

Background Paper for
Making Monetary Policy Work

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1 Introduction

This paper reviews current thinking about monetary policy and places current UK practice in a global and historical context. Its main focus is on the role of monetary policy in controlling inflation. This has been the main focus of UK monetary policy since the adoption of inflation targeting in 1992.

At a broad level, making monetary policy work is no different from any other kind of policy. There are two main challenges for economic policy: First, it is necessary to understand the nature of good policy. This requires both a theoretical appreciation of the issues involved, appropriate measurement and empirical analysis. The second challenge is to find ways to make policy happen. This is a challenge of institution design. The framework in place in the U.K. since 1997 has features which are intended to create an environment for good policy making.

This paper will discuss these issues beginning by looking at the history of inflation in the U.K. since the 13th century. For the largest part of this period, the U.K. used money linked to precious metals. This binds the hand of monetary policy makers in a way that we will discuss. The main challenges for monetary policy have changed after 1931, when the U.K. left the gold standard. Since then, monetary policy has been of wider significance. Along with these practical developments have come a change in our understanding of the inflation process. We will review this and show how this has led to changes in thinking about institutional arrangements. Early accounts of inflation were inclined to put weight on supply-side factors such as cost shocks. However, the modern theory of inflation places monetary policy at the heart of controlling inflation.

The remainder of this paper is organized as follows. The next section looks at how inflation is measured and the history of inflation in the U.K.. Section three of the paper looks at sources of inflation – both real and nominal factors. Section four considers the costs of inflation while section five discusses policy mistakes and how they may occur. In section six we discuss the policy trade-off and in section seven issues of expectations and policy credibility. Section eight describes the current institutional arrangements while section nine concludes.

2 Inflation

Inflation is a rise in the price *level*. In order to measure inflation, we need, in principle, a way of measuring prices of all goods in the economy. In practice, that is not a manageable task. We measure inflation by picking a specific set of goods and collecting information on how their prices change over time.

The earliest of price movement investigations related to changes in the price of individual commodities. By the early twentieth-century the first official general price indices were constructed in an effort to measure and support new social welfare schemes.¹ For example, with the onset of the First World War, the Liberal government recognised the necessity to study general price movements in order to measure and maintain social welfare standards of “working class” households.² Since 1914 the measurement of general prices has evolved into two main price indices for the UK; the Consumer Price Index (CPI) and Retail Prices Index (RPI). Figure 1 highlights how these official measures have evolved over time. Next, we briefly describe the idea of a price index, and how this has evolved in the UK.

2.1 Price Indices in the U.K.

The recognition that it was difficult to study general price movements through looking only individual prices lead to the creation of the first price indices. Irving Fisher defined a price index as; “An index number of the prices of a number of commodities is an average of their price relatives”³. The most common type of price index is a Laspeyres-type, or fixed weight index. The formula in (1) is a simplification of such an index, indicating the weighted price of a basket of goods at a given time, $I_{t,0}$, as a percentage of its weighted price at $t = 0$ (the base date). For a Laspeyres index, weightings on items should be determined at the base period and be representative of the expenditures upon each good or service within the basket being investigated. However, most indices are not true Laspeyres indices as the base period that

¹In the UK, these schemes included the introduction of old age pensions (1908) and national insurance (1911).

²“The rapid changes...in the price of the items entering into the cost of living have made clear the necessity of calculating index numbers showing general changes in that cost, with special and practical object of using such numbers as means of adjusting various long term contracts on a basis of movements in prices.” In “Methods of compiling cost of living index numbers.”, International Labour Office, Studies and Reports No.6, p.8.

³“The Making of Index Numbers”, Fisher, Irving., p.3

weights are determined over do not generally coincide with $t = 0$ (the start date for measuring prices in the index). For example, RPI weightings are based upon household expenditures over the previous twelve months.

$$I_{t,0} = 100x \frac{\sum P_{it}Q_{ib}}{\sum P_{i0}Q_{ib}} \quad (1)$$

where: P_{it} =price for the ith item at time t , P_{i0} =price of the ith item at time 0 and Q_{ib} =price of the ith item purchased in some base period.

In principle, there is an infinite number of price indices that could be constructed, covering any given combination of prices for individual goods and services. As such, the relevance of a price index will vary depending upon the required use. For example, the quantity and prices of goods and services that one individual buys may differ from that of another individual. As such, the price index that is relevant for a given individual may have only limited relevance for others. Most often, macro economists are interested in (and define inflation as) changes in the general level of prices. This represents how the internal purchasing power of a currency has evolved overtime. A true measure of such inflation requires information on the price of all goods and services, weighted by their share of national expenditure – an almost impossible task in practice.

In July 1914, the Board of Trade introduced the UK Government’s first systematic and continuous Cost-of-Living measure to monitor the increase month-by-month in the cost of maintaining unchanged the standard of living prevailing among the “working class” at the onset of the First World War. Items in the index fell into five broad groups (food, rent, clothing, fuel and light, and miscellaneous other items) and covered a limited number of items within each category.⁴ Weights assigned to items were based on the average expenditures of 1,944 urban family budgets collected by the Board of Trade in 1904 – Figure 2. Information for prices were obtained from a relatively small number of locations; for example, food prices were obtained from just over 500 locations, clothing from just over 200 representative outfitters, draper and boot retailers in over 80 towns.

The measure suffered from obvious deficiencies. The Ministry of Labour Gazette acknowledged that no allowance was “made for any changes in the

⁴Only 14 items represented food expenditures of the working classes: Beef, mutton, bacon, fish, flour, bread, potatoes, tea, sugar, milk, butter, margarine, cheese and eggs. Fruit and vegetables were excluded due to seasonal availability.

standard of living since that date (July 1914), or for any economies or readjustments in consumption and expenditure since the outbreak of the war.” Further problems included that the index was viewed as a subjective measure of “working classes legitimate” expenditure. For example, alcohol was excluded altogether, while tobacco and cigarettes were underweighted, representing under 1% in the index.

It was not until 1937-38 that the Ministry of Labour carried out a new budget inquiry of 10,396 working-class households with the aim of updating the basket of goods and associated weightings. But, given that this information related to expenditure under peace-time conditions, it was not viewed as suitable to serve as a basis for a cost-of-living index in the changing circumstances created by the war.⁵ Only in June 1947 were the findings of the enquiry implemented with the establishment of a new Interim Index of Retail Prices by the Cost of Living Advisory Committee⁶.

However, problems remained with the interim index. The weights represented ‘... the proportions shown by the 1937-38 budgets, adjusted to take account of the broad changes in relative price changes between that date and mid-June 1947.’ Critics also argued that sampling may have been biased as only the more literate households may have kept accurate budgets, leading to an over-representation of necessities in the budgets.⁷ Furthermore, expenditure on alcohol and tobacco had to be estimated due to a tendency for individuals to underestimate these in their budgets.⁸ The Cost of Living Advisory Committee recognised many of these limitations, but decided that the pattern of households’ expenditure continued to undergo changes in the immediate aftermath of the Second World War. As such, a new budget enquiry was not undertaken until 1953-54, when the pattern of expenditure was judged to have stabilised sufficiently.

⁵The UK had been at war for 18 months by the time the results of the survey became available.

⁶The change in name to a retail prices index reflected changing objectives for the measure in the aftermath of the war. Recognition was also given that cost-of-living was a misleading term when no allowances were made for regional variations in genuine costs-of-living. Further, the new index covered a wider sector of the population; the 1937-38 budget enquiry included persons insured against unemployment - a considerable portion of salaried employees.

⁷Of 22,000 households visited, only 10,396 provided budgets that were satisfactory.

⁸Estimates indicated that in 1937-38, around 11.4% of working class expenditure was on drink and tobacco. See "Changes in the Cost of Living and Distribution of Income since 1938", D. Sears.,

This new enquiry produced a larger sample for RPI weighting - 11,638 households and eventually allowed many of the committee's recommendations to be implemented into the first official Retail Prices Index from 1956. The new survey, and price index, captured a broader range of society, with only a couple of categories excluded for exhibiting a pattern of spending that was considerably different from the bulk of the population.⁹ Further advances were introduced with the introduction of the Family Expenditure Survey (FES) from 1957, allowing weights to be revised on an annual basis.

A number of minor changes occurred to the index through the 1960s and 1970s. In 1986 a wide-ranging report into RPI was released, establishing the basis of today's measure, including definition, scope and coverage and treatment of subsidies, discounts and owner occupied housing costs. The Harmonised Index of Consumer Prices (HICP), now CPI, was introduced in 1997 and is based upon the same underlying dataset as RPI but with differing coverage and methodology. For example, CPI excludes a number of RPI series relating to housing costs, but includes university fees excluded in RPI.¹⁰

The CPI Technical manual sets out the current definition, scope, coverage and construction of RPI and CPI. Some of the key characteristics include:

- the current weights are obtained from the annual Expenditure and Food Survey (EFS), which is the successor to the FES established in 1957. Around 6000 households are surveyed each year.
- households deriving the majority of their income from the state, and high-income households are excluded.
- the indices are produced through weighting together separate low level indices into higher level indices and eventually into the all items measure.
- the series are annually chain-linked.¹¹ As such, the indices are Laspeyres-type (fixed base weight), where each year the index attempts to

⁹High income households (defined as those with a head of household earning more than £20 per week) and so called 'pensioner households' (roughly those households deriving at least three-quarters of their income from the state).

¹⁰For more details on the difference between RPI and CPI see "The New Inflation Target: the Statistical Perspective", ONS.

¹¹Separate indices are constructed for each year, with January=100, before the years are chained together. Chaining is necessary each year as the weights and items in the basket of goods changes, so a chain linked index cannot be described as a ratio of prices in the current to the base period.

measure the change in price of a basket of goods and services fixed by composition, quantity and quality.

- the current base for RPI is January 13 1987=100, and January 2005=100 for CPI.

- a number of derivative indices exist and are based upon slightly differing baskets i.e. RPIY (RPI excluding mortgage interest payments and indirect taxes), RPIX (RPI excluding mortgage interest payments), CPIY (CPI excluding indirect taxes) and CPI-CT (CPI at constant tax rates).

Questions over the representativeness of the official indices still exist. Expenditure on some items is sufficient to merit inclusion in their own right, but for many items representative goods or services are selected to provide a reliable measure of price movements of a broad range of similar items. Selection of such goods is judgmental and based upon whether their price movements are sufficiently different from a representative good to justify inclusion in their own right. However, around 650 individual items are still captured by the RPI basket – representing a far broader coverage than earlier cost of living indices.¹²

Undoubtedly, the construction and accuracy of general price indices has improved over the past 94 years, but by definition these measures remain imperfect. In his 2002 LSE-Bank of England Lecture, Mervyn King, then deputy governor of the Bank of England, explained how measurements of inflation can suffer from a number of biases.¹³

One such bias is a new product bias. Leaving a basket of goods unchanged over time will induce a bias against new products that have been introduced into the market after the basket was fixed, a typical example being Information Technology goods. A substitution bias may also exist when weights assigned to items within a basket of goods and services remain unchanged for a certain period of time. Figure 3 shows that, in fact, changes in weights have been substantial over time. A third bias mentioned is a quality bias. Comparing the price of items over time does not take account of quality improvements (e.g. personal computers). The use of hedonic pricing can help to alleviate this bias, but given the way that RPI is constructed, this cannot be eradicated over a period of years. Another example of mis-measurement is the outlet bias. Looking at prices from Harrods' catalogue since the middle of

¹²Changes to items listed in the basket should not be over interpreted beyond their significance as representative items.

¹³These biases are some of the issues discussed by the Boskin Commission Report: Boskin, M et al. (1996), 'Towards a more accurate measure of the cost of living.'

the 1890s, Mervyn King showed that ignoring changes in retail practice (like the growth of internet shopping) can introduce a bias into official measures of inflation. The ONS select their outlets for their price surveys with great care, but there is intrinsically some level of bias that cannot be removed.

The treatment of housing is another important but difficult element to be considered when constructing a general price index. The difficulty comes from the fact that the true price of housing is not directly observable. In principle, we should measure housing services in terms of rents (even for owner-occupiers), but mortgage payments affect the amount that owner occupiers actually pay. The mortgage payments are often linked, in same form, to the Bank Rate. This implies that any change in monetary policy translates mechanically into a change in mortgage payments, and in turn in the true price of housing. Also changes in house prices need somehow to be factored in. Capital gains on housing can be viewed as a wealth transfer from renters to homeowners. But to the extent that tenure status simply reflects different points in time in someone's life cycle, it is not obvious that the economy as a whole benefits or suffers from house price changes.

The fact that after 94 years of development official price indices remain imperfect does not render them as meaningless though. Policy makers tend to stress the importance of public confidence behind and general interpretation of such measures for the economy and purpose for which they are used. Since 1992 one of the central pillars of UK government economic policy has been to deliver price stability as a precondition for high and stable levels of growth and employment. Definitions of price stability tend to be vague notions. The price index used for the purpose of inflation targeting provides an observable measure for policy and decision makers.

However, as Mervyn King noted in 2002:

“There is nothing mythical about the RPIX measure of inflation, nor the figure of 2.5%. But it is important to have a precise numerical target which is easy to understand in order to provide an anchor to inflation expectations and to which the MPC can be held accountable”.¹⁴

¹⁴"The Inflation Target Ten Years On", King, M., 2002

2.2 The History of Inflation in the U.K.

We end this section on measurement by looking at the history of inflation in the U.K..

In principle, we can look inflation over long time periods to the extent that data exist. In practice, for the reasons that we have already discussed, it is difficult to get a completely consistent approach. Figure 4 give estimates of inflation going back to the 13th century.¹⁵

The panels for the early years show a lot volatility. There are at least two reasons. First, there could be more measurement error. Second, the relatively high weight on seasonal food prices in a predominantly agricultural economy will also make inflation more volatile.

3 The Sources of Inflation

In this section, we discuss some of the main sources of inflation, drawing a distinction on whether they emphasise real or nominal phenomena in determining the level of inflation.

3.1 Real Factors

As a way into thinking about real factors in determining inflation, consider the price of a specific good – wheat. We would expect supply shocks to wheat production, plus changes in global patterns of demand for wheat based products, such as bread, to have a material impact on the consumption expenditure of a representative British household. In fact, if we go far enough back in history, wheat prices are pretty important determinants of the price level given how important food was in the consumption bundle of a typical British household. In 1904 expenditure on bread represented 8.9% of the Cost-of-living Index, but by 2008 bread, cereals, cakes and biscuits represented only 1.5% of the RPI basket.

A striking feature of the charts on inflation in Figure 4 is that during the twentieth century, and especially the post-WWII period, we have seen more stable and less persistent inflation than the previous 600 years, with

¹⁵Source: Allen-Unger database "European Commodity Prices 1260-1914" available at <http://www2.history.ubc.ca/unger/ECPdb/index.html>, a collection of long-run historical data from a wide variety of social history studies across countries and over different centuries.

no episodes of deflation after 1943. It is intriguing to notice in Figure 3, that until the 1980s, food has been a dominant, although decreasingly important, component of expenditure for UK households. Since the 1970s, in contrast, housing has become increasingly important in the consumption bundle of British families. A possible interpretation of the evolution of UK inflation is that, because of its expenditure composition, the UK economy was more exposed to supply shocks (affecting food prices) prior to the twentieth century, but it was more exposed to demand shocks during the last one hundred years. Anecdotal evidence support this view.

In the second half of the fourteenth century, a significant portion of the UK population died because of the black death. In economic terms, this represented a very large negative supply shock, which strongly affected labour supply in the country. A sharp drop in the labour force, and thus in the number of employees, led to a sharp contraction in production and an equally sharp rise in the price level. According to some recent historical studies, during this period the level of prices increased, cumulatively, by 50% in the UK.

More generally, in a predominantly agricultural economy, we might postulate that shocks to food supply would have quite a bit of explanatory power in understanding inflation. Some people even argue that it makes sense today to focus only on core inflation which strips out volatile prices – such as seasonal foods. This is because we should expect inflation changes to be only temporary if supply reverts to normal. In this world, inflation should not be very persistent.

Such supply-side views of inflation were also present in some of the debates in the 1970s. The oil price shocks of 1973-1974 and 1979-1980 were mainly due to supply-side developments in the global oil market. During the 1970s, the western economies (including the UK) were far more dependent on oil as a factor of production than they are now. The large increase in costs was passed through the supply chain, implying a higher general level of prices and a lower level of production.

These episodes suggest that one way to understand inflation more generally might be to extend this analysis, going good by good and then tracking what is going on in each market to get an understanding of inflation. However, for reasons that we will explain this is not particularly fruitful.

In understanding inflation, it is essential to differentiate between changes in relative prices and changes in the price level. For the sake of discussion, let us continue to focus on wheat and suppose that shocks to weather affect the

wheat harvest and hence change the price of wheat. This is clearly a relative price change, i.e. it is a change in the price of wheat relative to the price of other goods. It is likely to change consumption patterns as households consume less wheat and buy substitutes which are now relatively cheaper.

Contrast this with what happens if the prices of all goods rise in the same proportion. Wheat will also be more expensive in this case, but so is everything else and it is not at all clear that there need be any changes in consumption at all. In fact if wages and prices all rise together, we might not expect anything to change. Inflation could even be neutral having no real effect on behaviour. Understanding pure inflation means knowing why all prices could rise and that it is not going to be a story about the supply and demand in specific markets.

3.2 Nominal factors

In his classical "Studies in the Quantity Theory of Money" (1956), Milton Friedman famously claimed that "Inflation is always and everywhere a monetary phenomenon". We will now discuss the logic of this claim and link it to modern demand-side theories of inflation.

Money is means of payment which allows us to get beyond barter as a means of trade. Consider the following thought experiment. Suppose that we were simply to double the amount of money circulating in the economy. Would we all be richer? A basic insight says no. Since our apparent purchasing power had risen, we would all presumably buy more. But there would be no reason to expect more to be produced. So all prices would have to rise so that supply and demand for each good was equated. This would create inflation.

This is all a bit simplistic, but the logic seems basically correct. This type of reasoning ties the creation of money to the price level and to inflation. Since fiat money is purely a means of payment, having no intrinsic value, it is impossible to create anything real by having more money. In the years between 1821 and 1914, and then between 1925 and 1931, the UK was part of the gold standard monetary regime, according to which the value of the currency was pegged to the value of gold. This meant that the growth rate of money, and thus inflation, was pinned down by the growth rate of the stock of gold in the world.

It is interesting to note that the price level rose around the times of the discovery of new gold mines in 1849 and 1896, with a tendency to fall in the

periods between discoveries as real incomes rose relative to the gold stock. Figure 7 shows that being part of the gold standard made it possible for the UK to maintain a remarkably stable level of prices: in 1910 the level of prices was even lower than the level of prices in 1810!

After WW-II, the use of fiscal and monetary policies to support economic activities implied that the link between money growth and inflation weakened, generating an exponential rise in the price level.

Most countries have, throughout history, operated a range of commodity based monetary systems. The UK had operated under a bimetallic standard prior to 1797, and gold standard between 1821 and 1914, and from 1925 to 1931. More recently, Bretton Woods was a de-facto gold standard in that the reserve currency (the US Dollar) was convertible into gold. The choice of gold as the commodity of choice reflects the fact that gold has the desirable properties often associated with money; durable, recognisable, storable, portable, easily standardized, and difficult to manipulate the supply (in the short run at least).¹⁶ But, more importantly, the choice of commodity money reflects the perceived long-run price stability offered by such systems and the maintenance of narrow foreign exchange limits.

From 1821 to 1914, the price of one ounce of (standard 22 carat) gold was set at £3, 17s, 10 1/2d. Sterling returned to gold at the same parity in 1925, but came off the gold standard in September 1931. Keynes had been critical of the restoration of Sterling at its pre-war parity, noting that rapid inflation since 1914 would render the return as "cold-blooded income deflation", through the higher interest rates required to maintain adequate gold reserves. The extension of the franchise, rise of unions and the labour party had politicised monetary policy with authors like Keynes linking monetary policy to unemployment. As such, there was greater downward resistance to wages and prices (as witnessed by the general strike of 1926), and less credibility in the ability of the Bank of England to do as it pleased to maintain the currency peg.

¹⁶Bordo and Eichengreen (1998) noted that the 'classical gold standard' period in the late nineteenth century developed out of a range of commodity money standards and reflected the benefits of adopting similar monetary arrangements to the dominant trading nation of the day: the UK.

4 The Costs of Inflation

The discussion about the possible sources of inflation brings us naturally to the question why inflation is undesirable. To appreciate the costs of inflation, it is useful to draw a distinction between anticipated and unanticipated (surprise) inflation. When inflation is perfectly anticipated, the private sector embodies this expectation in its consumption and investment decisions, as well as in wage negotiations. On the other hand, when inflation is unexpected, the businesses and households have not taken it into account when forming their decisions. In this section, we will see that anticipated and unanticipated inflation may have very different costs for households depending, among other things, on the extent of the surprise as well as on the household's financial position.

4.1 Anticipated Inflation

A first cost associated with anticipated inflation is often referred to as "Shoe Leather" cost. The idea is that higher inflation is associated with higher nominal interest rates, which increase the opportunity cost of holding money. In this sense inflation is a tax on money balances. As emphasized by Bamouel and Tobin, the increases in both inflation and nominal interest rates erode the purchasing power of money, and therefore it creates an incentive for households to reduce money balances, increase spending and move their wealth towards durable goods. This reduction in holding money balances implies that households and entrepreneurs need to go more often to the bank, thereby consuming the leather on their shoes at a faster rate.

Turning now to businesses, rapid inflation is associated with greater resources being devoted to changing prices. This is often referred to by economists as the "Menu Costs" of inflation, following the idea that restaurants need to change the prices of their menus as frequently as the changes in the general price level.

Finally, inflation may introduce distortions in the fiscal system whenever the thresholds determining someone's tax level is fixed in nominal terms. The effect of entering a higher tax band as a pure reflection of high inflation and nominal tax band thresholds is often called "fiscal drag".

4.2 Surprise Inflation

When inflation is a surprise, it is clear that citizens cannot plan around its consequences. Savers who hold cash discover that its value has gone down. Had they known this was a possibility, they would have been able to look to save in the form of assets which kept up with inflation. There are winners too. Those who are in debt (including the government) will find that the value of their debts have been eroded.

Whenever a credit line is agreed in nominal terms, an unexpected rise in inflation moves wealth from creditors towards debtors. An unanticipated fall goes in the opposite direction. A typical example is taking out a mortgage. After a house purchase that requires some form of lending, the real burden of the household debt is softened by an unanticipated increase in the price level. The same holds true for other assets, though the experiences of the high inflation in western economies during the 1970s and in South American economies during the 1980s and 1990s has taught the usefulness of introducing financial products whose returns are indexed to inflation.

A similar redistributive effect is also true for income. For instance, all wages negotiated before the unanticipated inflation will fall in real terms. The older groups of the population will experience a sharp reduction in the purchasing power of their savings, and hence unanticipated inflation acts as a wealth transfer from older cohorts to younger cohorts.

5 The Costs of Policy Mistakes

There are several reasons why policy makers' action may prove mistaken. First, there may exist a genuine misunderstanding of the mechanism through which the economy works and monetary policy decisions transmit to the economy. Second, policy mistakes may be the outcome of a deliberate goal to use a policy tool to alleviate the adverse effects of earlier unsuccessful policies. In this section, we will discuss the costs of both types of errors. We will then discuss how institutional arrangements now exist to guard against such sources of policy error.

5.1 Inflation and Public Finance

If governments issue debt that pays a fixed nominal interest level, then it can reduce its debt obligations by creating inflation. This is a form of

default. But markets are unlikely to be fooled consistently and governments will have to pay a higher and higher interest rate on its debts to compensate for inflation risk. In the UK, government offers indexed government debt to make it credible that this will not happen. The difference in the yield of indexed and non-indexed debt provides a measure of inflation expectations.

In practice post-war inflation in the U.K. played a major role in reducing the real value of public debt (see Figure 8).

During the 1980s and the 1990s, some South American countries experienced inflation rates of 300%, and even larger. The driving force of these spectacular numbers has been a sequence of very large public deficits run by increasingly indebted governments. Argentina, Brazil, Chile and Mexico came, at different times over this period, under huge political pressures caused by very poor macroeconomic performances. The use of public spending to expand aggregate demand can have very different consequences for inflation depending on how that debt is ultimately financed.

Government bonds are a useful instrument when borrowers require relatively small premia as a consequence of their trust in the ability of the governments to maintain its repayment promise. In the face of real economy turmoil, of the kind that was seen historically in South America, a government's credibility can be shaken and issuing bonds as public debt is no longer an option. The history suggests that taxation may also reach a natural limit. Moreover, with limited foreign currency reserves held by the national central banks, the emergence of large current account deficits in the face of limited access to international capital markets has led to money creation as a means of financing public spending. This has often led to high inflation.

5.2 Exploiting the Phillips Curve

In the 1950s, the LSE economist A.W. Phillips plotted the statistical relationship between inflation and unemployment in the U.K. Many economists after him interpreted the negative correlation between the two series as suggestive of the existence of a long-run trade off between inflation and unemployment. This observation led to the speculation that governments could perhaps choose between lower inflation and low unemployment.

There are two main problems with this view. First, there is a need for persuasive theoretical underpinnings for a long-run trade off. Second, the empirical relationship seems unstable. More generally, the specific nature of the policy trade-off depends on the mechanism of expectations formation.

Under adaptive expectations, economic agents look at the past to infer what price level will prevail in the future. According to this mechanism, inflation is stable only if the rate of unemployment is equal to its natural rate. The natural rate is the hypothetical rate of unemployment that would prevail in an economy without frictions such as real and nominal rigidities.

Milton Friedman and Edmund Phelps showed that the monetary authorities can achieve a permanent level of unemployment below the natural rate only through the adoption of expansionary policies that generate a continuous increase in the rate of inflation.¹⁷ In other words, there exists no *long-run* trade-off between inflation and real activity. The sin of policy makers during the 1970s was to try to exploit this illusional long-run trade-off, which had the consequence of generating inflation without lowering the level of unemployment. This theory led to the definition of the NAIRU (Non-Accelerating Inflation Rate of Unemployment) as the rate of unemployment below (above) which inflation tends to accelerate (decelerate).

6 The Policy Trade-Off

In the face of an output contraction caused by an increase in real wages, fiscal and monetary authorities may wish to adopt expansionary policies to sustain aggregate demand. The policies that expand aggregate demand to offset negative supply-side developments are referred to as "accommodative". The significant cost of accommodative policies in the face of supply shocks is that they tend to generate an increase in inflation, triggered -in this example- by higher wages and then corroborated by stronger government spending.

An alternative strategy for the government is to offset the inflationary consequences of supply shocks by, for instance, adopting policies that contract aggregate demand and therefore, through excess supply, reduce prices. The policy dilemma is then between containing inflation and promoting economic growth. It is a dilemma because by the very nature of supply shocks these two objectives are mutually exclusive. In other words, the policy makers face a trade-off between price stability and full employment in the *short-run*.

Understanding the theoretical foundations of the short-run trade-off is crucial to identify the channels through which monetary policy can affect the economy. First surprise inflation could lead people to be confused by

¹⁷For accessible readings on this, please see Friedman (1976) and Phelps (2006) Nobel lectures available at http://nobelprize.org/nobel_prizes/economics/laureates/

differences between relative and price level changes. This was suggested by Robert Lucas. According to this view, when firms face an unanticipated increase in demand, they wrongly infer that the demand for their products has increased, and on the basis of this consideration they may choose to increase production. If all firms were reasoning along these lines the economy would end up with a level of aggregate supply well in excess of the aggregate demand.

The second view is that wages and prices are sticky in the short run, and thus some of the adjustment to changing macroeconomic conditions need to work through changes in the quantity of goods and services. This is the so-called New Keynesian paradigm, which now lies at the heart of many central bank models.

Whichever way one thinks about this in theory, it is clear that a government may wish to temporarily boost output by relaxing monetary policy and creating an inflation problem later. But this makes it difficult for the government to promise low and stable inflation.

If one looks in the data, it is quite difficult to identify the trade-off faced by the policy makers in a particular period from looking at simple measures of correlation between inflation and unemployment in the tradition of Phillips. The reason is that the trade-off is a policy-invariant feature of the economy which depends on slow-moving processes such as institutional changes in the labour and good markets. The simple correlation between inflation and unemployment, in contrast, depends among other things on the stance of monetary policy.

To see this, consider a central bank that targets inflation successfully, i.e. a central bank that moves the policy rate such as to stabilize inflation perfectly. Unemployment, which is not targeted by the monetary authorities, varies then with movements in macroeconomic conditions, i.e. recessions (expansions) are period of high (low) unemployment. The implication is that over a monetary regime in which inflation is firmly anchored around the target, the empirical (reduced-form) Phillips curve relationship is flat.

For the sake of the argument, suppose now that policy makers are interested in stabilizing unemployment, while considering inflation of second order importance. To the extent that monetary policy is successful in achieving its objective, this scenario would be associated with a vertical Phillips curve as unemployment remains steady whereas inflation fluctuates over the business cycle.

But what does the data tell us about the slope of the Phillips curve?

Figure 9 looks at UK data since 1971. It is clear that over the past couple of decades there has been an apparent flattening in the reduced-form correlation between inflation and activity. In the 1970s the relationship was almost vertical, with high levels of inflation resulting from attempts to hold unemployment steady, and possibly below the natural rate. Through the 1980s and into the early 1990s an increasingly downward sloping relationship appeared as inflation was slowly squeezed out by the slack in the economy. However, since the onset of inflation targeting in the early 1990s the relationship has been virtually flat, perhaps reflecting the success of macroeconomic policy to control aggregate demand, as well as changes to the underlying inflation process stemming from the globalisation of good markets¹⁸.

7 Expectations and Policy Credibility

At the beginning of the 1970s, a group of economists led by Robert Lucas and Thomas Sargent proposed a very different approach to studying inflation dynamics based on the notion of rational expectations. In contrast to the common assumptions of the model of the 1960s and part of the 1970s, these economists argued forcefully that workers and firms try to forecast future inflation in the most accurate way possible, as large departures from their expected value would be associated with significant real costs. Their working assumption has been that households and businesses know the true model of the economy, and as such they understand and they are able to anticipate the behaviour of policy makers.

Under rational expectations and perfect policy credibility, there is no trade-off between inflation and unemployment. Suppose that the policy makers announce a series of interventions aimed at bringing inflation to, say, 2%. If the public judge these interventions credible and therefore trust the government/central bank, firms and workers will adjust nominal wages such as to make unemployment equal to its natural rate. The last step is for the policy authorities to implement the announcements, which will yield inflation to 2% and unemployment to its natural level.

The mechanism described above heavily relies on the government's ability to influence private sector expectations. After the announcement is made and nominal wage have been agreed on the basis of the policy announcement, the policy makers face an incentive to surprise the agents with unanticipated

¹⁸See Bean, C., (2006) 'Globalisation and Inflation' for further discussion.

inflation in an effort to expand aggregate demand beyond its natural level. This is called the time-inconsistency of monetary policy, and owes its formalization to Fynn Kydland and Edward Prescott. But the private sector, who has rational expectations, understand and anticipate the policy incentives, and hence nominal wages are settled at a higher level relative to the credible policy scenario. In equilibrium, there is no expansion in demand but inflation turns out to be higher than if policy makers maintained their promises.

The historical evolution of monetary arrangements is another way to interpret the evolution of inflation over the centuries. The ultimate goal of the monetary arrangements seen in the U.K. and overseas has been to pursue a well-defined target by committing to clear policies aimed at enhancing the monetary authorities' credibility to the eyes of the public. Certain experiences have been more successful than others, but the alterne fortune of each policy regime has heavily relied on its credibility (or lack of it).

A case in point is the Great Inflation of the 1970s. Following the oil price shocks of 1973-74 and 1979-80, most industrialized countries experienced a sharp rise in inflation. Most countries, but not all! West Germany did not see such a spectacular rise, with an average rate of inflation during the decade around 5% when the rest of the G7 were around 10% and more (Figure 10). What special about the German experience?

The German monetary authorities made it clear that fighting inflation was a priority. Furthermore, they made the announcement credible by committing to a monetary policy characterized by positive real rate. As positive real rates stimulate saving and therefore reduce the income that households have available for consumption, the German authorities were effectively depressing aggregate demand to contain inflation. The rest of the G7 countries, in contrast, chose to cut aggressively the nominal interest rate to contrast the sharp fall in unemployment. As a result the real interest rates were mostly negative, thereby stimulating spending and in turn inflation.

The experience of the 1970s reveals how costly the policy trade-off can be. The real costs of a deeper recession over a relatively short period of time need to be weighed against the real costs of a prolonged period of high inflation. Once policy credibility is lost, high inflation becomes embedded in the expectations of households and businesses. Then, workers require their wages to be indexed to inflation, as in the 1970s. Higher nominal wages drive higher productions costs, which in turn fuel further inflation and further expectations of high inflation. The real costs of eradicating these expectations can have a significant impact on the prospectsfor economic

growth.

8 Institutional Design

There are a number of lessons from this experience which fundamentally change the way that many countries approach monetary policy. Following on from the Great Inflation of the 1970s many countries have adopted institutions which are aimed at explicitly using monetary policy to control inflation. To make this effective, it was realized that some degree of independence of the conduct of monetary policy might be desirable. More and more discussion focused on the role of independent central banks in fulfilling a mandate of low and stable inflation. Governments that experienced the cost of getting inflation under control after a period of high inflation generally conceded that there was a case to prevent such episodes recurring. The institutional arrangements in place in the U.K. were born out of such thinking.

The watch word of monetary policy making became credibility – designing institutions to deliver policy and a clear and accountability basis for monitoring this. The UK government has responded to these challenges with two significant institutional reforms.

In December 1992, an explicit target for inflation was announced in an effort to anchor inflation expectations in the aftermath of the currency crisis which forced the British authorities to abandon the European exchange rate mechanism. In May 1997, the Bank of England was granted operational independence to meet the inflation target laid down each year by the Chancellor of the Exchequer. At present the target is 2% CPI inflation.

The job of the Monetary Policy Committee is to set Bank Rate to fulfill this mandate. This committee comprises five internal members, who have full-time executive positions in the Bank, and four external members who are mostly part-time and have no executive responsibilities. Each month all members of the committee are briefed by Bank of England staff, after which they meet for a private discussion and subsequently vote on interest rate decisions. The outcome is determined by majority rule.

The deliberations of the committee are reported in minutes that are published approximately two weeks after the committee's decisions. These explain the committee's thinking and report the votes of individual committee members.

Each quarter, the committee publishes the Inflation Report outlining the

committee's best collective judgement on the outlook for inflation and growth based on the market's prevailing view of the likely path of interest rates. The Inflation Report explains the wider economic forces that are likely to shape the path of inflation over a two to three year horizon. It also gives an opportunity for the committee to outline its view of the main risks that are likely to be relevant.

Individual committee members also give their individual views about the outlook in speeches and their writings. A somewhat unusual feature of the MPC is the fact that members of the committee are individually accountable due to their individual votes being made public. As part of their accountability they are also asked to give evidence to the Treasury Select Committee of the House of Commons, explaining their decisions.

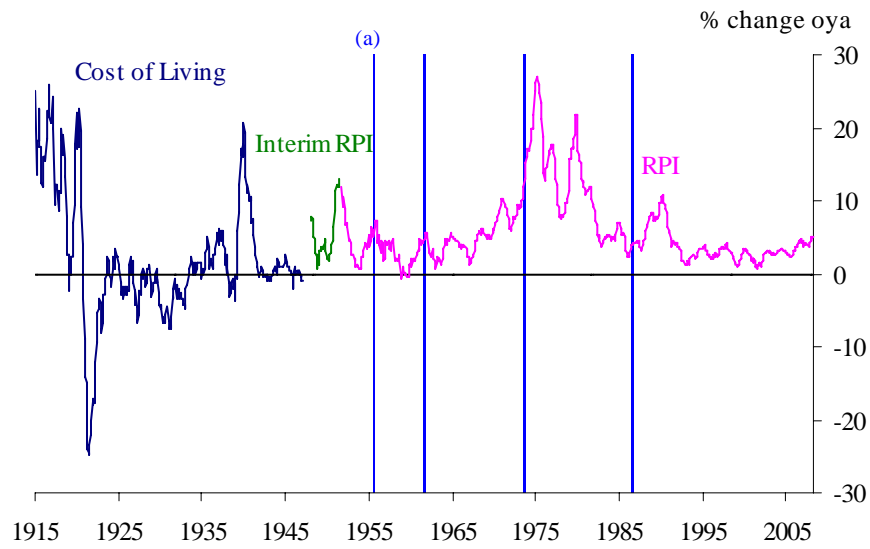
Monetary policy is now focused on maintaining the 2% CPI target. However, if inflation diverges more than 1% from that target, the Governor of the Bank of England must write a letter on behalf of the MPC detailing the reasons. To date, there have been three such letters – the first in 2007.

9 Concluding Comments

This paper has laid out some issues behind the historical evolution of monetary policy making in the U.K.. The paper has looked at the history of inflation in the U.K. and changing thinking on that topic. We have shown how this has lead naturally to the adoption of the current U.K. monetary arrangements.

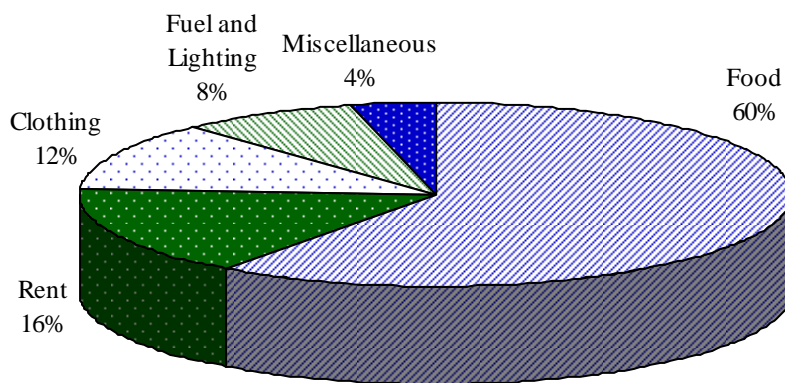
The arrangements now in place in the U.K. have three key features. First, monetary policy has a clearly defined objective in the form of the inflation target. Second, there is clear accountability for achieving that objective with the an emphasis on communication of the economic thinking behind decisions. Third, the decision are made on an independent basis where economic considerations are paramount. Together, these three features give the best possible chance for monetary policy to work effectively.

Figure 1: Official Measures of Inflation



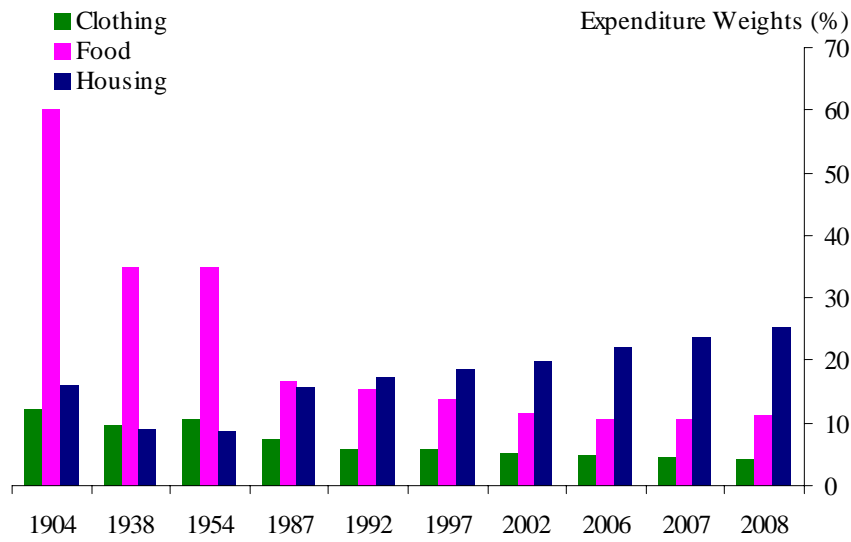
(a) Rebasing of RPI occurred in January 1956, 1962, 1974, 1987

Figure 2: Expenditure Weights in 1904



Source: Ministry of Labour, (1944) 'The Cost of Living Index Number Method of Compilation Introductory Note.'

Figure 3: Changing Composition of Official Inflation Baskets

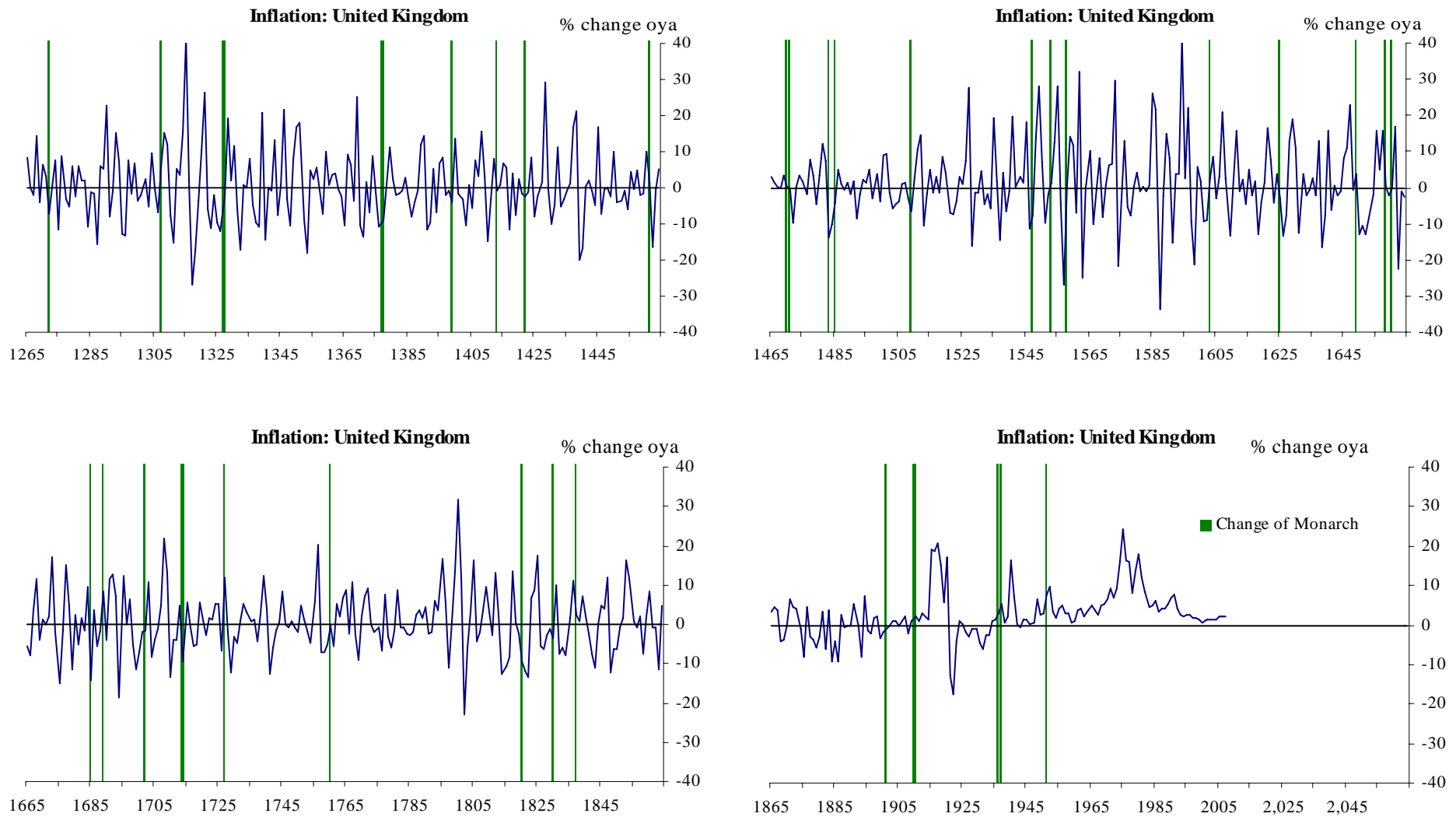


Note: Housing for 1904 and 1938 measures are based on rents only

Source: Ministry of Labour, (1944) 'The Cost of Living Index Number Method of Compilation Introductory Note.'

Sears, D., (1949) 'Changes in the Cost of Living and Distribution of Income Since 1938', Ministry of Labour and National Service, (1957), 'Report of an Enquiry into Household Expenditure in 1953-54', and the ONS.

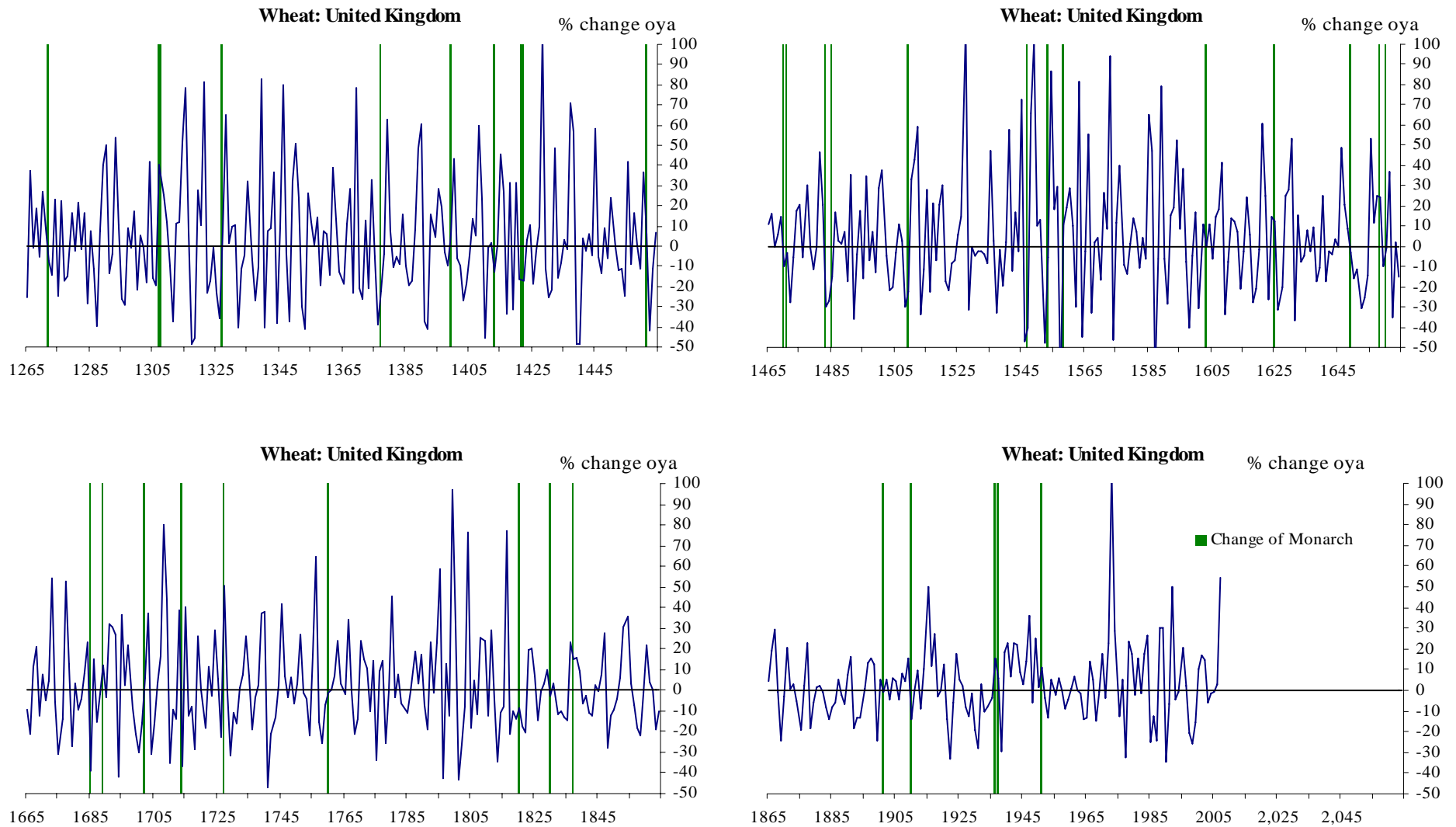
Figure 4: Inflation in the United Kingdom Since 1265



Source: "Consumer price indices, nominal/real wages and welfare ratios of building craftsmen and labourers, 1260-1913" Allen, R.C., and Global Financial Database (Post 1800)

Note: Allen computes the cost-of-living index for London and Southern England based upon fixed quantity weights of basic food commodities delivering basic nutritional requirements. The index is Laspeyres rather than geometric (items and weights afforded to items do not change over time) and expenditure shares of components changes over time. The dataset uses extrapolated and interpolated data where data is incomplete. Rents are not included. For full information on the construction of the series see "The Great Divergence in European Wages and prices from the Middle Ages to the First World War", Allen, R.C. (2001).

Figure 5: Wheat Price Inflation in the United Kingdom Since 1265



Source: "Consumer price indices, nominal/real wages and welfare ratios of building craftsmen and labourers, 1260-1913" Allen, R.C., and Global Financial Database (Post 1915)

Figure 6: Money Growth and Inflation

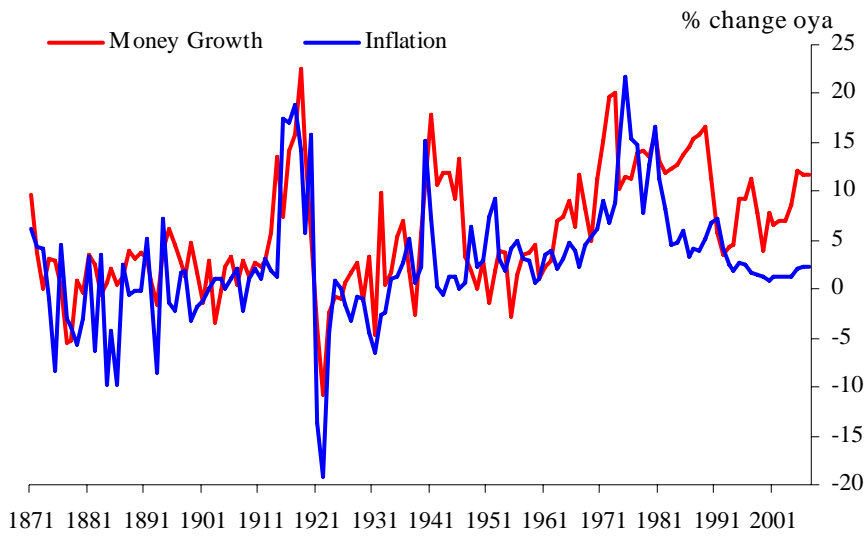
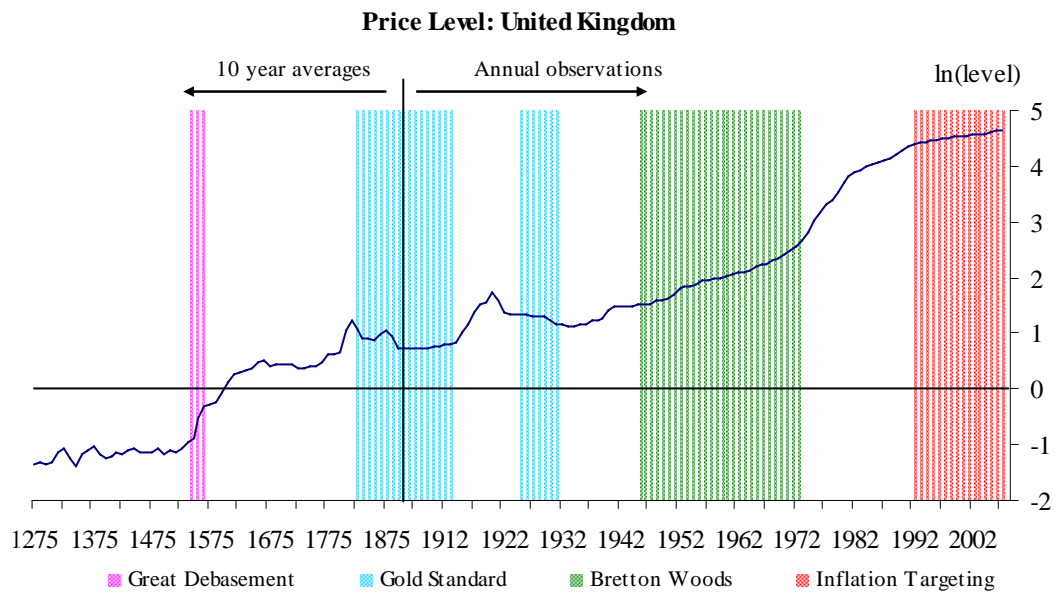
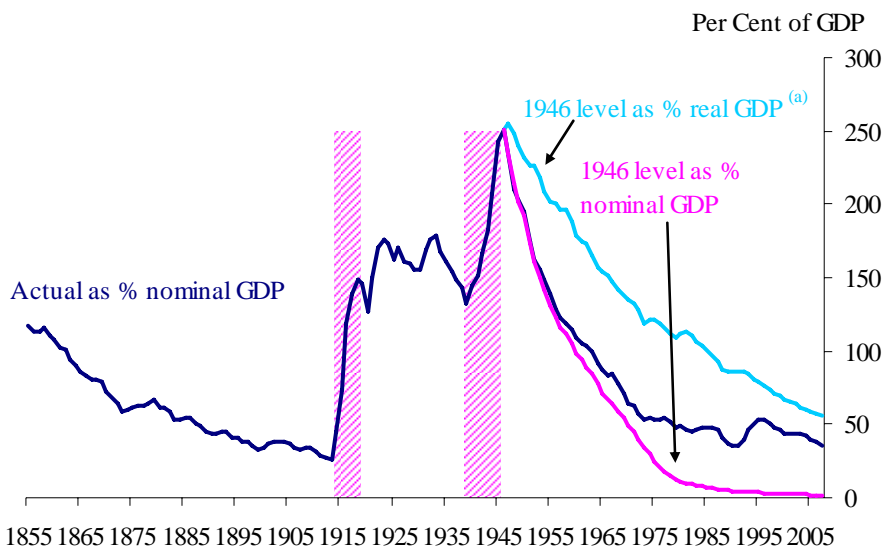


Figure 7: Price Level in the United Kingdom since 1265



Source: "Consumer price indices, nominal/real wages and welfare ratios of building craftsmen and labourers, 1260-1913" Allen, R.C., and Global Financial Database (Post 1915)

Figure 8: Inflation Erosion of National Debt



(a) Real GDP based at 1946

Source: ONS

Note: National Debt ceased to be published after 2003. Data from 2004 represents the gross liabilities of the National Loans Fund

Figure 9: Phillips Curve Trade-off

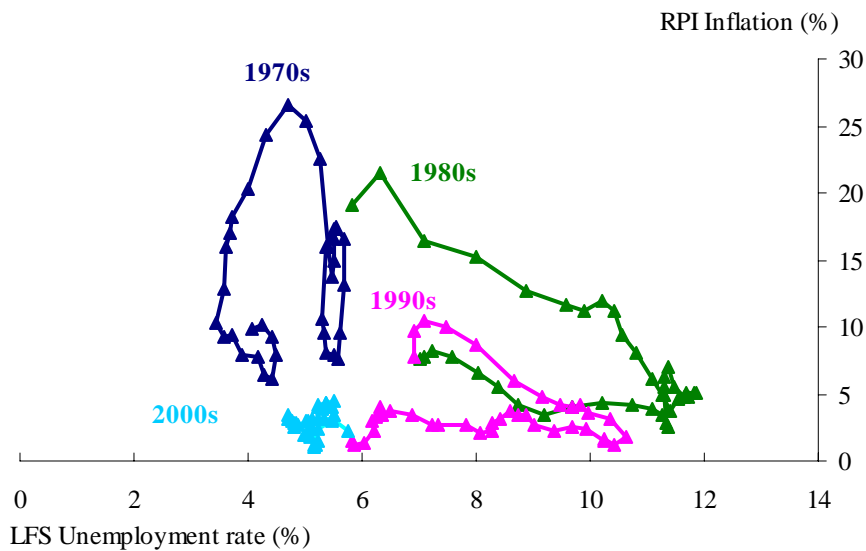


Figure 10: Real Interest Rates and Inflation

