"Muddling Through or Tunnelling Through?"
UK monetary and fiscal exceptionalism during the Great Inflation

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Abstract

The recent resurgence in inflation in the US and UK has resonance with the Great inflation of the 1960s and 70s. The UK's inflation experience in the 1960s and 1970s was one of the worst of the advanced countries, and unique in both scale and incidence. This paper reconsiders the historical and empirical record of inflation in the UK from 1950s to the early 1990s through the lens of recent advances in economic theory, focusing on the role of monetary and fiscal policy interactions.   We show that the Great Inflation in the UK can be characterised as the sum of two processes. First, a number of regime shifts in underlying inflation expectations, starting in the late 1960s. Those shifts appear correlated with significant changes in the monetary and fiscal policy regime. Second, there were several bursts of inflation chiefly around the commodity price shocks of 1973/4 and 1979. Those largely reflected monetary and fiscal policies that, in hindsight, were excessively accommodating. But, the observed wage-price "spirals" during these episodes were relatively concentrated, the worst of which in 1974/5, was driven by the structural defects of ill-timed incomes policies that locked in temporary real wage resistance through indexation agreements. Those bursts did not de-anchor expectations further and merely led to temporary overshoots of inflation.   Retrospectively, it is not clear that a tighter monetary policy alone would have been sufficient to reduce underlying inflation expectations, without changes in the fiscal regime.   In the mid-1970s primary public sector deficits were used to absorb and mitigate the implications of high energy prices with little or no attention paid to stabilising the debt in the longer term.   The major shifts down in expectations in the later 1970s and early 1980s only occurred following major changes in the fiscal policy framework, reflecting the introduction of cash limits on government spending, the benefits of North Sea Oil revenues and the abandonment of fiscal policy as a stabilisation tool and its subordination to monetary policy. This appears consistent with Sargent's (1981) view that moderately large inflations are brought fundamentally to an end as much by changes in the fiscal policy regime as the monetary policy regime, and an acceptance of that regime by all participants in the economy

Britain's difficulties in the 1970's arise from ill-designed policies based upon long and widely held misconceptions about how the economy works. The basic error committed has been to neglect to control the money supply while pursuing an unrealistically low unemployment target, primarily by fiscal means

David Laidler, American Economic Review 1976

Whether the budget was in balance or had a surplus or deficit was a secondary consideration (indeed for some policy makers it was of virtually no importance).

Douglas Wass, Permanent Secretary to the Treasury 1974-1982 writing in 2008

....the historical evidence provide(s) little reason for being optimistic about the efficacy of a plan for gradual monetary restraint which is simultaneously soft on the government deficit.

Thomas Sargent, *Stopping Moderate Inflations*, 1981

Introduction

The pandemic of 2020 led to a massive fiscal and monetary expansion in many advanced economies to offset the voluntary and involuntary lockdowns that threw many countries into deep recession. The support provided to aggregate demand coupled with supply disruptions and commodity price shocks has led to a resurgence in inflation in the US and UK that has resonance with the experience of the Great inflation of the 1960s and 70s. The UK's inflation experience in the 1970s was one of the worst of the advanced countries, and unique in both scale and incidence. A return to an environment of double digit inflation leads to the question of why its performance was relatively poor and unique ?

The Great Inflation during the 1970s and early 1980s has been the subject of intense study and scrutiny. Much of the focus has typically been on identifying common generic causes of the rise in inflation observed across many of the major economies. The conventional wisdom attributes it to a combination pf cost push forces (commodity price shocks and union-driven wage pressure), coupled with over-accommodative monetary and fiscal policies, with different weights placed on the "bad luck" versus the "bad policy" elements of the story.   Rather less attention has been paid to the question of why the experience of the UK was markedly different to that in many other advanced economies. The Great Inflation period offers an example of UK exceptionalism with several bursts of wage and price increases that were not observed in other advanced economies in quite the same way. The approach to fiscal and monetary policy co-ordination was also exceptional in the development of a framework based on the credit-counterparts to broad money in which fiscal policy credibility ultimately came to form the most important plank.

In this study, we reconsider the arguments and the historical and empirical record of inflation in the UK from 1950s to the introduction of inflation targeting in the early 1990s.   We re-examine the phases of inflation during the 1970s and re-evaluate some of the leading hypotheses using a suite of different macro models. At the core of the paper is a re-examination of the role of aggregate demand management and the interaction of monetary, financial and fiscal policy, which had

important implications for inflation expectations and wage determination in the labour market. The burgeoning fiscal and current account deficits that emerged in the 1970s, coupled with double-digit money growth and a de-anchoring of inflation expectations, are suggestive of significant macroeconomic policy failures, at least from the modern-day perspective of how monetary and fiscal policies should operate.

However, the modern-day perspective to stabilisation policy, based as it is on the centrality of monetary policy and interest rates, is an anachronistic lens through which to view 1970s policymaking. We show the overwhelming importance of fiscal policy decisions in this period. Fiscal policy was the key instrument used by all governments in their attempts to manage demand in the economy. That reflected an in-built scepticism of the power of interest rates to affect spending in the economy. This was not however a simple continuation of the "go-stop" polices of the 1950s and 1960s, even if the "Barber boom" of 1972/3 (and perhaps the "Lawson boom" of the late 1980s) was very much in character with previous episodes. As the quote above from Douglas Wass suggests, little obvious thought was directed in the mid-1970s to the problem of debt stabilisation in the longer term, although public debt was at historically low levels during this period. Indeed, much of the inflationary pressure in this period was absorbed in a large primary public sector deficit as the government paid double-digit wage increases to public sector workers and introduced subsidies and tax cuts to lower income households to persuade them and their union representatives not to bid for higher wages. For the first time in three centuries, the public sector would run a primary deficit in peacetime and doubts emerged, especially in financial markets, about whether future primary surpluses could be achieved in the future, even with the prospect of North Sea Oil Revenues coming on stream. That led to problems in both the gilt and foreign exchange markets that ultimately added to inflationary pressures. Indirect tax changes, to the extent they were accommodated by policy, also affected the price level.

Fiscal policy would also be instrumental in the ending of the Great Inflation. Despite the fiscal problems in the mid-1970s, there was an increasing grasp and understanding throughout the decade about the importance of fiscal and monetary linkages by both policymakers and financial markets. This was faltering at first, as the authorities grappled with the new post-Bretton Woods environment and went in search of a new nominal anchor. But, ultimately, this would lead to greater fiscal and monetary discipline that would lead to a fall in inflation in the second half of the decade and again during the 1980s following the aberration of the Winter of Discontent, the difficult first years of the Thatcher government and the experimentation with exchange rate targeting in the late 1980s. As a result, the mixture of "bad policy" versus "bad luck" characterisation of policy over this period is perhaps not the best one. We would suggest a better contrast can be made between "muddling through"[1] – where the authorities feeling their way through to a framework for curbing inflation through experimentation and incremental steps, learning from mistakes as they went along – and "tunnelling through"[2], where the authorities had a clear vision of what was needed to be done to bring inflation down, but successive shocks and other factors meant that they were thrown off course. What started off as a case of largely

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[1] See Lindblom (1959)'s famous article on the science of 'muddling through'.
[2] "Tunnelling through" was the specific phrase used to characterise the UK's policy in the mid-1970s where the authorities justified borrowing in 1974 to finance large short-term current and account budget deficits as a result of higher oil prices, but with a view to tunnelling through until North Sea Oil revenues would come through and return both deficits back into surplus. We use the phrase as a more general characterisation of policy.

"muddling through" in the 1970s transitioned to a case of largely "tunnelling through" in the 1980s as the causes of the UK economy's problems became better understood and the longer-term vision of what was necessary to become a low inflation economy with sustainable growth became clearer.

The analysis of monetary-fiscal interactions in the 1970s and 1980s was, however, very different to how we would analyse this issue today.   The main focus was on how budget deficits would affect money growth and inflation, via the credit counterparts approach favoured by the IMF and British monetarists. There was little direct consideration of whether prospective deficits and surpluses would stabilise the debt stock in the longer term. Large unexpected budget deficits had to be funded by the banking system when non-bank investors had limited demand for government debt, increasing prospective money growth and inflation.   Interest rates were also set with a view to maximise the funding of the deficit from investors in the gilt market or to manage sterling, rather than how they should be set optimally to stabilise the economy for a given stance of fiscal policy. Fiscal policy was more "active" and monetary policy more "passive" than they are today.   That suggests fiscal *theories* of inflation, such as the "unpleasant monetarist arithmetic" of Sargent and Wallace (1981) and the "fiscal theory of the price level" (Leeper (1991), Cochrane (2001)) may be relevant lenses through which to evaluate policies during this period. Whether the ultimate focus on fiscal policy by the UK authorities as a means of keeping a lid on broad money growth rather than stabilising the debt stock ended up being the right policy option for the wrong reasons is a question we explore.

Equally important was the role of the exchange rate, which was an ever-present and unofficial intermediate target for most governments during the period, despite the floatation of sterling in 1972 (Bordo, Humpage and Schwartz (2015)).   Indeed, the entire period between 1972 and 1992, including periods of ostensible monetary targeting, might not unreasonably be described as a managed-float regime with both interest rates and exchange rate intervention used at various points set to ensure implicit intermediate targets or ranges for the exchange rate. This was, in our view, an inevitable part of muddling through given the historical importance of the exchange rate as a discipline on policy. The ultimate failure of ERM membership would, in the end, lead the authorities to stumble on flexible inflation targeting and, ultimately, central bank independence, as the means to achieving low inflation.

The plan of the paper is as follows. We first discuss the different phases of inflation in the UK between the late 1960s and early 1980s and how that differed to other advanced economies. We then review the background to the problems of the 1970s by looking at some of the key macro fundamentals and institutional features of the British economy during the 1950s and 1960s. In the third section, we look at each of the phases of inflation in the Great Inflation in more detail and provide an overall narrative of the period. In the fourth section we then attempt to bring things together and evaluate the relative weight on the different underlying causes of the Great Inflation proposed in the literature. We first undertake a "representative" structural VAR analysis using a traditional monetary approach to identify the underlying shocks. This acts as a "benchmark" or "straw man" which we stress test using other diagnostic models and statistical techniques. In the concluding part of the paper, we consider whether the econometric evidence fits with a deeper institutional analysis of the period, focusing particularly on monetary and fiscal interactions and

how those were perceived by policymakers, financial market participants and those setting prices and wages.

I   The phases of inflation in the 1960s and 1970s

Previous analyses of the Great Inflation in the UK (eg Woodward (1991) and Schulze and Woodward (1996)) have identified the major phases of inflation in the UK. The UK's inflation rate was unique in that there were four distinct phases leading to four peaks of double-digit inflation in 1971Q3, 1975Q3, 1977Q2 and 1980Q2. Chart 1.1 shows these distinct phases on two measures of consumer price inflation between 1961 and 1992: the retail price index (RPI) which was the measure used by contemporaries at the time, and a retrospectively modelled version of the current CPI index[3]. Chart 1.2 compares this with other G7 countries and marks several of the key international events during this period.

Chart 1.1 shows that inflation in the early 1960s averaged around 3.5% per year. It then started picking up rapidly in the late 1960s following £'s devaluation in 1967, peaking at around 10% in 1971Q3, before falling back to around 6% a year later. The next phase started shortly after the floatation of sterling in June 1972. This led to a long upward phase peaking in 1975Q3 during which there was the first of two large oil price shock at the end of 1973. There was then a significant fall back in inflation until the middle of 1976, before a further peak in 1977 following a large depreciation of sterling over that year. From that point on, inflation began to fall back before another urge in 1979-1980 following the so-called Winter of Discontent and a second oil price shock following the fall of the Shah in Iran.

Chart 2.2 shows that the pattern of UK inflation was very different to that in the US and other G7 countries, with perhaps the exception of Italy. The UK showed an unusually large surge in inflation in the late 1960s and peaked almost a year later than average G7 inflation rates, following the first oil price shock in 1973/4. The increase in inflation following the second oil price shock in 1979 was more synchronous with other economies but the UK peak was unusually large. Again only Italy shows a similar profile to that of the UK.

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[3]Unlike the RPI, the CPI excludes housing costs (mortgage interest payments) and council tax, includes university accommodation fees and stockbroker charges, and the averaging of price quotes at the elementary level of aggregation is exclusively based on using the Jevons and Dutot averaging formulae (the preferred choice of many statistical agencies) instead of a mixture of Carli and Dutot formulae.

**Chart 1.1 Consumer Price Inflation: 1961-1992**

Peak 1: 71Q3   Peak 2: 75Q3   Peak 3:77Q2   Peak 4: 80Q2

% change on 4 qtrs earlier

CPI Inflation (modelled)
RPI inflation
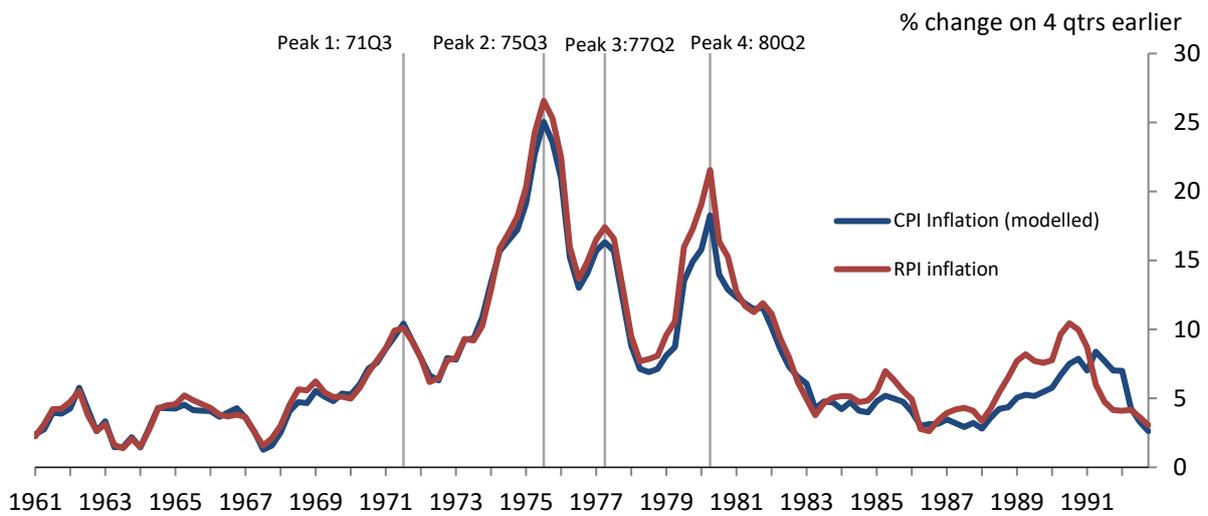
Chart 1.2: Inflation in the UK, the US and the rest of the G7

£ convertibility   £ Devalued   US suspends $ £   1st Oil   IMF loan   2nd Oil
                                  convertibility   floats shock   shock

% change on 4 qtrs earlier

UK   US   Rest of G7
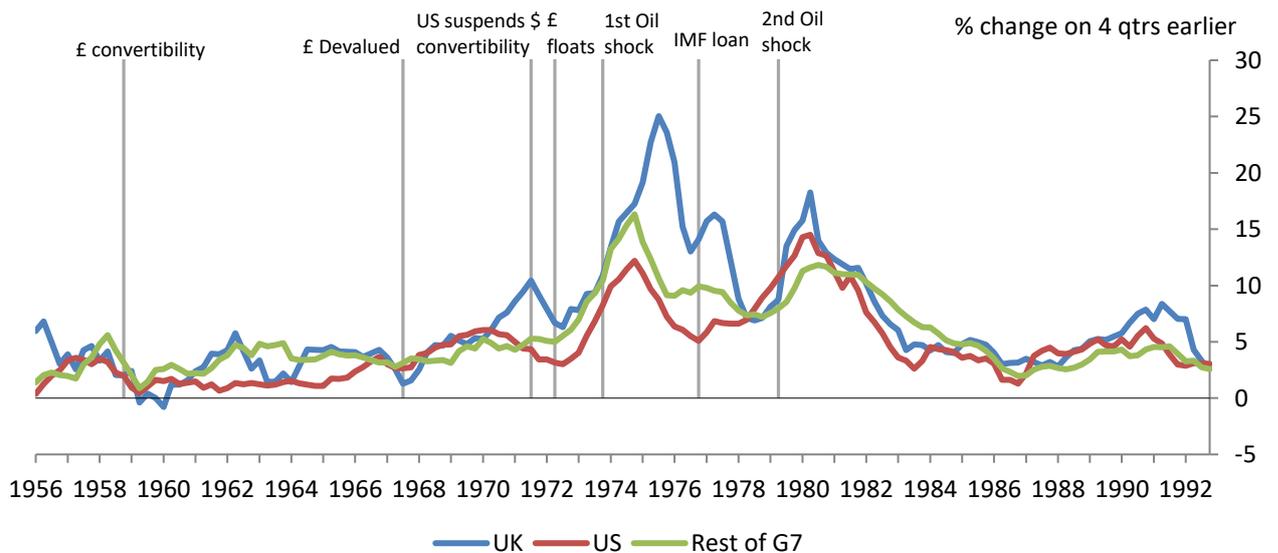
This suggests that the UK experience was relatively unique and that there are idiosyncratic as well as common factors in the increase in inflation in the UK that need identifying. The plan for the remainder of this paper is to re-examine the narrative of the inflation experience in the UK during the 1960s, 70s and 80s and tease out the relative importance of the different factors that are hypothesised to have driven the observed movements in inflation. Some of those factors were dependent on structural developments occurring well before the 1970s, so it is worth reviewing some of the fundamentals in the UK economy in the period after the Second World War.

II   Background fundamentals: the UK economy in the 1950s and 1960s

In first section, we present some of the key macro fundamentals and institutional features of the British economy during the 1950s and 1960s.   Some of these trends (and changes in them) would have a huge influence on the Great Inflation period and many were changed because of it.

(i)   The Bretton Woods regime and the constraints on domestic policy prior to 1971

A key fundamental shaping the 1950s and 1960s British economy was the exchange rate regime in place—the adjustable peg Bretton Woods System (BWS), discussed in detail in Bordo (1992). Although the UK was a charter member of the BWS when it was established just after WW2, it only declared current account convertibility in December 1958. Under the BWS, financial policy was constrained by the fixed exchange rate peg and the state of the balance of payments.   In theory, the system was self-stabilising. Overly expansionary fiscal and monetary policies relative to that in countries overseas would lead to a rise in nominal income and a balance of payments (current account) deficit reflecting an increased demand for imports. That would be a prompt for the deficit country to tighten policy and, symmetrically, the corresponding surplus countries to relax policy. In terms of the fashionable open economy policy trilemma, independent fiscal and monetary policy under a pegged exchange rate required capital controls to be in place, which was indeed the case for the UK between 1939 and 1979.

In practice, surplus countries were often reluctant to lose their favourable balance of payments position putting the full burden of adjustment on countries with a deficit.   If those deficit countries were reluctant to tighten policy because of the impact on their domestic economies, this would typically lead to a decline in foreign exchange reserves and ultimately a speculative attack and currency crisis. Such crises were then only resolved either by an adjustment in the peg or alternatively by a rescue by the IMF and other authorities that would force a policy of contractionary fiscal/monetary policy to remove the deficit and replenish international reserves.

The UK experienced frequent balance of payments problems in the post-WW2 period and experienced both devaluation (in 1949 and 1967) and several rounds IMF assistance (see **Charts 2.1** and **2.2**).   The work of Naef (2021) shows it was also frequently intervening in the foreign exchange market (**Chart 2.3**). Those problems reflected a combination factors. There were some fundamental weaknesses on the supply side of the British economy, particularly in the tradeable sector of the economy, and the UK also had responsibilities associated with £'s role as a reserve currency. Coupled with a desire by successive UK governments to maintain full employment this led to a progressive worsening in the net trade position of the UK (**Chart 2.4**).

Chart 2.1: $/£ Exchange Rate
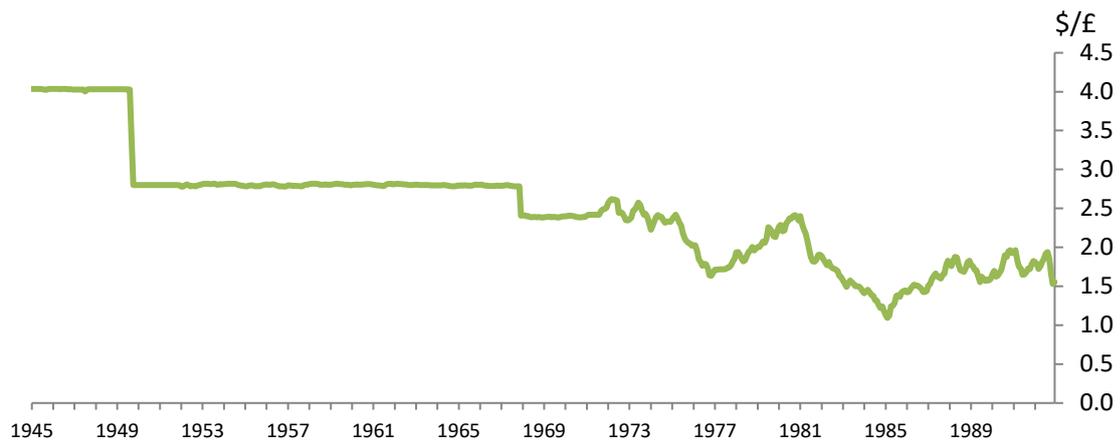
**Chart 2.2: UK drawings from the IMF**
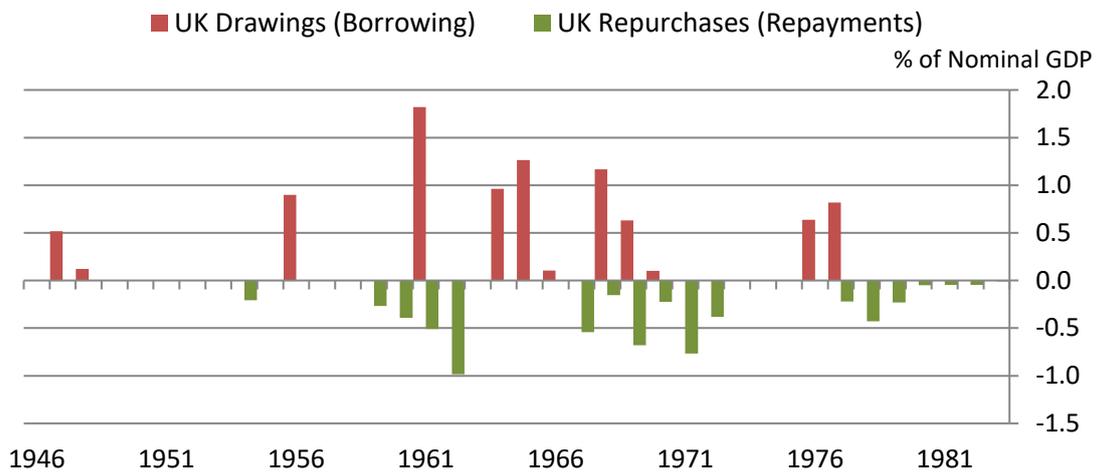
Chart 2.3: Bank of England Intervention in the foreign exchange market
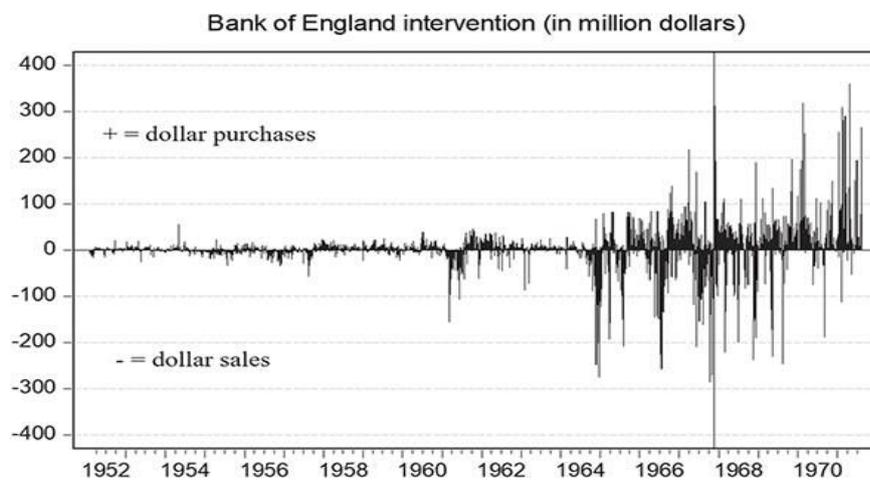

Source: Naef (2021)

Chart 2.4: The UK Current Account and Balance of Trade deficit
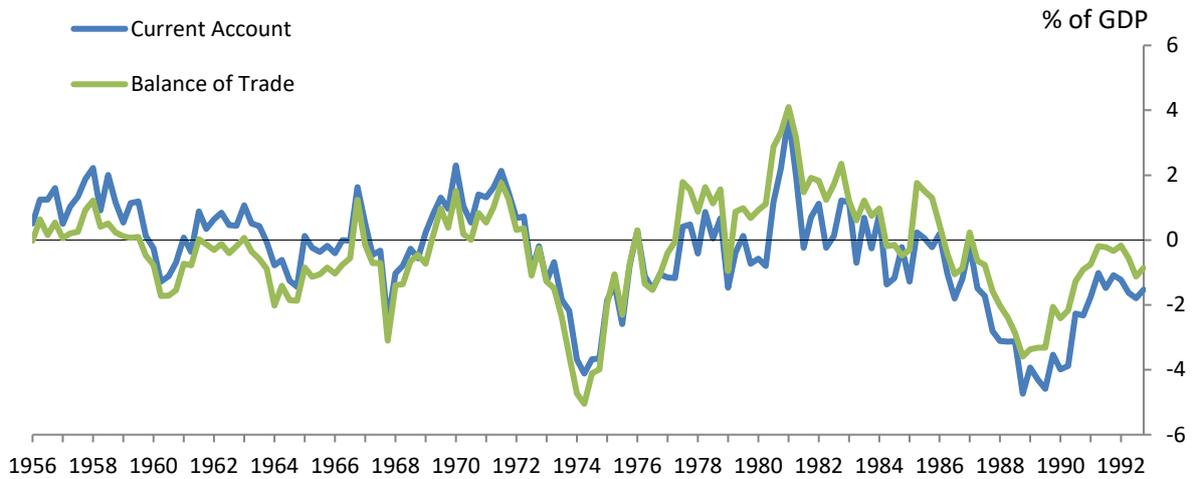
(a)   Supply-side weakness and relative decline

The period between 1945 and the early 1970s is often seen as a 'golden age' of productivity growth. Indeed, the UK experienced the fastest rates of productivity growth in its history, with the growth in output per hour peaking at around 4% in the late 1960s and early 1970s (**Chart 2.5**). Yet at the same time, the UK's productivity growth lagged behind many of its competitors (**Table 2.1**) and the UK economy was increasingly perceived as being in decline and by the 1970s had become known as "the sick man of Europe".

**Chart 2.5: Labour productivity growth (Output per hour)**
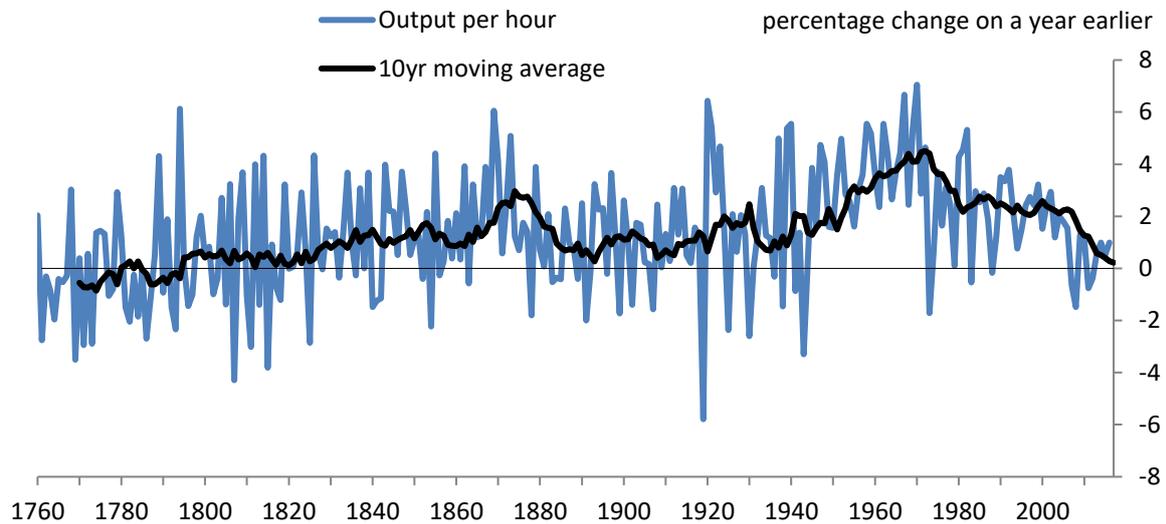
Source: Thomas and Dimsdale (2017)

Table 2.1 Growth in GDP per hour worked, 1950-1973 (% per year)

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Canada	3.89
France	5.47
Germany	5.83
Italy	5.94
Japan	7.40
UK	3.87
US	2.68

Source: Conference Board, Total Economy Database

Chart 2.6 UK share of world trade
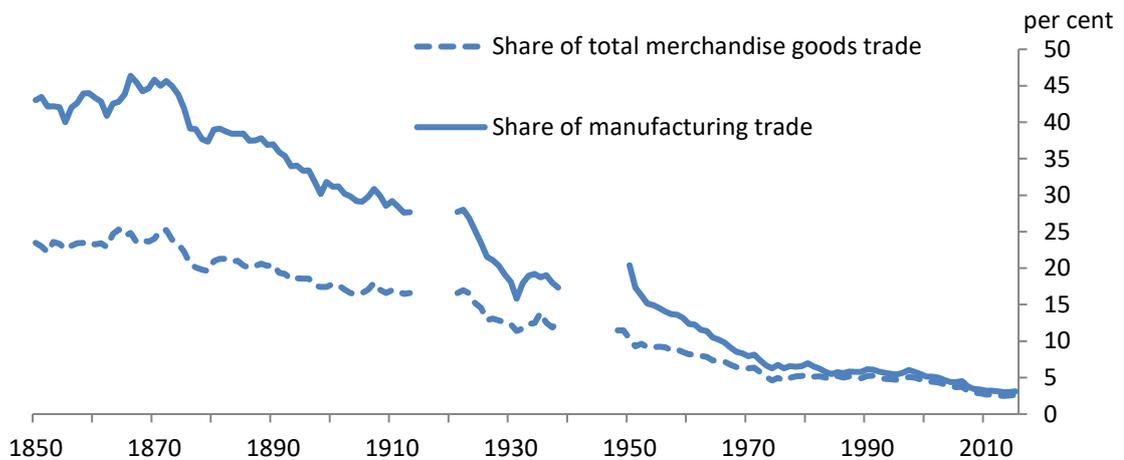
Source: Thomas and Dimsdale (2017)

That reflected a growing weakness in the tradeable goods sector of the economy, which in turn made it harder to keep the current account in balance. The UK's share of manufacturing trade dropped from around 20% after World War 2 to under 10% by the start of the 1970s, continuing the downtrend since 1870 that had been briefly interrupted by a hiatus in the 1930s (**Chart 2.6**).

Despite the dominance of the dollar in the Bretton Woods system, sterling also acted as a reserve currency during the Bretton Woods period for the so-called Sterling area countries, who held their foreign exchange reserves in this currency. This required the UK to have adequate reserves of foreign currency to meet potential sales by £ area holders. But the lack of sustained balance of payments surpluses never allowed the UK to build up sufficient reserves which remained only a relatively small proportion of total liabilities (**Chart 2.7**).

Chart 2.7: Reserves and the £ balances
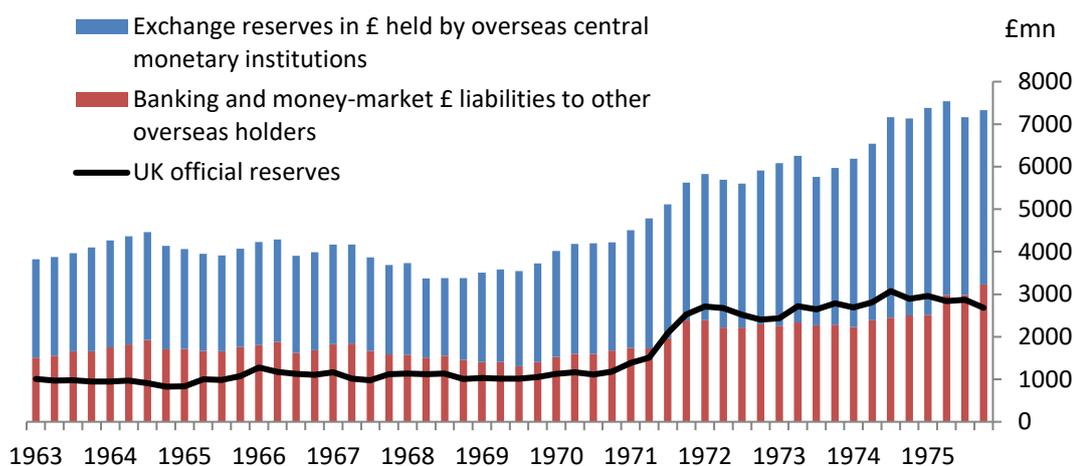
The apparent failings in the British economy and its responsibilities to the £ area were an important factor in the decisions of policymakers over this period. They sought to understand and remedy the reasons for the UK's productivity performance but were always wary about the constraints it posed and the risks for sterling should its reserve currency status become undermined as a result[4]. As discussed in the next section, their attempts to break out of the straightjacket would frequently come up against the constraints of the Bretton Woods system.

(ii) The Objectives of Policy – full employment and faster growth

Post-war macroeconomic policy during the 1950s and 1960s has often been characterised as one of Keynesian demand management with an overall goal of full employment. The conventional view is that there was a post-war consensus where governments, both Conservative and Labour, took a "corporatist" view and saw their role as planning and managing the economy together with trade unions and the bosses of key industries many of which were nationalised. There was a consensus that macroeconomic policy should aim to achieve full employment to avoid the experience of the interwar period which exhibited ruinously high unemployment levels (**Chart 2.8**). In return the unions would attempt to ensure pay settlements remained reasonable to ensure full employment could be achieved without it being fundamentally inflationary. This consensus became known as 'Butskellism' named after the Chancellor "Rab" Butler and Hugh Gaitskell who was shadow chancellor and, later, leader of the Labour party in the 1950s.

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[4] See Schenk (2010) and Avaro (2020/21) for a discussion of the methods through which UK government ensured sterling area countries continued to hold their reserves in £.

Chart 2.8: Unemployment rate adjusted to a LFS basis since 1900

Per cent
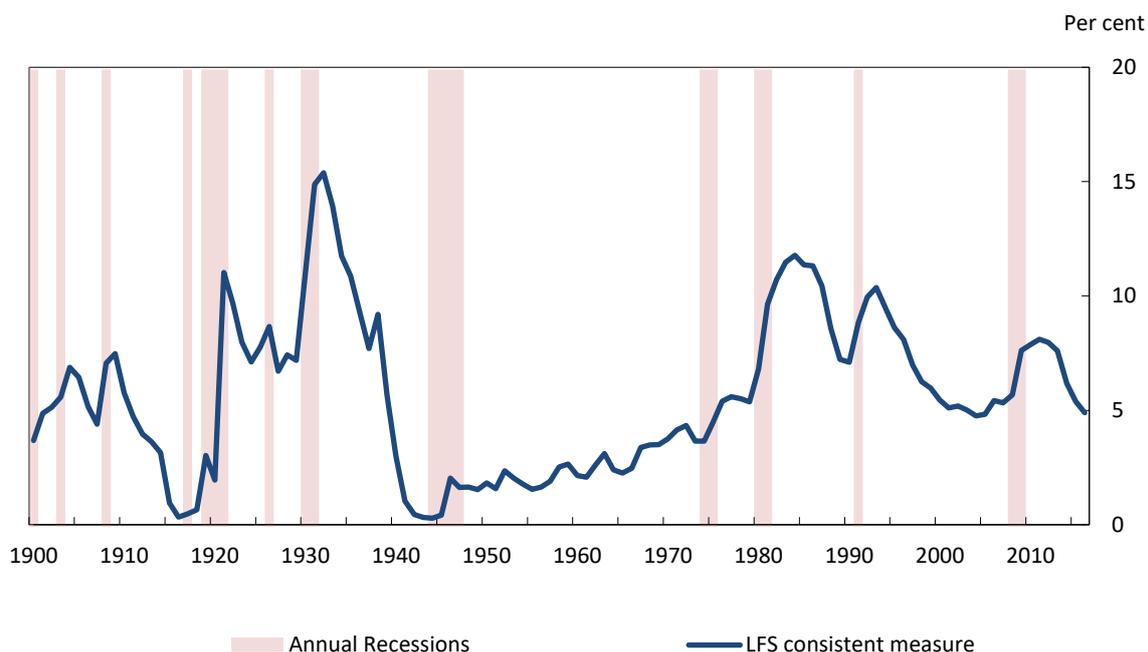
Source: ONS, Thomas and Dimsdale (2017): Bank of England Millennium of Macroeconomic Dataset.

A further strand to influence official thinking from the late 1950s onwards was the Phillips curve relationship, which suggested there was a long-run trade off between unemployment and inflation. A reduction in the unemployment rate could only be accomplished at the expense of higher inflation. Coupled with a belief that the welfare losses of unemployment outweighed the welfare losses of rising inflation, that in itself meant there was an underlying acceptance that elevated inflation was a price worth paying for full employment.

But, as Booth (2000) argues, the belief in Butskellism was not universal either within officialdom or amongst politicians. For example, the Chancellor Peter Thorneycroft and his spending minister, Enoch Powell, both resigned in 1957 as a result of what Booth calls "proto-monetarist" concerns. Worries about inflation were ever apparent in the 1950s and 1960s, even if it remained relatively low, as what mattered for the balance of payments – and hence the ability to meet the sterling peg – was inflation relative to its competitors. Inflation rates exceeding those abroad, which was often the case in the 1950s and 1960s, as shown in **Chart 1.2**, were problematic. The Bank itself often took a stand against excessive public spending for fear of the implications for maintaining the sterling peg if that worsened the balance of payments and increased inflation.

Throughout the 1950s and early 1960s there existed a persistent conflict between the objective of maintaining a high level of employment and correcting deficits in the balance of payments and emerging inflation pressure. This produced a succession of what were-called "stop-go" cycle or, as Dow (1998) recommends, "go-stop" cycles in which expansionist periods of 'go' to try and boost the economy and lower unemployment, would lead to balance of payments problems, pressure on sterling forcing the authorities to hit the brakes and introduce deflationary measures which

checked economic growth. As discussed in the next section the go-periods were largely implemented via fiscal policy and the stop periods by a combination of fiscal and credit controls. These booms and busts, with their well-known monikers, are shown in (**Chart 2.9**) using both Cloyne (2013)'s identified tax changes associated with demand management and the overall level of public sector net borrowing.   This led to a "growth cycle" emerging, where although the economy avoided outright recessions, periods of strong growth were followed by periods of weak or almost zero growth. The go-stop growth cycle seemed to be holding the economy back relative to the high growth rates experienced by other economies.

Chart 2.9: Public Sector Deficit and Tax changes associated with demand management
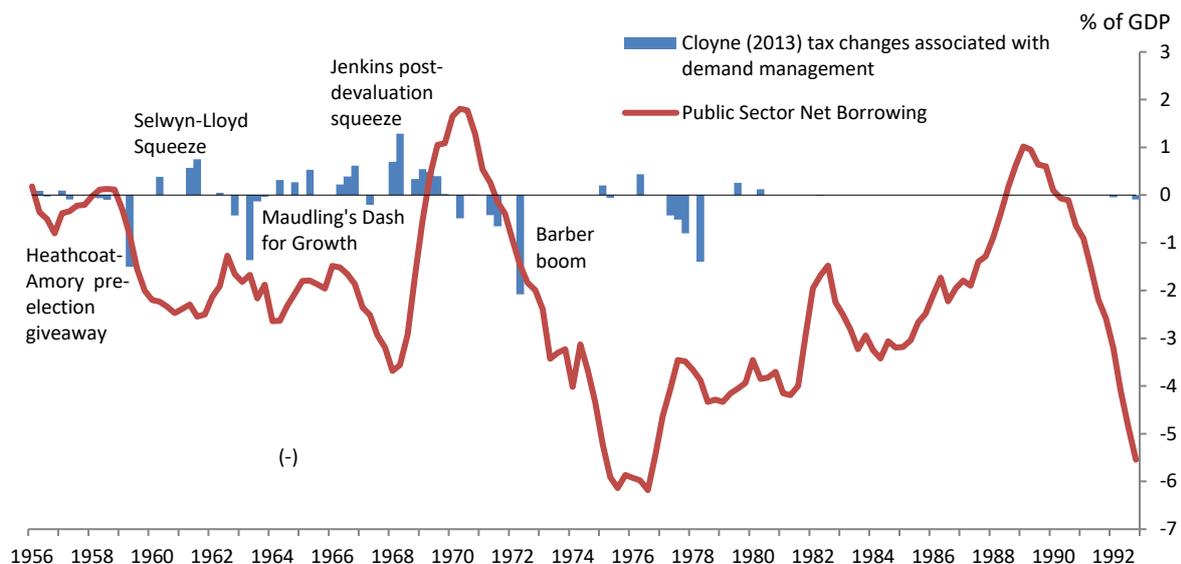
During the 1960s the growing disillusion with go-stop, led to less focus on demand management and more focus on improving underlying growth rates in the economy, in part through increased planning co-ordinated by central government. The Conservative government introduced the National Economic Development Council (NEDC) in 1962 and the Labour Government of 1964 introduced the Department of Economic Affairs to co-ordinate these efforts under the umbrella of the "National Plan" which aimed for growth rates of 4%.   But how was this to be achieved ?   The US economics profession in this period was making enormous strides in writing down models of economic growth such as Solow (1957). In the UK policy was increasingly influenced by the development of growth theory by the British economists Roy Harrod and Nicky Kaldor, who were advisors to the Conservative and Labour governments during the 1960s. Harrod's theory of growth, published in 1939, predated Solow's and emphasised the need for high investment as the precursor for faster growth and this appeared to be borne out internationally as sharp increases in the post-WW2 investment- output ratio appeared to be delivering rapid productivity growth in economies such as Japan and Germany. So improving the environment for investment growth (and, if necessary, that could include direct investment by the public sector) was the means to achieving faster growth. That led to the idea it may be necessary to run the domestic economy hot and lower taxation to generate an environment favourable for investment. Harrod argued the case

in several articles he wrote in the Financial Times in the early 1960s[5], arguing that import restrictions may be necessary should running the economy hot lead to balance of payments problems.

That in part was the reason for Chancellor Maudling's Dash for Growth in 1963/4, which was often seen as a simple extension of previous go-stop policies.   As Maudling himself would admit (Maudling (1978)), and Cairncross (1996) confirms, this was a gamble, to try and break out of the straightjacket and achieve a virtuous circle of higher expected growth, increased investment and productivity which would then work to validate the expectation.   This would necessarily require trying to ride out the balance of payments problems until the faster growth was delivered and in private he was even prepared to consider floatation, harking back to the ROBOT discussions of the 1950s discussed in the next section.   But once again the economy overheated but no further action was taken in the run up to the October 1964 election in which the Conservative government was defeated leaving a difficult legacy for the incoming government who would be faced with a series of balance of payments crises until eventually devaluation was forced upon them in 1967.

Given the failure of force-feeding the economy through pump-priming domestic demand, Kaldor, who was advisor to the incoming Labour Government, suggested the focus should be on export-led growth and shifting resources to the manufacturing sector. Underlying this was Verdoorn's law based on the empirical observation that faster output growth in manufacturing would produce faster productivity growth (see Kaldor (1966)). This was based on the idea that rapid output growth in the manufacturing sector would cause economies of scale in manufacturing and delivered improved productivity growth rather than high inflation.   Fiscal policy incentives was one means of achieving this and this was the reasoning behind the selective employment tax encourage the shift of jobs towards manufacturing. But it also implied tighter public spending following the devaluation of 1967 to ensure resources shifted appropriately into the tradable sector. This was in fact delivered by Roy Jenkins, the Labour Chancellor, who managed to return the UK current account back into surplus by 1970 but at the expense of higher unemployment which would emerge over the next two years.

This would have a significant impact on the incoming Conservative government. In opposition the Conservative Party under Edward Heath, who would become Prime Minister in 1970, was developing its own solution to Britain's problems, by seemingly at least, committing to a hands-off, non-interventionist approach to industry, based on increasing competition (which applying for EEC membership was part) and tax cuts to encourage investment.   As discussed later, this lasted barely lasted 18 months before an infamous "U-turn".

(iii) The operation of policy – Go-stop and the role of monetary, credit and fiscal policy

In the 1950s and 1960s the authorities largely used fiscal policy to stabilize the economy. Monetary policy, as an active tool, was generally sub-ordinated to fiscal policy over this period and was used along with exchange rate intervention to help maintain the Bretton Woods peg. But there were important interlinkages between the two policies that paved the way for much that happened during the 1970s.

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[5] See for example "Still time for expansion", from the Financial Times Feb 24th 1960

Signing up to the Bretton Woods system of fixed exchange rates provided both a nominal anchor and also presented an external constraint on the full employment ambitions of successive governments. There had been some discussion in the late 1940s and early 1950s about the conduct of post-war monetary and exchange rate policy and when the return to full convertibility of sterling would be achieved. In particular, there was the so-called "ROBOT" scheme that would have meant in effect the UK operating under a floating exchange rate rather than joining Bretton Woods (see Cairncross (1985), Burnham (2003)) which provoked intense discussions between the Bank, the Treasury and other parts of government in 1952.

The 1950s and 1960s would see various similar tensions between the different parts of government responsible for monetary and fiscal policy. Following WW2 the government's control over monetary policy was rubber stamped when the Bank of England was nationalised in 1946. The Bank was subsequently an official agent of government albeit with a fair amount independence in operational matters.   Within government, the Treasury saw itself as in control of macroeconomic policy, taxation and public spending but the shift towards a focus on growth led to other departments encroaching on the Treasury's turf, most notably the Department of Economic Affairs in the 1960s.   Often during this period it was easiest to use the word the "authorities" to refer to those in control of macroeconomic and monetary policy.   In effect, the authorities represented a tripartite relationship between the Bank, the Treasury and the rest of the Government. Sometimes the Treasury and the Bank would align to try and force a change in government policy (eg in the early 1950s with the failed advocacy of the ROBOT scheme). At other times, the Treasury and the Government were aligned against the Bank, such as in the mid-1950s when there was unhappiness with the failure of monetary policy to rein in the Butler mini-boom of the early 1950s.

The tension over monetary policy was in part the motivation for the appointment of the Radcliffe Committee to examine the workings of the monetary system. The Radcliffe discussions took place over the 1957 to 1959 period and essentially took the Keynesian position that monetary policy was sub-ordinate to fiscal policy as a tool for demand management (Laidler (1982)). The Radcliffe Committee concluded that monetary policy should be concerned with the overall level of 'liquidity' in the economy and that direct control of the quantity of credit and money should supplement control via interest rates, which was viewed as having little direct impact on demand given a perceived failure of its effectiveness in the early 1950s.   So the tendency towards direct credit and monetary controls had started earlier but was rubber stamped by Radcliffe. The fact that the banking system was a cartel of the big 5 banks (Barclays, Lloyds, Midland, Westminster Bank and National and Provincial) made it more amenable for the Bank to implement controls on behalf of the government. Radcliffe recommended working via liquidity ratios of the banks via the use of Special Deposits, which were assets the banks would be required to place in the Bank of England but would not count towards the liquid asset ratios that the banks typically maintained.   It was argued the squeeze on liquidity ratios would cause the banks to cut back on their lending. These liquidity ratio tools were supplemented by controls on hire purchase finance companies, which were important in funding consumer durable purchases (see Aikman et al (2016)).

Over the 1950s and 1960s this system of demand management using fiscal and credit instruments would be severely tested as governments frequently came up against a balance of payments constraint leading to the Go-stop cycle discussed earlier.   Attempts to boost the economy with fiscal policy would lead to current account deficits and moves were then made to use credit

controls to rein in borrowing and reduce demand. Current account deficits would frequently be followed by falls in the flow of bank lending (**Chart 2.10**) driven by direct controls imposed by the authorities (see Aikman, Bush and Taylor (2016)).

Chart 2.10: The current account and bank lending
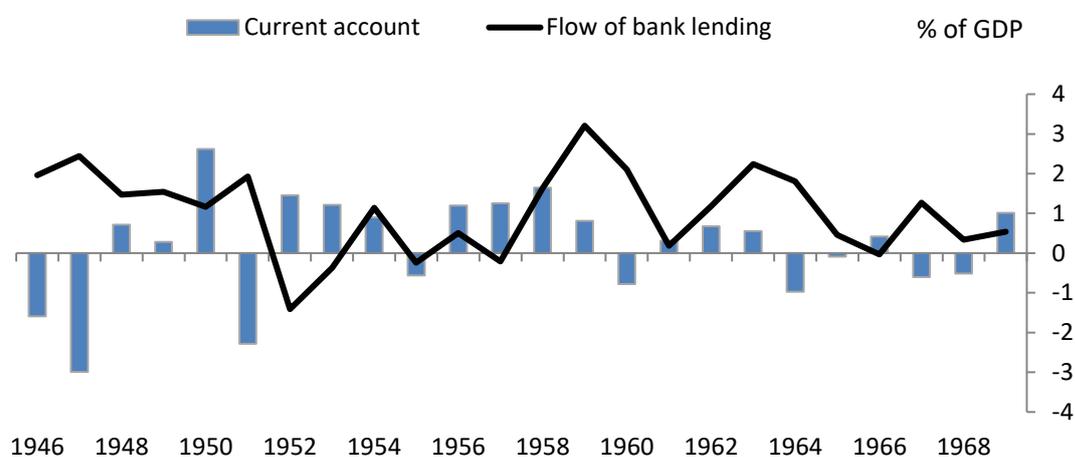
The efficacy of the fiscal policy as a tool of demand management has been one focus of criticism. For example, Dow (1964) argued that government spending and taxes exacerbated rather than stabilised cyclical fluctuations due to the sluggish nature of fiscal policy responses and their lagged effect on the economy. A fiscal boost would often take place as the economy was recovering naturally from a slump. In later work (Dow (1998)) he presents a more nuanced view and prefers the interpretation, discussed earlier, that governments were simply too optimistic about supply potential and simply overheated the economy beyond its limits. UK governments could see the growth rates being achieved by their competitors and were using fiscal policy to try to "force-feed" the economy with demand growth to try and achieve them.

The view of Matthews (1971) is that the authorities just alternated myopically in their policy measures between concern about unemployment during slumps and the balance of payments during booms, without prejudging the issue of whether policy was the only factor generating fluctuations.   Another explanation for the stop-go cycle is the idea of the political business cycle. Politicians of the day would simply expand the economy just before an election in order to win popularity only to deflate the economy once the election was won and out of the way. The "Butler boom" and "Heathcoat-Amory boom", which were generated ahead of the 1955 and 1959 general elections, are often seen as a manifestation of this.

The system of liquidity and credit control also came in for much criticism.   Liquidity controls were often seen as ineffective as banks always had "back door" access to Bank of England facilities (Howson (2004)). The overdraft system, where firms could draw flexibly on pre-arranged credit lines according to need, also did not lend itself easily to system which required direct and timely control of bank advances.   Frequently the Bank had to use "moral suasion" or arm-twisting to get the main clearing banks to meet government targets for credit expansion. The clearing banks resented this given other parts of the financial system such as the building societies were not subject to the same constraints.

(iv) Debt management and monetary financing

At the interface of monetary and fiscal policy in the post-World War 2 period was debt management. At the end of World War II, public sector net debt stood at around 250% of GDP (Chart 2.11) much of it short-term debt held by the banking system. Although such "monetary financing" had been justified in wartime, there was a fear after the War that the resumption of private sector activity would lead to a large increase in credit and money creation given the liquidity of the banking system. As a result, there was a push to term out the debt by selling medium-term debt to the banks and longer-term debt to non-bank investors as the short-term debt became due. However, there was also a desire to ensure this funding was as cheap as possible to keep the costs of government debt service manageable. In particular, the prevalent Keynesian view of the late 1940s and 1950s was that long-term interest rates should be kept low to promote investment and which permeated official thinking at various points.

Chart 2.11 Public sector net debt (par value)

% of GDP
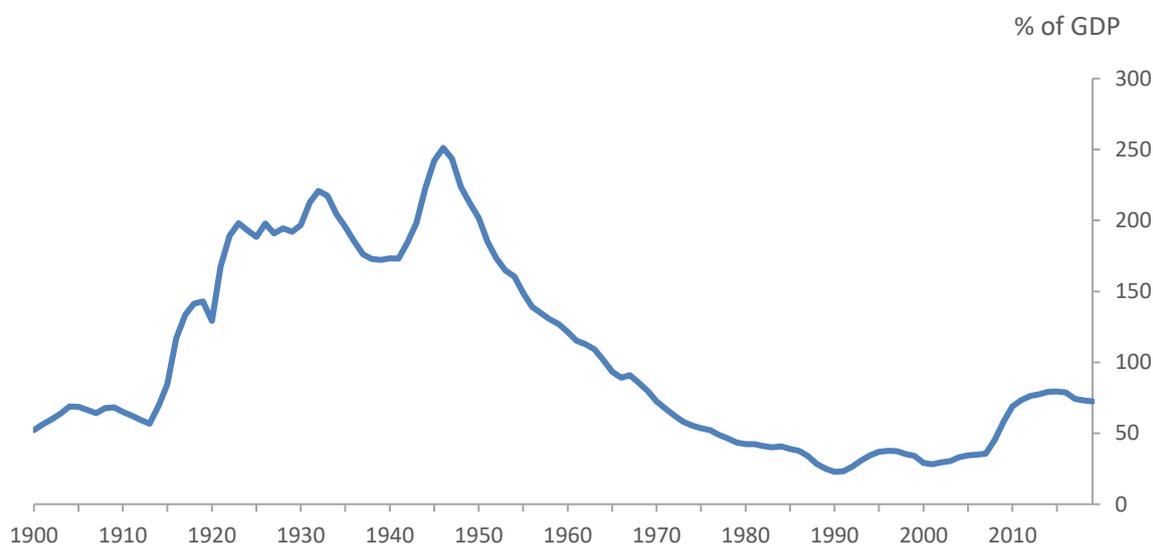
As a result, much of monetary policy, in terms of interest rate setting, was tactically involved in walking a tightrope of trying to ensure sufficient sales of longer-term debt to the market without raising the cost of finance too drastically. This was made difficult by the microstructure of the gilt market where the matching of buyers with particular gilt issues was dependent on stock market "jobbers" that were poorly capitalised.   One approach the Bank used was the so-called "Duke of York" tactic, where the Bank would increase short-term rates to a peak level in the hope of generating expectations of a future fall in rates and a rise in gilt prices to engender greater demand for long-term government bonds (ie assuming regressive expectations in the gilt market). More generally, the Bank would lean into the wind and attempt to sell more to the gilt market when it was buoyant and fewer when the market was tighter (see Howson (2004), Allen (2019)). That meant gilt sales to non-bank investors often happened in opportunistic bursts and by default meant that large, unexpected government deficits would be financed by default via the banking system if the Bank judged it too difficult for gilt sales. This impinged on bank balance sheets and money growth. **Box A** discusses the detail of this. As a result, the Bank frequently allowed the

deficit to be funded by (broad) money growth.[6] It was only in the later 1960s when monetarist thinking and the credit counterparts framework for monetary control began to impinge on policymaking that the link between the deficit, gilt sales and the money supply became more recognised.   These developments are also discussed in **Box A**. As the deficits became larger in the 1970s, the more important this issue would become for monetary policy, which we discuss later.

(v) The evolution of the financial system

During the 1950s and 1960s, the UK financial system was highly compartmentalised and cartel agreements operated among the clearing banks, who largely provided working capital for companies, and among the building societies who dominated the provision of mortgage lending (see **Chart 2.12**). Investment in equities and corporate bonds in the capital market was the preserve of insurance companies, unit trusts and pension funds. This structure suited the authorities quite well given it made the system more amenable to direct credit controls.   It was also a relatively safe system and there were no major financial booms or crises during this period, in part because the balance of payments constraint often meant controls had be put in place to restrain credit well before any boom were to get going.

But there were costs to this approach. The City of London had largely lost its mantle as the leading financial centre in the world to New York City and was another manifestation of a perceived supply side failure given the UK's historic expertise in financial markets. The total assets of the main UK-owned banks and building societies declined as a share of GDP after WW2 and in the 1960s the ratio was barely higher than a century earlier prior to the dominance of London in the late C19th and early C20th (**Chart 2.13**). The presence of capital controls (and to the extent they were binding) was an important contributing factor to this. However, on the other side of the ledger financial innovation began to evade the controls and led to the creation of the Eurodollar market that began to breathe new life into the City (Schenk (1998)). Foreign-owned and other fringe and merchant banks outside the main clearers began to become more important. The clearers themselves also began developing their overseas subsidiaries. This led to growing pressure to dismantle compartmentalised domestic financial system and make it more competitive. This was one of the key reasons for the Competition and Credit Control policy introduced by the authorities in 1971. This was to have major implications for credit growth and the money supply during the Great Inflation period.

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[6] There are analogies here with the "even keel" policy adopted by the Federal Reserve in the 1960s and 1970s. See Consolvo at al. (2020). However, in the case of the UK operations, the banking system would end up holding short-term government debt rather than reserves.

Chart 2.12 Mortgage providers 1880-2008

% of household income

- Insurance company and other specialist lenders
- Securitised mortgages (SPVs)
- Banks
- Building Societies
- Total mortgage lending
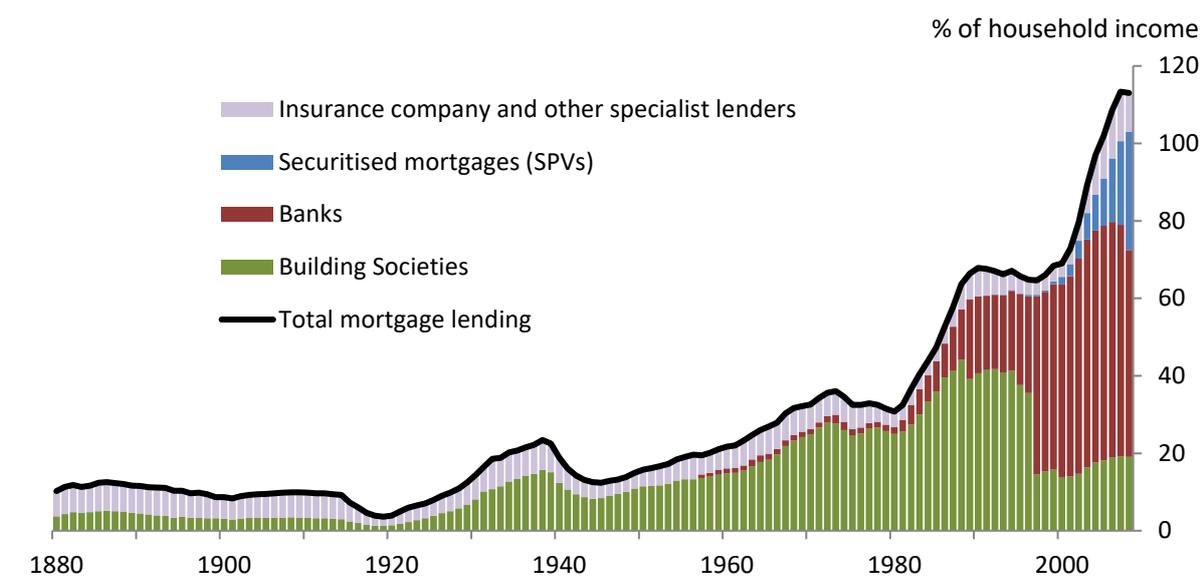
Source: Thomas and Dimsdale (2017)

Chart 2.13 UK Banking System (MFI) and Institutional Investors' assets – since 1880

% of GDP

- All UK-resident MFIs including foreign-owned banks and building societies
- UK-owned and resident MFIs
- Insurance companies and Pension Funds (Insurance Companies only until 1957)
- Investment and Unit Trusts
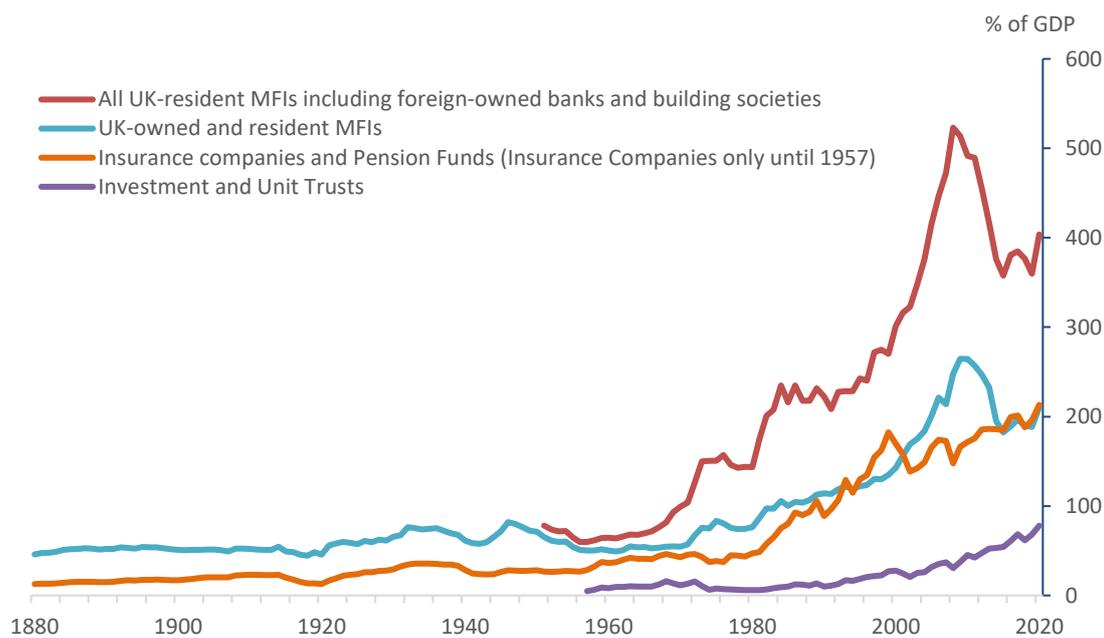
Sources: Sheppard (1971), Roe 1971, Capie and Webber (1985), Bank of England Statistical Abstracts and Bank of England database, ONS MQ5 release. Monetary Financial Institutions (MFIs) include banks and building societies. The ONS MQ5 release was discontinued in 2018 pending more general improvements and enhancements to the UK financial accounts. The data for Insurance Companies and Pension Funds has been extrapolated to 2020 using ONS balance sheet data from the National Accounts. The data for investment and unit trusts has been extrapolated using data on total funds invested produced by the Investment Association.

**Box A: The links between debt management and the money supply**

Since the Bank of England joined the London banks' clearing house in 1864, the UK payments system has fundamentally been based on settlement by bank deposits. The Bank of England has been the main banker for the government since its inception in 1694 and provides the main accounts of the government, such as the Exchequer Account or Consolidated Fund (effectively the government's current account). The accounts of the main clearing banks at the Bank of England (once known as bankers' balances but now known as central bank reserves) have been used since 1864 to settle interbank debts arising from payments made by their customers using their commercial bank accounts. That means that the transactions associated with government spending and taxation will settle across the Bank of England and commercial bank balance sheets. However, in providing liquidity to the market the Bank between the early C19th and late C20th generally acted at arms' length from the commercial banking system and operated via specialist financial institutions known as discount houses (see King (1936) for a history). These operated as shadow banks, taking short-term funds from the banks ("money at call") and investing them in high quality public and private bills that could be used to secure liquidity from the Bank of England either through direct sales (re-discounting) or through repos (market loans secured on bills).

By the 1950s and 60s the system had developed such that government deficits would automatically be financed by the discount houses or the banking system in the event the Bank of England could not secure sales of government debt to investors in the non-bank private sector. This could happen in various ways and two examples are illustrated below.

Under arrangements made during the cheap money period of the 1930s, the discount houses agreed to underwrite the government's Treasury bill tender in return for retaining its privileged access to the Bank's liquidity facilities. The discount houses were also required to hold a certain amount of their assets in government securities and bills. That meant any residual financing the government needed to finance its deficit spending would automatically be taken up by the houses. If that left them temporarily short of funds, the Bank would make short-term market loans to the houses at Bank Rate (the rate charged by the Bank in its role as lender of last resort to the market) to ensure control of short-term market rates. In this case, the Bank would credit the government's account with funds from the sale of the bills, backed on the asset side by increased loans to the discount houses (possibly secured on the bills issued). Once the government spent the money, either on goods and services or transfers of various kinds (Stage 2 in Example 1), this would flow into the commercial bank accounts of recipients in the non-bank private sector. The Bank of England would accordingly debit the government's account by the amount of funds spent and credit the banks' reserve accounts in settlement for the transaction between the government and the non-bank private sector. Given the banks earned no interest on their reserve accounts with the Bank, they would then seek to lend this money back to the discount houses as "money at call" which earned an agreed positive interest rate. That in turn, as a third stage, would incipiently boost the deposits of the discount houses (not shown in the diagram) and immediately allow them to repay their loan to the Bank. In settlement that would imply a reduction in the commercial banks' reserve accounts at the Bank matched by a fall back in the Bank's market loans. The result of this complicated set of transactions is that the issuance of bills to the houses at the rate of interest set by the Bank (or desired by the authorities) would lead to an increase in the broad money stock in the form of higher deposits held at the commercial banks. The houses themselves

would make a small profit on the different between the T-bill rate and the money at call rate. The banks would then make a turn on the gap between the call rate and the deposit rate (possibly zero if the deposits created were largely current accounts).

Example 1: Deficit funded by T-bills taken up by discount houses

Bank of England

Assets	Liabilities
Market loans	Reserves
	Public Sector Deposit

Government

Assets	Liabilities
Public Sector Deposits	Bills
	Gilts

Discount Houses

Assets	Liabilities
Bills	Money at call
Deposits	Market loans

Non-bank private sector

Assets	Liabilities
Deposits	Advances
Gilts	

Banks

Assets	Liabilities
Reserves	Deposits
Money at call	
Gilts	
Advances	

Stage 1: Deficit financed by issuing T-bills to DHs who borrow from BoE

Stage 2: Government spends the money increasing deposits and reserves

Stage 3: Banks reinvest in money at call, DHs repay loan to BoE

The Bank could achieve the same ultimate ends in funding the deficit by a sale of gilts directly to the banks. The banks generally preferred to hold short to medium-term gilts as investments and the Bank often was able to sell these to banks even if long-term investors' demand for long-term and undated issues was weak. In this case, the discount houses would not necessarily be involved, and the banks would end up holding gilts directly as a counterpart to increased deposits.   The Bank, however, did not necessarily believe this was the end of the story. Because gilts did not count towards the banks' liquidity ratio, selling gilts to the banks would lower the ratio of liquid assets to deposits ratio. Given an agreement with the banks that they would maintain a liquidity ratio of between 28-32%, any squeeze on this would lead the banks to reduce their lending in response (Stage 3 on Example 2 below).   This of course required the banks' liquidity ratio to be

binding (or viewed as a binding constraint) which was not always the case.

Example 2: Deficit funded by gilts sold to banks

Bank of England

Assets	Liabilities
Market loans	Reserves
Bills	Public Sector Deposit

Government

Assets	Liabilities
Public Sector Deposits	Bills
	Gilts

Discount Houses

Assets	Liabilities
Bills	Money at call
Deposits	Market loans

Non-bank private sector

Assets	Liabilities
Deposits	Advances
Gilts	

Banks

Assets	Liabilities
Reserves	Deposits
Money at call	
Gilts	
Advances	

Stage 1: Deficit financed by issuing gilts to banks, reserves fall

Stage 2: Government spends the money increasing deposits and replenishing reserves

Stage 3 ? : If binding banks could restore liquidity ratio by reducing advances

These transactions obviously relate quite closely to modern day QE (central bank asset purchases) which also lead to the creation of bank deposits. The only difference is that it is the central bank rather than commercial banks buying gilts, and rather than holding gilts on the asset side of their balance sheet the commercial banks end up holding central bank reserves, which currently now pay interest, in order for central banks to keep control of short-term interest rates. Given both gilts and reserves are both liquid forms of public sector debt, many see commercial bank and central bank purchases as only superficially different, with the key common element the impact on the money supply.

As monetarist thinking developed in the 1960s, the link between deficits and the money supply was made clearer. In the UK this thinking developed through the credit counterparts approach to broad

money, itself a derivative of the flow of funds approach to analysing financial transactions that had developed on both sides of the Atlantic after the War (Bjork and Offer (2013), Goodhart and Needham (2017)). Essentially the credit counterparts were an identity derived from the consolidated balance sheet of the banking system, including that of the central bank (that could also include a broader set of monetary financial institutions (MFIs) which in the UK would include building societies). It essentially made the accounting link between the increase in broad money, defined as the sum of notes and coin held outside the banking/MFI system plus deposits with the banking/MFI system, and the other flows of assets and liabilities on its balance sheet. In its simplified form this was given by:

Δ Broad money = Δ MFI £ Lending to the private sector + **Δ MFI £ lending to the public sector** + Δ Net FC lending + Δ net £ lending to overseas residents - Δ net non-deposit liabilities

Given MFI lending to the public sector was just the difference between the public sector's borrowing (net cash) requirement (PSBR or PSNCR) and that part of it financed by issues of debt to the non-bank private sector this could then be re-expressed as

Δ Broad money = Δ MFI £ Lending to the private sector + **PSBR - sales of government debt to non-banks** + Δ Net FC lending + Δ net £ lending to overseas residents - Δ net non-deposit liabilities

While this seemed to provide a direct link between the government deficit and the money supply, it made clear that only deficits funded by the banking system had monetary implications. If the Bank of England could fully fund the deficit with sales of gilts to the non-bank private sector it would insulate the money supply from changes in fiscal policy and there would be no "public sector contribution". This of course was not something the Bank felt able to deliver. **Chart A.1** below shows the counterparts to broad money growth (defined as M4) back to 1963. It shows the importance of the banking system as a source of funds throughout the late 1960s and early 1970s. These were on a scale similar to recent QE operations so they were not trivial by any means and at times supported (in an accounting sense) double digit money growth even when other sources of money creation (chiefly bank lending) were contributing little. We will return to this in the main body of the paper.

**Chart A.1: Counterparts to Broad Money Growth**

23
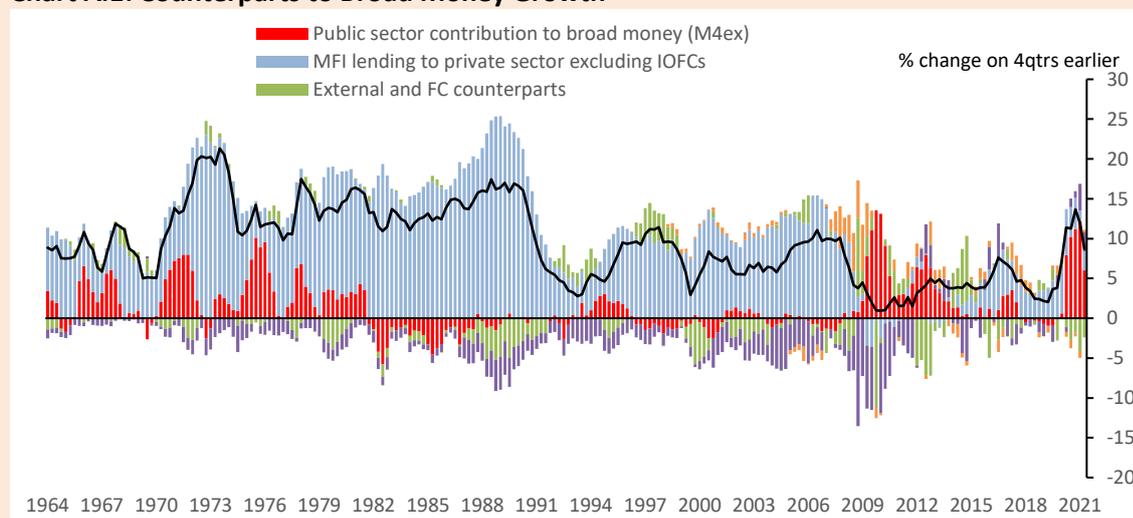
(vi) Trade Unions, incomes policies and cost-push inflation

A key belief among many Keynesian economists after WW2 was that inflation was largely a "cost-push" phenomenon, a key element of which were pressures arising from wage costs. Wages were viewed as essentially exogenous and the outcome of centralised bargaining between trade unions and employers. A key plank of the post-WW2 consensus was to not only maintain full employment but also ensure adequate real living standards for the bulk of the population supported by the safety net of the new welfare state. This idea had several strands, which were accepted by both the Conservatives and Labour parties. First, was to ensure a fair share of labour, which meant co-operation and agreement with trade unions whose interests were to push for higher wages and for redistribution from capital to labour. Second, was a fear of social unrest should living standards decline, as was perceived to have been the case in the interwar period. Thus, there was a post-war consensus, supported by both parties for full employment and for sustainable real growth in labour incomes but the need to keep wage and price inflation low because of the exchange rate peg.

A result of these objectives the government would turn to prices and incomes policies, sometimes in the form of voluntary agreement with unions and employers, or statutory if agreement could not be reached. These would impose some combination of temporary controls on prices or set and agreed wage "norms" to be respected, sometimes with fines and penalties for transgressions. **Table 2.2** adapted from Brittan (1979) summarises some of the key pay policies over this period.

Chart 2.14 Average weekly earnings and Incomes Policies
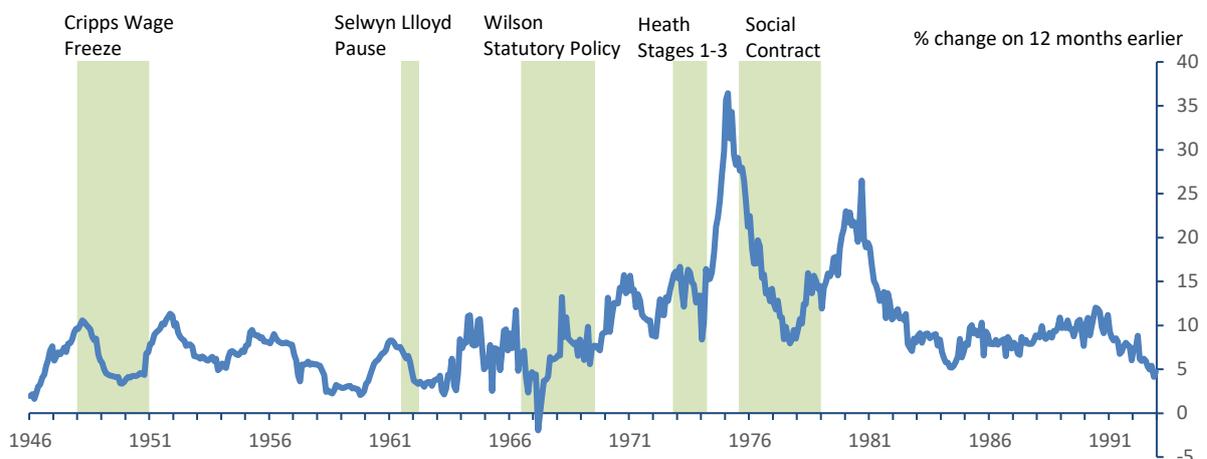
The problem with prices and incomes policies is that although they often had temporary success they created distortions that meant once the policy had been lifted there would be a burst of wage demands and price increases to restore relativities. **Chart 2.14** illustrates this for wages and incomes policies in the post-war period. Part of the problem identified by Brittan (1979) is that money illusion after WW2 by unions had led to a trend decline in the labour share (**Chart 2.15**) and the pressure to restore that share could not be held in check permanently by incomes policies in the mid-1970s.

One particular distortion that was argued to have been induced by prices and incomes policies was the wedge between private and public sector earnings. The government was in principle more able to impose pay restraint on its own workers (at least initially) than those in the private sector but

this would then lead to changes in wage relativities that public sector unions would attempt to make up once controls were lifted or it would lead to strikes, the miners' strike in 1972 being one example. **Chart 2.16** shows that public sector earnings growth would greatly exceed those in the private sector during the peaks in the 1970s following the incomes policies of earlier periods, which had essentially prevented a catch up of public to private sector pay (which had enjoyed a premium for manual workers since WW2). Public sector workers were more heavily unionised and became and larger part of the workforce during the 1960s (**Chart 2.17**) which also helped them more than make up the difference with the private sector given many of these were in critical industries. The pressure on public sector wages obviously had implications for the fiscal position and would be an important feedback loop in the 1970s.

Table 2.2 U.K. Pay Policies 1961-1974

July 1961-March 1962	**SELWYN LLOYD PAY PAUSE**
	Enforced in public sector until breached by Electricity Council in November 1961. Initial voluntary compliance elsewhere.
March 1962-July 1966	Conservative "guiding light," succeeded by Labour Statement of Intent in December 1964. Neither policy enforced.
July 1966-Autumn 1969	**WILSON GOVERNMENT STATUTORY POLICIES** (a) July—December 1966. Freeze (b) January 1967—June 1967. "Severe" restraint gradually becoming less intense. (c) June 1967—April 1968. 3.5% plus productivity agreements (d) April 1968—mid-1969. Policy intensified by Jenkins.
1969-November 1972	No real pay policies. Labour policies fade away in 1969 as emphasis shifts to abortive attempt at union reform ("In Place of Strife"). Conservative government elected in June 1970 initially opposed to incomes policy, but tries to fight public sector wage claims.
November 1972-March 1974	**HEATH STATUTORY POLICIES** (a) November 1972—January 1973. Stage One. Freeze. (b) February—October 1973. Stage Two. "£1 per week" plus 4%. (c) October 1973—February 1974. Stage Three. 7% plus "thresholds."
March 1974-July 1975	Pay policy collapses with defeat of Conservative government. Ineffective initial "Social Contract" under Labour. Threshold payments honoured.
August 1975 to end of 1978	**WILSON-CALLAGHAN "SOCIAL CONTRACT" CONTROLS** (Not statutory, but regarded as compulsory and enforced in Stages One and Two by TUC. Government sanctions against noncompliance in private sector.) a. August 1975—July 1976. Stage One. Maximum £6 per week increase. b. August 1976—July 1977. Stage Two. £2.50 to £4 per week limit. c. August 1977—July 1978. Stage Three. 10% limit to earnings increase. d. August 1978—end of year. Stage Four, 5% Policy breaks down with Ford strike

Source: Brittan (1979)

Chart 2.15 The Labour Share

- including housing income in GDP
- excluding housing income in GDP
- Employee share of corporate income
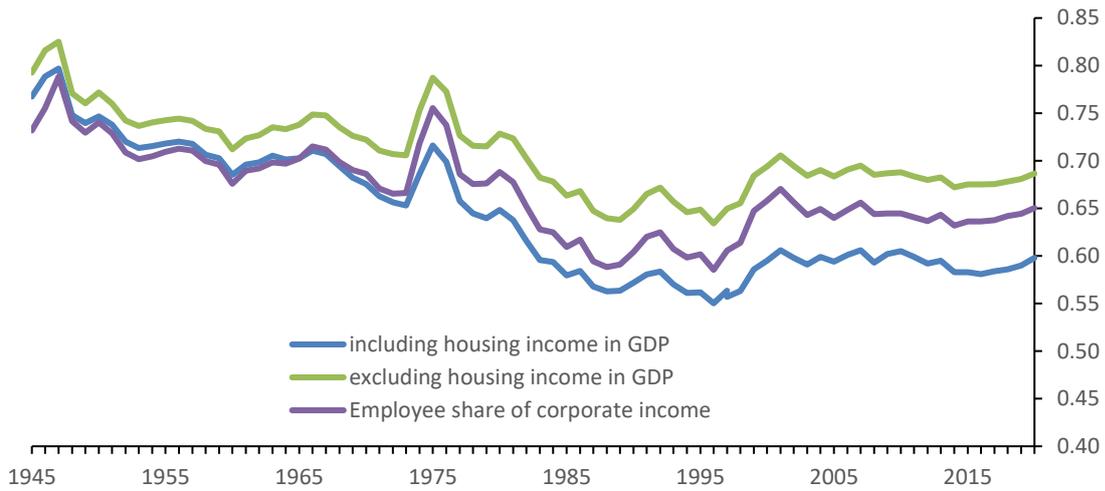
Chart 2.16: Public and Private Sector Earnings of manual workers

% change a year earlier (April)

- Private Sector
- Public Sector
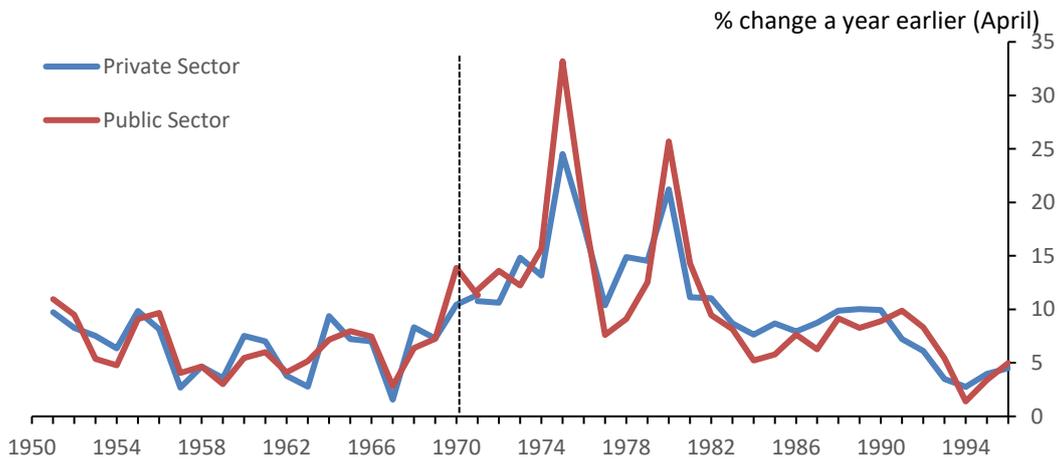
Chart 2.17: Public sector employment as a % of total employment
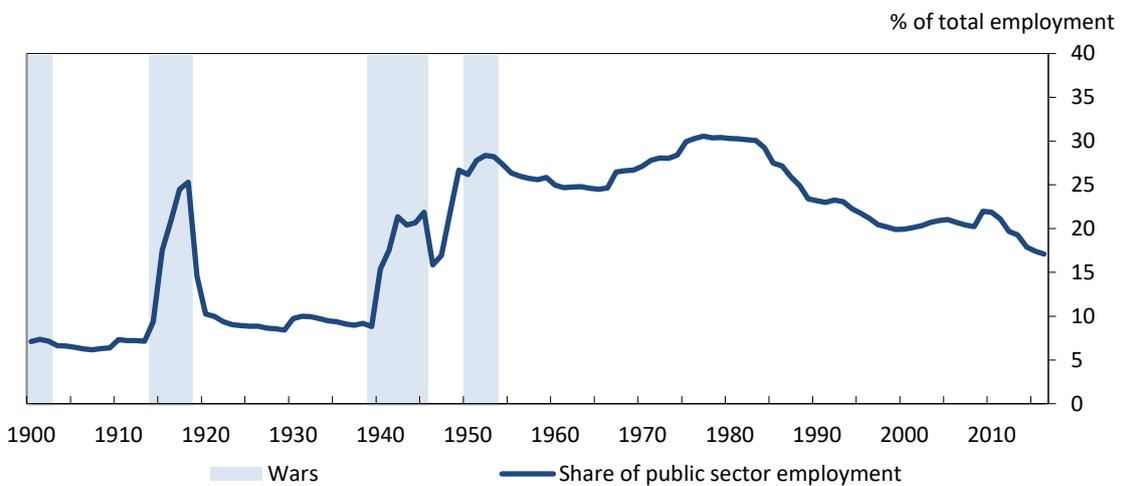
% of total employment

- Wars
- Share of public sector employment

Source: Thomas and Dimsdale (2017): Bank of England Millennium of Macroeconomic Data

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However, wage and other cost-push pressures in themselves could not be the ultimate cause of persistent inflation. They had to be accommodated by monetary and fiscal policy. Nominal spending would have to expand, otherwise the wage pressure would simply lead to higher unemployment. This was being made clear by Milton Friedman and later New Classical economists. Ultimately, if workers did try and bid for levels of real earnings that were incompatible with what companies could offer at a given level of employment then the only way these could be reconciled is with a rise in the equilibrium or "natural rate" of unemployment. Repeated attempts by the authorities to push unemployment below that natural rate would simply lead to ever higher inflation particularly if expectations were adaptive. This was the message of Friedman's presidential address to the American Economic Association in 1967, the Phillips curve relationship suggesting a trade-off between wage or price inflation and unemployment was an illusion. This, together with the development of the New Classical theory of the Phillips curve, is discussed in more detail in Box B. The lack of a long-run trade-off between output and inflation only gradually filtered through to policy makers at the decision-making level in the UK and they would be thwarted in their attempts to push unemployment below the natural rate. The misplaced belief in prices and incomes policy as a remedy for the resulting increase in inflation is argued to have delayed the implementation of correct counter-inflationary pressures in the UK during the 1970s.

Box B: Developments in monetary theory and re-evaluation of the Phillips Curve Trade off.

The Keynesian emphasis on aggregate demand management using largely fiscal policy measures faced increased criticism from the late 1960s from both monetarists and a little later the new classical macroeconomic revolution of the 1970s (see Hoover (1988)).

Monetarists such as Milton Friedman and later new classical economists such as Lucas (1973) placed more emphasis on monetary shocks (unexpected movements in the money supply) as the major source of disturbances and therefore monetary policy had greater importance. Both schools placed more weight on the role of expectations and uncertainty about relative price movements, rather than sticky prices as the reason why such disturbances cause temporary movements in output away from trend and traced out a short-term relationship between output and unemployment. Friedman (1968) placed weight on the idea of adaptive inflation expectations. In Friedman's story, there was an equilibrium or natural rate of unemployment ground out by the real world frictions in the labour market. But monetary disturbances could lead to a temporary movement away from that equilibrium. An increase in the money supply and nominal spending would lead in the first instance to an unexpected increase in inflation given flexible goods prices. The actual real wage faced by firms would fall incipiently causing firms to demand more workers. This would then start to bid up nominal wages. However because this increase in nominal wages would be perceived as a rise in real wages by workers with adaptive inflation expectations, they would then be prepared to supply more labour in response. The resulting increase in nominal wages would therefore end up being less than the increase in prices, leading to an equilibrium fall in the real wage and higher output and employment. However, inflation expectations would then adjust adaptively to higher wage and price inflation leading to the possibility of wage-price "spirals" until ultimately, unemployment would return to its natural rate at a higher rate of inflation.

The new classical monetary approach to business cycles (Lucas 1973, 1975) placed more emphasis on microfounded models and rational expectations. In this case, monetary shocks would only cause a very temporary disturbance to output to the extent agents have imperfect information and confuse a change in the general level of prices with a relative price change that causes them to supply more labour or output. These mechanisms are discussed further in Hoover (1988). This results in the Lucas "surprise" supply curve linking output to surprise changes in prices and money. This school built on Friedman's legacy to cast doubt on the use of stabilisation policy (the "policy irrelevance hypothesis") given agents with rational expectations would reset prices and wages rapidly once the transitory nature of the monetary shock was revealed (Hall and Sargent (2018)).

These ideas permeated slowly into the thinking of economists and policymakers in the UK. The importance of money supply disturbances rubbed against the grain of the Radcliffe consensus and the historical use of Bank Rate as the key instrument of monetary policy. Friedman's advocacy of a fixed growth rate of money ("the k-percent rule") led to increasing thought being given to monetary targets both in the Bank of England, Treasury and UK academics from the late 1960s onwards (see Needham (2014)).   An emphasis on monetary targets was also increasingly advocated by the IMF and were discussed with the UK government at various points during periods when the UK was asking assistance in the 1960s (Goodhart and Needham (2017)). This led to an experimentation with unpublished targets as a disciplining device on policy and which began to creep into official policy announcements (such as Barber's budget of 1971). Eventually official targets were introduced in 1976 following the agreement with the IMF.

Understanding of both the theory and empirics on drivers of the natural rate of unemployment, took longer and it would not be until the 1980s when economists (eg Layard and Nickell (1983)) developed a framework that would allow estimates of the natural rate to be analysed thoroughly. That meant there was somewhat of a disconnect between the older cost-push theories of inflation that were associated with wage pressure and higher commodity prices and the apparent breakdown of the short-run Phillips curve relationship. As we discuss in Section 3, the authorities were aiming to keep unemployment at levels that retrospectively were lower than current estimates of the natural rate and as a result policy may have "over accommodated" cost-push shocks over the course of the 1970s.

III Explaining the phases of inflation

In this part of the paper we provide a short narrative of the four phases of inflation shown earlier based on the peaks in 1971Q3, 1975Q3, 1977Q2 and 1980Q2. For each phase we describe the possible proximate causes of the pick up in inflation from the previous trough and what caused the fall back from each peak until the following trough. For this exercise, we draw extensively on secondary sources but also draw on some under-used information on inflation expectations.

Phase 1: Devaluation in 1967 and the wage explosion of 1969-1970

During this period up to the peak 1971Q3, inflation rose from under 2% in 1967 to 10%. Why this pick up happened is actually quite difficult to pin down and has not been settled in the existing literature (Schulze and Woodward (1996)). The devaluation of sterling in 1967 did push up import prices but once weighted by the share of imports in final expenditure these at best only had a minor role to play in the subsequent pick up of inflation to 10% (**Chart 3.1**).

Chart 3.1: CPI inflation and contributions from unit wage costs and import prices
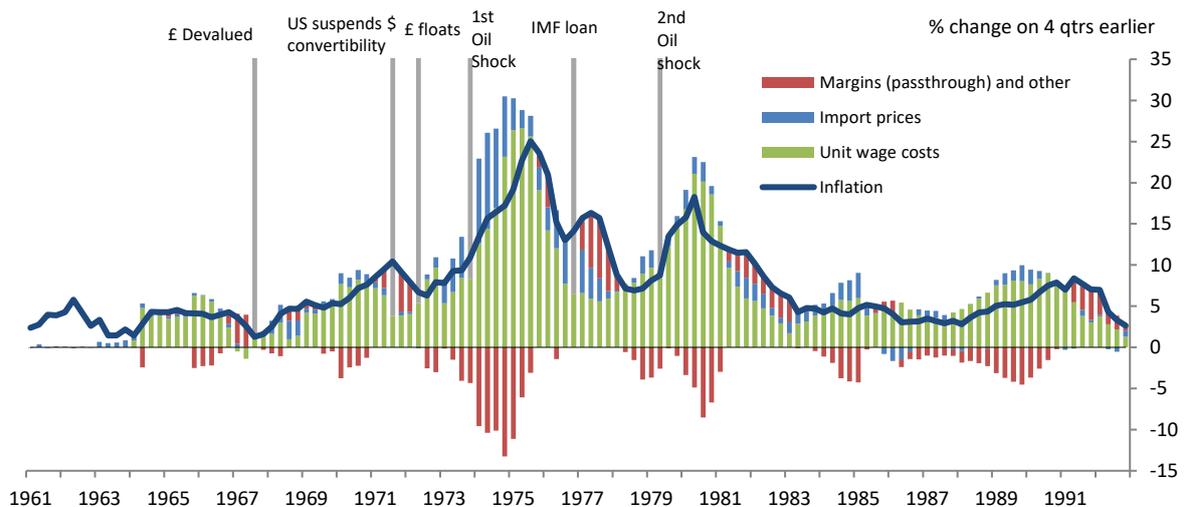
The main proximate driver was a large pick up in wage inflation from around 1968 from under 5% to almost 15% per year by 1971. This was not warranted by a commensurate pick up in labour productivity growth, and so led to a significant pick up in unit wage cost growth. Once passed through with a lag this seems to be the key proximate cause of the pickup in inflation to 1971.

It is not clear why the wage explosion happened when it did. There are a number of potential factors. First, is the breakdown of the Labour Government's pay policy of the 1960s (see earlier **Chart 2.14**) following which the government shifted its focus on agreeing more general reforms with the Trade Unions. The set of proposals named "In Place of Strife" were unacceptable to the unions and key members of the Labour government and the policies were watered down. This may have strengthened the belief of unions to push for higher pay rises and remedy the distortions

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created under the incomes policy. Internationally there was also growing industrial unrest, with the May 1968 riots in France being the most well known, and a pick up in wage inflation was experienced in many economies.

Together these influences would suggest there was a rise in the natural rate of unemployment over this period, well before the famous miners' strikes of the early 1970s and the oil price shocks. We examine this econometrically further in the next section but the late 1960s is when measures of mismatch increase. For example, the Beveridge Curve (which plots the ratio of vacancies to unemployment for each year) appears to shift outwards in from 1967 to 1971 (**Chart 3.2**)

Chart 3.2: The Beveridge curve

**Chart 3.3: Unobserved Component Model – movements in trend UK growth since 1660**

More generally, these labour market influences suggest a more general narrative that the end to the golden age of post-war growth started somewhat earlier in the late 1960s, rather than the conventional date of 1973. **Chart 3.3** shows estimate of the trend growth rate based on an unobserved components model of GDP estimated over a very long sample using the Kalman Filter, based on the local linear trend model of Harvey (1989). This is taken from the study of Dimsdale and Thomas (2019). This indeed shows the post-World War 2 rate of trend output growth rate peaking around 1967. We return to this further in section 4.

However, both of these explanations are largely supply-side ones. When one factors in the demand side, the evidence of excessive demand is mixed. **Chart 3.4** shows two measures of de-trended output over the post-war period using the Cristiano-Fitzgerald (1999) band-pass filter (BP-CF) and an un-observed components (UC) model of the business cycle, estimated on quarterly growth from 1955, based on assuming an AR(2) business cycle. These appear to show a peak in the cycle in the third quarter of 1968, suggestive of excess demand pressures immediately following the devaluation, before turning sharply negative in the early 1970s suggesting demand falling below potential supply growth.

Chart 3.4: Post-war growth cycles using the Christiano-Fitzgerald Band-pass (BP) filter and unobserved components (UC) model

Aggregate demand over the second half of the 1960s was dominated by the lead up and aftermath of devaluation of 1967. The incoming Labour administration had faced a severe balance of payments deficit and a high level of domestic demand following Maudling's Dash for Growth in 1962/3. There was a re-introduction of restrictions on lending in May 1965 and applied to all banks and to the larger finance houses. Bank Rate was temporary reduced to 6% in June 1965, but the continuing weakness of sterling forced a rise to 7% in July 1966, which was accompanied by a tightening of lending ceilings and hire-purchase restrictions combined with reduction in public spending. This was then followed by a relaxation in the first part of 1967 as Bank Rate came down to 5.5% in May following three reduction of ½% and public spending increased from around 37% to

around 40% of GDP leading to a rise in the public sector deficit to just under 4% of GDP by 1968. Broad money growth picked up to 10% in part due to banks and building societies financing the public sector deficit (**Chart A.1**).   This explains the movement into excess demand that carried through into 1968.

Renewed pressure on sterling, culminating in the devaluation crisis of November 1967 then forced a tightening of first monetary and then fiscal policy. First, there was a rise of in Bank Rate to 8% and re-imposition of lending ceilings. Bank Rate was then maintained within a narrow range of 7–8% from November 1967 until April 1970 and lending ceilings were in continuous operation during the period. To ensure resources moved into exports and manufacturing fiscal policy was then tightened to try and restrain domestic demand. Roy Jenkins the Chancellor was successful in this aim and the current account of the balance of payments moved into surplus albeit with unemployment creeping up. The correction of the balance of payments following devaluation proved to be a slow process and was achieved by Chancellor Jenkins with some assistance from the IMF. He also sought to negotiate drawing rights from the IMF to support sterling. His Letter of Intent contained commitments on Domestic Credit Expansion (DCE)—a measure of the money supply adjusted for the balance of payments . In his Second Letter of Intent of May 1969, the Chancellor set a target for the growth of DCE of £400 million for 1969–1970. The implementation of the targets agreed with the IMF led to a sharp fiscal contraction which turned the Public Sector Borrowing Requirement (PSBR) of around 4% of GDP in 1967 into a surplus of around 1% of GDP in 1969. Fiscal contraction was associated with a decline in the rate of growth of sterling M3 from around 10% in 1967 to 1.7% in 1969, while the current account moved from a deficit to surplus. In his Budget statement in April 1970 Chancellor Jenkins reported that the flow of DCE had turned out to be negative in 1969–1970 because of the swing of the current account into surplus.

So the picture of excess demand over the period, given by the filtered estimates, suggests a positive output gap in 1968 was turned into a negative output gap by 1970-1971 through tighter monetary and fiscal policy. Lagged transmission can potentially explain the rise in unemployment and falling inflation experienced in 1971 to 1972, discussed in the next section.

However, a final and important piece of evidence in explaining the rise in inflation to its peak in 1971Q3 is increased inflation expectations amongst the general public. From 1961 onwards qualitative surveys of household short-term inflation expectations are available. Carlson and Parkin (1975) and Batchelor and Orr (1988) derive quantitative estimates from these using assumptions about the distribution of expectations based on earlier work by Theil (1958) (see **Box C**). The expectations series of Batchelor and Orr (1988) is shown against wage and price inflation in **Chart 3.5** below. There is a notable pick up in expectations both immediately after devaluation and prior to the pick up in earnings and inflation once negotiations with the unions broke down in 1969. In both cases expectations appear to lead or are concurrent with wage and price inflation and so, superficially at least, this derived data would not suggest expectations were adaptive. Also, there may to be too much of a time lag between expectations and the (limited) excess demand detected in 1968 for this to be the entire explanation for the increase observed in 1969. It is suggestive that the cause might be more related to shifts in household heuristics, influenced by newsworthy events such as the devaluation or the breakdown of the "In Place of Strife" initiative. Both were front page news items given their political significance.

Chart 3.5: Earnings growth, CPI inflation and Household Inflation Expectations
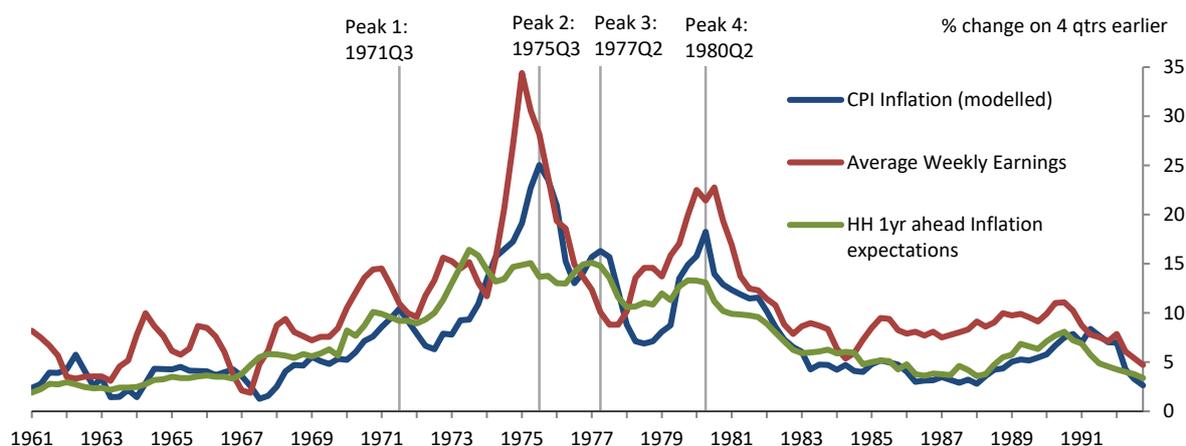
Phase 2: From Bretton Woods to the nadir of 1975

The years 1971-1975 in many ways mark a watershed in UK economic history. This is true across several dimensions and altered many of the trends discussed in Section II. In fact, there were so many structural changes coupled with shocks to the economy that it makes it difficult to pin down any single underlying cause of the pick up to 25% inflation that followed.

There were three key structural changes occurring over this period:

The first major paradigm shift was the collapse of Bretton Woods in 1971, which ushered in a period when the UK largely operated with floating exchange rates albeit a managed or "dirty float" at times (Bordo, Humpage and Schwartz (2015)). Movements in the exchange rate after this point were often large and provided many challenges to governments over the next twenty years (**Chart 2.1**). Sterling ultimately floated in 1972 and depreciated sharply. In many ways, the floatation of sterling was seen by some as an opportunity to finally break free of the balance of payments constraint on growth, but it quickly became apparent that there would be significant inflationary implications of allowing sterling to fall precipitously over this period. In particular, unlike the 1950s and 60s, there would no automatic brake from the discipline of the exchange rate peg should there be a boom in money, credit and activity.

The second major change was the introduction of Competition and Credit Control (CCC) in 1971 on the initiative of the Bank. This was the first step in a rocky road to full financial liberalisation in the 1980s and 1990s (see Goodhart (2015)). The apparatus of direct controls on money and credit was dismantled and the compartmentalised structure underpinning banking and building society cartels began to break up. The main aim was to improve competition in the financial system and allow more effective control over money and credit through changing interest rates rather than through direct controls. However, it would also mean a much more elastic response of money and credit to changes in the demand for credit by households and firms at a given level of interest rates and would lead to the start of a series of credit booms experienced by many advanced economies after 1970 (see Jordà et al. (2016)). That meant it was important for interest rates to react promptly to any signs of inflationary pressure.

The third major change was the emergence of large global commodity price shocks which, from the early 1970s, would have major effects on the supply side of the economy given they implied large adjustments in real wages which workers might potentially resist or take time to adjust to[7]. As noted earlier, policymakers had not fully internalised the impact of such shocks on the supply side and particularly the natural rate of unemployment should there be insufficient adjustment in real wages (see **Box D**). In 1973Q4 following the start of the Yom Kippur war, the $ price of oil virtually quadrupled overnight.

Chart 3.6: Oil prices
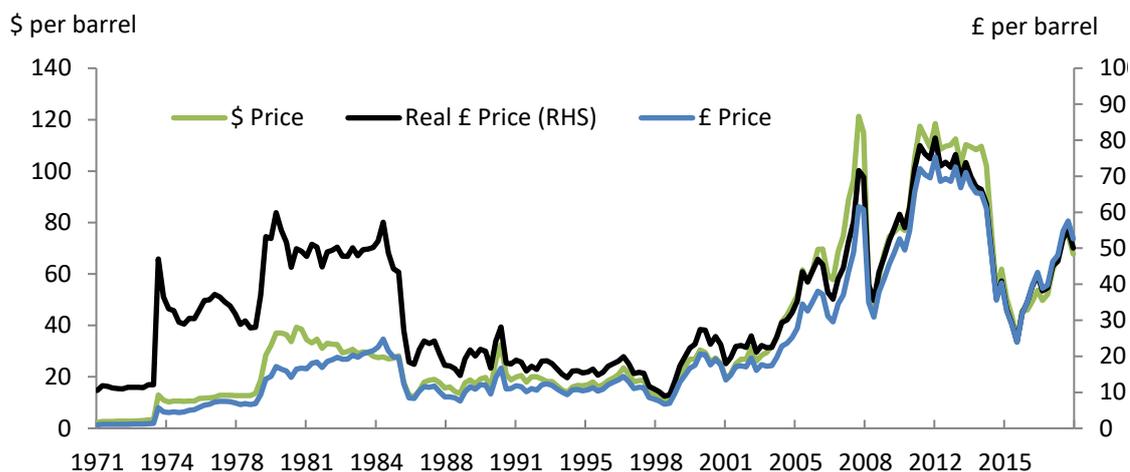
These three fundamental factors would interact with monetary and fiscal policy decisions to cause the large rise in inflation from around 10% in 1971 to 25% in 1975. The policy responses from 1971 onwards are best split into two parts. The first part covers 1971 to 1973 which includes Competition and Credit Control and the U-turn by the Heath Government from late 1971 and subsequent Barber boom in 1972/3. The second part covers the response to the first oil price shock at the end of 1973 and the second wage explosion leading up to the peak in inflation in mid-1975.

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[7] Barsky and Kilian (2002) argue that oil price increases may not have been driven by shocks to the supply of oil but were rather driven by expansionary monetary policies in the early 1970s.

Box C: Inflation Expectations Measures in the 1960s and 1970s

Batchelor and Orr (1988) were able to construct an estimate of 1-year ahead household inflation expectations from the following qualitative series.

The Gallup (1961) survey

This was instituted in January 1961 by Social Surveys (Gallup Poll) Ltd and the question asked concerning inflation expectations was:

> *Q1 Over the next six months do you think that prices will go up, go down, or stay the same?*

Information on the fraction of respondents, excluding don't knows', who think prices will fall (A), stay the same (B) or rise (C). This was the data used by Carlson and Parkin (1975) in their earlier survey.

The Gallup (1974) survey

In January 1974, as part of a more comprehensive monthly survey, Gallup Poll introduced two different questions about inflation:

> *Q2' Over the past twelve months do you think prices have risen a lot, risen a little, stayed the same or fallen?*
>
> *Q2 Over the next twelve months do you think that prices will rise a lot, rise a little, stay the same, or fall?*

This allowed four response proportions A, B, C and D for expectations and perceptions measuring the fractions of the sample answering in the 'fall', 'same', 'rise a little' and 'rise a lot' categories.

The EEC survey

In May 1984, the EEC commissioned the Office of Population Censuses and Surveys to conduct a UK survey as part of its programme of harmonized consumer surveys in member countries. This was run thrice yearly, in January, May and October, until 1979. In January 1980 conduct of the survey was transferred to Gallup Poll, and the survey was run monthly. Two questions about inflation were asked in these surveys:

> *Q3' Compared to what they were twelve months ago, do you think that prices in general are now much higher, moderately higher, a little higher, about the same, or a little lower?*
>
> *Q3 By comparison with what is happening now, do you consider that in the next twelve months prices will increase more rapidly, increase at the same rate, increase at a slower rate, be stable, or fall slightly?*

This yields five response proportions A, B, C, D and E for expectations (A', B', C', D' and E' for perceptions) measuring the fractions of the sample with successively higher inflation forecasts.

The Gallup (1981) survey

In October 1981, Gallup Poll piloted a new survey of consumer expectations. This was run intermittently through the first half of 1982, and monthly from January 1983 onwards. In contrast to the earlier surveys, it asked for a quantitative estimate of expected inflation:

Q4 Over the next twelve months, what do you think the rate of inflation will be?

This allows direct calculation of the mean and standard deviation of expectations across individuals. A technique for quantifying the results of the three-category Gallup (1961) survey was developed by Carlson and Parkin (1975), building on earlier work by Theil (1958) and others. The assumption is that a respondent to a survey taken at time *t* implicitly forms a subjective probability distribution function (p.d.f.) for future inflation and answers the survey questions in the light of this distribution. As discussed in Batchelor (1986a), there are three types of empirical assumption necessary to infer the parameters of the p.d.f.s from the survey responses. These concern the expectations distribution, the response function and the scaling technique. Layered on to this is the need to pool data from the various surveys.

Box D: The real adjustment of the economy to higher oil prices.

Figure B1 shows how real wages respond to an energy price shock using a simple labour demand and labour supply framework with sticky wages and prices in the short-run. It is assumed that, like the UK before the mid-1970s, that the economy concerned does not produce oil. On the vertical axis is the real consumption wage, ie, the nominal wage (per head) divided by the final consumption goods price rather than the GDP deflator or value-added price.

 A rise in energy or import costs will lead to an increase in the wedge between the real product wage of interest to domestic firms and the real consumption wage of interest to workers. This means that at each and every level of the real product wage, the real consumption wage will be lower. So the labour demand curve (which is based on the real product wage) shifts downwards in real consumption wage space. And the 'warranted' real consumption wage, the real wage that would mean firms would be happy to carry on employing L* workers, falls to $w^{*'}$ in this case at point D.

Figure C.1: Adjustment of the real consumption wage to higher energy prices
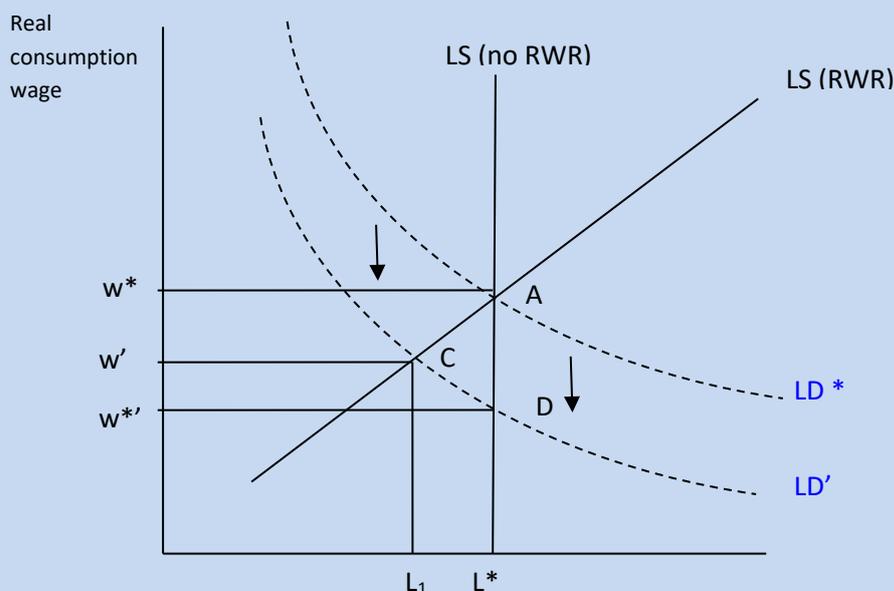
However, if workers' labour supply curve is upward sloping rather than vertical (or, in a more general framework, if their target real wage is decreasing in unemployment), workers will resist some of the fall in real wages. As a result, the economy will move towards point *C* in the medium term. At this point, employment is lower than its initial level and the real wage is higher than the new warranted real wage, $w^{*'}$. If real wage resistance is permanent or highly persistent then the economy may get stuck at point C and never return to the initial equilibrium L*, at least over an observable horizon. In practice, this means the warranted real wage is not necessarily that consistent with 'equilibrium' employment. It is merely the real wage that is consistent with unchanged employment relative to the baseline level existing prior to the shock.

The work of Bruno and Sachs (1985) and Rotemberg and Woodford (1996) show that the required

or "warranted" adjustment in real consumption wages consistent with maintaining employment at a baseline level is given by a range based on factor shares in final output:

Range of impacts: $S_E/(1 - S_E)$ * % change in P_E/P to $S_E/(1 - S_L)$ * % change in P_E/P

where S_E and S_L are the shares of primary energy and labour in final goods production and factors are assumed to be complementary. The upper bound assumes that capital goods prices and non-energy import prices are as energy intensive as other final goods and respond to oil prices in the same way as domestic final goods prices. Given the share of energy was around [1.1%] of final expenditure at the end of 1973 and that of labour in total costs around a half, the 1973/4 oil price shock, which in real £ terms rose by 2.5-3 times between end 1973 and mid-1975 (**Chart 3.3**), would have required between [3%-6%] downward adjustment in real consumption wages (relative to trend productivity).

How the required fall in real consumption wages is split between nominal wages and prices depends on monetary and fiscal policy. As we discuss later, a monetary policy of "full accommodation" aimed at stabilising nominal wage costs and maintaining employment, would imply all of the real wage adjustment to come through a higher price level. Monetary policy would effectively "look through" the temporary increase in imported inflation and aim to stabilise the output gap and domestic inflation in the medium-term. However, such a policy runs the risk of increasing inflation expectations if those are formed adaptively and might induce a Wicksellian wage-price spiral of ever declining real interest rates, increasing output gaps and upward pressure on wages and prices, should monetary policy not respond sufficiently as discussed earlier in **Box B.**

(a)   Go-stop revisited - Competition and Credit Control, the fall of Bretton Woods and the Barber Boom

The Conservative Government had come into office with a non-interventionist objective. There would be no aim to attempt to stabilise the economy or control inflation through a price and incomes policy. Taxation would be reformed with an emphasis on moving away from direct taxes to indirect taxes and tax relief on debt interest would both act to encourage investment. There was a rejection of incomes policy although the government adopted what was called the "N-1 approach" towards wage settlements in the public sector was introduced. Under this policy, each settlement was intended to embody a slightly lower increase than the last and was an attempt to reduce wage inflation gradually without the use of an explicit incomes policy. But ultimately proved ineffective in reigning in settlements.

However, 18 months into the new administration there was a U-turn. In 1971 unemployment, as measured at the time, was approaching the sensitive 1mn mark in part reflecting the lagged effect of Roy Jenkins's squeeze in 1968 and 1969. This led the Heath government, which had succeeded the previous Labour administration in 1970, to relax its restrictive policies. The basic rate of income tax was reduced in 1971 but this did not reverse the downturn, and unemployment rose to more than 1 million in 1972. Chancellor Anthony Barber then adopted a more expansionary fiscal stance to reduce the level of unemployment. In the March 1972 budget he introduced tax cuts and

increased public expenditure with an aim of achieving a rate of growth of GDP of 5% per annum. This it was calculated would return the economy to full employment and would spur investment growth in much the same way as Harrod had argued 10 years earlier. Indeed Harrod himself would write in the *Bankers' Magazine* of that year that "an increase in demand by easy money and tax reduction should not have any adverse effects on the wage-price spiralling that is proceeding". To keep a control on prices, the U-turn was made complete with the re-introduction of an incomes policy comprising of the three stages shown in in **Table 2.1** and the establishment of a Pay Board and Price Commission.

These fiscal policy changes occurred alongside the introduction of Competition and Credit Control which in itself was boosting money and credit growth through a re-intermediation of the conventional banking system following the end of direct controls (**Chart 3.14**). The competition aspect of CCC was very much in line with the Heath government's aim to improve business performance. However, as Needham (2014) points out the introduction of tax relief on debt interest went some way to undermine a key principle of CCC – that interest rates should be used to control credit. It meant that companies could write off interest rate increases against tax. This was also coupled with a reluctance by the government, and the Prime Minister Ted Heath in particular, from using the interest rate weapon at all. At several points in 1970, 1971 and 1972 he resisted the advice of the Bank of England to raise interest rates in response to rising inflationary pressure. This is suggestive of an "active fiscal"/"passive monetary" policy regime where fiscal policy is geared to objectives that are not consistent with debt stabilisation, accommodated by monetary policy which does not respond sufficiently to the rise in inflation.

The result of the loosening of fiscal and credit policy coupled with an inert policy rate was inevitably a boom in both asset prices and demand. There was a strong recovery in domestic demand and nominal GDP growth picked up from 10% to 20% over the course of 1972 and 1973 with real GDP peaking at a 4-quarter growth rate of just under 10% in 1973Q1 (**Chart 3.7**). Public Sector Borrowing increased to 6% of GDP, much larger than the deficits of the 1950s and 1960s, which had generally averaged something like 2-3% of GDP (**Chart 2.9**). The balance of payments swung from a surplus of 1.6% of GDP in 1971 to a deficit of about the same size in 1973 and sterling fell some 15% following its floatation in June 1972. This pushed up the sterling value of import prices, which were already increasing globally for a number of commodities. This short-lived rapid expansion of growth has become known as the "Barber boom" (see **Box E**).

Box E: The Barber boom and bust of 1972/3 – another dash of "go-stop"

In 1971, with unemployment rising to the psychologically important 1million mark (on the administrative claimant count measure used at the time) led the Heath government to relax the restrictive policies it had started out its administration with. Barber's aim was to achieve a growth rate of 5% for the next two years, adding 10% to the level of GDP. This would be achieved by decreasing income taxes (largely through raising allowances) by £1 billion, in order to increase consumption, with an overall expansion of public sector borrowing by £3.4bn. In his Budget speech of March 1972, Barber stated "I do not believe that the stimulus to demand I propose will be inimical to the fight against inflation."

[Charts D1](#) and [D2](#) below show the contributions to GDP growth from each component of demand split into two categories: consumption, stockbuilding and imports; and investment, government spending and exports. It shows that GDP growth reached 4% in calendar year 1972 and around 7% in 1973 fuelled by an increase in consumption and stockbuilding. This also had the effect of increasing imports and pushing the current account into deficit (see earlier [Chart 2.4](#)). This put pressure on £ which forced its formal floatation in June 1972 ([Chart D3](#)) which depreciated throughout the rest of 1972 and 1973 by just under 20% in effective terms using current BIS weights. This helped to boost exports and added to demand in 1973.

**Chart D1: Contributions to annual GDP growth of Consumption, Stockbuilding and Imports**
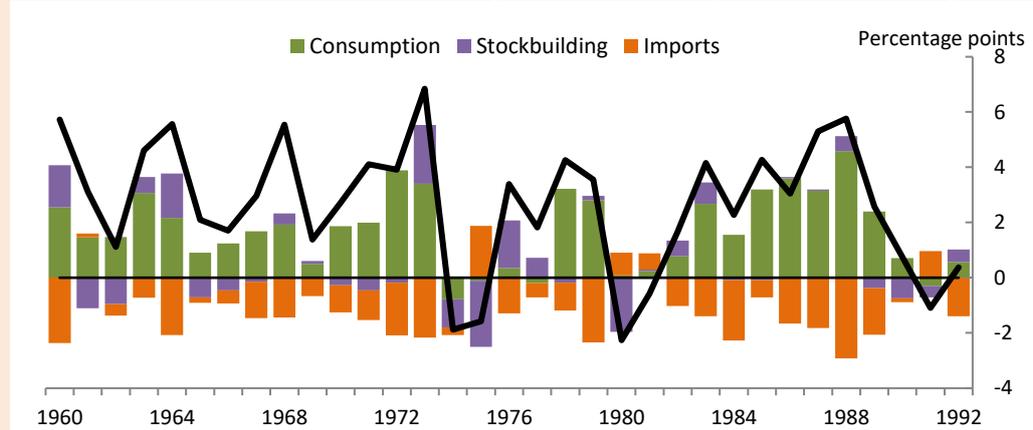
Chart D2: Contributions to annual GDP growth of Exports, Government Consumption and Investment
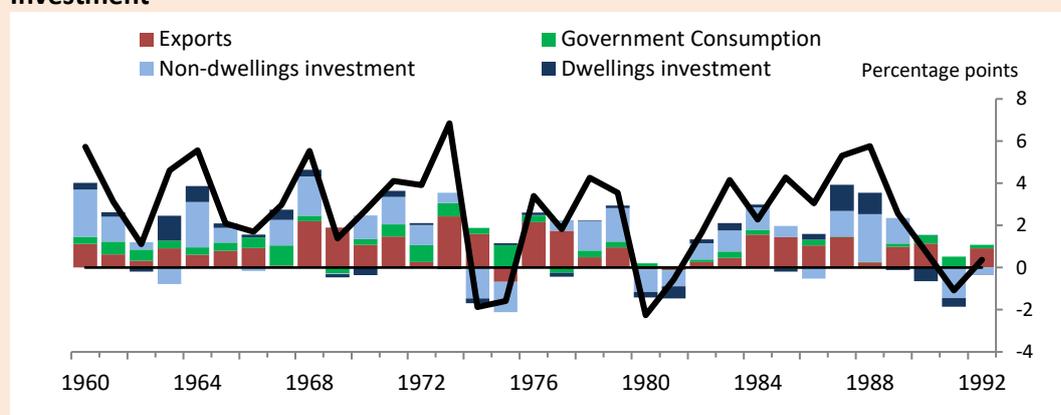

Source: ONS

Chart D3: Sterling ERI (current BIS weights)
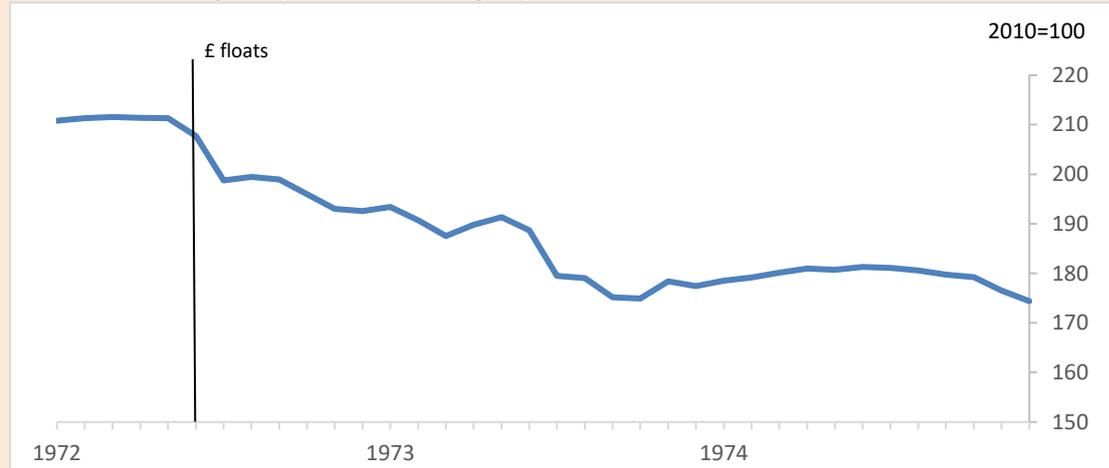
Source: BIS

Also fuelling the boom was the impact of Competition and Credit control on bank lending, particularly by the fringe lenders who made loans to both the residential and commercial property sectors. Residential and commercial property prices increased at record rates in 1972 and 1973 (Chart D4), which then reversed sharply in 1974 as a result of the tightening of policy in 1973, from which followed the Secondary Banking crisis discussed in the text. The impact on all the domestic demand components was significant and contributed to the recession in 1974/5.

Chart D4: Residential and Commercial Property Prices
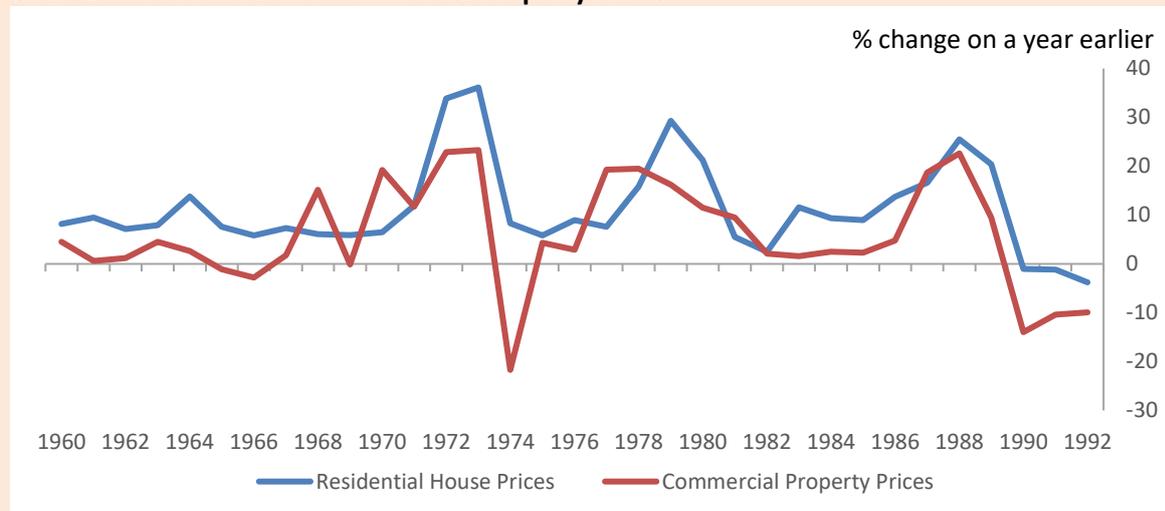
Source: Thomas and Dimsdale (2017).

It was only in late 1972 that monetary policy responded and conditions were tightened fairly drastically. Minimum Lending Rate (MLR), which had replaced Bank Rate as the official monetary policy instrument, went up from 7.5% in November 1972 to 13% in November of the following year (Chart 3.8) but this was barely able to reverse the decline in real rates, which had reached well into negative territory given the rise in inflation expectations that had steadily picked up, following the collapse of Bretton Woods in 1971. This tightening of monetary policy was also complemented with the introduction of the Supplementary Special Deposits Scheme or "Corset" designed to place penalties on the banks (through requiring them to place non-interest bearing deposits at the Bank)

should they expand their deposit liabilities beyond certain limits. This implied a step back from the experiment in deregulation of the banking system introduced by the Bank under CCC. Growth slowed sharply and by November 1973 the economy was in recession. At the same time, the collapse in property prices had led to banking crisis among the fringe or "Secondary" banks. As the Bank noted at the time, "it thus found itself confronted with the imminent collapse of several deposit-taking institutions, and with the clear danger of a rapidly escalating crisis of confidence". The go-stop cycle had barely lasted 18 months and, importantly, the stop phase was well in motion before the sharp rise in oil prices that was about to come.

**Chart 3.7: Nominal and Real GDP growth**
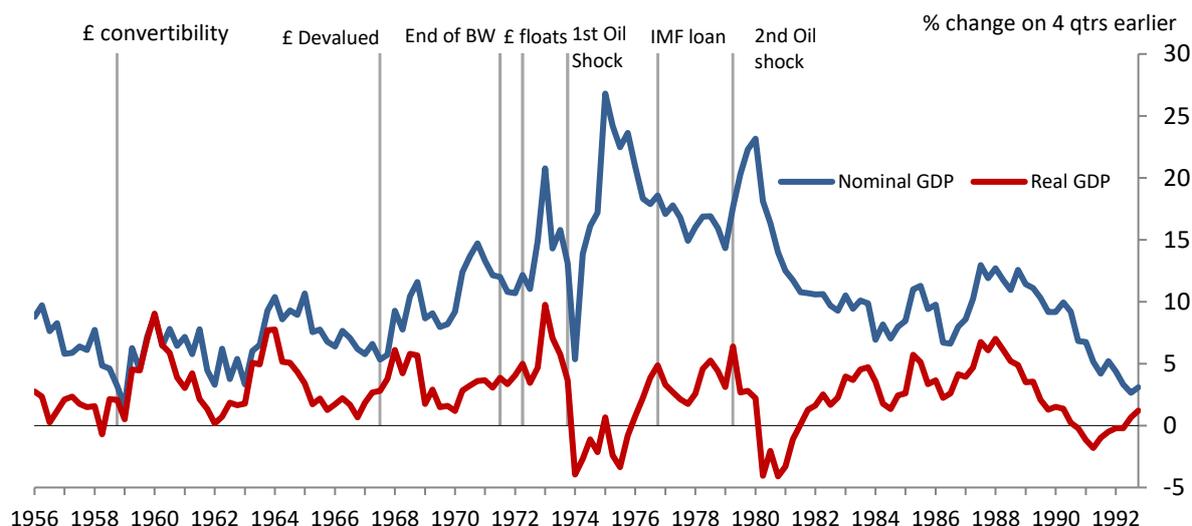
**Chart 3.8 Nominal and real short-term rates: 1961-1992**
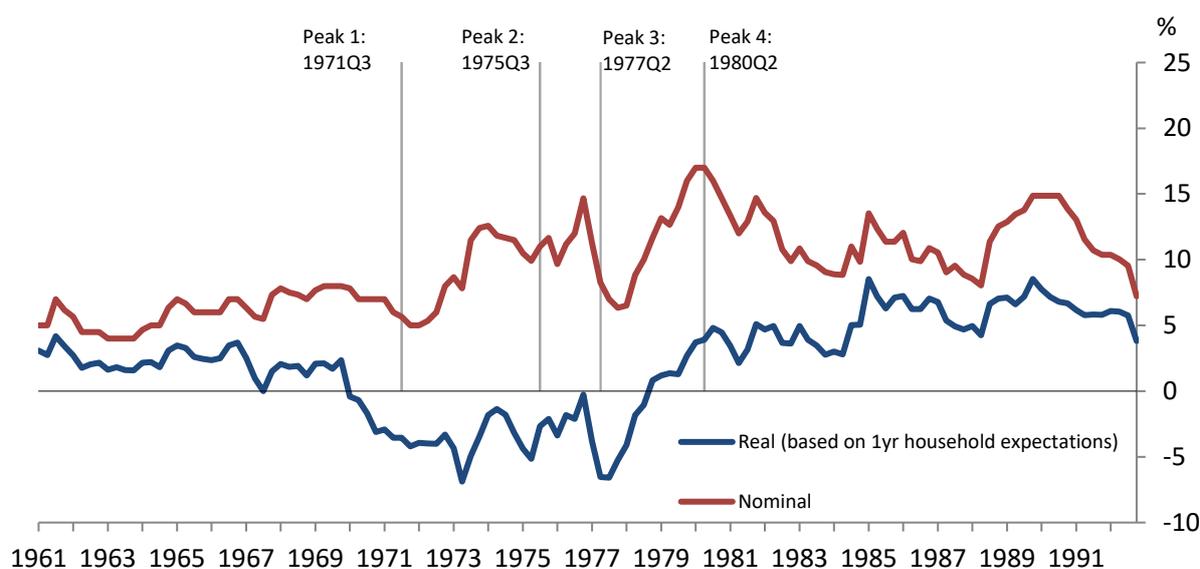
(b)   The first oil price shock and policy "accommodation"

The period from 1973Q4 to the peak in inflation almost two years was probably among the most turbulent in UK economic history. The economy was already in recession following the fall out of the Barber boom, but two events conspired to add a strong inflationary impulse that would imply huge challenges for policy makers.

In October 1973, the Government launched "Stage 3" of its pay policy. The policy was designed to limit wage increases to £2.25 a head or 7% (whichever was greater) but it also contained provisions for extra "threshold payments" which would be triggered once the Retail Price Index (RPI) rose 7% above the level at the start of the policy. This was in effect a gamble that inflationary pressures were on the wane given the tightening of policy and an easing of commodity price inflation. Heath announced this policy on 3rd October. Literally, a fortnight later Arab oil producers would cut oil production by 5% following the start of the Yom Kippur war, prompting a quadrupling in oil prices and ensured the thresholds would be triggered. This was on top of increases in other commodity prices. Overall import price inflation would peak at 50% during 1974 contributing around 10% to inflation if passed through (**Chart 3.9**).

Chart 3.9: Export and import price inflation
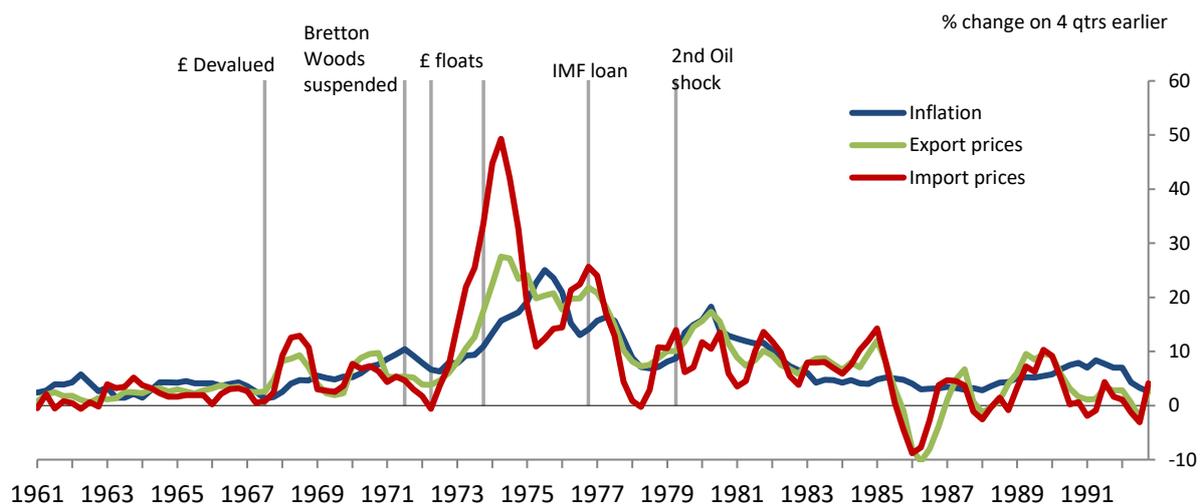
The near simultaneity of these two events would ensure the gamble had backfired almost immediately. The Stage 3 threshold clauses have come to be viewed as one of the most disastrous (albeit unfortunate) economic policy decisions made by a UK government. The threshold agreements covered a third of the workforce and would be triggered 11 times over the next 12 months. Not only would this ensure that real consumption wages would not be able make their required adjustment in the near term to higher energy prices, which would imply weaker profits for firms and, implicitly, a higher short-run natural rate of unemployment. But it would also reduce any lag between prices changes and wage changes (Miller (1976)). This is a matter of some significance because it means real wage resistance during this period had been baked in by policy and was not necessarily endemic in union or worker behaviour.

Things got worse for the government when the miners refused to accept the initial 7% limit on wage increases under stage 3 and went on strike causing the imposition of a state of emergency and a three-day week in January 1974. This caused a large drop in output in 1974Q1 which needs to be borne in mind when interpreting the growth profile over this period. Heath called a general election on the basis of "Who governs Britain ?" which the Conservatives lost and Harold Wilson, unexpectedly, formed a minority Labour government in February 1974.

The new administration placed an increased emphasis on a new incomes policy—the "Social Contract"—as a way of restraining inflation. It was a voluntary agreement with the Trades Union Congress (TUC) where the government agreed to adopt economic policies favoured by the unions in exchange for wage restraint. This would involve policies such as rent controls and subsidies of various kinds such as food. However, they also agreed to honour the threshold payments under the Heath incomes policy and more generally, the guidance under the Social Contract was to broadly maintain living standards. That meant real wage rigidity was further baked into the system under the new voluntary incomes policy. However, the subsidies on food and prices were seen as a means by which the RPI could by kept under some control and would limit threshold payments and settlements more generally. However, this just meant the public finances bore the brunt and linked government spending more closely to underlying inflation.

More generally, the oil price increase presented a major challenge to policy. The UK as an oil importer at this point would necessarily suffer a real income squeeze and it was felt the impact would ultimately be deflationary. It would also have a major impact on the balance of payments and hence would imply pressures on sterling which might add to the inflationary pressure. At the global level, it was feared there would be a downturn as a result of the distribution between oil producers and oil consumers – it was believed that oil producers would have a lower propensity to consume out of income than oil importers. There were also fears by the IMF and OECD that advanced economies would act independently to deflate their economies and, to avoid a 1930s style depression, were arguing for global accommodation.

However, the government had come in with very little plan for how to deal with the economic problems Britain faced. This is well summarised by two Treasury ministers of that government:

The real problem was the fact that we had worked out no short- medium- or long-term economic and financial policies

Joel Barnett, Chief Secretary of the Treasury

There is no comparable example of such intellectual and political incoherence in a party coming into office in the C20th history of the UK

Edmund Dell, Paymaster General

Dennis Healey, the new Chancellor, presented a mildy deflationary budget in March 1974, but with a second election in prospect his mini-budget of July 1974 reversed this and was expansionary, though a VAT cut from 10% to 8% was part of the package intended to trim off around 1% from the RPI and reduce the effect on threshold payments. In his third budget of 1974 Healey turned his

attention to problems emanating in the corporate sector. The social contract had done little to limit wage increases which, together with higher energy prices, were now putting pressure on the production costs of companies who were still subject to the Price Code of the previous Heath government limiting increases in prices. As a result profit margins were being squeezed hugely which is evident in **Chart 3.1**. Reported corporate profits were flattered by stock appreciation, where the increase in the prospective sales prices of previously built up stocks was accounted for as an improvement in profitability. However, underlying profitability was weak. The solution in the budget was to provide tax relief on stock appreciation gains and a relaxation of the Price Code. This would improve the financial surplus of the corporate sector at the expense of the government deficit but would do little in itself to improve the balance of payments.

In summary, through a combination of subsidies on prices and tax relief on inventory appreciation, fiscal policy in 1974 went a long way to accommodate the impact of the energy price increases rather than to try and offset the inflationary impact as other advanced economies such as Japan and Germany (ref Nelson paper). Healey later argued he was following the guidance of the IMF and OECD to support spending. It is noticeable that the only other advanced economy to follow the UK in this was Italy, and both would end up asking for IMF assistance in the following year. And, as noted earlier, both would have markedly poorer inflation performances than other advanced economies over the next few years. The public sector deficit in 1975 would increase to around 6% of GDP mirroring that of the current account deficit.

A prevalent view in officialdom at this time was that taking the strain of the oil price increases on the balance of payments and fiscal deficits, was reasonable, because of the prospective earnings and tax revenues from North Sea Oil that would be coming on stream in the later 1970s. The UK was simply "tunnelling" through until the windfall gain could be achieved. Therefore, those in government saw the burgeoning fiscal deficits as temporary.   Financial markets and, as a result, the Bank saw things differently and very much in the here and now of how such large twin deficits would be financed both internally and externally. As a proxy for inflation expectations in financial markets, Bush (2022) derives a measure of the forward curve shown in **Chart 3.10**. Financial market expectations ratcheted up to over 20% in 1974/5. It would be financial market expectations that would cause the key difficulties in both the gilt and foreign exchange markets over the next two years.

Chart 3.10: Financial market inflation expectations

(b) *Long rates*
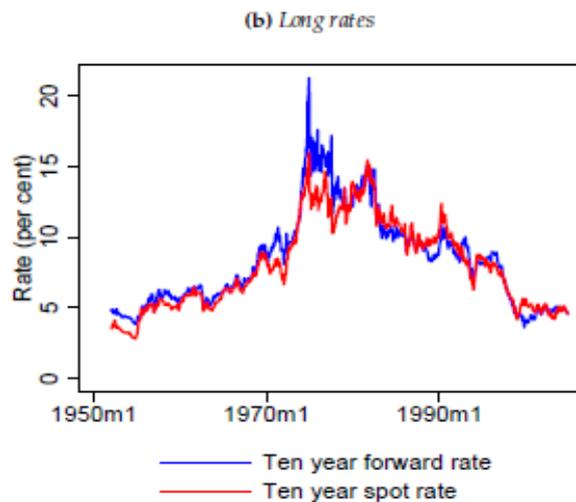
Focus would turn on reducing public expenditure. These factors and tensions were very evident in Healey's March 1975 budget where, although he started grasping the nettle on public expenditure, the cuts were back-end loaded into later years, and in terms of public sector debt, maturities were being structured so that redemptions would take place when oil revenues should be at their greatest during the 1980s (Needham (2014)).

Chart 3.11: Taylor rule adapted from Nelson and Nikolov (2001)
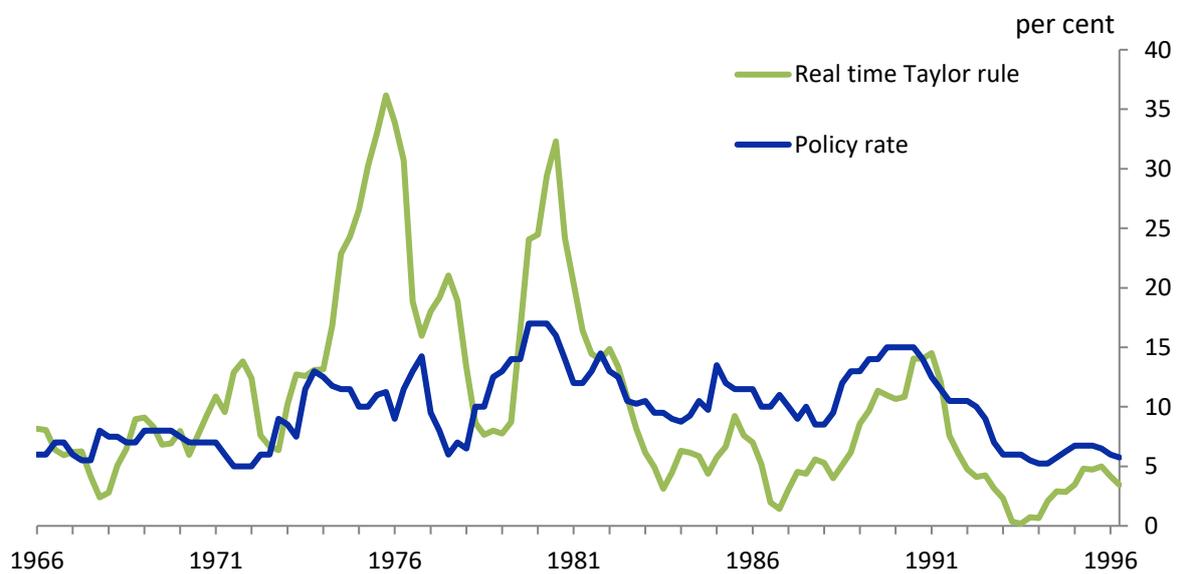
In terms of monetary policy nominal short rates stayed in double digits in 1974 and 1975 but were cut gradually from 13% to 10% by mid-1975 as the recession, which had begun in late 1973, started to bite. In this sense, monetary policy worked to accommodate the energy price change in an attempt to avoid an even worse recession. In terms of countering inflation, the resulting path of policy was way below what a Taylor-rule prescription would have suggested given the inflation and GDP data at the time (see **Chart 3.11**). Of course, such rules conditional on outcomes imply implausibly high short-term rates would have been required to reduce inflation and the argument

is had they been embedded in expectations and understood by agents in the economy, then inflation would have been considerably better.   Indeed, one telling indicator of the government's attitude to the use of interest rates to manage domestic demand is that the government made loans to building societies to prevent them from raising mortgage rates despite the rise in the MLR. For this reason, many argue the high inflation over this period was simply one of monetary policy neglect in the absence of modern theories of how policy should operate. The implication is that inflation could have been lowered by more aggressive monetary policies which, if they had been anticipated and built into expectations, would have worked to nip any spiralling of wage and prices in the bud. However, a crucial part of the interpretation here is the behaviour of inflation expectations in **Chart 3.5.** It appears from household expectations that they remained stable at around 10% and were not de-anchored further by the large increases in wage and price inflation. Therefore, despite accommodative polices, the burst in inflation to a peak of 25% was not persistent or, at least, not de-stabilising and so any wage-price spiral was limited and inflation would begin to fall back towards 10% once energy price and other import price effects had worked their way through and margins were restored (during 1975). However, the underlying double-digit rate of inflation of around 10%, experienced since the start of the 1970s, would persist.

Phase 3: The IMF crisis of 1976 and fiscal consolidation

Inflation fell back sharply following the peak of 1975 as import price inflation subsided and rising unemployment arising from the recession began to pick up. Despite the accommodation of cost pressures in 1975, there was a second recession in mid-1975 around the same time as the peak in inflation which spilled over on to employment with a lag.   In 1976, unemployment picked up and reached 5% (on the modern Labour Force Survey-based measure). By this point, the Labour government decided that priority should be given to controlling inflation, even if this involved a rise in unemployment. It abandoned, at least temporarily, the post-war economic objective of full employment. The need to control inflation was also the view of the main union leaders who collectively came to the conclusion that "we can't go on like this"[8]. They feared another round of wage inflation on this scale would lead to the fall of the government and a much tighter policy and worsen the unemployment problem. Therefore, co-operation between the government and the TUC on macroeconomic and incomes policy under the Social Contract would be a feature of the next few years. The Labour government aimed to achieve an inflation rate of no higher than 10% for RPI inflation and the TUC duly delivered their end of the bargain by controlling settlements in line with Stages 1 and 2 of the social contract (see earlier **Table 2.1**) with wage inflation falling dramatically from 35% to below 10% by 1977.

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[8] Attributed to Len Murray General Secretary of the Trades Union Congress (TUC) at the end of the TUC conference of 1974.

Chart 3.12: Public Sector Net Lending (+) or Borrowing (-)
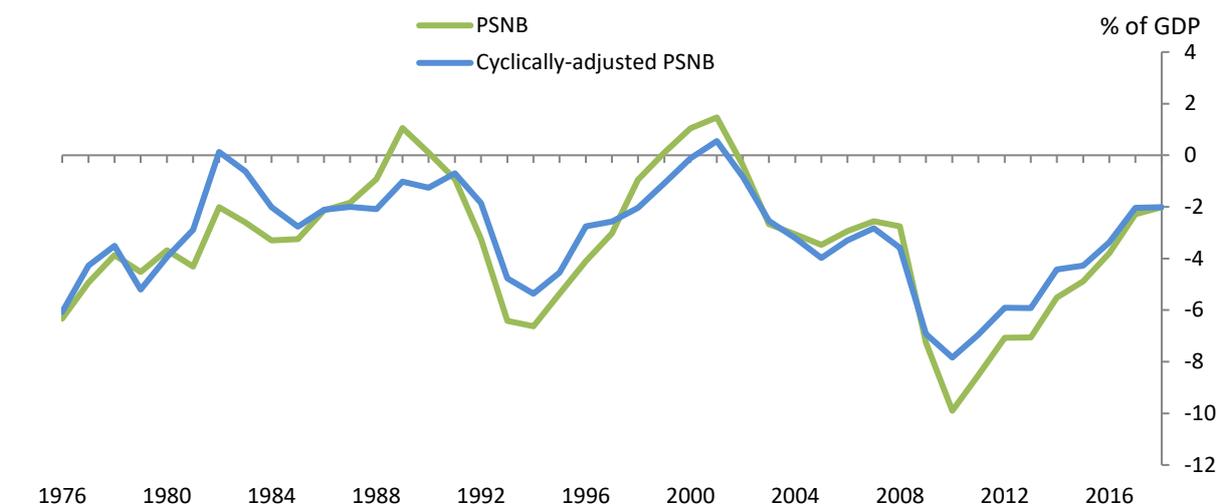
Source: Office for Budget Responsibility

The current account deficit began to improve towards the end of 1975 as world trade and exports recovered and the terms of trade improved as exporters were able to restore margins. But the improvement in the current account did not translate into a stronger pound. There was a sharp decline in sterling as the Sterling-Dollar exchange rate fell from $2.22 in 1975 to $1.80 in 1976. The authorities had viewed a depreciation as helpful to lock in the improvement in the balance of payments and to offset the higher inflation differentials between the UK and other countries. Intervention by the Bank was therefore geared to allow that to happen. However, what was viewed as a botched technical intervention by the Bank in March 1976 led to intense pressure on the pound in part because of fears about an impending funding crisis on account of the high level of the PSBR and fears about renewed monetary growth. Despite the tighter fiscal policy announced in the 1975 budget, public sector borrowing remained obstinately high at around 6% of GDP in 1976 (see Chart 3.9). In June, the government was forced to seek a swap facility with G10 central banks, organised through the Bank for International Settlements (BIS), amounting to $5.3 billion in order to stabilise sterling (Schenk 2010) and led to a July package of future spending cuts which proved highly contentious both within the cabinet and the Labour party. This was not enough to placate the gilt market however. There was a gilts 'strike' in July 1976 with many buyers in the gilt market unwilling to take on additional government debt even at yields in the region of 15% and the government was forced to borrow from the banking system, which implied a positive contribution of the public sector to money growth (see earlier **Chart A.1**).

These developments led to several important underlying initiatives that developed throughout the year that would work to impose monetary discipline and would ultimately bring inflation down. First in the March 1976 budget the Chancellor announced cash limits on fiscal policy, which the government had already been begun planning for as far back as 1975. Previously public spending plans had been based in volume terms and nominal spending would effectively be indexed to inflation in order to achieve that. Now plans would be set in cash terms based on the government's expected outlook for inflation. Alongside that increasing emphasis was placed on (initially unpublished) monetary targets for the broad measure of money £M3 as a disciplining device on policy. As discussed in **Box A**, the credit counterparts approach to the monetary aggregates provided a direct account link between the PSBR and money growth and, together with cash limits,

provided a framework for linking monetary and fiscal policy with the desired inflation outcomes of the authorities.

Matters would come to a head in the second half of the year. The Prime Minister Jim Callaghan[9] gave a well-known speech at the 1976 Labour Party Conference where he effectively announced the end of the post-war consensus with the now famous words "We used to think you could spend your way out of a recession and increase employment by cutting taxes and boosting government spending. I tell you in all candour, that option no longer exists". Milton Friedman later stated he thought this was one of the most important speeches made by any government minister on economic policy[10]. In response to further heavy pressure on sterling and declining reserves, the government was then forced to turn to the IMF for emergency assistance, undertaking further tightening of fiscal policy in exchange for a loan to help repay the previous swap facility from the G10 central banks. Discussions over this both within government and with the IMF were intense. As part of this the government formally adopted targets for broad money (based on the IMF's preferred measure of Domestic Credit Expansion or DCE which was essentially the sum of private and public sector borrowing from the banking system). Monetary and fiscal policies were now co-ordinated in the effort to bring down inflation to below double figures. However, the higher import price inflation following the sharp depreciation of sterling, the effect of the severe drought of 1976 on domestic food prices and a rebuilding of corporate sector margins would mean inflation increasing into 1977 peaking in Q2 at around 17%, given they occurred alongside an accommodating cut in interest rates to under 7% by the end of the year. This is despite the success of the social contract in bringing earnings growth down to single figures.

Phase 4: The Winter of Discontent and the Medium Term Financial Strategy 1978-1983

The period from 1977 appeared to signal a major turnaround. The agreement with the IMF restored confidence in both the gilt and foreign exchange markets. The current account of the balance of payments recovered much more quickly than expected and well before the first proceeds of North Sea oil started to flow in volume in 1978. Indeed the authorities would now have to work hard to lock in the deprecation of 1976 and avoid sterling increasing in a way that would wipe out the recent gains in competitiveness. This upward pressure on the pound allowed the Bank to intervene and "cream off" dollars in order strengthen the official reserve position and this prevented sterling from rising (**Chart 3.13**). But eventually £ was uncapped towards the end of 1977 and sterling would appreciate gradually over the next two years.

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[9] Harold Wilson, the Prime Minister elected in 1974 had resigned earlier in March 1976.
[10] "To Jimmy from James," *Newsweek*, December 6, 1976, p. 45.

Chart 3.13: Official Reserves and $/£ exchange rate
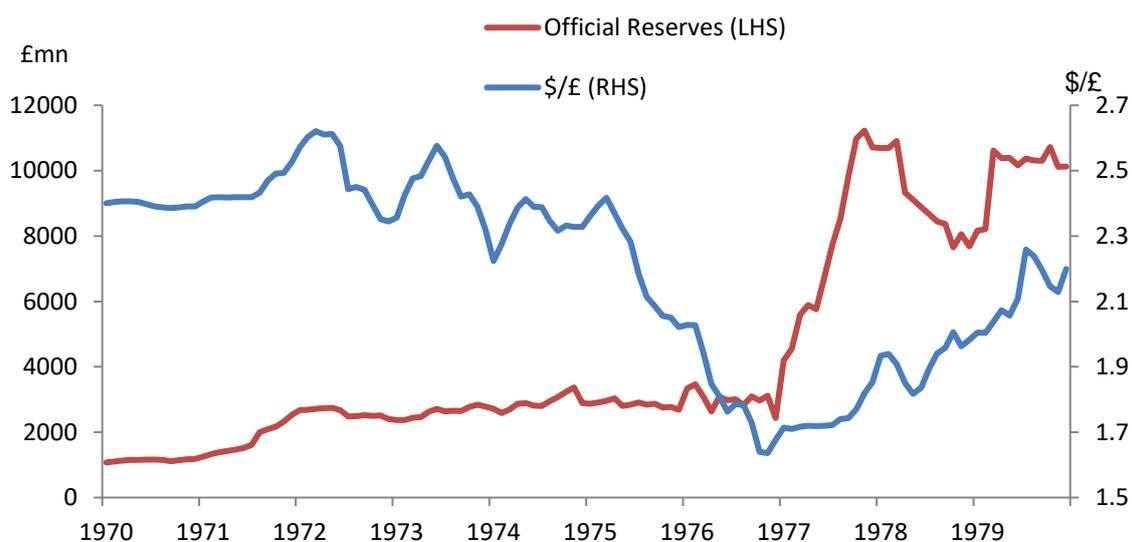
Healey's restrictive fiscal policies continued in the budget of March 1977, but public sector borrowing turned out to be much better than was predicted at the time of the IMF crisis in the previous year. Indeed the turnaround in the public finances had been well underway before negotiations with the Fund had commenced. The problem had been an overly pessimistic forecast of the PSBR by the Treasury. Healey in his autobiography stated

'If I had been given accurate forecasts in 1976, I would never have needed to go to the IMF at all'
(Source: The Time of My Life, Denis Healey)

Indeed the IMF agreement expired on 2 January 1979 with less than half of the loan drawn. The improvement in the public finances allowed Healey some leeway in fiscal policy and he was able to meet his commitments on borrowing and the money supply with some relaxation of fiscal policy after the March 1977 budget with £1bn extra spending in 1977/1978 and around £2.5bn in the following year (Wass (2008)). Whether this fiscal easing was warranted and contributed to the pickup in inflation in 1979 and 1980 is still debated, given there was only a modest fall in unemployment. Growth, however picked up to around 4% in 1978 and the filters shown in earlier suggest a cyclical peak was reached in 1979. The expansion was in part motivated by the prospects of an election in 1978, which Callaghan eventually decided against, and by 1978 the government felt it had retail price inflation under control and into single figures.

These positive developments on retail price inflation, however, were undermined by the breakdown of the Social Contract with the unions. The first three stages of the incomes policy had worked well and wage inflation, as noted earlier, was by 1977 below 10%. Attempts by the government to keep a permanent cap on wage growth, via a suggested 5% limit on pay increases under stage 4 of the policy in 1978, ultimately failed like previous incomes policies. This led to the Winter of Discontent in 1978/9 and a further wage explosion with increases in earnings of well above 10%. The Labour government, which by this time was in a minority in Parliament, fell after a confidence vote and was replaced by Mrs Thatcher's Conservative government following an election in May 1979.

The new government came in with a determination to control inflation once and for all. In fact the incoming government initially introduced two measures that would work to increase prices in the immediate term. They implemented the Clegg Commission recommendations on public sector pay increases, which Callaghan had instituted as part of settling the Winter of Discontent dispute. This would lead to public sector wage inflation increasing to 25% in 1980 (**Chart 2.16**). They also implemented a shift towards indirect taxation away from direct taxation, raising the rate of VAT to 15% and standardising it across many goods and services. This, in itself, the government calculated would add around 4% to the price level. Both factors would be proximate causes of the rise in inflation from below 10% when the government was elected in 1979 to the peak of around 20% in 1980Q2.

The government also came to office at the same time as a second large increase in world oil prices. Unlike 1973 however, the rise in oil prices was now associated with an appreciation of the sterling exchange rate. This reflected the fact that Britain was now a producer rather than net importer of oil. But the stronger exchange rate also reflected more restrictive monetary and fiscal policies. The high level of British interest rates relative to those prevailing internationally led to a sharp appreciation of the exchange rate. Both the growing perception that Britain's balance of payments was underpinned by its role as an oil producer and its high level of interest rates strengthened sterling which appreciated by 15% in 1980 and caused great difficulty for the manufacturing sector. This meant that import price inflation in sterling terms did not pick up nearly as much as in the earlier oil price shock, and so the rise in inflation is not just a story of monetary accommodation of commodity price pressures.

Tight monetary policy represented a major shift in emphasis towards monetary policy and, in particular, money supply targeting by the incoming government as part of its Medium Term Financial Strategy (MTFS). Initially, the Conservative government retained the Labour government's use of one-year monetary targets, and ceased to employ an incomes policy. But, under the MTFS it began to set medium-term intermediate targets for broad money growth (an idea which had begun under Healey), based on the £M3 measure, as the keystone of its counter-inflationary policy. So policy was now geared towards meeting declining targets for money supply growth over a number of years with a firm view of influencing inflation expectations, but in a gradualist way.

Fiscal policy and public sector borrowing were now to be firmly embedded within the MTFS through the credit counterparts approach. So, control of the PSBR and tight fiscal policy was supportive of a tightening of monetary policy, even though the credit counterparts really emphasised that it was the funding of a given PSBR via the banking system (the PSBR less sales of government debt to the non-bank private sector) that contributed to money growth.   Another important funding initiative in 1981 was the introduction of index-linked bonds as a credibility device geared towards lowering the government's incentive to inflate away its debt liabilities through unanticipated.   Fiscal policy and funding policy were now to be an important part of the toolkit to secure a low inflation environment.

What was not anticipated is just how important they would be in securing the new regime. The measure of broad money chosen as the intermediate target, £M3, remained stubbornly resilient (**Chart 3.14**). This was in part due to the suspension of the Supplementary Special Deposits Scheme or Corset in June 1980, following the abolition of exchange controls in 1979. As discussed earlier,

the "Corset" was designed to place penalties on the banks (through requiring them to place non-interest bearing deposits at the Bank) should they expand their deposit liabilities beyond certain limits. The removal of exchange controls made the Corset ineffective since it could now readily be by-passed by offshore intermediation.

Chart 3.14: Broad money growth and inflation
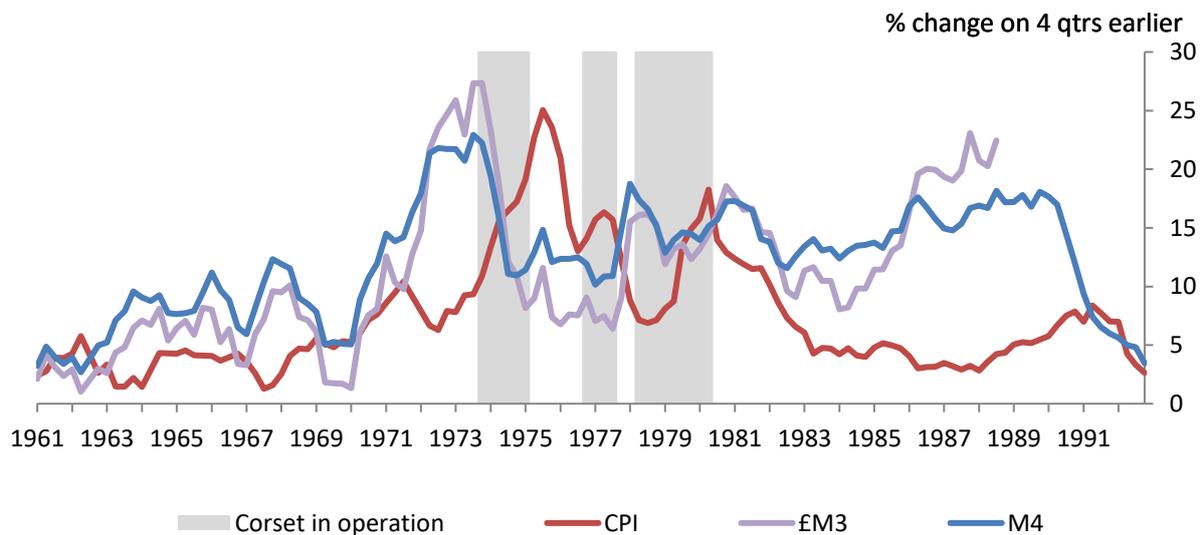
The abolition of the Corset opened the way for a new round of re-intermediation of the traditional banking system which was now able to lend freely and no longer faced a penalty for accumulating excessive interest bearing liabilities. The result was that broad money grew much more rapidly than envisaged in the MTFS even though this was not reflective of loose policy. In addition, banks started to move into the mortgage market providing extra impetus to credit and money growth. The result was that broad money grew more rapidly than envisaged in the MTFS even though this did not really reflect an underlying loose stance of monetary policy. MLR was increased sharply in 1980 as a result of the need to try and meet the £M3 target and the yield on Treasury bills averaged 15.1%, the highest ever recorded pushing real short-term rates up to 5% based on household expectations. Indeed, nominal short rates remained within a range of 10-15% until the mid-1980s in order to restrain credit and money growth. This led to a large recession and rapidly increasing unemployment.

The high level of interest rates and strong appreciation of sterling made the prospect of a further tightening of monetary policy unattractive. So, in the 1981 Budget, the Chancellor Geoffrey Howe decided to tighten fiscal policy despite the severity of the recession with a view to try and retain the credibility of the MTFS through the lens of the credit counterparts relationship between the PSBR and money growth. The PSBR itself remained stubbornly high at around 4% of GDP in part due to the recession. The fiscal tightening in the teeth of a recession prompted an infamous letter by 365 economists in protest. In the Budget, taxes were raised through the non-indexation of allowances.

The impact of monetary and fiscal tightening on the level of activity was severe although real incomes were not squeezed as much under the first oil price shock given there was not a worsening of the terms of trade. Unemployment on a Labour Force Survey basis increased from 5.4% in 1979 to 9.7% in 1981. The recession which followed the second oil price shock was therefore severe and was concentrated in the tradable goods sector. While this was not successful in achieving the stated targets of the MTFS, it had greater success in checking inflation which fell from nearly 20% in 1980 to under 5% in 1983 at the start of Mrs Thatcher's second term.

However, it took a large recession and a decimation of British manufacturing industry to return inflation back to the levels of the mid-1960s. We return to the issue of whether it may have been possible to bring inflation down without a large recession in section 4, but from this point on the period of persistent double-digit inflation, was effectively over.

Epilogue: The abandonment of monetary targeting and the Lawson boom and bust 1983-1992

From 1983 to 1988 the rate of inflation remained relatively stable averaging around 5% within a range of 3-7% on an RPI basis. In effect, it was a return to the period operating in the early 1960s. However, there would be a brief foray of inflation back to double figures in 1990 (in RPI space), after which there would be fall back to rates of 2-3% in RPI and CPI space, consistent with the inflation target brought in 1992[11]. It is worth reviewing this period as it represented an important and final denouement in the fight to achieve a regime of effective price stability.

The failure of monetary targeting based on £M3 became apparent to the authorities very early in the MTFS during 1980 and 1981. There was then considerable debate on how to modify and restore credibility in the MTFS. Many favoured shifting towards using the monetary base or a narrower aggregate such as M1 as they key intermediate target. Indeed, some of Mrs Thatcher's advisers such as Alan Walters, argued for a shift towards monetary base control though this was not implemented for fears it would lead to unnecessary short-term interest rate volatility. Attempts to revise the definition of money used for the monetary target met with only limited success. Overfunding of the PSBR was another device which was used in the mid-1980s to contain the growth of broad money. This implied selling more government debt to the non-bank private sector than required to fund the PSBR, which led to the negative public sector contribution shown in Chart A1. However, this led to a drain in commercial banks' reserves and it required the Bank to intervene by buying bills in the market to maintain its ability to control short-term interest rates. Such was the scale of the required intervention, the Bank soon bought up all the Treasury bills available and switched to commercial bills, ending up with a so-called "commercial bill mountain" and was viewed as a highly distortionary intervention in the money market[12]. It was ultimately abandoned in the late 1980s. The result was what might be called MONTINO (monetary targeting in name only), with a large number of monetary indicators being monitored. Nigel Lawson however claimed that, although the record of achieving monetary targets had been disappointing, it had delivered in terms of inflation.

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[11] This was initially a target of 2.5% specifically for the measure of inflation RPIX which was the RPI excluding mortgage interest payments. From 2003 this was switched to a target of 2% for the Consumer Price Index (CPI).
[12] Allen (2015).

However, he began to turn back to the exchange rate as a possible nominal anchor and began informally shadowing the Deutschemark as a means of importing the low inflation credentials of the Bundesbank but also with a view to joining the European Exchange Rate Mechanism or ERM. This in part was influenced by the Louvre accord of 1987, which was an international effort to stabilise the dollar and international currencies more generally. As sterling began to recover in the mid-1980s, interest rates would be set lower than otherwise to keep the level of the pound at just under a 3DM/£ rate against the Deutschemark, in part a repeat of the experience in 1977. The other complicating factor was the stock market crash, also known as, "Black Monday" in 1987. Fearing a repeat of the Great Depression that followed the Wall Street Crash of 1929, there was a co-ordinated international attempt to loosen policy. A similar response in 2008 would be lauded as an example of policymakers learning the lessons of the Great Depression, but in this case such a loosening proved misconceived as the stock market fall did not lead to or reflect any fall in underlying consumer confidence or aggregate demand. Indeed underlying demand pressures had been building up in the mid-1980s in part due to financial liberalisation.

As noted above, the abolition of the Corset had relaxed restrictive conditions on bank lending through removing restrictions on the growth of interest-bearing deposits. Once banks were free from restrictions on either side of their balance sheets, they could attract funds and expand their loan portfolios. Particularly significant was the decision of banks to enter the mortgage market. Building societies which had previously dominated the market for housing finance took steps to make their activity more commercial and following the Building Societies Act of 1986 were put on a level playing field with the banks. They abandoned their previous practice of rationing mortgages and were now able to access wholesale funding markets and enter the market for unsecured credit. The result was an increased access to unsecured borrowing and the potential for households to withdraw equity from their homes via mortgage borrowing both of which they could use to increase spending.

Starting in 1985 there appears to have been an upsurge of confidence among households, who were now willing to take on large mortgage commitments to finance house purchase and were less constrained in taking out unsecured credit. The personal sector saving ratio declined as households increased their expenditure in part financed by drawing down the equity in their homes. Rising house prices encouraged this process though increasing the value of the collateral households could use to secure home equity loans. A similar degree of optimism increased the commercial and industrial demand for loans. The strong sense of optimism resulted in a house price boom with strong growth in both consumption and investment. Overall domestic demand was the key driver of the recovery during the mid-to-late 1980s.

Despite the emerging boom both monetary and fiscal policies remained relatively loose. Chancellor Lawson made major reductions in income tax in the 1986, 1987 and 1988 budgets, while at the same time reducing public sector borrowing by sales of public sector assets under government privatisations schemes. The expansionary effects of a booming private sector combined with the relaxed stance of economic policy led to renewed inflation and a growth rate of GDP of around 5% per annum that ultimately proved unsustainable. This unsustainable position was not recognised at the time despite a significant current account deficit emerging in the balance of payments. The deficit was viewed as the natural counterpart to improved productivity in the UK and increased foreign direct investment in an increasingly competitive UK economy. This was known as the

"Burns doctrine" named after the permanent secretary Sir Terry Burns. In particular, the government's supply-side reforms were argued to have increased the underlying performance of the economy.   So again this might be viewed as the authorities attempting to "tunnel through" albeit the supply-side foundations for this had not been achieved and the current account was reflecting excess demand pressures.   Similarly, the public sector finances looked sound. The unadjusted public sector borrowing requirement (PSBR) looked comfortable in 1987 and 1988, as tax receipts were boosted by the strong recovery. However, the level activity in 1988–9 was in fact in excess of the potential capacity of the economy. While tax receipts increased and the accounts showed a surplus, the sustainable level of output was well below actual GDP. In other words, although there appeared to be a budget surplus, there was in fact an underlying budget deficit ([Chart 3.12]).

The strength of output growth began to put upward pressure on inflation, which increased to around 8%. There was a tightening of short-term interest rates, in part to rein in demand but also to match European interest rates leading up to Britain's entry into the ERM in October 1990. Following Lawson's resignation in late 1989, due to disagreements with Mrs Thatcher's adviser Alan Walters about the exchange rate policy, John Major became Chancellor and he pushed through full ERM membership in October 1990. Household income gearing (debt service payments as a % of household income) reached unprecedented levels given high interest rates and the build up of debt in the boom. This tightening of monetary policy ultimately led to a significant recession in the early 1990s. The economy which had become accustomed to the ready availability of credit went into sharp reverse and led to a recession starting in 1990Q3. To prevent the decline in activity proceeding too far, there was a large relaxation of fiscal policy. From 1990 to 1993 the cyclically-adjusted public sector deficit increased to 6.3% of GDP. As discussed in Clark and Dilnot (2004) this was a degree of discretionary expansion unmatched at any point in the post-war era except during the mid-1970s but was not fully appreciated at the time.   Part of this reflected tax cuts in advance of the 1992 election. Ultimately pressure soon built up on sterling (which was viewed by many as overvalued as in 1925) and interest rates remained in double digits to defend sterling despite the ongoing recession. In September 1992 the UK was forced to suspend its membership of the ERM when ongoing speculation put enormous pressure on sterling and at one point had forced the government to raise interest rates to 15%.

Following ERM exit, the government and the Bank now had to find a new nominal anchor and fast. This was arguably a last act of "muddling through" at short notice. Various intermediate targets had failed and there was an intellectual shift towards directly targeting the goal of monetary policy –inflation. The RBNZ had moved to inflation targeting in 1989/90 and this was soon adopted by Canada in 1991. This appeared to provide a ready- made solution for the UK and under Bank advice was adopted. The fall in inflation induced by the recession had brought inflation down to under 3% and a target of 2.5% for the RPIX measure of inflation was adopted (later to be 2.0% on a CPI basis). This was not undermined by the fiscal position despite the large deficit emerging in the early 1990s recession. The Chancellor Kenneth Clarke introduced a series of spending cuts and managed to push the primary deficit back towards a positive position, a policy of "prudence" continued by the incoming Labour government in 1997 who had fought the election on the basis of matching Clarke's spending plans. The average inflation rate between 1993 and 2021 averaged 2.0%.

IV   Empirical Evidence on the Causes of the Great Inflation

In this part of the paper we will evaluate some of the underlying hypotheses of what caused the high and variable rates of inflation over this period. We start with a short literature review and then consider some econometric evidence on the causes of the Great Inflation.

(i) Literature on the causes of the Great Inflation.

Bordo and Orphanides (2013) provide a summary of the wide range of explanations for the Great Inflation in the literature on the US. The UK literature is smaller, with academics investigating a subset of the hypotheses put forward for the US. 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 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 inflation (largely driven by commodity price inflation) and the slowdown in productivity growth raised the rate of unemployment consistent with stable inflation (the NAIRU). Miller (1976), as noted earlier, finds that real wage resistance was made worse by the design of incomes policies, which hardened the link between price and wage inflation.

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). Nelson (2005) contains a similar summary, with a very insightful critical stance taken towards most explanations. 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 inconsistency 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 prior to 1970 or would have fallen earlier and faster in the mid-1970s. 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 considerably smaller than in Cloyne and Hurtgen (2016)). Using an estimated theoretical model, 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 using professional forecasters' inflation expectations 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 pickup 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. But 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

It is not clear how this view fits with the work of Goodhart (1989) and Needham (2015) who claim that the Bank of England had already moved towards 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, 2016). 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.

(ii) Empirical evidence

The literature discussed above has used various approaches to analyse the causes of the Great Inflation, typically focusing on one particular cause or hypothesis. In this part of the paper we will look at some additional empirical decompositions and analyses of the data, in order to provide additional insights into the plausibility and quantitative importance of each hypothesis. We first start with a 'monetary' structural VAR (SVAR) model which provides a complete decomposition of the drivers of the Great Inflation using a standard shock identification scheme typically used in an analysis of monetary policy. We augment this with shocks to the banking system to cover Competition and Credit control and other shocks to the financial system. However, we do not explicitly include fiscal, labour market or inflation expectations data in this model. So, we take this decomposition as an initial benchmark, based on a standard "monetary view" of the economy. However, we then use a set of subsidiary models to test the broad conclusions of the SVAR model, where we bring additional fiscal, labour market and inflation expectations data into play.

(a) An SVAR shock decomposition of the Great Inflation

The structural cointegrated VAR approach we undertake here builds on that adopted by McCleay and Thomas (2016) when looking at the Long Expansion period in the 1990s and early 2000s. This framework not only considers the impact of standard macroeconomic and policy shocks such as aggregate demand, aggregate supply and monetary policy but also shocks to the banking system (to capture the effects of Competition and Credit control) and shifts in core or trend inflation. That allows a joint investigation of the impact of all the potential factors affecting inflation during the 1960s, 70s and 80s. The SVAR is estimated over the period 1966Q1-2015Q3 so we can compare the Great Inflation with later periods when expectations were more anchored around an explicit inflation target. A long sample covering various economic cycles also helps identify long-run cointegrating relationships in the data which allows us to distinguish between permanent and temporary shocks as first outlined by King, Plosser, Stock and Watson (1991). But we have avoided including the Brexit referendum (announced in 2015Q4) and Covid pandemic which are likely to affect the estimation of co-integrating vectors given both represent major structural changes occurring right at the end of our sample.

The distinction between permanent and temporary shocks is useful especially for the Great Inflation. For instance, this allows us to distinguish between permanent regime shifts in monetary policy – what today we typically call a core inflation or inflation expectations shock – from a temporary shock to the policy rule which is often what is identified in many structural VAR analysis. The cost of a long sample is that we are estimating over a number of policy regimes and there may be periods of structural change both in terms of the trend behaviour of the economy and in terms of the cyclical relationships between variables. So, this will provide an estimate of how policy has responded *on average* to shocks hitting the economy. This means shocks to the implied monetary policy rule in the model will reflect deviations from the average reaction function, rather than the

reaction that might be estimated in a sub-sample. But that might be useful if we want to identify whether the accommodation of shocks was more or less than under the later regime of inflation targeting.

We estimate a system that includes the standard macroeconomic variables used to identify these shocks namely inflation, real GDP and short-term interest rates. We augment these with measures of money, credit, the rate of return on loans and deposits, plus a number of financial market variables such as long-term bond yields, equity prices and the real exchange rate. That allows us to investigate the role of money and credit and their effect on various asset markets as well as on GDP and inflation. In all we use 10 series to identify the different shocks we would like to uncover. The data we use are as follows:

- Quarterly CPI inflation (π)
- Real GDP (y)
- Short-term policy rate (is) ie Bank Rate/Minimum lending rate.
- Long-term interest rate (il) we use a zero-coupon UK 10 year government bond yield
- Broad money (m4x)
- Bank and building society credit (m4lx)
- The own rate on M4 (id) as a measure of deposit rates
- The corporate bond yield (ib) to proxy the interest rate on borrowing
- Real equity prices (pk) we use the FTSE-all share index deflated by the GDP deflator
- Effective Real effective exchange rate (e)

In the cointegation analysis documented in Appendix 1 we are able to identify 5 cointegrating vectors :

Money demand equation: *m4x - p = 0.5*y – pk + 8*(id - is) + k_1*

Term structure relationship: *is = il + k_2*

Fisher relationship: *is = π + k_3*

Dividend growth model relationship: *pk = y + k_4*

Corporate bond spread: *ib = il + k_3*

where the k terms are constants that pin down equilibrium means in the long run. In summary, there is a long-run demand for real money balances that depends on the spread between deposit rates and long rates and also on output and asset prices (as a proxy for wealth). The short-long rate spread and the real interest rate are stationary around their sample means as is the asset price to GDP ratio suggesting equity prices are proportional to dividends for a given profit share. Corporate bond yields are cointegrated with long-rates suggesting a stationary spread over the sample period.

We then proceed to estimate a cointegrated VAR or VECM model on our vector of 10 variables which we denoted by x. The VECM model is given by:

$$\Delta x_t = d + B\Delta x_{t-1} + \Pi x_{t-1} + e_t$$

where Π can be written as $\Pi = \alpha\beta'$, where β is our *5 x 5* matrix of *5* cointegrating vectors which represent deviations or "disequilibria" in each of the long-run relationships above, and α is an *5 x 5* matrix of response coefficients to those disequilibria.

Once estimated we then invert the VAR to obtain the moving average representation of the model which describes the evolution of the variables in terms of current and past shocks.

$$x_t = x_0 + \mu_t + C(1)\sum_{i=0}^{t-1} e_{t-i} + C^*(L)e_t$$

Unlike the standard non-cointegrated VAR, $C(1) = F$ is a reduced rank matrix (rank = $n - r = 5$), which Engle and Granger (1987) and Engle and Yoo (1991) show can be written as the product of two matrices which are *n* x *n-r* (or equivalently *n* x *k*) matrices related (non-uniquely) to the parameters of the cointegrating vector . The model can then be written as a trend-cycle decomposition of x_t:

$$x_t = x_0 + \mu t + \gamma \tau_t + C^*(L)e_t$$

where there are *n-r* common stochastic trends (CSTs) given by:

$$\tau_t = \theta'\sum_{i=0}^{t-1} e_{t-i}$$

So in general, when there are *r* cointegrating relationships among the *n* variables in x_t, the moving average representation is defined in terms of $k = n-r$ common stochastic trends (made up of cumulated permanent shocks) and *r* temporary shocks. But the reduced-form errors e_t that make up the common trends and temporary shocks cannot be given a structural interpretation without additional restrictions.

The challenge here is then to identify both the 5 permanent shocks or stochastic trends driving the system and the 5 temporary shocks that merely have a cyclical effect on each of the variables. The technicalities of identification are discussed in more detail in Appendix 1. Here we concentrate on outlining the economics of our identification procedure, based on the shocks we wish to identify for this period.

In analysing the Great inflation, we want to distinguish between the standard macroeconomic shocks that are typically analysed in SVAR analysis, but given the prevalence of shocks to the banking system we are also interested in identifying these as well. But we need to allocate these across the both the permanent and temporary shocks. We deal with the standard macroeconomic shocks first:

For the standard macroeconomic shocks – aggregate supply, aggregate demand and monetary policy shocks – we can think of splitting each type into permanent and temporary shocks. For

example, we might think of aggregate supply shocks being split into those that permanently affect the level of output such as TFP shocks or the natural rate of unemployment from those that are typically viewed to have a transitory effect such as cost push or mark-up shocks.

Similarly for monetary policy we might think of the permanent component as the inflation target or nominal anchor that pins down inflation expectations in the economy and distinct from temporary shocks to policy that represent the deviation from some average rule designed to meet that nominal target.

Finally for aggregate demand shocks, we can think of shocks that (in a small open economy) will shift the equilibrium exchange rate (which we showed earlier was non-stationary) such as shocks to world demand or preferences for UK exports, as opposed to shock to domestic demand which would not affect the structural trade balance and should only have a temporary effect on output and other real variables. That gives us six shocks we can try and identify shown in **Table 4.1**.

Table 4.1: Standard macroeconomic shocks

Type of shock	Permanent shocks	Temporary shocks
Aggregate supply	Technology/TFP	Cost push/mark up
Aggregate demand	World demand/preferences	Domestic demand/confidence
Monetary policy	Core inflation	Deviations from rule

Then we identify three shocks that affect the banking sector using the Monte-Klein model of banking to help distinguish these (see Friexas and Rochet (1997) for an exposition). These shocks are listed in Table 4.2 and aim to capture some of the features of Competition and Credit Control and the subsequent use of the Corset to control the growth of the money supply. Two of these shocks are likely to be candidates as permanent shocks. The first of these is a shock to competition that should move loan and deposit rates in opposite directions ie it should lower the cost of intermediation. The switch to Competition and Credit control in 1971 is likely to have led to a permanent impact on the competitiveness of the banking system. The second is a shock to the cost and availability of wholesale funding which was the second feature of Competition and Credit control. Banks were able to access compete for wholesale funding.   This would bid up the cost of wholesale funding and would then lead to banks to price up their deposit rates, under cost-minimisation across funding sources under the Monte-Klein model. So this shock would move loan rates and deposit rates in the same direction relative to the policy rate. The final shock is one to bank risk taking and should only directly affect the spread of loan rates over risk free rates under Monte-Klein, which we noted was stationary. So this would suggest it mainly has a cyclical effect and so we treat this as a temporary shock.

Table 4.2: Shocks arising in the banking system

Type of shock	Permanent and temporary
Cost of intermediation	Permanent effect
Cost and availability of wholesale funding	Permanent effect
Bank risk taking	Temporary effect

The remaining shock we try and identify as a shock to risk premia that originates in the non-bank financial sector. So it affects financial markets such as bond, equity and FX markets but does not initially lead to an expansion of money and credit.

Given these theoretical priors about the permanency of the candidate shocks we set about trying to identify these shocks through a set of restrictions. We decompose the reduced-form residuals of the VECM into a linear combination of structural shocks as shown below:

$$e_t = \Gamma_0 \eta_t \quad \text{and}$$

$$C(L) = \Gamma(L)\Gamma_0^{-1} \quad C(1) = \Gamma(1)\Gamma_0^{-1} \quad \Omega = \Gamma_0^{-1} \Sigma \Gamma_0$$

We need enough restrictions on the shocks to identify the mapping matrix. This is a 10x10 matrix so we need 100 restrictions to identify this matrix. We already have placed 25 restrictions on this matrix by uniquely identifying 5 cointegrating vectors. In the presence of cointegrating relationships, KPSW (1991) and Warne (1991) show that Γ_0 can be partitioned into two matrices = [H J] so that $\Gamma(1)\Gamma_0^{-1}$ = [F 0] which just says that 5 of our shocks will have no long-run effect on the variables in our system. Importantly the cointegrating vectors have placed some restrictions on the long-run impact matrix. For example, our permanent shocks will affect short and long-rates by the same amount in the long run given they are cointegrated in a one-for-one relationship. We can also get n*(n+1)/2 restrictions from assuming the structural shocks are mutually uncorrelated so that Ω is a diagonal matrix. That provides 55 restrictions. That means we need twenty additional restrictions, 10 on the permanent shocks and 10 on the temporary shocks. These can come from imposing restrictions on either the timing, sign or long-run impact of each shock as discussed in the appendix.

For the permanent shocks it seems natural to use long-run identifying restrictions in the spirit of Blanchard and Quah (1989) and King et al (1991). The long-run restrictions applied are as follows:

(i)   Only the core/target/expected inflation shock is allowed to affect inflation in the long-run. So only monetary policy determines the inflation rate in the long run. This implies four zero restrictions on the long-run impact of the other shocks

(ii)   The aggregate demand shock does not have a permanent effect on output even though it has a permanent effect on the real exchange rate.

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(iii)   Aggregate supply and demand shocks are assumed to be neutral for finance. They do not have an impact on the cost of intermediation or the ratio of M4 lending to GDP in the economy. That implies that the aggregate demand shock has no long-run impact on the stock of real lending in the economy given it has no impact on GDP. That delivers 5 restrictions.

(iv)   Finally the funding cost shock is also assumed not to affect the cost of intermediation in the long run as it should push down on both loan and deposit rates relative to safe rates. But unlike the aggregate demand and supply shocks it is allowed to permanently affect the ratio of lending to GDP in the economy.

For the temporary shocks we can either use timing or sign restrictions on the shocks. Sign restrictions have the advantage of avoiding arbitrary timing assumptions. But as found in Canova and de Nicolo (2002) and Barnett and Thomas (2013) they can produce implausibly large contemporaneous effects of demand and monetary policy shocks on GDP and inflation. Here we proceed in two steps. We first apply standard timing restrictions. We then gauge the plausibility of the restrictions by assessing whether the sign and size of the unconstrained responses look plausible given what theory would suggest. The short-run restrictions applied are as follows:

(i)   We assume prices are sticky in response to demand and financial shocks so that only mark-up or cost-push shocks such as VAT have an immediate impact on prices. That provides four restrictions

(ii)   Only aggregate demand and mark-up shocks can have an immediate effect on output (ie within the quarter). That provides three restrictions. Financial market, banking sector and monetary policy shocks only affect output with a lag.

(iii)   Monetary policy shocks have an immediate effect on Bank Rate. But the financial and banking sector shocks are assumed to just affect risk premia and credit spreads in the short-run and not affect risk-free rates immediately. This is based on a Taylor-rule assumption that monetary policy only responds immediately to output and inflation and these shocks only affect inflation and output with a lag.

(iv)   The financial market risk premium shock is assumed to have no immediate effect on money as it originates outside the money creating sector.

Our identifying restrictions on both the permanent and temporary shocks are summarised below.

Permanent shocks: Long-run restrictions **Temporary shocks: Impact restrictions**

$$
\begin{bmatrix} \pi \\ y \\ is \\ il \\ id-is \\ ib-id \\ m4x \\ m4lx \\ pk \\ e \end{bmatrix}
=
\begin{bmatrix}
0 & 0 & * & 0 & 0 \\
= & 0 & * & * & * \\
* & * & * & * & * \\
* & * & * & * & * \\
* & * & * & * & * \\
0 & 0 & * & * & 0 \\
* & * & * & * & * \\
= & 0 & * & * & * \\
* & * & * & * & * \\
* & * & * & * & *
\end{bmatrix}
\begin{bmatrix} \eta_{TFP} \\ \eta_{for} \\ \eta_{nom} \\ \eta_{coi} \\ \eta_{fun} \end{bmatrix}
\qquad
\begin{bmatrix} \pi \\ y \\ is \\ il \\ id-is \\ ib-id \\ m4x \\ m4lx \\ pk \\ e \end{bmatrix}
=
\begin{bmatrix}
0 & 0 & 0 & 0 & * \\
* & 0 & 0 & 0 & * \\
* & * & 0 & 0 & * \\
* & * & * & * & * \\
* & * & * & * & * \\
* & * & * & * & * \\
* & * & * & 0 & * \\
* & * & * & * & * \\
* & * & * & * & * \\
* & * & * & * & *
\end{bmatrix}
\begin{bmatrix} \eta_{AD} \\ \eta_{Pol} \\ \eta_{brisk} \\ \eta_{Prem} \\ \eta_{mu} \end{bmatrix}
$$

Permanent shocks: **Temporary shocks:**

η_{TFP} = neutral aggregate supply shock η_{AD}= aggregate demand shock

η_{for} = overseas demand / preference shock η_{Pol} = monetary policy shock

η_{nom}= core/target inflation shock η_{brisk} = Bank risk taking shock

η_{coi} = cost of intermediation shock η_{prem} = Risk premia shock

η_{fun} = wholesale funding shock η_{mu} = Mark up/cost push

We then use the identified model to provide a historical decomposition[13] of inflation to analyse the importance of different shocks over the long expansion period and to see what light it sheds on the candidate explanations outlined in the earlier section. The advantage of having a long sample back to the 1960s is that we can also compare the Great Inflation period with later episodes. The full decomposition is shown in **Chart 4.1**. To get an overview we group together the aggregate demand and supply/cost-push shocks together.

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[13] A historical decomposition involves running a sequence of dynamic forecasts starting at a particular point in time. The first forecast is a base projection that takes the value of each variable at the start of the decomposition (reflecting the impact of shocks that have occurred before the start point) and maps out how each variable would return to its trend path in the absence of further shocks. Given this base projection, the path of each structural shock is then sequentially fed into to the SVAR until the resulting forecast is equivalent to the observed data. The marginal impact of each shock is then recorded to produce the historical decomposition.

Chart 4.1: The historical decomposition of the Great Inflation period

Legend: Core inflation · Monetary policy · Aggregate Supply · Cost push · Aggregate demand · Cost of Intermediation · Wholesale funding · Bank risk taking · Data — percentage chg on a year ago

Regime labels: Bretton Woods post-devaluation · Floating · Proto-MTFS · MTFS · Louvre Accord/Shadowing DM · ERM

X-axis: 1967Q1, 1970Q1, 1973Q1, 1976Q1, 1979Q1, 1982Q1, 1985Q1, 1988Q1, 1991Q1

Y-axis: -10 to 30
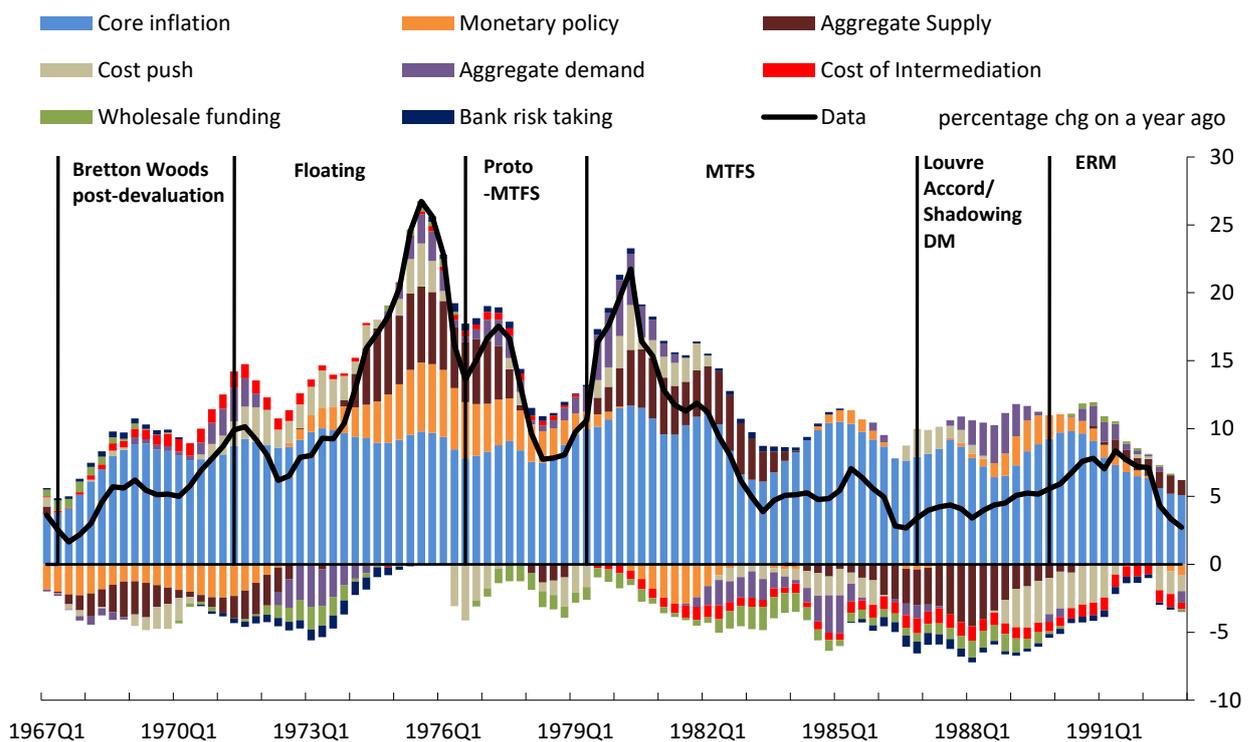
The decomposition suggests that the 1st peak in inflation in 1971Q3 was largely the result of a rise in "core" inflation following the devaluation of 1967. This mirrors the household inflation expectations data despite not using that data in the SVAR. Indeed the contribution of the core inflation shock stays relatively stable until 1977 again mirroring what we saw with the expectations data, in that they do not appear to have moved very much during peaks 2 and 3 in the mid-1970s. There is little evidence, at least under this identification scheme, of spiralling or unstable inflation expectations. The core inflation contribution also falls in the early 1980s. So the SVAR results would very much corroborate what we saw with the household inflation expectations data. The expectations do not appear particularly adaptive and would appear to shift more discretely at times of major regime change.

The next two peaks are largely explained by a combination of cost-push shocks, permanent aggregate supply shocks and temporary monetary policy shocks. This combination would appear to support to the "over accommodation" hypothesis. Shocks to commodity prices and wage pressure would have contributed to the pick up in inflation under the average policy response. But the response at the time appears to have led to considerably higher inflation either because of the implicit rule on place or misjudging the movements in demand relative to potential supply at the time. In the absence of temporary policy shocks inflation would have been 3-5pps lower during the mid-1970s. Notably in 1980 there is less evidence of over-accommodation suggesting the response of monetary policy of the Thatcher government was at least in line with the average of the sample.

The SVAR, as identified here would suggest at best a delayed impact of demand shocks. These would include fiscal shocks on inflation but we do not explicitly identify them here. They added froth to an inflationary situation and, if reflective of known fiscal expansions, with a considerable lag of two years. These contributions are of course based the average response of monetary policy

across regimes. The lack of that average monetary policy response to shocks that appears to have caused the problem and so this reinforces the idea of accommodation.

Shocks to the banking system do have some contribution to make but do not appear as key drivers of inflation over this period and so would not support a monetarist argument that the second peak of inflation in 1975 was the result of Competition and Credit Control. Indeed the impulse responses suggest that wholesale funding shocks actually have supply-side benefits that push down on inflation as suggested in **Chart 4.1**.

These SVAR estimates provided some support for the over-accommodation hypothesis. But the stability of core inflation, like the stability of the household expectations data, is perhaps less in line with the existing literature which would suggest they should be reacting to the high wage and price outturns. They also do not support a simple monetarist interpretation of the high inflation in the mid-1970s suggesting the role of money is more subtly linked to the policy framework. So in the next few sections we examine some of these questions in more detail

(b) Evaluating the over-accommodation hypothesis – Unemployment and the NAIRU

To evaluate the over-accommodation hypothesis and associated wage-price spiral hypothesis we need to look more closely at wage inflation and inflation expectations which were not included in the variable set of the SVAR. The SVAR suggested some degree of over-accommodation of the energy price shocks in the 1970s, but that did not lead to a shift in core inflation or inflation expectations, although it may have reinforced an inflationary bias that was already present

We first consider movements in the natural rate of unemployment and the extent to which they have been under-estimated. The Barber boom was initiated on the basis that rising unemployment was opening up a level of spare capacity that justified a growth rate of 5%. Traditionally the NAIRU has been estimated using wage and price equations with structural variables such as the replacement ratio or union density added to the model to pick up movements in the natural rate. Movements in real import prices or direct measures of the wedge between consumer prices and the value added deflator capture the potential impact of real wage resistance. However, often those structural variables do not consistently appear significant in wage equations in long samples suggesting they may be imperfect proxies. An alternative method is to assume the natural rate is an unobserved component and back out an estimate from that would be required to explain earnings growth in a wage Phillips curve. This is the approach of Gordon (1997) who uses a Kalman-filter approach and which we replicate for the UK below from 1955 for the wage Phillips curve in **Chart 4.2**.[14] We introduce a dummy for periods when incomes policies were in operation as well as allow for the impact of temporary productivity shocks. The impact of the incomes policy is shown in the Chart.

[14] Based on Greenslade et al (2003).

Chart 4.2 Kalman filter estimates of the NAIRU
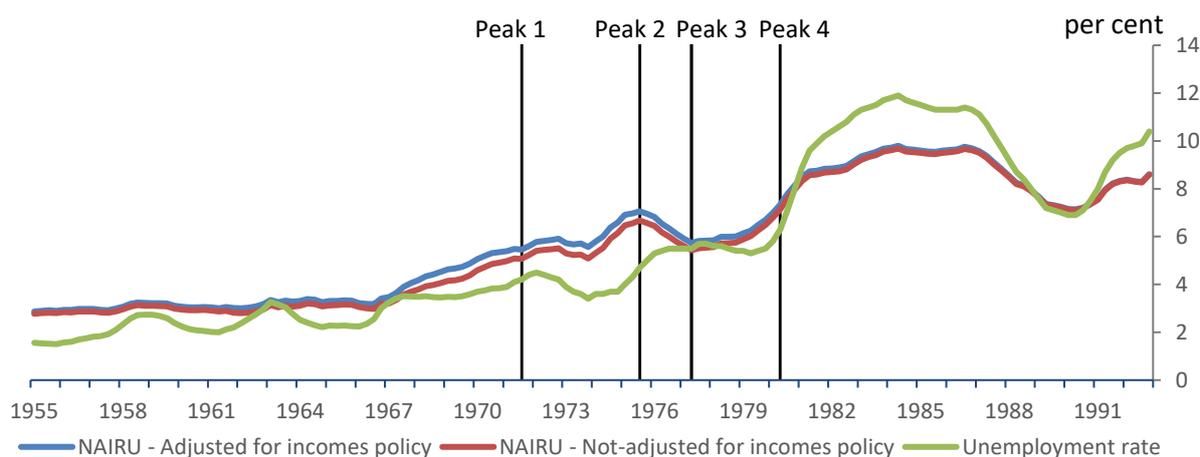
The estimates suggest that for most of the period from the mid-1950s unemployment was below the estimated natural rate. The go-stop cycle of the 1950s and early 1960s is clear when the natural rate was estimated to be fairly low at less than 3% but still above what contemporaries would have called full employment. It is from the late 1960s that estimates of the NAIRU tend to increase markedly and the efforts of the Heath government to bring unemployment back to 1950s and 1960s levels are quite apparent from this chart. A further rise in the natural rate occurs following the oil price shock and the implementation of Stage 3 of the incomes policy. It is only by 1977 that the unemployment gap is closed and inflation subsequently falls back. The expansion of fiscal policy in 1978/9 may have held inflation below a further rise in the natural rate. The 1980s then saw a prolonged period when unemployment was well above the natural rate which paved the way for the fall in inflation over that period.

An alternative metric to look at a relevant measure of the real product wage relative to trend productivity – the so-called real wage gap suggested by Bruno and Sachs (1985). Periods when real product wage growth is in excess of trend productivity in the marketed sector of the economy will typically be a signal of a rising natural rate of unemployment. **Chart 4.3** shows an estimate based on non-oil market sector real product wages relative to trend productivity where the trend is based again on an unobserved components estimate derived from the Kalman filter. By focusing on non-oil market sector measures rather than the GDP deflator and whole economy estimates of productivity, ensures the estimates are not distorted by the effect of government output, housing and (from 1976) oil production. This is broadly supportive of the story in **Chart 4.2**. From 1968 to mid-1975 real product wages including employers' national insurance and pension contributions rise 10% relative to trend productivity during the period when import and other commodity prices are increasing. Post-tax real consumption wages, which had been drifting down relative to trend productivity since the war (warranted in part by the two devaluations of sterling) stabilised over this period reflecting the incomes policy and other pressures to resist declines in real wages. But the rise in the natural rate of unemployment in the early 1980s suggested by **Chart 4.2** is not obviously apparent in the real wage gap estimates.

Chart 4.3: Real wages relative to trend labour productivity - market sector excluding oil and gas and housing
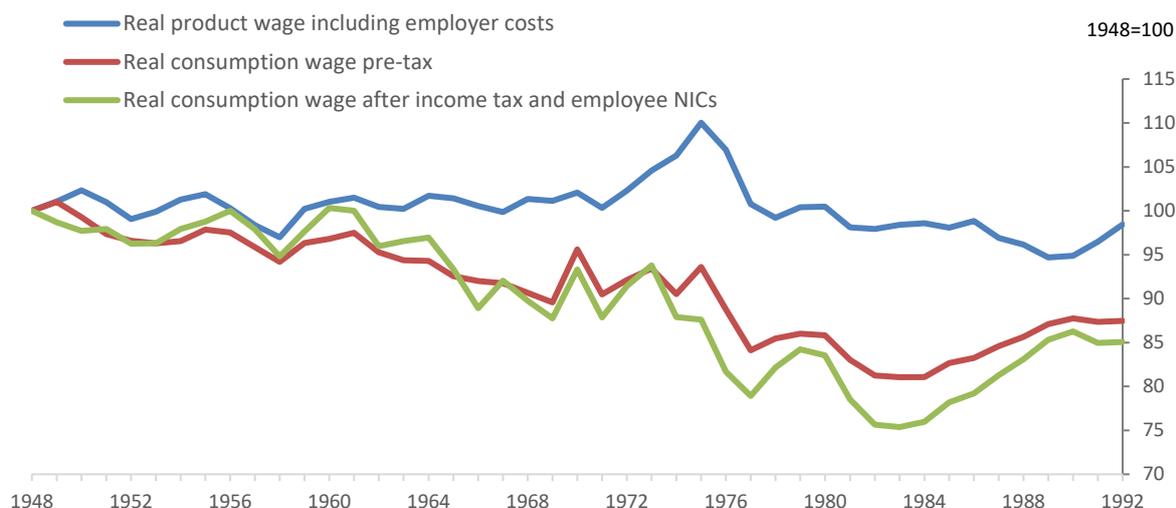
(c) Household Inflation expectations and the wage-price spiral

While unemployment may have been below the NAIRU, the SVAR estimates suggested this had little impact on core inflation or inflation expectations. This estimate did not take into account the information in wage inflation or the household inflation expectations data derived from the Gallup Surveys. So we crosscheck this result by estimating a simple three equation cointegrated VAR in price inflation, unit wage cost inflation (earnings growth adjusted for productivity) and the household inflation expectations data. We test whether there are feedbacks between the three variables taking into account any cointegrating relationships between the data. We find that there are two cointegrating relationships [15] which can be identified as wage and price inflation each cointegrating with inflation expectations with a unit coefficient. So these two terms represent "surprises" in inflation. When we estimate the resulting cointegrated VAR or VECM we find that lags of price inflation and unit wage cost inflation are significant in the equations for both variables, suggesting some wage-price interactions in the data. We also find that the surprise terms (deviations of lagged wage cost growth and inflation from inflation expectations) also affect the price and unit wage cost equations. However, none of these lagged terms feedback into inflation expectations. In other words, if there is a surprise movement in wages or prices these do not positively increase inflation expectations in a future period. Both wages and prices revert over time to household inflation expectations. So there is no Granger causality of any kind confirmed by an Likelihood ratio-test based on the exclusion of the lagged variables (**Table 4.3**). As a result, household inflation expectations appear both weakly and strongly exogenous for unit wage costs and inflation as defined by Banerjee et al (1993). This suggests that household expectations are not adaptive, a conclusion which appears to confirm the SVAR results.

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[15] All three variables are integrated of order 1 over this period.

Table 4.1 Testing the strong exogeneity of inflation expectations

```
MOD(16) Estimating the model by FIML
        The dataset is: N:\DIV1\MTM TEAM (NEW)\RA work\Data\Long run dataset\Bordo, Bush and Thomas\BBT Wage price spiral.i
        The estimation sample is: 1965(1) - 1992(4)

Equation for: DULCinfa
               Coefficient  Std.Error  t-value  t-prob
DULCinfa_1        0.385059    0.09367     4.11   0.0001
DCPIinfa_1        0.0266873   0.1664      0.160  0.8729
DINFE1_1          0.0815271   0.2654      0.307  0.7594
DULCinfa_2        0.184864    0.1033      1.79   0.0765
DCPIinfa_2        0.0406833   0.1656      0.246  0.8065
DINFE1_2          0.234415    0.2650      0.884  0.3786
DULCinfa_3        0.219382    0.1010      2.17   0.0322
DCPIinfa_3        0.453464    0.1576      2.88   0.0049
DINFE1_3         -0.772211    0.2579     -2.99   0.0035
CIa_1            -0.255957    0.06752    -3.79   0.0003
CIb_1            -0.320510    0.09730    -3.29   0.0014
Constant    U     0.168764    0.1779      0.949  0.3450

sigma = 1.73219

Equation for: DCPIinfa
               Coefficient  Std.Error  t-value  t-prob
DULCinfa_1       -0.0889547   0.05493    -1.62   0.1085
DCPIinfa_1        0.387468    0.09757     3.97   0.0001
DINFE1_1         -0.0372245   0.1556     -0.239  0.8115
DULCinfa_2        0.0347372   0.06056     0.574  0.5675
DCPIinfa_2        0.0478453   0.09712     0.493  0.6233
DINFE1_2          0.135769    0.1554      0.874  0.3845
DULCinfa_3       -0.00834872  0.05923    -0.141  0.8882
DCPIinfa_3       -0.0352553   0.09242    -0.381  0.7036
DINFE1_3          0.0514761   0.1513      0.340  0.7343
CIa_1             0.134801    0.03959     3.40   0.0010
CIb_1            -0.245833    0.05706    -4.31   0.0000
Constant    U    -0.165371    0.1043     -1.59   0.1160

sigma = 1.01576

Equation for: DINFE1
               Coefficient  Std.Error  t-value  t-prob
DULCinfa_1       -0.0512489   0.03963    -1.29   0.1990
DCPIinfa_1        0.0549682   0.07040     0.781  0.4368
DINFE1_1          0.193930    0.1123      1.73   0.0873
DULCinfa_2       -0.0203528   0.04370    -0.466  0.6424
DCPIinfa_2       -0.0369081   0.07007    -0.527  0.5996
DINFE1_2          0.0750428   0.1121      0.669  0.5049
DULCinfa_3       -0.0181105   0.04274    -0.424  0.6726
DCPIinfa_3        0.0188628   0.06668     0.283  0.7779
DINFE1_3         -0.144808    0.1091     -1.33   0.1876
CIa_1             0.0436086   0.02857     1.53   0.1301
CIb_1            -0.0726972   0.04117    -1.77   0.0805
Constant    U    -0.0477660   0.07526    -0.635  0.5271

sigma = 0.732913

log-likelihood   -475.357482  -T/2log|Omega|    1.40586513
no. of observations       112  no. of parameters       36
```

LR test of over-identifying restrictions: Chi^2(8) = 7.1904 [0.5162]

(d) Inflation expectations, regime shifts and inflation bias

If inflation expectations were not responding systematically to actual wage and inflation outturns then what were they responding to ? One idea mooted in the narrative section is that household expectations are based on simple heuristics such as a random walk or martingale that shift with larger perceived regime shifts in the inflationary environment. To identify the periods of these shifts this we use two very simple approaches. First, a very simple Markov Switching Regression on the inflation expectations series based on Hamilton (1989)'s original approach assuming three states for the constant term which are interpreted as three different regimes for inflation (a high, a

low and a medium regime).   Second, a simple long-run co-integrating regression (Engle and Granger (1987)) with shift dummies in periods identified as those associated potential regime shifts, specifically 1967Q3 (Devaluation), 1971Q3 (Bretton Woods), 1976Q4 (Callaghan speech and cash limits), 1981Q1 (Howe budget).   After conditioning on the dummies, the residual of the regression is tested for stationarity using an Augmented Dickey-Fuller test. The results are shown in **Chart 4.4** and **Chart 4.5, Tables 4.2** and **4.3.** Additional diagnostics are shown in the online Appendix IV.

The Markov switching results based on three regimes in Table 4.2 suggest mean inflation rates of around 3%, 7% and 13%. The estimated shifts appear correlated with shifts in institutional framework, such as the devaluation of sterling in 1967 and the collapse in Bretton Woods followed by the floatation of sterling in 1971/1972. But, they are also arguably marked by a change in the fiscal regime from the austerity of the late 1960s back to a more expansionist dash for growth in 1972. The shift dummy results are similar. An additional hypothesised shift down in expectations in 1976Q4, following the Callaghan speech and the establishment of cash limits for public spending, is also significant.   A unit root test on the residual of the shift-dummy regression suggests the residual is stationary.

The data suggests there were then two structural shifts down in household inflation expectations in the late 1970s and subsequently in the early 1980s. The major shifts down in expectations again appear correlated with major changes in the fiscal policy framework with the introduction of cash limits, the benefits of North Sea oil revenues, together with the abandonment of fiscal stabilisation policy and its subordination to monetary policy in the early 1980s. So it appears consistent with Sargent's view that moderate inflations are typically brought to an end with at least some changes in fiscal policy regime.

Chart 4.4 Markov-switching regression of inflation expectations (3 regimes)
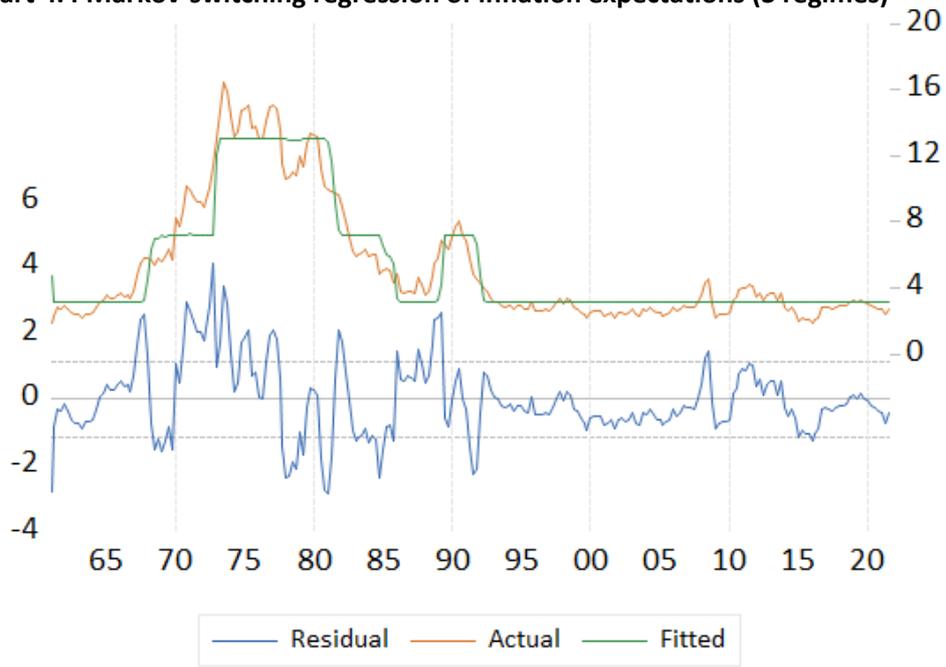
Chart 4.5: Simple shift dummy regression
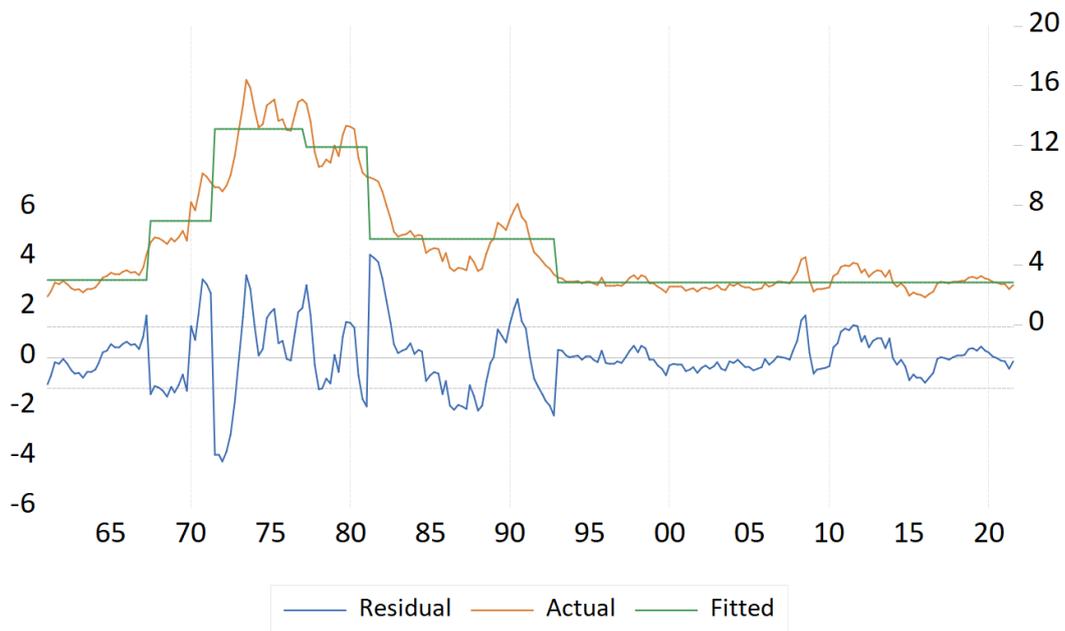
Table 4.2: Markov Switching Estimates of mean inflation rates

Dependent Variable: INFE
Method: Markov Switching Regression (Newton-Raphson / Marquardt
  steps)
Date: 01/26/22 Time: 16:42
Sample (adjusted): 1961Q1 2021Q3
Included observations: 243 after adjustments
Number of states: 3
Initial probabilities obtained from ergodic solution
Standard errors & covariance computed using observed Hessian
Random search: 25 starting values with 10 iterations using 1 standard
  deviation (rng=kn, seed=192973384)
Convergence achieved after 46 iterations

Variable	Coefficient	Std. Error	z-Statistic	Prob.
	Regime 1 – Low inflation			
C	**3.050817**	0.093332	32.68793	0.0000
	Regime 2 – Medium inflation			
C	**7.266886**	0.210643	34.49861	0.0000
	Regime 3 – High inflation			
C	**13.17898**	0.222658	59.18926	0.0000
	Common			
LOG(SIGMA)	0.103468	0.047190	2.192556	0.0283
	Transition Matrix Parameters			
P11-C	17.27471	488.5967	0.035356	0.9718
P12-C	12.75811	488.5973	0.026112	0.9792
P21-C	0.917866	1.200224	0.764746	0.4444
P22-C	3.901970	1.043499	3.739315	0.0002
P31-C	-22.21717	10589.10	-0.002098	0.9983
P32-C	-3.371663	0.961330	-3.507290	0.0005
Mean dependent var	5.254263	S.D. dependent var		3.720485
S.E. of regression	1.153108	Sum squared resid		317.7880
Durbin-Watson stat	0.377619	Log likelihood		-392.6483
Akaike info criterion	3.313978	Schwarz criterion		3.457725
Hannan-Quinn criter.	3.371878			

Table 4.3: Simple shift-dummy regression and unit root rest

Dependent Variable: INFE
Method: Least Squares
Date: 05/16/22   Time: 12:24
Sample (adjusted): 1961Q1 2021Q3
Included observations: 243 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.984385	0.245170	12.17271	0.0000
DUM67Q3	3.992490	0.397221	10.05106	0.0000
DUM71Q3	6.124473	0.406970	15.04895	0.0000
DUM76Q4	-1.218660	0.406970	-2.994471	0.0030
DUM81Q1	-6.157411	0.361839	-17.01698	0.0000
DUM93Q1	-2.881624	0.216428	-13.31446	0.0000

R-squared	0.889429	Mean dependent var	5.254263
Adjusted R-squared	0.887096	S.D. dependent var	3.720485
S.E. of regression	1.250127	Akaike info criterion	3.308749
Sum squared resid	370.3878	Schwarz criterion	3.394997
Log likelihood	-396.0130	Hannan-Quinn criter.	3.343489
F-statistic	381.2828	Durbin-Watson stat	0.467180
Prob(F-statistic)	0.000000		

Null Hypothesis: RESID_INFE has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=14)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.367325	0.0000
Test critical values:	1% level	-3.457515	
	5% level	-2.873390	
	10% level	-2.573160	

*MacKinnon (1996) one-sided p-values.

As a further test if we add the shift dummies from **Table 4.3** to the unit wage cost and inflation equations in the VAR in section (d) we find they are not significant. Thus suggests that inflation expectations are actually "super exogenous" for wage and price inflation (Hendry and Massman (2007)) and that all three variables "co-break" with the regime shifts in inflation expectations. Clearly these are very simple univariate regressions based on derived measures of short-run household expectations and further work would be required to make this result robust. But, they are suggestive of a heuristic basis for household expectations which are influenced by regime shifts that would have been highly visible to the general public.

(e) Evaluating the monetarist explanation of inflation

The 1970s is often viewed by British monetarists as the supreme example of why inflation, with a long and variable lag, is fundamentally linked to money growth. The pick up in broad money growth between the end of 1971 and mid-1973 almost exactly mirrors the pick up in inflation from end of 1973 to mid-1975 (**Chart 3.14**). In terms of money velocity there is a noticeable V in this period reflecting the lags between money growth and spending (**Chart 4.6**). As Allen (1983) notes, this is in fact a unique period where the Friedman-Schwartz prediction of long and variable lags is most stark. Nothing like this is evident at any other point in UK monetary history going back to the mid C19th. That in part is likely to be the existence of a fixed exchange rate regime for most of the period back to 1821 where domestic money growth might be expected to lag world prices, driven by balance of payments flows, as in the classic price-specie-flow mechanism. The sudden switch to a floating exchange rate regime coupled with a regime shift Competition and Credit Control is therefore argued to be one of the few quasi-natural experiments we have on the monetarist hypothesis. The implication is that had money growth been controlled in the early 1970s the energy price and other cost pressures on inflation would have been offset by falls in the inflation rate of other prices (non-energy intensive goods), with the overall inflation rate relatively stable.

Chart 4.6: Velocity of Broad Money
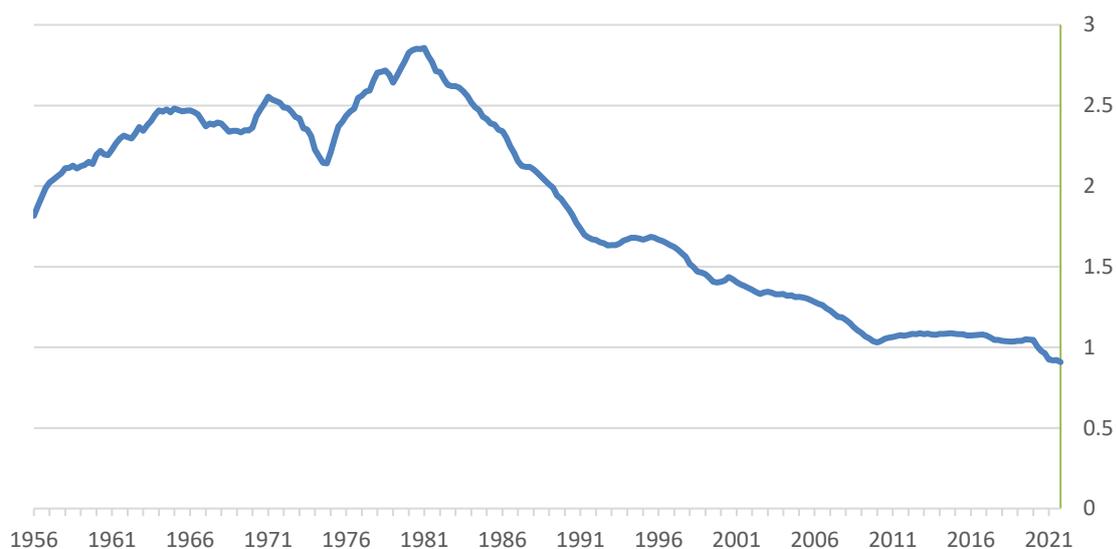
However, a closer analysis of the period suggests a number of problems with this hypothesis. A key driver of money growth was Competition and Credit Control in 1971 and this initially induced a rise in both the supply and demand for money. It led to increased competition for borrowers and re-intermediation of the traditional banking system, which led primarily to changes in relative rates of return rather than nominal spending. As Goodhart (2015) shows, when banks expanded their lending they bid up wholesale deposit rates, so it was the rate of return on money that moved initially to equate demand with supply, not lower yields on other assets or higher nominal spending. Indeed relative rates moved in a perverse way where wholesale deposit rates rose above some corporate borrowing rates allowing some customers to borrow and re-deposit with the banking system at a profit ("round tripping"). On this argument there were arguably no "excess"

money holdings in the immediate aftermath of the introduction of CCC. This is suggested by the SVAR results which showed that the three banking sector shocks only make small contributions to the pick up in inflation.

So how in principle could the money created by CCC, initially willingly held, lead to higher nominal spending some eighteen months later, especially given by this stage monetary policy had tightened, money growth was slowing and the Corset was in place. Part of the answer may be that the money holdings built up by the corporate sector might have been used to absorb the pressure on cashflow and corporate profitability as energy prices and wages costs picked up in 1974. In other words, those holdings were used as a buffer stock to absorb increases in costs. In this sense the money created by CCC was used to accommodate higher energy prices and wage inflation in 1974 and 1975, through companies drawing down their money holdings, with money passing to the household sector in the form of higher wages who would then spend their higher incomes. This shift in money holdings could explain the increase in aggregate velocity in 1975/6, and is consistent with the pattern of sectoral money holdings in **Chart 4.7** which shows corporate money holdings falling by nearly 10% in 1974.

Chart 4.7: Corporate and Household Money Holdings
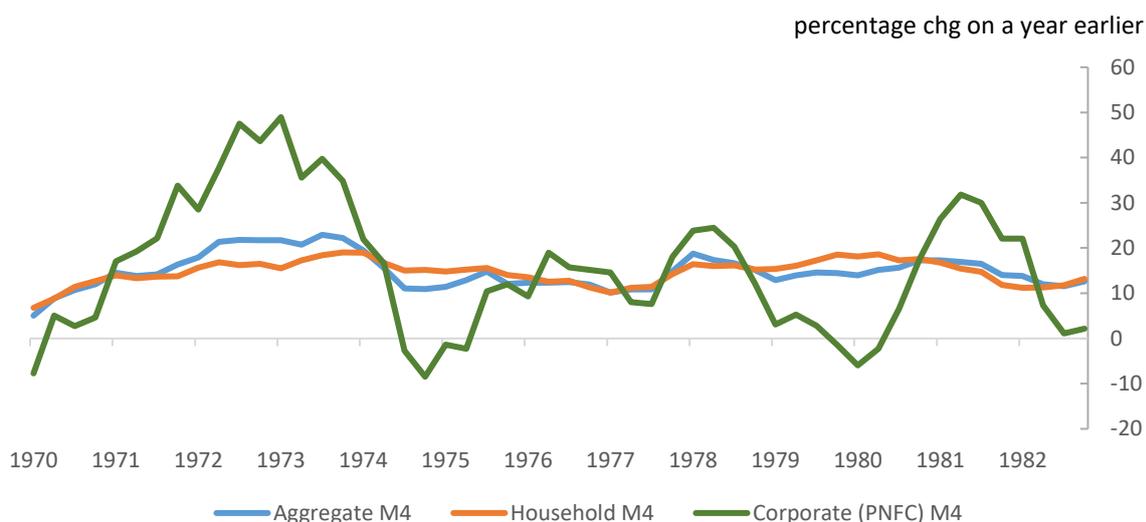
A more plausible monetary hypothesis is that money growth was in part a reflection of loose monetary and fiscal policy and it was this element that was correlated with inflation. As discussed, ex-ante real interest were negative for most of the period suggesting a highly passive monetary regime. We can use the SVAR historical decomposition to shed light on this. **Chart 4.8** below shows the contribution of the monetary policy shock identified in the SVAR to both M4 growth and inflation. This shows that the policy shock, which we interpreted as "over accommodation" contributed to an 8pp turnaround in broad money growth from 1970 to late 1974 and the same contribution to inflation about a year later. On this basis the lag from policy driven money growth to inflation was a lot shorter.

Chart 4.8: Impact of policy shock on money growth and inflation

pp contribution to annual change

Policy shock contribution to M4 growth   Policy shock contribution to inflation
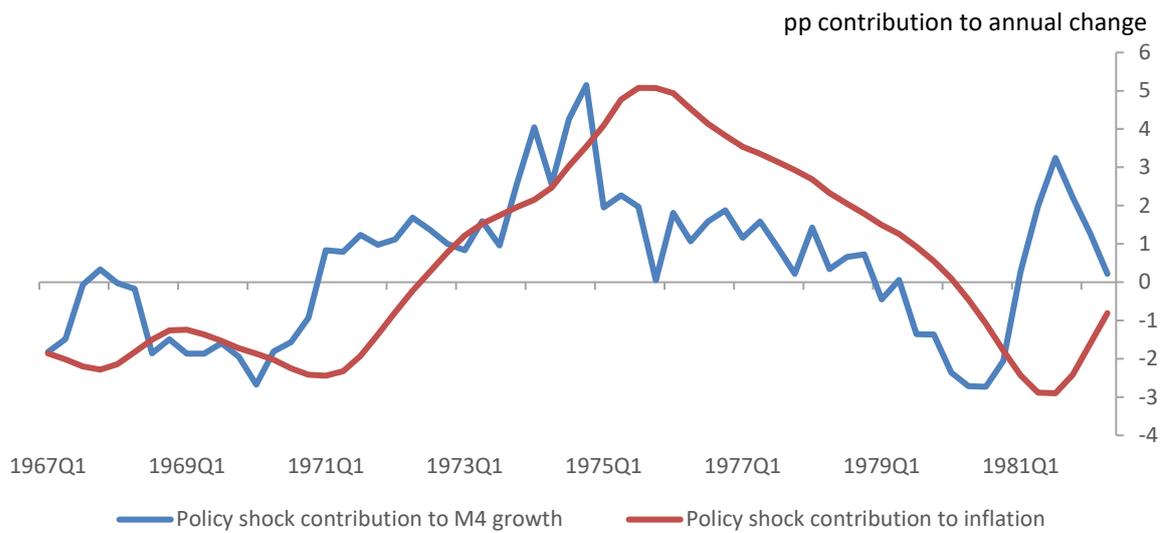
We have also seen that fiscal measures were used throughout the 1970s to accommodate the various cost push pressures whether through subsidies or public sector wage payments. These could not always be financed with gilt sales to non-banks and hence funds would be raised by borrowing from the banking system as we showed in **Box A** and below in **Chart 4.9**. The public sector contribution to money growth often sustained double-digit growth rates of broad money in the 1970s, despite weak lending (**Chart A1**). This, together with the evidence from the regime shifts in expectations all points to monetary-fiscal interactions as the key, as we discuss in more detail in the next section.

Chart 4.9: Public Sector Primary Surplus and funding from the banking sector

% of GDP

"Broad monetary financing"
Public Sector Actual Surplus
Public Sector primary surplus
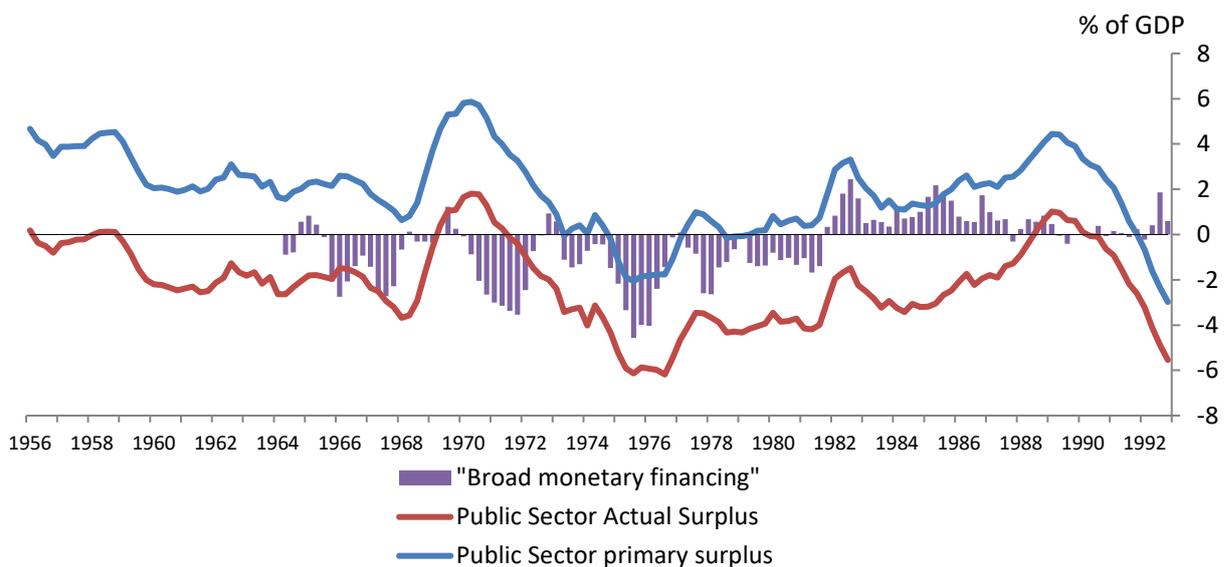
(f) Fiscal theories of inflation – what was the role of the fiscal regime in the cause and remedy of the Great Inflation

In the final section of this paper we assess the fundamental role of fiscal policy. In their review of fiscal and monetary interactions, Leeper and Leith's (2016) make a call for historical evidence and better data to shed light on the role of fiscal theories. We try and answer that call by drawing together evidence from the UK's experience in the Great Inflation.

The monetary neglect hypothesis of the Great Inflation in the UK, whether based on a New Keynesian or monetarist viewpoint, makes the case that tighter monetary policy and a more aggressive response of interest rates to inflation in line with the Taylor principle (or to reduce private sector credit growth) would have led to better inflation outcomes in the early-mid-1970s and may have avoided the real costs of bringing inflation down in the 1980s. Some of that may undoubtedly have reflected over-optimism about the supply-side and arguably there were periods of fiscal go-stop or boom-bust cycles in 1972/3, 1978/9 and later in 1988, despite the support for fiscal demand-management evaporating in the 1960s and formally renounced in 1976. The structural VAR we have produced in this paper certainly gives some support to those arguments.

But whether New Keynesian or monetarist, the monetary neglect conclusion still has an important fiscal element. For higher interest rates to have a definitive deflationary effect in the canonical New Keynesian model, this must be supported (in expectation) by an increase in future primary fiscal surpluses to cover the higher debt service costs and ensure the government's present value budget constraint is satisfied. Active monetary policy must have "passive" fiscal support in the language of the Fiscal Theory of the Price Level (FTPL). If fiscal policy is not set in this way, the regime is said to be one of fiscal dominance. This is the message of Woodford (2001) and, more recently, Leeper and Leith (2016) in the fiscal policy literature.

If fiscal policy ignores stabilisation of the debt, then higher interest rates may well have perverse "Neo-Fisherian" effects and increase inflation either immediately or at least in the longer term, which Sims refers to as 'stepping on a rake'. In the hyper-inflation literature Loyo (1999) argues a Neo-Fisherian effect very much happened in the case of Brazil where fiscal policy did not act to stablise the debt and higher interest rates in response to inflationary pressures simply led to more interest income to bond holders and wealth effects on spending that made the inflationary problem worse. Indeed, as Leeper and Leith show, if fiscal policy does not act to stabilise the debt, the more active monetary policy becomes in terms of its response to inflation the worse the inflationary outcome gets.

From a monetarist perspective, fiscal also matters. Sargent and Wallace's unpleasant monetarist arithmetic (UMA) shows that even if the authorities do control the money supply in the short-term, persistent budget deficits will lead to growing debt-income ratios in dynamically efficient economies where the real rates of interest on government debt exceeds the growth rate.   If there is a limit to how much debt the private sector will hold and markets do not anticipate future primary surpluses to stabilise the debt then the expectation will be that the government will have to resort to seigniorage (increasing the monetary base) once that debt limit is reached, which will

increase expectations of future money growth today. So large budget deficits are best avoided in a tight monetary policy strategy.

What can we say about the UK's experience ? It seems reasonable to hypothesise that during the early 1970s that something approaching a fiscal dominant regime was in existence in particular *local episodes*, where fiscal policy was being actively used to stabilise the economy and absorb the inflationary impact of cost push shocks but with no explicit commitment to stabilise the debt. In these episodes there is ample evidence that monetary policy was passive by avoiding increases in interest rates that may have proved costly for the government both in terms of its finances and in terms of electoral support from particular interest groups in society such as home owners. These episodes of local fiscal dominance, however, were typically short-lived. They produced the bursts of high inflation we observe at several points in 1970s, but "globally" the objective of policy was for low inflation with implicit or explicit fiscal consolidation. The global policy rule would dominate in the longer term once the authorities had a willingness (or were politically strong enough) to introduce the policies to deliver that.

One approach we can use to identify these local episodes is to look closely at the primary deficit (adjusted for cyclical factors). The years 1972-1975 were pretty unique experiences at least in the context of previous experience in the UK leading up to that point. **Chart 4.10** show it was the first time in 300 years the public sector ran a significant primary deficit in peacetime in the UK. Over centuries the British fiscal and monetary orthodoxy had been to run significant primary surpluses in peacetime, a commitment mechanism that allowed them to fund extremely large deficits during the many periods of conflict in which the UK was involved. The precipitous fall in the primary surplus in the 1970s shown more clearly in **Chart 4.9**, and the willingness to use the deficit to absorb cost push pressure must surely have affected expectations and caused doubt in 1974 on when and to what extent primary surpluses might be run in the future, the prospect of North Sea Oil notwithstanding. Similarly the relapse in the primary surplus in 1978 may also be viewed in a similar way. It was not until the 1980s that persistent primary surpluses would be run at significantly positive levels, indeed a net debt repayment was made in 1989 and helped facilitate the large deficit in the early 1990s recession. Subsequent large deficits in the Great Financial Crisis and recently the pandemic have been followed by attempts to restore primary surpluses back to positive territory, although actually getting there has proved elusive.

Chart 4.10: Public Sector Primary Surplus 1689-2021
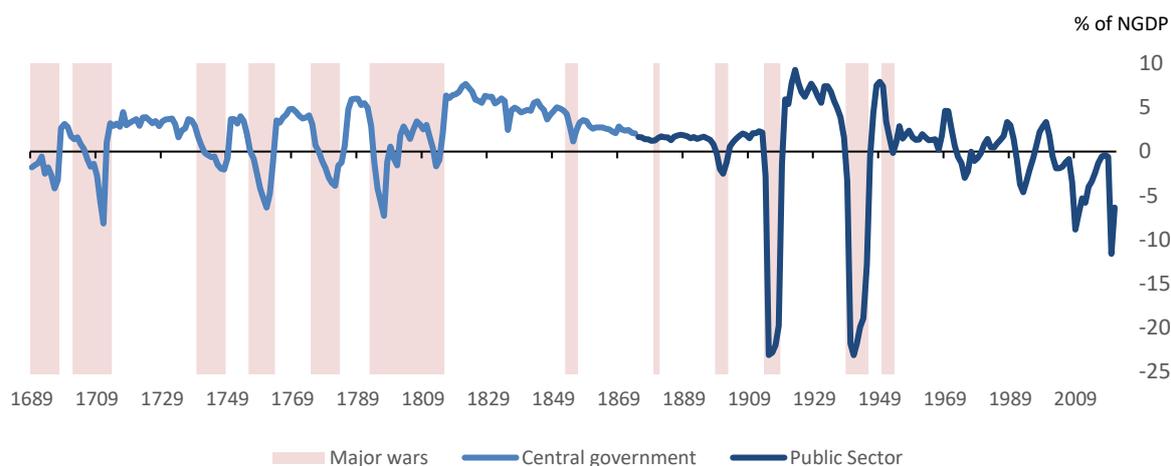
We can test for this approach more formally by looking for 'local' policy rules (as opposed to global ones) i.e. how did policy react to shocks in this particular period, as opposed to what are the global policy rules which pin down the price level. As Leeper and Leith (2016) explain, estimating reduced form policy rule coefficients directly is fraught with difficulty. The intertemporal government budget constraint and the Fisher equation hold one way or another. But we can attempt to identify shocks which in turn shed light on the structural parameters of the policy rules, to complement what we know or at least suspect from the historical narrative.

We look particularly response to an unexpected increase in real commodity prices. We would expect the shock to put downward pressure on consumption and output and upward pressure on consumer prices. If monetary policy is dominant, we would not expect to see a fall in real short rates. Adverse supply shocks should also destabilise the public finances. We would therefore expect to see debt rise. If fiscal policy is dominant, the primary surplus to income ratio should not rise in response to stabilise the debt.

Rather than a structural VAR, we use a factor-augmented local projection (FALP) regression method based on Bush (2022) derived from the method originally introduced by Jorda (2005) where we simply estimate the dynamic impact of an exogenous commodity price shock on UK data by regressing the change in the response measure of interest over the horizons of interest on the change in real commodity prices, allowing for a contemporaneous response.

Real international commodity prices are measured as the ratio of the BLS/CRB commodity price index (sourced from Thomson Reuters Datastream) to the US consumer prices index (sourced from the Federal Reserve Bank of St Louis). The key variables of interest are the logarithm of nominal public sector debt and the primary surplus to GDP ratio, although the response to other macroeconomic variables of interest were also examined such as retail sales and CPI inflation. The model is monthly estimated over the first half of the SVAR period from 1965 to 1982, to focus on the two commodity price shocks in 1970s as a potential local fiscal dominance regimes.

Chart 4.11: Local fiscal dominance

The subfigures present estimated responses to a one percentage point increase in real commodity prices. The red bold line shows the mean estimated response; the dark grey region shows the ±1 standard error confidence interval; the light grey region shows the ±2 standard error confidence interval.

(a) *Public sector debt*

Impulse: commod shk.; response: debt

(b) *Primary surplus to income ratio*

Impulse: commod shk.; response: primary surp.

(a) *Retail sales*

Impulse: commod. shk.; response: ret. sales

(b) *Manufacturing output*

Impulse: commod. shk.; response: manu. outpu

(c) *Consumer prices*

Impulse: commod. shk.; response: CPI

(d) *Policy rate*

Impulse: commod. shk.; response: Bank Rate
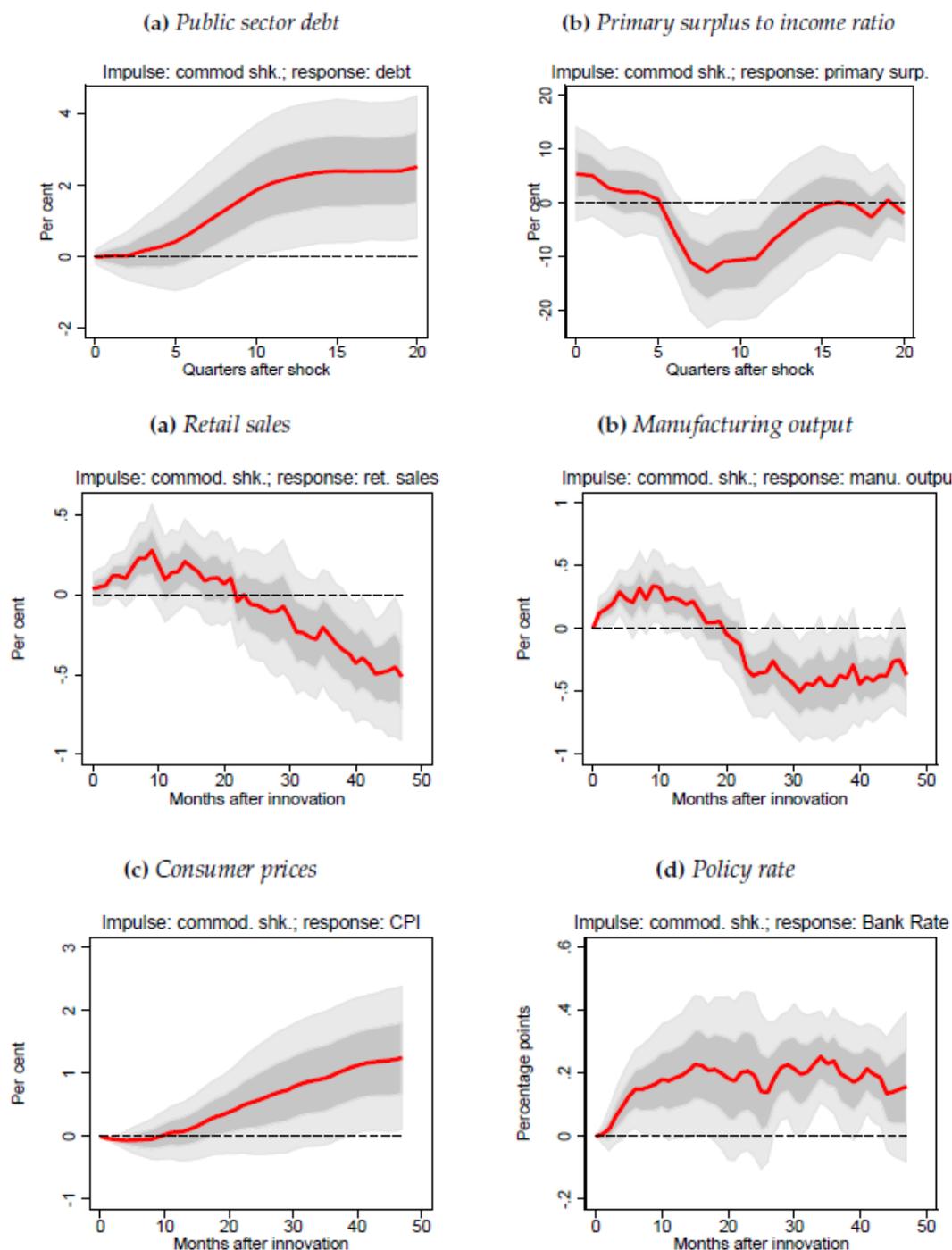
Chart 4.11 shows the impact of an increase in real commodity prices on a number of key variables. Although retail sales and manufacturing output display puzzling short-term responses, beyond a horizon of about a year, their evolution, together with that of consumer prices, looks like the

response to a supply shock. Policymakers did appear to respond over this period by raising the nominal policy rate, but not by enough to move real rates sufficiently to stabilise inflation, in line with the narrative evidence. Crucially, not only did the primary surplus to income ratio not act to stabilise nominal debt dynamics, but it actually fell, further destabilising debt dynamics. So this does support the idea there may have been evidence of local fiscal dominance over this period.

However, it is also clear that many in financial markets would not have viewed fiscal policy through a fiscal dominance/FTPL lens but rather through something like the counterparts approach, where government borrowing was viewed as inflationary because of its effect on the broad money supply via funding from the banking system. This was certainly the case in the gilt market where Gordon Pepper a prominent and influential commentator for the stockbrokers W. Greenwell & Co regularly blamed fiscal policy for Britain's inflation and balance of payments problems in the 1970s[16]. The growing use of the counterparts framework by the authorities to provide monetary and fiscal discipline cemented that financial focus. In essence, this viewpoint did have some similarity to the Sargent and Wallace UMA argument, but only superficially. The perceived constraint here was not a debt limit, but rather the flow of new gilts the government could issue to the non-bank private sector in a given period. And it was the implications for expected broad money growth rather than base money or seigniorage that mattered for inflation. The looseness of fiscal policy in the mid-1970s and some of the doomsday predictions for expected borrowing clearly had an impact on financial market expectations and prices in gilt and foreign exchange rate markets, driven by this viewpoint of the link between public sector borrowing, broad money growth and inflation. In that sense the authorities simply had to address the fiscal issue from 1975 onwards to ensure orderly markets. Strikes in the gilt market and collapses in sterling, both anticipating expected future broad money growth, would simply add to inflation pressure. So, the fiscal actions of 1975-1977 and later in the early 1980s, which were geared primarily to meeting a target for broad money growth, may have inadvertently delivered the response required under other fiscal theories. Despite the monetary and fiscal exceptionalism of the UK's counterparts-based framework, they either tunnelled through or muddled through (depending on one's preferred fiscal theory) to the right conclusion.

V   Conclusions

Our paper has revisited the causes of the Great Inflation in the UK. Our results suggests the roots of the Great Inflation start in the 1950s and 1960s with the failure of go-stop policies and government planning to alleviate the fundamental weaknesses on the supply-side of the economy, which were increasingly becoming apparent. The Bretton Woods system prevented over-ambitious demand policies from creating sustained inflation because of the balance of payments constraint and the enforced tightening of policy that was required to maintain the exchange rate peg. Once this constraint was removed, misguided monetary and fiscal policies could lead to inflationary pressures given that sterling was free to depreciate in response to balance of payments difficulties.

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[16] See *Greenwell's Monetary Bulletin*, various.

However, the deeper underling narrative is one of the authorities realising that the inflationary nettle, which had been a growing problem since World War 2, had to be grasped once and for all. For much of the 1970s they were feeling their way towards a new framework and anchor for monetary stability following the demise of Bretton Woods, with an eclectic and changing mix of targets and instruments in the face of difficult structural issues on the supply side and large shocks to commodity prices. This is the "muddling through" hypothesis. As a result, there were many missteps and difficult moments along the way before inflation was ultimately brought down in the early 1980s. However, by the mid-1970s there was a determination by the authorities, and indeed trade union leaders, to bring inflation down to more acceptable levels and a key part of that was setting in place a fiscal regime that meant that public sector deficits would not just be a safety valve for cost-push shocks of various kinds, with no commitment to follow deficits with primary surpluses. The prospective benefits of North Sea Oil revenues would help make that transition. The authorities during the mid-1970s very much saw the trials and tribulations of the 1974-1976 period as part of "tunnelling through" until the benefits of greater monetary and fiscal discipline could be achieved, as did the Thatcher government in the 1980s, following its own period of difficulties in its early years in office.

So, what started off as a case of largely "muddling through" transitioned to a case of largely "tunnelling through" as the causes of the UK economy's problems became better understood and the longer-term vision of what was necessary to become a low inflation economy with sustainable growth became clearer. Part of that adjustment also required reforms on the supply-side of the economy to make the UK product and labour markets more competitive and allowed all parties in the economy to co-ordinate on a low-inflation economy capable of delivering sustained growth.

The question of course, with the benefit of hindsight, is whether a better mix of policies would have produced better outcomes. It is possible that tighter monetary policy in the early 1970s may have reduced inflation and inflation expectations at the expense of higher unemployment. That may have avoided the large rises in unemployment that seemingly had to be suffered in the 1980s to bring inflation back down from what was undoubtedly a more entrenched inflationary environment. But that would have had to be accompanied by fiscal discipline and an acceptance by the trade unions of the need to co-ordinate with government on a lower rate of inflation, neither of which were politically feasible in the early-to-mid 1970s. One might even go back to the late 1960s as the period of missed opportunity, where the successful fiscal retrenchment of Roy Jenkins following the devaluation in 1967, was not matched by a similar success in achieving the "In Place of Strife" agreement with the trade union. That would have placed industrial relations on a surer footing that may have helped avoid the move into double-digit inflation in the first place.

The answer to many of those questions depends crucially on the behaviour of inflation expectations. A contribution of our paper is to re-evaluate the behaviour of inflation expectations, using the available survey data. We show that household inflation expectations, derived from qualitative surveys over the period, behave largely as a series of regime shifts rather than showing clear signs of adaptive behaviour. The upward shifts in inflation expectations happened well before the oil and commodity prices of the mid-1970s suggesting inflation was already an important issue in the minds of policymakers and the public in the early years of the decade. Those appear correlated with shifts in institutional framework, such as the devaluation of sterling in 1967 and the collapse in Bretton Woods followed by the floatation of sterling in 1971/1972. But they are also

arguably marked by a change in the fiscal regime from the austerity of the late 1960s back to a more expansionist dash for growth in 1972.

The commodity price shocks of 1973/4 and 1979 do not appear to have fundamentally de-anchored expectations further, but merely led to temporary overshoots of inflation. Those overshoots were however large and do appear to have represented both misguided incomes policy that locked in real wage resistance coupled with an "over-accommodation" of those shocks that reflected an overwhelming preference of the authorities to stabilise unemployment and at levels that were below an increasing natural rate of unemployment. But it is not clear that a tighter monetary policy in itself would have been sufficient to reduce underlying inflation expectations. There is some evidence that the economy approximated a fiscally dominant regime in 1973/4 with primary surpluses worsening in response to commodity price shocks. Financial markets also initially doubted the government's commitment to tackle public spending in 1975 and 1976 with implications for both funding the budget deficit and the exchange rate that would delay the fall in inflation.

The data suggests that there were two structural shifts down in household inflation expectations in the late 1970s and subsequently in the early 1980s. The major shifts down in expectations again appear correlated with major changes in the fiscal policy framework with the introduction of cash limits, the benefits of North Sea Oil Revenues, together with the abandonment of fiscal stabilisation policy and its subordination to monetary policy in the early 1980s. So, it appears consistent with Sargent's view that moderate inflations are brought fundamentally to an end as much by changes in the fiscal policy regime as the monetary policy regime, and an acceptance of that regime by all participants in the economy.

This leads us to more fundamental questions in the conclusion to this paper. How much of the inflation experience was inevitable given the collapse of Bretton Woods as a disciplining device, the structural supply-side problems facing the UK and the openness of the economy, making the UK vulnerable to shocks from abroad ? How much of this was a failure of the institutional framework of monetary and fiscal policy in the UK to adapt to those changes quickly enough ? How much was it the slowness of policymakers and politicians to grasp and absorb the major changes in economic thought occurring in the 1960s ? Much has been written on these issues already. It is hard not to have sympathy with the policymakers in the 1970s and 1980s given the external shocks that they faced and the supply-side difficulties that were crystallising, and especially given household expectations that the living standards improvement of the Golden Age would continue. Credit must also be given to policymakers for grasping the inflationary nettle in the late 1970s and 1980s, making difficult decisions about fiscal policy that were against the consensus of many in the economics profession and their own parties and constituency base. But there were also periods when policymakers were overoptimistic about what fiscal and monetary policy could achieve and periods when they prematurely believed that the corner had been turned and they had tunnelled through to a low inflation equilibrium (such as 1978 and the mid-1980s). Both problems would lead to ill-advised expansions of policy that did contribute to the inflation, but perhaps both are a necessary part of muddling through incrementalism. Many of these issues are relevant to the post-pandemic adjustment to large fiscal deficits and vastly expanded central bank balance sheets.

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Appendix I: Statistics on the variables entering the structural VAR

The data we use are as follows and shown in **Chart A1**:

- For inflation (π) we use a seasonally-adjusted measure of quarterly CPI inflation extended back to the 1960s using the ONS's long-run measure of consumer prices (see O'Donaghue, Goulding and Allen (2004))
- For real GDP (y) we use the headline measure of real GDP at market prices.
- For the short term-interest rate (is) we use Bank Rate.
- For the long-term interest rate (il) we use a zero-coupon UK 10 year government bond yield
- For our measure of broad money (m4x) we use the break-adjusted stock of M4 excluding the deposits of intermediate OFCs as shown in the introduction. The GDP deflator is used to deflate the series to create real broad money balances.
- For the growth of credit quantities (m4lx) we use the real break-adjusted[17] stock of M4 lending (bank and building society lending) to households, PNFCs and non-intermediate OFCs. This measure is also adjusted for the impact of securitisations, so any securitised-loans are retained within the stock. This 'headline' measure of M4 lending is often referred to as M4Lx(ex). The GDP deflator is used to deflate the series.
- For the own rate on M4 (id) we use a weighted average of the effective interest rates on currency (zero), sight deposits, time deposits and other savings instruments such as ISAs. Each weight is based on the share of each instrument in the stock of M4. The inclusion of currency and non-interest bearing deposits in the calculation of the average allows us to pick up the falling share of these components in overall deposits which pushes up the own rate over time.
- To proxy the rate of interest on borrowing (ib) we use Investment-grade UK corporate bond yields covering all companies, including financial companies. Our use of corporate bond spreads reflects the fact that we have a relatively continuous series we can take back to the 1960s. The yields we used are measures from Bank of America which go back to 1997. Prior to this we use yields from Global Financial Data back to 1966. Corporate bond yields have been found to be a useful summary measure of credit conditions in US studies (eg Gilchrist et al (2009) and Gilchrist and Zakrasjek (2012))**.** And the inclusion of financial company spreads means that we should pick up movements in bank funding costs which would feed into the borrowing rates faced by households. A preferable alternative would be to have used actual bank borrowing rates faced by companies and households. But these are less readily available before the mid-1990s.

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[17] The break-adjustment method corrects for any breaks in the stock series arising from changes in the reporting population, classification changes, revaluation effects and write offs. The break-adjusted stock takes the latest estimate of the unadjusted stock of lending and projects this backwards using transactions data on the flow of lending. See http://www.bankofengland.co.uk/statistics/Pages/iadb/notesiadb/Changes_flows_growth_rates.aspx for more details.

- For real equity prices (pk) we use the FTSE-all share index deflated by the GDP deflator
- The real exchange rate (e) is the narrow UK real effective exchange rate index from the BIS based on consumer prices.

Chart A1: Data series used in the SVAR
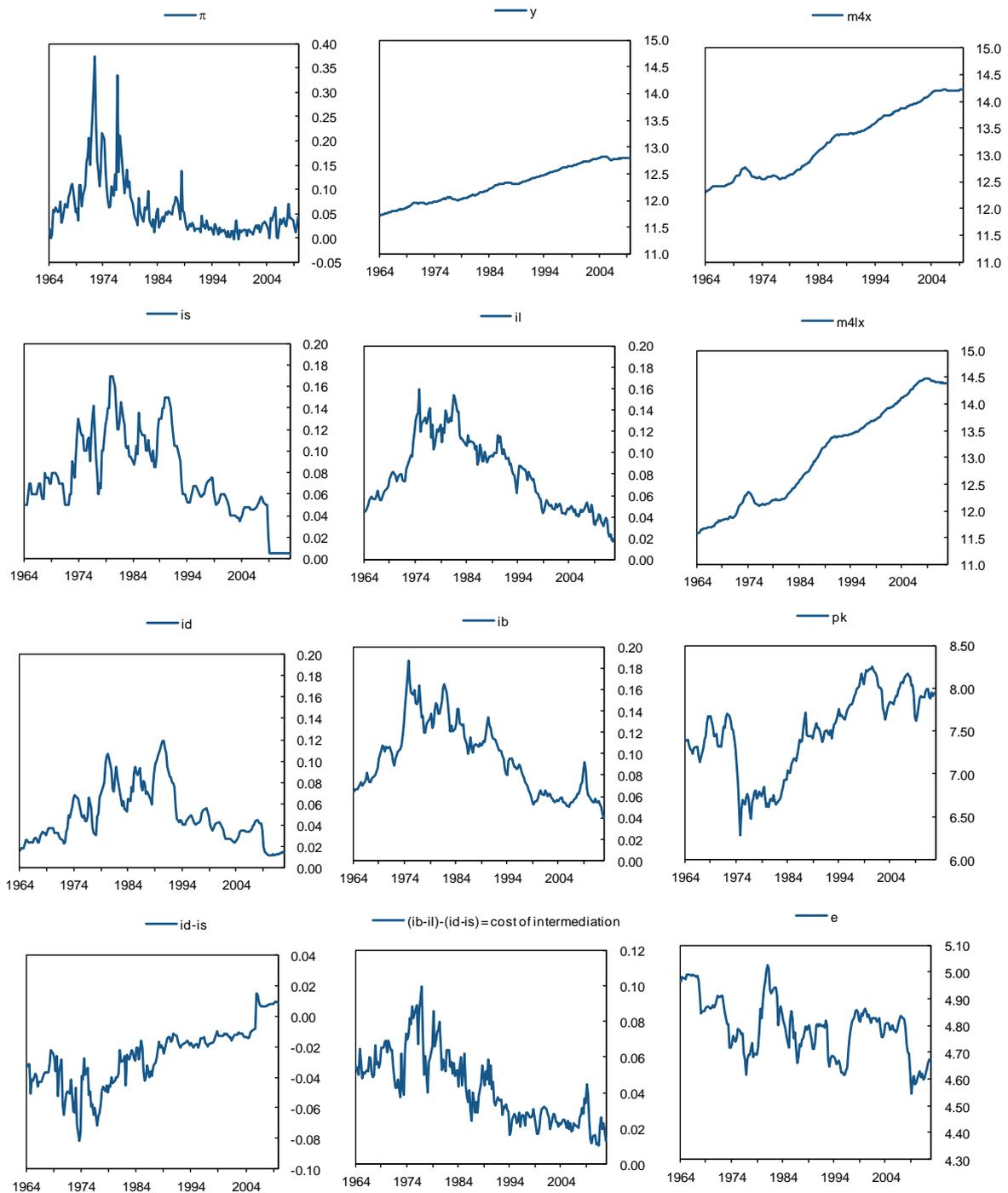
Appendix II: Cointegration analysis

As a first step we look at the data in log levels (except for inflation and the interest rate variables which are just levels of the relevant interest rate/inflation rate) and test the stationarity of our series using standard Augmented Dickey-Fuller statistics. This is summarised in **Table A1**. All the series appear to be integrated of order 1 in the levels of the data but can be made stationary by first differencing. That includes the inflation rate and interest rate series that are often treated as stationary variables in shorter sample periods. In particular quarterly inflation can appear stationary on standard ADF tests given its volatility but annual CPI inflation is non-stationary over the whole sample period. As discussed in more detail in Appendix 1 the non-stationarity of the series means the underlying trends in all these series are stochastic trends with a potential drift component with a sign that depends on the series.

Table A1: ADF stationary tests

Series	t-Stat	P-value	Lag based on Akaike Information Crietrion
Inflation (annual)	-3.23 (-1.67)	0.02(0.4466)	1 (4)
Real GDP	-1.3729	0.5949	0
Bank Rate	-1.5088	0.5273	0
Long-term government bond yields	-0.7967	0.8175	1
Deposit rate	-2.2773	0.1804	1
Corporate bond yield	-1.4671	0.5483	1
Real M4x	-0.2984	0.9215	2
Real M4Lx	-0.7638	0.8265	2
Real equity prices	-1.4447	0.5595	1
Real exchange rate	-2.7930	0.0611	1

The next step is to look for cointegration among the variables. That will determine how many common stochastic trends there are driving our ten variables. For example if we find 6 long-run relationships between the variables that means there will be 4 common stochastic trends driving our 10 series.

In **Table A3** we apply the procedure of Johansen (1988) to determine the degree of cointegration in our system. The degree of cointegration appears very sensitive to lag length of the VAR. The Schwarz and Akaike information criterion suggest a short lag length of 2 and on that assumption

the Johansen test indicates there are 3 cointegrating vectors. But longer lag lengths required to make the errors serially-uncorrelated and closer to normality suggest six possibly seven vectors. In part, that probably reflects the fact that inflation and interest rates are close to being stationary series

Table A3: Johansen cointegration trace test statistics

H₀:rank<=	Trace test [Prob] : 2 lags	Trace test [Prob]: 4 lags	Trace test [Prob] : 6 lags
0	333.86 [0.000] **	320.73 [0.000] **	335.96 [0.000] **
1	236.93 [0.000] **	241.65 [0.000] **	257.60 [0.000] **
2	163.58 [0.028] *	181.48 [0.002] **	194.02 [0.000] **
3	117.57 [0.139]	138.30 [0.006] **	136.80 [0.008] **
4	84.278 [0.237]	102.55 [0.014] *	99.428 [0.026] *
5	61.047 [0.205]	71.538 [0.034] *	69.663 [0.050] *
6	40.355 [0.212]	47.546 [0.052]	45.517 [0.080]
7	21.540 [0.335]	26.697 [0.112]	26.029 [0.131]
8	9.5994 [0.319]	9.8662 [0.297]	9.6977 [0.310]
9	1.4373 [0.231]	1.6356 [0.201]	2.7204 [0.099]

Notes: A '**' represents rejection of the null hypothesis at the 1% level, and a '* ' a rejection at the 5% level

Table A3 suggests that choosing 4 cointegrating vectors and imposing the restrictions consistent with the relationships above is rejected. That suggests there may indeed be more cointegrating relationships when credit quantities and prices are added. We first attempted to identify an additional cointegrating vector based on a credit demand relationship where credit is dependent on yields, GDP and asset prices, but we failed to find an acceptable relationship that could not be rejected by the data. That suggests there may be a stochastic trend in credit supply that works independently of spreads and output reflecting shifts in non-price factors (eg terms and conditions) and other quantitative restrictions (eg loan to value ratios). We then experimented with testing for cointegration between the corporate bond rate and long-term bond yield, ie that credit or borrowing spreads are stationary

That produced a set of vectors that could not be rejected at the 1% level (**Table A4**) but could be rejected at the 5% level of significance. Inspection of the vectors themselves suggest that the real interest rate and corporate bond spread vectors are the ones most likely to be leading to a rejection of the restrictions. In particular the corporate bond spread shows some evidence of a mean shift at the start of the crisis but until we observe the behaviour of spreads over the next few years it is probably too early to confirm that through statistical tests. So given: (a) the theoretical appeal of these cointegrating relationships; (b) that they proved acceptable in a smaller system; and (c) that they cannot be ruled out at the 1% level in this larger system, we use these as the basis for our cointegrated SVAR.

Table A4: Summary of restrictions on β

	β_1	β_2	β_3	β_4	β_5
π	0.00	0.00	-1.00	0.00	0.00
y	-0.50	0.00	0.00	-1.00	0.00
is	7.93	0.00	0.00	0.00	0.00
il	0.00	-1.00	0.00	0.00	1.00
id	-7.93	1.00	1.00	0.00	0.00
m4x	1.00	0.00	0.00	0.00	0.00
m4lx	0.00	0.00	0.00	0.00	0.00
pk	-1.00	0.00	0.00	1.00	0.00
ib	0.00	0.00	0.00	0.00	-1.00
e	0.00	0.00	0.00	0.00	0.00

LR test of restrictions: $\chi^2(24) =$ 42.004 [0.0129]*

Appendix III: Impulse responses in the SVAR

We can examine whether our identifying restrictions produce sensible responses by carrying out impulse response analysis and a forecast error-variance decomposition. First we consider the standard macroeconomic shocks.

Both the permanent and temporary aggregate supply shocks produce responses that suggest output and inflation move in opposite directions in the short run, despite the absence of explicit sign restrictions. In the long run a positive TFP shock produces a depreciation of the real exchange rate suggesting higher exports are needed to offset the higher import spending resulting from the permanent expansion of output. Monetary policy also appears on average to have tried to offset the inflationary implications of a permanent TFP shock, but appears to accommodate mark-up shocks and minimise the output implications. The response of output under the temporary mark-up shock is relatively small. Both shocks account for over half the variance of inflation up to a two year horizon.

The aggregate demand shocks we identify produce responses of output and inflation that move in the same direction in short run, which is line with theoretical priors. They also produce a stabilising policy response. The rise in output and inflation following the overseas demand shock is rather short lived and insignificant suggesting the crowding out effect of policy and the real exchange rate happens relatively rapidly. The main effect of the shock is on the real exchange rate. The temporary aggregate demand shock has a more persistent effect on output and explains around 30% of the variance of output at very short horizons.

The monetary policy shocks that we identify also have sensible effects. A negative core inflation shock raises real (ex post) interest rates and leads to fall in output and a depreciation of the real exchange rate, following an initial appreciation. The temporary policy shock also appears sensibly signed on output and inflation at the one to two year horizons. So we have no 'price puzzle' effects despite the use of timing restrictions. But the output response is very small and insignificant compared to the impact on inflation which appears to mainly operate through the exchange rate and import prices. The temporary policy shock also appears to have a perverse effect on long rates via the term/risk premia. That could reflect higher uncertainty about monetary policy goals following any deviation from the 'average policy rule' used by policymakers over the sample period.

The banking sector shocks produce some interesting differences. The cost of intermediation shock although it leads to a permanent impact on both money and credit has only a very small impact on output in either the short or long run. A fall in the cost of intermediation also leads to a fall in equity prices suggesting it leads to a switch between equity and bank debt for a given level of activity. Overall this shock accounts for about 36% of the movements in money at long horizons and around 36% of the movements in credit.

The wholesale funding shock appears to have a more significant effect on the economy. A fall in wholesale funding costs lowers credit spreads and boosts lending. That in turn leads to a rise in output that is significant and permanent (see Appendix for standard error bands). There is also a significant fall in inflation. That in part may be driven by the initial appreciation of the exchange rate but it also suggests that this shock has a permanent effect on potential supply perhaps reflecting that the higher lending finds its way into riskier more productive sectors. Money expands following this shock but by significantly less than lending. Unlike the cost of intermediation shock the expansion of money and credit is associated with a persistent pick up in equity prices in this case perhaps suggestive of some of the hot potato effects discussed earlier. Deposit rates fall by a similar amount as loan rates as predicted by the model section 1. Overall this shock accounts for around 20% of the movements in money and 50% of the movements in lending. It also accounts for around 1/3 of the variation in output at long horizons.

The bank risk-taking shock has a more symmetric effect on money and credit than the wholesale funding cost shock. It also leads to a significant fall only in loan rates rather than deposit rates as suggested by the model in Section 1. Although this shock only has a temporary effect it accounts for around 10-20% of the movements in money and credit at the two to three-year horizon. A positive shock to bank risk taking that boosts money and credit also increases output like the wholesale funding shock. By definition this shock is assumed not to have a permanent effect on output and potential supply so inflation also rises in response to this shock. Asset prices also appear to respond positively to this shock again suggesting the money created by credit expansion finds its way into financing asset transactions.

Overall, it suggests our identifying restrictions on the banking sector shocks have led to meaningfully different shock responses that accord with our priors about how money and credit should behave and produce contrasting impacts on inflation and output that may help us explain the various features of the long expansion period.

For each shock the response shown is the impact of a 1 standard error shock introduced in 1964Q1. Error bands represent 1 standard deviation away from the mean and produced using boostrapping.

Impulse responses:
Overseas demand shock

Response of short rate

Response of Real money

Response of long rate

Response of real exch rate

Response of deposit rate

Response of inflation

Response of output

### Response of loan rate

Response of Real asset price

Response of Real lending

100
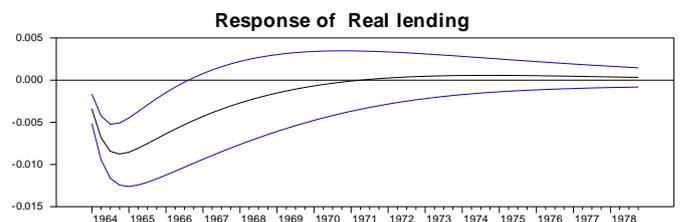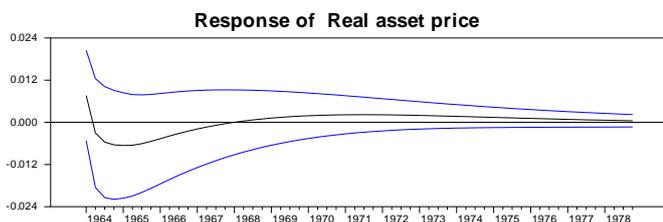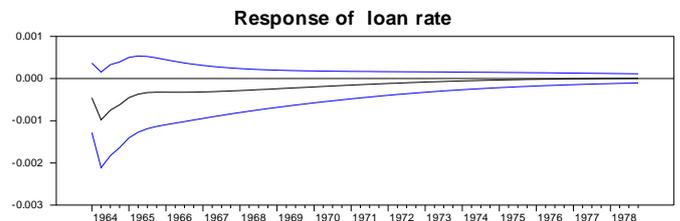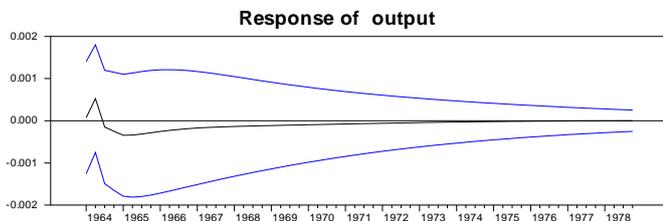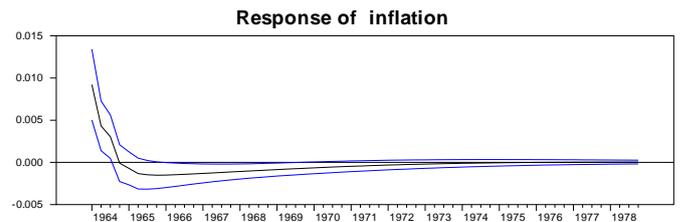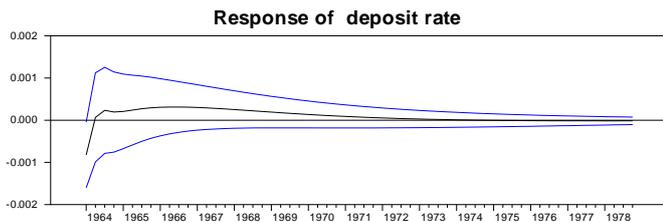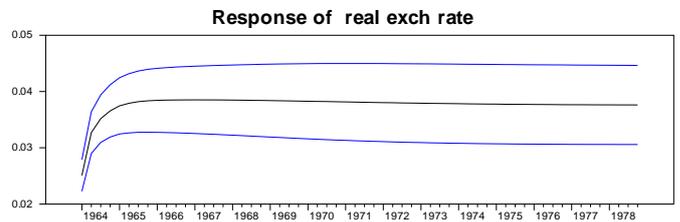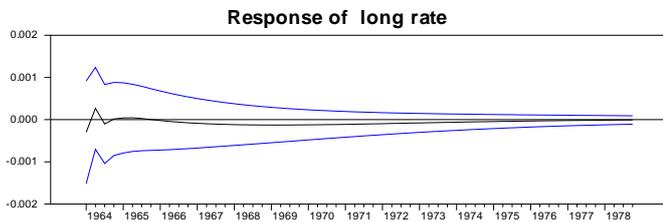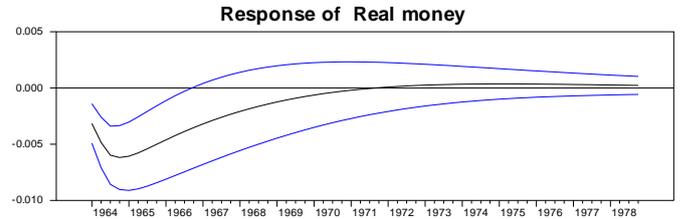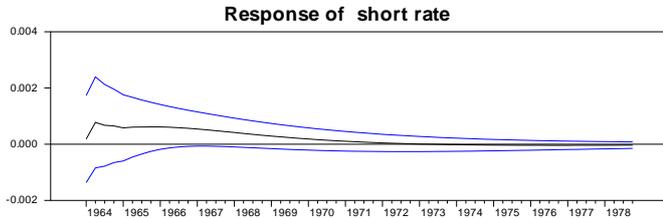
Impulse responses:
TFP shock

Response of short rate

Response of Real money

Response of long rate

Response of real exch rate

Response of deposit rate

Response of inflation

Response of output

Response of loan rate

Response of Real asset price

Response of Real lending
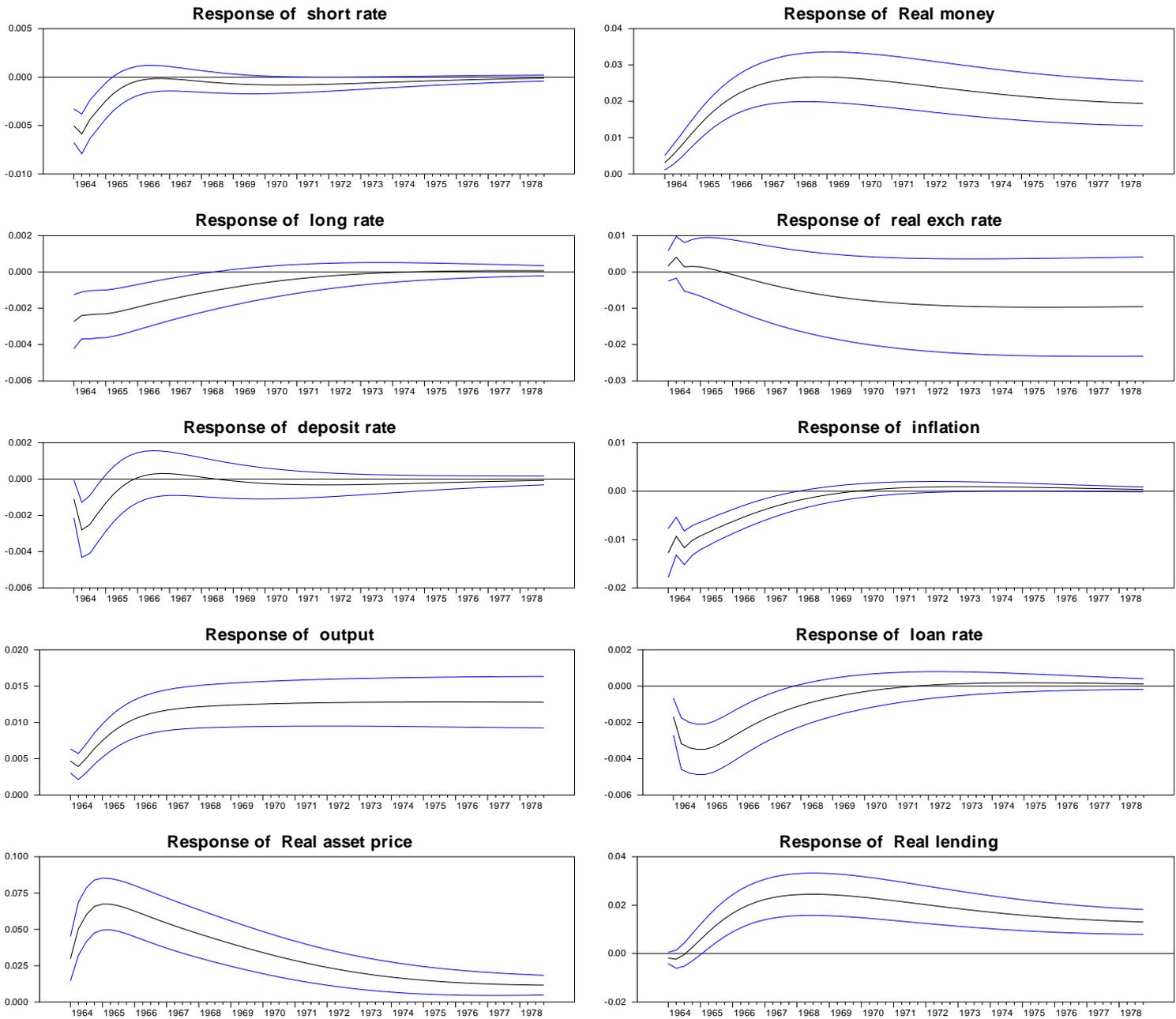
Impulse responses:
Core inflation shock
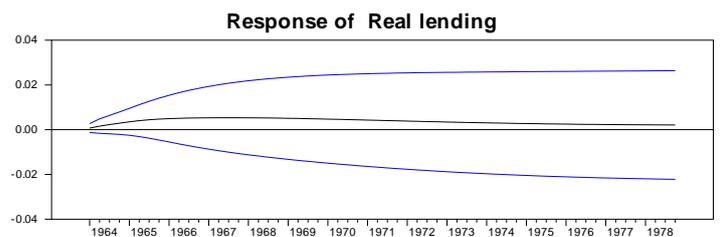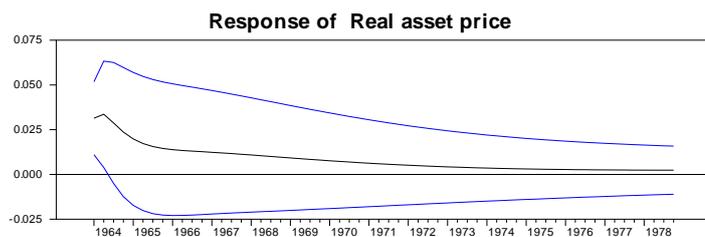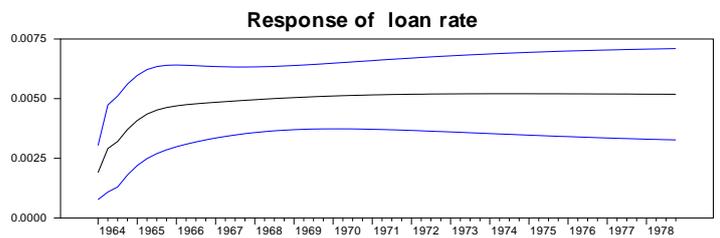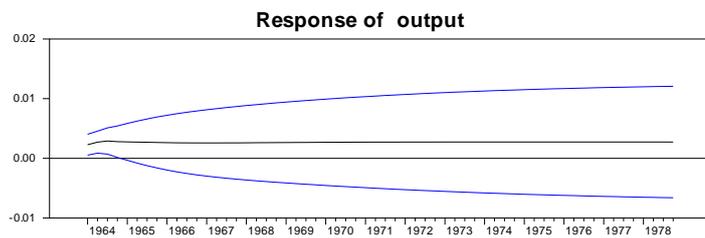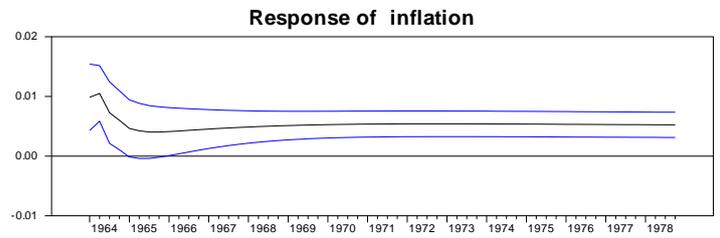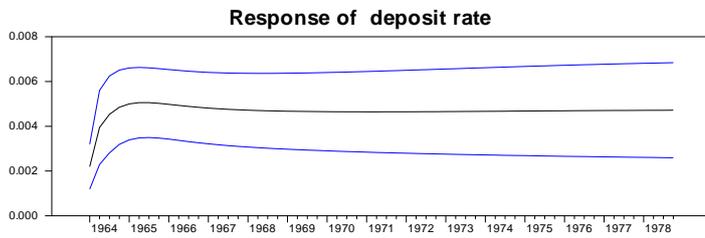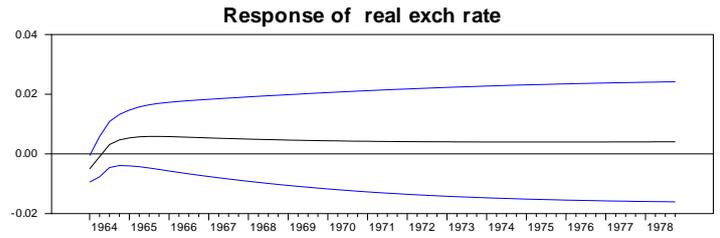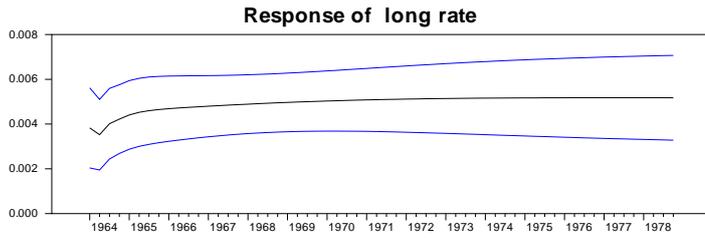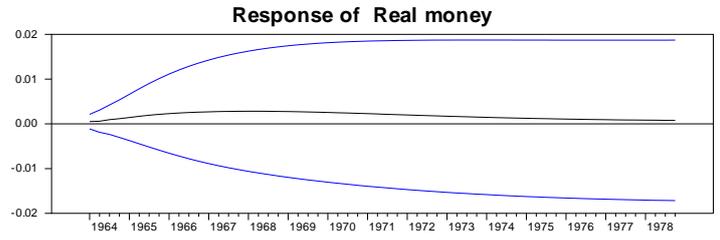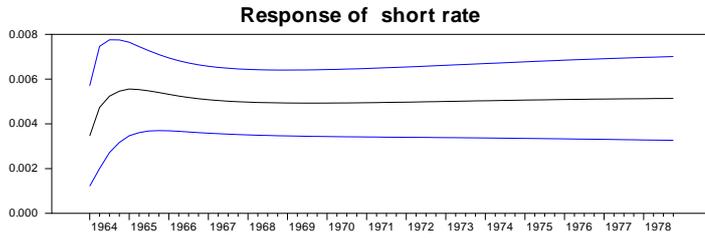
Impulse responses:
Cost of int. shock

Response of short rate

Response of Real money

Response of long rate

Response of real exch rate

Response of deposit rate

Response of inflation

Response of output

Response of loan rate

Response of Real asset price

Response of Real lending

103
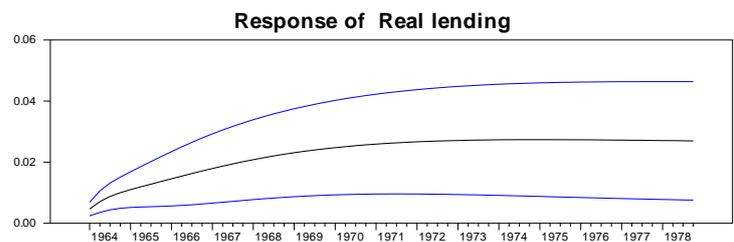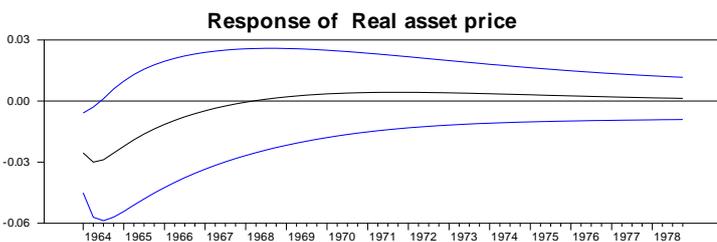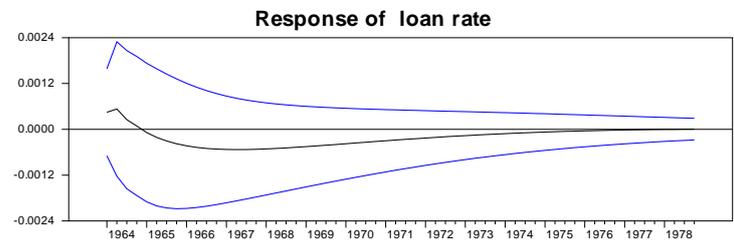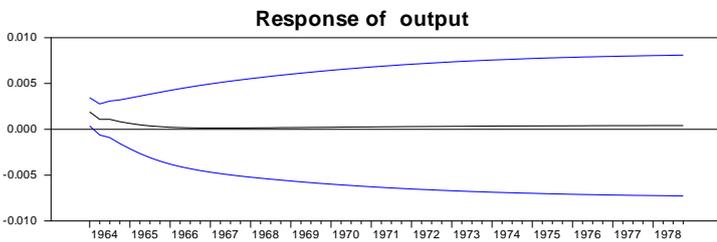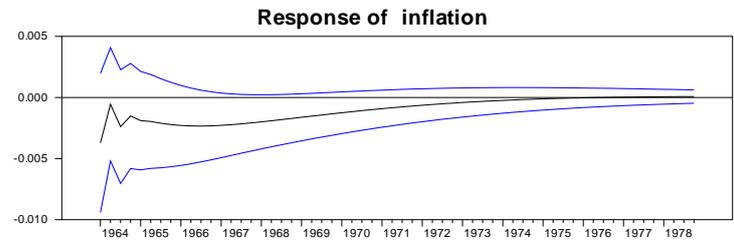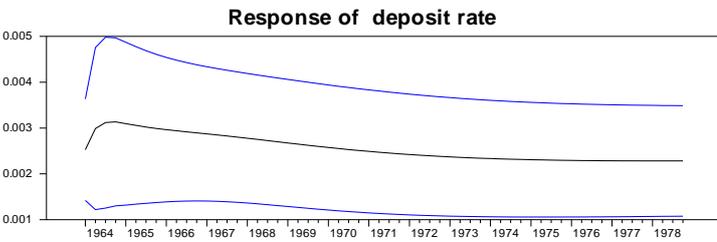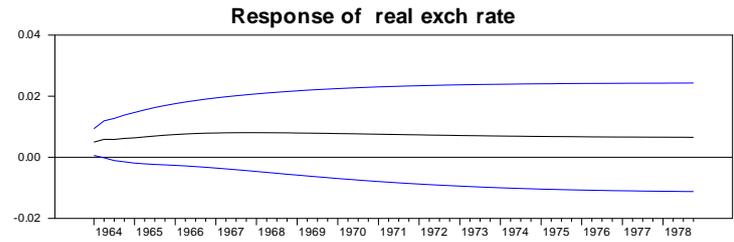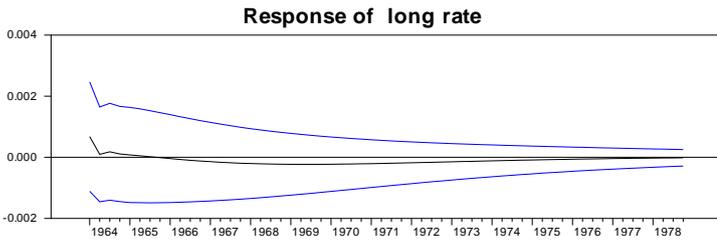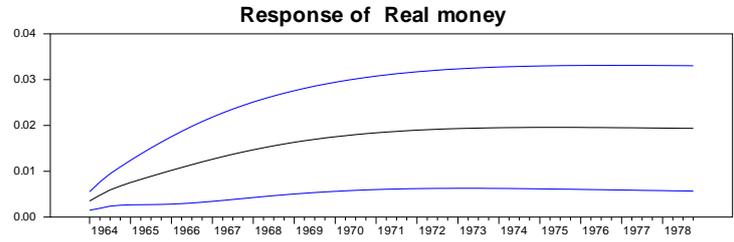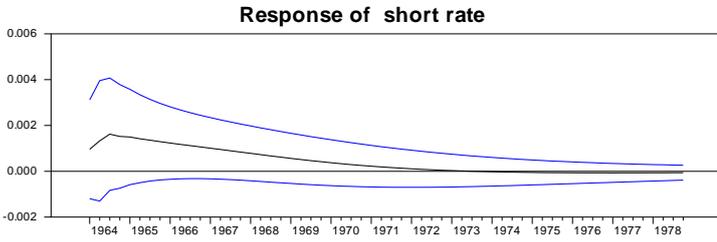
Impulse responses:
W'sale funding shock

Response of short rate

Response of Real money

Response of long rate

Response of real exch rate

Response of deposit rate

Response of inflation

Response of output

Response of loan rate


Response of Real asset price

Response of Real lending

104
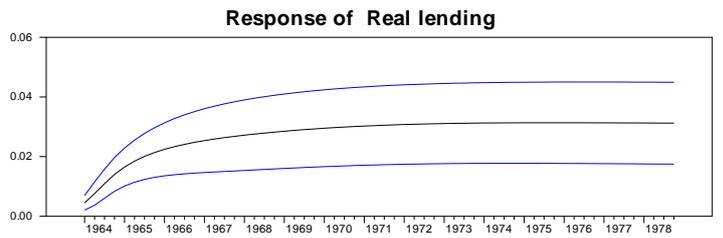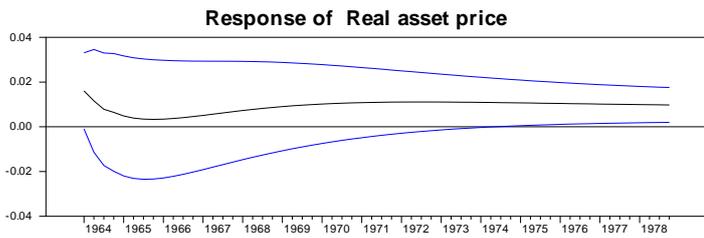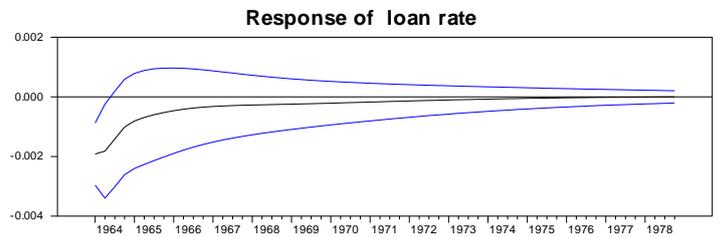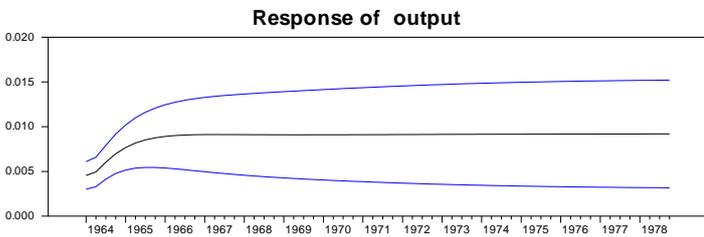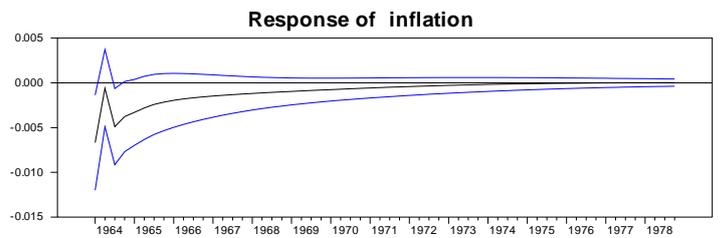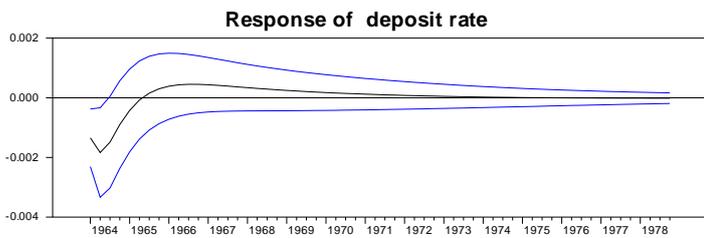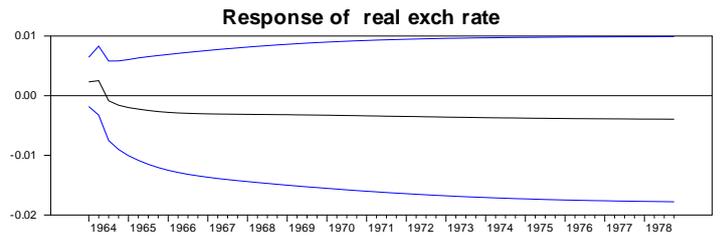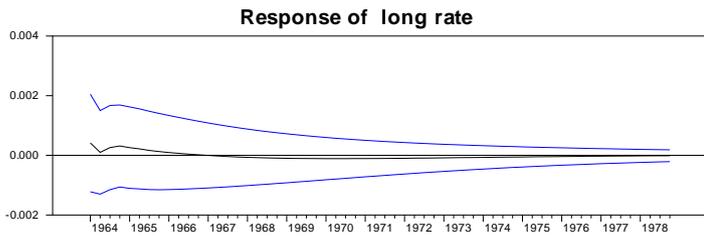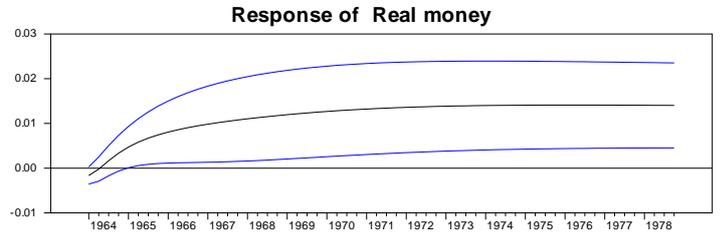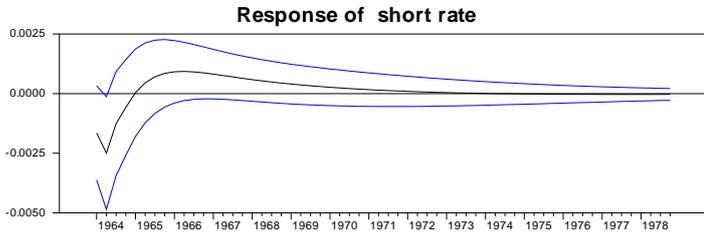
Impulse responses:
Aggregate Demand shock

Response of short rate

Response of Real money

Response of long rate

Response of real exch rate

Response of deposit rate

Response of inflation

Response of output

Response of loan rate

Response of Real asset price

Response of Real lending

105
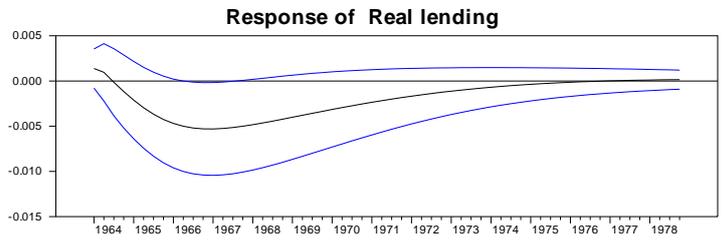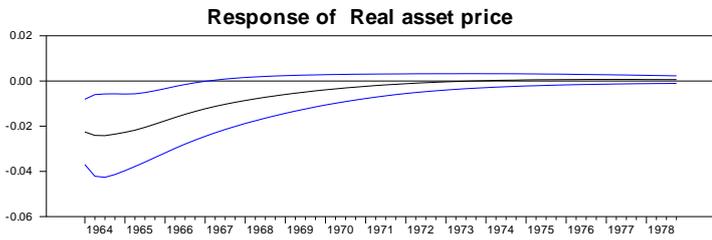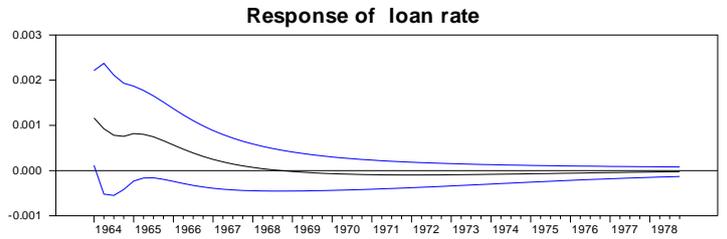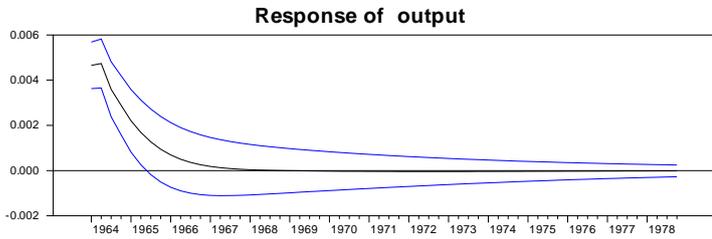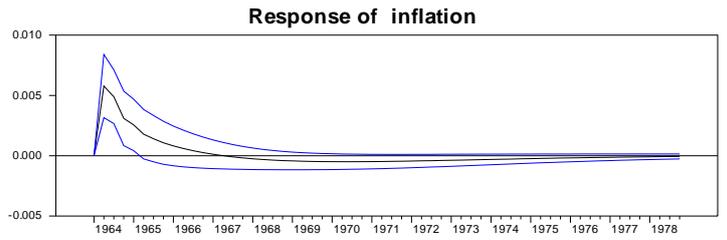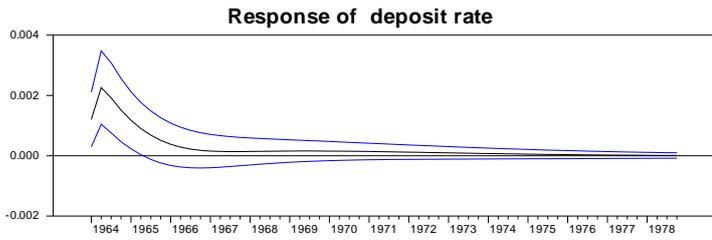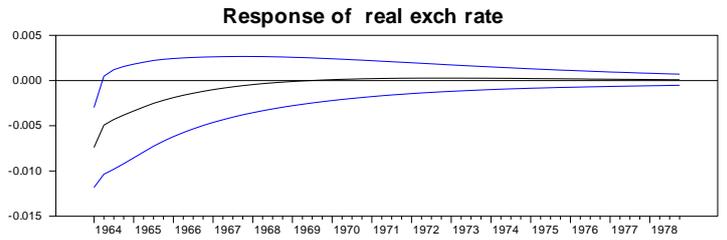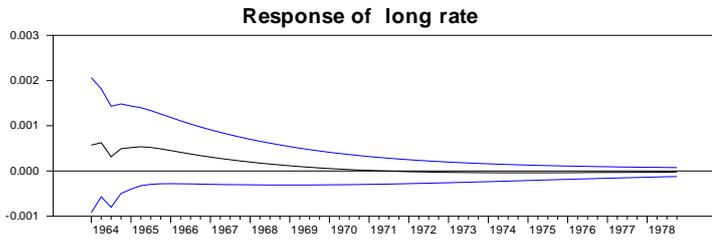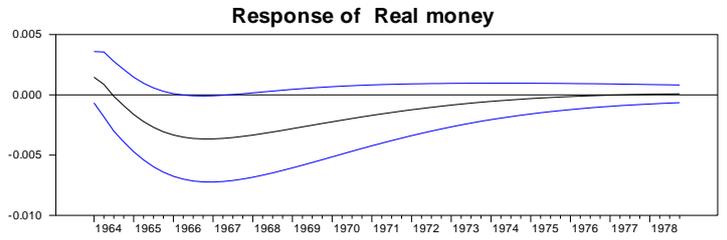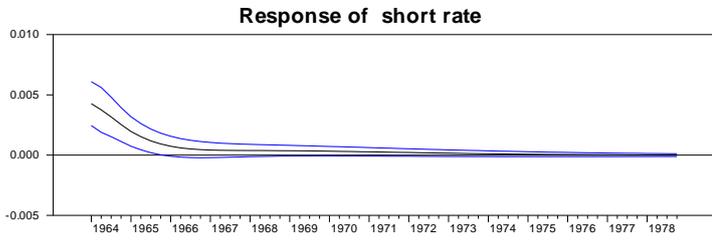
Impulse responses:
Monetary Policy shock

Response of short rate

Response of Real money

Response of long rate

Response of real exch rate

Response of deposit rate

Response of inflation

Response of output

Response of loan rate

### Response of Real asset price

Response of Real lending

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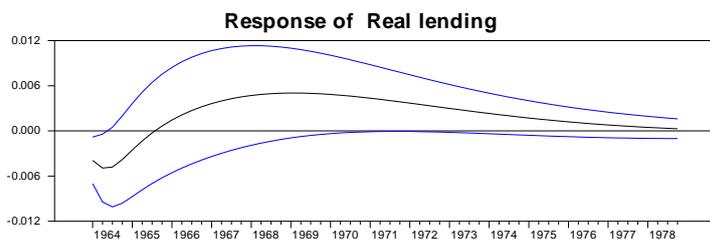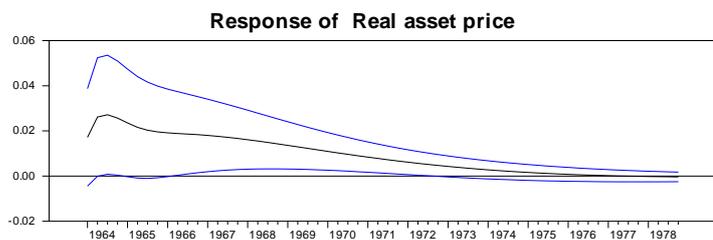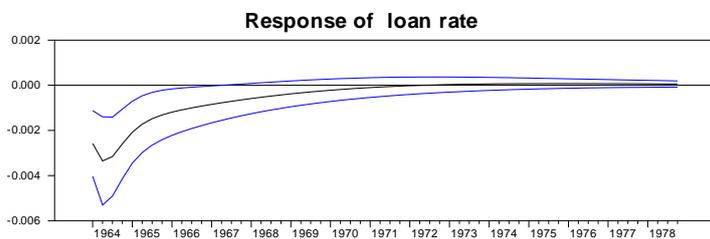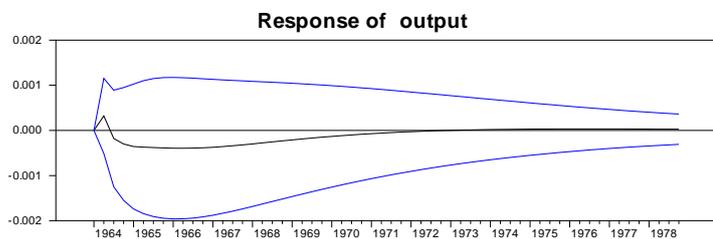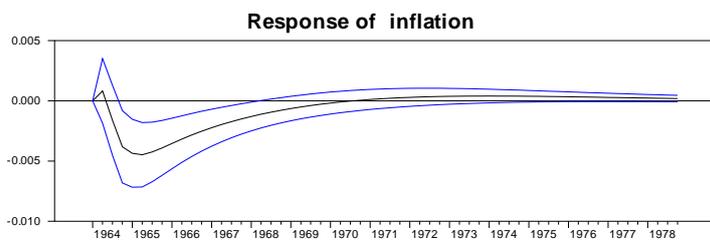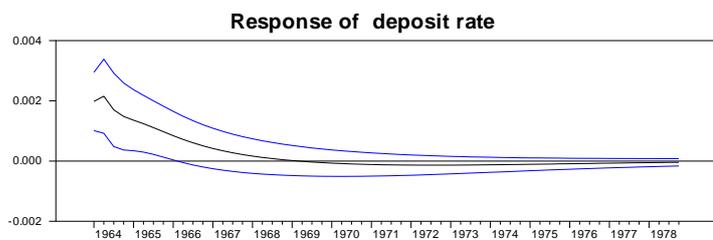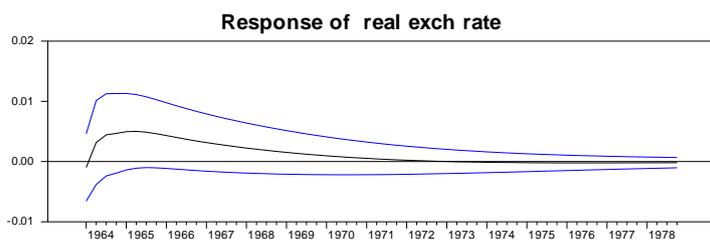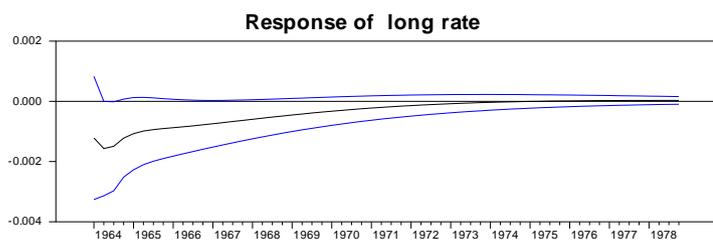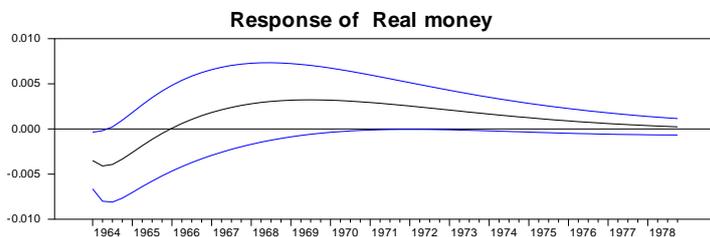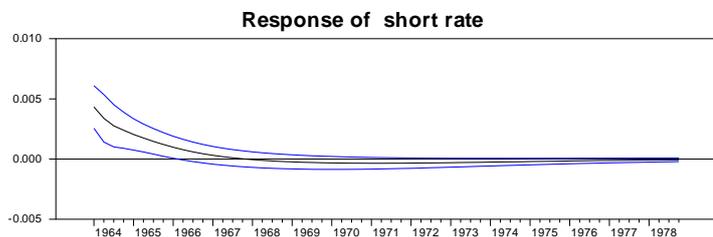
Impulse responses:
Bank Risk shock

Response of short rate

Response of Real money

Response of long rate

Response of real exch rate

Response of deposit rate

Response of inflation

Response of output

Response of loan rate

Response of Real asset price

Response of Real lending
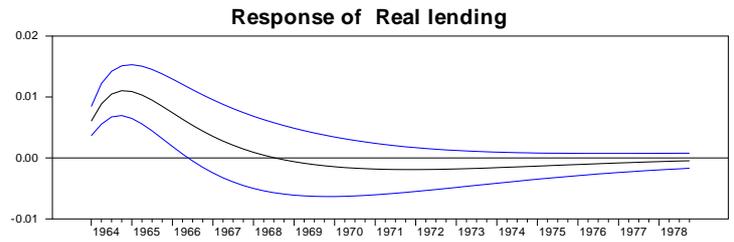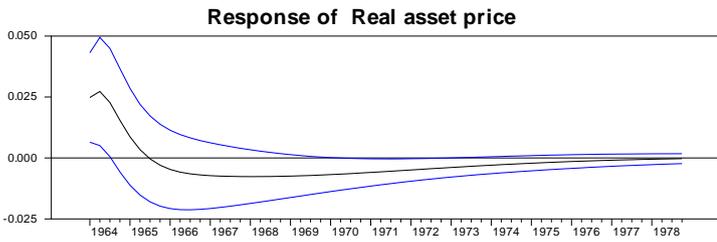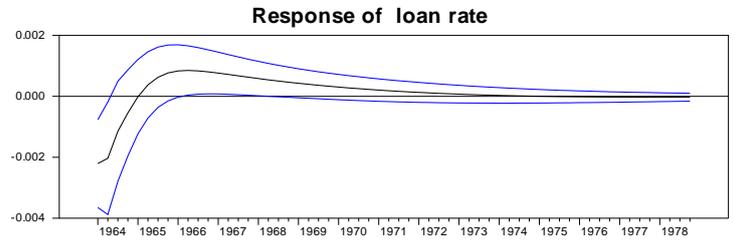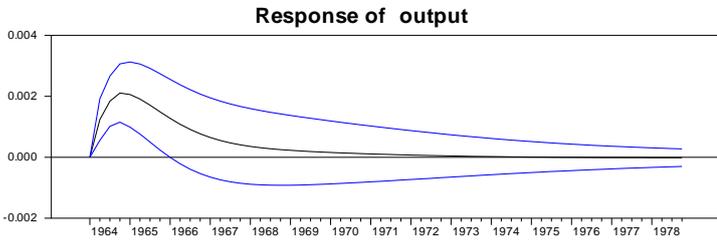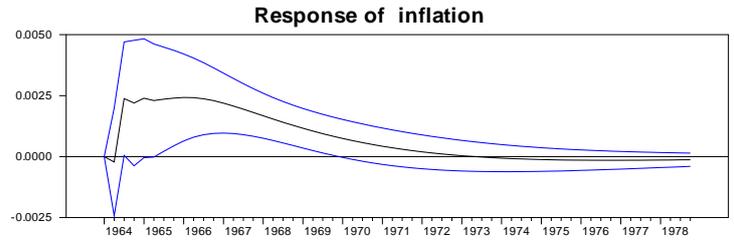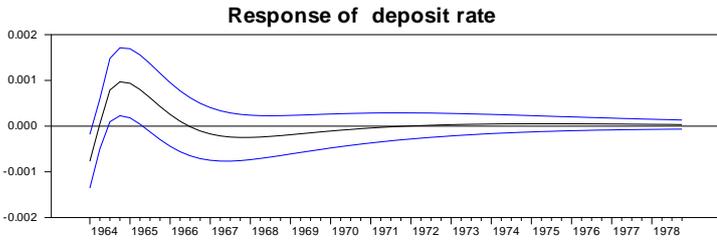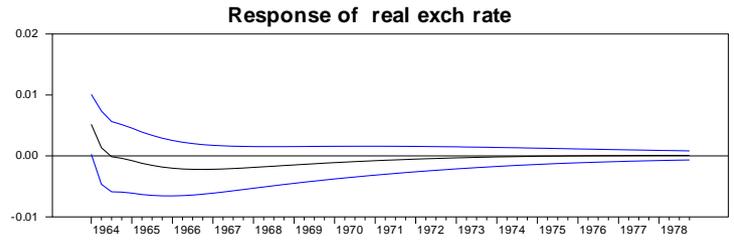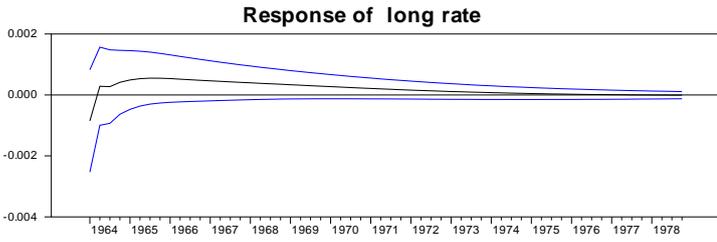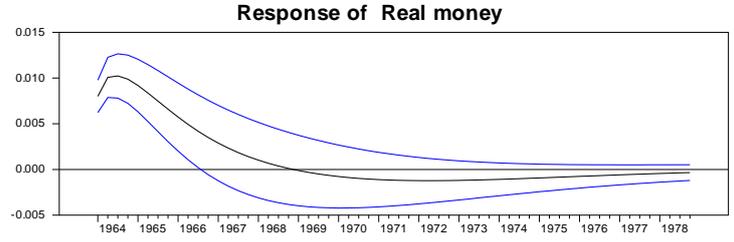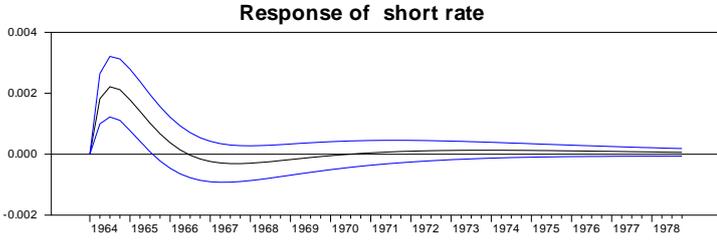
Impulse responses:
Risk Premium shock

Response of short rate

Response of Real money

Response of long rate

Response of real exch rate

Response of deposit rate

Response of inflation

Response of output

Response of loan rate

Response of Real asset price

Response of Real lending
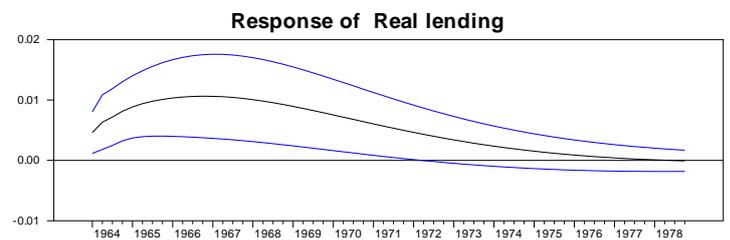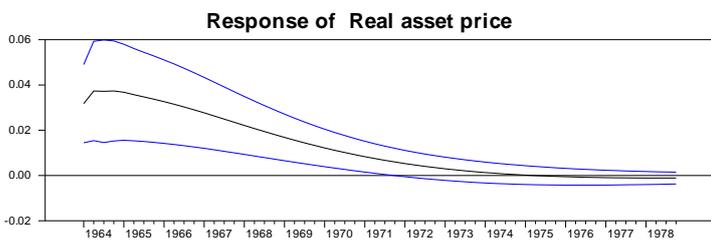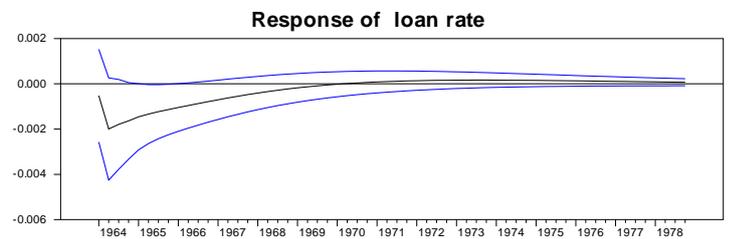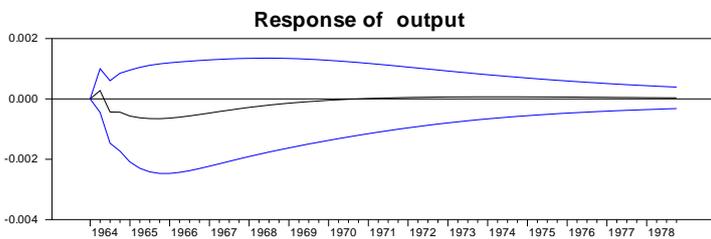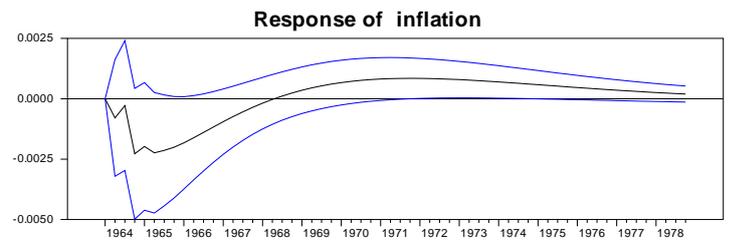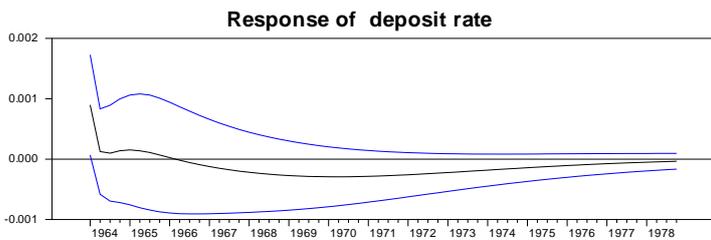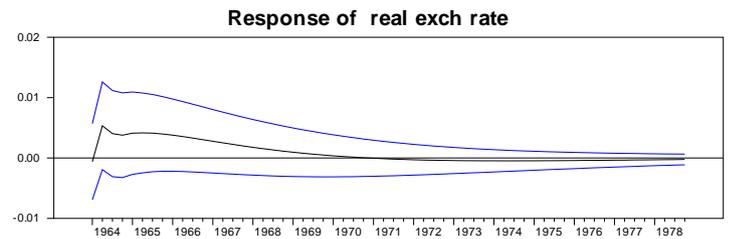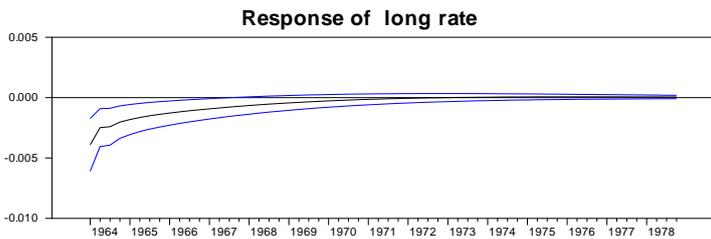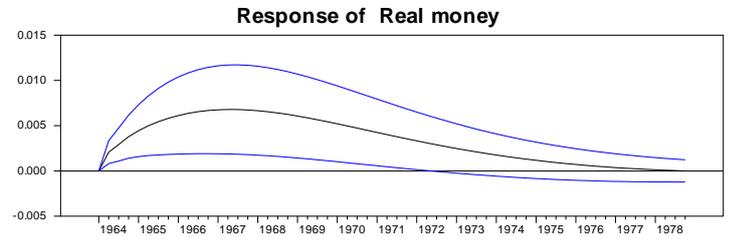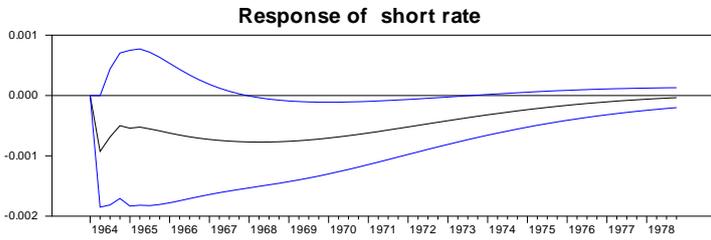
Impulse responses:
Cost Push shock

Response of short rate

Response of Real money

Response of long rate

Response of real exch rate

Response of deposit rate

Response of inflation

Response of output

Response of loan rate

Response of Real asset price

Response of Real lending

Markov Switching Smoothed Regime Probabilities

P(S(t)= 1)

P(S(t)= 2)

P(S(t)= 3)