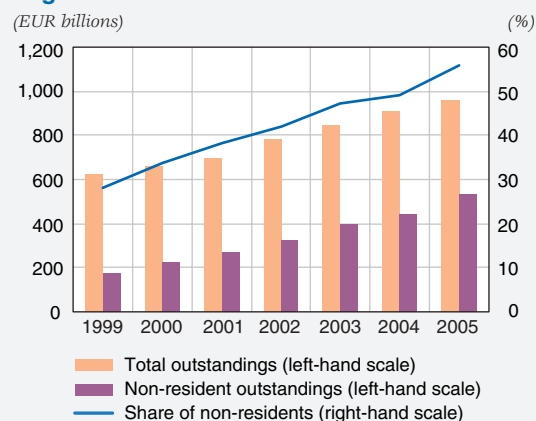


Source: Banque de France

enterprises (SMEs). Thus, following the launch of Alternext in Paris in May 2005, Euronext has decided to set up similar markets in Amsterdam and Brussels by the end of the first half of 2006. In October 2005, Deutsche Börse opened a new segment within its open market, Entry Standard, to which greater requirements are attached.

The range of new products on offer has also expanded, both through partnerships and innovation. Since November 2005, Euronext-Liffe has been offering a range of online services (Afirm, Bclear, Cscreen), which includes pre-trade price discovery, post-trade matching and clearing of OTC equity derivatives. At the beginning of 2006, Euronext and Agence France Trésor, together with France's primary dealers in government securities, set up a secondary OAT market for individual investors.

Non-resident holdings of French government negotiable debt securities



Source: Banque de France

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The ideas and conclusions developed in the articles do not necessarily reflect the views of the Banque de France, despite the fact that most of the authors work in the Banque de France departments that deal with issues of financial stability.

Better capturing risks in the trading book

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The 1996 Amendment to the Basel Capital Accord, which allows, under certain conditions, the use of internal models to calculate regulatory capital requirements for market risk, has resulted in an apparently sound supervisory trading book regime for internationally active banks.

Since this amendment was passed, the composition of the trading book has nevertheless changed substantially to include a more and more credit-related products such as credit derivatives and tranches of collateralised debt obligations (CDOs), as well as complex products such as hedge fund or fund of funds structured products. Furthermore, the contents of the trading book are expected to broaden due to the implementation of new international accounting and prudential standards.

This development has led to an increase in credit risk in the trading book and a concomitant rise in other risks such as default risk, event risk, liquidity risk, concentration risk and correlation risk, which were not adequately captured when market risk regulations were devised.

This has prompted:

- banks to improve their risk assessment and control systems for trading book activities. These systems still often use Value at Risk (VaR) calculations based on a uniform 10-day holding period, which does not always appear relevant;*
- banking supervisors to enhance the supervision of these systems, in particular by ensuring that the measures proposed in July 2005 by the Basel Committee and the International Organisation of Securities Commissions (IOSCO), known as "Basel 2.5", are correctly implemented. These measures aim to capture risks in the trading book in a more rigorous and comprehensive manner.*

1| AN APPARENTLY WELL-ESTABLISHED TRADING BOOK SUPERVISORY REGIME

The trading book supervisory regime introduced in 1996 requires credit institutions and investment firms to measure risks resulting from the transactions held in their trading book and to cover these risks by regulatory capital. This regime offers firms the use of either a standardised approach or an internal models approach to calculate the capital requirements associated with the trading book. Most major internationally active banks favour the internal models approach, built on the Value at Risk (VaR) methodology. Both the general risk, arising from general market movements, and the specific risk, related to changes in the credit quality of issuers, must notably be covered by adequate capital.

Box 1

Prudential definition of the trading book

Positions held with trading intent are those that have been taken with a view to short-term sale and/or with the intent of benefiting from actual or expected short-term price movements or to lock in arbitrage profits. Positions held for hedging other elements of the trading book are those taken with a view to offsetting, totally or to a large extent, the risk factors associated with these items. For institutions subject to International Financial Reporting Standards (IFRS), the trading book includes:

- financial assets held at fair value through profit and loss, i.e. those held for trading purposes, unless they are designated as effective hedging instruments;
- the temporary sales of securities and forward foreign exchange transactions, if they are carried out with a view to benefiting from favourable interest rate movements or if they hedge other elements of the trading book;
- other transactions with credit institutions or investment firms, if they finance one or more elements of the trading book.

Source: Regulation 95-02 of 21 July 1995 on the prudential supervision of market risk, Advisory Committee on Financial Legislation and Regulation (CCLRF - le Comité consultatif de la législation et de la réglementation financières).

1|1 Definition of the trading book

In order to calculate regulatory capital requirements, credit institutions and investment firms classify their assets and off-balance-sheet items under one of the two following categories: the banking book, in which most medium- and long-term transactions are held and which is subject to regulatory capital requirements for the credit risk¹ arising from these transactions; the trading book, which consists of positions in financial instruments and commodities held either with trading intent or in order to hedge other elements of the trading book (see Box 1), and which is subject to capital requirements for market risk.² In particular, the trading book includes most derivatives such as financial futures, interest rate and currency swaps, options on securities, etc.

1|2 Capital requirements for market risk

Capital requirements for market risk were introduced more recently than those for credit risk with the 1996 Amendment to the 1988 Capital Accord. Market risk includes: interest rate risk, equity position risk, settlement and counterparty risk and foreign exchange risk. With a view to limiting the vulnerability of institutions to these risks, the 1996 Amendment allows banks to use either a standardised approach or an internal models approach to calculate their capital requirements.

Most major international banks have developed, in accordance with strict qualitative and quantitative criteria laid down by the regulators, internal models built on daily Value at Risk (VaR)³ measures, calculated from a number of risk factors: interest rate risk, foreign exchange risk, equity position risk, commodity price risk and option risk. Capital requirements are equal to the higher of the Value at Risk on the previous day or the average Value at Risk of the 60 previous business days, to which the competent supervisory authority applies a scaling factor of at least three depending on the quality of the risk management system and the accuracy of the model (see Box 2).

As regards the quality of the risk management system, banking supervisors require in particular, in

¹ Requirements determined in France in accordance with the provisions of Regulation 91-05 on the solvency ratio.

² Requirements determined in France in accordance with the provisions of Regulation 95-02 on the prudential supervision of market risks.

³ Lévy-Rueff (G.) (2005) for the different VaR calculation methods.

Box 2**Calculation of capital requirements under the internal models approach**

$$FP = \text{Max} \left(\text{VaR}_j, \left(\sum_{j=60}^{j-1} \text{VaR}_j / 60 \right) \times (3 + \text{additional factor}) \right)$$

Source: General Secretariat of the Commission bancaire.

addition to the existence of adequate internal control procedures, that internal models be closely integrated in the day-to-day risk management process and that operational limits be consistent with their modelling. The accuracy of the model is assessed on the basis of the number of exceptions (when observed losses exceed those calculated by the model) identified by backtesting by the institutions.

1|3 General risk and specific risk

For interest rate risk and equity position risk, a distinction is made between general risk, *i.e.* the risk arising from general market movements (fluctuations in the level of interest rates or general equity market movements), and specific risk, *i.e.* the risk related to the credit quality of issuers. While the current trading book regime aims to cover general risk and specific risk, internal models have been primarily designed to provide an alternative to the standardised measure of general risk and allow the effects of correlations across and within risk factors to be taken into account.

Although measuring specific risk under the internal models approach has also been allowed, it presents difficulties in terms of modelling a number of key variables such as event risk, defined as a significant and/or sudden change in the price of a security in the wake of events affecting the issuer and often beyond the assumptions of VaR models (99% confidence interval, 10-business-day holding period), or default risk, associated in particular with the sudden failure of an issuer (jump-to-default risk). The Basel Committee therefore made the use of internal models for measuring specific risk subject to additional conditions. In order to use estimates derived from modelling specific risk, these models must be able to explain *ex ante* historical changes in the value of the portfolio and capture concentrations in the composition of the portfolio. They must also demonstrate that they remain reliable in an adverse

environment and that they can be validated by backtesting. Lastly, a risk capital surcharge is applied to the use of such models if they inadequately capture event and default risk, equivalent to a multiplier of four.

2| AN INCREASE IN CREDIT RISK IN THE TRADING BOOK

Since the 1996 Amendment to the Capital Accord, banks have significantly improved their modelling of market risk but, to date, no supervisory authority has authorised an institution using internal models to measure specific risk to apply a multiplier of less than four, given that the capture of event and default risk remains partial. Furthermore, the composition of Banks' trading books has changed considerably over the past years to include more and more credit-related products, resulting in an attendant rise in event and default risk. This increase in credit risk in institutions' trading books is mainly attributable to the fast development of the credit derivatives market and hedge fund structured products. Moreover, it is likely to grow further due to the application of the new international accounting (IFRS) and prudential (Basel II) standards.

2|1 Credit derivatives

Initially used by banks to hedge and transfer the credit risk in their banking book, credit derivatives such as credit default swaps (CDSs) and collateralised debt obligations (CDOs) now form part of large institutions' trading activities. They are mainly used to generate short-term gains on expected changes in credit risk and to offer investors products with a higher risk/return profile. This development has been fuelled by the recent environment of low spreads and low volatility, which has prompted investors to seek higher yields.

While, at the end of 2000, the proportion of credit derivatives in the trading book of the main French banking groups only stood at 30% and 41% (for protection buying and selling respectively), it now stands at 93% and 98% (see Box 3). Nowadays, credit risk transfer instruments are used more widely for the dynamic management of portfolios than for hedging credit risk on banks' balance sheets. This development was accompanied, as highlighted by the Report of the Joint Forum⁴ on Credit Risk Transfer

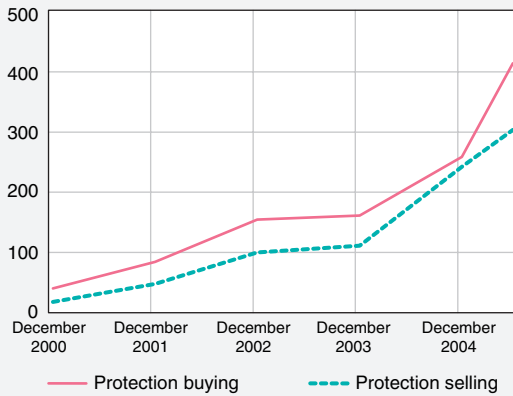
⁴ The Joint Forum, established in 1996, is a forum for dialogue and exchange between the three international organisations charged with setting the standards applicable to the financial sector: the Basel Committee on Banking Supervision (BCBS), the International Organisation of Securities Commissions (IOSCO) and the International Association of Insurance Supervisors (IAIS).

Box 3

Changes in the notional amount and the classification of credit derivatives used by the main French banks

Changes in the notional amount of credit derivatives used by the main French banks.

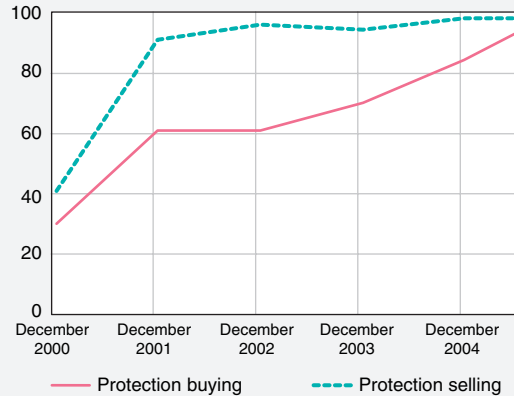
(Notional in billions of euro)



Source: General Secretariat of the Commission bancaire.

% share of positions on credit derivatives in the trading book

(%)



(October 2004), by a growing sophistication of trading instruments and strategies: arbitrage CDOs (synthetic CDOs), CDOs of CDOs (CDOs-squared), STCDOs (single tranche CDOs), correlation trading, etc.

2|2 Hedge fund structured products

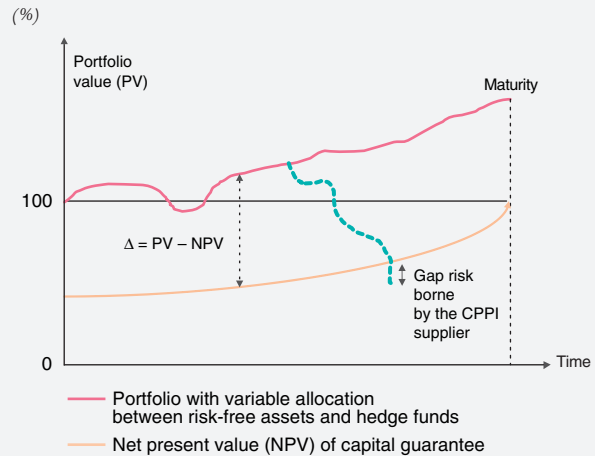
The development of banks' hedge fund activities has also led to an increase in credit risk in the trading

book. In addition to financing granted in the form of credit facilities and repos, trading operations in the form of financial derivatives and prime brokerage activities,⁵ the major international banks have been developing their marketing of hedge fund or fund of funds structured products. These products, such as Constant Proportion Portfolio Insurance (CPPI) –see Box 4– aim to offer investors a capital guarantee plus a return indexed on the performance of a hedge

Box 4

Constant Proportion Portfolio Insurance (CPPI)

CPPI products offer investors a capital guarantee (“principal-protected”) as well as a return indexed on the performance of a high-yield risky asset, for example an equity stake in a hedge fund. In order to be able to guarantee the repayment of the principal, the bank invests the capital put forward by the client in both risk-free and risky assets, with the allocation between the two types of asset varying according to the performance of the hedge fund; the greater the proportion invested in risky assets, the higher the potential return, and vice versa. The risk for the institution is low in normal market conditions, but may increase in the event of adverse developments that push the liquidation value of the risky asset below the level that allows the institution to purchase the risk-free assets needed to guarantee repayment of the principal at maturity.



Source: Risk.

⁵ Prime brokers offer hedge funds a wide range of services: financing in the form of securities and/or cash loans, execution of orders, settlement and clearing of transactions, valuation, preparation of daily accounts, etc.

fund or a fund of funds. Equity stakes in hedge funds or in funds of funds, purchased by banks in order to structure such products are usually booked in the trading book. They contribute to the total VaR of the trading portfolio and are therefore subject to capital requirements calculated under the internal models approach.

2|3 New accounting and prudential standards

Lastly, the International Financial Reporting Standards (IFRS) are also likely to lead to an increase in credit risk in the trading book. Until these standards were adopted (1 January 2005 in Europe⁶), positions booked in the banking book were subject to different accounting treatment (accrual) than those booked in the trading book (market value). Yet, the implementation of IFRS results in

an extension of the scope of the application of fair value accounting, which is closely based on market value,⁷ to non-trading activities. This removal of the differences in accounting treatments tends to blur the boundary between the banking book and the trading book and could broaden the contents of the latter, especially since the capital requirements for credit risk in the trading book are lower than those for the banking book (see section 3|1).

Furthermore, the fact that institutions subject to IFRS generally have to measure at fair value instruments held to hedge other elements accounted on an accrual basis in the banking book, in particular credit derivatives hedging loans, is a source of accounting mismatch. In order to prevent such a mismatch, which results in volatility in the P&L accounts, banks could more systematically book all these items in the trading book, which may be contrary to the prudential criteria laid down for the booking of such transactions (see Box 5).

Box 5

Criteria for classifying credit derivatives in the trading book

In order to be booked in the trading book, credit derivatives must be purchased with trading intent or for the purpose of hedging other elements of the trading book. They must be free of any restrictive covenants on their tradability or be able to be hedged completely.

Moreover, the General Secretariat of the Commission bancaire may object to a credit derivative being recorded in the trading book if the institution does not have the necessary resources and experience to actively manage them or if it does not have adequate systems and controls.

In order to be eligible for the trading book, all the following conditions must be satisfied:

- *the institution must have a clearly documented trading strategy for credit derivatives which has been approved by senior management;*
- *there must be clearly defined procedures including, in particular, a system of limits and daily tracking of their observance;*
- *a daily, conservative valuation must be carried out, either at market prices or with reference to a model that has been validated by the internal risk monitoring division and that has not been objected to by the institution's internal or external auditors;*
- *an active monitoring of positions must be carried out, including in particular an evaluation of the quality and availability of market data used in the valuation process, the volume of transactions, and the size of the positions traded;*
- *the institution must have in place a system of reporting to senior management as part of its global monitoring of the management of risks arising from the institution's trading activities;*
- *valuations at market prices or with reference to a model must take into account liquidity risk and modelling risk, using a methodology that has been approved by senior management.*

Source: General Secretariat of the Commission bancaire/Procedures for calculating the international solvency ratio.

⁶ For the consolidated accounts of companies listed on an organised European market.

⁷ Amis (P) and Rospars (É.) (2005) for changes in international accounting standards.

Lastly, the removal, in the new capital adequacy framework (Basel II), of the current cap associated with the minimum capital requirements (8% of risk-weighted assets) applied to positions in the banking book may encourage banks to transfer part of these assets, in particular high-risk positions, to the trading book. Indeed, the spectrum of risk weights in Basel II is much broader than in the 1988 Accord and will result in the application of risk weights of over 100% (current maximum) to exposures on counterparties with a high probability of default.

3 | AN INCOMPLETE ASSESSMENT OF RISKS IN THE TRADING BOOK

In addition to the increase in default and event risk, the growing presence, in the trading book, of credit risk transfer instruments and complex and structured products, which are generally less liquid, has resulted in an escalation of certain types of risk. The latter, which include liquidity risk, concentration risk and correlation risk, are not fully addressed in current regulations on market risk.

3|1 Liquidity risk

The liquidity of a financial instrument plays a key role in determining the holding period for a bank of such an instrument and therefore in assessing the regulatory capital requirement to which it is subject. In general, credit risk in the trading book is subject to lower regulatory capital requirements than in the banking book. For instance, under the standardised approach, selling protection through a credit derivative with a notional of 100 and whose underlying reference entity has a minimum rating of BBB- (investment grade) would generate a credit risk capital requirement of 8 in the banking book compared to a specific risk capital requirement of only 1.6 in the trading book. This difference, often accentuated when the internal models approach is used to measure specific risk, can be mainly attributed to the different time horizons on which the risks are assessed: one year for credit risk (corresponding to a horizon for estimating the probability of default of the issuer) and ten days for market risk (corresponding to a horizon for the closing out or hedging of positions).

The preferential treatment granted to the trading book can be ascribed to the fact that the positions are held for short-term sale and they can be easily unwound or hedged on the market. However, in practice, this is often not the case.

Admittedly, the liquidity of credit derivatives is tending to increase, in particular for the most standard products (such as single-name credit default swaps) and, more generally, due to the creation of standardised indices for credit default swaps.⁸ Nevertheless, the assumption that positions can be closed out or hedged within ten days, which is currently used as a basis for calculating capital requirements using VaR models, may prove inappropriate for the increasingly frequent case of complex structured products. For instance, equity stakes in hedge funds or in funds of funds held for hedging structured products that are sold to investors are generally booked by banks in the trading book even though the liquidity of these equity stakes is limited given the narrowness of the market and the low frequency at which the issuing funds may redeem them (usually on a monthly or quarterly basis and sometimes on a half-yearly basis). The inclusion of such equity stakes in the trading book therefore generally results in insufficient capital requirements, as they only marginally contribute to the VaR on the institutions' overall trading portfolio.

Moreover, the lack of observable prices or values in active markets that can be used in the daily valuation of these exposures increases the liquidity risk associated with such positions even further. The results of the survey conducted, in April 2005, by the Basel Committee among 47 international banks⁹ show that a very significant proportion of all the positions booked in the trading book could not be valued with an active reference market, and over a quarter of these positions were on credit derivatives.

3|2 Concentration risk

In this survey, concentration risk is also cited by institutions as being particularly difficult to capture in VaR measures across products (credit, interest rate, foreign exchange, equity, and commodities products). While enabling banks to diversify their exposures across different sectors of the economy and different credit quality segments, the rapid development of the credit

⁸ *iTraxx in Europe, CDX in the United States.*

⁹ *BCBS (2005), "Trading book survey: A summary of responses", April.*

risk transfer market and in particular the CDO market has nevertheless made it necessary for institutions to enhance the sensitivity of their internal models to concentration risk in the trading book. Indeed, most CDOs include the same names in their reference portfolio, giving rise to concentration risk on an entity and/or a sector associated with their widespread use in institutions' active credit portfolio management.¹⁰

3|3 Correlation risk

More generally, current models do not fully capture the growing complexity of products or all the parameters that could influence the risks associated

with them. In particular, as the BIS 75th Annual Report stresses, much progress remains to be made in assessing the risk profiles of highly-leveraged instruments such as CDOs and CDOs of CDOs and their sensitivity to correlations between probabilities of default. The credit risk correlations across names in a given reference portfolio are most often calculated, in order to price the risk, using a one-factor Gaussian copula model that is based on strong theoretical assumptions (identical constant default time correlations across all names, normal joint default probability distribution) and not empirically tested.¹¹ An increase in trading in such instruments, mispriced in relation to the real risk incurred, would constitute a structural risk.

Box 6

The point of view of De Nederlandsche Bank by Jan Brockmeijer, Director of the Financial Stability Division

The banking and the trading book in prudential regulation

Traditionally, the international capital adequacy rules for banks distinguish between the banking book and the trading book. This distinction has its rationale, because banking book items run into longer-term credit and other risks that deserve a different capital adequacy regime. Typically, in the banking book "non-tradable" financial instruments are recorded, i.e. instruments that are difficult to value at market prices and to sell to third parties. These instruments, such as bank loans, are generally intended to be held on the balance sheet until maturity. The trading book traditionally is reserved for financial instruments held for short-term profit taking ("trading intent") or in order to hedge other elements of the trading book; these instruments should be liquid and valued at market value. The latter implies that any change in value of a trading book instrument immediately shows up in the P&L and capital. Given its focus on tradability, the trading book capital regime measures risk exposure on the premise of a ten-day holding period, consistent with a feasible liquidation horizon, whereas the banking book capital regime is based on a much longer holding period. As a result, the capital charge on instruments recorded in the trading book may be substantially lower than the same instruments held in the banking book.

Blurring of the banking and the trading book – movement towards the trading book

The distinction between the banking and the trading book is gradually becoming more artificial, because of a variety of –often intertwined– developments that have led to a blurring of the borders between the two books and to a gradual shift towards the trading book. Some examples are:

- *banks increasingly use credit risk transfer (CRT) instruments to trade credit risk. For instance, a bank might securitise a credit portfolio held in its banking book by using CDOs, creating junior (high default risk) and senior (low default risk) tranches. Banks that buy credit risk may well be inclined to hold the junior tranches in their trading book, even though these are not very liquid;*
- *moreover, the different prudential treatment of the banking book and the trading book –in combination with new accounting standards promoting valuation at market or fair value– has created incentives for banks seeking to hedge risks related to banking book items to place more positions in the trading book. To reduce non-trading income volatility and in order to benefit from the more lenient capital charges, banks have an incentive to place both the hedged item as well as the associated hedge together as "economic hedge" in the trading book.*
- *Finally, some hedge fund performance related products are recorded in the trading book, although their risk characteristics do not comply with the tradability condition of a trading book treatment.*

¹⁰ Cousseeran (O.) and Rahmouni (L.) (2005): "The CDO market –Functioning and implications in terms of financial stability".

¹¹ Amato (J.) et Gyntelberg (J.) (2005).

The general trend is that due to the rise of CRT and other hedging instruments, through which the underlying risk components like credit and interest rate risk can be hedged within an assumed short-term horizon, institutions are inclined to hold more and more financial instruments in their trading portfolio, even though the liquidity of some of them can be questioned. The result is that a higher concentration of risks –specific credit risk (default and event risk) and liquidity, correlation and concentration risk– enters the trading book, which was not originally designed for that purpose.

Regulatory reaction

One factor behind this shift towards the trading book is the fact that, under the new Basel Accord, the approach towards risks run in the trading book and that towards risks run in the banking book do not fully concur with each other. For example, the banking book requirements do not take into account diversification of credit risk, while this aspect reduces the calculated risk in the trading book regime. To strengthen the alignment between the prudential regulatory framework and current practice and to reduce potential regulatory arbitrage, the trading book capital regime –in particular the regulations on default risk– has to be designed in a way equivalent with the regime adopted for the banking book. With the publication of the Basel II capital framework in the summer of 2004, the Basel Committee stressed the importance of addressing the increased market liquidity and default risks in the trading book. In July 2005, the BCBS and IOSCO presented further improvements to the trading book regime. Most important elements are:

- *the provision that banks must have policies and procedures for placing items in the trading account for capital purposes –to prevent regulatory arbitrage;*
- *that trading positions that cannot be sold or hedged in liquid markets within ten days are subject to an incremental default risk charge. In addition, the introduction of the fair value option under IFRS might reduce the incentive for a bank to place its hedged item and the associated hedge in the trading book.*

Future challenge

It remains to be seen whether these recent regulatory changes will be sufficient to mitigate the practice of banks to place less liquid instruments in the trading book, for which this book was not originally designed. Due to the lack of sufficient, reliable data to measure and price credit risks, particularly during stress conditions, the distinction between banking book and trading book has its merits in the present environment. In the longer term however, with the increasing potential for modelling and trading credit risks, the development of a uniform regulatory framework capturing all kind of risks poses new and difficult challenges for regulators.

4| ENHANCING THE TRADING BOOK SUPERVISORY REGIME

In order to better capture the risks that might affect their financial soundness, most major internationally active banks have been developing both economic capital calculations, integrating in particular credit and market risks, and stress testing. These tools will be increasingly scrutinised by banking supervisors under the supervisory review process (Pillar 2) of the New Basel Accord. Furthermore, through the implementation of measures known as “Basel 2.5”, supervisors will enhance the oversight of systems set up by banks for measuring and managing risks within their trading book.

4|1 Economic capital and stress testing

Most major internationally active banks have been developing tools for calculating economic capital integrating, in particular, credit and market risks and their different components. Economic capital¹² for all types of risk is generally calculated at the one-year horizon with a confidence interval determined by the bank on the basis of the probability of default corresponding to its current or targeted rating. While the main tool for measuring economic capital associated with market risk often remains a VaR calculation based on a 10-day holding period, some institutions have devised complementary approaches using stress testing and/or scaling up the VaR to

¹² Tieset (M.) and Troussard (P.) (2005) for the difference between economic capital and regulatory capital.

reflect a horizon for closing out or hedging positions assumed to exceed ten days.

Furthermore, although modelling credit risk correlations is not as yet common practice, progress is being made in this area. Some models now incorporate contagion effects, which allow banks using them to capture the impact on credit risk from declines in overall market liquidity,¹³ the failure of large firms or adverse industry-level developments. Such approaches make it possible to better take into account extreme or tail risks as well as liquidity risk.

Banking supervisors, in addition to the increase in the current VaR multiplier and/or the opposition to the inclusion of certain items in the trading book, will enhance the review and the assessment of the methods developed by banks to calculate and monitor their economic capital, as proposed in the International Convergence of Capital Measurement and Capital Standards: a Revised Framework (Basel II).¹⁴

4|2 “Basel 2.5”

In July 2005, the Basel Committee and IOSCO proposed a series of measures,¹⁵ known as “Basel 2.5”, that aim to improve the trading book regulatory regime. The proposed improvements follow the Basel II architecture, based on three complementary pillars:

PILLAR 1: MINIMUM CAPITAL REQUIREMENTS

The measures adopted aim to clarify the types of exposures that qualify for inclusion in the trading book, provide further guidance on prudent valuation methods for these exposures and stress testing, and strengthen modelling standards for market risk. These measures require banks to meet following requirements:

- the implementation of a clear set of policies and procedures for determining which positions could be included in, and which should be excluded from, the trading book. In this respect, the Committee decided that open equity stakes in hedge funds should be booked in the banking book, considering that their very limited liquidity and the uncertainty surrounding

their daily marking-to-market meant that they rarely qualify for inclusion in the trading book;

- the use of prudent valuation methods for less liquid trading book positions and, where necessary, higher valuation adjustments than those made under standard accounting practice;
- the taking into account, under the internal models approach, of the results of stress testing in the assessment of capital adequacy;
- the capture of event risk by internal models used to measure specific risk, and the calculation of an incremental capital charge for default risk not captured in the VaR-based calculation;
- the use of more robust modelling standards for specific risk and the conduct of more complete backtesting and model validation tests.

Banks that have already received specific risk model recognition will have to meet these requirements by 1 January 2010. If they fail to do so, they will have to use the standardised rules for specific risk.

PILLAR 2: SUPERVISORY REVIEW PROCESS

The measures adopted require banks to make a comprehensive assessment of risks in their trading book. They aim to ensure that these risks are adequately covered by economic capital, taking into account the output of the VaR model, valuation adjustments and stress testing. These measures require banks using internal models to demonstrate that:

- they hold enough internal capital to withstand a range of severe but plausible market shocks;
- internal capital assessments include an assessment of market concentration and liquidity risks under stressed market conditions;
- stress testing factors include market risks that are not adequately captured in the VaR model, for instance, non linear/deep out-of-the-money products, jumps-to-defaults, significant shifts in correlations;
- their different risk measurement techniques are used in an appropriate manner to arrive at the overall internal capital assessment for market risk (VaR, stress testing, etc.).

¹³ Bervas (A.) (2006): “Taking market liquidity into account in risk management”.

¹⁴ Basel Committee on Banking Supervision (BCBS), November 2005.

¹⁵ BCBS (2005): “The application of Basel II to trading activities and the treatment of double default effects”, July.

PILLAR 3: MARKET DISCIPLINE

Lastly, the additional disclosure requirements under Pillar 3 aim to improve the quality of information disclosed relating to the trading book. In this respect, banks are subject to the following disclosure requirements:

- qualitative information on trading book valuation techniques;
- the soundness standard used for modelling purposes;
- the methodologies used to achieve the firm's internal capital adequacy assessment.

First, the “Basel 2.5” measures should strengthen the trading book supervisory regime. The implementation of these measures will be scrutinised by national banking supervisors and the Basel Committee. For this purpose, a working group was set up by the Committee in Autumn 2005: the Accord Implementation Group on Trading Book.

Second, these measures will result in an increase in the level of capital charges associated with trading book positions that are less liquid or incur a high default risk. They will thus promote the convergence of the level of capital required to cover such positions between the banking book and the trading book and so reduce the possibilities of regulatory arbitrage.

Lastly, in the longer term, they may provide an opportunity, beyond the already scheduled review of the prudential recognition of the use of internal credit risk models, to examine the possibility of adopting an economic and regulatory approach that is more focused on risks themselves than the way these risks are booked.

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Market liquidity and its incorporation into risk management

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The excessively optimistic assessment of market liquidity, i.e. the belief that transactions can be settled at current prices without any notable delays or transaction costs, may be a serious threat to financial stability –the near failure of the LTCM hedge fund in 1998 was a case in point. Admittedly, the financial community today appears to have a better grasp of the risks arising from liquidity illusion. The fact nonetheless remains that current risk management tools, particularly the most common Value at Risk (VaR) measures, do not capture this complex component of market risk satisfactorily. In fact, standard VaR calculations do not take specific account of the risk to which a portfolio is exposed at the time it is liquidated.

This article aims to explore the different aspects of liquidity risk and provide signposts to methods for incorporating this risk into existing risk control tools. We first examine “normal” or average liquidity risk, which corresponds to the costs of liquidating or hedging a position in tranquil periods, then illiquidity risk that arises in crisis periods and results in the market’s inability to absorb order flows without violent price adjustments. Two separate methodologies, which must nonetheless be combined in a comprehensive approach, are required to analyse these two situations. In the first case we seek to assess the frictions that emerge in imperfect markets by using bid-ask spread measures and by analysing the negative impact on prices resulting from the liquidation of a sizeable portfolio. In the case of extreme risk, we assess the potential consequences of occurrences that are rare, fundamentally uncertain and systemically important.

In each case, we suggest and describe a number of techniques that aim to incorporate these elements into the risk measurement and management systems used by private market participants, while underscoring the obstacles to application given the frequent unavailability of the data required. We show that these techniques are relevant because they provide a more cautious and more realistic assessment of financial institutions’ exposure to risk.

Lastly, it is in market participants’ own interest for central banks and supervisory bodies to have at their disposal the information required to construct indicators for monitoring market liquidity or conducting sufficiently comprehensive stress tests in order to assess the financial system’s resilience to liquidity shocks, while taking into account all the externalities that market participants do not individually consider.

The increased marketability of financial instruments and transferability of risks has been one of the major features of the modernisation of financial systems over the last twenty years. Bank balance sheets have been transformed for both assets and liabilities, with traditional bank intermediation being supplanted by market operations. Structured finance and collateralised transactions have developed rapidly, as have methods for making credit risk marketable. In the current financial environment, a considerable part of balance sheet management and structured financing is thus founded on the assumption that markets for underlying assets will regularly fulfil their transfer function, thanks to the constant presence of counterparties. However, market liquidity, *i.e.* the ability to settle transactions at current prices and at all times with no notable transaction costs, is never totally ensured. In fact, one of the most pernicious threats to market liquidity is the very illusion of its continuity. This illusion means that market participants overestimate their ability to unwind transactions or hedge their positions smoothly and rapidly to meet requirements in unforeseen circumstances, which could lead them to take excessive risks *ex ante*.

Market liquidity is at the heart of central banks' financial stability concerns because it is a precondition for market efficiency and also because its sudden disappearance from markets may degenerate into a systemic crisis, as evidenced by the turbulence of summer and autumn 1998, which resulted in the abrupt drying up of liquidity on the bond markets.

An extensive body of the literature dealing with the microstructure of financial markets has been devoted to identifying the determinants of liquidity and modelling liquidity. Similarly, numerous studies on financial crises show that the shortage of liquidity is an element that is always present in times of major crises (currency crises, banking crises, bursting of speculative bubbles, payment system gridlock, etc.). However this risk, a component of market risk that is difficult to capture, is still not sufficiently accounted for in risk measurement and management tools.

This could be harmful because it is precisely the failure of internal control systems that has often been the culprit in past episodes of financial turmoil such as the virtual collapse of the LTCM hedge fund in 1998.¹

The purpose of this article is to present a number of techniques that aim to assess the risks incurred in the event of a decline in market liquidity and to examine to what extent these techniques may contribute to improving risk control in financial institutions and also help the relevant authorities to enhance their analyses and assessments of financial stability. We will examine beforehand the exact nature of market liquidity and the causes of its imperfection and chronic inconstancy.

1 | NATURE OF MARKET LIQUIDITY AND RISK OF ILLIQUIDITY

1|1 Imperfect market liquidity and the importance of transaction costs

Liquidity may be defined as a range of characteristics rather than a one-dimensional attribute of assets and of the markets on which they are traded. It is also a relative concept, as the more liquid the asset, the more it is easily traded for liquidity "*par excellence*": money, *i.e.* at low cost, at short notice and with no risk of a notable change in price. A perfectly liquid market would therefore guarantee a single bid/ask price at all times and irrespective of the quantities being traded. Financial markets, even those deemed the most liquid, conform less than perfectly to this ideal configuration. Liquidity risk is therefore the risk of not being able to immediately liquidate or hedge a position at current market prices. This *market liquidity* risk is different from *balance sheet liquidity risk*, which is the inability to raise liquid funds by offloading assets or *borrowing*. It results from the fact that markets are not perfect at all times and in all segments (atomicity of participants, free entry

¹ See CGFS (1999), Jorion (P) (2000).

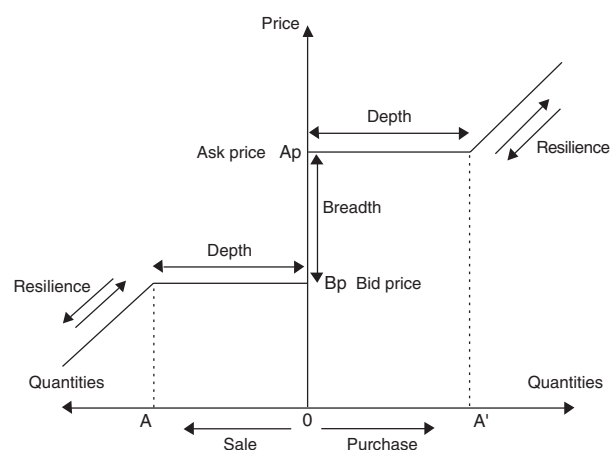
and exit at no cost, transparent information). The degree of liquidity of a market is traditionally assessed on the basis of three essential criteria:

- the tightness of the bid-ask spread, which measures the cost of a reversal of position at short notice for a standard amount,
- market depth, which corresponds to the volume of transactions that may be immediately executed without slippage of best limit prices,
- market resilience, *i.e.* the speed with which prices revert to their equilibrium level following a random shock in the transaction flow.

The first aspect is a direct measure of transaction costs (excluding other operational costs such as brokerage commissions and clearing and settlement fees). The last two indicate the market's ability to absorb significant volumes without adverse effects on prices. The rest of the article will focus mainly on market breadth and depth insofar as it will pay more attention to the costs of immediacy than to how long it takes prices to return to equilibrium (see Chart 1).

The bid price is the highest price that the market maker is willing to pay at a given time to acquire a specific amount of assets. Symmetrically, the ask price is the lowest price at which the market maker is willing to sell a given amount of assets. The gap between the bid price and the ask price (the bid-ask spread) compensates the market maker for the immediacy of execution that it offers to its counterparties. The spread measures the cost of a sell/buy or buy/sell sequence over a short period (two-way transaction); only the half-spread should therefore be attributed to a single transaction (sale or purchase) if one considers that the mid-price is the one that should be paid in a perfectly liquid market. The tightness of the spread depends, *inter alia*, on the costs of processing orders from market makers, the size and volatility of accumulated order flows as well as the degree of information asymmetry between market makers and initiators of transactions (the market maker is exposed to the risk of dealing with

Chart 1
Aspects of market liquidity



Note : The bid price B_p and the ask price A_p are defined for the standard amounts OA and OA' . The B_p-A_p spread represents the "breadth" of the market. The amounts OA and OA' are those that may be traded without price slippage: they reflect market "depth". Beyond points A and A' , one sees the negative impact of large-value transactions on the execution price. Resilience refers to the time aspect of liquidity and indicates how quickly prices adjust to their equilibrium value following a shock in transaction flow.

investors that have private information regarding the real value of the asset). In a quote-driven market, the quoted spread² corresponds to the difference between the best bid price and the best ask price offered by market makers, whilst in an order-driven market, what is important is the difference between the best limit order book prices.³ However, the spread quoted in the markets is not generally an exact reflection of transaction costs (for a buy/sell sequence) because certain transactions may be traded not at the bid or the ask price but at prices located within this spread, or even outside this spread, even for standard amounts.⁴ In addition, the spread is a measure of the liquidity available at a given time. With a view to risk measurement and management, it is therefore important to take account of its variability over time.

In particular, the spread is quoted for limited amounts and it normally tends to widen in the presence of massive order flows, which is what the concept of depth refers to. In the case of a sale,

² In general, the quoted spread is expressed as a ratio of the mid-price. It is then called the relative (quoted) spread.

³ These two types of market organisation differ with respect to the price setting methods and the way in which liquidity is ensured. On an order-driven market, liquidity is created by matching orders in a central order book. On a price-driven market, liquidity is created through the actions of intermediaries (market makers) who guarantee investors a bid price and an ask price for a minimum amount.

⁴ One may therefore calculate the relative effective spread, corresponding to the absolute difference between the price at which a transaction was performed and the midpoint (the difference is expressed as a ratio of the midpoint).

the negative impact of order flows on the bid price comes from the decline in the market aggregate demand curve depending on the amounts offered, *i.e.* its imperfect elasticity. The latter may be attributed, in particular, to the information asymmetry between market participants. A substantial flow of sell orders for an asset is in fact likely to arouse the suspicion that initiators of transactions have privileged information on the quality of this asset, and lead potential buyers to demand a price discount in exchange (the drop in the price may in fact lead to the total disappearance of the market⁵). Execution risk, *i.e.* the possibility of errors and delays in the settlement of large-value orders, may also prompt such market reactions. Price sensitivity to block transactions is often estimated using Kyle's λ (1985) in the following econometric equation:⁶

$$\Delta P_t = \alpha + \lambda NVOL_t + \varepsilon_t \quad (1)$$

where price changes ΔP_t are a linear function of the net volume of trades ($NVOL_t$: difference between the amount of buy orders and sell orders in period t), with ε_t representing a random error. The λ coefficient assesses the market's ability to absorb large-value transactions: the higher the value, the smaller the market's absorption capacity.

Ultimately, to realistically assess portfolios' risk exposure it is necessary to take into account the transaction costs incurred during liquidation. Transaction costs cover the costs of resorting to the market for the allocation of resources and transfer of property rights, *i.e.* the execution costs referred to above (spread, impact on prices and other operational costs), and also the possible opportunity cost if transactions have had to be deferred (forced relinquishment of the benefits of immediacy).⁷

These liquidation costs are relatively predictable in tranquil periods: the corresponding risk appears to be fairly manageable at these times. Nevertheless, tranquil periods may mask the development of financial vulnerabilities and

liquidity is a fragile feature of markets. Therefore, liquidation costs are much less predictable in the presence of market stress.

1|2 Fragility of liquidity: co-ordination problems and crises

Market liquidity depends essentially on the presence of a sufficient number of counterparties and their willingness to trade. The latter depends on investors' expectations regarding price developments and also their risk aversion at a given time, as well as the information available (*e.g.* on issuers' creditworthiness). A "good equilibrium" of regular liquidity therefore presupposes heterogeneous expectations and behaviour, ensuring the execution of orders irrespective of the transaction direction. Some analysts thus emphasise the contribution highly leveraged institutions operating under few regulations make to market making and liquidity. Similarly, it is rightly believed that liquidity is cumulative in nature and that, for example, the opening up of markets to new participants is likely to strengthen the positive externalities produced by a broader investor base. However, this must not lead us to ignore the precariousness of the collective valuation that – at any given time – characterises financial markets and even those that are deemed the most robust, for it is subject to sudden swings in opinion.

The perception of guaranteed liquidity has in the past therefore led a number of financial players to take excessively risky positions. C. Borio (2004) shows, in an anatomy of financial crises, that these crises are typically preceded by phases of excessive confidence in which risk exposure is heightened, fuelled by leverage. A hint of doubt creeping into market operators' minds is all it then takes to radically change the market configuration and trigger a liquidity crisis.

Liquidity crisis is illiquidity risk that has reached its paroxysm. It may be defined as the market's inability

⁵ This phenomenon was highlighted and illustrated by Akerlof in 1970 for the second-hand car market. In the same vein, Genotte and Leland (1990) consider the 1987 stock market crash to be a result of problems of information asymmetry between market participants.

⁶ This conventional econometric specification postulates the stationarity of ΔP_t and $NVOL_t$, or the existence of a cointegration relation between these variables.

⁷ The latter may be calculated as the difference between the value of unexecuted orders at date t and that corresponding to the actual liquidation date T (based on the mid-price at T), see Perold (1988).

to absorb order flows without provoking violent price adjustments that are unrelated to fundamental value. It is characterised by the sudden widening of the bid-ask spread, or even the total disappearance of buy (or sell) flows and the inability to trade. It often leads to an increase in short-term volatility as well as the slump of the primary markets. It therefore contains the seeds of serious systemic upheaval. The risk of having to face this type of event is that of booking major losses insofar as it is necessary to unwind positions in order to settle liabilities or meet hedging requirements.

This risk is difficult to capture because it refers back to the paradoxical nature of liquidity clearly outlined by Keynes in 1936: the liquidity of a financial asset simply does not exist for the financial community as a whole. In other words, an asset can only remain liquid if its liquidity is not put to the test by all investors simultaneously. The drying up of liquidity is in fact the consequence of the unanimous co-ordination of market players at a “bad equilibrium”, with all players wishing to exit the market at the same time. Obviously, this type of occurrence can hardly be forecast: it may be triggered by a simple swing in the collective opinion, as shown, for instance, by the collapse, and then virtual disappearance of the Perps (Perpetual floating-rate notes) market in 1987.⁸ In addition, the collapse of liquidity generates incentives that rationally induce economic agents to behave in ways that worsen the market situation as a whole. This negative chain of events is amply described in the literature on banking crises leading to rushes on bank deposits.⁹ It occurs in exactly the same way in market crises involving flights to liquidity. It is rational to try to act first, *i.e.* to seek to exit as soon as distrust sets in, even if this behaviour only serves to speed up the evaporation of liquidity:¹⁰ when it spreads, the fear of being short of liquidity is self-fulfilling. Naturally, a large financial institution (such as the main market makers on certain highly concentrated OTC derivative markets) may paralyse the market by pulling out. The difficulties faced by smaller but very active and highly leveraged participants, such as hedge funds

(which may account for one-third or even half of daily transactions on the New York Stock Exchange and the London Stock Exchange) may cause the same types of problems. When they liquidate their assets in times of financial distress, their actions are likely to alarm other market participants and thus trigger “predatory trading”,¹¹ *i.e.* selling in anticipation, which withdraws liquidity instead of providing it at the appropriate time.

Ultimately, liquidity crises reflect the dysfunction in the price regulation mechanism: instead of restoring the balance, price movements exacerbate pro-cyclical behaviour.¹²

Extreme liquidity risk is not a sum of minor independent risks, but rather systemic risk that leads to a major break in the usual statistical relationships between risk factors. It is, admittedly, a rare risk, but one that is inherent to liberalised financial systems where phases of excessive optimism alternate with sharp market decline. More generally, successive financial innovations reveal an increase in the revocability and conditionality of commitments to meet investors' demand for marketability-liquidity. While they serve to increase microeconomic efficiency, these facilities for pulling out of commitments –notional in times of stress– may give rise to the sometimes pathological spread of the preference for liquidity. With such specific risks, preventive measures rather than risky forecasts must be encouraged. Improving risk assessment tools is one essential aspect.

2 | INCORPORATING LIQUIDITY RISK INTO RISK MANAGEMENT TOOLS

Value at Risk (VaR) is an estimate of the maximum potential loss that may be incurred on a position at a given time horizon and level of confidence. Though in recent years it has become a reference

⁸ “Perps” were perpetual notes, whose coupons were linked to an interest rate reference (usually the Libor) and periodically redefined (every three months or every six months). Created in 1984, Perps were very popular, especially because the authorities allowed banks that issued them to include them in their regulatory capital under certain conditions and also because they enjoyed tax benefits. With higher yields than those offered on the interbank market, Perps attracted a large number of investors, in particular Japanese banks. In December 1986, there was a sudden drop in Perps prices. According to Fernando and Herring (2003), rumours and concerns surrounding a possible change in the Perps accounting regime were sufficient to precipitate the collapse of this market.

⁹ See Diamond (D.), Dybvig (P.) (1983).

¹⁰ See Bernardo (A.), Welch (I.) (2004).

¹¹ See Brunnermeier and Pedersen (2005).

¹² See Cohen and Shin (2003).

for market risk management –and this is why we are focusing on it in this chapter– the VaR model does not satisfactorily capture liquidity risk, which is an integral component of market risk. In calculating VaR, it is assumed that the positions concerned can be liquidated or hedged within a fixed and fairly short timeframe (in general one day or ten days), that the liquidation of positions will have no impact on the market and that the bid-ask spread will remain stable irrespective of the size of the position. The price referred to is often the mid-price or the last known market price. However, as we have seen, the quoted market price cannot be used as a basis for valuating a portfolio that is to be sold on a less than perfectly liquid market: in practice, account must be taken of its orderly liquidation value or even its distress liquidation value. The standard VaR model is not a reliable guide because it neglects the risk to which a portfolio is exposed during its liquidation.

It is nonetheless possible to adjust VaR measures so as to incorporate trading execution costs into risk assessment. For the sake of simplicity, we will examine the liquidity of a single asset, as the measurement of the liquidity risk of a portfolio of assets leads us to non-specific considerations on the correlation of risk factors.

There are indeed *ad hoc* techniques for re-evaluating VaR by artificially increasing the volatility of positions deemed illiquid, or by lengthening the time horizon used for calculating VaR. However, because they propose arbitrary adjustments, these techniques do not deal directly with the issue of liquidity. The principle of adjustments that we present here consists essentially in re-calculating the distribution of asset returns by using not the market value but the liquidation value in “normal” times or in times of stress.

2|1 Taking “normal” liquidity risk into account

“Normal” liquidity risk is a relatively foreseeable average risk. It includes an “exogenous” component that corresponds to the average transaction costs set

by the market and an “endogenous” component¹³ that corresponds to the impact on prices of the liquidation of a position in an excessively tight market and that therefore applies to orders that are large enough to move market prices. The first component may be incorporated in an adjusted VaR model by using various bid-ask spread measures, while endogenous liquidity risk may be factored in by using measures of the elasticity of prices to volumes (impact measures).

USING BID-ASK SPREAD MEASURES

The value realised from reselling assets is generally not equivalent to their theoretical market price because a liquidity cost, which is represented by the half-spread, puts a strain on the sales price.

It is therefore expedient, when examining historical bid-ask price series, to estimate the (exogenous) liquidity cost that may affect the market value of a position. A simple method would consist in adding the observed average of the half-spread to conventional VaR. This method does not however take account of the variability of the half-spread over time. This is why it would be wiser to try to extract from historical data series information on the statistical distribution of bid-ask prices, and in particular on their volatility.

Standard VaR calculations presuppose using a distribution of returns. The distribution may be determined using three types of methods (parametric, historical simulation or Monte Carlo simulation).¹⁴ The same approaches may be applied to the distribution of bid-ask spreads with the aim of calculating the most unfavourable half-spread for a given time horizon and confidence threshold. The highest exogenous liquidity cost is thus obtained. It is added to the standard VaR defined for the same time horizon and the same confidence threshold.

Assessing the overall risk of an asset by simply summing up its price risk –which is reflected by the standard VaR model– and the exogenous liquidity cost amounts to assuming that these two components are perfectly correlated (*i.e.* that high variability of the mid-price is associated with

¹³ This distinction is made by Bangia et al. (1999).

¹⁴ See Lévy-Rueff (G.), (2005).

Box 1

Calculation of VaR adjusted for exogenous liquidity according to the parametric method

The parametric method for calculating VaR, applied to an asset, is based on the assumption of the normal distribution of returns of this asset. Let μ be the expected value of the distribution and σ its standard deviation.

The lowest return expected at date t , at a confidence threshold of 99%, is:

$$R_t^* = \ln(P_t^*/P_t) = \mu - 2,33 \sigma \quad (2)$$

where P_t is the asset price (midpoint) at t and P_t^* the worst price expected at a confidence threshold of 99%. The coefficient 2.33 is the normal-law quantile at the confidence threshold of 99%.

VaR at date t , measuring the highest potential loss at a confidence threshold of 99% is by definition equal to $P_t - P_t^*$ so that using (2):

$$\text{VaR} = P_t (1 - e^{\mu - 2,33 \sigma}) \quad (3)$$

If we assume that the relative bid-ask spread is also taken from a normal distribution, the worst relative spread at the threshold of 99% is:

$$\mu' + 2,33 \sigma'$$

where μ' is the expected relative spread and σ' its standard deviation. The exogenous liquidity cost (ELC) at a one-day horizon is the worst half-spread at the threshold of 99%:

$$\text{ELC} = \frac{1}{2} P_t (\mu' + 2,33 \sigma') \quad (4)$$

Lastly, liquidity adjusted VaR (L-VaR) is:

$$\text{L-VaR} = \text{VaR} + \text{ELC} = P_t (1 - e^{\mu - 2,33 \sigma}) + P_t/2 (\mu' + 2,33 \sigma') \quad (5)$$

the high variability of the bid-ask spread itself). This assumption may on occasion lead to the overestimation of the risk.

Several studies show that such a correction leads, in some cases, to significantly boosting the amount of VaR. Bangia *et al.* (1999) estimate for example that, in May 1997, liquidity risk accounted for over 17% of the market risk of a long position on USD/Thai Baht and for only 1.5% for positions on USD/Yen, the Yen/USD market being very liquid. Using a similar methodology for the stock market (CAC 40), Le Saout (2002) shows that the liquidity component may be substantial (up to 52%) for certain securities. Looking at the Indian bond market, Roy (2005) finds that liquidity risk accounts for some 16% of the total risk on little traded securities.

The drawback of this methodology, however, is that it requires large samples of daily or even intra-day trading data, which are not always available.

Another option is to use the Roll (1984) measure, which seeks to provide an estimate of the implied spread using only observed market price series, under a number of assumptions (see Box 2).

This indicator may of course come in for criticism due to the underlying simplifying assumptions. Stoll (1989) considers that it is liable to underestimate the effective spread because it neglects the effects of information asymmetry when evaluating transaction costs.¹⁵ Nevertheless, the Roll measure often provides relevant information on markets' liquidity situation.¹⁶ Chart 2 shows how close Roll's coefficient

¹⁵ See Huang and Stoll (1997) and Stoll (2000) for a review of bid-ask spread modelling and its breakdown into three types of factors: asymmetric information effects, inventory effects and order processing costs.

¹⁶ See Lesmond (2005), Uppner (2000).

Box 2

The Roll measure as a proxy for the bid-ask spread

Let an asset whose observed price p_t at t is assumed to reflect the (unobservable) fundamental value m_t of the asset, adjusted by a fixed transaction cost between dates $t-2$ and t , be noted as c (half-spread):

$$p_t = m_t + c q_t \quad (6)$$

with $q_t = +1$ in the case of a purchase and -1 in the case of a sale.

The fundamental value m_t of the asset is assumed to follow a constant variance random walk (as dictated by public announcements). The expected value of Δp_t is therefore zero: $E(\Delta p_t) = 0$. If it is assumed that buy and sell order flows are equiprobable at time t and that they are serially independent and do not depend on random public announcements, it may be shown that:

$$E(\Delta p_t \cdot \Delta p_{t-1}) = \text{Cov}(\Delta p_t, \Delta p_{t-1}) = -c^2 \quad (7)$$

Therefore, the estimated half-spread c at date t is:

$$c = \sqrt{-\text{Cov}(\Delta p_t, \Delta p_{t-1})} \quad \text{si } \text{Cov}(\Delta p_t, \Delta p_{t-1}) \leq 0 \quad (8)$$

This measure is defined only if the co-variance between successive price changes is negative. To obtain a time series of Roll coefficients, one must therefore neutralise the observations for which the co-variance is positive. Intuitively, the negative co-variance is due to the fact that there cannot be two successive price increases (decreases) in the absence of public announcements (i.e. in the absence of changes in fundamental value) and if the spread is fixed; transactions therefore occur at the quoted bid or ask price.

(calculated for each day between 27 October 2005 and 21 February 2006 on the basis of intra-day data) is to the half-spread actually quoted for a French share.¹⁷

The interest of using this measure as a tool for managing liquidity risk does not appear to have been considered hitherto. This is despite the fact that, in the absence of detailed databases, it can provide an indicative value of the bid-ask spread and be used to calculate an adjustment factor for VaR, for example as part of a historical simulation (see Box 3). This method for determining VaR adjusted for liquidity cost is recommended for its simplicity, because it does not require the formulation of assumptions on the probability distribution of returns or on that of Roll coefficients. Table 1 in fact shows that the latter cannot be

considered here to be normally distributed, as the asymmetry coefficient (skewness) is not zero and the kurtosis is (slightly) above 3. VaR calculations adjusted according to the historical simulation method will therefore consist in using the historical distribution of returns and the historical distribution of Roll coefficients over the same period to estimate the distribution of possible losses –including liquidity cost– on a current position.

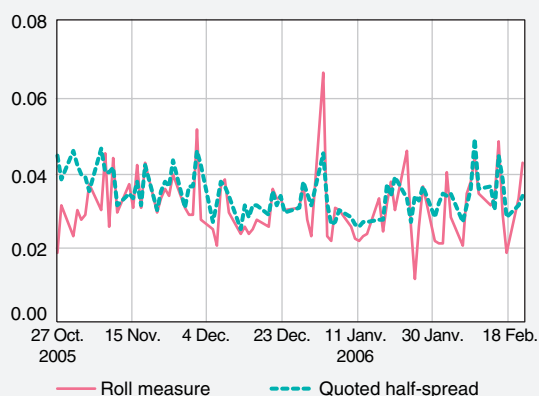
Estimates of the bid-ask spread nonetheless indicate the cost of immediacy for limited value transactions, corresponding to market depth. Prices can therefore be considered as exogenous. However, the higher the transaction amount, the more important it is to take account of the risk that a negative price movement could result from these transactions (endogenous liquidity risk).

¹⁷ We randomly selected the Essilor share. Identical calculations were carried out for all the CAC 40 companies, which, in general, revealed that the Roll coefficients were extremely close to the quoted half-spreads.

Box 3

Calculating adjusted VaR using the Roll measure as part of a historical simulation

Chart 2
Roll measure and bid-ask spread of the Essilor share
(Eur)



Source: Bloomberg; Banque de France calculations

Here, we have a sample of daily Roll coefficients over four months only. For the sake of homogeneity, the series of daily returns on this share over the same period is used to calculate VaR adjusted for exogenous liquidity cost.

We apply the historical simulation method, i.e. we use the observed distribution of daily returns as well as that of Roll coefficients between 27 October 2005 and 21 February 2006.

At the threshold of 99%, the most negative rate of price change R^* is around -2.2% and the highest Roll coefficient EUR 0.067. As the mid-price (P_t) of the share was EUR 73.45 on 22 February 2006, the following results are obtained (for one share).

Table 1

Features of the empirical distribution of Roll coefficients	
Average	0.031216
Median	0.030148
Minimum	0.011899
Maximum	0.067064
Standard deviation	0.008471
Skewness	1.130643
Kurtosis	3.038863

Table 2

Calculations of VaR adjusted for the Essilor share at a one-day horizon and at a threshold of 99%

Lowest expected price $P^* = P_t e^{R^*}$	71.852
$VaR = P_t - P^*$	1.598
Exogenous liquidity cost (ELC)	0.067
Adjusted VaR $LVaR = VaR + ELC$	1.665
Share of ELC in adjusted VaR	4.02%

In this case, the exogenous liquidity risk (ELC) accounts for a fairly small proportion of the market risk of the Essilor share. This security therefore appears to have good liquidity on the calculation day (tightness of the spread). This evaluation however fails to cover the endogenous component of liquidity risk. Besides, the same type of calculation for other securities, outside the CAC 40 in particular, could yield significantly less favourable results.

USING IMPACT MEASURES

Endogenous liquidity risk is the risk that the actual price of a transaction may be significantly different from the price quoted just before the transaction was performed. This is also known as slippage. It is therefore important to determine the relation that may exist between the size of an order and the

price slippage that this order may cause, i.e. define an impact measure (function).¹⁸

One may therefore seek to estimate a coefficient representing market depth, such as Kyle's λ or variants of it.¹⁹ It must be noted that, in equation (1), the coefficient λ relates to sales as well as purchases, which means that the impact of

¹⁸ It must be pointed out that these impact measures may be high (in other words, asset prices may vary considerably even though turnover is low) without being influenced by market depth or liquidity: for example when a public announcement leads to a price revision. Nonetheless, for long series, it is rare for major price adjustments to occur without corresponding transaction flows.

¹⁹ Kyle's coefficient is a frequently used indicator in studies on market microstructure. Pastor and Stambaugh's measure (2003) is close to this, the idea being that the reversal in the sign of returns following the trading of large volumes is more pronounced in less liquid markets.

purchases and sales is assumed to be symmetrical. This simplifying assumption may be removed by estimating, for example, an econometric equation of the following type:

$$\Delta P_t = \alpha + \lambda_1 VOL_{P,t} + \lambda_2 VOL_{S,t} + \varepsilon_t \quad (9)$$

where $VOL_{P,t}$ and $VOL_{S,t}$ respectively represent the volume of buy orders and the volume of sell orders over the period t , with λ_1 being the coefficient of the impact of purchases and λ_2 that of the impact of sales. In formulae (1) or (9), the term ΔP_t corresponds to the absolute (or relative) change in the mid-price after a transaction.²⁰

If one sticks to equation (1), estimating coefficient λ at a given time requires the use of a sample of intra-day data on bid-ask prices, actual transaction prices and trading volumes. The procedure is as follows: based on intra-day data, to each transaction is attributed the midpoint price that precedes it by at least five seconds, allowing time for quotation changes. For the net volume of orders ($NVOL$), orders are classified between those initiated by buyers and those initiated by sellers. Following Lee and Ready (1991), transactions performed at a price above the midpoint are classified as “buy” transactions and those conducted at a price below the midpoint are classified as “sell” transactions.

Re-estimating equation (9) by linear regression at each date t using these data thus provides a time series of impact coefficients. Lastly, a corrective factor for VaR that takes account of endogenous liquidity risk must be deduced from the estimated coefficients. To do so, an historical simulation may be carried out. In the case of a sale, a discount determined by the coefficient λ of the day is subtracted from the mid-price. Both components of liquidity risk (endogenous and exogenous) may in fact be incorporated into the calculation in the process.

This methodology is also quite demanding in terms of data availability. A strategy that is easier to implement might be to start directly from restrictive

(pessimistic) assumptions on the price-elasticity of demand and supply, in order to estimate the potential costs arising from the liquidation of a portfolio in a shallow market.

Assuming firstly, market demand that is quite inelastic in the short term, so that daily transaction value is assumed to be fixed (equal to that observed on the calculation day), and secondly, inelastic supply (meaning that the seller accepts any price imposed by market demand, provided that its order is fully executed) leads us to form fairly pessimistic expectations of market liquidity: the absorption of an excess supply of securities leads solely to a drop in the average ask price (absence of quantity effect, *i.e.* of adjustment of the quantity demanded to supply). Therefore, if V is the daily trading value of a certain category of securities (assumed to be fixed), N the number of stocks traded daily (assumed to be known), P the average price of the stock before the transaction ($P = V/N$), the excess supply ΔN pushes the average price from P to $P' = V / (N + \Delta N)$. The rate of change in the price resulting from the liquidation of ΔN stocks is therefore:

$$\Delta P/P = - \Delta N/N \quad (10)$$

Equation (10) thus makes it possible to adjust the historical returns observed for an impact factor $\lambda' = \frac{\Delta P/P}{\Delta N/N}$ linked to the size of the portfolio to be liquidated, and to calculate adjusted VaR using a historical simulation. This approach is doubly interesting. First because it is based on conservative assumptions, which are appropriate in a risk-control perspective, and second because it uses data available for a large number of stock markets (average daily transaction value and average number of stocks traded daily). D. Cosandey (2001) illustrates this approach by considering the liquidation of equity portfolios.

The same concern about data availability may justify recourse to more general indicators, such as the Amihud (2002) illiquidity ratio, which may be calculated on the basis of daily transaction prices

²⁰ It is possible to select changes in actual transaction prices as a dependent variable, but it may be preferable to use the mid-price because it can change in the absence of transactions, unlike the transaction price. Using the transaction price could lead to underestimating the impact of a sale. Besides, equation (9), like equation (1), assumes the stationarity of variables at play or the existence of a cointegration relation between these variables.

and volumes. For a given asset class, the average illiquidity ratio in the month t is defined by:

$$\gamma_t = \frac{1}{D_t} \sum_{d=1}^{D_t} \frac{|r_{d,t}|}{v_{d,t}}$$

with $r_{d,t}$ being the return on the asset $v_{d,t}$ the volume of the asset traded (in currency units) on day d , during the month t , and D_t the number of observations in the course of the month t . To obtain a daily assessment, the following expression is considered:

$$\gamma_d = \frac{|\ln P_d - \ln P_{d-1}|}{v_d}$$

where P_d is the price observed on day d , and v_d the turnover on day d . The γ_d coefficient may be considered as the equivalent of Kyle's λ estimated at low frequency. As a general indicator, it applies symmetrically to purchases and sales. No distinction is made here between fundamental factors and liquidity problems in price changes. In a study of the US stock market, Hasbrouck (2005) however finds that the Amihud ratio is the best indicator based on daily data of the impact of volumes on prices. The γ_d coefficient may therefore replace Kyle's λ in the calculation of adjusted VaR.

It must here again be emphasised that liquidity risk estimates are often hampered by a lack of data: for example, the trading volumes required to calculate the Amihud ratio are rarely available on the foreign exchange markets. In addition, there is a lack of directly usable market data for certain little traded derivatives. Pricing these instruments therefore means using valuation models and the issue of liquidity risk assessment therefore becomes part of the larger problem of model risk (see below).

Moreover, a more in-depth analysis of impact functions would in fact require more sophisticated modelling than that derived from Kyle's model. Thus, the dynamic properties of prices would be better captured by introducing lagged variables into the impact function. Similarly, the linear specification of the impact function may be called into question, as the liquidity premium (or discount)

demanded by the market for the execution of orders is probably not strictly proportional to their size.²¹ In addition, we have hitherto considered a stable relationship between turnover and price changes. Another methodological approach would be to consider that price elasticity is random in nature due to the impact of unpredictable factors, other than order size, on price changes. Some recent theoretical studies thus attempt to directly model the reaction function of the market to volumes as a stochastic process,²² but the possibilities of practical implementation with respect to risk management remain uncertain.

Lastly, we made the implicit assumption of a block and instantaneous liquidation of a position to measure its incidence on prices. However, the market impact differs depending on the duration of the liquidation. An element that is decisive for the impact on prices is in fact the *liquidation rate*: the aggressive liquidation of a position may provoke a powerful negative reaction from the market. Conversely, chopping transactions up into small-sized orders that are presented on the market progressively may, in theory, significantly reduce liquidity costs. Nonetheless, slower liquidation generates higher opportunity costs and exposes the position to price volatility (price risk) over a protracted period. There is therefore a trade-off between the risk of price change and endogenous liquidity risk, with the optimal liquidation strategy making it possible to partially control the impact on prices by choosing the amount to be liquidated periodically or the time frame for liquidation.²³ The assumption of immediate liquidation is in fact justified in crisis situations when investors cannot choose their liquidation strategy, but are subject to panic (see below).

The spread and elasticity measures suggested, based on past observations, are supposed to provide relevant information for "average" situations and fall smoothly within the framework of the VaR model. They therefore appear to be useful for the management of normal liquidity risk.

However, market liquidity may undergo violent upheavals. The impact of *collective* liquidation in times of stress is not covered by measures of endogenous

²¹ See Almgren and Chriss (2003).

²² See Jarrow and Protter (2005), Çetin et al. (2004).

²³ On optimal liquidation models, see Bertsimas and Lo (1998), Almgren and Chriss (2000), Berkowitz (2000), Subramanian and Jarrow (2001).

risk –which concern the liquidation of individual positions– and even less so by the measures of exogenous risk considered above. This underlines the difficulty for market participants to protect themselves from a risk that is systemic in nature.

2|2 Capturing extreme liquidity risk

A general liquidity crisis is an extreme event: it occurs infrequently but its consequences may be very costly. The singularity of such events calls for appropriate risk management tools. The extreme value theory and stress tests may help to prevent these types of events. More generally, the fundamental uncertainty surrounding market liquidity, in particular in periods of turmoil, calls for a precautionary approach and the consideration of the model risk that affects the various indicators of liquidity risk.

EXTREME VALUE THEORY AND MANAGEMENT OF LIQUIDITY CRISIS RISK

Beyond the limitations stemming from the fact that they do not cover transaction costs in normal times, conventional VaR calculation methods appear to be poorly adapted to the capture of liquidity crises, which are extreme events. The historical simulation is in fact liable to be based on a sample of data that is too narrow to take account of the worst eventualities, while the parametric method is based on the use of normal distributions that tend to underestimate the distribution tails of losses.²⁴ Nonetheless, it is in fact these tails that must be properly assessed in financial risk management.

The extreme value theory provides theoretical results on the limit (asymptotic) probability distribution of extreme losses and it does so without having to formulate strong assumptions on the form of the underlying distribution of returns. The principle consists in extrapolating the behaviour of possible extreme values based on the sample of the greatest losses actually observed.

From a practical perspective, *i.e.* for the calculation of the parameters of the asymptotic distribution, we therefore do not use a complete series of returns and losses, but only the series of maximum losses (the sharpest drops in prices). Two approaches are used to construct this sub-sample:

- the block maxima method, which consists in breaking the historical observation period into data “blocks” of equal length (*e.g.* monthly, quarterly or half-yearly blocks) which are divided into n time periods, and using only the upper bound of each block. When n becomes very large, the maxima follow a “generalised extreme value distribution”.
- The peaks over threshold method, which is based on the analysis of losses exceeding a high threshold u to be defined. When u becomes very large, the losses exceeding the value u follow a “generalised Pareto distribution”.

Each of these methods therefore shows a limit probability distribution whose parameters are estimated using the sub-sample of extreme values. This distribution may then be used to assess exceptional risks.²⁵

To apply extreme value theory to liquidity crisis risk one must therefore, ideally, have long series of indicators on average liquidity risk. For example, where one is fortunate enough to have a significant sample of bid-ask spreads for a financial product, one must extract from this series the widest spreads in order to determine their distribution and calculate the corresponding VaR adjusted for extreme liquidity cost. This also holds for indicators of endogenous risk.²⁶

Another way of proceeding, which is justified by the interdependence of risks during major crises –in particular between price risk and liquidity risk– would be to directly calculate an extreme VaR, while considering that the market data that were used to construct this VaR model provide information on the risks of price changes as well as the risks of loss arising from the evaporation of liquidity. While this

²⁴ This is why even CVaR (Conditional VaR) or Expected Shortfall, which corresponds to the average amount of losses exceeding a predefined amount of VaR and which therefore concerns possible extreme losses, is liable to underestimate the real distribution of extreme losses so long as it is calculated –like the VaR on which it is based– on the basis of a normal distribution.

²⁵ On extreme value theory, see Embrechts et al. (1997).

²⁶ It must be noted that the extreme value method is a semi-parametric method for assessing risk, for it is based on the explicit formulation of a probability distribution. Some studies use a more empirical approach, by determining a corrective factor for non-normality based on the historical distribution of the spread. See Bangia et al. (1999) and Le Saout (2002).

method is simpler, it is probably less precise because it does not model the determinants of liquidity.

Extreme value theory is an attractive approach for assessing extreme illiquidity risks that is grounded on clear foundations. Nevertheless, as an asymptotic theory, it requires sufficiently long observation series, which could pose problems, especially when the markets are not very mature. It is also difficult to implement in its multivariate version when too many risk factors are taken into account. This highlights the limits of a strictly statistical approach to liquidity crisis risk.

LIQUIDITY STRESS TESTS

The difficulty of applying extreme value theory in the face of the complex chain of events that is set in train during crises may lead to a preference for other approaches based on simulation, *i.e.* stress tests. The Basel Committee moreover acknowledges stress tests to be an integral element of the internal control of market risks.²⁷

Stress tests encompass various practices (scenarios, sensitivity analyses) that aim to assess the consequences of infrequent but plausible large-scale shocks on the value of a portfolio. Stress tests therefore presuppose first, the definition of the relevant market movements and second, the quantification of their impact on the value of the portfolio. Following the Asian crisis of 1997 and the events of autumn 1998, the large financial institutions improved their ability to conduct such tests.²⁸

From the perspective of extreme liquidity risk, stress tests make it possible to assess the implications of certain phenomena that characterise crisis episodes: unusual increase in the correlation of risks, atypical rise in volatility or even the inability to trade on certain market segments. They therefore enable the detection of complex risks that are difficult to capture using a probabilistic approach.

Liquidity crisis is not only an extreme event, it is also a collective phenomenon that develops and fuels itself in an endogenous manner on the spread of liquidity fears. It is therefore crucial to examine

the factors that may lead to such one-way market movements. One of these factors is the practice of stop-loss rules, *i.e.* the mechanical triggering of a sell order when the market price overshoots a predefined threshold, another is dynamic hedging, which leads net issuers of put options to liquidate the underlying securities for hedging purposes when the prices of these securities drop sharply and a large majority of option holders seek to exercise their options. These waves of mechanical selling on bearish markets are instrumental in the spread of liquidity problems.

More generally, an institution's crises scenarios must, as much as possible, incorporate the fragility of its entire balance sheet, *i.e.* the possible mismatches between illiquid investments on the assets side and precarious sources of finance on the liabilities side. For example, the difficulties of meeting margin calls on collateralised loans or uncertainty surrounding borrowing capacity may herald more major difficulties when they lead to the unwinding of positions under stress.

An especially edifying stress test for a large institution would be to envisage the consequences of the simultaneous withdrawal of its counterparties from the market. This was in fact the path taken by JP Morgan and Deutsche Bank in the aftermath of the near bankruptcy of LTCM. Aware of the potential dangers arising from the high concentration of certain markets (interest rate options and credit derivatives), the two banks developed "dealer exit stress tests" aimed at estimating the risks of a sudden drying up of market liquidity generated by one or several of their counterparties.²⁹ In this regard, it is important for institutions to consider liquidity conditions from a *systemic* angle by paying particular attention not only to the possible impacts of the concentration of the positions of their counterparties and other market participants, but also to their own impact on the markets when they account for a substantial fraction of these markets.

Besides the problems relating to the relevance of the scenarios chosen, the implementation costs and the low frequency of stress tests, one of the essential difficulties of stress tests remains endowing the scenarios envisaged with a degree of plausibility. This intrinsic limitation of risk measurement,

²⁷ See the 1996 Amendment to the Capital Accord to incorporate market risks.

²⁸ See CGFS (2000) and (2001).

²⁹ See Jefferly (2003).

particularly for very rare and systemically important events, highlights the importance of experience and good judgement in the analysis of the potential scale of liquidity risk.

MODEL UNCERTAINTY

AND THE PRECAUTIONARY APPROACH

Indeed, in liquidity risk management, the problem of *measurement* is closely linked to that of *decision-making* under uncertainty. Faced with the uncertainty that surrounds future liquidity conditions, and consequently measures of illiquidity risk, *forecasting* appears in fact to be a delicate or even insurmountable task, especially for major phases of stress. This in no way signifies that all efforts of quantification must be abandoned. It instead requires the adoption of a *precautionary* attitude in the face of the inaccuracy of the risk indicators.

One must therefore acknowledge the shortcomings that at times result from the lack of information and the complexity of the interactions, and appreciate that the models designed to assess risks may be subject to uncertainty. This is particularly clear for the valuation of little traded derivatives, whose pricing is based exclusively on the construction of models.³⁰ Two main types of errors may, in general, compromise a model's reliability: errors concerning parameters and errors of specification. In any case, the most harmful attitude in practice would be to place one's trust in biased indicators tending towards the underestimation of liquidity problems.

Taking into account the risk linked to model uncertainty and the precautionary principle therefore leads to the consideration, around a reference model, of a set of possible alternative models and the choice in the risk assessment process, of the model that yields the greatest losses. This conservative strategy, which it seems appropriate to use when it is not possible to rely on conventional statistical inference procedures, refers back to a type of uncertainty that cannot be perfectly measured in terms of probabilities and which affects the liquidation value of an asset in certain critical situations. This strategy may in fact be transposed into mathematical terms and yield quantified operational results.

In the probabilistic context of the extreme values theory, it has been suggested that the calculation of an extreme VaR model encompassing market risk and liquidity risk may be a way of factoring in extreme liquidity risk. Similarly, the determination of a sufficiently robust adjusted VaR measure could play this role in a context of strong uncertainty. In this regard, Rey *et al.* (2004) provide an interesting illustration. The authors develop a calculation of VaR by linking each possible loss not to a point probability, but to an interval of probabilities, whose width is dependent on a parameter that represents perceived uncertainty. By setting the value of this parameter at a level that is sufficiently high, in accordance with the precautionary principle, the aim is to capture the highest liquidity risk within certain bounds of plausibility. Recognising the incomplete nature of the information available and the limited capacity to process this information should in fact be an integral part of all liquidity risk control strategies.

³⁰ See Cont (2004).

The international financial community currently appears to have a better grasp of the risks associated with liquidity illusion. A working group made up of large private financial institutions³¹ recently focused on the initiatives that need to be taken by private players in their risk management procedures in order to bolster the stability and efficiency of the financial system. The report resulting from this work especially underlines the need for financial institutions to strengthen their capacity to assess the possible threat of crowded trades, which means that they need to re-appraise their usual risk measures and enhance their stress tests.

To this end, this article has attempted to clarify the different aspects of illiquidity risk and explore a few avenues for incorporating this risk into the existing risk control tools. Two main conclusions may be drawn.

- There is a productive convergence between research on financial market microstructure and risk management practices. This convergence should make it possible to construct and track relevant indicators of market liquidity risk.
- It is essential to make a distinction between normal times and times of stress. This distinction calls not only for the development of separate methodologies, of which we have provided a few examples, but also for the combination of these different methods in a comprehensive risk approach.

Overall, the construction of appropriate models that help financial institutions to better evaluate their risk exposure must be encouraged as an element of market self-discipline. However, liquidity risk management cannot of course be reduced to the search for quantitative indicators: experience and good judgement are crucial in this area, particularly for coping with periods of stress when market behaviour sometimes diverges from conventional models.

In addition, it must be borne in mind that from a macroeconomic point of view, market liquidity is the product of externalities generated by all market participants, which agree to act as counterparties in sale/purchase transactions and by so doing perform a market making function. Even though financial institutions may be aware of the collective nature of liquidity, there is little likelihood of them being able to make the most of this: first because their information on the scale and overlapping of risks is necessarily limited; second because they have no incentive, from the point of view of individual rationality, to shore up market liquidity when it is floundering. It is therefore a major stake and clearly a matter of concern for public authorities.

Communication between markets and authorities is at the heart of the prevention of generalised illiquidity risk. This is why it is necessary not only to encourage information transparency between market participants (for example between hedge funds and their counterparties) so that they can build appropriate tools for managing liquidity risk, but also for supervisors to have better means of assessing such risks at the financial system level, and transfer, if need be, the results of this assessment to the markets. From this point of view, the performance of aggregate stress tests could assist in the quantitative assessment of the financial system's resilience to liquidity shocks. These stress tests should incorporate participants' size and level of leverage, identify their sources of finance and more generally take account of the multiple interdependence networks between counterparties. Similarly, the development of regular indicators for monitoring market liquidity would be useful to public authorities in the carrying out of their financial stability tasks.

³¹ The Counterparty Risk Policy Management Group II, chaired by Corrigan (E. G.). See the group's report, "Toward greater financial stability: A private sector perspective" published in July 2005.

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Productivity and stock prices

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This study looks at the degree of correlation between stock prices and productivity at different levels, i.e. analysis of the correlations between certain components of the two variables and how correlations vary according to the different frequencies characterising these variables.

It should be acknowledged that the approach used is only designed to isolate the stylised facts related to the cyclical components of the variables under review and not to explain them. In particular, the method chosen cannot be used to make forecasts or to provide a refined economic interpretation of these stylised facts.

Nonetheless, this analysis, applied to the United States and the euro area over the period 1973(1)-1985(4), highlights the following points:

- in the United States, an increase (or reduction) in the cyclical component of the rate of stock returns is positively correlated with current or future increases (or reductions) in that of the productivity growth rate;*
- in the euro area, this correlation is less strong.*

It appears, for example, that a sharp fall in stock prices precedes a marked decline in productivity (link between stock prices and future productivity) and, as a result, in profits. This fall could then be interpreted as a normal, even desirable, adjustment mechanism for asset prices. Correspondingly, a sharp rise in stock prices should not automatically be interpreted as the emergence of a future bubble given that such rises appear to foreshadow an increase in productivity and therefore in profits. Over the most recent period 1986(1)-2002(4), these correlations appear less pronounced, thus indicating a possible break.

Our result is robust given that two complementary methods corroborate it and that it is similar to Estrella's (2003) findings for the United States. This pattern appears to suggest that the cyclical component of stock prices is in phase with that of productivity.

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From a theoretical point of view, the price of a financial asset reflects the profit expectations of the company concerned.¹ Much research shows, for example, that stock returns are positively correlated with future production (Fama, 1990). At the same time, production and expected profits are in principle closely linked to productivity: productivity gains are in general associated with expanding production and reductions in unit labour costs.² It follows that an increase in productivity may lead to a rise in future profits.

However, financial asset prices and productivity can be distorted or influenced by short-term factors that have nothing to do with the fundamentals or the structural relation between the two variables. Asset prices can, for example, react to market rumours. In the same way, average labour productivity is sometimes affected by short-term factors (see Croux, Forni and Reichlin, 2001 or Estrella, 2004, for discussion of this last point). We may consequently observe divergences in developments in these variables during certain periods.

Furthermore, over the period under review (1972-2002), stock markets in both the United States and the euro area posted very great fluctuations. Most strikingly, in the second half of the 1990s in the United States, strong growth on equity markets was accompanied by a substantial increase in labour productivity. If the existence of a co-movement between these two variables were substantiated, it would be possible to derive information about the direction of one variable from that of the other.

A number of statistical techniques allow us to measure the degree of correlation between asset prices and productivity at different levels: analysis of the correlations between the components of the two variables; and investigation of how correlations vary according to the different frequencies characterising these variables (dynamic correlations, see Avouyi-Dovi and Matheron, 2003). It should be noted that the approach adopted in this study is not designed to provide an explanation but rather to isolate stylised facts regarding

the components of the variables under review. In particular, the method does not enable us to make forecasts or to provide a refined economic interpretation of these stylised facts. It should also be borne in mind that, by definition, our approach does not allow us to study pathological phenomena such as bubbles, which are eliminated from this analysis.³

In the wake of Kydland and Prescott (1982), the approach selected has become widespread in the literature devoted to economic cycles. In this type of research, productivity plays a crucial role in economic developments. However, this approach has been little used with respect to finance, with a few rare exceptions, notably Estrella (2003) and Beaudry and Portier (2005), who apply it to the analysis of interactions between productivity, monetary policy and financial indicators in the context of the US economy.

The originality of our contribution lies in the number of methods utilised and, above all, in their application to the euro area. To our knowledge, there are virtually no studies providing an analysis of the co-movements of productivity and stock returns that deal both with the United States and the euro area. In order to avoid using data that are likely to be substantially revised, we propose studying the two variables at a quarterly frequency over the period 1972-2002.

We start by isolating the cyclical and long-term components of the productivity growth rate and stock returns in the euro area and United States in order to study their correlations. This allows us to measure how the co-variation between the productivity growth rate and stock returns changes depending on whether one takes the unadjusted series or solely the cyclical components of these variables. In addition, we compare the cyclical components of stock returns in the United States and the euro area in order to verify whether the hypothesis of interdependence remains valid for our sample.

We then go on to employ dynamic correlations to obtain a more detailed decomposition of the

¹ In terms of theoretical approaches, we can cite that of Gordon-Shapiro in which the price of a stock is equal to the discounted value of the dividends on that stock (see Wadhvani, 1999) and the so-called residual income approach (the Edwards-Bell-Ohlson model), which makes it possible to decompose the value of a stock into two components: an accounting measure of capital and the discounted value of expected profits (Edwards and Bell, 1961, and Ohlson, 1995).

² All other things being equal, when productivity increases, unit labour costs fall and profits increase. It is this accounting relation that suggests that there may be a positive relation between productivity and stock prices.

³ In addition, analysing this type of phenomenon would require the prior definition of an equilibrium level for asset prices, which is not the purpose of this study.

co-variation between these variables using their position in the frequency domain (low frequency for the long term, intermediate frequency for business cycles, and high frequency for the residual).

1| Co-VARIATION OF COMPONENTS OF THE PRODUCTIVITY GROWTH RATE AND THE STOCK RETURN RATE

1|1 Methodological reminder

Under certain circumstances, a chronological series may be regarded as the sum of different signals (or movements), each of which appears at specific frequencies (see Brockwell and Davis, 1991). From the point of view of economic or financial analysis, it may be useful to isolate a number of specific signals in the unadjusted series:⁴ in principle, it would not

be pertinent to analyse the business cycle using an indicator that includes both long-term and cyclical phenomena. For this, we use filtering techniques.

Comparative studies of these techniques have shown that they are not all very robust and that the use of some of them does not necessarily lead to the result expected in terms of the decomposition of the series (see Guay and Saint-Amant, 2005). In this paper, we have used one of the most effective techniques –the filter proposed by Christiano and Fitzgerald in 2003.⁵ It allows us to isolate, for the United States and the euro area, the cyclical and permanent components of the apparent labour productivity growth rate and of the rate of real stock return rate.

The data are taken from the bases of Datastream (DS) or official US or European sources (see Box 1). For reasons of consistency, we have chosen here to analyse real data. Moreover, hourly productivity data for the euro area are not available for the whole of the study period. In addition, as a result of the difficulty of measuring working time in euro area

Box 1

Empirical data

The data used are quarterly and cover the period from the first quarter of 1972 to the fourth quarter of 2002. A quarterly frequency has been chosen in order to have a measure of productivity that covers the whole of the business sector. The period covered by the study has been chosen in order to avoid the problem of the revision of data, especially those for the US economy, which are revised over several years. Variables available with a monthly frequency (stock prices, etc.) have been turned into quarterly data using three-month averages.

The stock prices taken as asset prices in this study are the indices calculated by Datastream. This choice is dictated by the wish to use indices estimated in an identical manner and covering the same sectors for the two areas under review. In addition, they are available for a long period including for the euro area. These indices are deflated by the relevant consumer price index for each area. Stock returns are calculated as the first difference of the logarithm of stock prices. Data for economic activity and prices are seasonally adjusted.

• Data for the United States: *the consumer price index and real GDP are taken from the databases of the Bureau of Labor Statistics. GDP corresponds to the business sector excluding agriculture.*

• Data for the euro area: *real GDP and the consumer price index are taken from the database of the ECB's area wide model for the euro area developed by Fagan et al. (2005). Pre-1999 data have been backdated.*

Apparent labour productivity is calculated as the ratio of real GDP to employment for the euro area, and the ratio of real GDP to total hours worked for the United States.

⁴ We may recall here what Engle said in 1974 regarding the treatment and analysis of time series: "... there is little discussion of whether the same model applies to all frequencies. It may be too much to ask of a model that it explains both slow and rapid shifts in the variables, or both seasonal and non-seasonal behaviour. It is at least reasonable to test the hypothesis that the same model applies at various frequencies." See also Corbae et al. (2002).

⁵ These authors state: "We identify one approximation which, though it is only optimal for one particular time series representation, nevertheless works well for standard macroeconomic time series."

countries, annual labour productivity data, which are available for a short period, are not regarded by experts as very reliable. We have therefore opted for the most robust productivity indicators for the euro area, *i.e. per capita* productivity. By contrast, in the case of the United States, hourly productivity, taking account of the total number of hours worked, has been preferred. This creates a small distortion between the two areas under review, but in the United States productivity dynamics measured by *per capita* or hourly production are comparable. We have opted for hourly productivity, which seemed to us to be richer in terms of information. As shall be seen later, the results obtained in this article are qualitatively robust to account being taken of this alternative measure of average productivity.

In the definition of the business cycle put forward by the National Bureau of Economic Research (NBER), the cyclical component of a series comprises all cycles whose duration is between six and thirty two quarters, while the permanent or long-term component is associated with cycles with a duration greater than thirty two quarters.

In what follows, we use the expressions “duration” and “recurrence period” interchangeably.⁶

Artis *et al.* (2003) took the recurrence period of the cycle as being between five and thirty two quarters. We have preferred the definition based on the work and discoveries of Burns and Mitchell (1946), used notably by the NBER.⁷ Indeed, Burns and Mitchell highlighted that the duration of a phase of the cycle is no less than 6 quarters and no greater than thirty two quarters. This definition has become customary when describing the business cycle in the United States. As a result, the recurrence period of the business cycle is taken as being between six and thirty two quarters.

Once the business cycle has been isolated, we assess the correlations between the cyclical components of the different variables being investigated. These calculations are carried out using a robust estimation method, the augmented generalised method of moments, which enables unbiased measurement of coefficients and confidence intervals (see Box 2).

Box 2

Calculating the correlations

Let $(a_t, t = 1, \dots, T)$ where T designates the number of observations be the apparent labour productivity growth rate and r_t ($t = 1, \dots, T$) the return on the DS index. We indicate the short-term component of a variable by the exponent ct . We calculate the correlations between the cyclical components of the productivity growth rate and of stock returns, a_t^{ct} and r_{t+k}^{ct} , for $k = -2, \dots, 2$.

These correlations are estimated by a robust econometric method, the generalised moments method augmented by the Newey-West HAC procedure (with four lags), which allows us to correct the effects of a potential heteroscedasticity of residuals. This correction helps to obtain unbiased estimates of standard deviations for the correlation coefficients.

The calculation of the correlations between the current, leading or lagged cyclical components allows for a more refined interpretation of the relation highlighted between these components. To illustrate our point, let us take the example of productivity at date t a_t^{ct} and of leading (k positive) or lagged (k negative) stock returns r_{t+k}^{ct} for k periods:

- for $k = 0$, a significantly positive correlation indicates similar behaviour in the two cyclical components of the two variables; by contrast, a negative correlation points to opposite behaviour in the two variables;
- for $k = -1$ (or $+1$) for example, a significant positive correlation indicates that the cyclical component of productivity precedes (or anticipates) that of stock returns by one quarter.

⁶ The period is defined as the inverse of the frequency. We see therefore that the longer the recurrence period of a cycle, the lower the frequency of the phenomena. Thus, we talk about low frequencies when we look at long-term movements, which are generally associated with the idea of growth.

⁷ For technical details, see Christiano and Fitzgerald (2003) or Baxter and King (1999), and Avouyi-Dovi and Matheron (2003) or Zhu (2005) for applications.

Table 1 summarises the correspondence between recurrence periods (time domain analysis) and frequencies (spectral analysis), which we will draw on in the formulation of the dynamic correlations. The table should be read as follows: a cycle whose recurrence period is equal to a single quarter corresponds to a frequency of 2π . A cycle whose

recurrence period is thirty two quarters then corresponds to a frequency of $2\pi/32$, *i.e.* $\pi/16$.

The raw and filtered data for the United States and the euro area respectively are set out in Charts 1 and 2. The left-hand column of each of the charts shows the raw data (thin line) and their long-term components (thick line), defined as frequency movements of less than $\pi/16$ (*i.e.* cycles of thirty two quarters). The right-hand column shows cyclical components, as defined above.

The long-term components call for a number of remarks. First, we note that in the United States the productivity growth rate is characterised by a marked upward trend from the mid-1990s onwards, whereas, in the euro area, the trend is

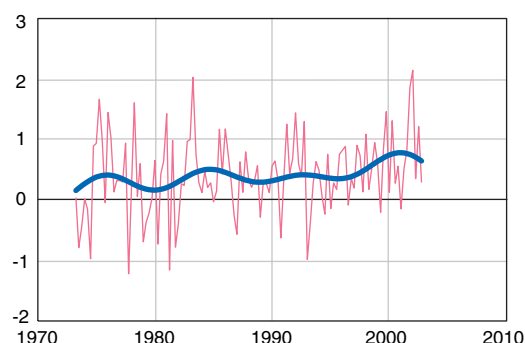
Table 1
Correspondence between time and frequency domains

	Long term	Cycle	Noise
Time domain	∞ to 32 quarters	32 to 6 quarters	6 to 1 quarters
Frequency domain	0 to $\pi/16$	$\pi/16$ to $\pi/3$	$\pi/3$ to π

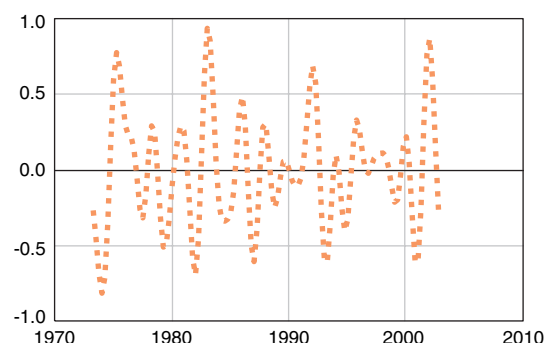
Chart 1
Raw US data and their long-term and cyclical components

(%)

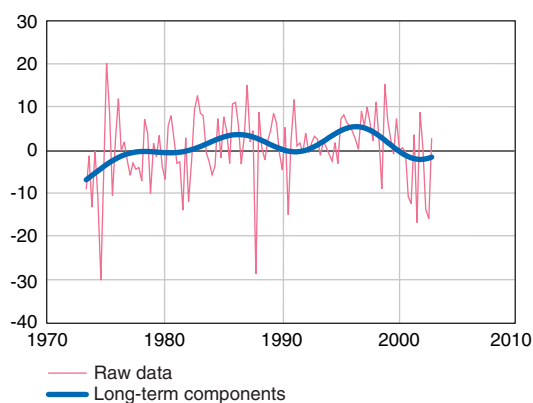
Productivity growth (*a*)



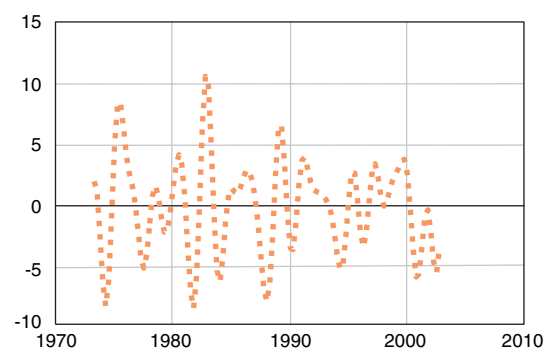
Cyclical component of *a*



Stock returns (*r*)



Cyclical component of *r*



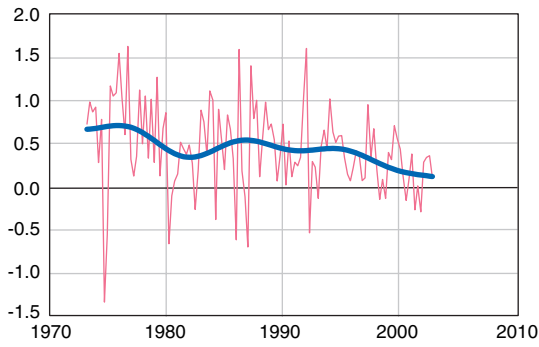
— Raw data
— Long-term components

Note: Permanent components are indicated by the thick line in the left-hand column.

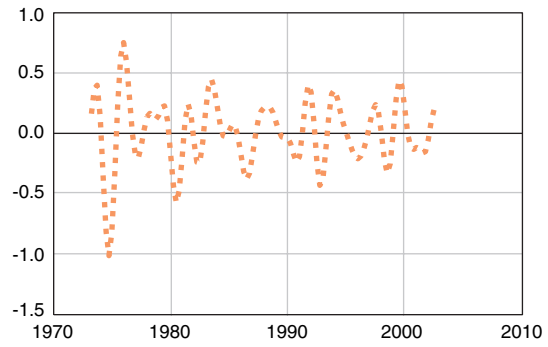
Chart 2
Raw euro area data and their long-term and cyclical components

(%)

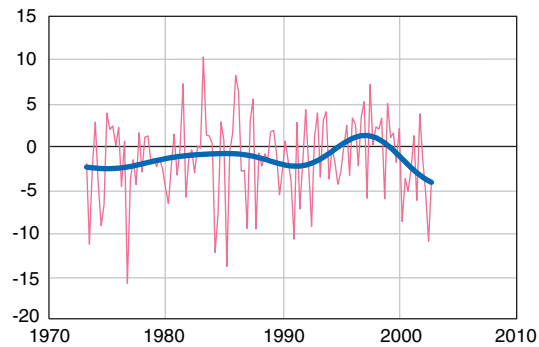
Productivity growth (a)



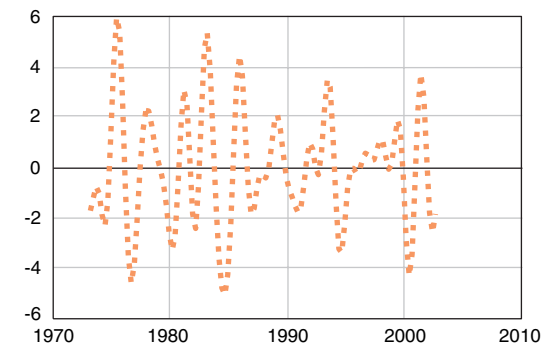
Cyclical component of a



Stock returns (r)



Cyclical component of r



— Raw data
— Long-term components

Note: Permanent components are indicated by the thick line in the left-hand column.

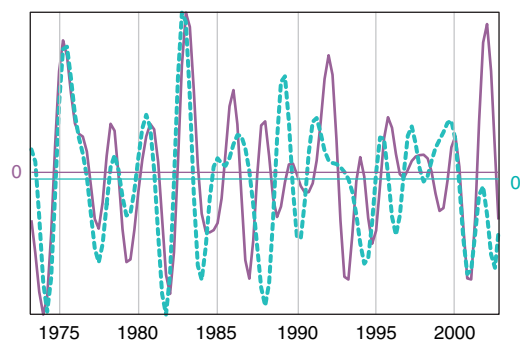
downward. These results corroborate the findings of Lecat (2004) and Skoczylas and Tissot (2005). Second, the long-term trend in stock returns is similar in the United States and the euro area: after a substantial rise in the second half of the 1990s, a swift correction took place in the early 2000s.

1|2 Results

The results of the correlations are set out in Table 2. Charts 3 and 4 provide a visual comparison of the cyclical components of the apparent productivity growth rate, marked a , and the stock return rate, marked r .

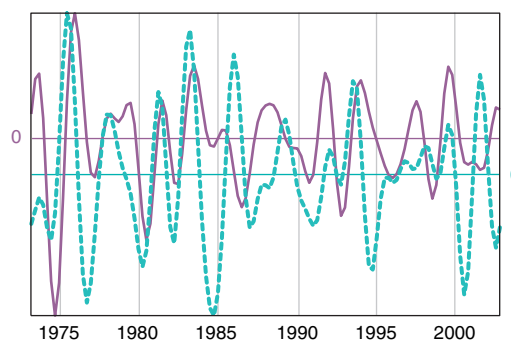
Charts 3 (United States) and 4 (Euro area)
Comparison of the cyclical components of the productivity growth rate and the stock return rate

United States



Cyclical component:
 — Of productivity growth (left-hand axis)
 - - - Of real stock returns in DS index (right-hand axis)

Euro area



Cyclical component:
 — Of productivity growth (left-hand axis)
 - - - Of real stock returns in DS index (right-hand axis)

An analysis of the charts shows that:

- in the United States (see Chart 3), the cyclical components of the productivity growth rate and stock returns appear to co-vary and are therefore mainly in the same phase, at least until the mid-1990s;
- in the euro area (see Chart 4), overall we reach the same conclusion, but the two variables appear to get out of sync earlier, in the mid-1980s;
- the cyclical components of stock returns in the United States and the euro area appear to co-vary positively (see Chart 5). This co-variation suggests the possible presence of contagion effects from the United States to the euro area.

It thus appears that there is a positive relation between productivity and stock returns. It is difficult, however, on reading the charts to tell whether there is a significant relation between the productivity growth rate at date t and current, lagged or leading stock returns.

It should be possible to clarify this point *via* an analysis of the correlations (see Table 2 and Table 2a in the appendix), which leads to the following observations.

Chart 5
Comparison of the cyclical components of stock returns in the United States and the euro area
(%)

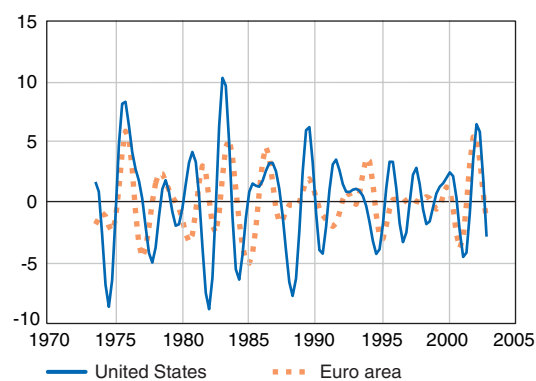


Table 2
Correlations

	<i>k</i>	United States		Euro area	
		(1)	(2)	(3)	(4)
		Raw data	Filtered data	Raw data	Filtered data
period 1973(1) – 2002(4)					
<i>Corr</i> [<i>a</i> (<i>t</i>), <i>r</i> (<i>t</i> + <i>k</i>)]	-2	0.03	0.32 (*)	0.13	0.37 (*)
	-1	0.22 (*)	0.49 (*)	0.12	0.38 (*)
	0	0.18	0.46 (*)	0.06	0.23 (*)
	1	0.13	0.27 (*)	0.02	-0.07
	2	-0.23 (*)	0.05	-0.25 (*)	-0.42 (*)
period 1973(1) – 1985(4)					
<i>Corr</i> [<i>a</i> (<i>t</i>), <i>r</i> (<i>t</i> + <i>k</i>)]	-2	0.14	0.41	0.27 (*)	0.61 (*)
	-1	0.41 (*)	0.67 (*)	0.21	0.64 (*)
	0	0.34	0.70 (*)	0.06	0.40 (*)
	1	0.31 (*)	0.48 (*)	-0.03	-0.06
	2	-0.18	0.11	-0.27 (*)	-0.54 (*)
period 1986(1) – 2002(4)					
<i>Corr</i> [<i>a</i> (<i>t</i>), <i>r</i> (<i>t</i> + <i>k</i>)]	-2	-0.11	0.34 (*)	-0.02	-0.08
	-1	0.00	0.33	0.09	-0.07
	0	-0.01	0.21	0.09	-0.12
	1	-0.11	0.05	0.12	-0.22
	2	-0.31 (*)	-0.03	-0.24	-0.36 (*)

Note: A star indicates a significant coefficient at the 5% threshold. *a*(*t*) denotes the labour productivity growth rate and *r*(*t*) stock returns. For example, if *k* = 1, *Corr*[*a*(*t*), *r*(*t*+*k*)] denotes the correlation between *a*(*t*) and *r*(*t*+1). See Box 2. The filtered data correspond to the cyclical components of the variables under review.

UNITED STATES

- A strong and statistically significant positive correlation at the usual threshold (5%) appears to exist between the cyclical components of the productivity growth rate and stock returns (Table 2, column 2). We note in particular that a positive variation in *r* in a previous quarter precedes a positive variation in the cyclical component of the productivity growth rate. This interpretation is consistent with the idea that stock prices reflect profit expectations.

- By comparing columns 1 and 2, we can see that the relation between the raw data concerning *a* and *r* appears less clear. In particular, few of the correlation coefficients are statistically different from 0 or have the sign suggested by economic theory.

- The correlations calculated for the sub-period 1973(1)-1985(4) corroborate and reinforce the results presented above. On the other hand, for the sub-period 1986(1)-2002(4), the relation between the cyclical components of productivity and stock returns appears significantly less marked.

It should be noted that in the case of the United States, the above conclusions are qualitatively insensitive to the measure of productivity used. Indeed, we obtain very similar results using *per capita* productivity (see Table 2a in the appendix).

Estrella (2003) obtains similar results to ours over a longer period (1954-2002). In particular, he finds an instantaneous correlation between the cyclical components of stock returns and productivity of 0.60, compared with 0.50 for the whole of our sample. It should be pointed out that he uses a different definition of the business cycle to ours (between eleven and twenty eight quarters) and uses the SP500 index for stock prices. This shows that the result obtained is generally robust.

EURO AREA

- There also appears to be a positive and significant relation between the cyclical components of the productivity growth rate and stock returns, but it appears less marked than for the United States (see Table 2, column 4).

- The observation concerning the effect of past stock returns (a maximum of two quarters) on productivity, *i.e.* the fact that a positive (negative) variation in stock returns precedes a movement of the same sign in productivity, also remains true for the euro area.

- The sign of the correlation coefficient between productivity and two-period leading returns is surprising. We should note that here too the use of raw data (see Table 2, column 3) would have led to the absence of any significant relation between the two variables.

- By carrying out an analysis based on sub-samples, we arrive at a similar conclusion to that drawn for the United States. The link between the cyclical components of productivity and stock returns derives mainly from the sub-period 1973(1)-1985(4).

Overall, the above results reveal a number of common points between the United States and the euro area. In both cases, there appears to be a relation between the productivity growth rate and the stock return rate. The filtering of the data reveals that this relation appears to be essentially located at business cycle frequencies, *i.e.* that it may derive from movements whose recurrence period is between six and thirty two quarters.

Moreover, a past increase in the cyclical component of the stock return rate is positively correlated with a contemporaneous increase in that of the productivity growth rate. Thus, a sharp fall in stock prices appears to precede a marked decline in productivity and, all other things being equal, in profits. In this instance, the fall could potentially be interpreted as an adjustment mechanism for financial markets. Similarly, a sharp rise in stock prices should not automatically be interpreted as the appearance of a future bubble given that the latter appears to foreshadow an increase in productivity and therefore in profits. Put more succinctly, we may interpret stock returns as a leading indicator of productivity *at business cycle frequencies*.

Table 3
Correlation between the cyclical components of stock returns

	<i>k</i>	1973-2002	1973-1985	1985-2002
<i>Corr</i> [<i>rUS</i> (<i>t</i>), <i>rZE</i> (<i>t+k</i>)]	-2	0.02	-0.12	0.25
	-1	0.21	0.05	0.39 (*)
	0	0.38 (*)	0.31 (*)	0.42 (*)
	1	0.43 (*)	0.50 (*)	0.30 (*)
	2	0.32 (*)	0.47 (*)	0.10

Note: *rUS*(*t*) denotes stock market returns in the United States and *rZE*(*t*) those in the euro area. A star indicates a significant coefficient at the 5% threshold.

We should note that there is a positive and significant correlation between the cyclical components of stock returns in the United States and the euro area (see Table 3). This result is line with that obtained by Avouyi-Dovi and Neto (2004).

We complete this part of the study with an analysis of causality as defined by Granger⁸ in order to identify some preliminary explanations for the relations described above. We set out the results of the Granger causality tests in Table 4. These tests are conducted on raw or filtered data. In the latter case, for technical reasons, the results need be interpreted very cautiously.⁹ As a result, the Granger causality tests are used here primarily to corroborate the results already obtained.

The results suggest that the apparent productivity growth rate accounts for part of stock market return behaviour both in the United States and the euro area.

Table 4
Granger causality tests (%)

Null hypothesis	United States		Euro area	
	Raw data	Cyclical components	Raw data	Cyclical components
<i>r</i> does not cause <i>a</i>	93.00	80.50	63.00	99.99
<i>a</i> does not cause <i>r</i>	0.29	0.01	0.64	0.00

Note: The null hypothesis is the absence of causality. The test statistic is distributed as a χ^2 whose number of degrees of freedom is equal to the number of constrained parameters in the regressions. This number is equal to 3 in our analysis. A critical probability of less than 5% indicates a rejection of the null hypothesis at the 5% threshold.

⁸ According to Granger, *x* causes *y* if taking account of *x* improves the forecasting of *y*.

⁹ The definition of cyclical components is based on the application of a bilateral moving average filter, so that the cyclical component of a variable at a given date contains information about the future values of the raw variable.

By contrast, the reverse Granger-causality relation does not appear compatible with the data.¹⁰

In what follows, we test the robustness of the above results using a complementary technique. This enables us to arrive at a more refined analysis of the above-described correlations.

2| ANALYSIS OF DYNAMIC CORRELATIONS

2|1 Concept of dynamic correlation

In this section, we assess directly the correlation between each of the different movements

making up the variables under review.¹¹ We thus avoid defining the various components at the outset as we did in the previous section. The corollary to this is that this technique involves a greater number of calculations.

The dynamic correlation between two chronological series on a given frequency band, for example business cycle frequencies, can be interpreted as the degree of correlation between the cyclical components of these series located on the frequency band selected. This measure is relatively flexible, as it gives us a continuous picture of the variations in the correlation on different frequencies bands (see Croux, Forni and Reichlin, 2001). Box 3 provides a summary of the technical details.

Box 3

Dynamic correlations

Let us take a stationary bivariate process $(x_t, y_t)'$. The traditional concept of correlation is a static measure of the linear relation between x_t and y_t . By contrast, the dynamic correlation between x_t and y_t , denoted $\rho_{xy}(\omega)$, makes it possible to decompose the correlation between these series in the frequency domain. In particular, it allows us to quantify the amount of the correlation between x_t and y_t that is due to the movements observed at frequency ω . Let $S(\omega)$ denote the spectral density of $(x_t, y_t)'$ at frequency ω :

$$S(\omega) = \begin{pmatrix} S_x(\omega) & S_{xy}(\omega) \\ S_{yx}(\omega) & S_y(\omega) \end{pmatrix}, \quad \omega \in [-\pi, \pi]$$

where the cross spectrum $S_{xy}(\omega)$ is a complex number, such that $S_{xy}(\omega) = S_{yx}(\omega)'$ (with the sign " ' " denoting the transpose-conjugate operation). The dynamic correlation $\rho_{xy}(\omega)$ associated with $(x_t, y_t)'$ is defined by:

$$\rho_{xy}(\omega) = \frac{C_{xy}(\omega)}{\sqrt{S_x(\omega) S_y(\omega)}}, \quad \omega \in [0, \pi[$$

where $C_{xy}(\omega)$ is the real part of $S_{xy}(\omega)$. Thus, this statistic is nothing more than the correlation coefficient between real waves at frequency ω appearing in the spectral decomposition of $(x_t, y_t)'$.

To estimate $\rho_{xy}(\omega)$ we first calculate $S(\omega)$ using the relation:

$$S(\omega) = \sum_{k=-\infty}^{k=+\infty} \Gamma_k e^{-i\omega k}, \quad \omega \in [-\pi, \pi]$$

where $\Gamma_k = E z_t z_{t-k}'$ is the autocovariance at order k of $(x_t, y_t)'$. In practice, the Γ_k are not known. We use a VAR model, previously estimated on $(x_t, y_t)'$ and derive from it analytically the Fourier transform needed for the calculation of $S(\omega)$. The confidence intervals relating to the dynamic correlations are simply calculated from the sampling uncertainty associated with the VAR model.

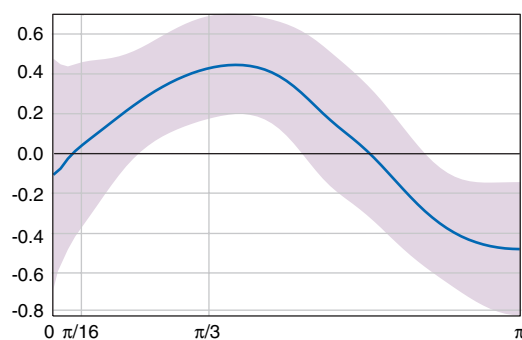
¹⁰ To complete this study, we also carried out tests on the cyclical components of the real interest rate and the productivity growth rate. The calculation of the correlations between these two variables produced a weakly significant relation in the United States and a negative contemporaneous relation for the euro area. The causality tests did not allow us to corroborate these relations. It appeared difficult to draw any conclusions from these exercises. Moreover, like Estrella (2003), we also studied the links between the cyclical components of the nominal short-term interest rate and the productivity growth rate. In this case, we obtained a negative relation for the two areas. In the interests of consistency, we favoured the analysis of real variables.

¹¹ It can be shown that under some circumstances, a statistical series can be split into an infinite number of components, each of which appears at a specific frequency. It is customary to refer to these components as movements (for example, short-term movements, seasonal movements, etc.).

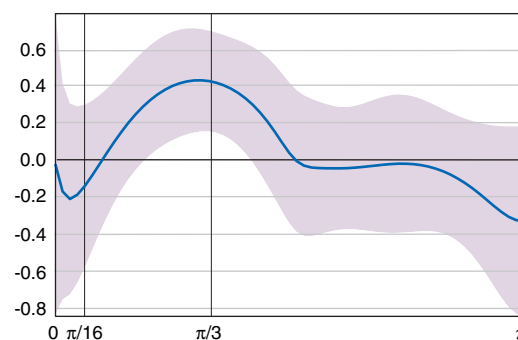
2|2 Results

Charts 6 (United States) and 7 (Euro area) Dynamic correlation between productivity growth and stock returns

United States



Euro area



The empirical results are set out in Charts 6 and 7. The shaded area indicates the confidence interval at 95%.¹² The frequencies indicated on the x-axis demarcate the business cycle, between $\pi/16$ (thirty two quarters) and $\pi/3$ (six quarters), the long-term (low frequencies), between 0 and $\pi/16$, and the residual, from $\pi/3$ to π .

In the United States, the dynamic correlation between the apparent labour productivity growth rate and stock returns (see Chart 6) is statistically non-significant at low frequencies, *i.e.* for movements of periods greater than eight years (thirty two quarters). On the other hand, it becomes statistically positive at business cycle frequencies, thus corroborating the results in the foregoing section.

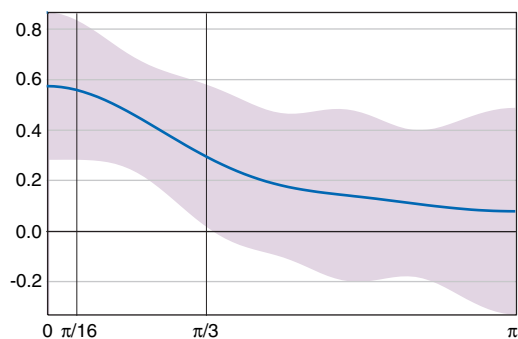
Regarding the highest frequencies, corresponding to “noise”, the chart shows significant negative correlation between the productivity growth rate and stock returns. Apart from the fact that, by definition, noise is hard to interpret, this observation illustrates the difficulty of obtaining a clear reading of the overall relation between these two undecomposed variables.

In the euro area, the dynamic correlation between the apparent labour productivity growth rate and

stock returns (see Chart 7) is close to that obtained for the United States: it is statistically positive at business cycle frequencies, but not different from zero at other frequencies. Once again, this result supports our previous conclusions.

Lastly, Chart 8 confirms the relation at business cycle frequencies between stock returns in the United States and the euro area. The dynamic correlation between these variables is positive and statistically significant between $\pi/16$ and $\pi/3$. It is interesting to note that it remains significant at low frequencies.

Chart 8 Dynamic correlation between stock returns in the United States and the euro area



¹² This is calculated, as is customary, using a vector autoregressive model first applied to the data.

The analysis that we have set forth highlights that an increase in the stock return rate is positively correlated with current and future increases in the productivity growth rate at business cycle frequencies. Our result is robust given that two complementary methods corroborate it. This pattern appears to suggest that the cyclical component of stock prices is in phase with that of productivity.

Accordingly, a sharp fall in stock prices may precede a marked decline in productivity and, all other things being equal, in profits. This fall could then be interpreted as a normal, even desirable, adjustment mechanism for asset prices. Similarly, a sharp rise in stock prices should not automatically be interpreted as the emergence of a future bubble given that such a rise appears to foreshadow an increase in productivity and therefore in profits.

It would, of course, be interesting to analyse these results using a more structural model (based on microeconomic behaviour) in order to corroborate or invalidate this hypothesis. But that would involve making use of tools that go beyond the purview of this study.

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APPENDIX

Table 2a
Correlations with *per capita* productivity

	<i>k</i>	United States	
		(1)	(2)
		Raw data	Filtered data
period 1973(1)–2002(4)			
<i>Corr</i> [<i>a</i> (<i>t</i>), <i>r</i> (<i>t</i> + <i>k</i>)]	-2	0.13	0.48 (*)
	-1	0.26 (*)	0.64 (*)
	0	0.20	0.56 (*)
	1	0.15	0.30 (*)
	2	-0.18	-0.01
period 1973(1)–1985(4)			
<i>Corr</i> [<i>a</i> (<i>t</i>), <i>r</i> (<i>t</i> + <i>k</i>)]	-2	0.28	0.52 (*)
	-1	0.38 (*)	0.72 (*)
	0	0.33 (*)	0.67 (*)
	1	0.23	0.38 (*)
	2	-0.16	0.01
period 1986(1)–2002(4)			
<i>Corr</i> [<i>a</i> (<i>t</i>), <i>r</i> (<i>t</i> + <i>k</i>)]	-2	-0.07	0.37 (*)
	-1	0.06	0.42 (*)
	0	-0.01	0.31
	1	0.01	0.10
	2	-0.27	-0.07

Note: A star indicates a significant coefficient at the 5% threshold. *a*(*t*) denotes the labour productivity growth rate and *r*(*t*) stock returns. For example, if *k*=1, *Corr*[*a*(*t*),*r*(*t*+*k*)] denotes the correlation between *a*(*t*) and *r*(*t*+1). See Box 2. The filtered data correspond to the cyclical components of the variables under review.

Corporate equity and financial stability: An approach based on net worth at risk

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This article is based on a study conducted jointly by the Deutsche Bundesbank, the Banco d'España, the Centrale dei Bilanci (Italy) and the Banque de France under the aegis of the European Committee of Central Balance Sheet Offices.¹ It looks at companies' resilience in the event of an exceptional cyclical shock.

The article starts by outlining the economic role of equity capital, which lies at the heart of the relationship between risk and return. It can be examined from two main angles, either as a financing instrument or as a buffer in the event of a shock.

This study focuses on this second function, looking at it from a meso-economic perspective for which the use of central balance sheet offices is particularly well suited. It sets out to describe the implications of a crisis situation in terms of minimum capital requirements. A comparison is drawn between the situation of manufacturing sector companies in the four countries under review over the period 1987-2002 by means of several traditional indicators (income, equity capital), which resulted in the computation of a Net Worth at Risk (NWAR) indicator. The NWaR figures are calibrated on the basis of an analysis of the distribution of accounting losses (in particular at the 90th and 95th percentiles) calculated using company samples. They indicate the minimum capital that would be required in order to absorb any losses in the event of very unfavourable economic conditions.

The difference between NWaR and the observed level of equity capital gives us an indication of the number of companies for which the default rate is likely to increase significantly in a crisis situation. The proportion of companies that appear fragile in the event of a severe economic downturn is around 40%, as against 20% in a "normal" situation. However, this statistical analysis needs to be put into perspective. In practice, only a minority of companies default, since the majority of them benefit from protective measures implemented by their shareholders, managers and creditors to enable them to weather the downturn and revive their activity.

In spite of the limitations of this indicator (which are also discussed in the study), these findings will draw the attention of bank and company managers to the need to make financial projections and credit risk assessments both in normal business conditions and crisis situations.

An approach based on net worth at risk sheds light on the determinants of a sound financing structure and encourages the development of an active approach to preventing corporate financing problems.

¹ The authors would like to thank the members of the working group and in particular Michel Delbreil (Banque de France, Chairman of the working group), Ana Esteban (Banco de España), Franco Varetto, Vincenzo Favale (Centrale dei Bilanci, Italie), Dominik Elgg, Timm Körting (Deutsche Bundesbank). However, only the authors are accountable for the presentations of the findings and the analyses developed in this article. The complete report of the working group, including the tables of sectoral findings, can be downloaded from the Banque de France website at the address given in the bibliography of this article.

1 | THE ECONOMIC ROLE OF EQUITY CAPITAL

The question of the desirable level of equity capital arises when one starts to look at ways of measuring credit risk and choosing the best financing structure. It should be considered both from the perspective of individual companies and from a meso-economic perspective based on a large sample of companies. As regards the question of the optimal financing of the economy, if one were to interpret the Modigliani-Miller theorem literally, one might be inclined to attach less importance to equity capital and instead to emphasise other indicators: cash flows, leverage effect, ability to repay debts, etc. By demonstrating that, under certain conditions (such as perfect competition, making abstraction of the tax-related bias), a company's value is unrelated to its financing structure, Modigliani and Miller laid the foundations of corporate financing approaches based on flow dynamics. These approaches completed the assets and liabilities approach which had been predominant up until then and still continues to influence the traditional banking approach to credit risk.

This viewpoint is of particular interest to economists concerned with the relationship between equity capital and economic growth. For example, the report co-sponsored by the World Bank "Doing Business in 2005 – Removing obstacles to growth" looks at entrepreneurship in affiliated countries. This report highlights the links that may exist between institutional characteristics² and the growth rate of a country. Some of these relationships suggest that, if minimum capital requirements are initially too high, they are likely to hinder business creation. Others stress the importance of measures designed to protect "risk takers" (mainly creditors and capital investors) because these measures also play a role in making an economy more dynamic.

In order to find a satisfactory answer to questions which seem to lead to contradictory recommendations, it appears relevant to combine two dimensions: risk and return.

Tying in risk with return enables us to look at the two functions of equity capital (*i.e.* protective buffer and source of financing) under the same angle. This immediately sheds light on the economic function of equity capital, as compared to other sources of financing, in particular in terms of preserving financial stability, the key focus of this article.

Significant advances were made by Knight (1921),³ who introduced a breakdown of risk into two categories, "measurable" and "unmeasurable" risk, and identified the different economic behavioural patterns associated with each category. The measurable risk is defined as risk proper or "determinate uncertainty". This uncertainty can be covered, for example by setting aside provisions which reduce the amount of profits paid to the entrepreneur-shareholder. The unmeasurable risk or "indeterminate uncertainty" represents the true risk taken by the entrepreneur that enables him to generate a profit. Corporate equity embodies this type of risk. The greater the true risk, the higher the profit potential. Knight goes one step further by pointing out that a large amount of equity capital should in principle reflect a high level of indeterminate uncertainty. In his book, he also touches on the issue of the relationship between the company and its creditors by showing that, in an uncertain environment, a company will find it particularly difficult to inspire confidence on the part of its creditors if it has a small amount of equity capital.

The relationship between uncertainty and financing structure developed by Knight was taken a step further by Myers and Majluf (1996). They put forward an analytical framework explaining in what circumstances company managers suggest to their shareholders that the company be financed preferably by a capital increase. They make the assumption that managers are always better informed than shareholders about the company's future prospects. When managers are optimistic about the company's prospects, they tend to favour debt security issuance because they are aware of equity prices' potential to appreciate. In their opinion, shares are currently undervalued and it is therefore not in the interest

² This report mainly sets out to establish a relationship between regulations and economic performance. The role of equity capital is not its main focus. However, the authors do take an interest in this issue insofar as they take a look at the obstacles to business creation and development.

³ Knight does not view his work as the introduction of a new theory but rather as the structured and clarified presentation of previous concepts. He refers to the work of various German economists relative to profit analysis and the firm, as well as work by Jean-Baptiste Say and Courcelle-Seneuil, the latter having studied the relationship between profit and risk.

of the company to finance itself at an undervalued issue price. Conversely, when managers are pessimistic about the company's prospects, they are likely to issue new shares as they would raise equity capital with a significant premium. From this standpoint, the level of equity capital is seen as relative and largely linked to the degree of uncertainty or expected "risk". Furthermore, the existence of risk, which is the counterpart of a profit maximisation strategy, justifies the existence of a minimum amount of equity capital.

2 | DIFFERENCES IN EQUITY RATIOS ACROSS COUNTRIES

The theoretical framework used to explain the role of equity capital could suggest that every company is subject to a universal law. In a context of financial market globalisation driven by a global economic integration process, itself principally spurred by companies, one would expect the relative level of equity capital across countries to be somewhat similar.

However, even in a highly integrated economic area like the European Union, this does not appear to be the case.

This article looks at companies in the following four countries: Germany, Spain, France and Italy (see Appendix 1 for a presentation of the databases used). As shown in Chart 1, equity ratios⁴ differ substantially from one country to another.

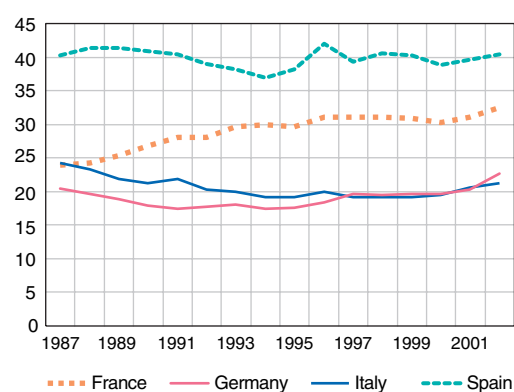
Spanish firms have the highest equity ratio; the median of the ratio of equity capital to total assets was close to 40% from 1987 to 2002. Conversely, Italian and German companies appear less capitalised, with an equity ratio of around 20%. The situation of French firms improved significantly over this

same period. In 1987, their equity ratio was close to that of Italian and German firms. In 2002, the median of the ratio of equity capital to total assets stood at roughly 30%, *i.e.* in an intermediate position. The same observations can be made when analysing overall distributions.⁵

In addition to the risk-return relationship on which economic literature tends to focus, specific equity capital differentiation factors also need to be taken into account in order to understand these differences. It is essential to identify these factors to correctly interpret the equity ratios, both for the purpose of individual company assessments and meso-economic analyses of financing structures.

The statistical observations do not appear to be related to the sectoral composition of the four national samples, because an analysis of the results by economic sector leads to the same conclusions. On the other hand, other structural factors such as company size, bank-firm relationships and the national legislations on collective proceedings introduce a number of differences and should therefore be given full attention.

Chart 1
Median of the equity ratio
(ratio equity capital/total assets)
Manufacturing sector –(NACE: D)
(%)



⁴ The indicator used is the ratio of equity capital to total assets. This enables us to offset the distortions linked to company size. It is also a more suitable indicator for conducting analyses of distributions and thus making cross-country comparisons.

⁵ Detailed statistics are presented in the report of the working group, which can be downloaded from the Banque de France website.

2|1 Size effect

A number of findings emerged from the analysis of the sub-sample of large companies (defined as companies with a turnover of more than EUR 50 million). The equity ratio of Italian firms was very stable over the period under review, while that of Spanish firms showed pronounced fluctuations in line with business cycle movements. In France, this ratio improved. It posted a significant rise up until 1994, then declined, but remained higher than in 1987. This swing could be due to the share buyback policy adopted by certain firms to raise their return on equity. At the end of the period under review, the equity ratio of large French firms was close to that of their Italian and German counterparts.

A comparison of the equity ratios of large firms with those of SMEs also brings to light a number of national differences. In Germany, and to a lesser extent in Spain, large companies are better capitalised than smaller ones. Conversely, in Italy, the disparities are less pronounced. In France, the equity ratio of large companies was higher than that of small ones during the first half of the period, but in 2002, they were practically identical as the equity ratio of the largest firms had started to decline at the end of the 1990s.

2|2 Institutional factors

According to Delbreil *et al.* (1997), the differences in equity ratios are largely attributable to structural factors.

First, the degree of legal protection of creditors differs from one country to the next. In Germany, for example, the law is very protective of creditors: they benefit from a preferential right to payment in the event of the company's bankruptcy. Similarly, in Italy, the law gives priority to secured creditors. Conversely, in France and Spain, commercial courts tend to give priority to salvaging companies rather than protecting the interests of secured creditors, in line with the objectives of the law on collective proceedings.⁶ This factor can –at least partly– explain the lower degree of capitalisation of German and Italian firms. Indeed, thanks to the protection from

which they benefit, creditors are less risk averse –which implies lower minimum capital requirements– than in Spain and France. This analysis is consistent with the work of Rajan and Zingales (1995) and La Porta *et alii* (1996).

Taxation and pension schemes can also explain differences in equity ratios. In Germany, pension provisions are very high and were for a long time considered as a substitute for equity, while in France –under the accounting framework prevailing during the period under review– pension payments are recorded as charges in the profit and loss account and not as a future liability to be recorded in the balance sheet. The same holds true in Italy and Spain.

2|3 Access to sources of financing: Bank-company relationships, group effect

Differences in equity ratios may be linked to the role played by the banking system. In this respect, the so-called *Hausbank* relationship which exists between German banks and their clients (especially SMEs) may explain the relatively low level of equity capital of German firms. In this system, banks and companies maintain a long-term and often exclusive relationship, such that the *Hausbank* is almost viewed as a partner involved in the smooth running of the company and not just as a mere fund provider. This structure contributes to reducing the information asymmetries that exist in a more traditional banking relationship and thus the amount of discrimination. The studies conducted by Elsas and Krahnert (1998) and Harhoff and Körting (1998) show that this practice contributes to an efficient allocation of bank financing and could partly explain why German companies are less inclined to seek alternative sources of financing, such as equity financing. The situation of Italian firms is diametrically opposed to that of German firms, but the results are the same. Traditionally, Italian firms have close ties with several banks and use multiple credit lines. Banks lower their risk by spreading their credit portfolio rather than properly assessing the creditworthiness of each company. Consequently,

⁶ In France, the law on collective proceedings has just been substantially amended (*Loi sur la sauvegarde des entreprises*). One of the objectives of the law is to better protect creditors to encourage them to get more involved in ensuring the success of the conciliation and salvaging procedures. In view of these developments, the assessment made for the past 10 years could be altered over the medium-term.

just like in Germany, Italian firms tend to have less recourse to equity financing because bank credit is relatively accessible.

Furthermore, in Germany alternative sources of financing play an important role. Thus, intra-group loans⁷ or loans from associated companies and pension provisions add to equity capital, raising the amount of stable resources.

Even though it is possible to provide a number of explanations for the differences in equity ratios, the fact remains that the relationship between the way in which the economy is financed and the level of equity capital is complex.

The analyses conducted by Rajan and Zingales (1995), La Porta *et alii* (1996) and those by the European Committee of Central Balance Sheet Offices (1997, 2000) show that the countries where intermediated financing is predominant are not necessarily those where companies appear the most indebted. Conversely, countries with highly developed financial markets are not always those where companies' equity ratio is the highest. They also show that a higher corporate debt ratio is not necessarily associated with a more dynamic economic growth rate.

According to the above-mentioned studies, the analysis of the growth patterns of the UK and German economies lends support to this viewpoint. German and UK firms post similar equity ratios, whereas the levels of bank intermediation and economic growth rates differ.

2|4 Differences in economic growth rates

In theory, there should not exist any medium to long term relationship between economic growth and companies' equity ratios. Even though buoyant economic growth gives rise to higher profits, it also encourages the arrival of new companies –startups, foreign investors– which spurs competition and increases the pressure on profits. The number of companies grows –and thus the overall amount

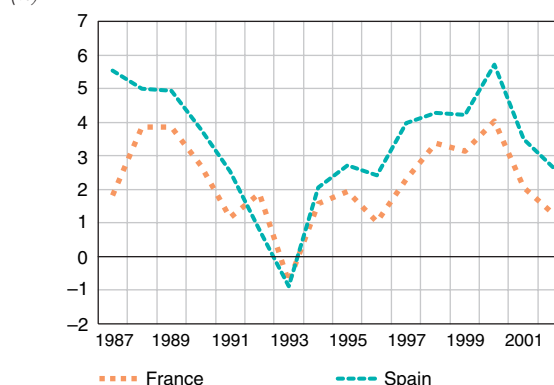
of equity capital– but not the equity ratio of each individual company. However, when sectoral growth does not result in the arrival of new entrants, the relative level of profits and equity capital may increase for a short period, if the profits are not entirely distributed. Indeed, companies already present in that sector benefit from an economic rent stemming from “barriers to entry”.

The trend in the equity ratio of Spanish manufacturing firms, compared with that in other countries reflects the above-mentioned relationship. Although Spain posted a higher growth rate than its European counterparts over the period under review (see Chart 2), the equity ratio did not increase (true, in level terms, it is the highest of the four samples). However, the economic recovery of 1994-1995 enabled Spanish firms to rapidly build up their equity capital again, following the recession of 1992-1993.

The comparative results obtained from the databases used in this study appear to be consistent with the conclusions of the theories underlying the differences in equity ratios and with other empirical studies on the subject. In particular, it seems important to stress the role played by institutional and legal factors. The differences in economic growth rates should also be taken into consideration.

The analysis of the economic role of equity capital contains two ideas: on the one hand, equity capital represents a source of corporate financing that

Chart 2
Annual growth of GDP (%)



⁷ In a consolidated approach, intra-group loans correspond to reciprocal transactions and are not included in the balance sheet presentation. This study is based on individual company accounts. Furthermore, a large number of holding companies are not part of the manufacturing sector and are not incorporated into the sample. This is why group financing is considered as external financing.

must be properly balanced with respect to debt financing, the other source of corporate financing; on the other, equity capital represents a guarantee for creditors because it is intended to absorb losses and shield creditors in the event of a shock affecting the company. In this respect, it can be viewed as a financial factor that contributes to ensuring long-term growth.

This last role of equity capital, which can be described as “financial stabiliser”, is particularly significant in a context where credit institutions are required to set up internal credit risk rating systems as part of the implementation of the Basel II Accord. Credit institutions are encouraged to test the information at their disposal from the point of view of its risk prediction capacity. In this respect, they are led to re-examine the role of equity capital as an indicator to be used for individual company assessments, in the light of the recent developments regarding accounting standards, the institutional context and companies’ financing habits.

In addition to modelling credit risk at the individual firm level, one should also look at the question of the optimal level of equity capital from a macroeconomic perspective. Although the stabilising role of equity capital has clearly been established by financial theory, it has not yet been properly quantified. This is why the “net worth at risk” indicator –described in the following section– was developed.

3| COMPUTING “NET WORTH AT RISK”

In order to compute the net worth at risk indicator, shortened to NWaR (Section 3|1), we first need to calculate the distribution of annual income of manufacturing firms in the four economies (Section 3|2), then that of the estimated losses over a two-year period (Section 3|3). These losses are used as a basis for calculating NWaR figures (Section 3|4). The difference between NWaR and equity capital gives us an indication of the proportion of companies whose equity capital alone would not be sufficient to absorb losses in the event of a situation of stress (see Part 4), *i.e.* the largest losses incurred by the worst performing firms (90th and 95th centiles) and over the

worst two years (conditional NWaR) or on average over the period 1987-2002 (unconditional NWaR).

3|1 The concept of net worth at risk

There are essentially two ways of measuring the resilience of a group of companies to an activity shock. The first approach consists in modelling the impact of an exogenous shock (such as a sudden increase in commodity prices, a fall in demand, an exchange rate shock requiring a sharp adjustment of profit margins or a supply shock on the labour market) on companies’ operating flows and profit and loss account. This approach requires making a number of assumptions on the elasticity of the different intermediate operating balances to such shocks and raises a few practical implementation difficulties, which are likely to affect the robustness of the results.⁸

The second approach –which we chose to adopt– focuses on equity capital and emphasises its role as buffer for losses. The NWaR indicator is derived from the accounting aggregate of net equity. A distinction can then be made between “conditional” and “unconditional” NWaR.

Net equity is defined using the reference variables of the BACH database (Appendix):

- + Subscribed capital
- + Share issue, corporate merger and split premiums
- + Revaluation reserves
- + Other reserves
- + Net profit or loss for the financial year
- + Special tax-based reserves
- Uncalled or unpaid subscribed capital
- Intangible fixed assets

We use the common definition of net equity, as it is obtained by deducting the “deferred charges” recorded under assets (and listed above) from the amount of equity capital. However, in the rest of the article, we refer to “equity capital” for simplicity’s sake. Computing NWaR amounts to estimating equity ratios

⁸ The Banque de France has, however, developed an individual assessment tool to conduct simulations according to different scenarios. This expert system for financial analysis is part of a package available to SMEs that wish to test the financial consistency of their projects or their resistance in certain business conditions.

on the basis of the losses to be covered. It corresponds to the minimum equity capital, as a percentage of total assets, that a company would need to weather a two-year recession if it were to incur the same amount of losses as that incurred by the worst performing firms following the shock. It is assumed that any company is likely to be among the 5% or 10% of the worst-hit companies. Box 1 describes the methodology used to compute this indicator and identify the recession

years. NwAr then represents the potential losses that a company might incur, with a given probability of occurrence, and not the losses that a company would incur in the event of recession. When compared to total assets, NwAr can be viewed as a measure of the equity ratio that a company would need in order to develop its activity in a given sector. The riskier the sector, the greater the NwAr must be for the company to withstand the sectoral fluctuations.

Box 1

Methodology for calculating net worth at risk (NwAr)

1| Databases used (see Appendix)

This study focuses on manufacturing sector companies with a turnover of over EUR 5 million; it does not include sole traders and partnerships. This gives us homogeneous and representative samples of companies for the four countries under review. This study covers the manufacturing sector for two reasons. First, the databases used have a high coverage rate. Second, given that the manufacturing sector has always played a structuring role in the economic cycle, it seems particularly appropriate to study it in view of the purpose of this paper. The sample is not stable, i.e. the population of companies varies each year, according to arrivals (new companies or those whose turnover exceeds EUR 5 million for the first time) and departures (mergers and acquisitions, defaults, other events). This enables us to have large samples over a long period.

2| Net worth at risk (NwAr)

The computation of NwAr is based on the calculation of losses to be covered. Three accounting variables are used: total assets, net equity and net income, the choice of which is explained in Appendix 1. The period under review is 1987-2002, which enables us to capture a variety of business cycle configurations in the countries under review. In order to establish a distribution of the cumulative results over a two-year period, we calculated two-year corporate profits and losses, for each company and each sector.

The statistical distributions of these 15 two-year periods enabled us to identify the 90th and 95th percentile values of net losses (i.e. the ratio between net accounting losses and total assets).

The NwAr figures correspond to the average values of the two-year losses (90th and 95th percentile) over a given period. The 85th and 99th percentile values were also calculated. The 85th percentile does not provide more information than the 90th percentile, while the 99th percentile yields partly unrealistic results due to the existence of extreme values, and in particular in the case of a segmentation by size or sector, it does not include a sufficient number of observations to be properly interpreted.

It is worthwhile comparing the significance of the percentiles in this study with that of the quantiles that credit institutions use to model risk according to the Basel II recommendations. Under Basel II, the 99.9th quantile represents the boundary between losses to be covered and losses which, with a 0.1% probability of occurrence, correspond to the indeterminate uncertainty. The 95th percentile in this study represents the amount of equity capital necessary to cover the losses of 95% of companies. This threshold might appear less strict than that for credit institutions. However, it is calculated on the basis of the losses incurred by the 5% of companies showing the highest level of debt and then applied to all companies, some of which are in reality hardly likely to incur losses thanks to their specific competitive position. It is therefore a very cautious approach.

3| Definition of recession periods

Underlying our definition of recession periods is a specific multicriteria approach applied homogeneously to all four countries. In view of the objectives of the study, the definition generally used by the National Bureau of Economic Research (NBER), based on the analysis of quarterly GDP statistics, did not seem totally appropriate. Indeed, the focus of this study is on the manufacturing sector and its sub-sectors and our objective was therefore to identify the recession periods specific to these sectors. Furthermore, given the nature of the test (stress test), it was decided to consider a more violent shock than that resulting from a macroeconomic recession as defined by the NBER, i.e. a period of two consecutive years, in order

to clearly establish a relationship between the macroeconomic context and corporate performance on the one hand, and between equity capital and losses on the other. We thus used a definition based on the accounts of the companies under review. The following three criteria were taken into consideration: the 90th percentile of the distribution of net losses, the annual change of value added derived from corporate balance sheet data, the annual change of value added derived from the national accounts. A year was considered as recessionary if it was highlighted by at least two indicators; the periods of two consecutive recessionary years were then identified. This procedure resulted in the years 1992-1993 being identified as a recession period for all four countries. For some sub-sectors, other two-year periods were brought to light and used in a sectoral analysis (not covered in this article).

4| Conditional and non-conditional NWR

Two NWR values were calculated for the identified recession period (1992-1993). They correspond to the 90th and 95th percentiles of the distribution of net losses over the two-year period. They are deemed conditional, because their value depends on the occurrence of a recession, as defined above.

Two other NWR values were calculated. They correspond to the average of net losses over the 1987-2002 period, for the same percentiles as above. They are deemed unconditional because they are based on an entire economic cycle.

5 | Differences between Value at Risk and Net Worth at Risk

Value at Risk corresponds to the maximum portfolio losses that an economic agent can incur over a specific period of time with a given confidence level. VaR is calculated on the basis of market prices, which are made available at frequent intervals (in general, daily). VaR depends on the period chosen. Its robustness depends on the extent to which market prices during the period under review are assumed to be representative of potential future developments. It also relies on other assumptions, such as the probability distribution, stationarity, market liquidity, etc. VaR gives the value of economic capital necessary to cover unexpected losses and can be used to differentiate between expected losses (covered by provisions, etc.) and unexpected losses.

By contrast, the computation of NWR is based on corporate accounting data, in accordance with the historical cost convention. This convention provides an imperfect proxy for market prices (when these are available). The statistical distribution of losses is directly derived from the observation of historical series and the distinction between expected losses and unexpected losses is not applicable in this context.

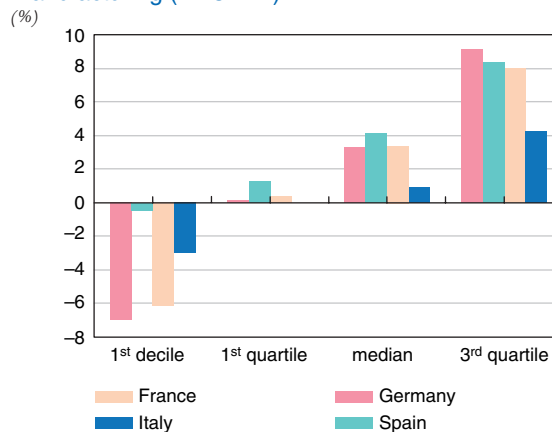
3|2 Distribution of annual income

The distribution of the net income/total assets ratio for manufacturing sector companies differs substantially from one country to the next. Chart 3 shows the first decile and the three quartiles of this distribution in 2002, the last year in the period under review.

According to the net income/total assets ratio, Italian firms are less profitable than their foreign counterparts: for 50% of firms, net income accounts for less than 1% of total assets. Spanish, French and German firms appear more profitable. In the last quartile, German firms show particularly high net income/total assets ratios (over 9.1%).

The picture changes if one looks at the first decile of the distribution, which is made up of the worst performing companies and where negative values mean that companies are incurring losses. In the first

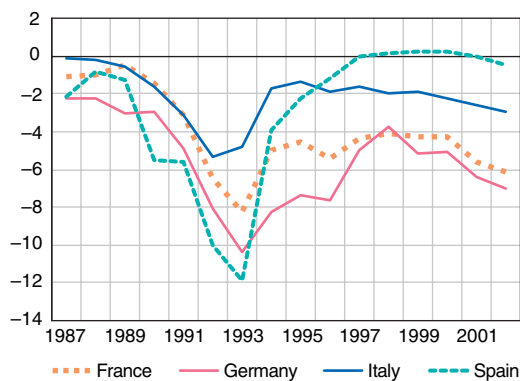
Chart 3a
Distribution of the net income/total assets ratio in 2002
Manufacturing (NACE: D)



decile, Spanish companies display the best results, *i.e.* relatively small losses, while Italian firms show lower losses than their French and German counterparts.⁹

⁹ Explaining the difference between these two country rankings is not easy. On the one hand, as higher risks tend to be remunerated by larger profits, the ranking could reflect a ranking of the level of credit risk in the four countries during the period under review. This argument could partly explain the case of German firms. However, it does not account for all situations: Spanish firms for example are highly profitable without incurring significant losses. Other factors, such as institutional, accounting and tax-related factors, should also probably be taken into account.

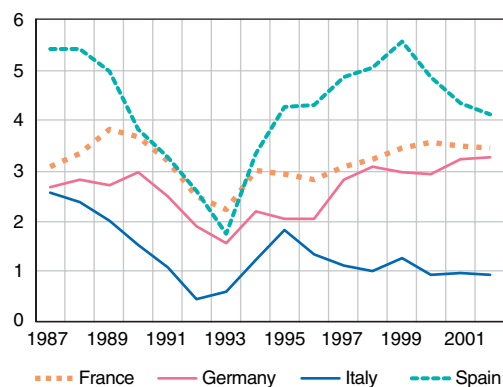
Chart 3b
1st decile of the distribution
of net income/total assets (1987-2002)



One should nevertheless not draw hasty conclusions as to the ranking of countries. Indeed, the indicator used is based on net income, which depends on the type of accounting convention applied and possibly on companies' tax optimisation behaviour.

On the other hand, the differences in performance across countries seem to reflect contrasting economic conditions. In the Italian manufacturing sector, for example, the dispersion of results is less wide than in other countries, in particular France and Germany. An analysis of net income in the 1st decile and the median over the whole period also brings to light the somewhat unique situation of Italian firms. Italy's specific policy mix in the

Chart 3c
Median of the distribution
of net income/total assets (1987-2002)



early 1990s, consisting of a depreciation in the lira and an accommodating fiscal policy might have enabled the least profitable companies to remain in activity, without necessarily raising the profitability of the entire Italian manufacturing sector.

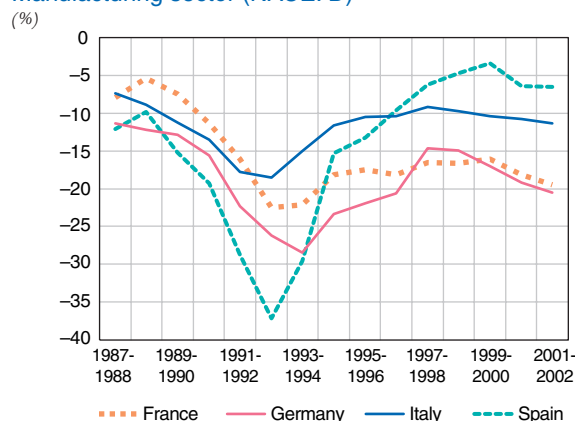
3|3 90th and 95th percentiles of the two-year losses distribution

In the rest of the study, we clarify and deepen the assessments made in the previous section by examining the 90th and 95th percentiles of the net losses/total assets ratio, which correspond to the first decile (or 10th percentile) and 5th percentile of the net income distribution (Chart 4). These percentiles are made up of companies incurring net losses. The following observations can be made regarding the changes in these percentiles over the entire period under review.

First, all four countries show very large losses in 1992-1993. These two years are therefore identified as a recession period, according to the procedure described in Box 1.

Generally speaking, the 95th percentile yields the same results as the 90th percentile in terms of the ranking of countries according to the net losses/total assets ratio in the manufacturing sector.

Chart 4
95th percentile of the two-year losses distribution
Manufacturing sector (NACE: D)



The losses incurred by Spanish firms in the 95th percentile are significantly higher during the recession period (accounting for 35% of total assets) than those recorded as from the mid-1990s (just over 5%).¹⁰ This can be attributed to the progressive convergence of Spain's macroeconomic indicators towards those of its European counterparts. At the start of the 1990s, Spain posted high inflation and Spanish interest rates were well above those in Germany and France. Interest payments represented a heavy burden on indebted firms, thus hindering their performance even further. Since the mid-1990s, the catching-up process of the Spanish economy and the convergence of interest rates prior to Spain's adoption of the euro led to a narrowing of the gap in financing costs between the European economies under review. Benito *et al.* (2004) have given empirical evidence of the positive effect of convergence in interest rates on the profitability of Spanish firms.¹¹

The 95th percentile also highlights the particularity of Italian manufacturing firms, as pointed out in section 3.2: Italian firms incurred lower losses during the 1992-1993 recession than their French and German counterparts. Since the mid-1990s, the 95th percentile of two-year losses for French and German firms has followed a similar pattern. However, the recession weighed more heavily on German firms, weakened by reunification.

To sum up, as shown in Chart 4, the amplitude of the economic cycle and the strength of previous recessions are shown to have a significant impact on companies' financial situation.

3|4 Conditional and unconditional NwAR

The 90th and 95th percentiles of two-year losses determine two values of NwAR. Conditional NwAR represents the net losses that a company may have to absorb during a two-year recession period if this company were to incur the same amount of losses as that incurred by the worst performing companies in the past. This two-year recession represents a worst-case scenario in the light of the events recorded

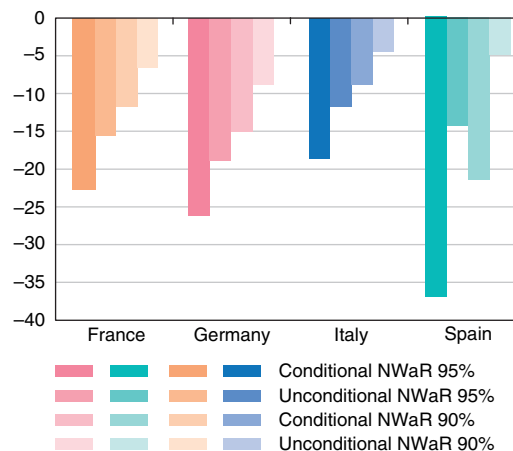
over the 15 years under review. Of course, it is not necessarily predictive of what may happen in the future. It nevertheless gives us an indication of the "cushion" of equity capital that would be needed to absorb the losses that a company may incur during a severe crisis in the event that it should not have taken any protective measures.

As shown in Chart 4, the years 1992-1993 have been identified as a recession period for all four countries under review. It should be recalled that this study sets out to examine companies' resilience to a severe recession, irrespective of the nature of the recession, on the understanding that the combination of factors that brought about the 1992-1993 recession cannot occur twice (see Box 1 and section 3|5 below).

Chart 5 shows both the conditional NwAR values (computed on the basis of the 90th and 95th percentiles for the years 1992-1993) and the unconditional NwAR values, which correspond to the respective averages of the 90th and 95th percentiles over the 1987-2002 period.

Spanish firms post the highest conditional NwAR values, both in the 95th percentile and the 90th percentile. This finding is in line with the fact that the income of Spanish manufacturing firms is highly cyclical (see Chart 3). German firms rank second: the 5% most vulnerable firms post NwAR values of

Chart 5
Net worth at risk (NwAR)
Manufacturing sector (NACE: D)
(%)



¹⁰ Over this same period, the 90th percentile of the distribution is positive, reflecting the fact that less than 10% of Spanish companies incur losses.

¹¹ Another explanation could be the fact that, following the substantial losses incurred in 1992-1993, a large number of Spanish firms either went bankrupt or were restructured. The general restructuring drive that followed was then reflected in the profitability distribution.

over 26.2% during a crisis period. For France and Italy, these figures are 22.5% and 18.5% respectively.

The ranking of countries is different if one looks at the unconditional NWAR. German manufacturing firms show the highest unconditional NWAR values, followed by French and Spanish firms. Italian firms continue to perform relatively well, recording the lowest unconditional NWAR values.

This change in the ranking of countries highlights the different information content of the conditional and unconditional NWAR. The conditional NWAR gives an indication of the amount of equity capital that relatively fragile companies need to weather a recession. The unconditional NWAR provides a measure of the amount of equity capital necessary to support relatively fragile companies throughout an economic cycle.

The size of the differential between conditional and unconditional NWAR provides the following information:

- it is an indication of the extent to which companies restructured their balance sheet¹² and improved their performance between the trough of the cycle and the cycle trend, for a given percentile;
- if one considers that this indicator is a proxy for credit risk, the differential between conditional and unconditional NWAR is an indication of the migration of companies between high risk categories and low and average risk categories.

The situation of Spanish firms is particularly noteworthy: the differential between conditional and unconditional NWAR amounts to 22.7 points, pointing to significant restructuring efforts and/or a substantial rise in profitability¹³ after the recession. The differential for German and Italian firms (7.5 points) probably reflects the combination of two phenomena: a less pronounced restructuring process on account of the lesser intensity of the recession and slower growth in productivity gains and profitability. In France (10-point differential), the restructuring drive, which had started in 1992-1993, continued until

1995-1996 as part of the French “competitiveness through disinflation” policy.

3|5 Need for caution in interpreting the results

Caution should be exercised when interpreting the results relative to net worth at risk. First, this is a worst-case scenario approach, reflecting the risk borne by the 5% or 10% worst performing firms. Furthermore, the estimated potential losses obviously depend on the extent of the recession. Thus, the recession in Europe in 1992-1993 hit a group of interdependent economies, each with its own national currency and therefore confronted by foreign exchange crises. For the four countries under review, the monetary context has changed and a recessionary shock in today's new environment would have different consequences. It should also be stressed that each firm is faced with specific factors (dependence on suppliers and clients, flexibility of the production structure, change in competitive pressure, etc.) which have an impact on its performance. It is therefore not possible to use the NWAR concept to estimate the individual default probabilities. NWAR provides information on the risk profile of large sectors or groups of companies, but should not be used for individual assessments.

Bearing this in mind, a comparison of NWAR figures and equity ratios (see section 4|3) in the four economies under review suggests that NWAR could be an explanatory factor underlying the equity ratio. Spanish firms record the largest losses during a recession, both in the 90th and 95th percentiles, as well as high equity ratios. The situation of Italian firms is diametrically opposed to that of Spanish firms, with relatively small losses and low equity ratios. French firms are somewhere in between, showing moderate NWAR and equity ratios. In all of these cases, there appears to be a relationship between the equity ratio and companies' sensitivity to business cycle variations. The more companies are sensitive to these fluctuations, in particular recessions, the larger the cushion of equity capital will have to be.

¹² As the sample is not constant, defaulting companies are excluded from the sample from one year to the next, which automatically alters the value of the percentiles, in particular the highest ones.

¹³ Measured by the amount of losses incurred.

These elements should, however, be set back within a wider context. The fact that NwAR may be viewed as a determinant of the equity ratio does not call into question the relevance of the other factors highlighted above. This is illustrated by the case of German firms, which show both high NwAR and lower equity ratios than the other countries under review.

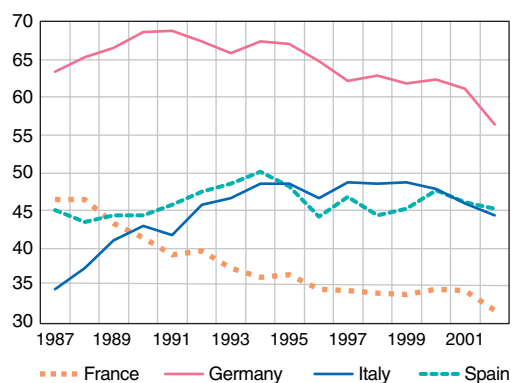
4 | COMPARING NET WORTH AT RISK AND EQUITY CAPITAL

Comparing NwAR figures with equity ratios for a given year is straightforward. By subtracting the NwAR value from the equity ratio for each company we obtain the proportion of companies that don't have sufficient equity capital to weather a two-year recession should they incur the same amount of losses (as a percentage of total assets) as the worst performing companies in the past. Chart 6 shows the proportion of countries with an equity ratio below the NwAR (95th percentile) for the four countries under review. From a meso-economic perspective, this can be viewed as the amount of equity capital covering the losses incurred by 95% of companies *i.e.* a residual risk of 5%.

Of course, these results are obtained on the assumption that all other things are equal. The financial system's reaction to a deterioration in companies' financing structure could have a positive or negative impact on the results, depending on banks' ability to prevent some of their clients from defaulting or the support they provide to their clients in difficult situations. In France, depending on their perception of the relative effectiveness of the various possible approaches (measured in terms of their capacity to minimise the amount of unrecoverable losses), credit institutions may choose either to opt for conciliation or an out-of-court settlement or have recourse to collective proceedings. This choice may also depend on the specific situation of each bank, in terms of liquidity and therefore its ability to bear a more or less significant transformation or illiquidity risk.

The situation of German manufacturing firms differs markedly from that in other European countries. A very large proportion of firms (55%

Chart 6
Proportion of companies with an equity ratio below NwAR (95th percentile)
Manufacturing sector (NACE: D)
(%)



in the 95th percentile in 2002) post an equity ratio below the conditional NwAR. Conversely, since 1990, France has shown the best performance (32% in the 95th percentile in 2002). The decline in the proportion of French manufacturing firms with an equity ratio below NwAR can be attributed to the increase in equity capital during the period under review. In Spain and Italy, the proportion of companies in this situation is similar, *i.e.* close to 45% in 2002. The same results can be obtained with the 90th percentile.

Although these results are generally attributable to both equity capital and potential losses incurred in the event of a recession, in the case of Germany they mainly stem from a lower equity ratio than in the other European countries. In the light of the NwAR values obtained, it seems that German firms could be encouraged to alter their financial management in order to raise their level of equity capital. It should be noted that this assumption concerning the behaviour of German firms is in line with the concerns expressed in other studies (Deutsche Bundesbank, 2003), in particular in the framework of the implementation of Basel II. The slight increase in equity ratios recorded in 2002 could be the first step in this direction.

Despite being relatively high, the equity ratios of a large proportion of Spanish firms are below NwAR, on account of the significant losses incurred during the recession. As regards the unconditional NwAR, Spanish firms show more favourable results. Indeed, the unconditional NwAR is an indicator

which smooths out the amplitude of business cycle fluctuations and only the trend economic growth rate is (indirectly) reflected in its calculation.¹⁴

Italian firms are also in an intermediate position. In this case, however, their situation stems from a combination of a relatively small amount of losses and a low equity ratio.

In terms of their NWR, French firms appear to have the largest resistance capacity to a cyclical shock. This can be attributed both to high equity ratios, which increased throughout the period, and relatively moderate losses during the 1992-1993

recession. As regards the unconditional NWR, the results are less good. In France, the proportion of firms for which the level of equity capital is below average two-year losses over the 1987-2002 period is high compared with that in Spain and Italy (but close to that in Germany). This could mean that poorly capitalised French firms continue to develop their activity for various reasons (bank support, alternative sources of financing, such as intragroup loans and trade credit). But it also points to their vulnerability, in terms of ensuring a proper balance of their sources of financing, to which shareholders and business partners should give their full attention.

Box 2

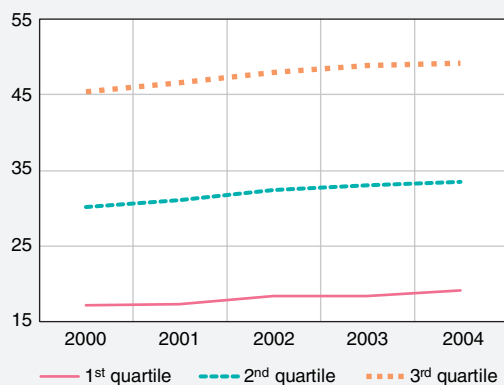
Recent trends recorded by French firms

The trends recorded by French manufacturing firms between 1987 and 2002 continued in 2003 and 2004.

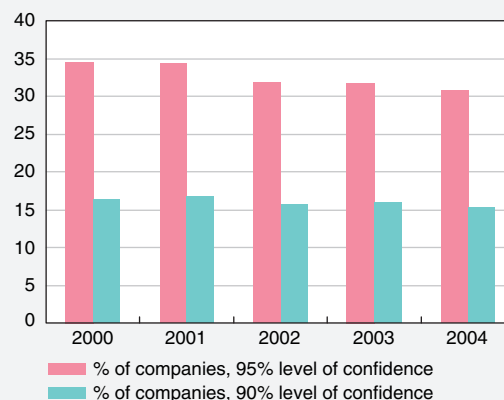
Net income and equity capital continued to post a slight rise.

In the 95th percentile, the proportion of companies with an equity ratio below NWR during a recession is at its lowest in 2004, at 30.8% (3,826 companies out of 12,417). This decrease is in parallel with the downward trend in the company default rates recorded over the period.

Equity capital of French firms



French companies with an equity ratio below the NWR



¹⁴ If one accepts the assumption that companies show better results in a context of strong economic growth. This is highly likely given that established firms are the first ones to take advantage of the new business opportunities arising from economic growth, before having to face competition from new entrants, which eventually leads to the convergence of results towards a long-term equilibrium.

In this study, we have expanded on the concept of net worth at risk (NWAR), defined as the equity capital that would be needed to absorb the losses incurred by a company if it were to incur the same amount of losses as that of the worst performing firms over a given period (at the 90th and 95th percentiles of the losses distribution). A distinction is made between the concepts of conditional NWaR (calculated on the basis of the losses incurred during the 1992-1993 recession) and unconditional NWaR (calculated on the basis of the average losses over the whole period 1987-2002).

The results obtained for the four countries are different.

The proportion of Italian and Spanish firms for which the conditional NWaR is above their equity ratio in 2002 (at a 90% and 95% level of confidence) is similar, i.e. roughly 45%. In the Italian case, however, this situation is due to the low level of equity capital and the small amount of losses.

German firms post less favourable results: for over 60% of firms the conditional NWaR is greater than their equity ratio in 2002. This situation does not necessarily imply greater vulnerability, because it probably results from a specific financing structure stemming in part from the strong Hausbank relationship between companies and banks. Furthermore, the proportion of banks in this situation declined slightly in 2002, the last year of the period under review.

The proportion of French firms for which the conditional NWaR is above their equity ratio in 2002 is lower (30%) than in the other European countries. This largely reflects company managers' drive to strengthen their financial structure during the period under review, as well as the moderate losses recorded during the 1992-1993 recession.

As regards the unconditional NWaR, i.e. the average losses incurred by the most highly indebted firms over the entire period 1987-2002, French firms show the same degree of vulnerability as German firms (roughly 15% to 20%), yet they do not enjoy a Hausbank-type relationship with their bank.

If one considers that NWaR represents a proxy for credit risk, the differential between conditional and unconditional NWaR would imply that the proportion of high-risk companies in a credit portfolio can be multiplied by two between a "normal" period and a period of significant stress.

In this context, the financial partners of these firms should make them more aware of the importance of financial factors and contribute to rebalancing the financing structure of the most vulnerable ones in the framework of an approach aimed at preventing corporate failure. Credit institutions must establish a dialogue with companies in view of the implementation of Basel II and explain to them the way in which their position on a standardised risk scale determines their credit policy. This dialogue can be viewed as going hand in hand with the improvement in information and internal ratings systems conducted by banks in the framework of Basel II. Banks would probably need to enhance their commercial strategy by systematically including information on credit risk factors.

More generally, computing and studying the NWaR indicator contributes to a better understanding of the determinants of companies' financing structure.

Bearing in mind the fact that it should not be used to assess individual company risk, this indicator has a meso-economic purpose. It contributes to improving the monitoring of company credit risk. It supplements the information provided by scores and ratings –which are generally available in the case of a stable economic environment– by an approach to risk in the case of exceptional economic tensions.

APPENDIX

Databases and methodology

The data used are drawn from the individual company databases managed by the Deutsche Bundesbank, the Banco d'España, the Centrale dei Bilanci and the Banque de France. Given the confidentiality of the data, each institution processed its own data according to a common methodology and the results –rendered anonymous– were pooled in order to compare them. The accounting concepts were drawn from national charts of accounts, which could be compared by means of a conversion table, developed by the European Committee of Central Balance Sheet Offices in order to handle the BACH harmonised company accounts database. Accounts are “harmonised” as national charts of accounts are drawn up in accordance with the Fourth Council Directive and using similar implicit conceptual frameworks.

The databases used in the study contain more than 10,000 companies for each country (see table below). These databases were not designed to obtain a set of representative statistics, but rather to have detailed accounting data, in particular for the purpose of risk analysis. However, thanks to the relatively large number of companies in the samples, the results were representative of the general situation of companies, especially as observations were made over a long period.

We used three accounting variables: total assets, net equity and net income. The four countries display similar financing structures (in particular, the bank intermediation rate and the role of trade credit). Furthermore, only manufacturing sector companies are within the scope of the study. These characteristics limit any cross-country comparison biases. The variables were standardised by means of ratios (net equity/total assets, net income/total assets), in order not to skew the results due to size effects. Lastly, net income was chosen over other intermediate operating balances (which are representative of companies' current performance), given that the purpose of the study is to measure losses eroding net equity, *i.e.* final losses. We chose to estimate two-year losses in order to smooth any possible volatility in the profit and loss account balance, as losses over two consecutive years generally reflect a structural deficit denoting deficits on all of the intermediate balances.

The table below gives an indication of the representativeness of the databases in 2000. Values for the other years may be slightly different as the samples are not stable from one year to the next. Representativeness indicators differ somewhat across countries on account of institutional factors.

Manufacturing industry (NACE: D)

Country – database	Germany (Deutsche Bundesbank)	Spain (Banque d'Espagne)	France (Banque de France)	Italy (Centrale dei Bilanci)
Number of companies	11,709	20,906	10,464	22,052
of which: companies with a turnover of over EUR 50 millions	1,706	347	1,845	1,832
Coverage rate	90.1% ^{a)}	100% ^{b)}	79.6% ^{c)}	100% ^{d)}

(a) As a % of total company turnover, drawn up by the tax authorities.

(b) As a % of the number of manufacturing companies included in the Directorio Central de Empresas database produced by INE, the Spanish national statistics institute.

(c) As a % of the workforce employed recorded by INSEE (the INSEE database covers all companies taxed on industrial and commercial profits on the basis of real and normal profits –BIC-BRN).

(d) As a % of limited liability companies recorded in the database of the national statistics institute.

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Recent developments in monetary and financial integration in Asia

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Asia's share of world trade has expanded constantly over the last two decades. This increase reflects, inter alia, the considerable strengthening of trade links between the countries of the region, fostered by the vertical specialisation of the Asian economies. In the 1980s, the most advanced economies in the region, e.g. Japan, relocated the most labour-intensive stages of their production processes to the newly-industrialised Asian economies like South Korea and Singapore and then, in the 1990s, to emerging Asia, i.e. Indonesia, Malaysia, the Philippines and Thailand. The emergence of China has also given significant impetus to regional trade integration. Surging intra-regional direct investment flows have accompanied and shored up trade flows, however, portfolio investment flows and cross-border bank loans have remained limited.

Given that production processes within the region are complementary and that the final destination for exports is outside the region, the lack of a regional exchange rate arrangement in Asia does not appear to be a concern in the short term. Indeed, the regional integration initiatives adopted in Asia in the aftermath of the 1997-1998 financial crisis aim to build further resilience to financial market turbulence.

Firstly, deeper and more liquid local bond markets should make it possible to reduce the double financial mismatch, i.e. the currency mismatch and maturity mismatch, which largely sustained the crisis. In this regard, the ASEAN+3 Asian Bond Market Initiative examines the supply-side issues while the Asian Bond Funds initiative of the Executives' Meeting of East Asia-Pacific Central Banks (EMEAP) deals with demand-side issues via the pooling of resources to buy bonds issued by member countries. Secondly, the Chiang Mai Initiative, which consists in a network of currency swap arrangements between the central banks of the ASEAN+3 member states, provides these countries with a regional financial assistance mechanism in the event of a liquidity crisis.

The Asian vertical model of production appears to have reached its limit and is evolving towards a more "horizontal" model in terms of both production (substitutability of production processes as a result of the shift towards higher value-added activities) and consumption (expansion of the regional market linked to the growth potential of domestic Chinese demand). Regional monetary co-operation could therefore aim in the future at curbing intra-regional exchange rate fluctuations in order to promote trade and investment within the region.

NB: The composition of the various groups of countries referred to in this study may be found in the Appendix. The authors would like to thank Daniel Cohen for his suggestions, and also Martine Chastang, Ingrid Gaudichau and Françoise Mejia for their assistance in compiling and editing data.

In 2004, seven years after the financial crisis, emerging Asia had become the main driver of global economic growth, accounting for 43% of world GDP (in purchasing power parity) and 15% of world trade.

Since the early 1990s, its growing share of world trade has been reflected in expanding trade with the industrialised economies (United States, Europe) and also with the other Asian countries. The vertical structure of production processes between the Asian economies accounts notably for the surge in trade, which has also gone hand in hand with intra-regional foreign direct investment (FDI). In this context of vertical specialisation within the region and reliance on final consumption markets outside the region, the peg of Asian currencies to the US dollar has been decisive. However, in 1997-1998, the financial crisis that affected the economies in the region called a halt to the rapid growth of their world and intra-regional trade. The Asian economies therefore developed several regional initiatives to reduce their vulnerability to external shocks.

This article examines the various regional initiatives that have been developed in Asia in the monetary and financial areas in the wake of the 1997-1998 crisis. It first seeks to take stock of trade and financial integration in Asia. It then goes on to analyse the objectives of Asian monetary and financial integration and outline the processes that have been implemented to achieve these goals.

1| REGIONAL INTEGRATION IN ASIA: AN OVERVIEW

Based on the promotion of exports, the economic development strategy implemented by Asian countries is at the root of the vigorous intra-regional trade and the emergence of China as a trade hub (1|1). Simultaneously, intra-regional FDI flows, which have accompanied trade expansion, have increased sharply, while bank lending and other types of cross-border capital flows (equity and bonds) have remained limited (1|2).

1|1 Closer trade integration

INTRA-REGIONAL TRADE STRUCTURE

The Asian economies' trade openness has expanded substantially over the last decade. Measured by the ratio of exports and imports to GDP, the degree of openness of these economies was multiplied by over 1.7 between 1990 (31%) and 2004 (55%). The ratio currently ranges from 25% to 84% for China, South Korea and Japan and is very high for Indonesia, Malaysia, the Philippines and Thailand (119%), which makes the latter economies more vulnerable to exogenous shocks (Table 1).

The greater openness of the ASEAN+3 economies (ASEAN, China, South Korea and Japan) reflects their increasing contribution to world exports and imports. These economies' share of world trade rose from 14.5% in 1990 to over 19% in 2004. Though a high degree of openness does not necessarily reflect substantial intra-regional trade, Asian economies' increased contribution to world trade has been accompanied by the strengthening of trade links within the region.

Table 1
Trade openness of Asean+3 countries
Compared with the United States and the Euro area

(exports and imports of goods and services, ratios as a % of GDP; data in value terms)

	Exports (a)		Imports (b)		Total trade (a + b)	
	1990	2004	1990	2004	1990	2004
ASEAN+3 countries	16	29	15	26	31	55
<i>of which :</i>						
Japan	11	14	10	12	20	25
China	15	40	12	37	27	76
Korea	28	44	29	40	57	84
Indonesia, Malaysia, the Philippines and Thailand	35	62	39	57	74	119
United States	9	10	11	15	20	25
Euro area (intra and extra-area trade)	28	37	27	35	55	71

Source: International Monetary Funds (IMF); Banque de France calculations

Box 1**Indicators of intra-regional trade**

Two indicators are traditionally used in the literature to assess intra-regional trade: a relative indicator and an indicator of intensity. They are defined as follows:

The relative indicator of intra-regional exports (A): $A = X_{ij} / X_{i.}$

The relative indicator of intra-regional imports (A'): $A' = X_{ji} / X_{.i}$

The relative indicator of intra-regional trade (A''): $A'' = (X_{ij} + X_{ji}) / (X_{i.} + X_{.i})$

The indicator of intensity of intra-regional trade to exports (B) or to imports (B'):

$$B = \frac{X_{ij} / X_{.}}{(X_{i.} / X_{.})(X_{j.} / X_{.})} = \frac{X_{ij} / X_{i.}}{(X_{j.} / X_{.})}; B' = \frac{X_{ji} / X_{.}}{(X_{i.} / X_{.})(X_{j.} / X_{.})} = \frac{X_{ji} / X_{.i}}{(X_{j.} / X_{.})}$$

or X_{ij} = Exports from country (or region) *i* to country (or region) *j*;
 X_{ji} = Imports from country (or region) *i* from country (or region) *j*;
 $X_{i.}$ = Total exports from country (or region) *i*;
 $X_{.i}$ = Total imports from country (or region) *i*;
 $X_{..}$ = World exports = World imports.

The relative indicator compares trade between two trading partners (country or geographical area) to the world trade of one of the two trading partners (country or area).

The indicator or index of intensity assesses the trade between two trading partners while taking account of their share of world trade. Therefore, if the index is equal to one, the intensity of bilateral (or regional) trade is neutral; if it is more (or less than) one, there is a bias in favour (or to the detriment) of regional trade.

Sources: Urata (2004).

Several indicators may be used to assess intra-regional trade (Box 1).

Intra-regional imports accounted for close to 44% of the total imports of ASEAN + 3 countries in 2004 compared with 31% in 1990; intra-regional exports made up close to 35% of total exports, compared with 27% in 1990. Intra-regional trade increased from 29% of the total trade of ASEAN + 3 countries in 1990 to 39% in 2004. The combined trade of the three main economies of the region – China, South Korea and Japan – accounts by itself for half of intra-regional trade. In comparison with Europe, at the start of the European integration process, the intra-regional trade of the countries that currently make up the euro area already accounted for roughly 60% of their world trade (Chart 1).

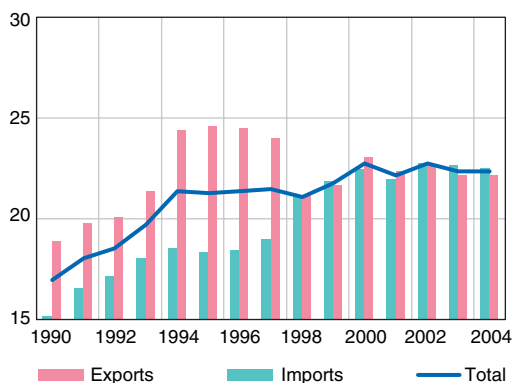
The 1997-1998 financial crisis, followed by the bursting of the new technologies bubble in 2001, put a damper on Asian countries' world and intra-regional trade. During these different episodes, intra-regional trade slowed slightly more markedly than world trade. Since 2002, Asian countries' intra-regional trade has found a second wind and is tending towards its pre-crisis level (Chart 2).

Moreover, the trend of the intensity index for intra-regional export trade over the past decade confirms Asia's strong regional trade bias. This bias is however much more pronounced for the ASEAN countries (index close to 4) than for the ASEAN + 3 countries (index close to 2) because ASEAN + 3 trade is strongly geared

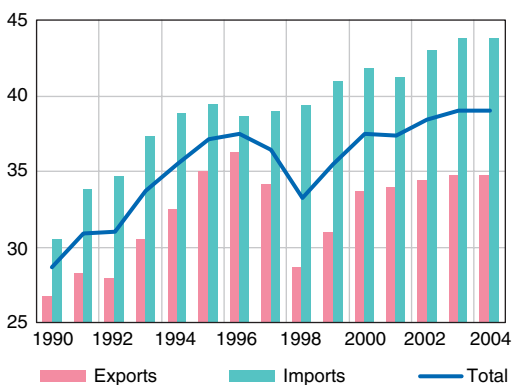
Chart 1
Intra-regional trade between ASEAN and ASEAN+3 countries and the European Union

(exports and imports of intra-regional goods, data in value terms, ratios as a % of world trade)

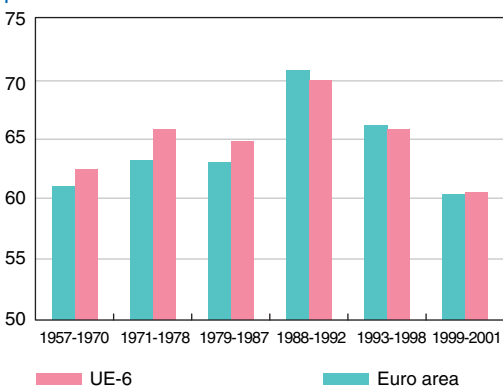
ASEAN



ASEAN+3



European Union

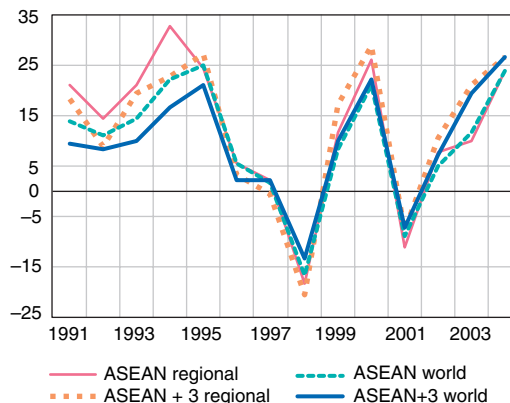


Sources: IMF, Asian Development Bank (ADB), Dorrucchi et al. (2002); Banque de France calculations

towards countries outside the region (Chart 3). In international comparisons, Sakakibara and Yamakawa (2004) show that ASEAN has higher intra-regional trade intensity than other areas such as the European Union and NAFTA, whose intensity

Chart 2
Growth rate of ASEAN and ASEAN+3 countries' world and intra-regional trade

(trade in goods in value terms, annual percentage growth rate)

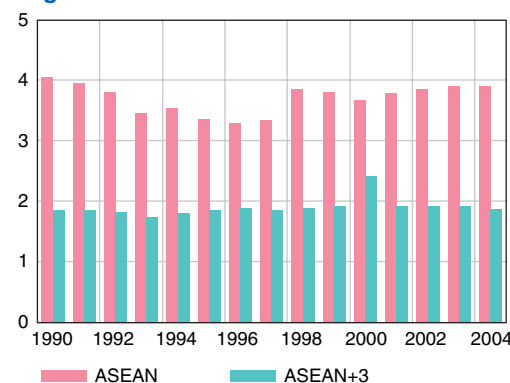


Source: ADB

indices are at around 2 and 3 respectively. In the case of ASEAN + 3, the regional bias is stronger than for Europe but less so than for NAFTA due to the less marked regional preference shown by China, Japan and South Korea.

The rapid growth in intra-regional trade cannot be solely attributed to a "gravity effect" linked to the economic size and the geographical proximity of the ASEAN + 3 countries. Using a gravity model for trade between the three major economies of the region (China, South Korea and Japan) and the ASEAN countries over the last two decades, Kim (2002) shows that the "observed" level of trade between these two groups of countries is higher than the "predicted" level. This therefore points to the existence of other factors accounting for the intensity of intra-regional trade.

Chart 3
Intensity index for ASEAN and ASEAN+3 countries intra-regional trade



Source: ADB

Indeed, the sharp acceleration of intra-regional trade also appears to be increasingly traceable to the vertical integration of these economies' production chains, like Japan and South Korea in the 1960-1980s period. The higher-income economies retain the capital-intensive processes and relocate the labour-intensive processes to the countries with lower incomes, specialised in assembly operations. Akamatsu (1962) and Yamazawa (1990) referred to the "flying geese" pattern of development of the Asian economies. This vertical redistribution of labour within the Asian economies can moreover be seen in the concentration of their intra-regional trade in intermediate goods. Trade in intermediate goods rose from 25% of intra-regional exports at the end of the 1970s to 47% in 2002 (Zebregs, 2004).

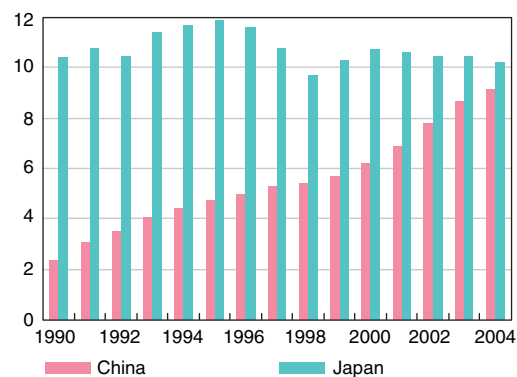
CHINA: A TRADE HUB

Over the last two decades, China has replaced Japan as Asia's trade hub.

In the mid-1980s, Japan initiated the vertical production process established within the area, with Japanese firms relocating their production to the four "dragons" (Hong Kong, South Korea, Singapore and Taiwan) and then to the four "tigers" (Indonesia, Malaysia, Thailand and the Philippines). These countries' economic catch-up and their openness to world trade subsequently curbed the fast growth of their trade with Japan (imports and re-exports). Conversely, these economies became increasingly commercially dependent on China. China's share of intra-regional trade has expanded constantly since 1990 (Chart 4).

In the 1980s and 1990s, China's trade structure was dominated by transport machinery and equipment and manufactured goods. In fact, Indonesia, Thailand, the Philippines, and to a lesser extent Malaysia, which had also specialised in these sectors, ran the risk of being overshadowed by China. Conversely, a rise in quality in Japan, Singapore and South Korea led these countries to develop a trade structure complementary to that of China.

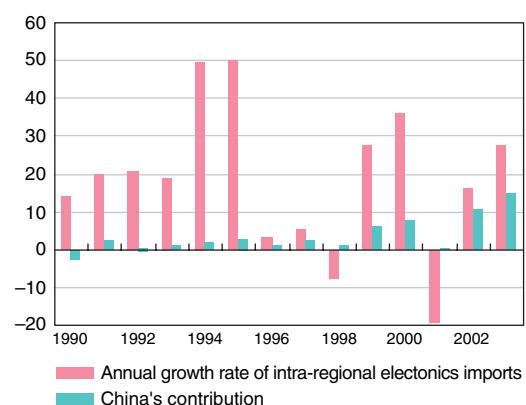
Chart 4
ASEAN+3 countries' share of trade with China and Japan
(as a % of the total)



Source: ADB

From the 2000s onwards, China diversified its trade base by focusing on trade in computer and communications equipment and electronics, becoming a competitor of Indonesia, Thailand, the Philippines and Malaysia in these sectors. China's contribution to the growth in intra-regional electronics imports (Chart 5) has increased over the past three years. Soaring intra-regional trade in the electronics sector reflects the development of assembly trade within the area to re-export.

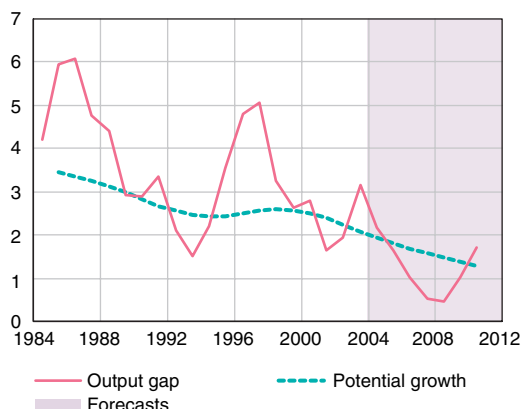
Chart 5
Growth of intra-regional electronics imports
among ASEAN+3 countries
(annual percentage growth rate and China's contribution in percentage points of the annual growth rate)



Source: Chelem dataset (Harmonised Accounts on Trade and the World Economy)

Chart 6
Trend towards the convergence of potential growth and business cycles of the ASEAN+3 countries

(standard deviation of output and potential growth gaps)



Note: trend/cycle decomposition using a filter (HP, $\lambda = 100$, based on annual data)
Source: IMF, World Economic Outlook; Banque de France calculations

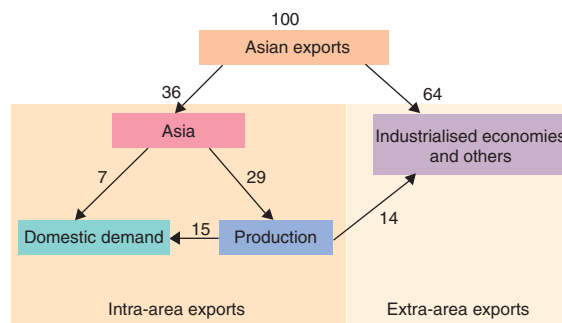
Overall, trade integration in Asia is likely to increase the interdependence of the ASEAN + 3 economies and therefore, make their growth less dependent on the world economy and more centred on China. In particular, China may be called upon to play a key role in the region as its intra-industry trade develops and its domestic demand expands. In fact, the sharp increase in intra-regional intra-industry trade has been accompanied by a trend towards the synchronisation of business cycles across the ASEAN + 3 countries that seems to have become more pronounced since the early 2000s (Chart 6).

Lastly, the high degree of trade openness and the extensive intra-regional trade may permit the economies of the region to benefit from China's strong growth. However, these factors also constitute a risk in the event of an exogenous shock affecting one of the economies.

THE ROLE OF FINAL EXPORT MARKETS OUTSIDE ASIA

Despite soaring intra-regional trade, the vertical re-organisation of production chains makes the

Chart 7
Destination of exports from emerging Asia excluding India (%)



Source: Monetary Authority of Singapore (2003)

Asian economies ultimately reliant on final demand from the US or European markets.

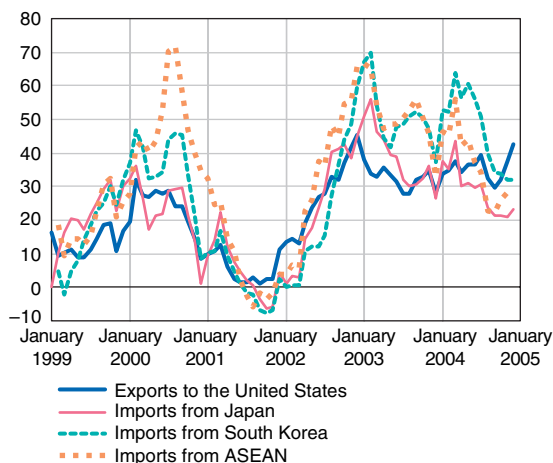
An estimate by the Monetary Authority of Singapore shows that while 36% of the area's exports of intermediate goods are intra-regional exports, 14% are subsequently re-exported outside the region. Overall, 78% of the region's exports are to final markets outside the region while 22% are absorbed by the region (Chart 7).

Moreover, a recent study (Bank of Japan, 2004) illustrates the existing "transmission chain", which starts from the final export market, *i.e.* the United States, and goes up to the Japanese economy, *via* China and the South-East Asian economies. The findings show that a positive shock of 1% on the United States' GDP leads not only to a rise in Japanese exports to the US market but also a fairly similar increase in Japanese exports to the East Asian economies after two years.

Regarding China's role as the assembly platform of Asia, the relation of dependency between China's imports from other Asian countries and China's exports to the United States is illustrated by the relatively similar growth patterns of the two types of trade (Chart 8).

Chart 8
China's trade – exports to the United States
and imports from Asia

(three-month moving average year-on-year growth as a %)



Source: China Customs Statistics

1|2 Slower progress in financial integration

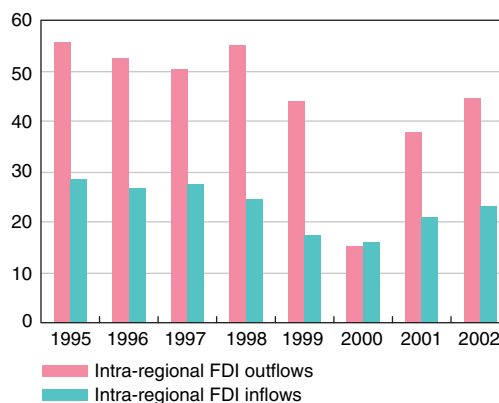
PREDOMINANT INTRA-REGIONAL DIRECT INVESTMENT

Concomitant with the growing intra-regional trade, surging FDI flows between the Asian economies have strengthened the regional integration process. In fact, in the model of vertical specialisation, investments made by firms from the most advanced economies such as Japan, South Korea and Singapore in the emerging or developing Asian economies have helped to boost their trade.

Intra-regional FDI outflows have picked up significantly since 2000, accounting for 44% of the ASEAN+3 countries' total FDI outflows in 2002 (a proportion relatively close to that of intra-regional trade flows). Intra-regional FDI inflows have stabilised at around 20% of total inward FDI. Intra-regional FDI flows nonetheless remain below their pre-crisis levels (Chart 9). However, the three major regional economies' (China, South Korea and Japan) share of inward and outward FDI outside the area tends to put this trend into perspective. Thus, in 2002, outward FDI from ASEAN to ASEAN+3 accounted for 73.5% of their total FDI outflows while 57% of FDI inflows into ASEAN were from ASEAN+3. Japan and Singapore are the main

Chart 9
Intra-regional FDI flows in ASEAN+3 countries

(as a % of total)



Source: United Nations Conference on trade and development; Banque de France calculations

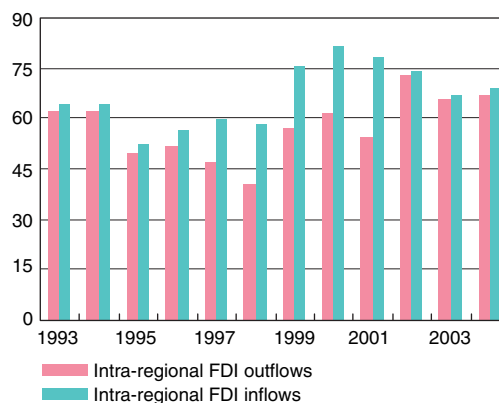
intra-regional FDI origin countries while China and Malaysia are the main recipients.

In comparison, FDI inflows and outflows within the EU currently exceed 65% of the FDI the European countries receive from or invest in the rest of the world (Chart 10).

Since the Asian crisis, the regional magnets for FDI have shifted from the ASEAN countries to China (Chart 11). This move was spurred not only by the direct impact of the crisis, but also, *inter alia*, by China's growing attractiveness, stemming from its cheap labour costs and its on-going trade

Chart 10
EU countries' intra-regional FDI flows

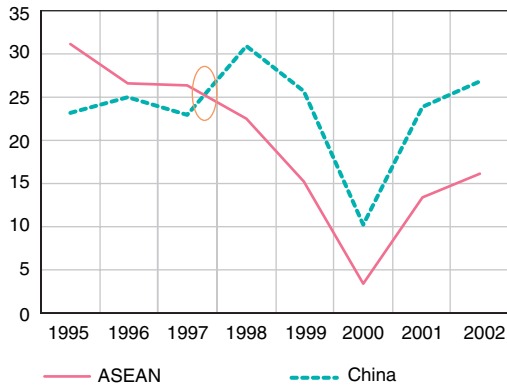
(as a % of total)



Note: The data concern EU-15 up to 2000 and EU-25 from 2001.

Source: Eurostat; Banque de France calculations

Chart 11
Destination of ASEAN+3 countries' FDI flows

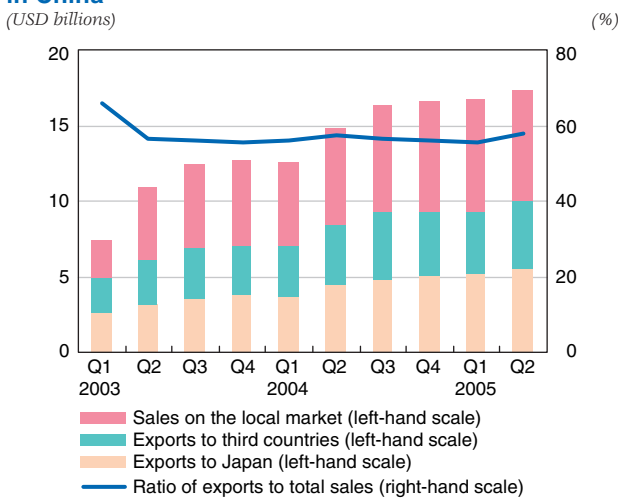


Source: United Nations Conference on trade and development.

and financial liberalisation. Thus, though in 1995 ASEAN received 31% of ASEAN+3 countries' total FDI inflows and China 23%; in 2002 the grouping received only 16% compared with China's 27%.

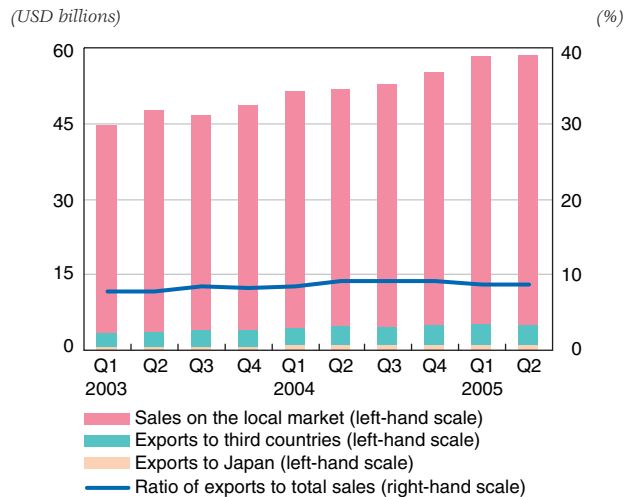
As an example, according to the findings of the survey conducted by Japan's Ministry of the Economy, Trade and Industry, until recently, FDI by Japanese companies in China was geared primarily towards exporting and not selling on the local markets, unlike their direct investments in the United States (Charts 12 and 13).

Chart 12
Purpose of Japanese companies' direct investment in China



Source: Ministry of the Economy, Trade and Industry of Japan (METI)

Chart 13
Purpose of Japanese companies' direct investment in the United States



Source: Ministry of the Economy, Trade and Industry of Japan (METI)

LIMITED CROSS-BORDER BANK LENDING AND PORTFOLIO FLOWS

The Asian economies' financial integration appears to be trailing considerably behind¹ their trade integration.

While their integration into the international financial markets has advanced substantially in recent years,² regional financial markets remain poorly developed. In general, the South-East Asian economies' stock markets appear to be more closely integrated into the US market than the Japanese market. For example, foreign investors accounted for close to 30% of turnover on the stock markets of Japan, South Korea and Thailand in 2004, but only a minority of these investors seem to come from other Asian countries (IMF, 2005a).

Likewise, banking integration appears to be more advanced with banks outside the region. The foremost foreign banks in terms of outstanding claims are European (British in particular) and US banks, which predominate in a number of Asian countries such as China, Indonesia, Malaysia, the Philippines and Thailand. Japanese banks often

¹ It is moreover difficult to measure because of the lack or inaccessibility of data.

² These markets captured half of the private capital flows to emerging economies in 2003, and two-thirds in 2004.

come third, except in Korea where they rank first among foreign banks (IMF, 2005a).

This assessment of the deepness of financial markets and banking integration in the region must nonetheless be put into perspective.

A number of studies show that Asian cross-border capital flows are probably underestimated because estimates do not cover transactions carried out by Asian investors on offshore markets. For instance, most Asian sovereign and corporate bond issues denominated in foreign currencies are denominated in US dollars outside Asia (up to 80% in the United States and in Europe), however a large proportion of these issues are underwritten by South-East Asian investors active on these markets (BIS, 2002; IMF, 2005a).

Similarly, Asian banks play a leading role internationally in the structuring of syndicated bank loans granted to Asian residents, as arrangers as well as fund providers (BIS, 2002).

Overall, intra-regional trade and FDI flows in Asia essentially reflect a vertical production model, while the other intra-regional financial flows are, in all likelihood, developing outside the region on offshore markets.

2| MONETARY AND FINANCIAL INTEGRATION: OBJECTIVES AND INITIATIVES

Due to the vertical structure of the different stages of production in the region and the final destination of the regional exports (United States and Europe), the lack of a regional exchange rate arrangement in Asia does not appear to be a concern in the short term. However, in the long run, a “horizontal” model will emerge from, the substitutability of production stages resulting from the shift towards higher value-added activities within the region, and an expansion of the regional

consumer market reflecting the growth potential of Chinese domestic demand. As this model gradually develops, closer monetary co-operation would be useful to reduce intra-regional exchange rate fluctuations and promote intra-regional trade and investment (2|1). Indeed, the regional integration initiatives conducted in the wake of the Asian crisis were more the result of financial concerns than monetary objectives. These initiatives aimed to guard against the risks of financial crises by fostering, at the regional level, the development of local bond markets (2|2) and a pooling of foreign exchange reserves (2|3).

2|1 Increasing regional monetary stability to facilitate intra-regional trade and investment

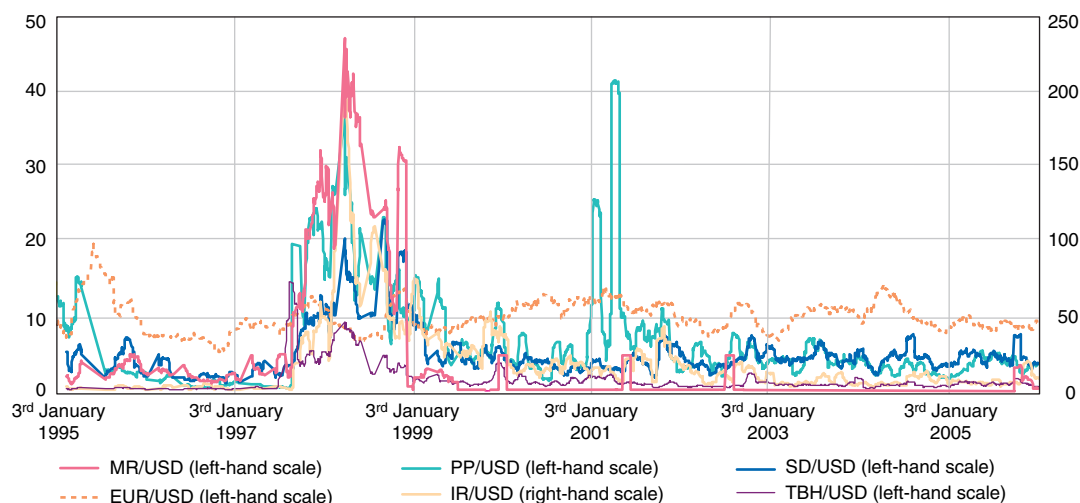
As with the European experience, the strengthening of monetary co-operation in Asia could help to boost intra-regional trade and investment. The region already enjoys relatively stable exchange rates as many of its currencies are pegged to the US dollar. However, closer intra-regional financial and trade links could prompt Asian countries to seek to stabilise intra-Asian bilateral exchange rates and, in the longer term, to form a regional currency union.

GUARANTEEING THE STABILITY OF INTRA-REGIONAL EXCHANGE RATES

According to the IMF classification (2005b), Malaysia and China adopted fixed exchange rates while Japan, South Korea, and the Philippines maintained floating exchange rates. Between these two extremes, Cambodia, Indonesia, Laos, Myanmar, Singapore, Thailand and Vietnam chose a managed floating rate regime and Brunei opted for a currency board regime. Beyond this diversity of exchange rate regimes, many economies in the region chose to peg *de facto* or *de jure* their currency to the US dollar in order to maintain the competitiveness. The relative stability of intra-regional exchange rates

Chart 14

Three-month historical volatility of the exchange rates of ASEAN-5 countries and the euro against the dollar



* Note: MR-Malaysian ringgit; PP-Philippine peso; SD-Singapore dollar; IR-Indonesian rupiah; TBH-Thai baht.

Sources: national sources; Banque de France calculations

is therefore ensured through the dollar link. Indeed, the exchange rates of Asian currencies against the dollar are generally less volatile than that of the euro (Chart 14).

Furthermore, the real effective exchange rates of a number of currencies in the region for which data are available have been relatively stable since early 2004 (Chart 15).

The ongoing strength of Asian trade with countries outside the region (United States and Europe) would not justify, at this stage, a common peg to a regional currency. Moreover, the “vertical” model of production structures in the region reduces the impact of exchange rate fluctuations on the different economies given the non-substitutability of the various stages of production. Conversely, in Europe, as the production process is more “horizontal”, the similarity of production activities makes the different economies more sensitive to exchange rates movements that could result in production activities being shifted to more competitive countries.

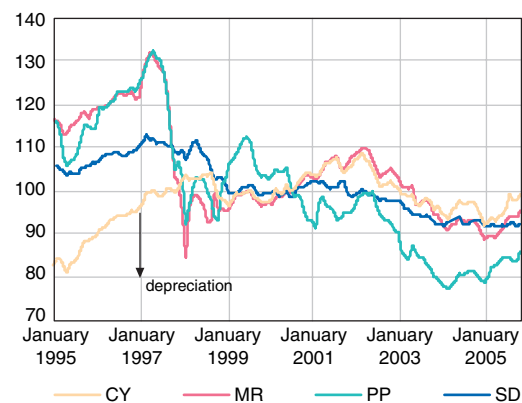
In the short term, a common peg is not a priority for Asian economies, but it may become necessary in the longer term. As the least developed countries in the region catch up, they will be able to move into higher value-added activities, using a “horizontal” production model, while the strong growth expected in Chinese domestic demand will boost trade *in fine*

between regional consumer markets, developing a horizontal consumption model. From then on, further monetary integration, which should reduce the direct exchange rate volatility between Asian currencies, would increase trade and financial flows within the region.

A number of proposals have been put forward to achieve an exchange rate arrangement in Asia, including pegging to one of the region’s currencies (yen or renminbi), to a currency outside the region, such as the dollar (Kwan, 2001; Nasution, 2005),

Chart 15
Real effective exchange rates

(100 = 2000)



Note: CY-Chinese yuan; MR-Malaysian ringgit; PP-Philippine peso; SD-Singapore dollar.

Source: IMF

or establishing a basket system of G-3 currencies, *i.e.* the euro, the dollar and the yen (Williamson, 2005; Ogawa *et al.*, 2004; McKinnon, 2002). In December 2005, the Asian Development Bank (ADB) announced that it was working on the composition of a basket of ASEAN+3 currencies. This basket, modelled on the European Currency Unit, would be a theoretical currency unit (the Asian Currency Unit), and is expected to be launched in June 2006. It will serve as a benchmark for managing the regional exchange rate fluctuations and will facilitate international comparisons with the dollar and the euro. In the longer term, it might result in the creation of a currency area.

ACHIEVING AN OPTIMAL CURRENCY AREA

In the 1960s, theories on Optimal Currency Areas (OCAs), pioneered by Robert Mundell (1961), maintained that, under certain conditions, a monetary union could lead to an increase in trade in the area. By reducing the costs of cross-border trade and financial flows and by removing exchange rate volatility in the region, an OCA would enhance trade (of goods and services) and investment between the countries forming the union (and boost its growth potential). These gains are to be set against the main cost associated with the formation of an OCA: the loss of autonomy in the conduct of national monetary policies. In this respect, literature on OCAs shows that the benefits (or costs) would increase (or decrease) according to:

- the flexibility of wages and prices in the countries of the union;
- the mobility of factors of production (capital and labour) between the countries of the union;
- the symmetry of the impact of shocks between the countries of the region;
- the degree of openness of the countries of the union;
- and the share of intra-regional trade.

For ASEAN countries, Eichengreen and Bayoumi (1996) developed a composite index taking account of the relative costs and benefits (asymmetrical shocks, exports structures, bilateral trade intensity and economic size) associated with member countries adopting a common currency.

On the basis of this index, they concluded that country pairs such as Singapore-Malaysia, Singapore-Thailand, Singapore-Taiwan, and Hong Kong-Taiwan were the best suited to form an OCA. In contrast, the case for Indonesia, South Korea and the Philippines was weaker. And the Malaysia-Thailand pair would have relatively little economic incentive to adopt such an external peg. Using the same approach, Madhur (2002) shows that ASEAN countries satisfy most of the OCA criteria. However, these indicators should be interpreted with caution. Frankel and Rose (1998), for instance, stress the endogeneity of some OCA criteria and show, in particular, that the closer the trade within the area, the more highly synchronized the business cycles.

2|2 Relocating financial intermediation activities within the region

Following the financial crisis of 1997-1998, Asian countries attempted to reduce their reliance on domestic and international bank borrowing by increasing the depth and liquidity of their local currency bond markets. They thus sought to enhance regional financial co-operation. These initiatives were spurred by two organisations: ASEAN+3 with the Asian Bond Market Initiative (ABMI) and the Executives' Meeting of East Asia-Pacific Central Banks (EMEAP) with the Asian Bond Fund initiative (ABF).

REDUCING THE ECONOMY'S RELIANCE ON FOREIGN-CURRENCY BANK FINANCING

Many factors account for the heavy reliance of both private and public Asian economic agents on short-term bank borrowing. First, the "financial repression" policies conducted by these countries in the 1970s explain why the financial markets are underdeveloped. In a "repressed" financial system, the government directly allocates bank credits to certain sectors such as agriculture, sets an interest rate ceiling for state bank lending, and bears *in fine* the credit risk. In this way, economic agents that can obtain cheap credits with low risk from state banks, have little incentive to use financial markets to raise funds from capital and securities markets. Furthermore, tax policies (*e.g.* stamp-duty on transfer of bond ownership)

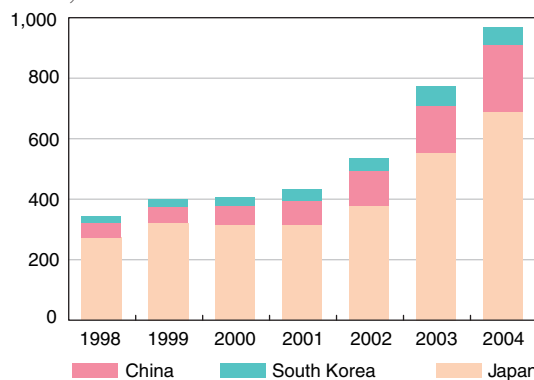
impede the development of the secondary market. Lastly, the lack of appropriate market infrastructures (clearing and settlement) is detrimental to the liquidity of these markets. As a result, local currency bond markets played a greater role after the financial crisis of 1997. The development of government bond markets acted as a catalyst for the corporate bond market (Luengnaruemitchai and Ong, 2005). Even though bank loans remain the main source of financing in emerging Asian economies, corporate and sovereign bond issuance is rising sharply in some countries. For instance, in 2004, bond issuance accounted for 75% and 39% of GDP in South Korea and Thailand respectively compared with 80% and 73% for bank loans. Moreover, these two countries have the largest corporate bond markets in the world measured as a percentage of GDP (IMF, 2005c).

The development of local currency bond markets should in particular reduce the vulnerability of Asian economies associated with double mismatches: maturity mismatch (*i.e.* long-term assets/short-term liabilities) and currency mismatch (*i.e.* assets in local currency/liabilities in foreign currency). Allen *et al.* (2002) attempted to quantify this double mismatch for Thailand in the period leading up to the crisis. Notably, they observed that at the end of 1996 a quarter of the liabilities in the banking sector and the non-bank private sector *vis-à-vis* the rest of the world were denominated in foreign currency, of which two-thirds and one-third respectively were due in the short term. Furthermore, more recently, the indicator constructed by Goldstein and Turner (2004) shows that, despite a reduction since the 1997 crisis, the currency mismatch persists in the Philippines, Indonesia, China, Thailand, and Malaysia.

CHANNELLING REGIONAL SAVINGS WITHIN THE REGION

McCauley (2003), in his analysis of the structure of capital flows to and from Asian countries since the 1997 crisis, stresses that while capital inflows have generally featured private investors, capital outflows can mainly be attributed to central banks from the region investing the proceeds of their foreign exchange market intervention in foreign assets. Genberg, McCauley, Park and Persaud (2005) estimated that in 2004, foreign public authorities, particularly in Asia, held around 70% of the outstanding stock of US Treasuries. Indeed, Asian countries' holdings of US Treasuries (public

Chart 16
Outstanding stock of US Treasuries
held by the main Asian investors
Public and private sectors combined
 (USD billions)



Sources: Treasury International Capital System (TIC), US Federal Reserve

and private sectors combined) have increased considerably over the recent period (Chart 16).

This trend reflects the lack of diversification of Asian central banks' portfolios, making them even more vulnerable to exchange rate risk in the event of a sharp depreciation of the dollar. Moreover, capital outflows from the region would thus increase the depth of the US and European bond markets, which act as financial intermediaries, instead of helping to develop Asian financial markets.

Ongoing capital account liberalisation in Asian economies should allow regional savings to be invested in the rest of the world as well as in the region (Eichengreen, 2004). For example, in Indonesia, China, and to a lesser extent in Thailand, foreign investors still cannot participate in local bond markets. However, the financial crises of the past decade have shown that the strengthening of financial systems has itself appeared to be a prerequisite for opening the capital account in the sequencing of financial liberalisation. For instance, the creation of money markets, bond markets (in particular for government bonds), foreign exchange markets, and interbank competition within the region would make it possible to ensure a more efficient allocation of capital, generate a higher return on regional savings and provide financing for investment at lower cost. In the longer run, these markets would help foster economic growth in these countries. Moreover, more flexibility in the exchange rate regime and the macroeconomic stability

of Asian economies may be necessary to accompany this financial liberalisation process.

In this context, the ABMI and ABF initiatives (see Box 2) aim to develop a regional bond market in parallel with domestic bond markets. The ABMI examines supply-side (issuers) issues, while the ABF deals with demand-side (investors) issues. ABF1 and

ABF2 differ from the ABMI in that they involve the pooling of foreign exchange reserves to buy bonds denominated in local and foreign currencies.

The resources involved in ABF1 and ABF2, which amount to USD 3 billion, should have only a minor impact on the liquidity of regional bond markets (whose outstandings total around USD 1,500 billion).

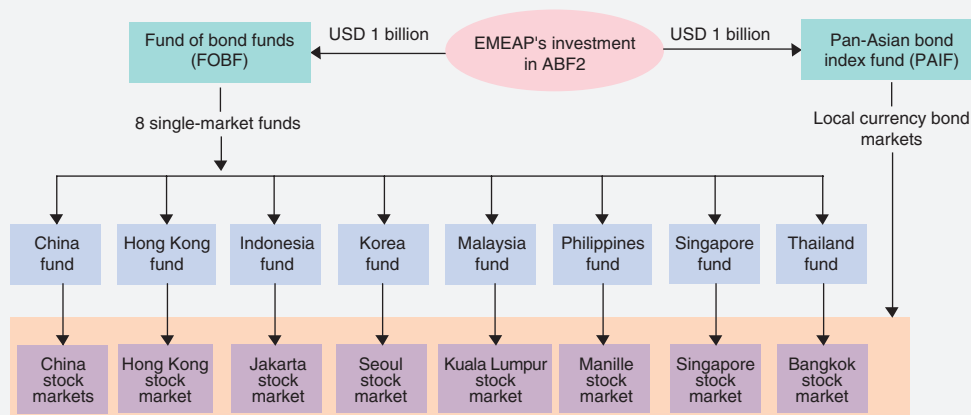
Box 2

The Asian Bond Market and Asian Bond Fund regional initiatives

ASEAN+3, with the technical support of the Asian Development Bank (ADB), launched in 2003, the Asian Bond Market Initiative (ABMI), which aimed to facilitate access to local bond markets by issuers and to strengthen infrastructures at the regional level. Six working groups were established under this initiative: New Securitised Debt Instruments, Credit Guarantee and Investment Mechanisms, Foreign Exchange Transactions and Settlement Systems, Issuance of Bonds Denominated in Local Currencies by Multilateral Development Banks, Foreign Government Agencies and Asian Multinational Corporations, Local and Regional Ratings Agencies and Technical Assistance Co-ordination. In the framework of the ABMI, three countries authorised multilateral institutions to issue local currency bonds. For instance, the ADB, the International Finance Corporation and the World Bank have already issued bonds denominated in Malaysian ringgit, while the ADB issued bonds denominated in Thai baht. In May 2005, the last two working groups, having reached their objectives, were dissolved.

In parallel, the Executives' Meeting of East Asia and Pacific (EMEAP) developed the Asian Bond Fund initiative (ABF1 and ABF2 created in 2003 and 2004 respectively). This initiative aims to meet the demand for Asian investment instruments from international investors (including Asian investors). Pooled resources from the foreign exchange reserves of EMEAP member countries are currently allocated to these bond funds. While ABF1 is fully managed by the Bank for International Settlements (BIS), ABF2 is managed by the private sector, but the BIS acts as the fund administrator. ABF1 pools reserves to the value of USD 1 billion, to be invested in US dollar denominated bonds issued by sovereign and quasi-sovereign borrowers in eight of the EMEAP economies (except Japan, New Zealand, and Australia). Following the success of the ABF1, EMEAP launched ABF2, which will invest USD 2 billion of EMEAP central bank reserves in local currency denominated bonds also to be issued by sovereign and quasi-sovereign in the same eight member countries. ABF2 comprises two components: the Pan-Asian Bond Index Fund (PAIF) and the Fund of Bond Funds (FoBF). The PAIF is a single-index bond fund investing in sovereign and quasi-sovereign domestic currency denominated bonds issued in the eight EMEAP markets. It provides Asian bond market investors with an excellent opportunity to diversify their portfolios. The FoBF comprises eight single-market funds investing in their respective markets. The ABF2 will gradually be opened up to institutional and retail investors from both within and outside the EMEAP region.

The ABF 2 structure for EMEAP investment



Nevertheless, the usefulness of these funds should not be overlooked. First, they may act as a catalyst for promoting new financial products denominated in local and foreign currencies, and for developing financial market infrastructures in the region. Second, they facilitate cross-border investment in that they encourage member countries to ease capital controls and speed up the implementation of fiscal and regulatory reforms at the local and regional levels.

2|3 Preventing and managing financial crises

The 1997-1998 crisis also highlighted the lack of co-ordination between Asian central banks against speculative attacks. In addition to the massive accumulation of foreign exchange reserves (around USD 2,000 billion in 2004, most of which are held by the three main ASEAN+3 countries) resulting from the exchange rate policy, the strengthening of regional co-operation in monetary and financial areas is also seen as a safeguard against the risk of financial crises. For instance, regional surveillance and financial assistance mechanisms, such as the Chiang Mai Initiative (CMI), have been put in place.

STRENGTHENING REGIONAL SURVEILLANCE MECHANISMS

The ASEAN Surveillance Process was established in 1998, and extended in 1999 to Japan, China and South Korea (ASEAN+3 Economic Review and Policy Dialogue). It is intended to facilitate decision-making and is guided by two principles: mutual interest and peer pressure. It is based on two mechanisms: monitoring to allow early detection of vulnerabilities and a peer review process to discuss the policy measures needed to address the vulnerabilities identified in the monitoring exercises.

To a lesser extent, other regional bodies such as Asia-Pacific Economic Cooperation (APEC) and the EMEAP are involved in reviewing recent economic and financial developments in the region. APEC has a large membership far beyond South-East Asia and provides a forum for exchanging information on a

wide range of topics: macroeconomic developments, exchange rates, financial markets, capital flows, and infrastructures. The diversity of its membership nevertheless makes it difficult to agree on common positions. The network of central banks established through EMEAP limits co-operation to monetary and financial areas as it mainly focuses on central bank issues such as financial markets, payment systems and banking supervision.

However, criticisms have been levelled at this multitude of regional bodies in charge of monitoring and surveillance in South-East Asia and the Pacific. Henning (2002) argues that the multiplicity and overlap of these institutions and mechanisms may have already reached the point of “diminishing returns”. He suggests therefore that these processes be streamlined in order to better allocate resources. In this respect, the Manila Framework Group, which consisted of deputy finance ministers and central bank governors of Asia-Pacific countries, was disbanded in 2004.

IMPLEMENTING THE REGIONAL LIQUIDITY SUPPORT FACILITY

ASEAN+3 is the only organisation in the region to have considered a regional liquidity support mechanism in addition to its surveillance mechanism. The Chiang Mai Initiative (CMI) launched in 2000 and revised in 2005 is a region-wide defence against future crises and complements IMF financial assistance in averting financial crises. The initiative comprises the existing regional ASEAN Swap Agreement (ASA), which amounts to USD 2 billion, and extends the coverage to all ASEAN countries, and a network of bilateral swap arrangements³ (BSAs) among ASEAN+3 members. Most agreements are dollar-denominated. In early February 2006, 19 BSAs amounting to USD 74 billion had been concluded, compared with USD 39.5 billion at end-April 2005. Automatic disbursement is limited to 20% of amount of this facility; any drawing beyond this limit requires an approval from the IMF, and therefore, is subject to IMF conditionality. To date, these facilities have not yet been used. However, the BSA (amounting to USD 6 billion) concluded between Indonesia and Japan when the Indonesian rupiah was under speculative pressure in August 2005 no doubt helped to calm the financial markets.

³ Participating countries are able to draw from the BSA for a period of 90 days at an interest rate of LIBOR + 150 basis points.

Table 2
Swap arrangements under the Chiang Mai initiative

(USD billions)

Lenders	Borrowers								Total
	Japan	China	Korea	Indonesia	Malaysia	Philippines	Singapore	Thailand	
Japan		3	13	6	3.5	3	3	3	34.5
China	3		4	2	1.5	1	–	2	13.5
Korea	8	4		1	1.5	1.5	–	1	17
Indonesia	–	–	1						1
Malaysia	–	–	1.5						1.5
Philippines	–	–	1.5						1.5
Singapore	1	–	–						1
Thailand	3	–	1						4
Total	15	7	22	9	6.5	5.5	3	6	74

Source: Japanese Ministry of Finance; Banque de France calculations

Under the CMI, China, South Korea, and Japan are the largest lenders and borrowers. Aside from these three major economies, Indonesia absorbs one-third of the available resources (Table 2).

In May 2005, ASEAN+3 decided to enhance the CMI by adopting a collective activation and decision-making process on the current network of bilateral swap arrangements, and an enhanced economic surveillance process at the ASEAN+3 regional level. This latter task was entrusted to the ADB.

The new CMI framework, which combines both stronger surveillance and increased financial resources, could help the countries in the region to ease their liquidity needs during a crisis. However, the amounts involved still remain far lower than external commitments to the three countries worst hit by the Asian crisis (South Korea, Indonesia, and Thailand), *i.e.* around USD 125 billion, of which

USD 40 billion from the IMF (Table 3). These regional liquidity arrangements must therefore be used to supplement other protection mechanisms against financial crises: IMF financial assistance and accumulation of foreign exchange reserves.

Table 3
Comparison of the funds available under the Chiang Mai Initiative in 2005 and under IMF financial support in 1997-1998

(USD billions, ratio in %)

	Amount available under the CMI			Funding by the international community in 1998		Ratio (a)/(b)	
	ASA	BSA	Total (a)	IMF	Others*		Total (b)
Thailand	0.2	6.0	6.2	4.0	13.2	17.2	36
Indonesia	0.2	9.0	9.2	15.0	34.7	49.7	18
South Korea	NA	22.0	22.0	21.1	37.3	58.4	38

* Total of bilateral and multilateral agreements

Source: IMF; Banque de France calculations

The regional monetary and financial initiatives implemented by Asian countries in the wake of the 1997-1998 crisis are intended to develop the role of financial markets in the financing of the economies and to reduce vulnerabilities associated with financial crises. However, this growing monetary and financial integration in Asia has to be achieved in an orderly manner to safeguard against the following two risks: a contagion risk associated with the integration of financial markets fostered by the Asian Market Bond and Asian Bond Fund initiatives, and a risk of moral hazard stemming from excessive risk-taking under the Chiang Mai Initiative.

These risks nevertheless seem to be contained in the short term given the small size of both Asian Bond Fund and Chiang Mai Initiative: USD 3 billion and USD 74 billion respectively, compared with bond outstandings and foreign exchange reserves of around USD 1,500 billion and USD 2,000 billion respectively. Moreover, the exchange rate policies of these countries are de facto pegged to the dollar and promote export-driven growth while contributing to the financing of global imbalances.

In the long term, it is likely that the amount of resources involved will increase, the production process will shift towards a "horizontal" model, and exchange rate issues will be examined with the greatest attention as soon as exchange rate regimes become more flexible. In this respect, lessons could be learnt from the European experience in particular on the role that can be played by supranational institutions and a group of core countries acting as an anchor for the regional integration process. The conditions for their creation and their viability are nonetheless beyond the scope of this article.

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APPENDIX

List of regions and acronyms used in this article

	Association of South East Asia Nations (ASEAN)		Executives' Meeting of East Asia Pacific Central Banks (EMEAP)	Asia Pacific Economic Cooperation (APEC)	North American Free Trade Association (NAFTA)
	ASEAN	ASEAN + 3			
Australia			x	x	x
Brunei Darussalam	x	x		x	
Cambodia	x	x			
Canada				x	
Chile				x	x
China		x	x	x	
South Korea		x	x	x	
United States				x	
Hong Kong			x	x	
Indonesia	x	x	x	x	
Japan		x	x	x	x
Laos	x	x			
Malaysia	x	x	x	x	
Mexico				x	
Myanmar	x	x			
New-Zealand			x	x	
Papua New Guinea				x	
Peru				x	
Philippines	x	x	x	x	
Russia				x	
Singapore	x	x	x	x	
Taiwan				x	
Thailand	x	x	x	x	
Vietnam	x	x			

Implications of globalisation for financial stability

On 4 November 2005, the Banque de France held its biennial symposium, devoted to the topic of "Productivity, competitiveness and globalisation". Some 20 speakers from central banks, international organisations, universities and the private sector contributed to the discussions, with the presence and participation of around 200 representatives of these different spheres of activity.

The symposium was comprised of three sessions, followed by a round table. The former considered recent trends in productivity and competitiveness, their impact on international capital allocation, and economic policy responses and their resulting spontaneous adjustments.

The roundtable, chaired by Roger Ferguson, Vice Chairman of the Board of Governors of the US Federal Reserve System and Chairman of the Financial Stability Forum until April 2006, brought the symposium to a close on a more financial note. The prevention and management of financial crises in both emerging and industrialised countries were discussed by the following five panellists: Zeti Akhtar Aziz, Governor of Bank Negara Malaysia, David Dodge, Governor of the Bank of Canada, Jacob A. Frenkel, Chairman of the Group of Thirty, Toshihiko Fukui, Governor of the Bank of Japan and Yaga Venugopal Reddy, Governor of the Reserve Bank of India.

Particular focus was placed on the optimum level of regulation required in order to benefit from the significant increase in capital flows while limiting the repercussions of overly sharp reactions by the markets. Also discussed was the need for an all-encompassing approach to adjusting global imbalances, combining all the levers: global demand, prices, and exchange rates.

The papers presented during the round table and the three preceding sessions are available on-line at www.banque-france.fr (Publications and Research, Proceedings of Seminars and Symposiums).

To give an insight into the views expressed during the roundtable discussions, Roger Ferguson's introduction and Jacob A. Frenkel's concluding remarks are being published in this issue of the Banque de France's Financial Stability Review. Roger Ferguson highlights four factors that contribute to exacerbating financial risks relating to globalisation: the emergence of major financial crises in emerging-market economies; a more complex institutional backdrop, as illustrated by the growth in hedge funds; the uncertainties surrounding some of the risk bearers of last resort, i.e. reinsurers and households; and the appearance of new financial products, whose impact in times of crisis is still unknown. Jacob A. Frenkel points out the increasing emphasis placed on financial stability issues and debates the risks of over-regulating, calling for a reopening of discussions on capital account convertibility.

1 | SPEECH BY ROGER FERGUSON

Let me introduce the next panel by using an outline from my old days in the private sector. At McKinsey, we used to organise the discussions around the following topics: the situation, the complication, and then the solution.

As for the situation, a “Paris Consensus” seems to have emerged. We all recognise that the global imbalances are unsustainable in the literal sense of the word and that they will not go on forever. There is no final agreement on the causes of these imbalances, but a number of candidates have emerged –such as productivity differentials across economies and relative growth rates– and I think that all of us can find some comfort in one of those explanations. Finally, part of the “Paris Consensus” is that the possibility of the global imbalances unwinding in an orderly way has not been discounted, but yet a concern that the unwinding might be disorderly, a so-called hard landing in the ways that we have all talked about, is clear among those in this room.

I would like to add a bit to the “Paris Consensus” and, at the same time, highlight some work done by colleagues at the Federal Reserve. In a recent paper entitled “Currency crashes and bond yields in industrial countries”, Joseph Gagnon examined twenty-six incidents of currency crashes across the globe in the past twenty years. He found that, since 1985, these so-called currency crashes have actually not been terribly disruptive; they have not led to a dramatic increase in interest rates, for example, or to a dramatic deceleration of growth in industrial economies. Another paper by Federal Reserve economists is “Financial market developments and economic activity during current account adjustments in industrial economies”. The authors, Hilary Croke, Steven B. Kamin, and Sylvain Leduc, found little evidence that shrinking current account deficits, at least in industrial countries, are accompanied by sharply weaker currencies and recessions. Hence, some reasons for cautious optimism can be found in such work by Fed staff members.

So that is the situation, the “Paris Consensus”, as I see it. The complication is in the topic that we want to discuss now. As Christian Noyer said at the opening, these conversations need to consider the question of financial stability. The first complicating factor is that during this recent period

of great productivity and globalisation, we have seen financial instability crises, such as occurred in 1997 and 1998, arising from the emerging-market economies. Those crises indicated that rapid movements of capital, which have been helpful to the United States, could be detrimental to economies with weak policy or institutional frameworks. The instabilities emanating from the emerging markets in turn created the risk of a negative impact on the United States. We have also seen the more surprising story of Japan, to which I think Otmar Issing alluded, which illustrates the possibility of instability arising in an industrial economy.

The second complication in this world of globalisation and high productivity is that the institutional backdrop has become more complex over the past twenty years. One example is the hedge fund industry, which was earlier alluded to with the mention of LTCM –Long-Term Capital Management–. We now have a hedge fund industry that is about one trillion dollars in size. To some people, this industry is relatively opaque; others have greater confidence in it but still find it to be large. According to hedge fund industry data, about 8,500 funds exist right now. The average size of a hedge fund is about USD 120 million, which is the size of a small to medium-sized bank in the United States. Therefore, no single hedge fund is likely to be systemically important. But even a fragmented industry has risks of “herding” behaviours and of high correlations across members’ strategies. Also, even though the average hedge fund is not large, the concentration of assets in the industry is another complexity. Clearly, institutional changes are an issue.

A third complexity is that the risk bearers of last resort fall into two categories. The first ones are institutional, in the form of insurers or re-insurers. The re-insurers, like hedge funds, may be a bit opaque to some in the public sector. The number of re-insurers is small, and the institutions are well-regulated, but the composition of their balance sheets and their risk exposures are, for many observers, not clear. The other shock absorber of last resort is the household sector. There is some concern, expressed by some people in this room, about the leverage that exists on households’ balance sheets and the degree to which households are relying on accommodative interest rates.

The fourth complexity, as we consider these global imbalances and their possible unwinding, is that a number of new products have emerged over the past twenty years. The credit default swap market has become significant as a way to transfer risk to the balance sheets of those who think they can best bear that risk. This development must be considered to be positive. However, some observers have expressed concern that many of these new products have not been tested during severe stress. The credit default market was tested in the United States when General Motors and Ford were downgraded. The market worked well, but as a test the downgrade was limited. More-exotic products have also emerged during the past few years –for example, interest-only mortgages, negative amortisation mortgages, and option adjustable rate mortgages. These products have not been tested under the kind of rapid changes in macroeconomic circumstances and of interest rates that could follow from a rapid adjustment of the imbalances.

These considerations all lead to this important and distinguished panel. I would put before them just three questions. First, in general, can the current policies, or others that we can reasonably implement, increase both macroeconomic and financial stability? Second, as a result of institutional and policy changes since the late 1990's, are the emerging economies better positioned than they were to withstand whatever changes may occur as part of the inevitable adjustment of these various imbalances? My third question has two parts: Have the risk-management skills of these newer institutions and their counterparties evolved sufficiently, and are the institutions prepared to deal with the adjustments that are likely to be a part of the unwinding of various imbalances we have discussed?

We have an excellent panel to look at the issues discussed today and perhaps answer these questions. From the industrial economies we have Governor Dodge from the Bank of Canada and Governor Fukui from the Bank of Japan. From the emerging economies, we have two distinguished policymakers as well: Y.V. Reddy from the Reserve Bank of India and Zeti Akhtar Aziz from Bank Negara Malaysia. Finally, Jacob Frenkel in the recent past was a distinguished policymaker and is the current chair of the Group of Thirty, which brings together policymakers and individuals from the private sector. So I would hope that he can give us a little bit of both perspectives.

2| SPEECH BY JACOB A. FRENKEL

The theme of this conference has been: “Global Imbalances, Financial Stability, and Productivity”. Those issues are central to the understanding of the operation of the international economic and financial systems. They are extremely timely, at the present junction of the world economy. Occasional observation of the global economic scene over the past twenty years reveals that the very same issues have occupied policy makers throughout the period but yet the world has undergone fundamental changes during the past twenty years and, as a result, the implications of imbalances, financial stability, and productivity are different today than what they were in the past.

The interdependence among economies reflects the globalisation of the economic scene. Economic policies in one country have their impact on others. This has been the fundamental *raison d'être* underlying the concept of international policy coordination which has gained special prominence in the second part of the 1980's. In 1985, at the Plaza Accord, the entire focus of policy coordination was reflected in exchange rate adjustments. The value of the dollar was reduced through policy coordination. Shortly thereafter at the Louvre Accord in 1987, the coordination of economic policies was expanded to include a broader range of macroeconomic policies in particular fiscal policies. The focus at that time was on budget deficits and external imbalances. The challenge was how to reduce the large surpluses of Japan and West Germany, which at the time were the “locomotives” of the world economy, while at the same time reduce the large deficits of the US. Of course, times have changed. West Germany has been unified with East Germany and has slowed down significantly while suffering from large budgetary burdens, and Japan has gone through the worst decade in its modern economic history, suffering from a prolonged recession and ever-expanding budget deficits and government debt.

The world economic system has changed dramatically. Capital markets have become much more integrated, and various economic crises have been intimately linked to the vulnerabilities of financial markets. LTCM, Enron, the Asian financial crisis, the Russian financial crisis, to mention a few, have all been manifestations of the new breed of the international financial system reflecting elements that were not as prominent even twenty years ago.

Not only has the nature of the markets changed, but also the main players in the global economic scene. Enough is to mention the growing role of Asia and in particular the rising prominence of China and India in the global scene. Against this background it is relevant to note that even though the range of issues addressed in this conference and, in particular, the challenge posed by the large global imbalances, are similar to the issues addressed twenty years ago but, that similarity is only apparent. The new nature of capital markets makes the challenge at the present juncture very different from the one in the past.

In order to appreciate the nature of the challenge, it is enough to recall that the US has been running a current account deficit of about 800 billion US dollars during 2005 which comprises about 6.5% of its GDP. That deficit has been growing steadily during the past few years and if it was not for the extraordinary appetite of a few central banks in Asia for the accumulation of foreign exchange reserves, the strains on the world capital markets induced by the large deficit would have been very severe. At the present time, China and Japan alone are holding about 1.7 trillion US dollars worth of international reserves; where China alone has accumulated over 400 billion US dollars just in the past two years. There is a growing consensus that such accumulation is unlikely to continue indefinitely; after all, trees do not grow to the sky. While the United States has been running a current account deficit in excess of about 800 billion US dollars during 2005, other economies have run significant surpluses. In this regard, Asia's surplus has exceeded 300 billion US dollars, whereas the surplus of the Middle East oil exporters plus that of Russia has also reached about 300 billion US dollars. This massive change of the distribution of wealth reflects a source of significant vulnerability.

While much of the focus in the public debate has been given to the large and growing imbalances in the current accounts of the balance of payments, the world economic system is challenged by many more imbalances including large budget deficits which reached in 2005 about 2.6 percent of GDP in the US and in the Eurozone and it reached about 6.5 percent of GDP in Japan. In addition, the large imbalances in the balance of trade and, in particular, the deteriorating trade balance of the United States threatens the emergence of extremely dangerous protectionist sentiments.

The most fundamental imbalance in the world economy relates to the saving propensities among the major countries. On the one extreme, the United States has a very low savings rate which is about 10 percent of GDP in 2005 while on the other extreme stands China with a very high savings rate reaching about 50 percent of its GDP. Between these two extremes stand India and Japan with national savings rates of about 25 percent, and the Eurozone with a savings rate of about 20 percent. Obviously, with such great diversity among national savings rates it is no wonder that the current accounts of the various countries reveal such a degree of imbalance.

In addition to these budgetary and current account imbalances, there are many other "imbalances" and disparities that characterize the world economic system. In this regard, it is enough to recall the imbalances in the energy field, in the pension system, in the degree of income inequality, in the different degrees of flexibility of national labor markets, in the demographic characteristics of various countries and regions in the world, in the social security system and the like. This wide range of imbalances implies that in order to address them there is a need to employ a broad array of policy instruments. These policies include macroeconomic as well as microeconomic policies. In particular, special attention should be given to strengthening the banking system, improving the functioning of financial markets including the market for foreign exchange, while accompanying these developments with the appropriate supervisory and regulatory mechanisms. In addition, policies must secure the openness of the various markets to free international trade in goods, services, and capital. Of course, this is a very tall order of economic policy challenges as it combines the broad array of macroeconomic and structural economic policies.

Unfortunately, policy makers have not exhibited a great appetite for dealing with structural measures. The lack of political will has reflected the notion that the political cost of dealing with structural issues is incurred up front whereas the benefits are widely spread in the distant future. The process of globalisation and, in particular, globalisation of capital markets, reduces significantly the force of this argument. In a well functioning capital market, current prices and rates of return reflect

the expectations of market participants about the future course of policies and events. Therefore, in a fundamental sense, one of the important roles of capital markets is to bring the future “closer” to the present. In a sense, under these circumstances, the “long run” is much closer to the “short run” than what it used to be. As it were, we are in a “fast forward” mode. Politicians, therefore, are now more likely to see the benefits of the structural measures during their own term in office and, as a result, some of the obstacles for the implementation of such policies are diminished. This is one of the important benefits of globalisation of capital markets and, thereby, also one of the main arguments for putting structural measures that enhance the flexibility of the economic systems high on the economic policy agenda.

The growing role that capital markets play in the modern economic system and the increased integration among national capital markets has shifted the policy attention toward securing financial stability. During the past few years, it has become clear that the traditional policy objective of securing price stability needs to be augmented by an additional policy objective: securing financial stability. After all, it is the weaknesses in the financial system that has been at the center of recent economic crises. As a result, much more attention is now given to the structure of the balance sheets of banks and financial institutions, to the role of transparency, as well as to the design of regulatory, supervisory and prudential systems.

There is a wise Chinese proverb stating that “the honey is sweet but the bee stings”. The challenge is how to benefit from the sweetness of the honey without being stung. Globalisation and structural measures generate the sweet honey but are frequently accompanied by some short-term hardships. The challenge is to secure the great benefits from the openness of markets and from the flexibility of the economic system while minimizing the hardships that occasionally arise in the short run following the adoption of the structural measures.

While there is a growing consensus that the large and growing current account imbalances are not sustainable, there does not seem to be the requisite urgency to deal effectively with these imbalances. To be sure, by the very definition of being “non-sustainable”, it is obvious that this process will come to a halt. The question, however, is will the

adjustment be orderly and navigated properly by the appropriate policy measures, or will the markets lose patience with the lack of policy response and respond abruptly and generate great disruptions.

One of the reasons for the unsatisfactory policy response is that previous forecasts have not materialized and, thereby, have reduced the credibility of the economic analysis. For example, we were told that the large budget deficit in the United States will result in a higher long-term real rate of interest. In fact, the long-term rate of interest declined and stayed low (the famous Greenspan conundrum). We were told that the large and growing current account deficit of the United States will result in a depreciation of the value of the US dollar. In fact, the dollar has strengthened. We were told that a sustained rise in the price of oil will result in higher inflation as well as in a slowdown of economic growth. In fact, inflation has not accelerated, economic growth seems to be robust, and the unemployment rate is on the decline. We were told that when the Federal Reserve adopts a strategy of raising the short-term rate of interest in a systematic manner, eventually the long-term rate will follow suit. In fact, the Federal Reserve has raised interest rates fifteen consecutive times with very little response on the long-term rate and, thereby, resulting in a flat and even negatively sloped yield curve. These and similar phenomena have undercut some of the credibility of the conventional economic analysis, have raised the possibility of a paradigm change, and may have contributed to the relative sanguine attitude. It would be a risky policy gamble to assume that because the predicted consequences of deficits and policies have not yet materialized, the various imbalances can be sustainable much longer.

Waiting for economic and financial crises would be an expensive way to sort out the various puzzles. It would be the wrong way. The analysis of crisis is typically divided into two: crisis prevention and crisis resolution. There is a professional consensus that the prevention of a crisis is the less costly alternative. To be successful, the well known policy package must be in place. It includes a solid fiscal system with low budget deficit and non-distorting taxes, price stability, a solid banking and financial system, a well functioning capital market, a well functioning foreign exchange market, and the appropriate institutions and regulations that secure

the attainment of the above. If, however, a crisis does erupt it is extremely important that it is dealt with effectively and promptly. The appropriate management and resolution of the crisis entails a complex set of policies about which I will not elaborate in these remarks. However, one important principle needs to be highlighted: in resolving a crisis one needs to be extremely careful not to sow the seed for the next crisis. Consequently, one should be very careful to resist the temptation of engaging in a wholesale bailout operation without paying due attention to the short-term and long-term budgetary consequences of the bailout operations and without paying due attention to the “moral hazard” that results from such operations and that may distort future patterns of risk taking. Accordingly, the criteria for assessing the success or failure of a specific crisis resolution should not just be in terms of the success in “extinguishing the fire” but rather in the success in preventing the next fire. These considerations have profound indications to the choice of the optimal degree of regulation. A system that is over-regulated can be as bad as a system that is under-regulated.

The various crises that took place during the past decade have been costly, but I believe it is fair to say that the world financial system and, in particular, the banking and financial systems in emerging economies are now much stronger than what they used to be. International reserve holdings have been rebuilt (and in some cases maybe even excessively so), capital markets have been improved, supervisory and regulatory systems are more solid than what they used to be, foreign exchange markets are deeper and more resilient, and there is a widespread understanding that it is a mistake (and even futile) to engage in massive foreign exchange interventions with an aim to cling to the

wrong exchange rate and prevent the manifestation of market forces. In fact, the adoption of flexible exchange rates has proven to be effective in reducing the likelihood of future crises. It has also contributed to the recognition that a successful functioning of the foreign exchange market requires building the appropriate infrastructure.

Let me conclude with one final thought. Before the onset of the Asian financial crisis in 1997, the IMF has almost completed the preparation for the adoption of a new amendment to its Articles of Agreement. This amendment was to require the membership to adopt (with some conditions) convertibility of capital account transactions in an analogous way in which members, under the current Articles of Agreement, are expected to adopt convertibility for transactions in the trade account. This proposed amendment reflected the belief that with a growing degree of globalisation and with the advances in capital markets, the world economic system would benefit from free movement of capital which, in turn, necessitates convertibility of capital account transactions. The eruption of the Asian financial crisis has derailed the planned adoption of the amendment to the Articles of Agreement, and reopened the debate on the virtues of globalisation, as well as on the preconditions that need to be in place for a “safe opening” of the capital account. In view of the policy lessons that have been learned, and in view of the fact that the world financial system (including that in emerging economies) is much stronger than what it used to be, I believe that the time has come for the reopening of the discussion that would lead towards capital account convertibility and that would necessitate the adoption of the relevant amendment to the Articles of Agreement of the IMF.

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