

DID MONETARY POLICYMAKERS STEP ON A  
RAKE?

*A Study of Monetary-Fiscal Interactions in the British  
Great Inflation*

DOCTORAL THESIS

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requirements for the degree of Doctor of Philosophy*

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# Declaration

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## Statement of co-authored work

I confirm that Chapter 3 draws on a paper I have co-authored with Professor David Aikman of Kings College London and Professor Alan M. Taylor of Columbia University. I contributed 70% of this work. I am also working on the role of fiscal policy in the Great Inflation in Britain with Professor Michael Bordo of Rutgers University and Ryland Thomas at the Bank of England, but Chapters 1 and 2 (where there is an overlap) are entirely my own work.



# Abstract

1960s-70s Britain experienced very high inflation relative both to its peers and its own previous history. The conventional wisdom blames both bad luck and bad *monetary* policy, leaving little or no role for *fiscal* policy. This thesis analyses the role of fiscal policy in the British Great Inflation and reinterprets the role of monetary policy through the lens of modern theory on monetary-fiscal interactions.

I show that fiscal policy was used very differently in the 1960s-70s than in most of the rest of modern British history and that this had consequences for inflation. Policymakers abandoned the previous practice of using fiscal policy to stabilise the public finances. In this regime, shocks (fiscal or otherwise) which led to a deterioration in the primary balance were ultimately financed not by subsequent tax increases or spending cuts but by surprise inflation. I argue that, in this unusual fiscal financing regime, a series of such shocks were probably responsible for the Great Inflation in Britain.

Where does a *fiscal* explanation of the Great Inflation leave accounts emphasising the role of *monetary* policy? Modern theory predicts that, in a regime such as Britain's in the 1960s-70s, contractionary monetary policy shocks eventually lead to *higher* prices. This phenomenon has been labelled 'stepping on a rake'. In fact, I find that surprise increases in the policy rate caused inflation to fall and – at least within conventional time windows of monetary analysis – there was no sign of it rebounding as per the rake hypothesis. This leaves a puzzle.

My explanation for how monetary policy surprises had conventional effects appeals to the institutional arrangements governing macroeconomic policy in 1960s-70s Britain. Monetary and fiscal policy were both used to manage demand and were ultimately both controlled by the Chancellor. The fact that they tended to pull in the same direction meant that, whatever the intention, fiscal policy did give the backing required for monetary policy to have conventional effects. But the extent of that backing depended on the timing of monetary policy announcements, as did the impact on inflation.

So I find no evidence that monetary policymakers stepped on a rake, but I do find evidence in favour of the theory's prediction that monetary policy requires fiscal backing.





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Writing a thesis isn't straightforward and requires patience and support of close family. My wife Sophie has gone above and beyond the call of duty to support me, while also running a business and publishing not one but two books while I have been studying. Our children William and Millicent haven't seen quite as much of their Daddy as they would have liked, but they have played important inspirational and emotional roles. I'm very grateful to my in-laws Beren and Peter for helping so much and for my family, particularly my parents, and friends for being very supportive and understanding despite long periods without hearing anything from me.

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The staff at LSE have been fantastically helpful, particularly Shuma Begum in the PhD academy who has helped me get over the line, Loraine Long in the Department and Delphine Bénézet who arranged my trip to Berkeley for me.

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Of course, the standard disclaimer applies: this thesis does not necessarily reflect the views of the Bank of England (past or present).

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than life, always effervescent with enthusiasm and very generous to me and other young economists with his time – a role model if ever there is one. If you didn't know Peter well and want to get a sense of what kind of man he was, I recommend spending a few minutes looking at his online condolence book (<https://intranet.birmingham.ac.uk/social-sciences/peter-sinclair.aspx>).

This thesis is dedicated to Sophie, William and Millicent to whom I owe so much and to Peter, with whom I would have loved to discuss this thesis.



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# Chapter 1.

## Introduction

What caused the Great Inflation?

If it isn't already, this question is bound to become one of the classic questions in macroeconomic history, alongside those about the Industrial Revolution and the Great Depression. Inflation was not, of course, a new phenomenon. Hyperinflations date back to the French Revolution ([Sargent and Velde, 1995](#)) and periods of high inflation have occurred ever since. For most of modern history, high inflation has been associated with wars ([Cagan, 1956](#)). What makes the Great Inflation of particular interest is that it occurred during peacetime.

Conventional explanations stress the role of supply-side shocks and the conduct of *monetary* policy. The departure point for this thesis is its focus on the role of *fiscal* policy, which is often ignored in this literature. In particular, I ask whether explanations of high wartime inflation – the state's need to levy resources via inflation taxes of one form or another – also apply to the Great Inflation and, if so, where that leaves the role of monetary policy.

I ask this question of Britain, which is a particularly promising country to study for a number of reasons. First, inflation was significantly higher in Britain than in other wealthy countries.<sup>1</sup> Second, Britain has a highly centralised and hierarchical power structure which makes it relatively easy to assemble with confidence narrative evidence on government policy. Third, as the land of Hume, Smith, Ricardo, Mill and Keynes, the evolution of fiscal doctrine may have had an outsized influence on policymaking.<sup>2</sup>

The second thesis chapter (the first after this introduction) puts the conduct of fiscal policy in the 1960s-70s into historical context. Drawing on three hundred years of Parliamentary speeches, I show that in most of modern British history, the primary peacetime objective of fiscal policy was to stabilise the public finances by running a balanced budget or a surplus. This objective was set to one side after the Second World War (WWII) and fiscal policy was instead used

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<sup>1</sup>Italy was another outlier, with similar rates of inflation to Britain.

<sup>2</sup>One could also add (Robert) Hamilton and McCulloch.

to manage demand. In this regime, shocks (fiscal or otherwise) which led to a deterioration in the primary balance were ultimately financed not by subsequent tax increases or spending cuts but by surprise inflation. To support this claim, I present estimates of the impact of fiscal shocks on the primary balance and the price level and complement this with narrative evidence that financial market participants believed there was a causal link between fiscal deficits and inflation, a belief reflected in asset prices. While I stop short of a full quantitative account of the role of fiscal policy in the Great Inflation, I argue informally that a series of fiscal and supply-side shocks negatively affected the public finances and, in the absence of corrective fiscal measures, were probably largely responsible for the Great Inflation in Britain.

The remainder of the thesis re-considers the role of monetary policy in the Great Inflation in light of these findings. Modern theory on monetary-fiscal interactions predicts that, in a regime such as Britain's in the 1960s-70s, contractionary monetary policy shocks eventually lead to *higher* prices. In other words, the authorities' efforts to tighten monetary policy during the Great Inflation ultimately would have made things worse, not better. This phenomenon has been labelled 'stepping on a rake' (in [Sims \(2011\)](#), a paper about the Great Inflation in the United States (US), in some respects an updated version of [Sargent and Wallace \(1981\)](#), in which monetary policy is conducted by setting interest rates, rather than the money stock).<sup>3</sup>

The third chapter analyses whether surprise increases in the monetary policy rate did in fact result in higher prices. To do this, I assemble new archival evidence on the timing of monetary policy announcements, new daily data on government bond prices, a new monthly 'big' data set of economic and financial indicators and a new data set of Treasury and private sector macroeconomic forecasts transcribed from archived papers and published journals. Using changes in asset prices on days of monetary policy announcements, I estimate the dynamic impact of interest rate surprises on the price level and the contemporaneous impact on forward rates, which at the medium to long end of the curve can be interpreted as a rough proxy for the impact on financial market participants'

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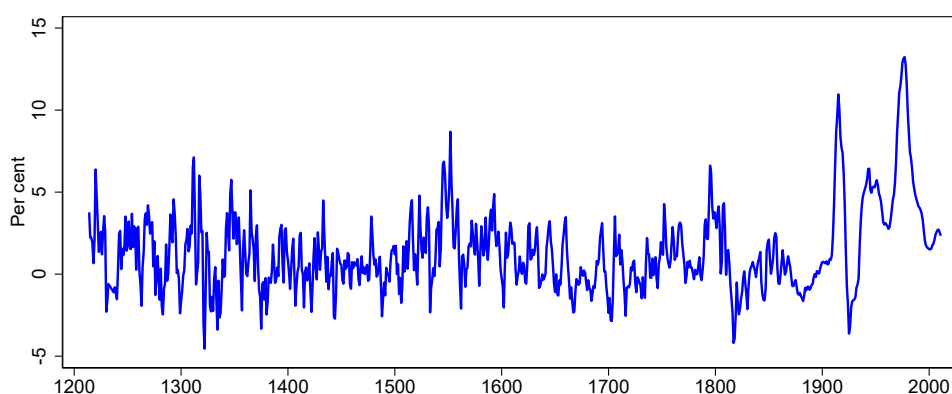
<sup>3</sup>Another important difference is that inflation stabilises the public finances by affecting the real value of *money* in [Sargent and Wallace](#) and *debt* in [Sims](#).

inflation expectations. In contrast to the ‘stepping on a rake’ hypothesis, these exercises suggest that the price level fell at long horizons, with no sign of any expected rebound. This leaves a puzzle to be resolved: my findings in the second and third chapters are hard to reconcile with theory.

In the fourth chapter, I show how my results can be reconciled and seek to answer the question posed in the thesis title. My explanation for how monetary policy surprises had conventional effects appeals to the institutional arrangements governing macroeconomic policy in 1960s-70s Britain. Monetary and fiscal policy were both used to manage demand and were ultimately both controlled by the Chancellor. The fact that they tended to pull in the same direction gave monetary policy the backing it needed to have conventional effects. But the extent of that backing depended on the timing of monetary policy announcements, as did the impact on inflation.

So I find no evidence that monetary policymakers stepped on a rake, but I do find evidence in favour of the theory’s prediction that monetary policy requires fiscal backing.

**Figure 1.1:** *UK inflation in the long run*



Sources: [Thomas and Dimsdale \(2017\)](#). The series is created using the Schumpeter-Gilroy index for 1661 to 1750 from [Mitchell \(1988\)](#), data for 1750 to 1770 from [Crafts and Mills \(1994\)](#), data for 1770 to 1882 from [Feinstein \(1998\)](#), data for 1882 to 1914 from [Feinstein \(1991\)](#), data for 1914 to 1949 from [O’Donoghue et al. \(2006\)](#) and data from 1949 onwards from the ONS.

*Note:* The figure shows the ten-year centred average of UK inflation.

The remainder of this introduction puts the Great Inflation in Britain into historical and international context, discusses theories on the causes of high

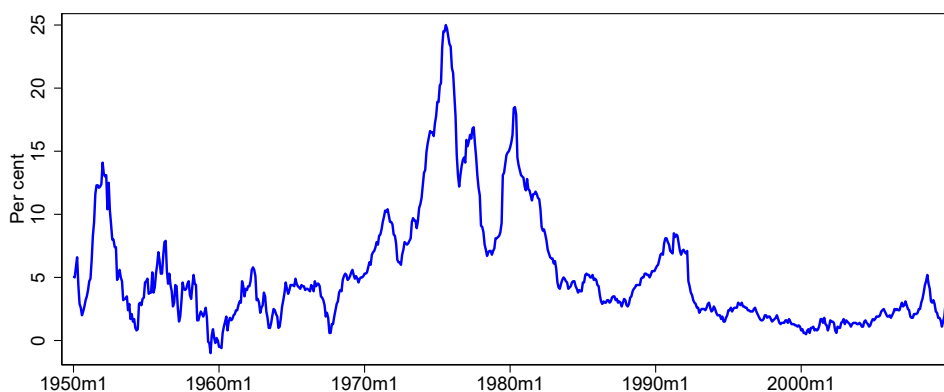
inflation including the rake hypothesis and takes a deeper look at post-WWII UK.

### 1.1. THE BRITISH GREAT INFLATION IN CONTEXT

Figure 1.1 shows British inflation in the long run. The final – and largest – peak shows the Great Inflation. Most other peaks occurred around the time of wars (e.g. the Wars with France, WWI and WWII) although the Great Debasement of the 1540s and early 1550s is an exception.

Figure 1.2 shows UK inflation in the second half of the twentieth century. Aside from a short rise in the 1950s associated with the Korean War, inflation was moderate and fairly stable throughout the 1950s and 1960s. This pattern reflected moderate and stable inflation for most of that period in the US, to which the UK pegged its currency as part of the Bretton Woods system. [Romer and Romer \(2002\)](#) attribute the stability of US inflation over this period to the ‘sophisticated’ monetary policy of the Federal Reserve in the 1950s.

**Figure 1.2:** *Post-WWII UK inflation*



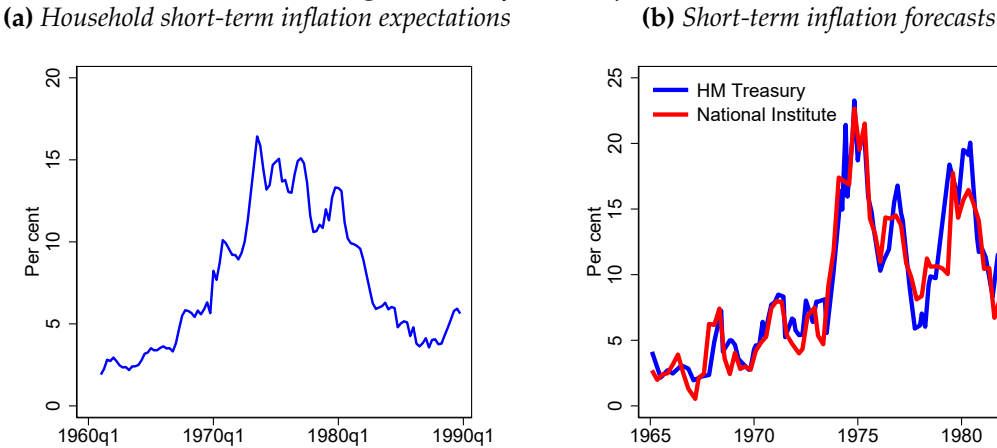
*Source:* [O'Donoghue et al. \(2006\)](#).

*Note:* The figure shows the annual rate of CPI inflation.

I follow the convention of dating the start of the Great Inflation in 1965 even though inflation took a few more years to rise in the UK than in the US. That said, judging by the amount of assistance required to maintain the dollar peg, the UK arguably had a credibility problem dating from WWII which worsened in the

1960s and led to devaluation in 1967 (see e.g. [Bordo et al. \(2009\)](#) and [Capie \(2010\)](#), Chapter 5). Figure 1.3 shows that inflation expectations also started to drift up well before 1970 (a trend that is also clear in nominal forward rates shown in Chapter 3 Figure 3.4).

**Figure 1.3: Inflation expectations**



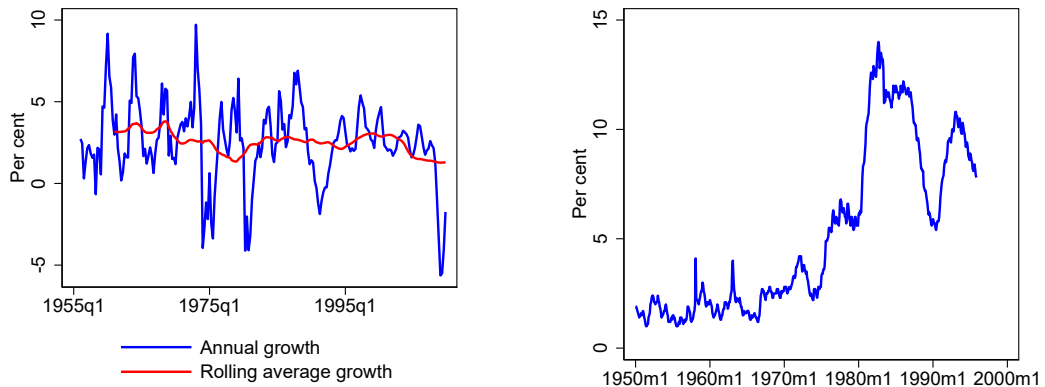
Sources: [Batchelor and Orr \(1988\)](#), National Institute for Economic and Social Research and the National Archives.

Notes: The first chart is based on surveys of households. Forecast data were transcribed from publications of the *National Institute Economic Review* and papers from the National Archives.

Inflation was very high and volatile in the 1970s, with two peaks corresponding to the oil shocks. At the first peak, in August 1975, inflation was 25 per cent. Contemporaneous with the rise in inflation was a fall in trend GDP growth and a rise in unemployment. Figure 1.4a shows a very large boom in output in 1972-73 (the ‘Barber boom’, named after the Chancellor Anthony Barber) followed by a recession, a modest recovery and another recession. The trend is hard to see through this volatility, but the red line shows that trend growth was lower in the 1970s than in the previous and subsequent decades. Unemployment, which had been exceptionally low throughout the 1950s and 1960s, started to climb in 1970, fell temporarily during the Barber boom before rising on and off for the rest of the decade (Figure 1.4b).

Inflation subsequently fell back in the early 1980s alongside a significant further increase in the unemployment rate, rose again for a short period in the early 1990s and then settled down to a rate of around 2%.

**Figure 1.4: UK GDP growth and unemployment rate**  
**(a) GDP growth** **(b) Unemployment rate**



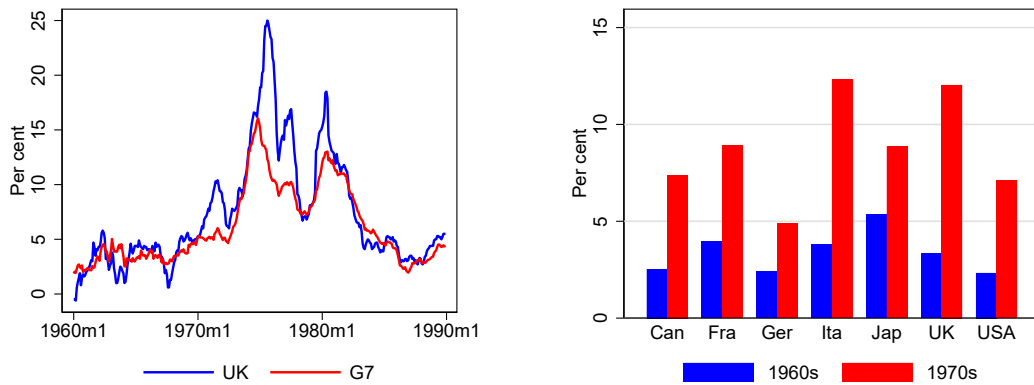
Source: ONS and [Denman and McDonald \(1996\)](#).

Notes: GDP growth is the annual percentage change in GDP. The red line is a ten-year centred rolling average. The unemployment rate uses administrative unemployment data.

Figure 1.5 shows UK inflation in international context. The time series pattern in the UK is broadly similar to that in other G7 countries, although UK inflation reached significantly higher rates in the 1970s. Italy and the UK are the clear outliers to the upside and Germany to the downside.

**Figure 1.5: UK and G7 inflation**

**(a) By year** **(b) By decade**



Sources: IMF *International Financial Statistics* and [O'Donoghue et al. \(2006\)](#).

Notes: Inflation in the first chart is the annual change in CPI inflation. The second chart shows the same series averaged over decades.



## 1.2. WAS HIGH INFLATION COSTLY?

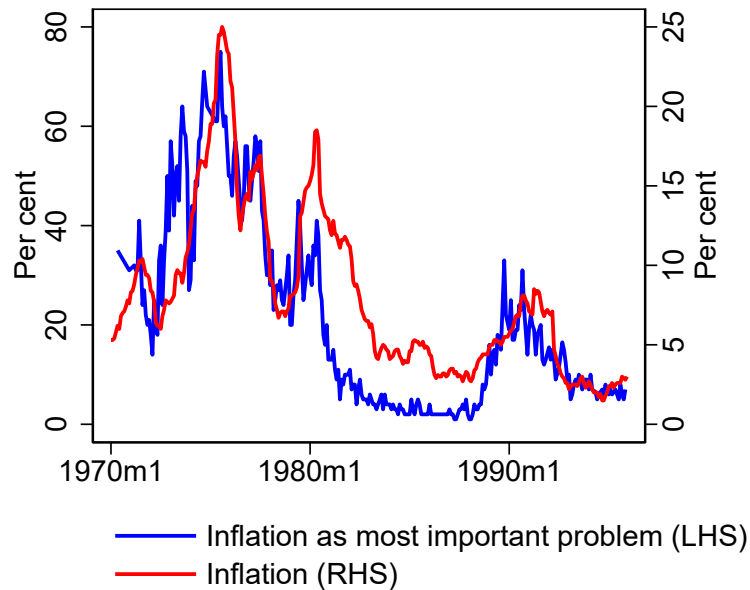
Should these patterns over time and across countries be of any interest? It is not immediately obvious that the rate of change of consumer prices should matter all that much. Ultimately we care about the *volume* of our consumption, along with other less marketable features of life such as health, friends and family.

In fact, the evidence is very strong that, for whatever reason, people care about inflation a lot. [Shiller \(1997\)](#) reports that inflation is widely reported on in the newspapers, more so than any other economic phenomenon and more so even than sex. He finds that more survey respondents believed that low inflation should be a national priority than that low unemployment should be prioritised. When asked directly about the Phillips curve trade-off, a large majority preferred inflation of 2% and unemployment of 9% than inflation of 10% and unemployment of 3%. Non-economist respondents had very different concerns about inflation than the economists surveyed, believing that high inflation would reduce their standard of living and viewing the issue in terms of fairness.

Shiller's evidence chimes with the findings of [Tomlinson \(2014\)](#), who reports on the activities of the Counter-Inflation Publicity Unit in the UK, in which Prime Minister Wilson took a close interest. [Tomlinson](#) cites the work of [Behrend \(1974\)](#). Her 1973 survey of British people found a high level of concern about the rate of inflation, with a high proportion believing that their wages had not kept up with prices. Evidently, Wilson's interest was warranted. [Figure 1.6](#) shows a measure public concern about inflation. It co-varies strongly with inflation. At the peak, 75% of respondents said that inflation was the most important issue facing the country.

Of course there is a large theoretical and empirical economics literature which tries to quantify the costs of high inflation. For our purposes, though, the mere fact that people were very concerned about high inflation in the Great Inflation is sufficient.

**Figure 1.6:** *Concern about inflation*



Sources: Jennings and Wlezien (2011), <https://www.comparativeagendas.net/uk> and O'Donoghue et al. (2006).

Note: The inflation concern series is based on Gallup surveys asking respondents about the most important problem facing the country. Missing data are interpolated.

### 1.3. LITERATURE ON THE CAUSES OF THE GREAT INFLATION

Bordo and Orphanides (2013) is a masterful summary of the wide range of explanations for the Great Inflation in the literature on the US.<sup>4</sup> The UK literature is smaller, with academics investigating a subset of the hypotheses put forward for the US.

As ever, explanations for bad outcomes can be grouped into two camps: bad luck and bad policy. The first bad luck explanation attributes high inflation to adverse commodity price and other supply shocks. Given the coincidence of both high inflation and low output growth over the 1970s ('stagflation'), it certainly seems intuitive that supply side shocks played a role. Rowlatt (1988) and Hendry (2001) both attribute the greater part of the rise in inflation in the

<sup>4</sup>Nelson (2005) contains a similar summary, with a very insightful critical stance taken towards most explanations.

1970s to movements in oil and other commodity prices. However, their results are difficult to interpret given the reduced form nature of the models employed. Using structural vector autoregressions (SVARs), [Benati \(2008\)](#) and [Barnett et al. \(2010\)](#) find smaller, although still significant, contributions from commodity prices.

Supply-side shocks might have been amplified by frictions in the labour market. [Grubb et al. \(1982\)](#) present theory and evidence that the burst in import price inflation (largely associated with commodity price inflation) and the slowdown in productivity growth raised the rate of unemployment consistent with stable inflation (the NAIRU). [Miller \(1976\)](#) finds that real wage resistance was made worse by the design of incomes policies, which hardened the link between price and wage inflation (a claim also supported by [Woodward \(1991\)](#)).

Even if there were adverse commodity and other supply shocks, was it inevitable that there would be a large and persistent rise in inflation? At the time, some academics appeared to have thought so. [Laidler and Parkin \(1975\)](#)'s survey of contemporaneous literature on inflation includes work denying that the Phillips Curve represents a structural relationship implying that deficient demand (and high unemployment) causes wage and price inflation to fall. Two examples are [Phelps Brown \(1971\)](#) and [Hicks \(1974\)](#).

The overwhelming consensus nowadays is of course that deficient demand does cause wage and price inflation to fall. Because the majority view also assumes or finds evidence in favour of tighter monetary policy reducing aggregate demand and inflation, it seems a natural conclusion that tighter monetary policy could have prevented the Great Inflation.

Even if monetary policy could have prevented high inflation, it does not follow from this that inflation was the result of bad policy – perhaps it was efficient to accommodate higher inflation in response to adverse supply shocks. A popular explanation of the Great Inflation in the theoretical literature is that central banks face a time consistency problem. [Kydland and Prescott \(1977\)](#) show that if a central bank cannot commit not to exploit the Phillips curve to reduce unemployment, the private sector rationally expects higher inflation which the central bank will deliver. The outcome is inefficiently high inflation. [Barro and](#)

[Gordon \(1983\)](#) argue along similar lines. These models imply that inflation varies with the natural rate of unemployment. [Parkin \(1993\)](#) and [Ireland \(1999\)](#) argue that the rise and fall in the natural rate of unemployment were responsible for the Great Inflation and its end. [Goodhart \(1989\)](#) makes a similar point in his discussion of inflation in the UK. However, as [Bordo and Orphanides](#) point out, these explanations do not appear consistent with the fall in inflation in the 1980s which was not accompanied by a fall in the natural rate of unemployment.

Several authors present evidence that monetary policy behaved differently in the 1970s than it did in later years (particularly the 1990s and 2000s). These contributions implicitly or explicitly fall into the ‘bad policy’ camp rather than the ‘bad luck’ camp. One example is [Nelson \(2003\)](#) who finds a very low response of the policy rate to inflation during the Great Inflation (which remained the case until inflation targeting began in 1992). However, [Benati](#) concludes that even if monetary policy had reacted to inflation in the 1970s as it did after the Bank of England gained full monetary policy instrument independence in 1997, inflation would not have been much lower in the 1970s. This result is vulnerable to two criticisms. First, as the author notes, such an exercise is subject to the Lucas Critique. With a different policy rule, for example, perhaps inflation expectations would not have risen as they did. Second, the result may simply reflect an estimated response of inflation to monetary policy shocks which is counterfactually low (e.g. it appears to be considerable smaller than in [Cloyne and Hürtgen \(2016\)](#)). In contrast, [Nelson and Nikolov \(2004\)](#) conclude that had monetary policy in the 1970s been conducted as it was from 1992 to 1997, inflation in the 1970s would have been barely any higher than in the 1960s – a huge difference from what actually happened.

A monetary policy rule that did not respond sufficiently to inflation may have left the economy vulnerable to self-fulfilling changes in inflation expectations. [Barnett et al.](#) investigate this possibility and conclude that shocks to inflation expectations were not a major driver of inflation in the 1970s.

If the majority view is that monetary policy was too loose and did not respond sufficiently to inflation in the 1970s, what might explain this? One possibility is that policymakers misunderstood the state of the economy – in particular the

amount of slack. [Nelson and Nikolov \(2003\)](#) use data revisions and documentary evidence to show that this was indeed the case. Data on output have been revised up significantly for some periods of the 1970s and the slowdown in productivity growth meant policymakers overestimated potential output growth by some margin. All in all, [Nelson and Nikolov](#) conclude that policymakers thought that the output gap was on average 7% weaker over the course of the 1970s than it really was. In separate work, the authors estimate that it explains about a quarter of the rise in inflation from the 1960s to the 1970s ([Nelson and Nikolov, 2004](#)).

The authorities may also have misunderstood the process generating inflation. [DeLong \(1997\)](#) argues that American policymakers believed that they could exploit the inverse relationship between unemployment and inflation to hold unemployment down for a sustained period. [Sargent \(2002\)](#) builds on this insight, arguing that as inflation rose, policymakers began to understand that it was impossible to reduce unemployment at the cost of higher inflation except in the very short run. According to [Nelson \(2002\)](#), this explanation does not fit with the historical narrative in the UK. He gives evidence that the British authorities did not believe until the late 1970s that there was a trade-off between unemployment and inflation. This implies that inflation could not have risen because policymakers were trying to keep unemployment low at the cost of higher inflation.

Instead, Nelson argues in other work ([Nelson and Nikolov, 2004](#); [Nelson, 2005](#)) that the main reason why monetary policy was too loose was that the authorities had a nonmonetary view of inflation. It was nonmonetary in three ways. First, the authorities believed that inflation was primarily ‘cost-push’ and therefore not a monetary phenomenon. Second, they did not believe demand was particularly sensitive to short-term interest rates. Third, they did not believe that inflation would respond to economic slack. In favour of this hypothesis, he quotes policymakers and cites the fact that incomes policies and credit controls were used to control inflation.<sup>5</sup>

On the face of it, it’s not clear how this view sits with [Goodhart \(1989\)](#) and [Needham \(2015\)](#)’s claims that the Bank of England had already moved towards

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<sup>5</sup>[Batini and Nelson \(2009\)](#) expand on the use of credit controls as a substitute for interest rates.

thinking about monetary policy in terms of monetary aggregates (a claim which [Capie \(2010\)](#) disputes). [Needham](#) goes as far as to claim that Competition and Credit Control (CCC), an important reform to banking rules and the conduct of monetary policy in 1971, started Britain's first 'money supply experiment'. He cites work by Goodhart and others estimating money demand functions and investigating the direction of causality. More compellingly, he finds archival evidence that officials discussed setting a money supply target in the 1971 Budget. In the event, the Chancellor (Barber) only made a passing reference to growth in the money supply, but the *Daily Telegraph* interpreted this as a target. In response, Barber disputed the details of the story, but did say that he had set "short-term guidelines for the increase in bank lending and in money supply." And after CCC was proposed, the Governor explained that the Bank of England was shifting its focus towards monetary aggregates. Indeed internal money targets were set on a continuous basis from 1971.

If policymakers were focussing on money, this begs the question of why monetary policy was not tightened more aggressively. [Needham](#) and [Capie](#) find several examples of Prime Minister Heath blocking increases in interest rates. [Needham](#) also shows that the Bank of England's money demand equations on which internal money targets were based were problematic. In the 1972 Budget round, the target was 20% (the elasticity of money demand with respect to real output was estimated to be well above 1). But later in the year, as the authorities were struggling to meet a 20% target, the Bank found evidence of instability in the money demand function and argued that M3 growth should be kept to 17%. The Treasury lost faith with the equations and this may have set back the move towards taking money targets seriously. Nevertheless, targets continued to be set and officials continued to be worried by very high M3 growth outturns.

[Batini and Nelson](#) have an explanation to reconcile the presence of monetary targets with a nonmonetary approach to inflation control: monetary targets were used to justify the use of nonmonetary policy instruments. The UK authorities analysed developments in the money supply through the lens of the credit counterparts. The credit counterparts to the change in broad money are the change in bank lending to the private sector and the budget deficit less the

change in non-bank private sector lending to the government and the change in banks' non-deposit liabilities. This identity seemed to rationalise the use of credit controls, which would reduce bank lending, and fiscal policy, to reduce the budget deficit, both of which would in turn reduce broad money.

The exchange rate peg must be a part of any explanation of British inflation before June 1972, when sterling started to float. The Bretton Woods regime probably disciplined British monetary policy. [Fisher \(1968, 1970\)](#) and [Pissarides \(1972\)](#) find that Bank Rate responded to movements in foreign exchange reserves in this period. Of course, this begs the question of how the exchange rate disciplined policy if the authorities lacked faith in monetary policy. The answer might well be that they *did* in fact believe that the policy rate was effective in attracting capital inflows and therefore preventing pressure on sterling. Either way, the commitment to the peg was not sufficient to prevent a succession of sterling crises including devaluation in 1967 ([Schenk, 2010](#); [Kennedy, 2018](#); [Naef, 2022](#)). And as [Bordo and Schwartz \(1999\)](#) point out, the direction of causation between commitment to the Bretton Woods system and commitment to low inflation is unclear *a priori*.

## 1.4. THEORY

### 1.4.1. Fiscal financing regimes

I define a fiscal financing regime as a set of arrangements and institutions accompanied by a set of expectations which determine how fiscal shocks are financed.<sup>6</sup> The regime plays a central role in determining inflation dynamics in modern

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<sup>6</sup>This definition is based on [Bordo and Schwartz \(1999\)](#) and [Bordo and Jonung \(2001\)](#). I adapt their definition to capture the potential role of unexpected inflation in financing surprise changes in tax or spending policy through real debt revaluations. In a slight stretch of the English language, I intend the definition to apply symmetrically in the sense that a contractionary fiscal shock can be financed by an unexpected reduction the price level. The focus on the the role of *unexpected* inflation in financing fiscal *shocks* stems from the fact that debt revaluations via unexpected inflation have been shown capable of playing a significant role in debt dynamics ([Sims, 2013](#)), while expected inflation, via seigniorage, typically only plays a minor role in financing government spending ([King, 1995](#)).

macroeconomic models.<sup>7,8</sup>

In the fiscal financing regime that prevailed for much of modern British history (see Chapter 2), a fiscal shock which temporarily lowered the primary balance was ultimately financed by higher primary balances afterwards. There was no, or only a small, impact on the price level, which in turn enabled sterling to remain convertible to gold at a fixed rate. This regime is often described as one in which monetary policy is dominant.

As demonstrated repeatedly through history, governments do not always stabilise the public finances using fiscal policy. In some regimes, shocks which raise government debt are financed by involuntary debt restructurings. From the middle of the eighteenth century onwards, this has appeared a remote possibility in Britain.<sup>9</sup> In repressive regimes, like that which probably prevailed in Britain in and after WWII (Allen, 2014), such shocks are financed by government invention which reduces the rate of return on government debt below that which would prevail in more open markets.

In the regime which I argue prevailed during the Great Inflation in Britain, the public finances are stabilised by unexpected changes in the price level. A simple formal treatment helps show how inflation can have this stabilising effect. The government's intertemporal budget constraint is:

$$D_t = D_{t-1}(1 + R_t) - S_t$$

where  $D_t$  is the nominal stock of government debt (one period maturity by assumption in this exposition) at the end of period  $t$ ,  $S_t$  is the nominal primary balance and  $R_t$  is the net nominal interest rate, determined at the end of  $t - 1$  and paid at  $t$ . Dividing through by the price level  $P_t$ , taking first differences in

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<sup>7</sup>See e.g. Sargent and Wallace (1981); Leeper (1991); Sims (1994); Woodford (1995); Leeper and Leith (2016); Cochrane (2023). In most of this literature, the regime is defined by the values of coefficients in fiscal and monetary policy reaction functions. See A.1 for further discussion of this point.

<sup>8</sup>The insight that the impact of government borrowing on inflation depends on whether or not the borrowing is backed by future tax revenues dates back at least to Hawtrey (1949 [1919], pp. 186-187).

<sup>9</sup>The UK did, however, default on a dollar loan from the US in 1934 (Gill, 2022).



real debt, rearranging and denoting inflation as  $\pi_t$ ,

$$\begin{aligned}
\frac{D_t}{P_t} - \frac{D_{t-1}}{P_{t-1}} &= \frac{D_{t-1}(1 + R_t) - S_t}{P_t} - \frac{D_{t-1}}{P_{t-1}} \\
&= \frac{D_{t-1}(1 + R_t)}{P_{t-1}} \frac{P_{t-1}}{P_t} - \frac{S_t}{P_t} - \frac{D_{t-1}}{P_{t-1}} \\
&= \frac{D_{t-1}(1 + R_t)}{P_{t-1}(1 + \pi_t)} - \frac{S_t}{P_t} - \frac{D_{t-1}(1 + \pi_t)}{P_{t-1}(1 + \pi_t)} \\
&= \frac{D_{t-1}(R_t - \pi_t)}{P_{t-1}(1 + \pi_t)} - \frac{S_t}{P_t}
\end{aligned}$$

The change in the real debt burden is an increasing function of the ex-post real interest rate  $R_t - \pi_t$ . This can in turn be re-written in terms of the ex-ante real interest rate  $R_t - E_{t-1}\pi_t$  and surprise inflation  $\pi_t - E_{t-1}\pi_t$ :

$$\frac{D_t}{P_t} - \frac{D_{t-1}}{P_{t-1}} = \frac{D_{t-1}((R_t - E_{t-1}\pi_t) - (\pi_t - E_{t-1}\pi_t))}{P_{t-1}(1 + \pi_t)} - \frac{S_t}{P_t}$$

Surprise inflation reduces the real debt burden and does so by lowering the ex-post real return on government debt.

The equations above are just accounting identities, not descriptions of behaviour. There are a variety of mechanisms through which a fiscal shock, unaccompanied by any offsetting future change in the primary balance, can change the price level. Ultimately they all rest on similar intuition. A temporarily cut in taxes, resulting in a reduction in the primary balance, causes an increase in debt which in turn results in higher interest payments, funded by greater borrowing, further adding to the debt. In the absence of anything else, debt would increase exponentially. This does not happen because at some point the people holding the debt feel so wealthy that they decide to spend more, which in turn causes the price level to rise through a Phillips Curve mechanism.<sup>10</sup>

<sup>10</sup>In rational expectations models with infinitely-lived agents, the wealth effect is captured by the transversality condition. This states that the present discounted limit value of an agent's assets is less than or equal to zero. Intuitively, if the limit value of a household's assets exceeds zero, then the household could reduce the value to zero by consuming more today without any loss of consumption in other periods. The transversality condition always holds in equilibrium

A regime in which fiscal shocks are financed through unexpected changes in the price level is often described as one in which fiscal policy is dominant.

### 1.4.2. Stepping on a rake

The ‘stepping on a rake’ hypothesis concerns the impact of a monetary policy shock in a regime in which fiscal shocks are financed through unexpected changes in the price level. It holds that, as long as the government has issued multi-period debt, a contractionary monetary policy shock initially reduces the price level, but at long horizons, the price level ends up *higher* than in the absence of the shock.

Given the obvious contrast with mainstream thinking, it makes sense to begin by discussing the rise in inflation – the rake handle – first. A simple example, using the intertemporal budget constraint which I have repeated here, should help fix intuition.

$$\frac{D_t}{P_t} - \frac{D_{t-1}}{P_{t-1}} = \frac{D_{t-1}((R_t - E_{t-1}\pi_t) - (\pi_t - E_{t-1}\pi_t))}{P_{t-1}(1 + \pi_t)} - \frac{S_t}{P_t}$$

What happens if  $R_t$  rises? Assuming  $\frac{S_t}{P_t}$  is fixed, then at least one of  $\pi_t$  or  $\frac{D_t}{P_t} - \frac{D_{t-1}}{P_{t-1}}$  must rise. The latter option is not sustainable because it implies lenders would be prepared to hold more and more government debt at the expense of their lifetime consumption. In other words, they would be passing on a free lunch.<sup>11</sup> So if  $R_t$  rises,  $\pi_t$  must also rise. This is the Fisher equation in action.

If rational expectations are assumed and debt is only one period long, an increase in the nominal interest rate causes inflation to rise straight away.

With multi-period debt, things get more interesting. So long as interest payments rise in response to the (unexpected) increase in the interest rate, inflation must rise at some point to prevent an explosive increase in the real value of government debt. What happens before then? The interest rate surprise causes government bond prices to fall, which in turn reduces demand and inflation via

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in standard rational expectation models with optimising infinitely-lived households (although one can write it as a finite period condition if households are certain to die and they derive no utility from bequests). It is an optimality condition concerning lender behaviour.

<sup>11</sup>And as stated above, the transversality condition prevents this.

a wealth effect ([Sims, 2011](#); [Cochrane, 2018](#)).

With sticky prices, the fall in the price level is drawn out, but inflation still rises after a lag, creating a boomerang / rake-like effect. [Sims](#)'s hypothesis is that in the 1970s US monetary policymakers tried to fight inflation by raising nominal interest rates, but this made things worse via the rake effect.



## Chapter 2.

# Fiscal Financing Regimes and Nominal Stability

*A sound monetary policy needs to be buttressed by a prudent fiscal stance.*

*At one time, it was regarded as the hallmark of good government to maintain a balanced budget; to ensure that, in time of peace, Government spending was fully financed by revenues from taxation, with no need for Government borrowing. Over the years, this simple and beneficent rule was increasingly disregarded, culminating in the catastrophe of 1975–76...*

Nigel Lawson, Budget speech, 15th March 1988

In this Chapter I use narrative and time series evidence to contrast the fiscal financing regimes – the set of arrangements and institutions accompanied by the set of expectations which determine how fiscal shocks are financed – in two periods of modern British history. The eras – those of the Gold Standard and the Great Inflation – may well have been those which Nigel Lawson had in mind in the quote above. I collect evidence from Parliamentary speeches to demonstrate the contrast between the two regimes. In the Gold Standard regime, an evolving series of conventions ensured that wars, the main source of expansionary fiscal policy of the day, were paid for by higher primary surpluses over subsequent years. No such conventions were in place by the time of the Great Inflation and this is reflected in the absence of evidence that fiscal policy was used to stabilise the public finances.

I show that the public finances were instead stabilised by unexpected inflation in the Great Inflation era: unlike in the Gold Standard period, expansionary fiscal shocks caused the price level to rise. This finding is corroborated by evidence that important agents outside of government believed that fiscal policy caused inflation, albeit the mechanism was different from the one suggested by modern theory.

My methodological approach is similar in some respects to that used in the

analysis of post-WWII US fiscal policy in [Romer \(2007\)](#) and in the study of Roosevelt's fiscal regime change by [Jacobson et al. \(2019\)](#). This Chapter builds on this tradition in demonstrating the usefulness of narrative historical methods and time series econometrics in characterising the fiscal financing regime, as well as the ability of fiscal theories of inflation to organise history and explain events.<sup>1</sup> Other contributions include new narrative evidence on fiscal objectives taken from over two centuries of Budget speeches and new narrative evidence on the understanding of fiscal policy and inflation outside of government.

This Chapter focusses on the fiscal aspects of fiscal financing regimes. The two eras are also characterised by contrasting monetary policies (see e.g. [Bordo and Schwartz \(1999\)](#)). The theoretical literature on the interactions between monetary and fiscal policy (surveyed by [Leeper and Leith \(2016\)](#)) shows that this is not a coincidence – some combinations of monetary and fiscal policy are stable (and therefore durable) and some are not. The third and fourth chapters of this thesis examine the interactions between monetary and fiscal policy *within* the Great Inflation regime. Questions concerning the determinants of fiscal financing regimes are left for future work.<sup>2</sup>

My narrative evidence on the Gold Standard and Great Inflation era fiscal financing regimes is presented in Section 2.1. Section 2.2 presents time series evidence which serves as a cross check and highlights the role of unexpected inflation in stabilising the public finances in the Great Inflation era.

## 2.1. NARRATIVE EVIDENCE ON THE FISCAL FINANCING REGIME

I analyse the fiscal financing regimes in two eras – the eras of the Gold Standard and the Great Inflation. I restrict the former to the dates 1717 (when through historical accident Britain moved to a gold standard) to 1914. I choose not to go beyond 1914 because WWI put such a strain on the public finances that it seems unlikely that the previous fiscal financing regime could have survived in tact. Indeed it did not: while, remarkably, sterling was re-pegged to gold at its

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<sup>1</sup>[Cochrane \(2023\)](#), page xii.

<sup>2</sup>Such work would of course build of that of others' such as [Bordo and Kydland \(1995\)](#)'s analysis of the Gold Standard as a fiscal commitment mechanism.

pre-war rate, the new regime was a gold exchange standard which proved to be fragile and collapsed in the 1930s. Of course one could question the inclusion of 1797-1821 when gold convertibility was suspended. The suspension period is discussed in Appendix [A.2](#).

I use the conventional dating of 1965-1982 for the Great Inflation era. While in principle I could have used the dates suggested by narrative evidence on the financing regime (which would have suggested a somewhat longer regime), I prioritise the greater ability to compare with the Great Inflation literature and believe that, as there is so much variation in the data in this shorter period, I lose little by restricting the dates.

### 2.1.1. Sources

My main source of evidence on the fiscal financing regime is the Budget speech. Budget speeches were typically given once a year and set out how spending plans would be financed – i.e. the mixture of tax and borrowing or debt repayment.<sup>3</sup> They were the main vehicles for tax policy announcements and for Chancellors to set out the objectives underlying them. Their format was remarkably stable, at least until WWII. The Budget speech normally took place after Parliament had already agreed the sums to be ‘supplied’ to the government. While the Chancellor tended to review these sums, the main focus was on the ‘ways and means’ by which the supplies would be financed. When prospective revenue based on existing tax policy was sufficient to finance the spending plans, the Chancellor had to decide whether to repay debt (via the original sinking fund mechanism discussed below) or to cut taxes. When revenue fell short, the Chancellor had to decide whether to raise taxes or to borrow. The change in format which occurred in the mid-twentieth century is discussed in Section [2.1.3](#).

The first use of the term ‘Budget’ appears to have been in 1733.<sup>4</sup> Because of restrictions on Parliamentary reporting, we do not know exactly when Budget speeches became the regular annual event that they are now. My sample of

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<sup>3</sup>I use the past tense here partly because from the 1990s onwards Budgets have increasingly covered spending policy as well as tax and debt policy.

<sup>4</sup>[Sabine \(1966, p.109\)](#).

speeches begins in 1769, although many of the early speeches have not been recorded verbatim. The speeches have been preserved in Cobbett's *Parliamentary History* and Hansard's *Parliamentary Debates*.

I use monarchs' speeches to expand my sample of primary evidence back to 1717. The monarch gives a speech about the government's priorities to mark the beginning of every new Parliamentary session (again, typically once a year). These speeches naturally range across a much broader range of topics, but in the period 1717-1769, monarchs often referred to fiscal policy, perhaps because there were no Budget speeches in the early years.

Where necessary (e.g. for my analysis of private sector views) I look at other primary sources including newspapers and government archives.

The secondary literature has made this analysis much easier than it would have been. I have relied particularly heavily on a history of the national debt before 1931 by [Hargreaves \(1930\)](#), supplemented by a more recent history by [Slater \(2018\)](#) and, to understand the revolution in institutional arrangements which made a large national debt possible, [Dickson \(1967\)](#), [Stasavage \(2003\)](#) and [Cox \(2016\)](#).

### 2.1.2. Policy objectives in the Gold Standard era, 1717-1914

Appendix [A.2](#) contains a full narrative of the evolution of the fiscal financing regime during the Gold Standard era, drawing heavily on Parliamentary speeches. The following paragraphs are a summary.

The years before 1717 saw the development of the funding system. Under this system, loans were issued with earmarked tax funding, so that interest would be provided for automatically. This system enabled large increases in debt in wartime. Initially, there was no system in place to pay back debt in peacetime. Walpole's 1717 sinking fund rectified this. While successful at first, Walpole himself abused the system and from the 1730s onwards it was much less effective. So during this century of wars, debt and taxes ratcheted up. Pitt brought in two new sinking funds towards the end of the century that made debt repayment automatic and in some sense marked the completion of the funding system. But by this point, debt was so high that relying largely mainly



on borrowing to fund the French Wars proved unsustainable.

1797 marked a turning point in war finance. Pitt announced a new tax – the precursor of the income tax – which would substantially increase the share of war spending funded by taxation. Under his new plan, this tax would be sustained in peacetime until the war debt had been paid off. While this plan did not survive the war intact, tax revenue grew in real terms by an annual average rate of 5.5 per cent from 1797 to 1815, compared to a rate of 1.1 per cent from 1792 to 1797. Over recent years, some academics have hypothesised that sterling's temporary depreciation against gold from 1810 to 1815 was caused by creditor fears that the war would be paid for by surprise inflation. The fact that the consol rate remained below the 1797/98 peak over this period calls this explanation into question, although it is possible that the Bank of England expanded the money supply temporarily to finance loans to the government.

By 1816, the political imperative was tax reduction. The Chancellor's bid to renew the income tax was rejected by Parliament and debt repayment fell down the priority list and remained low for 50 years. Nevertheless, some norms were established. These are best encapsulated by two quotes from Gladstone. In peacetime, "nothing but a dire necessity should induce us to borrow," whereas in wartime, "you get what revenue you can, and make large loans to meet the exigencies of the public service." The phrase 'balanced budget' was not used in this period, but it captures the peacetime strategy, while the wartime strategy was really a continuation of the pragmatic strategy deployed from 1797 to 1815 of attempting to maximise the share of war spending that was funded by tax revenue.

Debt repayment shot back up the priority list in the 1860s and remained there for most of the next 50 years. Gladstone embraced the approach of issuing terminable annuities whose service included a capital repayment component. In 1875, Northcote added a new sinking fund which was more flexible than Pitt's. This survived the whole period and significant progress was made in reducing debt, despite the very expensive Boer War.

As is clear from this summary, the fiscal financing regime did evolve over time. But one thing remained constant throughout: the unwavering commitment

to levy taxes needed to service existing debt. This was hard-wired into the eighteenth century funding system and in the nineteenth and early twentieth centuries it was achieved via balanced budget norms.

### 2.1.3. Policy objectives in the Great Inflation era, 1965-1982

**Before 1965** The 1941 Budget speech (the second time the phrase “inflationary gap” was used in the House of Commons) and the 1944 Employment White Paper are often seen as marking the start of Keynesian influence on fiscal policy. The Budget now had a much larger role in managing the economy. Post-WWII Budget speeches devoted considerably more space to reviewing recent macroeconomic trends (including those relating to the balance of payments) and discussing the outlook. This assessment would drive ‘the Budget judgement’ – the perceived need to boost or contract demand – which in turn would set the envelope for tax policy changes.

Where did this leave the traditional objectives of the Budget? This was one of the questions considered by the National Debt Enquiry, an internal government project set up by the Permanent Secretary to the Treasury and staffed by, among others, Keynes, Meade and Robbins. The paper that considered this question<sup>5</sup> observed that:

The principle of an annual excess of revenue over expenditure which remains unchanged year after year is incompatible with the general policy outlined in the recent White Paper on Employment Policy.... It may, therefore, at times be necessary deliberately to reduce rates of taxation in order to stimulate private buying (or to raise rates of taxation to restrict private buying) in the interest of stabilising total aggregate demand and without undue regard to the effect upon the balance of the budget in any one year....

There remains, however, a more controversial issue. It is agreed that budget deficits in certain years are admissible. But what of the balance of the budget over a series of years? If...it is desirable

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<sup>5</sup>Debt Repayment and Employment Policy, The National Archives T 233/158.

to reduce the total outstanding national debt, it would follow that budget surpluses in years of good trade should be greater or more frequent than the budget deficits which are permitted in years of bad trade, so that over the average of good and bad years together there is a net repayment of debt.... What reason is there to believe that there will be no conflict between the apparently quite separate objectives (i) of a net budget surplus over the average of years and (ii) of the maintenance of employment in each particular year?

The National Debt Enquiry recommended that these two objectives be reconciled by a low interest rate policy.<sup>6</sup> This was taken forward by the post-war government. The first three post-WWII Budget speeches all communicated a policy of “balancing the Budget, not year by year, but over a series of years.” But references to balancing budgets disappeared altogether in the 1950s, replaced by a focus on managing demand and the balance of payments.<sup>7</sup> So too did the low interest rate policy.

Another institutional change also suggests that debt stabilisation was no longer an objective of fiscal policy. In the 1954 Budget speech, Rab Butler announced the repeal of the sinking fund that had been put in place by Winston Churchill in 1928. This was debated late on the evening of 28th June 1954 and received little criticism aside from Labour MP Norman Smith.<sup>8</sup>

**1965 to 1970** The first government led by Harold Wilson was dominated by balance of payments problems. Inheriting a weak position, it failed to prevent devaluation in 1967 and battled to allay fears that sterling would be devalued further.<sup>9</sup> Budget speeches reflected this struggle, with taxes used to restrain demand so as to improve the external position. Amidst this focus on sterling and the current account, policymakers were indifferent to the fiscal position, as this quote from Roy Jenkins’ 1969 Budget exemplifies:

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<sup>6</sup>Howson (1987).

<sup>7</sup>Consistent with this, Allen (2014) reports that 1950s ‘fiscal policy also took little account of the outstanding total of government debt and there was no conscious policy towards total debt’.

<sup>8</sup>One more institutional change was giving the Treasury the power to issue debt in the 1968 National Loans Act.

<sup>9</sup>Cairncross and Eichengreen (2003 [1983], Chapter 5).

The increase in revenue is considerable... This should make the Central Government a net re-payer of debt in this fiscal year... But that result is incidental, although beneficial. The main purpose of the Budget is to continue the balance of payments improvement.

**1971 to 1973** Devaluation and deflationary policies did eventually turn the external position around, although it was the government led by Sir Edward Heath which enjoyed the benefit of the increased flexibility. But there was a new problem: by the second half of 1971, unemployment was heading towards the politically-sensitive one million mark. The Chancellor (Anthony Barber) was in no mood to tolerate further increases, saying in his 1972 Budget that “there is universal agreement that the present high level of unemployment is on every ground – economic and social – one which no Government could tolerate.”

The policy reaction was extraordinary. Tax cuts worth almost 3 per cent of GDP were announced. On this measure, the 1972 Budget measures were almost twice as large as the next most expansionary Budget in the 1945–2009 period. Barber realised that this course of action might not be compatible with a fixed exchange rate. He signaled his willingness to devalue in the Budget speech, stating that “the lesson of the international balance of payments upsets of the last few years is that it is neither necessary nor desirable to distort domestic economies to an unacceptable extent in order to maintain unrealistic exchange rates.” Sure enough, sterling was devalued in June 1972.

Nevertheless, he played down any inflationary consequences, stating that he did “not believe that a stimulus to demand of the order [proposed] will be inimical to the fight against inflation. On the contrary, the business community has repeatedly said that the increase in productivity and profitability resulting from a faster growth of output is one of the most effective means of restraining price increases.”

Perhaps the most startling feature of the speech is the lack of attention given to the public finances, particularly given the size of the tax cuts. This is all Barber had to say about them:

It has been traditional to give, in the Budget Speech itself, some

description of the Government's financial accounts, both past and prospective. But as all the figures are set out in the greatest possible detail in the Financial Statement and Budget Report, I think that hon. Members will agree that I can this year spare the House an oral summary.

By his 1973 Budget, the Chancellor judged that no further significant stimulus was required and recognised that "the large borrowing requirement in 1973–74 poses a considerable financing task for the authorities." In a pattern that would continue over subsequent years, he stated that "it would be quite unacceptable to rely to any substantial extent on borrowing from the banking sector." However, MPs were left with the impression that borrowing from the non-bank sector would be possible and pose no problems of note.

**1974 to 1978** The incoming Chancellor, Dennis Healey, faced a stagflationary tightrope, made worse by the Heath government's incomes policy by which wages responded automatically to prices, thereby baking in more wage rigidity.<sup>10</sup> Inflation already exceeded 10 per cent and unemployment had started to rise again. Consistent with his description of himself as "an unorthodox, neo-Keynesian monetarist,"<sup>11</sup> Healey responded with a succession of progressively more unorthodox policies. In his first Budget, Healey raised taxes, but tried to do so in a way which minimised the reduction in demand, despite high inflation. By 1976 and 1977, he was promising tax cuts on the condition that the unions showed sufficient pay restraint.

Perhaps the clearest signal of Healey's stance on fiscal deficits came in his second Budget, in November 1974. Despite inflation exceeding 15 per cent and a fiscal deficit of over 6 per cent of GDP,<sup>12</sup> the Budget raised the expected borrowing requirement by a further 0.8 per cent of GDP. His speech acknowledged the issue but he dismissed it on the following grounds.

Though a revision of the borrowing requirement to about £5.5 billion is a serious matter, it would be wrong to exaggerate its importance.

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<sup>10</sup>Miller (1976).

<sup>11</sup>Hansard House of Commons Debates 10th November 1977.

<sup>12</sup>Using the accounting conventions at the time.

As far as current expenditure is concerned, the public sector is in substantial surplus, receipts exceeding expenditure by over £3,500 million. The borrowing requirement arises because total capital expenditure of the public sector and its lending to others is nearly three times the current surplus.

However, as sterling came under pressure in 1975 and 1976, Healey was subject to outbreaks of something a bit closer to orthodoxy. For example, in his 1975 Budget, he raised taxes because “a borrowing requirement of over £10,000 million would involve unacceptable risks.” Underlying his concern was a fear that large government borrowing would worsen Britain’s balance of payments problems:

I think most commentators would agree that it is impossible to bring about a sustained and progressive improvement in the balance of payments over a period of years if at the same time the public sector financial deficit is increasing rapidly as a percentage of GNP.

This turn towards fiscal rectitude lasted only as long as the pressure on sterling. Following the successful IMF negotiations in 1976, there were substantial tax cuts in the 1977 and 1978 Budgets, despite ongoing fiscal deficits.

**1979 to 1982** The first Budget delivered by Sir Geoffrey Howe marked an evolution in the rhetoric. Taxes were raised by about 2 per cent of GDP and Howe signaled that deficits would continue to fall over time:

The public sector deficit will also fall from 4.5 per cent. to 3.75 per cent. of GDP. These are important steps in the right direction. I intend to continue along that path in the years ahead.

Howe gave two rationales for this policy. The first echoed Barber and Healey, albeit with an important difference. This was that public sector borrowing was fueling the money supply and thereby inflation. Unlike previous Chancellors, however, he did not dismiss concerns by assuming that borrowing would be funded by non-banks and therefore would not lead to money growth and inflation.

The second rationale was to avoid crowding out: “we need to reduce the burden of financing the public sector, so as to leave room for commerce and industry to prosper.”

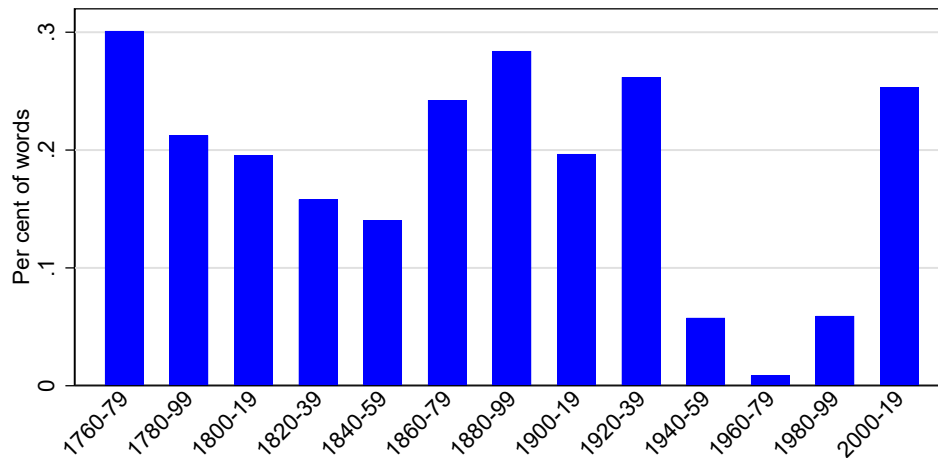
Howe stressed the continuity of the previous government’s policies in his 1982 speech, stating that his medium-term financial strategy was an “extension” of Healey’s post-1976 strategy of “monetary control...supported by progressively lower borrowing.” A commitment to balanced budgets and debt sustainability would only come after 1982.

**Comparison with the Gold Standard regime** Fiscal policy was not used to stabilise the public finances in the Great Inflation era. While deficits were mentioned, they were only of concern because of their perceived link to the balance of payments or the money supply. While falling reserves or faster monetary growth likely acted as a constraint on public sector deficits, there is no reason to expect that these constraints forced fiscal policy to behave as if it was being used to stabilise debt.

This stands in stark contrast to the way fiscal policy was used in the Gold Standard era. While commitment to debt reduction waxed and waned over time, commitment to debt stabilisation was achieved through the funding system and then balanced budget norms.

A very crude way to capture the evolution of Chancellors’ focus on debt is to count the number of times they mention the word ‘debt’ in their speeches. Figure 2.1 shows the evolution of this metric over 250 years of Budget speeches. It corroborates the conclusions from my narrative account quite closely. The metric is much lower in the Great Inflation era than in the Gold Standard era. Within the Gold Standard era, there is something of a dip after the French Wars, while it rises again from the 1860s. The only column which doesn’t match up closely to my narrative is the first. This could in part reflect the smaller sample size (as my sample only begins in 1769) and the shorter speech summaries (the average number of words in *Parliamentary History* for this period is 2000, compared to 4000 for the next 20 years).

**Figure 2.1:** Mentions of 'debt' in Budget speeches



Source: My calculations, using text from Cobbett's *Parliamentary History* and Hansard's *Parliamentary Debates*.

Note: Instances not relating to the government debt (e.g. relating to private debt) are removed manually.

#### 2.1.4. Private sector beliefs in the Great Inflation era

The previous subsection established that fiscal policy was not used to stabilise debt in the Great Inflation era.<sup>13</sup> Unsurprisingly, Chancellors did not announce that debt would be stabilised by surprise inflation; nor am I aware of evidence that this was their intention. But some influential people outside of government saw a link between the public finances and inflation. This subsection presents evidence in favour of this claim.

**Beliefs about the conduct of fiscal policy** It of course extremely difficult to know how households and businesses thought about fiscal policy. There was probably far greater diversity of views (including no view at all) among people outside of the policy world. However, journalists at *The Times* and the *Financial Times*, two papers influential in financial and business circles, did point out to

<sup>13</sup>I have seen no evidence that default was considered or expected after WWII. Physical and financial controls were used to reduce public sector borrowing costs, consistent with a repression strategy, but they had either been lifted or were very leaky by the end of 1971 (the year of Competition and Credit Control) if not before.



their readers that the conduct of fiscal policy had changed.

In 1976, Tim Congdon of *The Times* wrote that '[the balanced budget] orthodoxy... now seem[s] to have been forgotten. Taxation decisions are not taken with a view to keeping the budget deficit under control but only with a view to their supposed effects on demand'.<sup>14</sup> In the *Financial Times*, Samuel Brittan recalled that 'ten or 15 years ago an up-to-date economic student would have had no hesitation in coming out ... and regarding the balanced budget doctrine as fuddy-duddy. Even when interest in controlling the money supply revived, the balanced budget doctrine did not'.<sup>15</sup>

**Beliefs about the link between the public finances and inflation** There was more newspaper discussion about the role of fiscal policy in generating inflation. This was led by the British monetarists. Tim Congdon summed up their views at the time:

In their approach to monetary policy most economists emphasize the dependence of the supply of money on the public sector's financial position....The money supply must be restrained, in the opinion of most observers, because it otherwise fuels inflation.<sup>16</sup>

British monetarism was a theory which linked government borrowing to the money supply using the credit counterparts identity.<sup>17</sup> This identity shows that the change in bank deposits plus the change in their non-deposit liabilities is equal to the change in banks' claims on the private sector plus the change in banks' claims on the public sector. The last term is itself equal to the public sector borrowing requirement less the change in non-bank claims on the government.

The British monetarists believed that there was a limit to the capacity or willingness of the non-bank sector to take up public debt.<sup>18</sup> Beyond that limit, residual finance must come from the banking sector. They assumed that the

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<sup>14</sup>*The Times*, 20th February 1976.

<sup>15</sup>*Financial Times*, 12th June 1978.

<sup>16</sup>*The Times*, 9th October 1974.

<sup>17</sup>See [Batini and Nelson \(2009, Section 4B\)](#) and [Goodhart \(2017\)](#).

<sup>18</sup>It is hard to find a clear analytical explanation of what determined this limit. [Congdon \(1976\)](#) probably comes closest, explaining that there is a limit to the share of tax revenue in GDP and this in turn limits the share of debt interest payments which a government can sustain.

counterpart to a rise in bank claims on the government was a rise in bank deposits which would, in turn, cause inflation.

This mechanism could be thought of as ‘broad’ monetisation: beyond some level, government borrowing would be funded by an expansion in bank deposits which would cause inflation.

Newspaper stories which used this logic appeared regularly. A letter to *The Times* in 1968 coauthored by some MPs is an example from early in the Great Inflation. The letter blamed continued post-devaluation weakness in sterling on government borrowing. They continued:

The so-called “borrowing requirement” has not, in fact, been met by borrowing from the non-bank public, but by the creation of money within the banking system. It is this quasi-automatic creation of money which inflates demand in the economy and is therefore the main cause of the continuous depreciation of the pound here at home.<sup>19</sup>

As deficits and inflation rose in the mid-1970s, these views became more popular, as well as more newsworthy. Looking back from 1975, analysts from W. Greenwell & Co. claimed that ‘the Budget in March 1972 was one of the main causes of today’s inflation’.<sup>20</sup> *The Times* published at least two leaders spelling out the credit counterparts logic, the second of which was entitled ‘HIGH P.S.B.R.=HIGH M3 [broad money]=INFLATION’.<sup>21</sup>

**Evidence that markets were influenced by these beliefs** There is some suggestive evidence that British monetarists were sufficiently influential that their thinking affected government bond (gilt) prices. First, many of the leading British monetarists were stockbrokers, including Brian Griffiths at Pember & Boyle, Gordon Pepper at W. Greenwell & Co. and Alan Walters at Joseph Sebag & Co.<sup>22</sup> According to the *Financial Times*, their circulars were influential in the City of London: ‘nobody can deny that M. Pepper’s regular bulletins to clients

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<sup>19</sup>*The Times*, 22nd January 1968.

<sup>20</sup>*The Times*, 25th March 1975.

<sup>21</sup>*The Times*, 7th June 1978.

<sup>22</sup>Davies (2017, Chapter 5).

are an important factor in the formation of City opinion on monetary trends; to quote one Bank of England official not so long ago: “Things are quite at the moment. Gordon Pepper has the ‘flu’”.<sup>23</sup> On 9th October 1974, the *Financial Times* carried the following warning from W. Greenwell & Co.: ‘We fear that the public sector’s deficit will increase... Whichever political party wins the election, the Government will be unable to reverse this rising trend in the public sector’s deficit with sufficient speed to prevent a still further acceleration of inflation’.<sup>24</sup> The very next day, perhaps referring to the same analysis, the *Financial Times* markets report reported that:

Concern over public sector borrowing requirements highlighted by several recent brokers’ circulars further unsettled the market in British Funds and prompted some fairly persistent selling in this sector.... Increasing concern about public sector borrowing requirements in 1974-75 was reflected in renewed persistent selling of Gilt-edged.<sup>25</sup>

Further evidence on the weight market participants attached to government borrowing can be gleaned from movements in long-term bond prices and the associated market reports. Four out of the top ten largest daily movements in consol rates over the period of the big run up in long-term interest rates between 1972 and 1974 were associated with fiscal news. The largest of all – a rise of 0.86 percentage points – occurred on 12th November 1974. The *Financial Times* market report noted that ‘fears about the Government’s massive borrowing requirements for the current fiscal year revealed in Tuesday’s Budget prompted a sharp setback in British Funds’. Such moves in long-term rates were interpreted by financial market analysts as indicating changes in inflation expectations. For example, when reviewing trends in the gilt market in mid-1974, analysts at Pember & Boyle wrote that ‘the inflationary implications of substantial government assistance led to sustained selling and sharply lower prices throughout the list’.<sup>26</sup>

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<sup>23</sup>*Financial Times*, 3rd May 1973.

<sup>24</sup>*Financial Times*, 9th October 1974.

<sup>25</sup>*Financial Times*, 10th October 1974.

<sup>26</sup>Pember & Boyle Quarterly Review Supplement, December 1974.

## 2.2. EMPIRICAL EVIDENCE ON THE FISCAL FINANCING REGIME

This Section serves as a cross-check on my conclusions from the narrative evidence presented in Section 2.1. If these conclusions are correct, we would expect to see contrasting responses to fiscal shocks in the two regimes. In the Gold Standard regime, an expansionary fiscal shock should have been followed after a lag by an increase in the primary balance. It should not have caused a substantial rise in the price level, although there may have still been some effect through an aggregate demand channel. In the Great Inflation regime, we would not expect an expansionary fiscal shock to have been followed by a rise in the primary balance, but we would expect to see an increase in the price level larger than anything seen in the Gold Standard regime.

### 2.2.1. The Gold Standard era, 1717-1914

Some readers will find it self-evident that expansionary fiscal shocks in the Gold Standard era were financed by higher primary balances: the Gold Standard is a commitment to do just that.<sup>27</sup> Figure 2.2 shows that the Gold Standard was adhered to very closely except at the end of the French Wars.

Furthermore, the primary balance to income ratio displayed in Figure 2.3 is strongly suggestive of a regime in which war finance is backed by future primary surpluses. After each war, the primary surplus reached a higher share of income.<sup>28</sup>

**Empirical approach and data** A formal approach to estimating how wars were financed is nevertheless still necessary. Ideally, I would use a military spending shock which is well established in the literature. Unfortunately, nothing like this exists. As far as I am aware, the last empirical investigation of the macroeconomic impact of war spending over this period was Barro (1987).

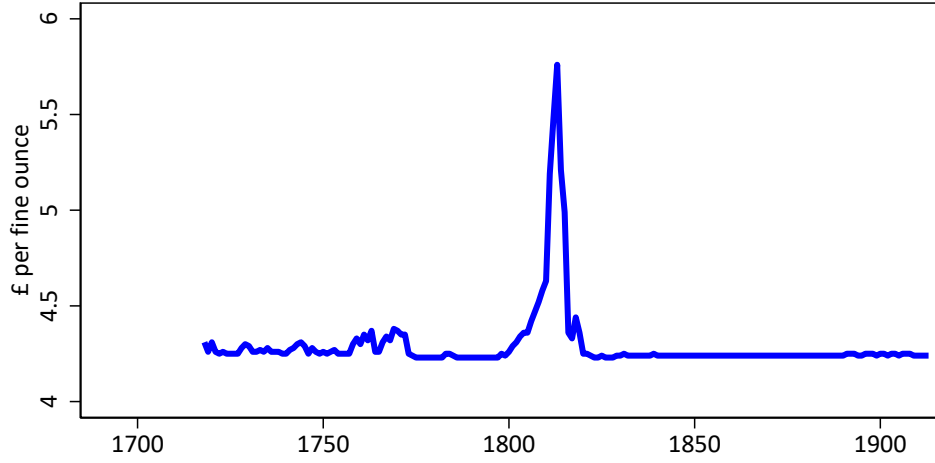
Rather than attempt to develop my own measure of military spending shocks here, I use an updated version of Barro's approach. My war spending measure is

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<sup>27</sup>See Canzoneri et al. (2001) for a formal treatment of this issue.

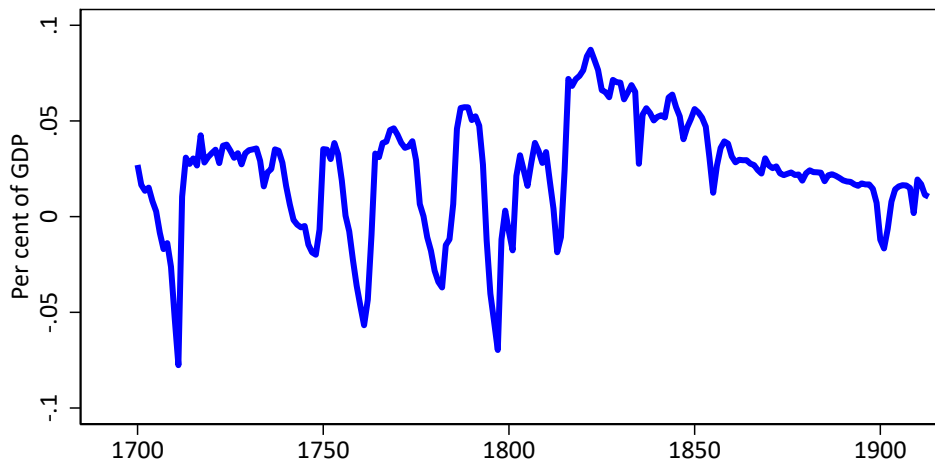
<sup>28</sup>The rebound in around 1800 is the response to Pitt's change of strategy discussed earlier, not the end of a war (the interlude in 1802-1803 only lasted one year).

**Figure 2.2:** *Market price of gold in sterling*



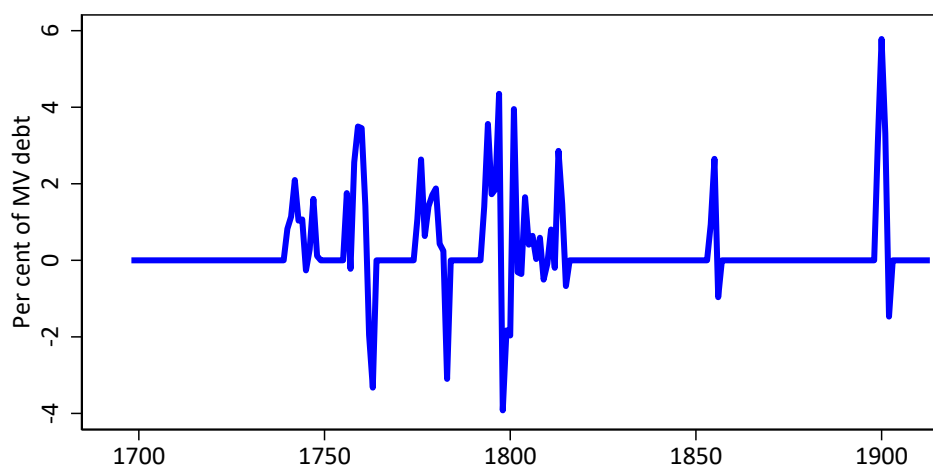
Source: [Officer and Williamson \(2024\)](#).

**Figure 2.3:** *Primary balance*



Source: [Thomas and Dimsdale \(2017\)](#), using data from [Broadberry et al. \(2015\)](#) and [Mitchell \(1988\)](#).

**Figure 2.4:** *War spending measure*



Source: [Thomas and Dimsdale \(2017\)](#), using data from [Clark \(2001\)](#), [Crafts and Mills \(1994\)](#), [Feinstein \(1991\)](#), [Feinstein \(1998\)](#) and [Mitchell \(1988\)](#).

Note: The war years are 1739-1748 (War of Austrian Succession), 1756-1763 (Seven Years' War), 1775-1783 (American War of Independence), 1793-1815 (French Wars), 1854-1856 (Crimean War) and 1899-1902 (Boer War).

the change in real government primary expenditure scaled by the market value of government debt during major wars involving Britain. My choice of scaling reflects the theoretical prediction that the impact of any given exogenous increase in government spending is decreasing in the market value of government debt.<sup>29</sup> I only include wartime observations because these fluctuations are most likely to reflect military spending which is not caused by business cycle phenomena. In other words, it is less likely to be endogenous to the business cycle. Figure 2.4 shows the measure.

I use local projections<sup>30</sup> to estimate the relationship between the war spending measure and the outcome variables of interest – the ratio of the primary balance to income and the consumer price index. I control for two years of lags of the impulse and response variables and two years of lags of three macroeconomic factors.<sup>31</sup> These control variables soak up a small amount of the variation in the war spending measure. The factors are estimated from 26 macroeconomic and

<sup>29</sup>See e.g. [Barro and Bianchi \(2023\)](#).

<sup>30</sup>[Jordà \(2005\)](#).

<sup>31</sup>For the reasons set out in [Bernanke et al. \(2005\)](#).

financial variables.<sup>32</sup> All the data are annual.

The specification is:

$$\begin{aligned} \Delta y_{n,t,t+h} = & \alpha_{h,n} + \beta_{h,n}x_t + \sum_{l=1}^L \kappa_{h,l,n}\Delta y_{n,t-l} \\ & + \sum_{l=1}^L \lambda_{h,l,n}x_{t-l} + \sum_{k=1}^K \sum_{l=1}^L \mu_{h,k,l,n}F_{k,t-l} + \eta_{n,t,t+h}, \end{aligned}$$

where  $\Delta y_{n,t,t+h}$  is the change in the outcome measure (indexed by  $n$ ) between  $t - 1$  and  $t + h$  horizon  $h$ ,  $x_t$  is the war spending measure explained above and  $F_{k,t-l}$  are the two lags (i.e.  $L = 2$ ) of the 3 factors ( $K = 3$ ). The  $\beta_{h,n}$ s form the impulse response functions.

The timing assumption for a causal interpretation is that war spending affected the outcome variables in the same year, but the outcome variables did not affect the war spending. The standard errors are heteroskedasticity and autocorrelation consistent.

**Results** The results are displayed in Figure 2.5. Because the fiscal cycle was very long, driven as it was by periods of war and peace, the impulse response functions are displayed up to a horizon of 40 years.

Because the average ratio of the market value of government debt to GDP over this sample was 1, the left-hand figure has a simple interpretation. War-related spending reduced the primary balance to income ratio on impact, but by less than it would have done had there been no offsetting measures (i.e. tax rises). This accords with the narrative history summarised in Section 2.1.2. The primary balance response became less negative over time and then positive (albeit not significantly so at the 5% threshold). The falls in the response at around the 20 and 35 year horizons reflect the impact of subsequent wars. Given the width of the confidence intervals, this result neither confirms nor rules out the hypothesis that war-related increases in spending were financed by higher subsequent primary balances.

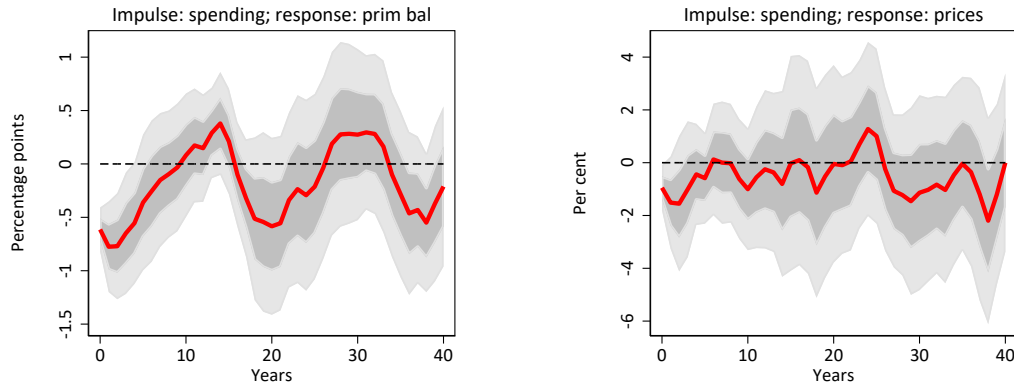
The right-hand figure shows that the response of consumer prices to a war-

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<sup>32</sup>Data are available on request.

**Figure 2.5:** *Responses to war spending*

The panels present estimated impulse responses of each variable to a rise in real government spending equal to one percent of the market value government debt. The red bold line shows the mean estimated response; the dark grey region shows the  $\pm 1$  standard error confidence interval; the light grey region shows the  $\pm 2$  standard error confidence interval.



*Notes:* See text.

related increase in government spending was, surprisingly, negative on impact, but not significantly different from zero in subsequent years.

### 2.2.2. The Great Inflation era, 1965-1982

**Empirical approach and data** Britain was not involved in any major wars in the Great Inflation era and, as can be seen in Figure 2.6a, there were no other sources of variation in the primary balance which were as marked as wars in the Gold Standard era. It is therefore all the more important to have a well-identified measure of fiscal shocks to estimate equivalent impulse response functions. Fortunately, such a measure exists.

Cloyne (2013) develops a measure of tax policy shocks using a narrative approach similar to Romer and Romer (2010). The paper categorises each tax policy change between 1945 and 2009 according to the official explanation for the change. Some of these categories (such as those undertaken for ideological reasons) are less likely to have been caused by business cycle factors and are

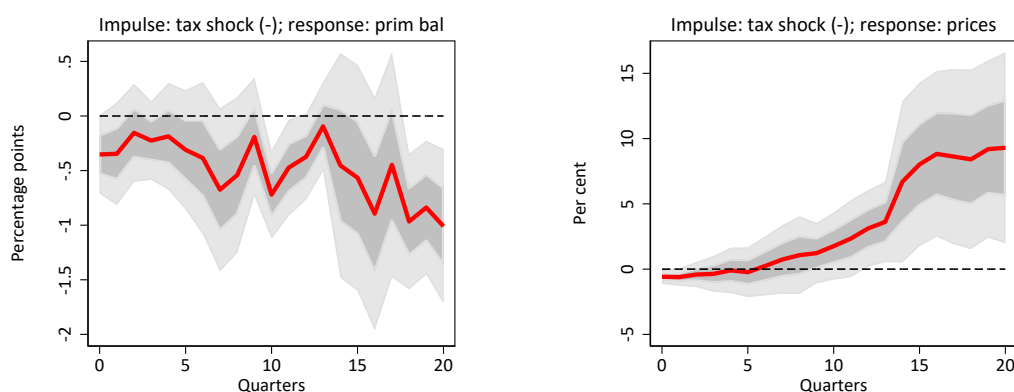




The right-hand figure shows that a tax cut raised the price level, albeit after quite a long lag. The increase is economically and statistically significant.

**Figure 2.7:** *Responses to tax shocks*

The panels present estimated impulse responses of each variable to an exogenous *cut* in taxes equal to one percent of the market value government debt. The red bold line shows the mean estimated response; the dark grey region shows the  $\pm 1$  standard error confidence interval; the light grey region shows the  $\pm 2$  standard error confidence interval.



*Notes:* See text.

**Comparison with Gold Standard era** The contrast between Figures 2.7 and 2.5 is very clear. The Great Inflation era evidence shows that expansionary fiscal policy was not financed by higher primary balances afterwards. This is not the case for the Gold Standard era evidence. Likewise, the Great Inflation evidence shows that expansionary fiscal policy caused economically and statistically significant increases in the price level, unlike the Gold Standard evidence.

The contrast in these results are exactly what we would expect, given the narrative evidence presented in Section 2.1. They provide additional evidence that expansionary fiscal policy was financed by higher subsequent primary balances in the Gold Standard era and surprise inflation in the Great Inflation era.

### 2.3. CONCLUSION

This Chapter shows that different fiscal financing regimes were in place in the Gold Standard era and the Great Inflation era in Britain. In the former, expansionary fiscal policy was financed by higher subsequent primary balances. In the latter, it was financed by surprise inflation. This evidence supports Chancellor Nigel Lawson's observation of a post-WWII change in fiscal behaviour that had consequences for inflation.

The approach I have used differs from the mainstream one, which relies on estimating coefficients in fiscal policy reaction functions. Instead, I have compiled evidence from the historical narrative, relying particularly on Parliamentary speeches, and estimates of the dynamic impact of expansionary fiscal policy on the public finances and the price level.

The purpose of this Chapter (and thesis) is not to provide a quantitative account of the rise and fall in 1960s-70s British inflation. However, a fiscal account of the rise and fall in inflation seems eminently feasible. Tax policy shocks themselves may have played an important role: Figure 2.6b shows a sequence of expansionary shocks in the first half of the 1970s, before the big rise in inflation. Additionally, supply-side shocks may have been propagated through fiscal channels. For example, shocks which caused an increase in the NAIRU from the late 1960s<sup>34</sup> may have caused a reduction in the primary balance (as welfare spending increased) and, because no offsetting tightening measures were undertaken, a rise in the price level. Adverse terms of trade shocks in the early 1970s may have had similar effects.<sup>35</sup> A full analysis along these lines is left for future work. The remainder of this thesis focusses instead on the impact of monetary policy in the Great Inflation fiscal financing regime.

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<sup>34</sup>Broadberry (1991).

<sup>35</sup>Banerjee (2024) finds that inflationary oil shocks cause improvements in fiscal balances in oil-importing countries, but his sample only starts in the 1990s, in what may have been a different fiscal financing regime.



## Chapter 3.

# Did Tighter Monetary Policy Make Inflation Great?

Chapter 2 establishes that expansionary fiscal policy in the Great Inflation era was financed not by higher primary balances but by surprise inflation. Section 1.4.2 explains the theoretical prediction that, in regimes in which monetary policy does not have fiscal backing, a surprise tightening in monetary policy *raises* the price level after a lag. This is the ‘stepping on a rake’ result from Sims (2011). This Chapter asks whether data from the British Great Inflation are consistent with this prediction. In other words, was it *tighter monetary policy* which made inflation ‘great’?

The conventional explanation holds that excessively *loose* monetary policy was the root cause of the Great Inflation.<sup>1</sup> On this view, the mid-1970s rise in the monetary policy rate shown in Figure 3.1 was a reaction to the rise in inflation, albeit one insufficient to prevent inflation exceeding 20%. The ‘stepping on a rake’ interpretation turns this explanation on its head: the rise in the policy rate *contributed* to the rise in inflation.

To estimate the impact of short-term interest rates on inflation, I use a high-frequency approach to identification. My interest rate surprises are the changes in one-year gilt (government bond) rates on days of monetary policy actions. This requires me to construct both a list of monetary policy actions and one-year gilt rates on the days of and the days before the actions. As I explain in Section 3.1, the Bank of England’s efforts to depoliticise monetary policy in the 1970s prevents the first exercise from being straightforward.

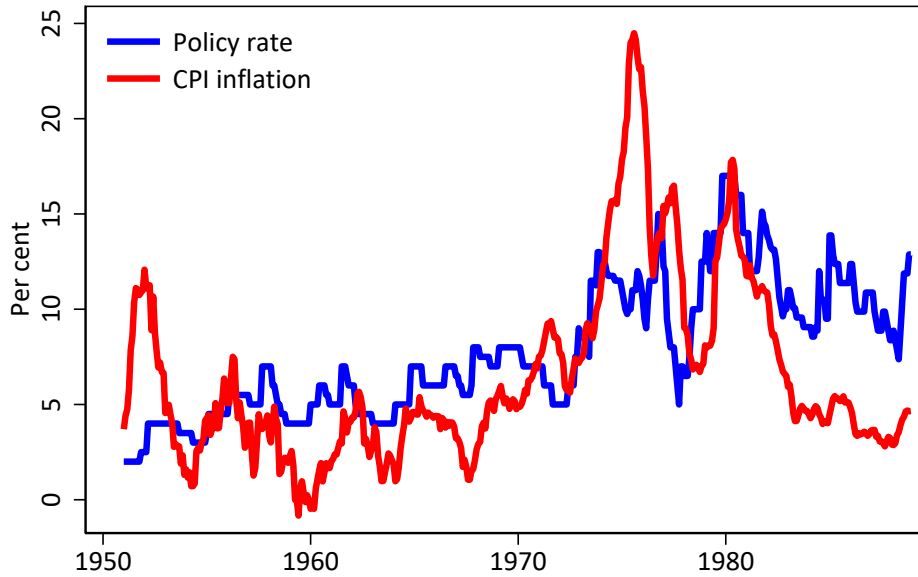
There is no existing data set of daily government bond yields for most of my sample. So in Section 3.2, I present new yield curve data for the UK and explain how the yield curves are estimated.

Section 3.3 presents estimates of the impact of interest rate surprises on

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<sup>1</sup>See Section 1.3.

**Figure 3.1:** *The monetary policy rate and inflation*



*Sources:* Bank of England and ONS.

consumer prices. They are consistent with the conventional wisdom – that a surprise increase in interest rates reduced consumer prices. My results do not rule out the possibility that there was a positive impact at horizons longer than those for which I present estimates. So in Section 3.4, I show that surprise increases in short-term interest rates also reduced long-term nominal forward rates. I argue that this is evidence that market participants did not expect increases in short-term interest rates to raise the price level.

The finding that the rake prediction is not borne out is puzzling in light of Chapter 2's conclusions. I investigate the puzzle in Chapter 4.

### 3.1. DATING MONETARY POLICY ANNOUNCEMENTS IN THE GREAT INFLATION

At times during the post-WWII period, the authorities sought to hide monetary policy actions in an attempt to depoliticise monetary policy.<sup>2</sup> This was particularly the case during a crucial part of the Great Inflation, between 1972 and 1978.<sup>3</sup> Over this period, the policy rate was called ‘Minimum Lending Rate’ (MLR). It was set as a markup on the rate set at the weekly Treasury Bill rate auction. The authorities could then keep up the pretence that MLR was determined by the market.

Helpfully from the researcher’s perspective, some changes in MLR were overtly described as ‘administrative’. However, such changes were in the minority in this period. This creates an obstacle for studying the impact of interest rate surprises. Market participants may not have observed all monetary policy actions, or may have believed that the central bank acted when it did not. While the authorities can never hide their actions completely – their operations in the money market to implement policy were observed by their counterparties – there is enough uncertainty to muddy the waters.

My approach to this problem is to pick dates on which the waters are clear: I include dates when there is evidence that the Bank of England acted and that market participants understood that the Bank acted. Unfortunately, there is no clear continuous record of monetary policy decisions taken during this period. However, there are good records of the weekly meetings between the Governor (or Deputy Governor) and the London Discount Market Association (LDMA) which represented money market intermediaries called discount houses. The discount houses played an important role in determining the outcome of the weekly Treasury Bill auction, which in turn determined the level of MLR. Most weeks, the Governor would give no hint about the Bank’s preferred outcome of the auction. However, on some dates he made his views clear. Table 3.1 gives some examples of the Governor’s steers to the LDMA.

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<sup>2</sup>Something analogous was happening across the pond, although the secrecy was much longer-lasting in the US (Dotsey, 1987).

<sup>3</sup>Burnham (2011).

In order to have greater confidence that my results do show the impact of monetary policy on market prices, I only include a date if a change in MLR is attributed to the authorities in the *Financial Times*.<sup>4</sup> To ensure that market prices reflect the impact of monetary policy as opposed to other macroeconomic policies announced at the same time as part of a package, I pick dates when no other macroeconomic policy announcement was made. This leaves 34 observations in my sample.<sup>5</sup>

**Table 3.1: Examples of monetary policy actions in the mid 1970s**

Date	Governor suggestion to discount houses	FT mention
1973 Jun 22	[The Governor] asked about the Tender and was told that the M.L.R. might move down. He said "That would not be unwelcome."	Yes
1974 Jan 4	On M.L.R. [the Governor] said he would not be upset if it fell 1/4% today.	Yes
1975 May 21	This led [the Governor] to a discussion about M.L.R. and he was told the market was divided into three camps. One or two were keen to see a change, a few would be happy with a change, but not keen to push it, and two or three thought the rate ought to be 15 per cent. He said he would have no objection to 2d. or 3d. more. (This morning the Chief Cashier had said that he thought 6d. would be too much of a jump).	Yes
1976 Sep 10	The Governor replied "Yes we are all apprehensive and a Market reaction in these circumstances would be right. No change would look odd; a 1/2 per cent change would be silly but 2 1/2 per cent would be terrible. The change must be limited to 1 1/2 per cent."	Yes
1977 Feb 3	[Administered change to MLR]	Yes
1978 Jan 6	[The Governor said] "there is need for a little restraint. 1/2 per cent. Followed by a pause would be all right and we need some stability."	Yes

Sources: Bank of England Archive LDMA1/34 and LDMA 1/35, *Financial Times*.

## 3.2. NEW YIELD CURVE ESTIMATES

This Section presents new yield curve estimates. I begin by describing the raw data collection.

### 3.2.1. Gilt prices and terms

Gilt prices were collected from issues of the *Financial Times* and manually transcribed into spreadsheet format. Two samples have been collected. One consists of gilt prices for the first and last working days of each month between 1965 and 1982. This facilitates the construction of monthly time series and a sample of daily changes. This replicates and extends the work of [Ellison and Scott \(2020\)](#),

<sup>4</sup>This approach was famously taken by [Cook and Hahn \(1989\)](#) for the US.

<sup>5</sup>The full set of dates is available on request.



who collect data for the last working day of each month. The second sample consists of gilt prices for the working days of, and preceding, the monetary policy dates described in Section 3.1. There are a few dates on which the *Financial Times* was not available (mainly because of strikes), so on these days I use the *Times* or the *Guardian*.

Figure 3.2 shows an example of the raw data. There are 48 gilts and other government-guaranteed bonds listed, all of which are collected. The number of bonds in issue and the maturity profile is quite typical (British government debt is well known for being of long maturity). In the decades following WWII, many gilts were double-dated. This gave the government the option of redeeming within a multi-year window. (The years are listed after the instrument names.)

Rather than use the yields listed in the *Financial Times*, I calculate redemption yields using the Debt Management Office's suggested method. To do this, I collect data on the maturity date and coupon from Pember & Boyle (1976). I follow the convention of assuming that investors price these gilts using the maturity date which results in the lowest price and hence liability for the government. Because redemption yields exceeded par yields for most of the gilts considered in the decades after WWII, the government was incentivised to redeem double-dated gilts at the end of the window. Sure enough, almost all gilts in the sample were in fact redeemed at the end of their respective window.

### 3.2.2. Methodology

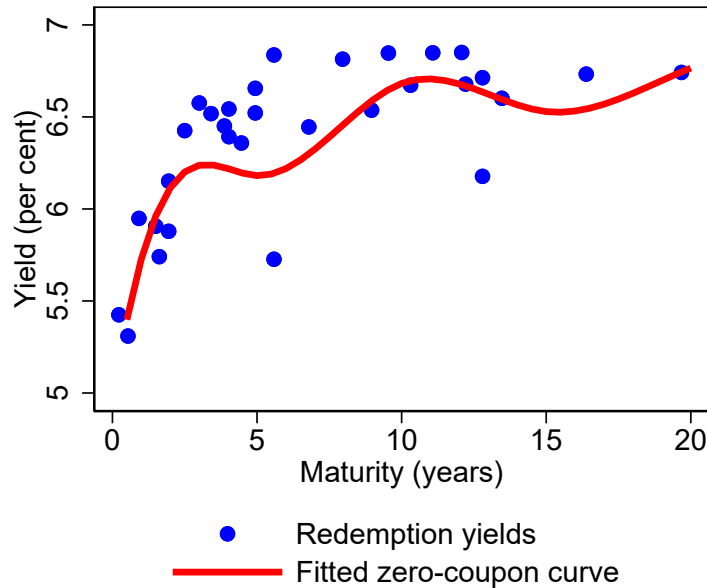
The gilt yields calculated here are not sufficient on their own to form a yield curve – the curve needs to be estimated. There are various different models used to fit yield curves. I use the variable roughness penalty (VRP) model, as originally proposed by Waggoner (1997), which models the yield curve with a cubic spline.

Figure 3.3 shows a zero-coupon yield curve fitted for the gilts listed in Figure 3.2, plotted against the redemption yields for those gilts. This is a fairly typical curve and the fit is reasonable.

Figure 3.2: Excerpt from Financial Times on 2nd September 1967

BRITISH FUNDS											
1967		L. west int. Price	Stock	Closing Price	+ or -	Gross yield per					
High	Low					Int'rat	R'dimp	tion			
						£	s	d	£	s	d
<b>"Shorts" (Lives up to Five Years)</b>											
99 <sup>2</sup> / <sub>8</sub>	98 <sup>3</sup> / <sub>8</sub>	96 <sup>1</sup> / <sub>2</sub>	Exchq. 5pc 1967	99 <sup>1</sup> / <sub>8</sub> 0	.....	5	0	0	5	6	0
99 <sup>7</sup> / <sub>8</sub>	96 <sup>3</sup> / <sub>8</sub>	98	Do. 4pc 1968..	99 <sup>3</sup> / <sub>8</sub> 25	.....	4	0	6	5	6	6
97 <sup>3</sup> / <sub>8</sub>	93 <sup>3</sup> / <sub>8</sub>	100	Fund'g 5pc 66-68	97 <sup>3</sup> / <sub>8</sub>	.....	5	1	6	5	16	6
96 <sup>5</sup> / <sub>8</sub>	92 <sup>3</sup> / <sub>8</sub>	99	Conv. 3pc 1969	96 <sup>5</sup> / <sub>8</sub>	.....	5	12	6	5	17	6
96 <sup>7</sup> / <sub>8</sub>	91 <sup>7</sup> / <sub>8</sub>	98	Fund. 5pc '59-69	95 <sup>7</sup> / <sub>8</sub>	.....	5	2	6	5	14	0
97 <sup>1</sup> / <sub>2</sub>	93 <sup>1</sup> / <sub>2</sub>	98 <sup>1</sup> / <sub>2</sub>	Elect. 4pc '67-69	97 <sup>1</sup> / <sub>2</sub>	.....	4	12	6	5	17	0
101 <sup>1</sup> / <sub>4</sub>	99 <sup>7</sup> / <sub>8</sub>	—	Exch. 6pc 1969	100 <sup>3</sup> / <sub>8</sub>	.....	6	9	0	6	3	0
99 <sup>7</sup> / <sub>8</sub>	97 <sup>3</sup> / <sub>8</sub>	—	Exch. 6pc 1970..	99 <sup>7</sup> / <sub>8</sub>	.....	6	1	0	6	8	6
90 <sup>3</sup> / <sub>8</sub>	87 <sup>3</sup> / <sub>8</sub>	100	Sav'gs 5pc '60-70	90 <sup>3</sup> / <sub>8</sub>	.....	5	6	6	6	11	0
99 <sup>7</sup> / <sub>8</sub>	99 <sup>1</sup> / <sub>2</sub>	—	Treas. 6pc 1971	99 <sup>7</sup> / <sub>8</sub>	.....	6	10	0	6	10	6
85 <sup>4</sup> / <sub>8</sub>	92 <sup>3</sup> / <sub>8</sub>	98 <sup>1</sup> / <sub>2</sub>	Conv. 5pc 1971..	95 <sup>3</sup> / <sub>8</sub>	.....	5	5	0	6	9	0
90 <sup>7</sup> / <sub>8</sub>	86 <sup>3</sup> / <sub>8</sub>	98	Gas 3pc '69-71.	89 <sup>7</sup> / <sub>8</sub> 25	.....	5	18	0	6	7	6
102 <sup>1</sup> / <sub>4</sub>	99 <sup>3</sup> / <sub>8</sub>	—	Exch. 6pc 1971.	100 <sup>3</sup> / <sub>8</sub> 25	.....	6	14	0	6	11	0
100 <sup>3</sup> / <sub>8</sub>	97 <sup>3</sup> / <sub>8</sub>	97 <sup>1</sup> / <sub>2</sub>	Conv. 6pc 1972..	98 <sup>3</sup> / <sub>8</sub>	.....	6	1	6	6	7	0
91 <sup>3</sup> / <sub>8</sub>	87 <sup>3</sup> / <sub>8</sub>	98	Gas 4pc '69-72....	89 <sup>1</sup> / <sub>2</sub>	.....	4	9	6	6	10	6
101 <sup>7</sup> / <sub>8</sub>	97	—	Exchq. 6pc 1972	98 <sup>7</sup> / <sub>8</sub>	.....	6	7	0	6	13	0
<b>Five to Fifteen Years</b>											
98 <sup>1</sup> / <sub>8</sub>	94 <sup>3</sup> / <sub>8</sub>	85	Victory 4pc 1976	96 <sup>1</sup> / <sub>2</sub>	+ 1/2	4	3	6	4	19	6
84 <sup>1</sup> / <sub>4</sub>	82	100	Elect. 2pc '68-73	82 <sup>7</sup> / <sub>8</sub> 25	.....	5	12	6	6	15	6
90	85 <sup>7</sup> / <sub>8</sub>	75 <sup>1</sup> / <sub>2</sub>	Trans. 5pc '68-73	87 <sup>1</sup> / <sub>2</sub> 25	+ 1/8	5	8	6	5	13	6
96 <sup>7</sup> / <sub>8</sub>	91 <sup>3</sup> / <sub>8</sub>	97 <sup>1</sup> / <sub>2</sub>	Conv. 5pc 1974	93 <sup>1</sup> / <sub>2</sub>	.....	5	13	6	6	13	0
97 <sup>3</sup> / <sub>8</sub>	94 <sup>1</sup> / <sub>2</sub>	80	Fundg 4pc '60-90	97 <sup>3</sup> / <sub>8</sub>	+ 1/4	4	3	0	4	12	6
79 <sup>7</sup> / <sub>8</sub>	75 <sup>7</sup> / <sub>8</sub>	100	Sav'gs 5pc '65-75	76 <sup>7</sup> / <sub>8</sub>	+ 1/8	5	18	0	6	17	0
104	98 <sup>3</sup> / <sub>8</sub>	—	Treas. 6pc 1976	99 <sup>3</sup> / <sub>8</sub>	.....	6	10	0	6	11	6
76 <sup>1</sup> / <sub>4</sub>	72 <sup>7</sup> / <sub>8</sub>	99 <sup>1</sup> / <sub>2</sub>	Elect. 3pc '74-77	75 <sup>3</sup> / <sub>8</sub> 25	.....	4	1	6	6	16	6
83 <sup>7</sup> / <sub>8</sub>	78 <sup>3</sup> / <sub>8</sub>	95 <sup>1</sup> / <sub>2</sub>	Trans. 4pc '72-77	80 <sup>3</sup> / <sub>8</sub>	+ 1/8	5	0	6	6	16	0
90	85 <sup>3</sup> / <sub>8</sub>	96	Exchq. 5pc '76-78	85 <sup>1</sup> / <sub>2</sub> 25	+ 1/8	5	18	0	6	16	0
82 <sup>5</sup> / <sub>8</sub>	78 <sup>1</sup> / <sub>2</sub>	99	Elect. 4pc '74-79	78 <sup>7</sup> / <sub>8</sub> 25	.....	5	7	6	6	16	0
76 <sup>1</sup> / <sub>4</sub>	71 <sup>3</sup> / <sub>8</sub>	99	Do. 3pc '76-79	73 <sup>3</sup> / <sub>8</sub>	.....	4	16	0	6	16	6
80 <sup>3</sup> / <sub>8</sub>	75 <sup>1</sup> / <sub>8</sub>	75 <sup>1</sup> / <sub>8</sub>	Treas. 3pc '77-80	76 <sup>3</sup> / <sub>8</sub>	+ 1/8	4	12	6	6	5	6
81 <sup>3</sup> / <sub>4</sub>	85 <sup>1</sup> / <sub>2</sub>	98 <sup>1</sup> / <sub>2</sub>	F'ndg 5pc '78-80	87 <sup>3</sup> / <sub>8</sub>	.....	6	1	6	6	17	0
77 <sup>7</sup> / <sub>8</sub>	71 <sup>7</sup> / <sub>8</sub>	81	Treas. 3pc '79-81	72 <sup>5</sup> / <sub>8</sub>	.....	4	16	6	6	12	6
<b>Over Fifteen Years</b>											
83 <sup>3</sup> / <sub>8</sub>	85 <sup>3</sup> / <sub>8</sub>	90 <sup>3</sup> / <sub>8</sub>	F'ndg 5pc '82-84	87 <sup>7</sup> / <sub>8</sub>	.....	6	6	0	6	16	0
99 <sup>3</sup> / <sub>8</sub>	95 <sup>3</sup> / <sub>8</sub>	—	F'ndg 6pc '85-87	97 <sup>3</sup> / <sub>8</sub>	+ 1/8	6	16	6	6	19	0
62 <sup>3</sup> / <sub>4</sub>	56 <sup>3</sup> / <sub>8</sub>	100	Trans. 5pc '78-88	58 <sup>7</sup> / <sub>8</sub>	.....	5	3	0	6	15	0
86 <sup>3</sup> / <sub>8</sub>	78 <sup>7</sup> / <sub>8</sub>	84 <sup>1</sup> / <sub>2</sub>	Treas. 5pc '86-89	81 <sup>7</sup> / <sub>8</sub>	.....	6	6	0	6	16	6
93 <sup>1</sup> / <sub>8</sub>	86 <sup>3</sup> / <sub>4</sub>	97	F'ndg 5pc '87-91	86 <sup>1</sup> / <sub>2</sub> 25	.....	6	12	6	6	17	6
95 <sup>3</sup> / <sub>4</sub>	87 <sup>7</sup> / <sub>8</sub>	—	Fund'g 6pc 1993	89 <sup>1</sup> / <sub>2</sub>	.....	6	14	6	6	18	0
58 <sup>1</sup> / <sub>2</sub>	53 <sup>1</sup> / <sub>8</sub>	100	Gas 3pc '90-96...	55 <sup>3</sup> / <sub>8</sub>	.....	5	10	0	6	11	6
58 <sup>7</sup> / <sub>8</sub>	54	100	Redptn 3pc '86-96	54 <sup>1</sup> / <sub>2</sub> 25	- 1/8	5	9	6	6	9	6
105 <sup>1</sup> / <sub>4</sub>	97 <sup>1</sup> / <sub>4</sub>	—	Treas. 6pc '95-98	100 <sup>7</sup> / <sub>8</sub>	.....	8	18	0	6	18	0
62	55 <sup>3</sup> / <sub>8</sub>	80	F'ndg 3pc '99-04	57 <sup>3</sup> / <sub>8</sub>	.....	6	2	6	6	12	6
87 <sup>3</sup> / <sub>8</sub>	80 <sup>7</sup> / <sub>8</sub>	85	Treas-5pc '08-12	81 <sup>1</sup> / <sub>4</sub> 25	.....	6	15	0	6	16	6
<b>Undated</b>											
63 <sup>1</sup> / <sub>4</sub>	56 <sup>1</sup> / <sub>8</sub>	—	Consols 4pc.....	58 <sup>3</sup> / <sub>8</sub>	.....	6	17	6	—	—	—
56 <sup>3</sup> / <sub>8</sub>	49 <sup>7</sup> / <sub>8</sub>	—	War Loan 3pc	52	.....	6	17	0	—	—	—
85 <sup>3</sup> / <sub>4</sub>	50 <sup>7</sup> / <sub>8</sub>	—	Conv. 3pc '61Aft	51 <sup>1</sup> / <sub>4</sub> 25	.....	6	16	0	—	—	—
47 <sup>6</sup> / <sub>8</sub>	43	—	Treas. 3pc '66Aft.	43 <sup>1</sup> / <sub>2</sub> 25	.....	6	17	0	—	—	—
39 <sup>3</sup> / <sub>4</sub>	35 <sup>3</sup> / <sub>4</sub>	—	Consols 2pc.....	36 <sup>3</sup> / <sub>4</sub> 25	.....	6	15	0	—	—	—
40	36 <sup>1</sup> / <sub>8</sub>	—	Treasury 2pc..	36 <sup>5</sup> / <sub>8</sub> 25	.....	6	15	6	—	—	—

Figure 3.3: Yield curve for 1st September 1967



Notes: See text.

### 3.2.3. Results

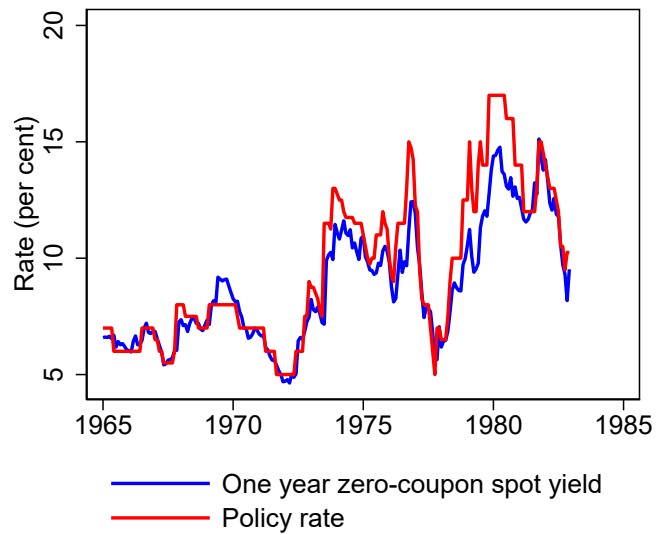
Figure 3.4 presents monthly estimates of UK yield curves. Figure 3.4a shows the one year spot rate alongside Bank Rate. Unsurprisingly the two move fairly closely together at a monthly frequency. Figure 3.4b displays ten year spot and forward rates. The ten year rates drifted up in the 1960s before rising very rapidly to a peak in 1974. They remained high throughout the 1970s before starting to fall in the early 1980s. The ferocity of the rise in yields between 1972 and 1974 strongly suggests a sharp rise in inflation expectations and inflation risk premia – it's hard to imagine why real yields and premia would rise so rapidly.<sup>6</sup> Interestingly, the forward rate rose even faster and to a higher peak than the spot curve, perhaps suggesting that market participants thought inflation would be even higher in the late 1970s and early 1980s than it was in the mid 1970s.

Figure 3.5 shows the change in one year spot yields on the days of monetary policy actions. This is the basis for the impulse response functions estimated in

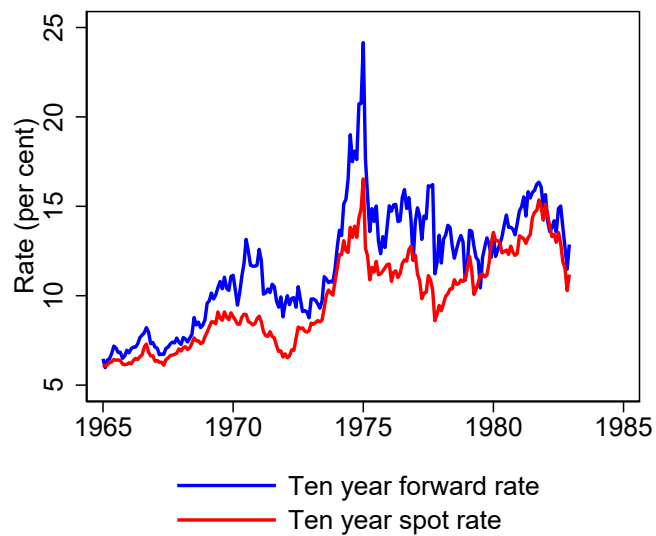
<sup>6</sup>See the discussion in Section 2.1.4.

**Figure 3.4:** *New UK yield curve estimates*

**(a)** *Short rates*



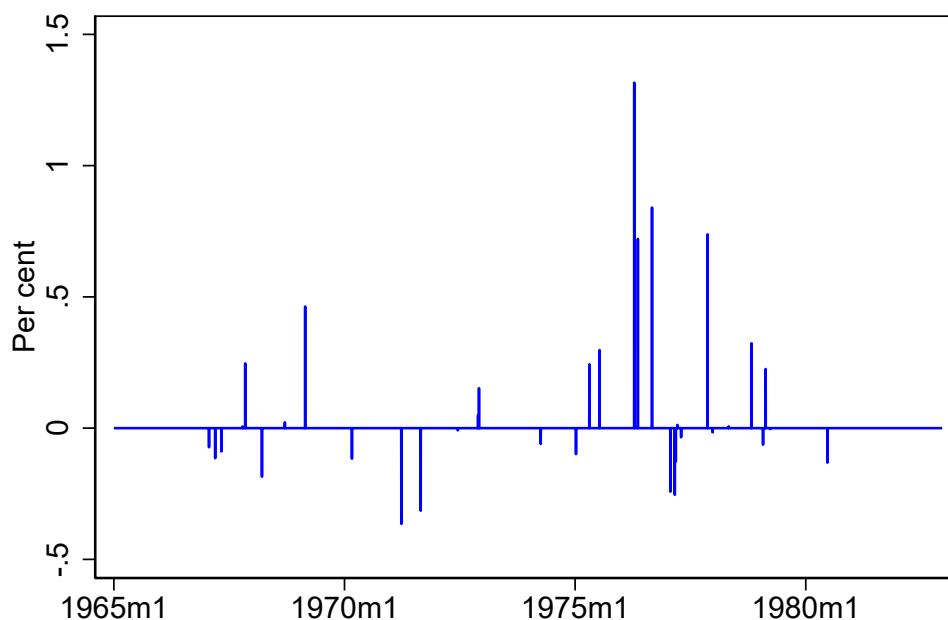
**(b)** *Long rates*



*Notes:* See text.

Sections 3.3 and 3.4. In Section 3.3, the daily surprises are aggregated to monthly frequency.<sup>7</sup>

**Figure 3.5:** *Interest rate surprises*



*Notes:* See text.

One potential concern about using market surprises is that markets may have been reacting to the revelation of private information held by the authorities about macroeconomic prospects.<sup>8</sup> If this were the case, the market surprises should have been predictable by HMT forecasts (controlling for other information about macroeconomic prospects). In fact, market surprises were not predictable by HMT forecasts.<sup>9</sup>

A second potential concern is that the market surprises represented reactions to other news on the day, rather than news relating to the monetary policy action. A comparison of the samples of market moves on policy and on non-policy days helps us assess this concern: if the variance of the changes in the policy

<sup>7</sup>The aggregation results in the number of surprises at monthly frequency falling to 32.

<sup>8</sup>See Nakamura and Steinsson (2018) for a discussion of this 'information effect' in the US in a more recent period.

<sup>9</sup>Regression output available on request.

sample is very large, then I can be confident that the interest rate surprise series is overwhelmingly driven by policy news, rather than other news. In fact, the variance of the market moves in the policy sample is 15 times higher than the variance on other days.

### 3.3. THE IMPACT OF SURPRISE INTEREST RATE CHANGES ON CONSUMER PRICES

**Empirical approach and data** I use local projections – the same approach as in Chapter 2 – to estimate the impact of surprise changes in interest rates on consumer prices. The data are monthly. I control for one year of lags. The factors are estimated from a set of 94 macroeconomic and financial variables.<sup>10</sup>

The specification is:

$$\Delta y_{t,t+h} = \alpha_h + \beta_h x_t + \sum_{l=1}^L \kappa_{h,l} \Delta y_{t-l} + \sum_{l=1}^L \lambda_{h,l} x_{t-l} + \sum_{k=1}^K \sum_{l=1}^L \mu_{h,k,l} F_{k,t-l} + \eta_{t,t+h},$$

where  $\Delta y_{t,t+h}$  is the change in log CPI between  $t - 1$  and  $t +$  horizon  $h$ ,  $x_t$  is the interest rate surprise measure explained above and  $F_{k,t-l}$  are the twelve lags (i.e.  $L = 12$ ) of the 3 factors ( $K = 3$ ). The  $\beta_h$ s form the impulse response functions.

Using market surprises to identify the effect of monetary policy is known as the ‘high-frequency’ approach to identification.<sup>11</sup> The identification assumption is that CPI did not affect the interest rate surprises that occurred within the same month. This seems plausible given CPI was published with a lag of over a month.

The standard errors are heteroskedasticity and autocorrelation consistent.

**Results** Figure 3.6 shows the response of CPI to a one percentage point interest rate surprise. After a lag of around one year, there was a growing negative

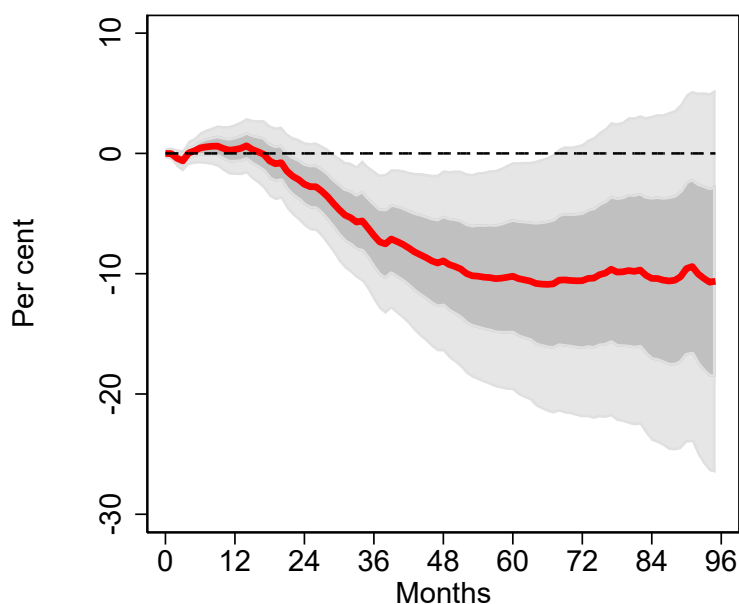
<sup>10</sup>Data are available on request.

<sup>11</sup>Gertler and Karadi (2015).

response for around three years after which the impact stayed fairly constant at a fall of around 10 percentage points. This result is qualitatively similar to that of [Cloyne and Hürtgen \(2016\)](#) for Britain in the period 1975 to 2007, as well as papers using American data such as [Bernanke et al. \(2005\)](#) and [Romer and Romer \(2004\)](#).

**Figure 3.6:** *Impact of interest rate surprises on CPI*

The panel presents the estimated impulse response of CPI to a one percentage increase in the one year spot rate on the day of a monetary policy action. The red bold line shows the mean estimated response; the dark grey region shows the  $\pm 1$  standard error confidence interval; the light grey region shows the  $\pm 2$  standard error confidence interval.



*Notes:* See text.

### 3.4. THE IMPACT OF SURPRISE INTEREST RATE CHANGES ON NOMINAL FORWARD RATES

In this Section, I estimate the impact of interest rate surprises on days of monetary policy actions on nominal forward rates. Under conventional assumptions, monetary policy has no impact on real rates beyond the short term. So any

impact of monetary policy on medium- to long-term forward rates should reflect the impact on expected inflation (and possibly inflation risk premia). I choose to focus my analysis on the ten year forward rate to be on the conservative side of things.

This exercise serves as a robustness check on my results in Section 3.3. Although this approach does not measure the impact on actual consumer prices, it has the advantage of easily allowing analysis of the impact on expectations of prices at longer horizons than those in Section 3.3.

**Empirical approach and data** The data are presented in Section 3.2. I estimate the impact on nominal forward rates using OLS. The standard errors are heteroskedasticity and autocorrelation consistent.

**Results** Figure 3.7 shows the impact of interest rate surprises on the nominal forward curve. At short horizons, a surprise increase in interest rates raised forward rates as market participants understood that gradualist policymaking induced persistence in interest rates. However, beyond the six year horizon, the impact became negative. This finding is in line with US evidence presented by [Gürkaynak et al. \(2005\)](#). Their interpretation is that inflation expectations were not anchored, so a contractionary shock to the Federal Funds rate was viewed as signalling the Federal Reserve's desire to achieve lower inflation in the medium term (and an expansionary shock signalled the Federal Reserve's lack of commitment to low inflation).

As always, there is a question of how to interpret these results. The simplest explanation is that market participants did not believe that contractionary policy shocks would raise inflation. This would lend support to the thesis that tighter monetary policy did not result in higher inflation.

A second interpretation is that contractionary monetary policy shocks reduced inflation risk premia.<sup>12</sup> This is certainly a possibility, but it is hard to square with the rake hypothesis. Under this hypothesis, contractionary monetary policy shocks destabilise the public finances and most likely raise uncertainty about future inflation.

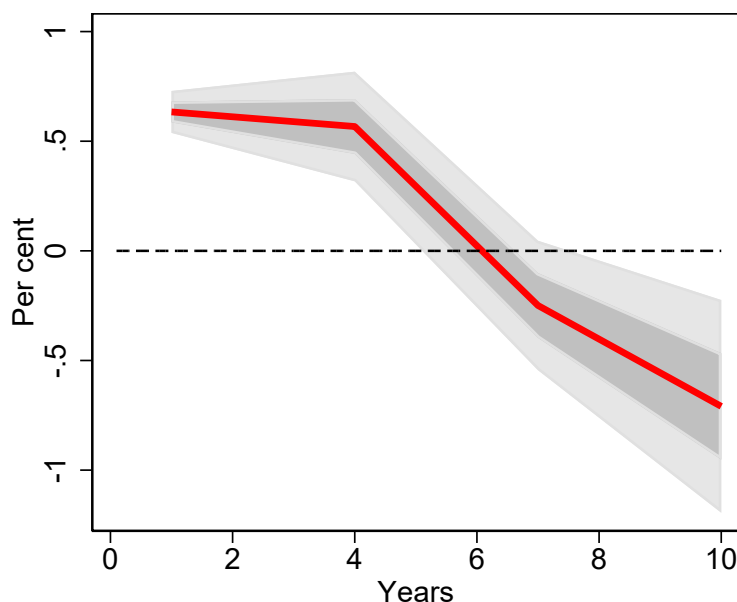
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<sup>12</sup>[Wright \(2011\)](#) presents evidence that monetary policy frameworks affect inflation risk premia.



**Figure 3.7:** *Impact of interest rate surprises on nominal forward rates*

The panel presents the estimated impulse response of forward rates to a one percentage increase in the one year spot rate on the day of a monetary policy action. The red bold line shows the mean estimated response; the dark grey region shows the  $\pm 1$  standard error confidence interval; the light grey region shows the  $\pm 2$  standard error confidence interval.



Notes: See text.

A third interpretation is that contractionary monetary policy shocks reduced real risk premia, leaving inflation expectations and inflation unchanged. Again, it is hard to square this with the rake hypothesis: actions which destabilise the public finances seem unlikely to have reduced real risk premia. Furthermore, [Hanson and Stein \(2015\)](#) find evidence that contractionary monetary policy shocks *raise* real term premia in the US.

### 3.5. CONCLUSION

This Chapter assesses the ‘stepping on a rake’ prediction that tighter monetary policy *raised* consumer prices through a fiscal channel. Estimates of the impact of interest rate surprises on the consumer price index and on nominal forward

rates show that it did not.

This leaves a puzzle: how was it the case that at the same time that surprise inflation stabilised the public finances, tighter monetary policy, which destabilises the public finances through its effect on interest payments, resulted in *falling* prices?

# Chapter 4.

## Monetary Policy and Fiscal Backing

This Chapter resolves the ‘rake puzzle’ left hanging at the end of Chapter 3.

In Section 4.1 I show that, although fiscal policy was not used to stabilise the public finances, the primary balance did in fact rise in response to surprise increases in interest rates. Drawing on the historical narrative, I explain that this was because monetary and fiscal policy were used *jointly* to achieve macroeconomic objectives. Sometimes they moved together as part of a policy package, but often they were in the same phase of a tightening or loosening cycle, so tightening in one instrument predicted tightening in the other. An increase in the monetary policy rate which surprised markets may, therefore, have signalled information about policymakers’ intentions for the overall macroeconomic stance, implemented by both monetary and fiscal policy, albeit not always on the same day.

I investigate this hypothesis further by exploiting institutional arrangements in Section 4.2. Budgets typically happened once a year, whereas the monetary policy rate could be changed at any time. In the few months after a Budget, fiscal policy was unlikely to be used, leaving monetary policy with a larger role. In these periods, interest rate surprises were less likely to be followed by complementary fiscal actions and, on average, were followed by only a small increase in the primary balance. Outside of these months, there was more scope for monetary and fiscal policy to pull in the same direction and interest rate surprises were followed by a larger increase in the primary balance.

In Section 4.3, I show that the impact of interest rate surprises depended on their timing. When they happened shortly after a Budget and they were followed by a smaller increase in the primary balance, they had a smaller impact on prices than when they happened at other times of year, when they were followed by a larger impact in the primary balance. This result demonstrates that the impact of monetary policy shocks varies with the degree of fiscal backing, consistent with predictions from the ‘stepping on a rake’ model.

## 4.1. A REINTERPRETATION OF GREAT INFLATION ERA MONETARY POLICY SHOCKS

### 4.1.1. The impact of interest rate surprises on the primary balance

The prediction that surprise increases in interest rates raise consumer prices, at least at long horizons, rests on them not being followed by a higher primary balance. So estimating the relationship between interest rate surprises and the primary balance is a natural way to start investigating the rake puzzle.

**Empirical approach** I follow the same method as in previous Chapters to analyse the relationship between interest rate surprises and the primary balance.

The specification is:

$$\begin{aligned} \Delta y_{t,t+h} = & \alpha_h + \beta_h x_t + \sum_{l=1}^L \kappa_{h,l} \Delta y_{t-l} \\ & + \sum_{l=1}^L \lambda_{h,l} x_{t-l} + \sum_{k=1}^K \sum_{l=1}^L \mu_{h,k,l} F_{k,t-l} + \eta_{t,t+h}, \end{aligned}$$

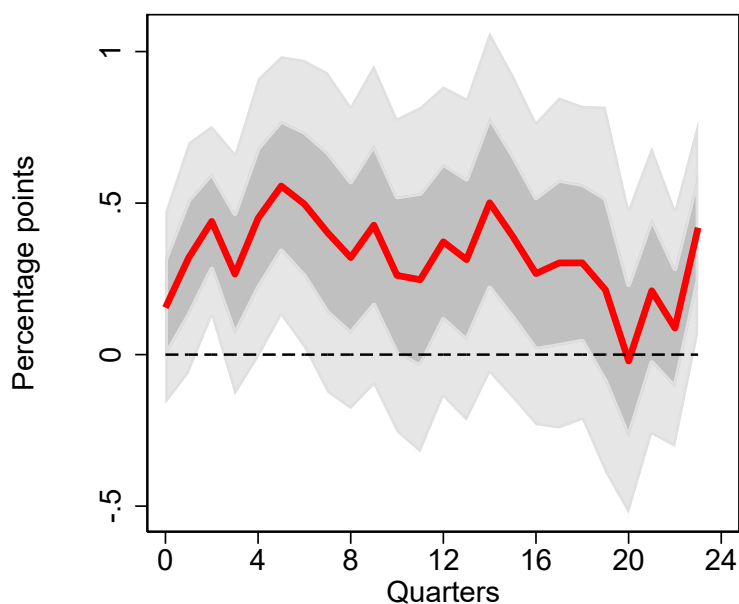
where  $\Delta y_{t,t+h}$  is the change in the primary balance to income ratio between  $t - 1$  and  $t + h$  horizon  $h$ ,  $x_t$  is the interest rate surprise measure presented in Chapter 3 and  $F_{k,t-l}$  are the lags of the 3 factors ( $K = 3$ ). The  $\beta_h$ s form the impulse response functions.

Primary balance data are only available quarterly, so I aggregate the interest rate surprise measure, use the same quarterly factors as in Section 2.2.2 and set  $L = 4$  to keep one year of lags.

**Results** Figure 4.1 shows that, following a surprise increase in the interest rate, the primary balance *did* rise, persistently, and by around 0.5 percentage points. Section 4.1.2 interprets this result.

**Figure 4.1:** *The path of the primary balance after an interest rate surprise*

The panel presents the estimated dynamic relationship between a one percentage increase in the one year spot rate on the day of a monetary policy action and the primary balance to GDP ratio. The red bold line shows the mean estimated response; the dark grey region shows the  $\pm 1$  standard error confidence interval; the light grey region shows the  $\pm 2$  standard error confidence interval.



*Notes:* See text.

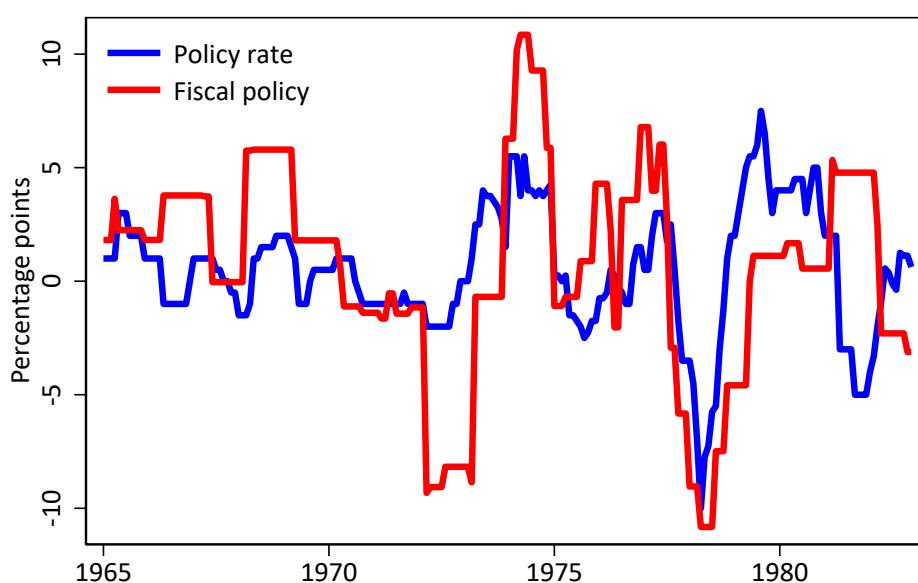
#### 4.1.2. How monetary and fiscal policy were used jointly

Rather than revealing a direct causal link between monetary policy and the primary balance, which would exist in regimes in which fiscal policy is used to stabilise the public finances, this Section argues that Figure 4.1.2 reflects the impact of a change in the stance of *overall* macroeconomic policy on indicators of both monetary and fiscal policy. Monetary and fiscal policy were both viewed as instruments of demand management and used for similar purposes. So it is unsurprising that they were correlated with each other. To make this argument, I present data on monetary and fiscal policy, followed by policymakers' accounts of how they were used.

**Data** Figure 4.2 shows summary measures of the change in the monetary and fiscal policy stances. The monetary policy measure is the twelve-month change in the policy rate. The fiscal policy measure is constructed from fiscal policy measures announced in Parliament (see the notes to the Figure for details) and is also constructed on a twelve-month basis. For ease of comparability, the monetary policy indicator is lagged by six months.

The Figure shows that there was a clear relationship between monetary and fiscal measures. Furthermore, monetary policy appeared to lead fiscal policy.

**Figure 4.2:** *Rolling changes in monetary and fiscal policy*



*Sources:* Bank of England, *Financial Statements* and speeches made in Parliament announcing changes in fiscal policy (recorded in *Hansard's Parliamentary Debates*).

*Notes:* The blue line shows the 12-month change in the policy rate, lagged by 6 months. The red line shows the rolling 12-month sum of the expected first-year impact of fiscal policy announcements such as Budgets on the central government primary surplus, scaled by expected central government revenue.

**Narrative evidence** Monetary and fiscal policy were both seen as instruments of demand management in the 1960s and 1970s. For example [Dow \(1964\)](#), an influential book by an economist who had worked in government and would

go on to work at the Bank, stated that 'the main role of fiscal and monetary policy should be, while maintaining an appropriate margin of spare capacity, to even out fluctuations in the growth of demand'. Demand was managed with a view to achieving both internal and external balance. This is reflected in the choice of variables included, and found to be significant in, a series of studies of monetary and fiscal policy reaction functions undertaken in the late 1960s and early and middle of the 1970s. [Fisher \(1968\)](#), [Fisher \(1970\)](#), [Pissarides \(1972\)](#) and [Coghlan \(1975\)](#) found that the monetary policy rate and tax rates all responded to movements in foreign exchange reserves, unemployment and consumer prices.

Furthermore, the Chancellor (and Prime Minister) were ultimately in control of both fiscal and monetary policy. The Chancellor signed off on changes in the policy rate in this era and in practice had a lot of influence. [Cairncross \(1997\)](#) and [Needham \(2015\)](#) both provide copious evidence in both the 1960s and 1970s of friction between the Bank of England Governor and politicians, with the politicians' original view usually prevailing.

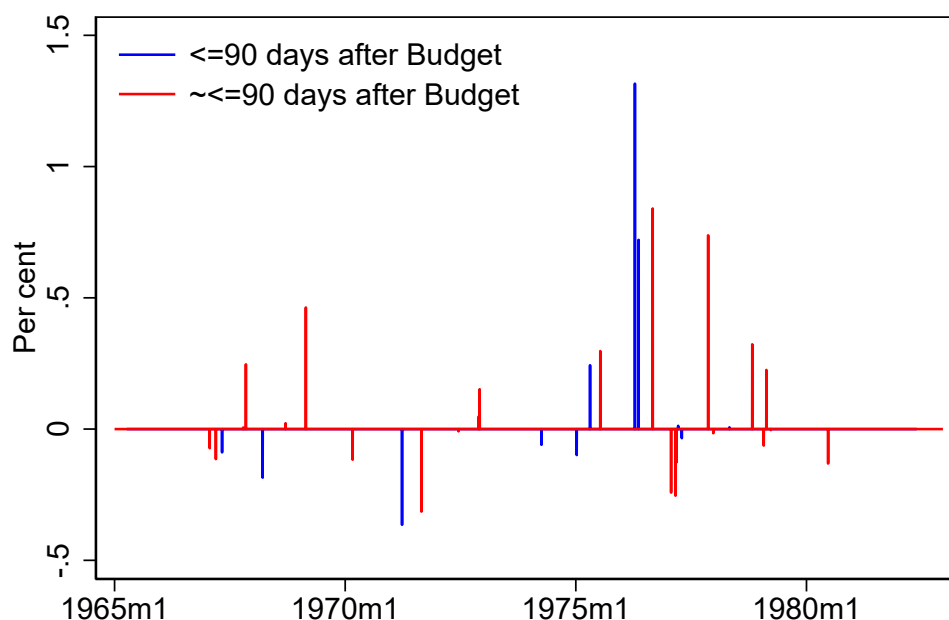
[Cairncross'](#) diaries also give some insight into how monetary and fiscal policy pulled in the same direction. In the entry for 10th March 1967, he wrote 'Governor wants his extra  $\frac{1}{2}$  off bank rate and although Sam Goldman is doubtful since it will be taken as a sign of the slant of the Budget, William is inclined to let the Bank decide for themselves this time'. This quote suggests that policymakers believed that changes in Bank Rate were seen as leading indicators of fiscal measures, consistent with the evidence in [Figure 4.2](#) that monetary policy tended to lead fiscal policy.

One reason why monetary policy might have been a leading indicator of fiscal policy is because fiscal policy decisions tended to take place only once a year, while Bank Rate could be changed at whatever frequency was felt necessary. Although fiscal policy could in principle be modified outside of the annual Budget cycle, Chancellors avoided doing so because, in [Dow \(1964, p. 407\)](#)'s words, 'special budgets ... have been treated as crisis measures, carrying a distinct implication that 'normal' policy had failed'.

## 4.2. INSTITUTIONAL VARIATIONS IN FISCAL BACKING

The narrative in Section 4.1.2 suggests that there may have been institutional reasons that meant that the relationship between interest rate surprises and the primary balance depended on the time of year. If policymakers wanted to tighten or loosen macroeconomic policy soon after a Budget, they would be unlikely to choose fiscal policy for the reason given above by Dow (1964). Bank Rate would probably have done more of the heavy lifting. On the other hand, if they wanted to tighten or loosen policy in the months before a Budget was scheduled, they might have chosen to act early but cautiously using Bank Rate and reinforce monetary policy with fiscal measures at the Budget.

Figure 4.3: Interest rate surprise subsamples



Notes: See text.

**Empirical analysis** I investigate this possibility empirically by allowing the relationship between interest rate surprises and the primary balance to vary with the timing of the interest rate surprise. I divide the sample into two: one



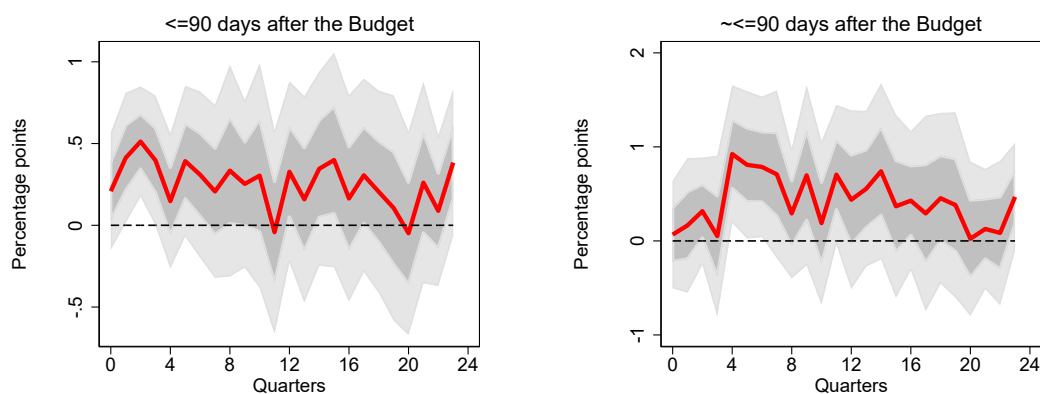
sample of interest rate surprises that occurred within 90 days of a Budget and one sample including all the other observations. Figure 4.3 shows the data.

I use the same specification as in Section 4.1 to examine the relationship in these two subsamples.

Figure 4.4 shows the results, which are consistent with my hypothesis. Following an interest rate surprise which occurred in the 90 days after a Budget, there was a persistent rise in the primary balance to income ratio averaging about 0.25 percentage points. In the other subsample, the response averaged around 0.5 percentage points. Although the confidence intervals are sufficiently wide to make this an uncertain result, the point estimates suggest that surprise increases in interest rates in the 90 days following a Budget had less fiscal backing than those which occurred at other times of the year.

**Figure 4.4:** *Different paths of the primary balance after an interest rate surprise*

The panels present the estimated dynamic relationships between a one percentage increase in the one year spot rate on the day of a monetary policy action and the primary balance to GDP ratio in the two subsamples. The red bold line shows the mean estimated response; the dark grey region shows the  $\pm 1$  standard error confidence interval; the light grey region shows the  $\pm 2$  standard error confidence interval.



*Notes:* See text.

### 4.3. FISCAL BACKING AND THE IMPACT OF MONETARY POLICY

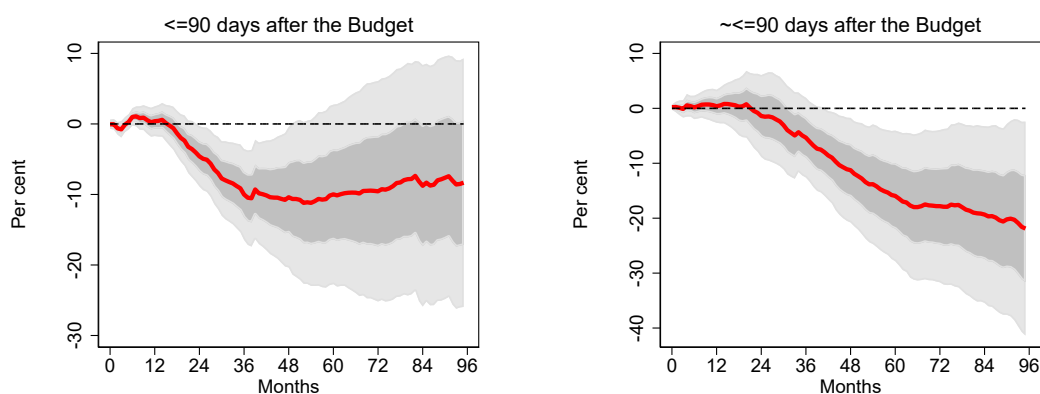
The ‘stepping on a rake’ hypothesis is a prediction about the impact of fiscal backing. If monetary policy is backed by fiscal policy, it has the conventionally-signed impact on prices. If it doesn’t, then it has the opposite impact, at least at long horizons.

The analysis and results in Section 4.2 showed that interest rate surprises which occurred soon after a Budget had less fiscal backing than those which occurred at other times of year. Theory predicts that the first subsample of interest rate surprises had a less negative impact on consumer prices than the second subsample.

I use the specification in Section 3.3 to test this prediction.

**Figure 4.5:** *Differing impacts on consumer prices*

The panels present the estimated impulse response of CPI to a one percentage increase in the one year spot rate on the day of a monetary policy action in the two subsamples. The red bold line shows the mean estimated response; the dark grey region shows the  $\pm 1$  standard error confidence interval; the light grey region shows the  $\pm 2$  standard error confidence interval.



*Notes:* See text.

Figure 4.5 shows the results. Interest rate surprises which occurred in the 90 days after a Budget and had less fiscal backing reduced consumer prices by about half as much as those which occurred at other times of year and had more fiscal backing. These results are consistent with theory’s predictions.

#### 4.4. CONCLUSION

This Chapter investigates the puzzling combination of results in previous Chapters – that Great Inflation era fiscal policy was not used to stabilise the public finances, but at the same time, interest rates had conventional effects on consumer prices.

The resolution of the puzzle is that monetary and fiscal policy were used by the same policymakers to achieve the same set of objectives, so they tended to pull in the same direction, even though fiscal policy did not respond to monetary policy.

Institutional factors mean that some interest rate surprises received more fiscal backing than others. The prediction from theory that interest rate surprises with more fiscal backing had a larger impact on consumer prices is supported by the data.

This has an important implication for the interpretation of the Great Inflation in Britain. The consensus view, set out most clearly in [Nelson and Nikolov \(2004\)](#), is that inflation would have been lower if only monetary policy had been tighter. This Chapter suggests that this statement is only true if it is assumed that higher interest rates would have been backed with tighter fiscal policy.



# Chapter 5.

## Conclusion

This thesis challenges the consensus view of the Great Inflation in Britain, which puts little or no emphasis on the role of fiscal policy. I present new evidence that the traditional objective of fiscal policy throughout most of modern British history – stabilising the public finances – was abandoned after WWII. In the Great Inflation regime, fiscal policy shocks were financed by surprise inflation rather than by changes in the primary balance. As well as being a source of shocks, fiscal policy was probably important in the transmission of other shocks to inflation.

Theory predicts that, in fiscal financing regimes such as the one in place in Britain during the Great Inflation, contractionary monetary shocks raise the price level. But I find that surprise increases in interest rates had conventional effects on consumer prices. On the face of it, this is a puzzling result.

Investigating this puzzle led me to a new interpretation of interest rate surprises. Instead of conveying information solely about monetary policy, they reflect changes in the overall macroeconomic policy stance. Because monetary and fiscal policy were both controlled by the Chancellor and used for the same macroeconomic objectives, changes in the overall stance were reflected in both monetary and fiscal policy.

Exploiting the difference in the frequency of monetary and fiscal policy announcements, I show that the impact of monetary policy on prices depended on the degree of fiscal backing. This suggests that tighter monetary policy could only have prevented the large increase in inflation in the 1970s if it had been backed by fiscal policy.

In conclusion, I find no evidence that tighter monetary policy made inflation worse but my last result, that the impact of monetary policy depends on fiscal backing, is in line with the theory underlying the ‘stepping on a rake’ hypothesis.

In breaking new ground in our understanding of the role of both fiscal and monetary policy in the Great Inflation in Britain, this thesis provides added mo-

tivation for studying the deep determinants of fiscal financing regimes. The literature on the Financial Revolution has increased our knowledge of the mechanisms by which governments can commit to repay debt without devaluing the currency, but there is huge scope to study why fiscal financing regimes change over time as they did in the UK and why they vary across countries.

# Appendix





## A.1. THE STANDARD APPROACH TO ESTIMATING MONETARY AND FISCAL POLICY REGIMES

Most papers on fiscal theories of inflation attempt to measure the coefficient on debt in a fiscal reaction function, i.e.  $\gamma$  in this equation:<sup>1</sup>

$$s_t = \gamma b_{t-1} + \delta' Z_t + \varepsilon_t$$

Estimating  $\gamma$  is challenging for a number of reasons. Most obviously, omitted variables (rows of the vector  $Z_t$ ) which are correlated with lagged debt would lead to bias. Somewhat more subtly, if  $\varepsilon_t$  is an autoregressive process, then  $b_{t-1}$  would not be independent of  $\varepsilon_t$  (Leeper and Li, 2017). More generally, if  $\gamma$  is not positive (and monetary policy is 'passive'), then  $b_{t-1}$  and the surplus  $s_t$  are jointly determined by the fiscal reaction function and the government debt valuation equation.

One approach to these problems could be to instrument  $b_{t-1}$  with old shocks (Barnichon and Mesters, 2020), such as fiscal news shocks. However, the instrument may lack relevance because when  $\gamma$  is zero fiscal shocks may have little impact on the real value of government debt.<sup>2</sup> Even if the instrument is relevant, the potential for omitted variable bias remains if the shocks affect  $Z_t$ .

Another approach is to estimate  $\gamma$  as part of a system of equations, disciplined by theory. A series of authors have done this using estimated DSGE models which allow  $\gamma$  to fluctuate over time.<sup>3</sup> This is a promising approach but also not uncontroversial. For example Cochrane (2023, ch. 24) notes that these papers tend to restrict the fiscal shock to be an AR(1) process. This, he argues, makes it more likely that the estimated value of  $\gamma$  will be positive, when in fact it could be zero, accompanied by an s-shaped fiscal shock process (Cochrane, 1998).<sup>4</sup>

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<sup>1</sup>There is of course a counterpart literature which attempts to identify the monetary regime (Clarida et al., 2000; Taylor, 1999).

<sup>2</sup>The analogy between debt issuance and a stock split when fiscal policy is active and monetary policy is passive illustrates this possibility (Cochrane, 2005).

<sup>3</sup>E.g. Bhattarai et al. (2016), Bianchi and Ilut (2017) and Chen et al. (2022) for the US and Fan et al. (2016) for the UK.

<sup>4</sup>More fundamentally, time series data can only shed light on how policy responds *in equilibrium*, so tell us nothing about off equilibrium threats which may play a role in determining

## A.2. NARRATIVE EVIDENCE ON THE GOLD STANDARD FISCAL FINANCING REGIME

**Before 1717** 1717 was 45 years after the last debt repudiation,<sup>5</sup> three years after the end of the War of the Spanish Succession, one of five major wars Britain fought in the eighteenth century, and of course the year Isaac Newton set the rate of exchange between silver and gold at a level which drove the former out of circulation. Government debt had more than doubled between 1697, the end of the previous major war, and 1714.<sup>6</sup> This debt burden was unprecedented and creditors were not fully confident that the war would be paid for by real primary surpluses. [Velde \(2022\)](#) documents investor fears of default and [Sussman and Yafeh \(2006\)](#) show that the interest rate on British debt exceeded the best-in-class Dutch rate by around two percentage points at the time.

The spread over the Dutch rate probably reflected arrears which arose from problems with the operation of what was known as the funding system. Under this system, most British government debt obligations had specific taxes earmarked to pay for their service and, if applicable, redemption. This was not a new arrangement,<sup>7</sup> but it was not working well in the two decades leading up to 1717. Many funds (taxes backing individual debts) fell short of what was needed to service the debts: at various points in those decades, more than 20 per cent of the funds were deficient.<sup>8</sup> Absent any remedial action, the government would fall behind on its debt service obligations. Remedial action was not automatic and, should the Treasury be unable or unwilling to divert surplus funds from elsewhere, would require new taxes to be proposed by the government and voted by Parliament. In practice, these deficiencies did sometimes lead to arrears, some of which exceeded one year.<sup>9</sup>

The spread was, however, on a long-run downward trend. Steps were taken by the Tory ministry led by Robert Harley in the early 1710s to make up funding equilibrium inflation ([Cochrane, 2011](#)).

<sup>5</sup>The Stop of the Exchequer.

<sup>6</sup>[Slater \(2018, p.47\)](#).

<sup>7</sup>See e.g. [Desan 2014](#), ch. 4 on the history of tallies which were backed by specific tax revenues.

<sup>8</sup>[Cox \(2015\)](#).

<sup>9</sup>[Velde \(2022\)](#).

deficiencies and lengthen the debt's maturity.<sup>10</sup> This probably contributed to reassuring creditors that Britain would honour its debts.

**1717 to 1797** The long process of improving Britain's creditworthiness was not complete in 1717. Both public discourse and market prices suggest investor nervousness concerning the prospect of debt being written down or taxed.<sup>11</sup> Although the funding system provided for servicing existing debts, there was no plan in place to reduce those debts so that future conflicts could be financed. This was the context for King George I's address to Parliament in which he highlighted the debt burden and requested that Parliament work to lower it in order to retain the nation's autonomy:

You are all sensible of the insupportable weight of the National Debts, which the public became engaged for from the necessity of the times, the pressures of a long and expensive war, and the languishing state of public credit: but the scene being now so happily changed, if no new disturbances shall plunge us again into streights and difficulties, the general expectation seems to require of you, that you should turn your thought towards some method of extricating yourselves, by reducing, by degrees, the Debts of the Nation.

My Lords and Gentlemen: I have an entire confidence in you, and have therefore nothing to ask, but that you would take such measures as will best secure your Religion and Liberties...

This was the catalyst for a number of schemes for reducing the debt. The proposal that carried was that of the Chancellor, Sir Robert Walpole.<sup>12</sup> There were three key strands. First, holders of redeemable debt were offered cash or new debts with a lower interest rate. Second, the number of funds which serviced the debts was reduced, which lowered the likelihood that any individual claim on the

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<sup>10</sup>Cox 2016, pp. 64-67; Macdonald 2013.

<sup>11</sup>Velde (2022).

<sup>12</sup>Though the true originator of the ideas may well have been William Paterson, who was also partly responsible for the Bank of England's creation. By the time that the proposal was enacted, Walpole had resigned.

government would have insufficient tax earmarked to it.<sup>13</sup> Third, the surpluses on these funds, boosted by lower interest payments, were then funneled into a sinking fund whose purpose was to buy back debt.

The debt conversions were modestly successful in reducing interest payments, which fell from an average of £3.1 million in the five years to 1717 to £2.9 million in the following five years.<sup>14</sup> Initially the sinking fund was used as intended, as George I acknowledged when he opened Parliament in 1724: “it must be a very great satisfaction to all my faithful subjects, to see the sinking fund improved and augmented, and the debt of the nation thereby put into a method of being so much the sooner gradually reduced and paid off.” He continued to mention the importance of the sinking fund throughout the 1720s. Despite a looming conflict with Spain, he requested in 1727 “that our present necessities shall make no interruption in the progress of that desirable work, of gradually discharging the national debt.” Indeed, later that year, Walpole raised the rate of land tax to fund higher military spending, despite pressure to divert funds away from the sinking fund.

Not long after, however, the sinking fund was used as security for new loans, thereby diverting future funds from debt repayment to interest payments. From 1733 onwards, surpluses meant for the sinking fund were used to fund spending. This change in approach was endorsed by George II in 1730, who stated to MPs that “you are the best judges, whether the circumstances of the Sinking Fund, and of the National Debt, will as yet admit of giving ease, where the duties are most grievous.” From 1734, the sinking fund was discredited by regular abuses.<sup>15</sup>

The second major period of conflict of the eighteenth century began in 1739 as the War of Jenkins’ Ear but the following year morphed into the War of Austrian Succession. The focus of fiscal policy and monarchs’ speeches in these years was of course on funding the military. The war was largely financed through borrowing, but the funding system meant that taxes rose to back the new loans.

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<sup>13</sup>Cox (2016, pp. 65–66).

<sup>14</sup>Figures on the public finances from here onwards are taken from Thomas and Dimsdale (2017) unless stated otherwise.

<sup>15</sup>Hargreaves (1930, pp. 44–46).

All but one of the loans issued to finance the war were funded by higher taxes (the other being secured on the sinking fund).<sup>16</sup> Revenue rose by more than 25 per cent over the course of the war, an annual average rate of over 2 per cent, compared to a gentle fall between 1717 and 1738.

The return of peace saw renewed focus on reducing debt in monarchs' speeches. George II reminded MPs in 1748 that:

Times of tranquillity are the proper seasons for lessening the national debt, and strengthening ourselves against future events; and, as the necessary means for these purposes, I must recommend to you the improvement of the public revenue, and the maintaining our naval force in proper strength and vigour.

George II's speeches continued to emphasise debt reduction and the sinking fund throughout this period of peace and some progress was made in improving the public finances. Spending naturally fell back after the war and primary surpluses reappeared. Interest rates on government borrowing, which had risen by over half a percentage point towards the end of the war, fell back, offering Prime Minister Pelham an opportunity to lower the debt service through a conversion. This was a success and (by 1757) resulted in British government debt largely taking the form of 3% Consolidated Annuities, commonly known as 'consols'.

Unlike in 1717, however, this time the reduction in interest payments was used to reduce taxes, rather than to increase debt repayment<sup>17</sup> and commitment to the sinking fund remained weak.<sup>18</sup> Furthermore, as part of the Pelham reforms, new debt was secured on the sinking fund and taxes previously earmarked to the redeemed debts were credited to the sinking fund.<sup>19</sup> As pointed out in Slater (2018, pp. 52-53), giving the sinking fund this new role diluted its original debt redemption objective.<sup>20</sup>

The pattern of war (1739 to 1748) and peace (1748 to 1756) was repeated twice

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<sup>16</sup>See Dickson (1967, Table 5, pp. 218-219).

<sup>17</sup>Hargreaves (1930, pp. 55-56).

<sup>18</sup>Browning (1971, p. 345).

<sup>19</sup>Dickson (1967, p. 243).

<sup>20</sup>In 1787, the sinking fund was turned into the Consolidated Fund, which remains to this day. It continued to operate sporadically as a source of funds to redeem debt until WWII.

over the following three decades. The Prime Minister during the Seven Years' War (1756-63), the Duke of Newcastle, raised taxes to fund loans and avoided circumventing the sinking fund system (perhaps because there weren't sufficient funds to divert).<sup>21</sup> Likewise, Lord North, Prime Minister during the American War of Independence (1775-1783) consistently raised new taxes to pay for the interest on the new loans. For example, in his 1776 Budget speech, he stated that "the interest on this [new loan] stock would amount to 64,000l.; and, as it was not meant to break in on the sinking fund, must be paid by new taxes."

As soon as the wars were over, or even before in the case of the American War,<sup>22</sup> attention turned to debt reduction. When opening Parliament at the end of 1763, George III said that:

The improvement of the public revenue, by such regulations as shall be judged most expedient for that purpose, deserves your serious consideration: this will be the surest means of reducing the national debt, and of relieving my subjects from those burdens which the expences of the late war have brought upon them; and will, at the same time, establish the public credit upon the most solid foundation.

This rhetoric continued into the first half of the 1770s, with Lord North pointing out the strategic importance of debt reduction in his 1772 Budget speech:

Thus we see, what I believe no body expected at the conclusion of the last war, some, though no very certain, prospect of gradually reducing the national debt; a step which will necessarily raise our credit and authority in Europe, and terrify our enemies into pacific measures. For it is not only an armed force, not only great armies and great naval forces that will deter our rivals from violence, but the capacity of raising these bulwarks when occasion calls. And the latter method is surely preferable to the former, which generally tempts one party or other to commit acts of hostility.

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<sup>21</sup>Browning (1971, p.358).

<sup>22</sup>In his 1782 speech opening Parliament, George III recommended that MPs give their "immediate attention to the great objects of the public receipts and expenditure; and above all, to the state of the public debt."

Whatever ministers' intentions, the pace of debt reduction after both wars was slow. Moreover, raising loans during wartime had become more difficult and more expensive,<sup>23</sup> reflecting the upward ratchet in debt and taxes. These facts, and the public debate accompanying them,<sup>24</sup> spurred Prime Minister Pitt the Younger, in his 1786 Budget speech,

to consider of the means of decreasing the national debt. To attempt to recommend this purpose by any words, would surely be quite superfluous: the situation of this country, loaded with an enormous debt, to pay the interest of which every nerve has been stretched, and every resource nearly drained, carries with it a stronger recommendation than any arguments I could possibly adduce. That something should be done to relieve the nation from the pressure of so heavy a load, is indeed acknowledged by all; and, I trust, that in this House there is only one feeling upon the subject.... To behold this country emerging from a most unfortunate war, which added such an accumulation to sums before immense, that it was the belief of surrounding nations, and of many among ourselves, that our powers must fail us, and we should not be able to bear up under it; to behold this nation, instead of despairing at its alarming condition, looking boldly its situation in the face, and establishing upon a spirited and permanent plan the means of relieving itself from all its incumbrances, must give such an idea of our resources, and of our spirit of exertion, as will astonish the nations around us, and enable us to regain that pre-eminence to which we are on many accounts so justly entitled.

The plan which was enacted was a commitment to pay £1 million each year into a new sinking fund to be overseen by an independent body. This would be counted as a spending item in the Budget. Pitt's intention was that in peacetime, governments would avoid borrowing, so the new commitment would force up the pace of debt reduction. Pitt recognised that new debt may nevertheless be

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<sup>23</sup>Hargreaves (1930, ch. 4).

<sup>24</sup>Dr. Richard Price's sinking fund proposals seem to have been particularly influential (Hargreaves, 1930, ch. 5).

issued and in 1792 introduced a second sinking fund to ensure that this would also be reduced. Pitt's second sinking fund was built on the funding system: rather than simply raising taxes to cover the interest charge on a new loan, the government would now raise taxes by an additional one per cent of the loan to provide for its redemption. In one sense, this marked the completion of the funding system: now there was a system by which every loan issuance would automatically trigger the tax increases needed to fund it.

Pitt's second sinking fund was put into action in the following year, as the first of many loans were raised to fund the wars with France (1793 to 1815). Pitt made very clear commitments that the sinking fund contributions would continue during war time, even if that meant higher gross borrowing overall. This policy was heavily criticised after 1815, but, at least under the system in place at the beginning of the war, it did force taxes to be higher than they would otherwise have been.<sup>25</sup> This system by design did not prevent another rapid rise in debt and with it a rise in borrowing costs. Pitt recognised this growing pressure in his April 1797 Budget speech, admitting that "he could not say that the terms of the loan were advantageous to the public." It is possible that Pitt's modified funding system may have proved durable had it been implemented twenty years earlier. But by the 1790s, the debt had already risen too much for further rapid growth to be tolerated.

**1797 to 1815** By Autumn 1797, the consol rate exceeded 6 per cent, having risen by over two percentage points since the start of the war. This rate had not been seen since 1717 and would not be seen again until the 1960s. In response,<sup>26</sup> Pitt used his November 1797 Budget speech to announce that he would abandon the existing strategy:

I admit the funding system, which has been so long the established mode of supplying the public wants, though I cannot but regret the extent to which it has been carried, is not yet exhausted. If we look, however, at the general diffusion of wealth, and the great accumulation of capital; above all, if we consider the hopes which the

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<sup>25</sup>O'Brien (2008) contains an excellent discussion of both sides of this controversy.

<sup>26</sup>Cooper (1982).



enemy have conceived of wearying us out by the embarrassments of the funding system, we shall find that the true mode of preparing ourselves to maintain the contest with effect and success is, to reduce the advantages which the funding system is calculated to afford within due limits, and to prevent the depreciation of our national securities.

Dismissing the notion of covering war spending without recourse to borrowing as “evidently impractical”, Pitt sought a middle way. His solution was not entirely without precedent. The land and malt taxes had been used as variable taxes from before 1717 and tended to rise during war time.<sup>27</sup> Pitt built on this notion of variable taxes in two ways. First, he introduced a new temporary tax – the ‘triple assessment’ (itself built on the system of assessed taxes) – which he hoped could raise revenue by a third, far more than could be achieved using the land and malt taxes.<sup>28</sup> Second, he introduced a distinction between permanent and temporary debt. Temporary taxes would be maintained during peacetime until the temporary debt was redeemed, at which point the country “shall not owe more than at the beginning”, with Pitt’s two sinking funds in place to redeem the permanent debt from that point onwards.

In the 1803 Budget speech, Pitt’s successor Addington was even more ambitious about the extent to which taxation could fund the war:

The committee will perceive, that the great object I have in view is to raise a large part of the supplies within the year. The extent to which I wish to carry this principle is this, that there shall be no increase whatever of the public debt during the course of the war. In the first place, it will be necessary to ascertain the probable amount of the annual charges of the war, and then to make provisions for carrying on a vigorous and even protracted contest, without making any greater addition to the public debt than what will be annually liquidated by the sinking fund.

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<sup>27</sup>See [Beckett \(1985, fn. 5, p. 295\)](#) for the case of the land tax.

<sup>28</sup>The triple assessment was an early version of the income tax. Vulnerable to evasion, it yielded barely half of the £7 million projected by Pitt ([O’Brien, 2016, Table 6.3, pp. 180-181](#)). So it was reformed in 1799 and was a major source of revenue for the war.

Although Addington did not succeed in preventing an increase in debt, the deficit did fall back to a third of its 1797 level.

As war spending continued to rise, particularly in the last three years, Chancellors Petty, Perceval and Vansittart did not maintain such an intense focus on minimising borrowing. In 1813, Vansittart modified (and arguably damaged) the sinking funding arrangements in order to avoid raising taxes. He did this by cancelling debt issued before 1786, thereby reducing the sinking fund contribution. Despite this measure, Parliament did continue to pass revenue-raising measures and revenue grew by a further 60 per cent in real terms between 1803 and 1815.

The French Wars were associated with a period of inflation, the causes of which have been the subject of ongoing debate. Over recent years, [Antipa \(2016\)](#) and [Antipa and Chamley \(2023\)](#) have argued that inflation occurred through a fiscal channel, at least in the last phase of the war (1810 to 1815). These papers do not challenge the conventional explanation of the suspension of convertibility in 1797 – a bank run triggered by deflationary pressure associated with the return of specie to France after the assignats experiment – but do argue that inflation during the restriction period was at least partly fiscal in nature. They establish that changes in the *agio* – the difference between the rates of exchange between sterling and gold on the market and at the mint – coincide with news about the progress of the war. They interpret British military setbacks as news about the likelihood that debt would be financed by real primary surpluses or by inflation and therefore the likelihood that Britain would return to the Gold Standard at the same official rate.

This is certainly one coherent interpretation of movements in the *agio*, but others are possible too. For example, war news reflected in the *agio* may have been interpreted at the time as information about *when* rather than *whether* convertibility would be restored. [Hawtrey \(1949 \[1919\], p. 291\)](#) hypothesises that ministers would have been reluctant to return to convertibility during the war because they did not want to lose the greater flexibility afforded by suspension to borrow from the Bank of England. Under this interpretation, fiscal policy does of course play a role, but the *agio* did not reflect news about how debt will be financed. On the face of it, the fact that the consol rate remained

clearly below the 1797/98 peak for the rest of the war points towards the second interpretation being more likely. This interpretation is still compatible with a temporary monetary financing channel. [Antipa and Chamley \(2023\)](#) show that the Bank of England's purchases of Exchequer bills was unusually high towards the end of the war. If the Bank did not offset this with a reduction in its claims on the private sector, there may well have been a temporary impact on the money supply, prices and the *agio*.

Either way, Britain did return to convertibility in 1821 and even if there was a period when the fiscal financing regime changed, this was a very small fraction of the two hundred years being considered in this Section.

**1815 to 1866** Progress towards debt reduction after Waterloo started on the back foot when Parliament refused to pass the government's proposal to renew the income tax. It nevertheless remained the government's objective, as stated in Vansittart's 1816 Budget speech:

He certainly thought it would be desirable to avoid, if possible, any increase of the unfunded as well as funded debt. Had the system he recommended been adopted by the House, a great and rapid improvement of public credit, would, in his conviction, have been the consequence. He still most sincerely hoped this would take place though with less rapidity.

Spending did not fall sufficiently rapidly to make up for the lost income tax, resulting in deficits in 1816 and 1817. The government looked for a new mechanism to secure debt repayment, but Pitt's sinking funds were now discredited as it was realised more widely that debt repayment was funded by new borrowing. So in 1819 the House of Commons passed a resolution calling on for a surplus of at least £5 million.<sup>29</sup> This helped Vansittart secure tax rises of over £3 million in the 1819 Budget. In 1823, the £5 million became a charge on the Consolidated Fund (in this respect it was the same as Pitt's 1786 sinking fund).<sup>30</sup>

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<sup>29</sup>[Hargreaves \(1930, p. 145\).](#)

<sup>30</sup>[Hargreaves \(1930, p. 149\).](#)

Taxes were cut in 1824 and the sinking fund charge could again only be paid by borrowing. In his 1828 Budget speech, the new Chancellor Goulburn rejected this approach and instead recommended that the charge be lowered to £3 million. In doing so, 'he begged not to be understood as supposing that we could presume to abandon the principle, which he conceived to be essential to the maintenance of the character of the country, and the stability of public credit, of making constant efforts for the reduction of the national debt'.

The following year, however, the £3 million charge was abandoned. It is not entirely clear why, but the debate after the 1829 Budget speech suggests that many MPs remained very sceptical of any arrangement which could see the government issuing and purchasing debt at the same time. In the same year, however, a Bill was passed which allowed the Commissioners for the Reduction of the National Debt (the independent body set up in 1786 to administer the sinking fund) to issue life and term annuities in exchange for perpetuities.<sup>31,32</sup> Terminable annuities were equivalent to perpetuities plus a sinking fund in the sense that the return on them included an element of capital repayment.

For all intents and purposes, however, debt repayment stalled in the 1830s. This can be seen in Budget speeches. For example, in 1831, the new Chancellor Viscount Althorp informed the House that "he was never an advocate for a large Sinking Fund, or a large surplus revenue." In the following year, he made clear that he was prepared to act to prevent deficits:

...if it appears that we cannot make reductions sufficient to meet the income of the country, it will be absolutely necessary to appeal to Parliament to strengthen the resources of the country for the payment of its expenditure; and I am perfectly satisfied, that, after I shall have proved that the reduction of the expenditure has been carried as far as is consistent with the safety, interests, and honour of the country, I shall not fail to receive the support of the Parliament, even if it should be my misfortune to have to propose such a measure.

Although the term was not used in Budget speeches of this period, Chancel-

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<sup>31</sup>Hargreaves (1930, pp. 158-160).

<sup>32</sup>A table in [Commissioners for the Reduction of the National Debt \(1891, pp. 240-241\)](#) shows that £56 million had been issued by 1890.

lors appeared to have adopted a balanced budget rule. When there looked likely to be a prospective surplus, as in 1833, Chancellors would decide, as Althorp did that year, that “a reduction of taxes should be made to the extent of the surplus.” But prospective deficits needed remedying, as stated in Robert Peel’s 1842 Budget speech:

...how shall that deficiency be supplied?... Shall we, in time of peace, have resort to the miserable expedient of continued loans? Shall we try issues of Exchequer-bills? Shall we resort to saving-banks? Shall we have recourse to any of those expedients which, call them by what name you please, are neither more nor less than a permanent addition to the public debt?...Sir, I cannot recommend such a step...You are bound...by the engagement which you yourselves have contracted. Almost the first vote you gave after the election of the present Parliament was the adoption of a resolution that it was impossible to permit that state of things to continue which presented constant deficits of revenue.

Peel’s response to this prospective deficit was to reintroduce the income tax.<sup>33</sup>

By 1849, the Chancellor (Sir Charles Wood) was targeting a small surplus which would “one year with another, effect a constant, even though it be a small reduction, of the national debt” and this objective was achieved for a few years.

Progress was halted by Britain’s entry into the Crimean War in early 1854.<sup>34</sup> In what was his second Budget speech, Gladstone signalled his determination to keep borrowing to an absolute minimum, famously remarking that “The expenses of a war are the moral check which it has pleased the Almighty to impose upon the ambition and the lust of conquest that are inherent in so many nations.” This objective was dropped by his successor Sir George Cornwall Lewis in the very next Budget speech, but in a decision imitating Pitt’s, he “to set aside one million sterling annually until the whole perpetual portion of the debt which they propose to contract shall be extinguished.” This sinking fund only survived three years (two years of which were peaceful), when it was dropped

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<sup>33</sup>A decision also motivated by a desire to reduce duties.

<sup>34</sup>See [Anderson \(1963\)](#) on its financing.

by Benjamin Disraeli in the context of the fallout from the 1857 Panic.

Gladstone did a better job of capturing the pragmatic strategy for financing nineteenth century wars when he said in his 1862 Budget speech that:

In years of war ... you do not think of the balance of your revenue and expenditure, but you get what revenue you can, and make large loans to meet the exigencies of the public service.

In peacetime, deficits should be avoided in almost all circumstances. While raising taxes in response to a prospective deficit in the 1859 Budget, he declared that "I think we are all nearly agreed on this, that in time of peace nothing but a dire necessity should induce us to borrow."

However, as he freely admitted after cutting taxes 1861, 1863, 1864 and 1865, he was unable "boast that, as a legislative and deliberative body, we have as yet risen to a sense of the full extent of our obligations with respect to the reduction of the public Debt."

**1866 to 1914** By his 1866 Budget speech, Gladstone had decided that "that the time has come when, to say the least, it is fitting that Parliament should bestow a greater degree of attention than has hitherto been bestowed on the question of the state and movement of the National Debt." He did not believe that discretionary surpluses could be relied upon, preferring instead an approach of "including in the estimate of expenditure and making provision by taxation for sums which are to be applied in liquidation of debt." His preferred approach was not a fixed debt charge, but terminable annuities. Although not popular with the public, Gladstone saw an opportunity to issue them to several public sector institutions including the savings banks which held significant amounts of government debt. This amounted to little more than an accounting trick, but significant sums were in fact repaid by this device.<sup>35</sup>

In contrast to Lewis' sinking fund, the terminable annuities plan survived Disraeli becoming Chancellor again. Indeed, he embraced the new focus on debt reduction, declaring in his April 1867 Budget speech that "if a Chancellor of the Exchequer is called upon to go into the market to raise money, he will walk

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<sup>35</sup>Hargreaves (1930, p. 185).

with a prouder mien, and experience greater facilities in raising money, if it can be shown that in the day of our prosperity we have made an honourable and an honest attempt to reduce the amount of our National Debt." The conflict in Abyssinia later that year temporarily held up debt reduction, but by the first half of the 1870s, Chancellors made regular references to significant progress in reducing debt.

Sir Stafford Northcote, Chancellor from 1874, saw a defect in the terminable annuities scheme. In his 1875 Budget speech, he pointed out that when terminable annuities mature, the Chancellor may not replace them with new ones, reducing the rate of debt repayment. He therefore wished Parliament "to consider whether it is not possible to devise some plan which might put us upon a way of securing a more regular, more constant, and more stable action upon the National Debt." His proposal was a fixed debt charge of £28 million, part of which would cover interest and part debt repayment. This new sinking fund would sit alongside terminable annuities, whose service would fall inside the fixed charge.

Northcote recognised that "under circumstances different from the present," it would be reasonable for a Chancellor to deviate from his scheme. Perhaps because of this signal that the scheme should be flexible, it continued to 1914 (and beyond). The scheme probably helped Northcote push through tax increases in 1876 and 1878. And rather than lower the debt charge in the face of conflict in Afghanistan and South Africa, he chose to rely on short-term borrowing, followed by a plan to redeem that borrowing which included a temporary increase in the debt charge. Gladstone grudgingly accepted the Northcote sinking fund, labelling it a "second best" approach in his 1881 Budget speech.

Northcote's scheme faced its second challenge in 1885 as wars broke out again in Africa and Asia. The prospective deficit was £15 million. The Chancellor (Hugh Childers) proposed that tax increases should cover half of this and £4.6 million be diverted from terminable annuity capital repayments (thereby lowering the debt charge by the same amount). In fact, Parliament rejected the tax rises and the government fell. Childers' replacement, Sir William Harcourt, again diverted funds from the debt charge rather than raise taxes and the following

year (1887) George Goschen reduced the debt charge to £26 million, pointing towards the rejection by Parliament of the 1885 Budget. Despite the reductions in the debt charge, significant debt repayments were made from the late 1880s until 1899 and Goschen could claim in his 1891 Budget speech that “the present House of Commons has not failed to discharge its duty in following up, and not slackening, the pace of the reduction of Debt, to which we all attach the very greatest importance.”<sup>36</sup> The progress in the 1890s was far from automatic. Harcourt raised taxes three years in a row, explaining the tax rise in his 1894 Budget like this:

We do not, therefore, propose to break up the fixed charge or permanent fund set apart for the reduction of the Debt. To take such a course in time of peace in order to meet expenditure which we regard as indispensable, not exceptionally, but as a part of the regular demands for the defence of the country, would be a fatal and a cowardly error, unworthy of a great nation. I pray the Committee to consider the vital consequences, alike in peace and in war, of this great, perhaps the greatest of all national reserves—a reserve not less valuable, even more valuable, than the Naval and Military Reserves. In peace time our financial credit depends upon the confidence which is felt that the nation is ready and willing to make all the sacrifices necessary to meet its needs and obligations; that its policy is not to increase, but to diminish, the Public Debt.

The Boer War, which started in late 1899, turned out to be the most costly since the French Wars. The Chancellor Michael Hicks Beach signalled in the 1900 Budget that current taxation would bear a significant share of the war costs, while of course falling far short of Gladstone’s lofty ambitions in 1854:

In the earlier years of that war, from 1792 to 1798, Mr. Pitt pursued the fatal policy of borrowing each year what he required for war

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<sup>36</sup>In response to the initial £1.5 million reduction in interest payments caused by Goschen’s famous conversion, the debt charge was lowered by £1 million, with the result that each year £500,000 more was devoted to debt reduction. The next change was in 1899 when Michael Hicks Beach lowered the debt charge by a further £2 million.



expenditure, and practically providing nothing by taxation except the interest on his loans. What was the result? He borrowed, and he increased the National Debt by £200,000,000. For that increase he got only £108,500,000 in cash. He began to borrow at a rate of interest a little over 4 per cent. By 1797 that rate of interest had increased to  $6\frac{1}{4}$  per cent. and more; and I have no doubt it is true, as I think it was once said, that out of our National Debt there is no less than £250,000,000 for which the State has never received a single halfpenny—a mere sacrifice to capital, to induce it to lend, without reducing in any material degree the interest on the loans. Happily for us, happily for the country, in 1798 Mr. Pitt turned over a new leaf. He raised £10,000,000 by the income tax, and continuously from that time to the close of the great war the expenses of the war were met partly by loans no doubt, but also largely by taxation.

Despite an increase over 30 per cent in tax revenue over the course of the war, the fastest growth on a four year basis since the French Wars, debt grew by over £150 million, reversing three decades of debt reduction. Having been suspended during the war, the debt charge was raised in 1903 and again in 1905, back to the £28 million level set by Northcote. Explaining this decision in his 1905 Budget speech, Chancellor Austen Chamberlain said:

...if it is right and just to borrow largely in the emergency of a great war, when the honour and even the existence of the Empire are at stake, it is upon the condition that when, peace is re-established we take the first opportunity in our power to restore our national credit and to lighten the burden of debt which we hand on to our successors.

Although the debt charge was reduced again by Chancellor David Lloyd George as the political focus switched to welfare reform, there were surpluses every year between 1904 and 1913 except from 1909 when the House of Lords voted down the Budget proposals. By 1913, debt had fallen back by £90 million.



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