



## How fiscal policy affects the price level: lessons from a not so distant past

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*This letter presents the findings of research carried out at the Banque de France. The views expressed in this post are those of the authors and do not necessarily reflect the position of the Banque de France. Any errors or omissions are the responsibility of the authors.*

*The last decade has witnessed large-scale debt accumulation in a number of developed countries. Such increases in debt levels raise questions about the sustainability of public finances and risks of debt monetisation. This letter analyses a historical case study of significant debt accumulation – Britain during the Napoleonic Wars. The author provides evidence on how expectations regarding the sustainability of public finances can affect the price level under extraordinary circumstances.*

Ever since the sovereign debt crisis erupted in the euro area, debt dynamics and their impact on the broader economy have been at the core of policy debates. A commonly cited risk from public debt accumulation is that it can bring about fiscally-induced inflation. The latter occurs when governments do not undertake the necessary actions to ensure fiscal sustainability, thus, jeopardising the value of their currency to the detriment of their citizens. Given the importance of this issue, this *Rue de la Banque* assesses inflationary pressures in an environment of high public debt by analysing a historical precedent – Britain during the Napoleonic Wars.

### **Historical evidence on the monetary financing of high public debt: the case of Britain during the Napoleonic Wars**

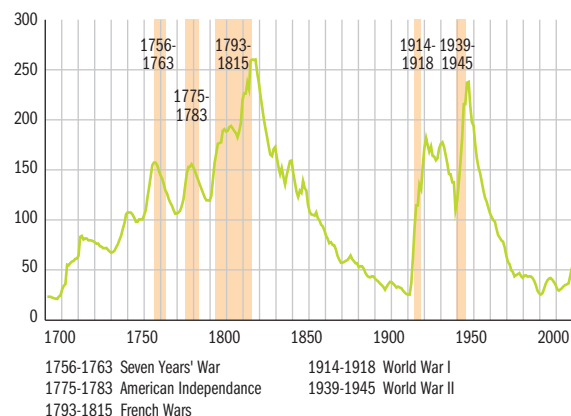
Between 1797 and 1821, Britain suspended the convertibility of paper money into gold in order to finance the Napoleonic Wars (Bordo and White, 1991). This put the country on a fiat currency regime with a flexible exchange rate, features that characterise most industrialised economies today.

The suspension of the gold standard was accompanied by large-scale debt accumulation and inflation.

After Napoleon's final defeat at Waterloo in 1815, the debt-to-GDP ratio reached 226%, up from 120% at the beginning of the French Wars in 1793. This increase is of the same order of magnitude as that caused by World War I (see Chart 1). In today's terms, only Japan comes close to this ratio.

**C1 Debt-to-GDP ratio**

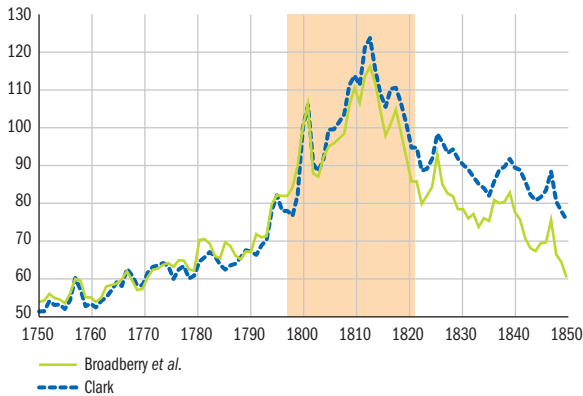
(%)



Source: Officer and Williamson (2013).

**C2 Price indices, 1750-1850**

(1800= 100)



Sources: Broadberry et al. (2012); Clark (2014).

At the same time, the price level increased by 22.3% between the suspension of convertibility in 1797 and the end of the war in 1815 (see Chart 2).<sup>1</sup>

**Asset prices reflect expectations regarding fiscal sustainability**

Hence, we observe a striking coincidence between, the accumulation of high public debt and the increase of prices during the suspension of the gold standard between 1797 and 1821. The Fiscal Theory of the Price Level, discussed in more detail further below, puts forward a mechanism that may explain this coincidence (Leeper, 1991; Sims, 1994; Woodford, 1995). In this framework, people anticipate developments in public debt and modify their consumption, investment and spending decisions accordingly. This, in turn, affects asset prices and the general price level.

In other words, fluctuations in asset prices within the period may reflect how people viewed the sustainability of public finances. In order to capture this relationship, it is useful to consider the financial indicators available to contemporaries which reflected these inflationary pressures.

One such series is the exchange rate of paper pounds into gold, the so-called *agio*, which is calculated as the difference between the mint and the market price of gold. The *agio* was traditionally used to measure inflation over the period, beginning with David Ricardo and the *Bullion Report*.

In particular, the *agio* gauges the internal value of paper money. When the *agio* increases, for instance, more paper

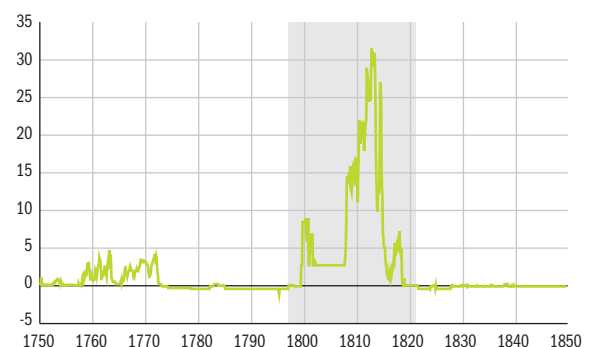
pounds are needed to purchase a given amount of gold. An increase in the *agio*, thus, means a decline in the pound's value, and, hence, corresponds to inflation. As a matter of fact, fluctuations in the *agio* are highly correlated with movements in the aggregate price level computed ex post. Correlation coefficients for the available monthly and yearly price indices range from 0.65 to 0.72 and from 0.68 to 0.79 respectively.

Chart 3 displays the *agio* between 1750 and 1850, the shaded area representing the suspension of the gold standard. It is noteworthy that none of the major conflicts before the suspension period, such as the Seven Years' War (1756-63), coincided with such a sizeable devaluation of the pound. It is only in 1802 and even more so after 1808 that the *agio* increased markedly, in line with intensified hostilities between Britain and Napoleonic France. At its peak, in mid-1813, the *agio* reached 45%, entailing an equivalent decline in the paper pound's value.

A more formal way to exploit the information content of the *agio* is to conduct break tests on the series (Bai and Perron, 1998 and 2003). These tests pin down the exact dates at which the *agio* shifted to a higher level and test whether these level shifts are statistically significant.<sup>2</sup>

**C3 The *agio*, difference between the mint and market prices of gold**

(%)



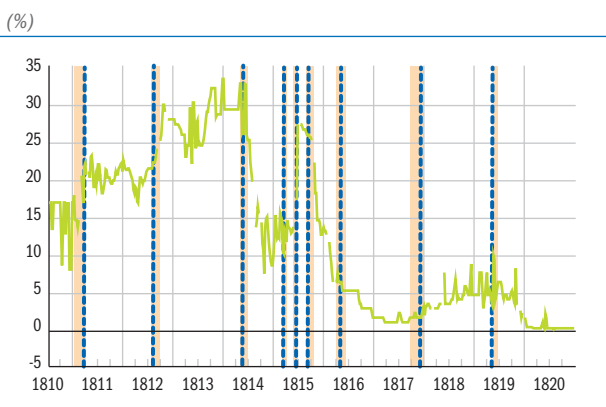
Sources: Castaing's course of the exchange reproduced in Neal, 1990 and Boyer-Xambeu et al. 1994.

1 The price indices presented in figure 2 were constructed ex post and, hence, not available to contemporaries.  
 2 The equation tested is  $agio_t = \mu_t + \varepsilon_t$  where the mean of the series ( $\mu_t$ ) changes with the advent of unexpected news regarding public finances.  $\varepsilon_t$  is an error term.

Moreover, if the aggregate price level reflects agents' assessment of fiscal sustainability in the future, important changes in the price level should convey information on the events that caused contemporaries to alter their predictions regarding public finances. The approach used here, thus, consists in first using the econometric procedure to identify significant breaks. In a second step, extensive contemporary sources are exploited to confirm that break dates coincide with events that shaped market sentiment.

Chart 4 focuses on the period from 1810 to 1821, spanning the years from the publication of the *Bullion Report* to the end of the gold standard's suspension. For this period, gold prices were published twice a week, on Tuesdays and Fridays, thus allowing, for a precise determination of break points. Break dates are depicted by dashed lines; the shaded areas around them represent the 95% confidence intervals. Altogether, there are no less than 9 break points for the *agio*, including the American declaration of War (August 1812) and the announcement of the gold standard's resumption (May 1819).

## C4 Break points, 1810-1821



Source: author's calculations.

The biggest fluctuations in the *agio* occurred between June 1814 and June 1815, the dates of Napoleon's first and second abdication, respectively. In particular:

- The Treaty of Paris, signed on 30 May 1814, put an end to 21 years of almost uninterrupted warfare. When the news reached London, the value of the pound increased by 60%.
- On 20 March 1815, Napoleon entered Paris, after having escaped from his exile on Elba, and immediately started to organise his army. At the mere prospect of a new war

against Napoleon, the pound's value declined by almost 60%. The fluctuation in the *agio* due to this particular event shows that it is the expectation of future public spending that affects the price level. No war-related spending had yet occurred, which rules out the hypothesis that inflationary pressures were caused by monetary expansion.

- Napoleon suffered his decisive defeat at Waterloo on 18 June 1815. On this occasion, the value of the pound increased by almost 60%.

Overall, the detected break dates in the pound's internal value, the *agio*, coincide with events that command a revision of expectations regarding public finances. In particular, unfavourable news – concerning a battle lost by the British, for example – had an inflationary impact. On the contrary, favourable news caused inflation to recede. This analysis, thus, provides evidence on how expectations regarding the sustainability of public finances can affect the price level.

## Some economic theory and lessons for current policy debates

According to the Fiscal Theory of the Price Level, adjustments in the price level guarantee the sustainability of public debt (Leeper, 1991; Sims, 1994; Woodford, 1995). In this framework, the aggregate price level is, therefore, determined by fiscal rather than monetary policy.

In particular, a government's ability to finance its expenditures can be constrained for economic or political reasons. The existence of a fiscal limit, e.g. the peak of the Laffer curve, is equivalent to relaxing the assumption that the fiscal authority accommodates the central bank's policies by keeping debt on a sustainable path. In such cases, inflation is no longer a monetary phenomenon.

In addition, rather than being a specific point – such as one particular debt to GDP ratio, for example – an economy's fiscal limit can be thought of as a distribution affected by various factors. The latter include contingencies, such as wars, or financial crises that are, at least in the short term, beyond a government's full control and that a government cannot avoid. Bouts of fiscally-induced inflation do not, therefore, necessarily imply that governments or central banks are not credible in their policy commitments.

Finally, a prerequisite for the occurrence of fiscal inflation is the absence of any other type of default. Non-consenting debt restructurings or haircuts, for example, that place

public debt on a sustainable trajectory imply that devaluing the currency is no longer necessary to guarantee the sustainability of public debt. Hence, fiscal inflation may occur, when default of any other type is off the table.

In practice, the workings of the Fiscal Theory of the Price Level are difficult to test for. This is the case because the theory's central prescriptions can be verified in real-life data, regardless of whether prices are determined by fiscal or monetary factors (Cochrane, 1998; Creel and Le Bihan, 2006). The framework remains, nevertheless, relevant under extraordinary circumstances, i.e. when events such as wars or severe financial crises push the economy to the limits of its fiscal capacity.

The existence of a fiscal limit, the possibility of reaching it unexpectedly, and its effects on the potency of monetary policy, thus, all call for sound fiscal policies on average. The latter require that sufficient revenues be generated to cover expenditures and would ideally also create some fiscal leeway for governments to be able to meet unforeseen outlays. Such fiscal policies safeguard citizens wealth by preventing bouts of fiscally-induced inflation or other types of default.

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