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No. 3047

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INTERNATIONAL MACROECONOMICS



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Discussion Paper No. 3047
November 2001

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November 2001

ABSTRACT

What Does the UK's Monetary Policy and Inflation Experience Tell Us About the Transmission Mechanism?*

This Paper provides a discussion of some aspects of aggregate supply and demand determination in the United Kingdom. It argues that: (1) UK policymakers in the 1960s and 1970s did not use the downward-sloping Phillips curve as a model of inflation or a guide to policy. The explanation proposed by Sargent (1999) for the US Great Inflation is therefore unlikely to account for the Great Inflation in the UK. (2) The proposition that inflation is a monetary phenomenon is fully consistent with the use of models in which money and other measures of monetary policy stance do not appear in the price-setting equations. (3) The UK exhibits a relationship between output and short-term real interest rates that is quite distinct from that observed in the US.

JEL Classification: E52 and E58

Keywords: Great Inflation, Taylor rule, transmission mechanism and UK monetary policy

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* Prepared for the Centre for Central Banking Studies workshop on the Monetary Transmission Mechanism, 2000. I thank Christopher Allsopp, David Gruen, DeAnne Julius, Eric Leeper, Allan Meltzer, Peter Sinclair, and Geoffrey Wood, as well as seminar participants at the Centre for Central Banking Studies, for extensive comments. The views expressed in this Paper are mine alone and should not be interpreted as those of the Bank of England, the Centre for Central Banking Studies, the Monetary Policy Committee, or the Centre for Economic Policy Research.

Submitted 05 October 2001

1. Introduction

The United Kingdom's monetary policy and inflation record over the past 45 years provides a rich source of information about the effects of monetary actions. It is a reflection of the wealth of this experience that several of the key catchphrases used in macroeconomic policy analysis were originally coined to describe regularities in UK policymaking or UK data: 'stop-go', 'the Phillips curve', and 'stagflation' are prominent examples.

Monetary policy in the UK has undergone several regime changes over this period: from a fixed exchange rate with foreign exchange controls until 1972; to free-floating with no domestic nominal anchor until 1976,¹ followed by a loose system of monetary targeting until the mid-1980s; then a renewed emphasis on exchange rate management—so-called 'shadowing' of the Deutsche Mark—that culminated in a fixed exchange rate regime—membership of the Exchange Rate Mechanism (ERM)—from 1990 to 1992.² Since 1992, of course, the UK monetary policy regime has been one of inflation targeting—with interest rate decisions made by the Treasury up to May 1997, and by the Monetary Policy Committee of the Bank of England thereafter.

For the period as a whole, the swings of inflation and economic growth have also been drastic. Inflation was continually in double digits from 1974 to 1977, and returned there in the early 1980s and early 1990s. Economic growth, already lower in the UK than in all of its major trading partners in the 1960s, underwent a slowdown after 1973, with a partial recovery beginning in the 1980s. There were recessions in 1972, 1974–75, 1979–81, and 1990–92. On the other hand, the disinflation associated

¹ As discussed below, monetary-aggregate targeting was introduced in the UK in 1976. From 1980, monetary targeting became part of the Medium Term Financial Strategy (MTFS), a monetary and fiscal policy programme announced by the Conservative Government in its annual budget. Formally, monetary targets (or projections) continued to be part of the MTFS until 1996. By 1988, however, monetary targets had been so de-emphasised in monetary policy formation that Nigel Lawson (the Chancellor of the Exchequer) could say 'As far as monetary policy is concerned, the two things perhaps to look at are the interest rate and the exchange rate.' (Testimony, 30 November 1988, in Treasury and Civil Service Committee, 1988, p. 36).

² Foreign exchange controls continued in the UK for the first seven years of floating exchange rates, but were abolished in 1979. Thus, one difference between the pre-1972 and 1990–92 fixed exchange rate regimes is that the absence of exchange controls in the ERM period gave little room for domestic monetary policy to differ, even in the short run, from that consistent with the exchange rate target.

with the early 1990s recession has been followed by a long period of low and stable inflation and reasonably stable real GDP growth.

In this paper, I discuss some key aspects regarding the transmission mechanism of monetary policy raised by the UK's experience. My analysis of the UK monetary policy record uses the tools of monetary policy rules and dynamic stochastic general equilibrium (DSGE) models.³ I first discuss, in Section 2, aggregate supply relationships. Then in Section 3 I discuss the specification of aggregate demand in the UK. Section 4 concludes.

2. Aggregate supply: Phillips curve specification

This section discusses aggregate supply, i.e. the inter-relationship of inflation, output, and potential output. Following the work of Friedman (1966, 1968) and Phelps (1967), most macroeconomic models adopt an expectations-augmented Phillips curve. These can be regarded as variants or extensions of the equation:⁴

$$\pi_t = \alpha(y_t - y_t^*) + E_t\pi_{t+1} + u_t, \quad (1)$$

where π_t is inflation, y_t is the log of real GDP, y_t^* is the log of potential real GDP, and $E_t\pi_{t+1}$ is inflation expected next period; u_t is a disturbance term. Generalisations of equation (1) could allow for lags of the output gap or inflation to appear in the equation, for the inclusion of additional variables, or for separate modelling of wage and price formation (e.g. Erceg, Henderson, and Levin, 2000). For the present discussion, however, equation (1) suffices. In the remainder of this section, I discuss whether changing views about the specification of equation (1) played a role in producing the Great Inflation of the 1970s, as well as whether equation (1) is compatible with inflation being a monetary phenomenon.

³ For examples of applications of these tools to the United States, see e.g. Clarida, Galí, and Gertler (1999), Dotsey, King, and Wolman (1999), Ireland (2001), Kiley (1998), Leeper and Zha (2001), and the papers in Taylor (1999). Recent applications to the analysis of the UK include Batini, Jackson and Nickell (2000), Dhar and Millard (2000), Aoki, Proudman, and Vlieghe (2001), Batini, Harrison, and Millard (2001), Neiss and Nelson (2001), Nelson and Nikolov (2001a, 2001b), and Nelson (2002).

⁴ This particular formulation is known as the 'New Keynesian Phillips Curve' (Roberts, 1995). For recent estimates, see e.g. Sbordone (1998) and Galí and Gertler (1999) for recent estimates.

2.1 Why did the Great Inflation of the 1970s happen?

The first aspect of the Phillips curve that I discuss pertains to the specification of the relationship, as well as its use as an *explanation of policy history*. The recent monograph by Sargent (1999) formalises and builds upon a familiar explanation for the ‘Great Inflation’ in the United States (say, 1965 to 1982). This explanation attributes policy mistakes to a particular mis-specification by policymakers of the monetary transmission mechanism. In Sargent’s account, policymakers estimated empirical Phillips curves on early post-war data, but instead of using the correct specification (1), they estimated equations of the form

$$\pi_t = \alpha(y_t - y_t^*) + b\pi_{t-1} + u_t, \quad (2)$$

again, possibly allowing for multiple lags of inflation or the output gap. Sargent argues that policymakers treated the estimated value of b as though it was a structural parameter—that is, it would remain constant in the face of changes in monetary policy regime. In so doing, they modelled inflation as though it evolved mechanically in a backward-looking manner as a function of lagged inflation and the output gap, regardless of policy regime. In reality, however, $b\pi_{t-1}$ was serving as a proxy for the expected inflation term in equation (1). Therefore, the b coefficient would be a function of the time series process for inflation, and would typically change with monetary policy regime.

Empirical estimates of equation (2) on data for the 1950s and early 1960s for the United States⁵ typically delivered a value of b that was above 0 and below 1.0.⁶ Thus, the steady state of equation (2) is $(y - y^*) = [(1-b)/\alpha]\pi$, which would seem to imply that output can be raised permanently above its potential value by appropriate choice of steady-state inflation rate. It took, according to Sargent’s story, a period in which policymakers attempted to keep output above potential, for them to realise that there was no such trade-off. A policy aiming to keep y_t above y_t^* by a constant amount produced a sequence of lasting increases in the inflation rate, not the once-and-for-all

⁵ And also the United Kingdom; see Figure 1 below.

⁶ See, for example, the estimates in Solow (1969). Solow believed that in finding $b < 1.0$ on US data in estimates of a specification similar to equation (2), he had found evidence against Friedman’s (1968) claim of a long-run vertical Phillips curve.

rise in the steady-state inflation rate suggested by equation (2). Moreover, the period of sharply rising inflation changed the time series behaviour of inflation to a unit root ($I(1)$) process, tending to raise the estimated value of b in equation (2)—in regressions on updated sample periods—closer to 1.0. Since their own estimates of the Phillips curve parameters now indicated no gains from steady high inflation, policymakers disinflated.⁷

Taylor (1997, p. 278) endorses the position that ‘the idea that there was a long-run [downward-sloping] Phillips curve’ was a major factor in generating the Great Inflation in the United States. He notes that the acceptance of a long-run trade-off between inflation and unemployment was enshrined in official US Government documents such as the 1969 *Economic Report of the President*.

The United Kingdom, however, is a different matter. Since the Phillips curve was originally derived from UK data, and a breakdown of the Phillips curve occurred in the 1960s and early 1970s in the United Kingdom (around the same time as in the United States), it is tempting to conclude that Sargent’s hypothesis serves as a good explanation of the UK’s own ‘Great Inflation’. The details of UK policy formation in the 1960s and 1970s, and the state of UK macroeconomic thinking at the time, however, argue against this interpretation.

Although, in the United States, the government’s economic advisers subscribed to the Phillips curve trade-off idea, the corresponding advisers in the United Kingdom rejected it. A prominent example is Nicholas Kaldor, who was a full-time special adviser to the Chancellor of the Exchequer, from 1964 to 1968, and again from 1974 to 1976.⁸ Far from accepting the Phillips curve trade-off, Kaldor was a deep sceptic, speaking negatively about the ‘uncritical acceptance of the econometric studies of Professor Phillips’ (Kaldor, 1971, p. 499). He even described the Phillips curve as a ‘crazy idea’ (Kaldor, 1972, p. 377). Leeson (1998) notes that Kaldor rejected the trade-off interpretation of the Phillips curve as early as February 1959. More generally, Kaldor’s colleagues in both the Treasury and in UK academia subscribed

⁷ As Cogley and Sargent (2001) put it, ‘the observations of the 1970s taught Volcker and Greenspan the natural rate hypothesis, which they eventually acted upon to reduce inflation.’

⁸ James Callaghan, the Chancellor from 1964 to 1967, names Kaldor as one of his advisers in his memoirs (Callaghan, 1987, p. 198).

predominantly to a non-output gap based—and, indeed, non-monetary—model of inflation.⁹ According to this view, demand management, including monetary policy, could affect real variables such as output, and excesses of output above potential would result in inflation. But there was great scepticism that holding output below potential exerted much significant dampening effect on inflation—at least if output gaps as great as those in the inter-war period were not contemplated. As discussed below, this view tended to shape the formation of anti-inflationary policy in the United Kingdom well into the mid-1970s. It certainly was not an environment conducive to acceptance of the Phillips curve either as a model of inflation or as a guide to macroeconomic policy choices. A more complete discussion of policymakers’ rejection of the Phillips curve is given in the Appendix.¹⁰

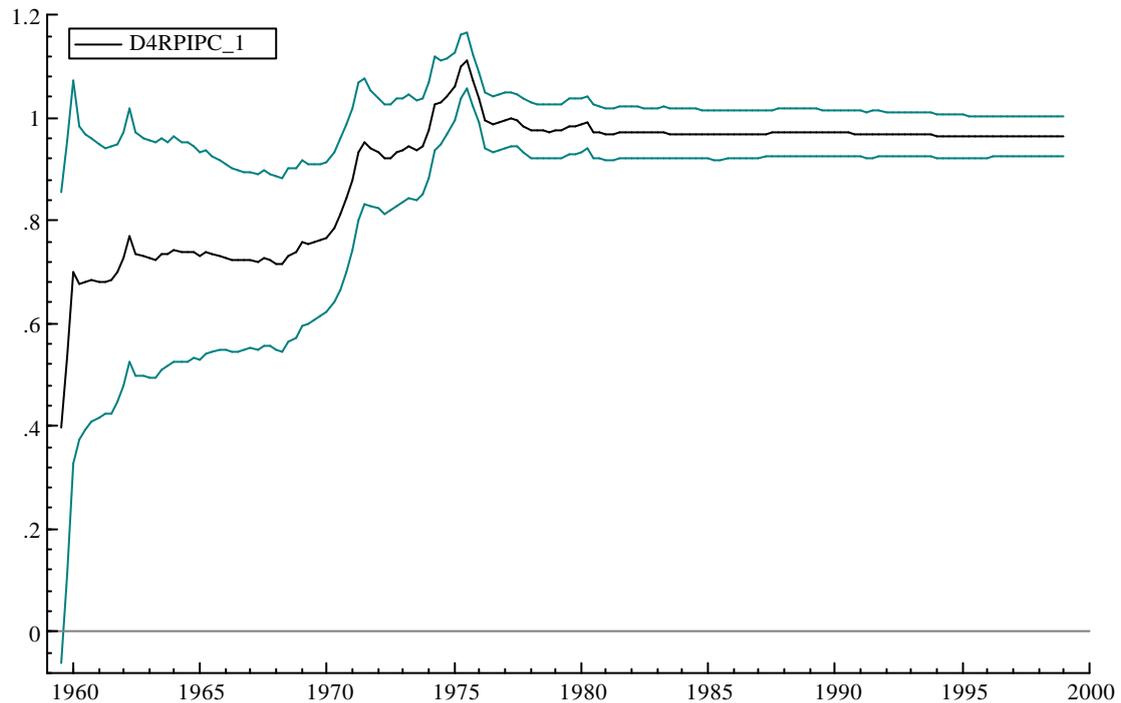
Quite apart from policymakers’ views, the details of the timing of events in the United Kingdom also seems inconsistent with the Sargent hypothesis. Estimates of the conventional downward-sloping Phillips curve exhibited instability starting in the mid-1960s, and the implied trade-off became more unfavourable. Indeed, the term ‘stagflation’ was coined by the Conservative Party spokesman on economic affairs, Iain Macleod, in November 1965.¹¹ The presence of stagflation was an issue in the 1966 general election campaign, with the Leader of the Opposition, Edward Heath, using the slogan ‘9–5–1’ to describe the prevailing conditions of 9% wage inflation, 5% price inflation, and 1% economic growth (Butler, 1989, p. 25). Stagflation can be regarded as a symptom of the breakdown of the original, non-vertical Phillips curve. According to the Sargent hypothesis, the advent of stagflation in the mid-1960s should have triggered a movement to disinflationary policies; but such policies were not introduced decisively until the late 1970s.

⁹ See the survey by Laidler and Parkin (1975), especially pages 761 and 764.

¹⁰ See also Nelson and Nikolov (2001b) and, for the US, Hetzel (1998).

¹¹ The *Oxford English Dictionary* traces the origin of the term ‘stagflation’ to a speech Macleod made in the House of Commons on 17 November 1965. In his biography of Harold Macmillan, Horne (1989) has a chapter entitled “‘Stagflation’—The English Disease: 1960–end of 1961’ in which he claims that in 1960–61 ‘a new word was entering the jargon of Westminster economists—“stagflation”’. If accurate, this statement may mean that Macleod (a member of Macmillan’s government) used the term stagflation in the years prior to his first employment of it in a Parliamentary speech.

Figure 1: Recursive least squares estimates of b in equation (2), UK data



Note: Upper and lower lines are 95% confidence interval bands.

Figure 1 plots recursive estimates on UK data of a backward-looking Phillips curve such as equation (2), for sample periods beginning in 1956 Q2.¹² The lagged inflation coefficient, b , became sharply higher in 1959–62 and again from 1969, and shifted to the vicinity of unity in 1973, where it has remained. The breakdown of this downward-sloping Phillips curve should, according to Sargent’s hypothesis, have motivated UK policymakers to adopt tighter monetary policies and to reduce inflation, culminating in an abandonment of expansionary monetary policies once the estimated value of b had hit unity. Yet in the UK, inflation continued to rise until 1975, and in 1980 stood at close to its 1975 peak; a sustained shift to single-digit inflation did not emerge until 1982.

In Sargent’s scenario, the failure of unemployment to decline permanently in the face of rising inflation convinces policymakers that the Phillips curve has vertical long-run properties. While this did happen eventually in the UK, it did not occur in the decade

¹² This equation differs in two ways from equation (2). First, π_t is measured by *annual* growth in the Retail Price Index, $(P_t - P_{t-4})/P_{t-4}$. Secondly, the output gap (measured in the same way as in Figure 2 below, as deviations of log GDP from a linear trend that breaks in 1973 Q4 and 1981 Q4) enters with a one-period lag rather than contemporaneously.

from 1965 to 1975, which saw almost constantly increasing inflation and higher unemployment than previously. Rather, policymakers were, as noted above, *already* sceptical about the value of any demand- or output-gap-oriented model of inflation. For many, the onset of simultaneously high inflation and low growth seemed only to confirm the pre-existing position that inflation was largely an institutional, cost-push phenomenon independent of the output gap, the stance of monetary policy, or the state of aggregate demand.¹³ This reaction was shared by a sizable fraction of the financial press. For example, an editorial in *The Banker* magazine of March 1971 argued,

‘[T]he Paish/Phillips relationship between unemployment and wage levels worked in the ’50s and early ’60s. Today it manifestly does not. Or at least the place where unemployment starts to limit wage claims is not at a politically acceptable 2 or 2½ per cent but at 5, 6, or even 10 per cent. Since this type of analysis essentially relating inflation to aggregate demand is no longer helpful it seems silly to be crucified by it. It does not follow that if limiting demand fails to reduce inflation, expanding it will not increase it. But since the Government already tacitly accepts that the large part of the cure to inflation is institutional... this is a risk that it has no option but to take.’ (1971, p. 237).

With a climate of opinion such as this, it is perhaps not surprising that the reaction of UK policymakers to rising inflation in the 1960s and 1970s was a combination of lax monetary policy, or even aggressive monetary expansion, and the employment of various non-monetary devices to hold down inflation. These devices typically took the form of measures designed to affect the prices of particular products; or attempts to intervene in the labour market through controls or agreements on wages. A six-month wage and price freeze was imposed in July 1966, more than five years before one was introduced in the United States, and was followed by legislative incomes policy until 1968. Edward Heath, as Leader of the Opposition in the 1970 election campaign, argued that reductions in payroll taxes and restraint in price increases by government-owned corporations would ‘at a stroke, reduce the rise in prices, increase productivity and reduce unemployment’ (quoted in Campbell, 1993, pp. 281–82). Direct price and wage controls were reintroduced in November 1972, and maintained until 1974, when they were followed by a voluntary wages policy until 1979

¹³ This position is distinct from Christiano and Gust’s (2000) characterisation of policymakers’ opinion in the United States. There, they argue, policymakers recognised the dependence of inflation on monetary policy, but felt obliged to accommodate cost-push shocks with increased monetary growth. Closer to the position described here is Hetzel’s (1998) characterisation of Federal Reserve views on inflation in the 1970s.

(supported by legislation in 1975–76).¹⁴ Initiatives announced in budgetary statements in 1974 attempted to reduce the Retail Price Index through subsidies on food prices and through cuts in indirect taxation.¹⁵

The emphasis on incomes policy, and on influencing specific prices, to control inflation was largely at the expense of measures to control aggregate demand. While tightenings in monetary and fiscal policy did accompany incomes policies in 1966–68 and 1976, the opposite was true on other occasions. For example, monetary policy was already very loose when the wage and price controls of 1972–74 were introduced, and the controls were accompanied by an aggressive fiscal expansion.¹⁶

From late 1973, policymakers did react to the growing criticism of the rapid money growth they had permitted. However—in large part because of the close relationship between interest rates on mortgage lending and short-term market interest rates—there remained an unwillingness to accept the political unpopularity resulting from the rise in nominal interest rates associated with monetary tightening.¹⁷ Consequently, the Government gave an instruction to the Bank of England that the growth rate of broad money (the Sterling M3 aggregate) was to be reduced—but not by a policy that involved increasing interest rates (Goodhart, 1997, p. 403). The Bank of England responded by introducing a direct quantitative control on £M3, the ‘Corset’, which imposed heavy marginal reserve requirements if increases in banks’ deposits exceeded a limit. While this device did accomplish a reduction in observed £M3 growth, it did so largely by encouraging the growth of deposit substitutes, distorting £M3 as a monetary indicator and weakening its relationship with future inflation. For the remainder of the 1970s, monetary policy often looked tight as measured by £M3 growth, but loose as measured by interest rates or monetary base growth. Indeed, it is

¹⁴ Harold Wilson (1979, p. 115) reported that the Treasury repeatedly urged him to introduce statutory wage controls during his administrations.

¹⁵ A key rationale for these 1974 measures was that the Labour Government had inherited from the Heath Government a statutory incomes policy that indexed wages to consumer prices. The 1974 actions on the Retail Price Index were an attempt to offset some of the effect of the first oil shock on prices, and so cushion the extent to which nominal wages would rise.

¹⁶ The shift to these policies by the Heath Government in 1972 is known as its ‘U-turn’ (see Campbell, 1993, Chapter 26). While monetary policy was loose in its own right, the sharp increase in fiscal deficits during this period was also heavily accommodated by money creation.

¹⁷ An example of this unwillingness is Margaret Thatcher’s promise, during the October 1974 election campaign, that a Conservative government would impose a ‘non-negotiable’ upper limit of 9.5% on mortgage interest rates (Butler, 1989, p. 31; Campbell, 2000, p. 272).

significant that not long after adopting £M3 targeting in 1976, UK policymakers unilaterally adopted a target for the sterling-dollar exchange rate, a policy that explains why nominal interest rates were cut all the way to 5% (less than half the rate of inflation) in 1977.¹⁸ Thus, even monetary targeting, like incomes policy, became a way of appearing to deal with inflation while avoiding genuine restrictions on aggregate demand.¹⁹

Figure 2 displays the actual values of the end-of-quarter nominal Treasury bill rate in the UK (R) against the value which, at each point in time, is suggested by a Taylor (1993) rule. The specific form of the Taylor rule used is:

$$RTay_t = r^{ss} + 4\pi^* + 1.5(100*[P_t - P_{t-4}]/P_{t-4} - 4\pi^*) + 0.5(100*y_{t-1}) \quad (3)$$

where P_t is the quarterly average of the Retail Price Index (RPI) and y_{t-1} is detrended log output (with the trend measured by a linear trend that breaks in 1973 Q4 and 1981 Q2). The right-hand-side variables in rule (3) are lagged to allow for delays in data collection,²⁰ and multiplied by 100 to be in units comparable to the nominal interest rate. The assumed inflation target is $4\pi^* = 2.5\%$, which corresponds to the actual UK inflation target since 1992, and the steady state real interest rate (r^{ss}) is set at 2%, the number used by Taylor (1993) and close to the average value of the UK ex-post real interest rate since 1965.

As Figure 2 shows, the actual nominal rate was below the Taylor rule's prescription throughout the period 1969–81. (In recent years the two series have been much closer to each other.)²¹ This finding supports the notion that in the 1970s there was a persistent unwillingness to rely on monetary policy to control inflation.

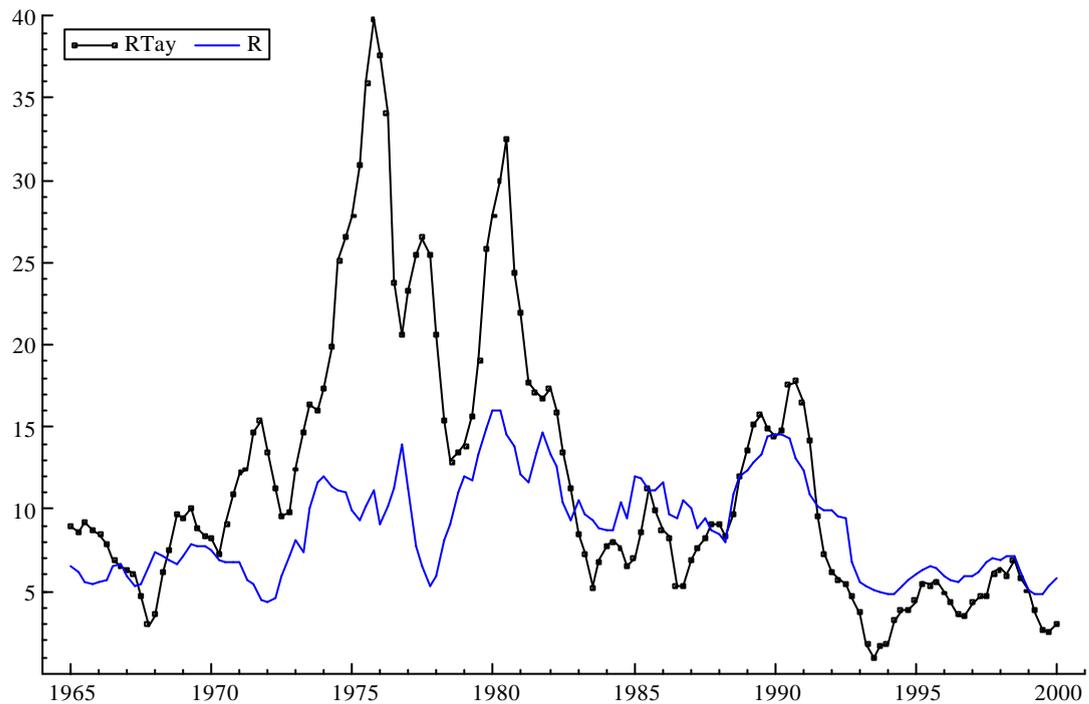
¹⁸ See Browning (1986, pp. 104–108) and Dell (1996, pp. 438–439) for discussions of this episode.

¹⁹ For discussions of the development of UK monetary policy in the 1970s, see Goodhart (1989), Minford (1993), and Bank of England (1984).

²⁰ However, the rule plotted makes no allowance for differences between initial and revised data. Orphanides (1999) emphasises the importance of this distinction for the analysis of rules with US data. For the UK, evidence is provided in Nelson and Nikolov (2001a).

²¹ Two points should be noted. First, the actual rate is above the Taylor rule prescription in the mid-1980s, yet inflation rose after 1987. Interest rates alone do not account for the excessive growth in aggregate demand in the late 1980s. This is consistent with the presence of the 'IS puzzle' described in Section 3 below. On the other hand, monetary base growth does seem to have been excessive prior to the late 1980s breakout of inflation (Stuart, 1996; McCallum, 2000), so a measure of monetary policy stance that included base money growth may suggest that policy was, indeed, excessively easy.

Figure 2: Actual nominal interest rate in the United Kingdom (R) and the value implied by a Taylor rule ($RTay$)



With the breakdown in 1978–79 of the last UK attempt at incomes policy, and the change in government in May 1979, there was a shift to a monetary policy more consistent with controlling inflation. Lord Cockfield, the Government’s minister in the House of Lords responsible for economic matters, summarised the situation:

‘It was the failure of incomes policies, as well as of other devices, which brought home not only to the Government but to most people that there was no alternative to a strict monetary policy... as the means of controlling inflation.’ (Speech to House of Lords, 15 November 1979, col. 1414).

A tightening of monetary policy (as measured by monetary base growth or interest rates)²² followed, and inflation declined sharply after 1980. Although there was a serious renewed breakout of inflation in 1988–90, policymakers’ acceptance of the role of monetary policy in controlling inflation remained. The Treasury in the

Second, the actual rate is above the Taylor rule prescription recently. This partly reflects the fact that the inflation series used in Figure 2 is one using the RPI, not the RPIX measure targeted by the Bank of England. In addition, the steady-state real interest rate of 2% assumed in rule (3) may be too low.

²² Monetary policy did not tighten as measured by Sterling M3 (the Government’s monetary target) which, as discussed above, was distorted as a measure of monetary conditions by the imposition and, in 1980, removal of the ‘Corset’. Bean and Symons (1989) note that by 1982 nominal GDP growth had reached the range which the Government had intended for it with the policies it announced in 1979–80, so actual policy was at least as tight as intended.

1990/91 *Financial Statement and Budget Report* stated, 'Inflation is a monetary problem and so monetary policy has to be in the forefront of the battle to conquer it.' Consistent with this, the United Kingdom has had a formal inflation target since October 1992, and this target was assigned to the Bank of England when it received independence in 1997. The Monetary Policy Committee, which makes interest rate decisions in the United Kingdom, stated in its publication *The Transmission Mechanism of Monetary Policy* (1999) that '[m]onetary growth persistently in excess of that warranted by growth in the real economy will inevitably be the reflection of an interest rate policy that is inconsistent with stable inflation. So control of inflation ultimately implies control of the monetary growth rate' (p. 169).

The evidence suggests that until the late 1970s policymakers predominantly did not believe that restraint in aggregate demand was very effective in controlling inflation; and they regarded the inflation that they did observe as emerging from institutional sources rather than from mismanagement of aggregate demand. This was not a model of inflation that would emerge from Phillips curve analysis. Policymakers did believe that monetary policy could affect real variables, even in the long run, and so followed demand management policies quite similar to those that might emerge from subscribing to a Phillips curve. 1976 was probably the watershed year in terms of an acceptance by UK policymakers of the importance of monetary policy actions for inflation, and of the long-run neutrality of output and unemployment with respect to monetary policy. But it was not until later in the 1970s that policymakers were prepared to accept the movements in interest rates and exchange rates, and the initial cost in the form of a recession, that would result from a policy that brought inflation down.

So Phillips curve analysis did not, I argue, play a substantial role either in generating or ending high inflation in the United Kingdom. Rather, the key analytical flaw in UK policymaking in the 1960s and 1970s was neglect of the links between monetary policy and inflation. Such links conveniently bring me to the next topic: the relationship between Phillips curves and the proposition that inflation is a monetary phenomenon.

2.2 Is the Phillips curve consistent with inflation being a monetary phenomenon?

A second aspect of the Phillips curve important in a discussion of the monetary transmission mechanism is a particular specification issue. As noted above, empirical Phillips curves (e.g. Gordon, 1997; Brayton, Roberts, and Williams, 1999; Driver, Greenslade, and Pierse, 2000) typically have more lags and/or leads of the output gap and inflation than appear in equation (2). Beginning with Phillips (1958), they usually also have included other forcing variables beside the output gap term. Examples include: dummy variables for periods of statutory price control; the prices of volatile elements of the price index such as food and energy; and the exchange rate or import prices to represent open economy influences.

I do not question the inclusion of these extra terms in empirical Phillips curves—and indeed, largely abstract from them from now on by concentrating on closed economy Phillips curves.²³ What I do question is the less common practice of including money growth (or other measures of monetary stance) in estimated empirical Phillips curves. The Phillips curve studies mentioned above do not follow this practice, but Perry (1978) and Hendry (2000), for example, do. These papers aim to ‘test’ monetary theories of inflation against other theories by estimating a regression, with inflation as the dependent variable, that includes both money growth and the output gap as explanatory variables. The implication would appear to be that the validity of ‘monetary explanations’ of inflation rests on the statistical significance (with positive signs) of money growth terms when used as additional regressors in estimates of equation (2).

These sorts of tests are, in my opinion, wide of the mark. I contend that the theoretical proposition that inflation is a monetary phenomenon rests on the specification of *aggregate demand* in an economic model. Essentially, the statement amounts to a claim that influences on the growth rate of nominal aggregate demand do not tend to be persistent if they are not associated with similar movements in the

²³ This is not to say that all the additional terms used in empirical Phillips curves can be justified theoretically. Allan Meltzer (1980), for example, noted the ‘generous use of dummy variables and extra effects’ in Robert Gordon’s pioneering empirical work on inflation.

growth rate of the nominal quantity of money. It follows that sustained movements in inflation are largely accompanied by movements in the growth rate of the nominal quantity of money per unit of output. None of these statements requires a specification of the aggregate supply segment of the model. The Phillips curve does not even have to be vertical for these statements to hold—they could be just as true if equation (2) were structural, for example. The statements certainly do not require terms in money growth to appear in the Phillips curve equation.²⁴

As Lionel Robbins (1960) observed, no reputable quantity theorist has argued that money affects prices other than via its effect on aggregate expenditure.²⁵ In a sticky-price world, changes in nominal aggregate demand tend to be manifested also in changes in the real volume of spending relative to the potential output of the economy—that is, in the output gap. [In this sequence, the output gap is the route through which movements in monetary growth are transmitted to the inflation rate.](#) Thus, the output gap and monetary growth are not ‘alternative explanations’ of inflation. Meyer and Varvares (1981, p. 24) made this point earlier: ‘We do not view the Phillips Curve and monetarist reduced form as mutually exclusive [models], but rather as structural vs. reduced form approaches to explaining inflation.’

I would not therefore expect money growth to have a non-zero coefficient in a correctly specified Phillips curve. What, then, are we to make of regression results (such as those in Hendry, 2000) in which both the output gap and money growth enter significantly? There seem to me to be two key elements underlying such results.

²⁴ These statements also do not exclude the likelihood that the money stock is endogenous. Every UK monetary policy regime experienced has been one that made the money stock endogenous. For example, the money stock is endogenous whenever the central bank uses an interest rate instrument. But as the Monetary Policy Committee (1999) note, alternative choices of interest rate paths by a central bank imply alternative paths for the money stock. The same is true of other monetary arrangements that also make the money stock endogenous, such as a fixed exchange rate regime. The endogeneity of the UK money stock under fixed exchange rates was emphasised by Williams, Goodhart, and Gowland (1976) and Williamson and Wood (1976).

²⁵ The specific statement by Robbins was ‘the immediate determinant of the price level and the general level of activity is the volume of expenditure that derives, not only from the money supply but also from trade credit and all sorts of money substitutes; and if any reputable quantity theorist since Hume has denied this, let him be forever disgraced’ (1960, pp. 102–103). The views of Milton Friedman are consistent with this statement. Friedman (1979, p. 302), for example, writes, ‘The only cure for inflation is to reduce the rate at which total spending is growing.’

First, the estimated significance of money growth may reflect changing degrees of nominal rigidity in the economy. If prices were perfectly flexible—so that output equalled potential each period—the output gap would be zero every period, and so would not (could not!) help at all in predicting inflation. Money growth and inflation, on the other hand, would continue to fluctuate together. Money growth would explain many (or all) of the movements in inflation, and the output gap would not explain any. If, on the other hand, the level of excess demand were the only determinant of inflation, and if the degree of nominal rigidity in the economy were constant (for example, if a fixed fraction of firms changed their price every period), the output gap would have a perfect relationship with inflation, and money growth would provide no extra information.

In practice, economies may behave between these two extremes, with the degree of price stickiness varying over time. For example, if the extent to which firms are prepared to change prices is state-contingent, the degree of nominal rigidity in the economy will change each period (Dotsey, King, and Wolman, 1999). Under these circumstances, the economy may behave like a hybrid of one in which only money growth matters for inflation, and one in which only the output gap matters for inflation. Money growth may therefore provide auxiliary information about inflation not present in the output gap. Another possibility is that money growth enters estimated inflation equations alongside the output gap if the empirical measure of the output gap is a poor approximation of the true output gap series.

3 The IS relationship in the United Kingdom: an empirical puzzle

This section discusses the aggregate demand side of the economy. For the transmission mechanism, the most pertinent aspect of aggregate demand behaviour is how changes in monetary policy—open market operations and changes in the authority's interest rate instrument—manifest themselves in changes in private spending decisions. I use the simple aggregate demand specification of Rudebusch and Svensson (1999, 2001) as a reference point. This specification is a single-equation empirical model of the relationship between real interest rates and aggregate

demand, according to which (detrended) log output (y_t)²⁶ depends on lags of itself, and on the previous year's average of a real interest rate measure.²⁷ Rudebusch and Svensson (2001), for example, present the following IS equation, estimated over US data for 1961 Q1–1996 Q4:

$$y_t = 1.161y_{t-1} - 0.259y_{t-2} - 0.088((S_{j=0}^3 R_{t-1-j}) - \Delta_4 p_{t-1}), \quad (4)$$

(0.079) (0.077) (0.032)

SEE = 0.0082.

Rudebusch and Svensson (1999, 2001) use equation (4) as the aggregate demand segment of a model that they use to conduct comparisons of alternative monetary policy rules.

Equation (4) has become one of the standard compact models of aggregate demand behaviour in the US economy (Estrella and Fuhrer, 2000). It does not appear easy, however, to obtain an analogous model of aggregate demand from UK data.

Estimation of the Rudebusch-Svensson specification on UK data for the sample period 1958 Q1–2000 Q2 produces:²⁸

$$y_t = -0.0002 + 0.854 y_{t-1} + 0.032 y_{t-2} + 0.015([\frac{1}{4}S_{j=0}^3 R_{t-j-1}] - \Delta_4 p_{t-1})$$

(0.0008) (0.078) (0.077) (0.019)

$R^2 = 0.79$, SEE = 0.0101,

so that the real interest rate term is insignificant and incorrectly signed. The results become even more at variance with those of Rudebusch and Svensson if the sample period is restricted to the last 20 years, 1980 Q1–2000 Q2:

²⁶ The series that Rudebusch and Svensson use is actually the CBO's 'output gap' series.

²⁷ The real interest rate measure used by Rudebusch and Svensson is a 'pseudo-real' interest rate, $R_t - 4*\Delta p_t$, so called because it subtracts current realised inflation from the nominal rate instead of expected future inflation. Note that a four quarter average of $4*\Delta p_t$ is the annual inflation rate, $\Delta_4 p_t$, which is why the latter appears in equation (4) below.

²⁸ This regression uses *IFS* data on the quarterly average nominal Treasury bill rate to measure R , the four-quarter percentage change in the RPIX index (RPI before 1974) to measure $\Delta_4 p_t$, and the broken-trend measure of output used in Figure 2 to measure y . The results are robust to alternative filtering procedures for the output series.

$$y_t = -0.0035 + 1.317 y_{t-1} - 0.395 y_{t-2} + 0.082([\frac{1}{4}\sum_{j=0}^3 R_{t-j-1}] - \Delta_4 p_{t-1})$$

(0.0014) (0.101) (0.099) (0.031)

$R^2 = 0.95$, $SEE = 0.0061$.

In this case, the interest rate term is not only incorrectly signed, but *significantly* positive. The positive sign on the interest rate persists in a more general dynamic specification: a regression of y_t on four lags of itself and of the interest rate term. When this specification is estimated, it delivers a long-run coefficient sum on the real interest rate of 0.73 (standard error 0.43). Muscatelli and Trecroci (2000) also report a positive sign on the real rate in estimated backward-looking IS equations estimated on UK data.

So there is a puzzle: why do UK estimates of the Rudebusch-Svensson specification deliver a positive sign on the real interest rate? I refer to this as the *IS puzzle* in the discussion below of several candidate explanations.

One explanation for the IS puzzle is that the UK specification is delivering inconsistent parameter estimates due to the omission of real exchange rate terms. In Nelson (2002), however, I find that including the real exchange rate in the equation has very little effect on the estimated real interest rate terms; they continue to have positive coefficients.

A second possibility is that the results are due to the exclusion of foreign output. In their estimated IS equation for Australia, Beechey *et al* (2000) find that the level of foreign output enters very significantly, and is a better proxy for open-economy influences on the economy than the exchange rate. Conditional on this effect, they are also able to pick up a significant negative effect on output of the domestic real interest rate. For the United Kingdom, however, this approach does not resolve the IS puzzle. If y_t is regressed on lags 1–4 of itself and of the real rate, and lags 0–4 of detrended

log US output,²⁹ the estimated long-run coefficients for 1980 Q1–2000 Q2 are 0.50 (standard error 0.43) on foreign output and 0.47 (s.e. 0.31) on the real rate.³⁰

Another explanation for the IS puzzle is that the variations in the real rate measure ($\frac{1}{4}\sum_{j=0}^3 R_{t-j} - \Delta_4 p_t$) are dominated by the sharp fall in its mean from the 1980s to the 1990s. This fall—which was greater in the UK than in the US—might reflect a decline in the steady-state value of the ‘natural’ real interest rate, or a higher ‘risk premium’ term in interest rates in the 1980s (perhaps due to lack of credibility of monetary policy before inflation targeting). Either of these effects could mean that monetary policy was not as tight in the 1980s as the real rate measure suggests, and that it is therefore harder to determine reliably the effects of monetary policy on aggregate demand. This explanation, however, does not account for the results in Beechey *et al* (2000) for Australia. Australia had a decline in the mean value of the real interest rate from the 1980s to the 1990s similar in magnitude to that in the United Kingdom, but Beechey *et al* are able to pick up a significant negative coefficient on the real rate. In light of this, the UK results above remain anomalous.

Another possible explanation for the IS puzzle is that equations of the Rudebusch-Svensson type are not structural, due to forward-looking behaviour in the economy. If the true structure of the economy is one in which the private sector’s spending decisions are based on utility maximisation (as in a DSGE model), then the implied IS equation for the economy will include expected future output, not just the lags of output that appear in (4). In this environment, the coefficients in the Rudebusch-Svensson specification are reduced-form, and not invariant to policy-rule changes. This factor may partially explain why the Rudebusch-Svensson model does not produce robust results when estimated on different countries. But it is less likely to explain the IS puzzle found above in UK data. In Nelson (2002), I generate data from a dynamic stochastic general equilibrium model with sticky prices, solved under monetary policy reaction functions estimated on historical US or UK data. When the

²⁹ Measured by the residuals of a regression for 1955 Q1–2000 Q2 of log US output on a broken linear trend (the breaks in slope and intercept occurring in 1973 Q4 and 1994 Q4).

³⁰ If the lag length on the real rate is changed to eight, the estimated long-run coefficient is essentially unchanged at 0.49 (standard error 0.34). David Gruen has reported a similar but more significant coefficient sum on US output when the UK IS equation is estimated using levels of output (as opposed to detrended levels). In his results, the real interest rate coefficient sum is positive when the sample period is 1980–2000, and negative (but insignificant) when the sample is 1985–2000.

Rudebusch-Svensson specification is estimated on the artificial data, the resulting regressions do produce a positive, near-unit coefficient sum on lagged output and a negative coefficient on the real interest rate, just as in Rudebusch and Svensson's estimates. Because these coefficients are reduced-form, plausible changes in the monetary policy rule do change the sizes of the estimated coefficients. But the coefficient on the real interest rate remains negative. So, by itself, forward looking behaviour may not account for the IS puzzle.

A related, but more generic, criticism of equations of the Rudebusch-Svensson type applies irrespective of whether the private sector is forward-looking. The criticism is that these equations do not isolate the effects of monetary policy on aggregate demand because the endogenous component of monetary policy—the response of monetary policy to current and prior shocks to aggregate demand and supply—makes the coefficients in the estimated equation a function of both the economic structure and the monetary policy rule that was in effect during the estimation period. To estimate the effects of monetary policy, one should instead, according to this argument, attempt to isolate the truly exogenous component of policy, for example through VAR or narrative techniques (as described in Christiano, Eichenbaum, and Evans, 1999). In the present context, a limitation of this argument is that it does not tell us why real interest rate coefficients are negative and significant in IS equations based on US and Australian data, but not on UK data. Presumably identification problems should be pervasive, and similar, for all three countries; yet an IS puzzle exists for only one. On the other hand, Leeper and Zha (2001) find that certain VAR identification schemes deliver 'reasonable' estimates of structural parameters for some subsamples of US data, but not for other subsamples. This finding could indicate that the identification problem is indeed prevalent in all countries, and that the degree to which it affects estimates of IS parameters is sensitive to the specific sample period.

Several other possible explanations should be noted. First, it is possible that variations in the unobserved natural real rate of interest are large enough to generate a positive average relationship between actual real interest rates and output. Secondly, unmodelled financial restrictions, such as borrowing or liquidity constraints, could be distorting the estimates of the IS equation. And my estimated equation abstracts from

fiscal policy, which could be important empirically for the behaviour of both real interest rates and aggregate demand.

In my opinion, the most promising single explanation for the IS puzzle is that other asset yields are relevant for aggregate demand. If these asset yields are correlated with the short-term real interest rate, then excluding them from the regression will deliver unreliable estimates of the real rate coefficient. Two pieces of evidence make this explanation the most plausible. First, Goodhart and Hofmann (2000) find that house prices are highly significant in an estimated IS equation for the United Kingdom, and that the real interest rate coefficient is negative once house prices are included in the specification.³¹ Second, in Nelson (2002), I find that real money base growth is highly significant when added to the Rudebusch-Svensson specification. This result is consistent with the arguments of Friedman and Schwartz (1963) and Meltzer (1999) that yields on many assets are relevant for aggregate demand, and that money growth can be a useful summary of the effects of these yields. The short-term real interest rate, by itself, may not be a sufficient statistic for all the asset prices relevant for aggregate demand in the United Kingdom.

4 Conclusions

This paper discussed several aspects of aggregate supply and demand determination that are relevant to the analysis of the transmission mechanism in the UK. To state my conclusions briefly: the evolution of beliefs about the Phillips curve probably did not play a major role in generating the policy mistakes that led to inflation in the United Kingdom in the 1960s and 1970s. Rather, poor understanding of the role of monetary policy in controlling inflation was much more important. At the same time, there are few grounds for believing that monetary policy variables should appear directly in structural models of inflation. Finally, on the aggregate demand side, the relationship between real interest rates and aggregate demand seems more complicated in the United Kingdom than it is in the United States, and modelling the effects of other asset prices on demand appears essential.

³¹ The Goodhart-Hofmann sample period begins in 1973, however, so it is not known whether their specification would deliver negative real rate coefficients if estimated on the 1958–2000 and 1980–2000 sample periods used above.

Appendix: Did UK policymakers in the 1960s and 1970s believe in an exploitable

Phillips curve?

In the text of this paper, I argued that belief by policymakers in a downward-sloping Phillips curve was not a plausible explanation for the rise in inflation in the UK in the 1960s and 1970s. In this appendix I document this claim, using information on policymakers' views on the economy in 'real time'.

The Phillips curve explanation claims that policymakers both believed in, and attempted to exploit, a permanent trade-off between inflation and unemployment (or the output gap). An essential step to investigating the plausibility of the Phillips curve hypothesis for the UK is to establish whether policymakers in the 1960s and 1970s—the executive branch (particularly the Prime Minister and the Chancellor of the Exchequer) that determined monetary policy, and their economic advisers—believed that there was a trade-off that they could exploit.

As discussed in the text, Nicholas Kaldor was a full-time special adviser to the Chancellor of the Exchequer, from 1964 to 1968, and again from 1974 to 1976. Morgan (1997, p. 208) states that Chancellor Callaghan 'owed much' to Kaldor's ideas. Kaldor's views and advice are therefore relevant in evaluating whether policymakers in the middle and late 1960s attempted to exploit an inflation / unemployment trade-off.

Kaldor emphatically rejected the existence of a downward-sloping Phillips curve:

'There is a widespread belief, for which there is no empirical support in the post-war statistics for this country, that there is a so-called "trade-off" between the level of unemployment and the rate of wage increases. Since the size of wage settlements is determined in key sectors—and those are the sectors where jobs are secure, whatever happens in the labour market as a whole, even with large-scale unemployment—there is little reason why such a trade-off should exist.' (Speech to House of Lords, 20 July 1977, col. 351).

In Kaldor's framework, therefore, there was no Phillips curve, even in the short run; wage growth was driven by 'cost-push' factors independent of the output gap, and this in turn drove price inflation (see also Kaldor, 1981). He emphasised an influence on the output gap on inflation only if output exceeded capacity.³²

Another full-time adviser to the Wilson Government was Thomas Balogh, who served as Economic Adviser to the Cabinet from 1964 to 1967 and Consultant to the Prime Minister in 1968. Morgan (1997, p. 208) states that Balogh had a 'strong relationship with the Prime Minister'. Like Kaldor, Balogh rejected the relevance of the Phillips curve as a description of inflation in the UK in the 1950s and 1960s:

³² In 1979, Kaldor revised his position, conceding that US and OECD studies had found a trade-off, but that 'it is a very poor one... requir[ing] a great deal of unemployment to bring about a moderate reduction in inflation' (House of Lords speech, 5 December 1979, reprinted in Kaldor, 1983, p. 44).

‘Thus a completely new situation can arise in which prices and wages chase each other at widely different levels of employment. In the absence of deliberate policy and deliberate agreement, which is likely only through government intervention, there is no determinate solution. The political atmosphere, the social environment and institutional factors will mainly determine the rate of the absolute increase in wages and prices.’ (Balogh, 1970, pp. 31–32).

Balogh dismissed the evidence for a Phillips curve in postwar data, arguing that ‘even in the period 1950–61, vast divergences of actual observations from those predicted by the “law” or “curve”... render [the] equation worthless for policymaking purposes’ (Balogh 1970, p. 63). Notably, both Kaldor’s and Balogh’s statements reject the existence of a conventional downward-sloping Phillips curve for the entirety of the postwar period, not just from the late 1960s period now associated with the breakdown of Phillips’ (1958) original curve.³³

Robert Neild was Economic Adviser to the Treasury from 1964 to 1967. Morgan (1997, p. 208) describes Neild as Chancellor Callaghan’s ‘closest adviser’.³⁴ In a submission to the Radcliffe Committee written jointly with I.M.D. Little and C.R. Ross, Neild expressed a view on inflation similar to Kaldor and Balogh’s:

‘The problem of persistent increases in costs and prices... is a problem inherent in the way wages, prices, and profits, are determined, and is likely to persist whether or not the level of demand is excessive.’ (Memorandum, December 1957, in Radcliffe Committee, 1959, p. 159).

Therefore, none of these three key economic advisers of the 1960s subscribed to a ‘Phillips curve’ view of a close relationship between inflation and the output gap, or to the associated view of a ‘trade-off’ available to policymakers between inflation and unemployment.

Aside from these specific advisers, it is also enlightening to find about the modelling by the UK Treasury in the 1960s. In 1974, a Treasury official described earlier practice in the Treasury’s modelling of wages:

‘[For] many years... wages were exogenous. At the beginning of setting up a forecast we would discuss with the Ministry of Labour... the most likely prospect for the level of wage settlements over the coming year. Having discussed with them what rate of wage increase we were going to use... that went as one of the inputs.’ (Testimony by Ms. M.P. Brown, 8 July 1974, in House of Commons, 1974, p. 134).

Thus, the Treasury’s model did not have a Phillips curve equation explaining wage inflation using the output gap or unemployment; rather, wages were treated as exogenous.³⁵

While policymakers in the mid- and late 1960s do not seem to have thought that the output gap was an important determinant of inflation, they did believe in non-neutrality, in the sense that increases in nominal aggregate demand could bring output toward, or above, potential. This raises

³³ Indeed, Balogh (1982, p. 214) criticised the promotion by US Keynesians in the 1960s of ‘the so-called Okun’s “Law” or the even more hair-raisingly absurd Phillips curve’.

³⁴ Callaghan (1987, p. 198) names Kaldor and Neild as his ‘two advisers’.

³⁵ This does not exclude the possibility that the Treasury and other departments used unemployment (or other measures of the pressure of demand) to forecast such variables as the current account deficit in the balance of payments.

the issue of whether policymakers—although not subscribers to the Phillips curve—deliberately attempted to keep output above potential. But the evidence suggests that this was not the case. Successive Budget speeches endorsed the idea of having the economy grow at its potential growth rate.³⁶ Regarding the level of output, the target appears to have been the level of potential. Denis Healey, a member of the 1964–70 Cabinet and Chancellor from 1974 to 1979, stated that ‘the fundamental Keynesian concept of demand management’ that guided policy in the 1960s was to ‘maintain full employment of a country’s productive capacity without creating inflation’ (Healey, 1989, p. 379). It is also important to remember that in the 1960s policymakers attempted to avoid large current account deficits. Aside from the inflationary risk, allowing output to exceed potential ran the risk of unacceptably large external deficits.

What about policymakers’ views of the Phillips curve in the early 1970s? Edward Heath, the Prime Minister from 1970 to 1974, describes in his *Autobiography* a conversation with his Chancellor in April 1971:

‘[Chancellor Barber] did tell me privately that there was scope for raising the rate of economic expansion to as much as 4 per cent without any serious risk of fuelling inflation because of the under-utilisation of both capital and manpower.’ (Heath, 1998, p. 345).

Heath (1998, p. 405) also describes a ‘thorough and logical’ paper presented to Cabinet in June 1972 on the causes of inflation:

‘Our policy of expanding demand was essential to growth and employment and, therefore, broadly non-inflationary, on which basis inflation resulted largely from wage settlements.’

In Heath’s view therefore, inflation was largely driven by cost-push wage pressure, and there was little or no effect of aggregate demand expansion on inflation until the point where output exceeded capacity. Heath’s views on inflation are consistent with those of Kaldor, Balogh, and Neild, so there is considerable continuity in policymakers’ views on this issue from the mid-1960s to the mid-1970s.

Sir Kenneth Berrill, the Chief Economic Adviser to the Treasury in 1973 and 1974, was explicit about this asymmetric Phillips curve used by policymakers in this period:

‘I would say that we do not believe the Phillips curve over quite a large band, but starting at the top end, when you reduce unemployment you can begin to see shortages of skilled labour, bottlenecks and so on developing, which affect the balance of payments and also earnings and prices. Then there is a large flat band. What happens at the heavy levels of unemployment we do not know because we have not had that since the 1930s.’ (Berrill, 8 July 1974 testimony, in House of Commons, 1974, p. 136).

Berrill reaffirmed this view under questioning from the Parliamentary Expenditure Committee:

³⁶ For example, in his April 1967 Budget speech, Chancellor Callaghan remarked that ‘3 per cent... [is] a [growth] rate not far different from that of productive potential... the rate we can sustain in the medium term’ (11 April 1967, pp. 993–994). See also Nelson and Nikolov (2001a).

Question: Between the summer of 1971 and the summer of 1972 we did see a distinct downturn in the rate of inflation. You would not attribute that to the rise in unemployment which had preceded it?

Berrill: No. Import prices were in our favour during that period. Nationalised industry prices were reduced during that period, and so on.' (Berrill testimony, p. 136).

The above statements indicate a belief that (i) holding output below capacity does not create important downward pressure on inflation, (ii) expansion of demand does not put upward pressure on inflation until output exceeds capacity, and (iii) rather than being largely driven by movements in the output gap, inflation is instead the outcome of autonomous movements in wages and in specific components of the price index. Together, these propositions amount to a rejection of a Phillips curve (either downward-sloping or vertical) as a model of inflation.³⁷ As discussed in Section 2, they are consistent with non-monetary theories of inflation, and with the low weight given to monetary policy until the 1970s in the control of inflation.

At the Labour Party Conference in September 1976, Prime Minister Callaghan gave a speech that is often quoted as indicating policymakers' acceptance of the absence of a long-run Phillips Curve trade-off. The relevant part of his speech is:

'We used to think that 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 that option no longer exists, and that insofar as it ever did exist, it only worked on each occasion since the war by injecting a bigger dose of inflation into the economy, followed by a higher level of unemployment as the next step. Higher inflation followed by higher unemployment.' (Conference speech, 28 September 1976, reprinted in Callaghan, 1987, p. 426).

This speech is often interpreted as implying that policymakers believed prior to 1976 in a permanent downward-sloping Phillips curve as in Phillips (1958). But as the above extract indicates, Callaghan did *not* say that policymakers used to think that lower unemployment could be bought at the cost of higher inflation. Rather, he had to 'tell' his colleagues that higher inflation had resulted from past attempts to bring the economy closer to potential. The switch in policymakers' opinion indicated by this speech is therefore from a belief in a flat Phillips curve at less than full employment (as suggested by Berrill's and Heath's statements above); to a belief in an expectational Phillips curve that is vertical (or positive-sloping) in the long run.

I conclude that a downward-sloping Phillips curve was not used by UK policymakers in the 1960s to mid-1970s as a model of inflation or as a guide to policy. A recent study by Haldane and Quah (1999) claims the opposite. Haldane and Quah refer only to monetary policy in their discussion of actual policymaking, as though it was accepted in the 1950s and 1960s that this was the appropriate device for demand management and inflation control. They make no mention either of the low weight assigned by UK policymakers to monetary policy until the 1970s in the aftermath of the 1959 Radcliffe Report, or of the reliance of successive UK governments on

³⁷ Similarly, Berrill's predecessor (1969–73) as Chief Economic Adviser to the Treasury, Sir Donald MacDougall, recalled that he was 'sceptical of the arguments of economists like Professors Paish and Phillips (of "Phillips curve" fame) that... [wage] settlements were determined by the level of unemployment' and was 'doubtful about [the] effect [of unemployment] on inflation both in the short and in the longer run' (MacDougall, 1987, pp. 130, 188).

incomes policies to control inflation. Both these aspects of UK policy are key elements of the analysis here of the Great Inflation. In addition, while Haldane and Quah state that their interest is in 'policymakers' beliefs about the economy' (1999, p. 260), the earliest actual statement by policymakers that they use is from 1992. By contrast, the above draws on policymakers' statements from the 1950s, 1960s, 1970s and 1980s. Study of this source material establishes that Haldane and Quah's statement that the 'original Phillips curve guided UK policy choices right up to the beginning of the 1970s' (1999, p. 261) is not accurate. Rather, as shown above, prior to the acceptance of a vertical Phillips curve in the 1970s, policymakers believed in an asymmetric Phillips curve that, instead of being downward sloping as in Phillips (1958), was flat in the region believed to be empirically relevant.

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