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Abstract

In the fifteen years leading up to the financial crisis in 2008, there emerged a great deal of agreement on the optimal design of monetary policy. This policy ‘consensus’ was accompanied also by a widely-shared view of how macroeconomies worked as the ‘Keynesian’ versus ‘monetarist’ debates slipped into the past.

This paper charts the emergence of this consensus and then looks at the way in which the apparently settled ideas of monetary policy have been disrupted by recent events. In particular, it looks at the way in which the crisis has forced a revision of both the targets and instruments of monetary policy.

Key words: Monetary policy, quantity theory, Phillips curve

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Recent Developments in Monetary Policy

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1. Introduction

Until the onset of the financial crisis in 2008, it was common to talk about a monetary policy ‘consensus’ which was itself part of a larger consensus about how macroeconomies work. The policy consensus included the following points of agreement:

- Monetary policy affects output in the short-run but only the price level (or rate of inflation) in the long-run;
- The most effective policy instrument is whatever short-term interest rate is under the direct control of the central bank;
- Monetary policy outcomes are improved by setting an explicit inflation target, placing responsibility for achieving this target in the hands of an independent central bank and making its decision-making as open and transparent as possible.

In the course of this paper we shall look at where this consensus came from and at the extent to which it has been disrupted by recent events.

In the next section, we look at the fundamentals of monetary policy. In particular, we identify the three key issues of the stability of money demand (or the instability of velocity), the full-employment constraint and the exogeneity of monetary aggregates. In years gone by, these are the issues that divided monetarists and Keynesians. In section three, we look at the basis of the recent ‘consensus’. In particular, we shall be concerned with the extent to which it reflects a genuine reconciliation of conflicting traditions or merely a ‘papering over’ of some quite large cracks. Section four brings the discussion up to date by looking at what the recent crisis has taught us about the conduct of monetary policy.

2. Some basic theory

Until the emergence of the monetary policy consensus in the 1990s, the theory of monetary policy was interpreted through the quantity theory of money, since this captured all three of the major controversies that dogged policy down the ages.¹

The quantity theory starts with an identity:

$$MV \equiv PT \quad [1]$$

Where M stood for some stock of money, P was the average price level and T was a measure of total transactions. V , or velocity, was then the figure that reconciled the total stock of money with total nominal spending measured over a year. Sometimes T was replaced by Y , standing for real output.

In order to turn this into a *theory*, with some predictive content, three restrictions were added. At their simplest and most extreme these involved assuming that V and T were fixed while causality ran from left to right.

In practice, the assumptions were less extreme than those we have just given. Both V and T were allowed to change slowly but crucially their trends were predictable and completely independent of changes in M . Furthermore, some economists recognised a number of very significant complications, particularly as regards velocity – the link between money and spending.

For example, Fisher pointed out that *total* transactions covered a very wide range of activities and that the amount of money held in anticipation of each type could vary. He divided nominal transactions into PT_1 and PT_2 where T_1 were income transactions and T_2 were financial transactions *not related to the level of income* (Fisher, 1911 ch.2). Thus, overall velocity may change as a result of the changing composition of expenditure.

¹ The origin of the equation is a matter of some dispute. Jean Bodin (1568/1997), Locke (1692) and Hume (1753) are all plausible contenders as early exponents and even Copernicus is said to have outlined the basic ideas in 1522 (Spiegel, 1991, pp.86-8). Grice-Hutchinson (1952, 1978) and Gómez-Camacho (1998) are amongst those who credit Navarrus (1493-1586) as giving the first clear statement of the quantity theory in his *Comentario Resolutorio de Usuras* (1556). In his later years, Navarrus taught at Salamanca where his followers became known as the ‘Spanish quantitavists’ and built what Vilar (1976, p.140) called a ‘well-founded scholastic tradition’.

Keynes in the *Treatise on Money* (1930/1971 vol.V) distinguished two velocities of circulation: V_1 , defined as annual money income/income deposits, and V_2 , the volume of business transactions/business deposits. V_1 was a form of income velocity (albeit with a rather narrow, personal sector, definition of money). V_2 , however, consisted of three distinct groups of transactions:

- (i) transactions arising out of the division of productive functions...
- (ii) speculative transactions in capital goods or commodities;
- (iii) financial transactions e.g. the redemption or renewal of treasury bills, or changes of investments. (1930/1971, vol.V p.41)

He then made the following, far-sighted observation:

[Transactions (ii) and (iii) above] need not be, and are not, governed by the volume of current output. The pace at which a circle of financiers, speculators and investors hand round to one another particular pieces of wealth, or title to such, which they are neither producing nor consuming but merely exchanging, bears no definite relation to the rate of current production. The volume of such transactions is subject to very wide and incalculable fluctuations...(1930/1971, vol.V p.42)

The significance of these insights by Keynes and Fisher is this. The quantity theory is often written as $MV=PY$ where PY is described as being equivalent to PT since T is a stable multiple of Y and we are usually interested in rates of change.² But data for the UK at least show wide fluctuations in non-GDP spending, much of which involves real and financial assets (roughly, Fisher's T_2).³ As far as *overall* velocity was concerned therefore, Fisher and Keynes had already pointed to its instability, years before Keynes took it further through his theory of liquidity preference in the *General Theory* (1936/1971).⁴

² See for example Mankiw (2006) p.82.

³ See for example Bain and Howells (1991).

⁴ Interestingly, Leão (2005) showed that capital and consumption spending in the US have different velocities and thus that velocity changes over the cycle as the composition of GDP changes.

However, in the years that followed, and especially after 1945, the controversy about the link between money and spending was played out not in terms of velocity, but its inverse, the demand for money. In the *General Theory* (1936/1971) had talked of three ‘motives’ for the holding of money.⁵ Of these, the ‘speculative’ motive depended on a variety of potentially unstable influences. The first was the *actual* rate of interest. Keynes made the simplifying assumption that money paid no interest, and so the rate of interest on non-money assets represented the opportunity cost of holding wealth in money form.⁶ Given that money paid no interest, one might ask why (or even whether) rational agents *would* hold money for purely wealth considerations. This brought Keynes’s second influence into the picture. This was the *expected* rate of interest (or the expected future change in interest rates). This arose because the expectation of a future rise (for example) in interest rates was equivalent to an expectation of a future capital loss on bond holdings and the rational action was to sell in advance of the rise. In the aggregate, the money stock is unchanged but long-term bond yields are pushed up and an increasing fraction of the money stock is held as an asset and is unavailable for spending. Furthermore, this expectation could be linked to the actual level of rates since, for a given state of the economy, the higher the actual rate the greater will be the expectation of a fall.⁷ Finally, there was the question of ‘confidence’, more widely interpreted. In uncertain times, liquidity has large advantages. As we have just seen it can protect against capital loss in the event of an interest rate rise. It is also advantageous in a recession. Firms (and households too) fail when they cannot pay bills as they fall due (not because liabilities exceed assets). Furthermore, the value of claims on the real economy will fall in a recession. It is better to be out of shares while the price falls, in the hope of bargains later.

⁵ In a subsequent debate with Ohlin (1937), Keynes recognised a fourth, ‘finance’ motive whereby firms needed to accumulate money balances prior to capital spending. This later became an important part of the ‘endogeneity’ mechanism whereby it was argued that the money supply *responded to* the demand for credit and was effectively beyond the control of the monetary authority (see Chick, 1983, pp.198-200).

⁶ Today, of course, we would represent this by the ‘spread’ between non-money rates and money’s own rate. (This is not as simple as it may appear).

⁷ This introduces the concept of the ‘normal’ rate of interest, that is normal for a given set of circumstances. Keynes’s view was that any view of the ‘normal’ rate was unlikely to be strongly anchored and would be prone to frequent revision.

From a policy point of view, the significance of Keynes's theory of liquidity preference is that it weakened further the link between the money stock and the quantity of spending since the money stock had to fulfil a number of functions and some of these had no connection with planned spending but were subject to frequent and unpredictable revision. The boundary between what Keynes called 'active' and 'idle' balances was extremely mobile and the velocity of an idle balance is zero. What became known as the 'Keynesian' approach to monetary policy through the 1950s, 60s and 70s was based on a rather loose interpretation of these arguments. The part that survived was that the demand for money was likely to be highly interest-elastic (as interest rates fell only slightly, for example, there would be a large increase in holdings of idle balances and little direct effect on spending).⁸ In a famous review of monetary policy, the Radcliffe Report (1959) commented 'We cannot find any reason for supposing, or any experience in monetary history indicating, that there is any limit to the velocity of circulation of money' (Radcliffe, 1959, p.133).

Unfortunately, Keynes's insights on uncertainty and the role of psychological factors largely disappeared. The result was that a 'Keynesian' approach to monetary policy came to be represented to generations of students as a flat *LM* curve (in the *IS/LM* model) when Keynes would have been more concerned with its stability than its slope. One of the lessons of the recent crisis, as we shall see in section four, is that the demand for liquidity is highly unstable in a crisis.

The 'monetarist' attempt to restore the connection between money and spending began with Friedman's (1956) famous 'restatement' of the quantity theory. This set out to place the demand for money on sound microfoundations (rather than on vague notions of motive) and made it a function of a fairly small number of variables, none of which was likely to behave erratically. The microfoundations meant that equilibrium prevailed and thus that any (exogenous) change in the money stock would cause agents to have excess (insufficient)

⁸ In the UK, the weakness of monetary policy was reinforced by a belief in the interest *insensitivity* of investment spending.

money balances. In response they would spend more (less). This spending would be spread across a wide category of goods, services and assets and thus a monetary shock had a direct effect upon aggregate demand and did not rely upon the interest-sensitivity of investment expenditure. Unlike liquidity preference and its use of bonds as the obvious alternative to money, the ‘restatement’ selected no particular category as an especially close substitute for money. For this reason, there was no reason to suppose that the interest-elasticity of money demand was low and so the monetarist view of monetary policy could also be caricatured within the *IS/LM* model – this time as a steeply-sloped *LM* curve.

Furthermore, unlike a ‘truly-Keynesian’ *LM* curve, which would have shown frequent and substantial shifts, the monetarist *LM* curve was firmly anchored. This was because agents were well-informed. Agents who are well-informed are not subject to the fear that might otherwise encourage them to rush to hold idle balances. This assumption of well-informed agents became important later in producing the ‘New Classical economics’ in which agents were assumed to enjoy rational expectations. The consequence of this was to produce a more extreme version of monetarism in which the effect of money on aggregate demand found its way directly to the price level rather than to the temporary increase in output that monetarism allowed.

The notion that an increase (for example) in aggregate demand would create an increase in output and employment was based upon the expectations-augmented Phillips curve. In the *General Theory* there was little discussion of the microeconomics of the labour market.⁹ Provided that entrepreneurs could be confident that estimated receipts (D^e) would exceed outlays (Z), which they almost certainly would with unemployment in excess of 12 per cent at the time, then output, rather than prices, would respond to an increase in aggregate demand. This was given further support by the simple Phillips curve (1958) which suggested that prices would begin to rise only when unemployment fell below five per cent and furthermore that a

⁹ Another source of the accusation that Keynes was weak on microeconomic fundamentals.

lower level of unemployment could be ‘bought’ in exchange for a low rate of inflation. This encouraged the view amongst policy-makers, if not amongst more cautious economists, that equilibrium in the labour market could be indicated by a low, and stable, level of recorded unemployment. The work of Phelps (1967) and Friedman (1968) showed that this could be true only if workers suffered from money illusion. Once workers began to bargain on the basis of the expected inflation rate, then equilibrium was possible with *any* rate of inflation and, furthermore, would be subject to shifts resulting from labour market imperfections and policy-induced changes in work incentives. *Given* labour market equilibrium, an increase in aggregate demand would lower unemployment by lowering the real wage and this could last only for so long as wage negotiations failed to catch up with the rate of inflation. And if workers, like other agents, were blessed with rational expectations, this would be no time at all.

Hence, by the 1970s monetarism (and even New Classical economics) could claim some apparent support from the facts of ‘stagflation’, the combination of rapid monetary expansions followed by rising (rather than falling) unemployment and increasingly rapid inflation. Workers now expected inflation and monetary policy affected only prices.

The third controversial issue concerned the appropriate choice of monetary policy instrument. Until the 1980s, most monetary policy *analysis* worked on the assumption that the money supply is exogenously determined by the actions of the central bank in controlling the monetary base. Because banks must maintain a minimum level of reserve assets, the supply of base money restricts their deposit-holding to some multiple of this base, giving the central bank considerable leverage over monetary conditions.¹⁰ In practice, however, central banks showed great reluctance when it came to using such an apparently powerful instrument. Faced with the monopolist’s choice of setting either the price or the amount of liquidity, central banks have long preferred to manage short-term interest rates through the price at which they make borrowed reserves available to the banking system. The consequence of this is that the

¹⁰ Hence the practice in many US textbooks of describing the monetary base as ‘high powered money’.

monetary base becomes demand-determined. Banks demand whatever quantity of reserves they require to support their intended lending and deposit-holding and the central bank is obliged to supply this on demand if the current level of interest rates is to remain undisturbed.

Furthermore, since banks' demand for these reserves stems from clients' liquidity needs and these in turn depend upon the state of the economy, the money supply becomes endogenous. In terms of the quantity theory, causality is reversed. It is *PT* that determines *M*. The reasons for preferring to set interest rates are numerous and beyond the scope of this paper.¹¹ However, it does mean that for the entire post-war period, the choice of monetary instrument has precluded the operation of any strictly monetarist policy. For example, when Mrs Thatcher's Medium Term Financial Strategy (1981-85) set explicit targets for growth of a broad money aggregate, the policy instrument remained the Bank of England's discount rate and not the monetary base. Similarly, the Volcker so-called monetarist experiment 1979-81 was denounced by Friedman (1984) because of its use of the interest rate instrument.

Although the possible endogeneity of the money supply was recognised many years ago,¹² its role in the critique of monetarism was promoted by Kaldor (1970, 1982, 1985), Kaldor and Trevithick (1981), Davidson and Weintraub (1973) and above all Basil Moore (1988) – economists who preferred the title of *post-Keynesians*. Moore (1988) contains a chapter in which he tested the hypothesis that it was firm's demand for working capital which explained the growth of bank lending (and thus the expansion of deposits). This triggered further empirical work which was broadly supportive of the link between the growth of credit and industrial production (e.g. Moore, 1989; Palley, 1994; Hewitson, 1995).

¹¹ Howells and Bain (2008, pp.260-61) offer seven reasons.

¹² e.g. Wicksell (1898), Schumpeter (1911). Some of the very early names associated with the quantity theory, mentioned at the opening of this section, were debating with critics who were in effect supporting an 'endogenous money' stance. This was especially true of Bodin (1568/1997). For more on the history of the endogeneity debate see Arestis and Howells (2002) and Mayhew (1995).

3. The recent consensus

The term ‘consensus’ reflects the belief not just that we have settled ideas about how macroeconomies (and monetary policy) work but also that these settled ideas are drawn from all the warring factions of the 1950s to 1980s. Hence, the post-Keynesian position that the policy instrument is the rate of interest and the money supply is endogenous is now standard in the theory of monetary policy (Romer, 2000; Woodford, 2003). Furthermore, the transmission mechanism, linking the monetary policy instrument to the level of aggregate demand and then to the rate of inflation, when explained by policymakers, shows details which offer something to each of the major schools of thought. The ECB (2004) publishes a flow chart, with explanation, and this features a role for the rate of interest in: investment (Keynesians), wealth effects and consumption (monetarists). Furthermore ‘expectations’ play a large role in many ways including consumption through expected future income (monetarists) and investment (Keynesians) while being volatile and difficult to model (Keynesians).¹³ Finally, the agreement that policy affects real variables in the short-run acknowledges the Keynesian position while insisting that only prices are affected in the long-run vindicates the monetarists.¹⁴ However, while this short-run/long-run distinction may *appear* to offer something to both sides, it remains a very controversial issue. At the root of the debate is the ‘New Keynesian Phillips Curve’ (NKPC) which the consensus uses to translate changes in aggregate demand into (long-run) price and (short-term) quantity effects. As we shall see, there are empirical problems with the NKPC; furthermore, there are some economists who dismiss its links to Keynes as based entirely on a misreading of Keynes.

The theoretical background to the New Keynesian Phillips Curve (NKPC) is that monopolistically competitive firms control their own prices due to product differentiation. Firms are constrained in setting prices, for instance by fixed duration contracts as in Taylor’s (1980) model or, by fixed random periods during which prices cannot be re-set, as in Calvo’s

¹³ The Bank of England’s explanation of the transmission mechanism is virtually identical. See, Bank (1999).

¹⁴ The real losers in the ‘consensus’ are the New Classical economists.

(1983) model.¹⁵ Firm's desired price depends on the overall price level and the output gap. Firms change their prices infrequently and when they do, they set their price equal to the average of the current and all future desired prices until the time of the next price adjustment. As a result, the actual price level is equal to a weighted average of all prices that firms have set in the past. Under profit maximization, expected future market conditions matter for today's pricing decision.¹⁶ The model can be solved to yield the standard NKPC as:

$$\pi_t = \alpha E_t \pi_{t+1} + \beta(y_t - \bar{y}) + \varepsilon_t \quad [2]$$

where α is a parameter close to or equal to one, π_t is the inflation rate which depends on future inflation $E_t \pi_{t+1}$ and the output gap $(y_t - \bar{y})$. Equation [2] is thus very similar to the expectations augmented Phillips curve of Friedman and Phelps and, indeed, Lucas. One important way in which the NKPC differs from earlier work on the Phillips curve involves the way in which expectations are assumed to affect price setting behaviour. In the expectations augmented Phillips curve, expectations are either forward or backward looking, or both, and if they are forward looking, they are expectations of current inflation. In the NKPC, expectations are about future inflation and the NKPC implies that inflation is a purely forward looking variable, without inertia.¹⁷

The contribution of the New Keynesian model is that it gives some microfoundation to the idea that the overall price level adjusts slowly in response to changes in economic conditions. Because of the frictions of the staggered contracts in the Calvo and Taylor models, monetary policy changes that raise or lower inflation have short-run effects on the output gap.

¹⁵ In the text, we follow the model by Calvo, as exposed by Mankiw (2001) and Gordon (2009).

¹⁶ We can iterate forward equation [2] below, that is to use the definition of inflation of period $t+1$ to substitute for the value of inflation that appears on the right-hand side of the equation and so on (Clarida *et al*, 1999). We obtain

the inflation rate in terms of future expected excess demand (or output): $\pi_t = E_t \sum_{i=0}^{\infty} \alpha^i (\beta x_{t+i} + \varepsilon_{t+i})$

where x_{t+i} represents excess demand or the output gap. Inflation is thus a function of future output gaps.

¹⁷ The reason that only future inflation expectations matter in the NKPC is because firms' adjustment prices are based on future expectations of desired prices, with the latter dependent on expected future economic conditions

Furthermore, the model is simple enough and has become a ‘workhorse’ for much recent research on monetary policy.¹⁸

However, the NKPC has been criticized for not fitting the empirical facts.¹⁹ Blanchard (2008) calls the NKPC equation ‘patently false’ (p.9) and Mankiw (2001) points out that the NKPC ‘... cannot come even close to explaining the dynamic effects of monetary policy on inflation and unemployment.’ (p. C52). Gordon (2009) discusses the drawbacks of the NKPC, and leaves ‘... to the reader the puzzle as to how this model could have become a “workhorse.”’ (p.23).

One of the empirical problems of the NKPC is that it cannot account for the high persistence of inflation. In the NKPC model, inflation expectations are purely forward looking. However, over the last fifty years or so, inflation has been highly persistent. Fuhrer and Moore (1995) find that correlation coefficients of inflation are close to one. Their simulation studies demonstrate that the staggered contract model (Taylor, 1980) does not replicate the high persistence shown in the empirical behaviour of inflation. In response, the Fuhrer-Moore model uses plausible assumptions of the labour contract and introduces the hybrid NKPC, with forward and backward looking inflation expectations.²⁰ Additionally, a series of papers (Rudd and Welan, 2006, 2007; Fuhrer 1997, 2006) provide evidence that inflation contains a sizeable amount of its own persistence, that is, persistence that is not due to the output gap.²¹ This is in contrast to the predictions of the NKPC, which assumes that inflation has no persistence of its own. As these papers show, there is a significant role for lagged inflation which challenges the underpinnings of the staggered contract rational expectations model that underlies the NKPC. Hence, the one feature of the NKPC that differentiates it from alternative models of inflation, such as the traditional backward looking Phillips curve, appears to be empirically irrelevant.

¹⁸ For a survey see Clarida et al (1999) but also McCallum (1997) who called the model ‘the closest thing to a standard specification’.

¹⁹ For a summary of its empirical problems see Mankiw (2001).

²⁰ Examples of studies that use the hybrid NKPC model are Casares and McCallum (2000), Ehrmann and Smets (2003), and Rudebusch (2002).

²¹ The only way through which inflation persistence could arise in the NKPC model is through correlation in the output gap.

Furthermore, microeconomic evidence on price setting behaviour also tends to contradict the foundation of the NKPC. It shows for instance, that in the standard Calvo pricing model price changes are less volatile than those found in micro price data (Bils and Klenow, 2004).²² Also, Calvo pricing predicts a perfect correlation between the average size of price changes and inflation. This feature of the Calvo price set-up does not find any empirical support from micro data, which shows little correlation between the size of the price changes and inflation.

Another critique of the NKPC is that it produces perverse dynamics. Ball (1994) uses a standard Taylor-type model and shows that staggered price adjustment is insufficient to explain how disinflation reduces employment and output when monetary policy is credible. In fact, he shows that completely credible disinflation can cause a boom in this type of model. The reason is that price setters are forward looking. If the central bank announces a decline in the growth of money (disinflation) and the announcement is credible, prices set before disinflation was announced are too high and firms should reduce the size of their price hikes before money growth slows. As a result, real balances rise, resulting in an increase in output and employment. In practice, however, when central banks disinflate, the typical outcome is a recession rather than a boom.

We turn now to the NKPC and its links to Keynes. The NKPC curve postulates that shifts in aggregate demand coming from monetary policy or other sources, have a short-term impact on employment and output. In so doing, it follows in the tradition of Friedman's (1968) augmented Phillips curve. The natural rate of unemployment is determined *by supply side factors only* and monetary policy has a temporary effect of two to three years. This view is contested firstly by Blanchard and Summers (1986), and their the concept of hysteresis: the actual level of unemployment affects the long-term unemployment rate so that a rise in actual

²² For a more detailed critical comparison of microeconomic evidence on price setting behaviour and predictions of the NKPC, see Fuhrer et al (2009).

unemployment moves the natural rate upwards.²³ The authors suggest that the mechanism behind hysteresis is the insider-outsider model, in which, when workers become unemployed, the employed workers increase their wage target and thus prevent the unemployed from getting their jobs back. Another channel through which hysteresis affects the natural rate is the human capital hypothesis, which states that the (long-term) unemployed effectively drop out of the labour market because of their loss of skills and/or general frustration to search for jobs (for example, Hughes and Hutchinson, 1988). More recently, Ball's (2009) analysis of 17 periods of large changes in the natural rate of unemployment and the corresponding changes in inflation point to a clear prevalence of co-movement that one would expect if hysteresis is the driving force behind large changes in the non-accelerating inflation rate of unemployment (NAIRU). Ball argues that, in contrast to general accepted wisdom, monetary policy has persistent and large effects on the NAIRU. Even though the hysteresis argument does not reject the idea that supply factors affect the natural rate of unemployment, it claims that the Friedman and NKPC model need to be generalized by including movements in actual unemployment additionally to supply side variables.

A similar argument, and one that leads to the same policy conclusion, is made by Davidson (1994), Arestis and Sawyer (1998 and 2005) and Sawyer (2010) amongst others. This is that the level of employment depends upon the level of investment and this in turn is influenced by aggregate demand and therefore monetary policy. Hence any policy that depresses aggregate demand and discourages investment will tend to raise the 'natural' rate of unemployment over time. For this reason, money *always* has real effects. The view that there is nothing fundamentally 'Keynesian' about the NKPC is strengthened by Keynes's own argument that wage and price rigidities do *not* lie at the heart of the unemployment problem.²⁴

²³ For an overview of the early discussions of hysteresis and its effect on the NAIRU see Cross (1988).

²⁴ 'There is ... no ground for the belief that a flexible wage policy is capable of maintaining a state of continuous full employment'. (Keynes, 1936/1971, p.267).

4. Recent lessons and issues

Seen within the long-run controversies regarding monetary policy, the most obvious consequence of the recent crisis has been the dramatic refocusing of both targets and instruments. As regards the former, there has never been any doubt amongst central banks that monetary policy can have *real* effects over some time horizon and it is those real effects that are uppermost in policymakers' minds at the moment. On the monetary policy front we have had the sort of reaction that Keynes in the 1930s might have dreamt about.²⁵ Of course, it is open to policymakers to argue that inflation remains the *primary* target and the dangers of a severe recession are that the economy is pushed into negative inflation which, as the Japanese experience shows, can be very difficult to reverse. Since central banks face explicit (or implicit) inflation targets of around two per cent, and since a policy stimulus can take up to two years to work its full effect, then a dramatic easing of monetary policy now, could be presented as entirely consistent with inflation targeting 'in the long-run'. Indeed, this appears to be the Bank of England's position, judging by the documents provided on its website offering an explanation of 'quantitative easing' (of which more in a moment). These all bear the statement 'inflation target 2%' prominently on their cover in order to emphasise that this is still the fundamental objective of policy. But it takes a sophisticated reader to work out the link between pumping liquidity into the economy when the actual inflation rate is already over three per cent and the target is two per cent. Interestingly, this brings into focus the precise form in which the inflation target is set. The Bank of England faces a *symmetrical* point target of two per cent, in the sense that its mandate is just as critical of outturns below target as it is of overshoots.²⁶ Hence that Bank can argue with some legitimacy that quantitative easing is intended to hit the target 'from below'. This is not so easy for central banks like the ECB, for

²⁵ Unfortunately, he would be all too familiar with the *fiscal* policy response. His remarks about the May Committee Report, established to recommend reductions in public spending in the face of the 1931 budgetary crisis, would surely be applied to recent (October 2010) decisions by the UK government. Keynes is reported to have described the Report as 'the most foolish document I ever had the misfortune to read' (quoted in Dalton, 1953, p. 290).

²⁶ See http://webarchive.nationalarchives.gov.uk/+http://www.hm-treasury.gov.uk/d/chxletter_boe050309.pdf

example, where the target is specified *asymmetrically* as ‘close to but below two per cent’. It is more difficult for the ECB to pass off aggressive quantitative easing as part of an inflation targeting policy since it is under no obligation to avoid undershoots. When practised by the ECB, a dramatically expansionary monetary policy is bound to look more like ‘old-fashioned’ Keynesian demand management.

When it comes to policy *instruments* the dramatic shift has been from price to quantity as central banks have engaged in large-scale open market operations to buy bonds and thereby causing an *exogenous* increase in liquidity.²⁷ The link from such asset purchases to aggregate demand works through three channels (see Bank, 2009). Firstly, where the bonds²⁸ are purchased from the banking system, banks reserves increase by an equivalent amount and since these reserves pay little or no interest it is a reasonable assumption that *some* of the increased reserves will be used to finance additional loans.²⁹ However, in the UK at least, the reluctance of banks to increase lending has seen a dramatic rise in their holdings of central bank reserves to outstanding deposits.³⁰ Secondly, where the asset purchases are from non-banks, then the broad money supply increases immediately by an equivalent amount. The question then is whether the non-bank private sector will spend the additional funds or, like commercial banks, simply build up liquidity. Clearly there is a major role for ‘expectations’ here. If the general level of uncertainty means that non-banks build up idle balances, then there is little effect on aggregate demand. This is a powerful demonstration of the way that Keynes’s ‘liquidity trap’ works in a modern economy. However, there is a third route that the Bank of England has been keen to stress. This is the ‘conditions in credit markets’. By this, the Bank means the terms on which borrowers can raise funds in securities markets. By buying bonds, the Bank is

²⁷ The major practitioners of bond purchases have been the US Federal Reserve and the central banks of England, Switzerland and Canada. The European Central Bank has been more cautious and faces the potentially sensitive issue of which country’s bonds it should purchase.

²⁸ A distinction is sometimes made between the purchase of government bonds, described as ‘quantitative easing’, and privately issued bonds, described as ‘*credit* easing’. Since there is little monetary significance in the distinction we refer to all such purchases as ‘quantitative easing’.

²⁹ In so far as banks are swapping a low risk asset (bonds) for a zero risk asset (central bank money) this also improves their ‘capital adequacy’ under the Basel II rules.

³⁰ In effect, UK banks have increased their lending but only to the central bank.

supporting prices and lowering longer-term yields, as well as reassuring market participants that there will always be a market for new issues.

The reason for this development of ‘unconventional’ policy instruments lies in the problem of the ‘zero lower bound’ to nominal interest rates. In a recent speech at the 55th Annual conference of the Federal Reserve Bank of Boston, Bernanke (2010), referred to the possibility of further quantitative easing (‘QE2’) and stressed that the Federal Reserve planned to maintain the official rate at very low levels for longer than was currently priced into the market. His argument was that a lower policy rate was desirable but that the US was caught by the zero lower bound for the federal funds rate. At the same conference, Evans (2010) argued that the US needed a more expansionary monetary policy and that real interest rates should be between -3 and -4 per cent until the end of 2012, compared with a current real rate of -1%. Regarding the ECB, their Staff Forecast from the beginning of September 2010, shows, based on the assumption that EONIA³¹ follows market expectations, that inflation will be below the ECB’s target of ‘below, but close to 2 per cent’, and that economic growth will be weak. The latest inflation report by the Bank of England (2010), presents forecasts, also based on a policy rate in accordance with market expectations, of inflation below its target and a weak real economy. The Bank of England minutes of the Monetary Policy Meeting (Oct2010) discuss the possibility of a continuation of quantitative easing.

Since households derive utility from the purchase of goods and services, it is the *real market interest rate* that is most relevant to their economic decisions and, consequently, monetary policy will influence demand only to the extent that changes in the nominal interest rate feed through to the real interest rate across the entire spectrum of the yield curve. Under inflation targeting, the task of monetary policy is to influence the real (short-term) interest rate in response to shocks that cause inflation to be below or above the target. Since nominal

³¹ EONIA is the overnight interest rate for the EMU area.

interest rates are bounded at close to zero³² and expected inflation is below the target, the real market interest rate, minus expected inflation, is too high compared to the level appropriate to the inflation target and at the same time to stabilize the real economy. The market rate exceeds the policy rate by a margin, where the latter is determined by various risks, uncertainty, liquidity premia, bank mark-ups to increase profitability etc.³³ In a simplified way the real market rate can be specified as:

$$\text{Real market rate} = \text{policy rate} + \text{margin} - \text{expected inflation}$$

Even when the policy rate is bounded at close to zero, the real market rate can be too high because the margin is too high and/or expected inflation is too low. The real rate can then be lowered only by reducing the margin and/or increasing inflation expectations. The margin can be reduced and thus contribute to a lower real market rate by what Bernanke (2009) calls ‘credit easing’, actions focusing on the mix of loans and securities that the central bank holds.³⁴

Lowering policy rates to close to zero have not translated into a sufficiently large reduction of the spread between lending and borrowing rates. Empirical work on the relationship between market and policy rates shows that household secured lending rates have a higher mark-up relative to household deposit rates since the beginning of the crises compared to the pre-crisis period (Biefang-Frisancho Mariscal and Howells, 2010). Also, the transmission from policy rate to bank lending rate has fallen relative to the transmission to the deposit rate since the crisis. The implication is that borrowing is relatively more expensive than it was before the crisis, even though the policy rate has been close to zero since March 2009.³⁵ A study by the Bank of England which decomposes bank lending rates to households into costs of funding, finds a sizeable residual mark-up over and above cost of funding on household

³² All official Central Bank statements insist that nominal interest rates cannot fall below zero. Below we turn to tools that may allow for negative nominal (short-term) interest rates.

³³ The latter is thought to be also responsible for the residual mark-up over the cost of funds (Button, 2010).

³⁴ In 2009, the Fed bought commercial paper and residential mortgage backed securities. The Bank of England and the ECB bought corporate bonds. Sometimes sales of government bills funded the purchases, leaving the quantity of money unchanged and sometimes, purchases were funded by the creation of money which links to quantitative easing.

³⁵ In the UK the policy rate has been 0.5 per cent since 5th March 2009; in the USA the target Federal Funds Rate has been 0.25 per cent since 16th December 2008.

bank lending rates since the crisis (Button, 2010). In other words, while the cost of funding is lower now than it was before the crisis, lending rates have not fallen to the same degree. Market interest rates (as well as the spread between borrowing and deposit rates) are too high to stimulate economic activity, leaving the danger of undershooting the inflation target in future.

The really substantial effect on the real market rate can then be achieved by either raising inflation expectations or creating negative nominal interest rates. We turn to the latter, more controversial tool, later and assume first that the nominal zero bound to interest rates applies. In these circumstances, central banks can affect the real interest rate only if they can change private sector inflation expectations. If the private sector were to believe that future inflation will rise, the real interest rate would fall and the economy would stabilize. The central bank would deliberately overshoot the inflation target in the future because this policy would correspond with higher inflation expectations and lower real interest rates. The implication of this policy is that the policy rate remains close to zero for some period even then when the real interest rate has returned to an appropriate level. Krugman (1998) has emphasized that the problem is that the policy is not credible. The private sector will expect that the inflation target will be followed once the real economy has recovered, so that the announcement by the central bank of a policy of higher future inflation does not affect inflation expectations, unless it is accompanied by any action or visible commitment supporting the announcement. One way of convincing the public that the central bank is determined to increase future inflation above its target is to follow a price level target (Bernanke, 2003; Svensson, 2003; Evans, 2010; Eggertson and Woodford, 2003). A price level target forms a path for the price level where the rate of increase in the price level is determined by the inflation target. The advantage of the price level target is that it has a memory in that lower inflation during a period of time where prices are below the target will be compensated for by corresponding higher inflation at a later period so as to attain the target price path again. If the public believes the price level target,

long-term inflation expectations will be stable, even though short-run expectations are below the target.³⁶ If prices have already fallen below the target, short-run inflation expectations will rise and with an unchanged policy rate, the real interest rate will fall and the economy will recover. A price level target can be seen as an average inflation target over a longer period of time.³⁷ Criticism of this type of policy rule involves the risk of excessive inflation expectations and a loss of central bank credibility.

So far, we have assumed that the zero bound is a binding constraint.³⁸ If central banks could reduce nominal interest rates below zero, they could directly affect the real interest rate and stimulate the economy. The zero bound on nominal short-term interest rates comes about because, while deposits can be subject to a tax or some other form of negative charge, investors can always hold currency ('cash') which pays a guaranteed zero return. Any device that were to lower the return on cash holding would also remove the zero lower bound on interest rates. Goodfriend (2000) and Buitert and Panigirtzoglou (1999) have proposed an unorthodox way of eliminating the zero bound on nominal interest rates by suggesting a tax on money. If the policy rate was zero and the central bank was to impose a carry tax on electronic bank reserves, competition amongst banks to avoid the tax would lower the interbank rate below zero by the amount of the cost of carry. The cost of carry is the lowest level to which the interbank rate would fall because banks would not lend to each other at cost greater than the storage cost at the central bank. Equally, long-term interest rates would become negative if banks expected the central bank to maintain negative short-term rates sufficiently far into the future. The central bank could vary the tax as it varies the policy rate. However, banks could hold reserves in a vault instead of lending on the interbank market and the carry tax on money could not be greater than the cost on storage. To deal with this problem, the central bank could also tax vault

³⁶ A central bank with inflation targeting may undershoot the target for some years and then return to it. The long-run average inflation is lower than the inflation target and the central bank will not compensate for the past target misses. Since with price level targeting the central bank compensates later for previous misses, long-term inflation expectations are unaffected by the initial undershooting.

³⁷ No central bank follows a price level target at the moment.

³⁸ See Yates (2004) for a useful survey on monetary policy at very low interest rates.

cash and currency. It is technically possible to impose a tax on commercial bank reserves in the central bank and on electronic money such as cash cards or with some innovation on currency.³⁹ The carry tax as a solution to the zero bound is compelling because varying the carry tax would not change interest rate policy. As with positive interest rate setting, the central bank can, if the public expects negative interest rates to last sufficiently into the future, cause even long bond rates to move closer to zero or to make them negative. Furthermore, the central bank would be able to deal directly with deflationary expectations by making nominal interest rates negative. However, there may be real public resentment against a system that makes money in people's pockets worthless.⁴⁰ There may be occasions where a moderate or targeted operation of negative interest rates may be sufficient. Münchau (2009) emphasizes that central banks have more than just one deposit rate at their disposal and they can target a specific operation. The Swedish Riksbank did introduce in August 2009 negative deposit rates on commercial bank deposits in order to discourage banks to hoard their surplus liquidity with the Riksbank instead of lending it to the public. To our knowledge, this is the only central bank that 'broke' the zero bound and there seems to be little official central bank interest in introducing a policy of negative interest rates.

5. Conclusion

Until recently, the design and conduct of sound monetary policy enjoyed a good deal of agreement. The Keynesian v monetarist battles of the 1960s-80s appeared to have been resolved by a 'consensus' which extended from policy into a shared understanding of how macroeconomies work. In this paper we have tried to show how the basis of this consensus while suggesting that the 'New Keynesian Phillips Curve' that lies at its heart is still

³⁹ A carry tax could also be imposed on currency by fitting a magnetic strip in each note. The magnetic strip could record when the note was last withdrawn from the banking system and a carry tax could be deducted depending on how long the note has been out of the system once the note is redeposited. Alternatively, a negative lottery could be designed, using the serial numbers printed on currency notes.

⁴⁰ For an interesting defence of monetary policy beyond the zero bound see Buiter (2004, 2009).

problematic. We have also shown how the recent crisis has created major problems for the operation of conventional policy instruments while at the same time forcing a rethink about the design of monetary policy targets.

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