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Where the Great Experiment went Wrong Transcript

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Where The Scientific Experiment Went Wrong

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The received wisdom is that risk increases in recessions and falls in booms. In contrast, it may be more helpful to think of risk as increasing during upswings, as financial imbalances build up, and materialising in recessions.

A. D. Crockett (2000).

1. Introduction

One of the interesting canards, perhaps as a result of the inflationary episodes of the 1970s and 1980s, was that price stability rapidly developed into a sufficient statistic to judge whether a macroeconomic equilibrium had been achieved. In both the public arena and the policy sphere, the continuing attainment of low and stable rates of inflation seemed to suggest that monetary policy had not only functioned well but perhaps had discovered the key 'to end boom and bust'. Indeed the then Chancellor summed up the view well, which was very much the overall consensus at the time, in a speech to the British Chamber of Commerce in 2000: "it was to avoid the historic British problem - the violence of the repeated boom and bust cycles of the past - that we established the new monetary framework based on consistent rules - the symmetrical inflation target; settled well understood procedures - Bank independence; and openness and transparency. And side by side with it and as important, a new fiscal discipline with, again, clear and consistent rules - the golden rule for public spending; well understood procedures - our fiscal responsibility legislation; and a new openness and transparency".

In most of the models we have thought about a persistent deviation in inflation from target can only occur if current or expected aggregate demand is persistently greater than potential output. And given that policy tends to stabilise demand through a sequence of predictable responses to any excessive demands, such a persistent deviation can only result from a faulty or mistaken interpretation by policymakers of the state of demand relative to supply. Although it is actually very hard to disentangle demand from supply shocks in real time - so much so that a large fraction of policymaker's time is spent trying to do just that - we might reasonably expect such judgements not be persistently wrong - as learning about the current state and the most recent states of nature may become easier as time passes, and todays become yesterdays.

Naturally, examining far ahead inflation expectations can be one way to judge whether households and firms believe that policy will react sufficiently to any dislocations in demand and supply. Over this long expansion period, the inflation expectations were indeed boringly stable. But such an observation does not necessarily make the job of the policymaker so easy that they can go off to the beach. First the inflation expectations themselves may contain an expectation that policy will respond to any current and future shocks so that the resulting inflation rate five or ten years ahead remains on track. The stable level of inflation expectations does not say that nothing needs to be done but there is some trust that the right things will continue to be done. Secondly, in a forward-looking model stable inflation expectations simply imply that the positive and negative output gaps cancel each other out and allow us to say very little about the implied path of the output gap over time. One way to think about the stable inflation expectations, which may seem rather unlikely, is that the noughties boom was balanced by a forecast of the subsequent recession and in the middle of all this expected volatility in output, inflation remained stable.

But before we start to think that there had been any kind of benign neglect of financial imbalances in the monetary policy debates prior to the crash, let me explain the tenor of the debate. There had been in fact a huge discussion amongst monetary economists about whether inflation targeting was sufficient or whether some innovation implying flexible inflation targeting was required or, indeed, whether the arguments in the policymaker's reaction function should be augmented to include factors such as asset prices or financial balances. The classic and simple view of inflation targeting is the straw man I developed in the previous lecture, where the central bank just seeks to bring inflation back to target over the forecast horizon with little or no regard for any output variance. The flexible inflation target will aim to stabilise both inflation and the real economy and will be willing to accept some trade-off between inflation and output variance. Some economists went further and argued that financial and monetary variables are not only information variables about the state of the economy but can be used as target variables in their own right. At some point these different approaches seem to me to converge and that is because I think the basic models did not articulate how a financial sector might

amplify rather than attenuate shocks and how risk-taking may lead to a highly unstable system.

That something went wrong is now clear. The performance of the economy after 2007 perhaps could not have been predicted given the performance in the fifteen year long expansion from 1992. And yet the whole thrust of the various debates we have examined on stabilisation policy have been formulated with the objective of creating stability. The ride since 2007 could be described as anything but stable. We are therefore left wondering whether the previous period of stability was really a chimera.

2. Independence Day for the Old Lady

In the previous chapter, we looked at the remarkable period of real income and inflation performance that provided the context, and to some extent, the diagnostic on the long expansion that ended so abruptly with the financial crisis. The inflation targeting regime established in October 1992 started first with a wide band of 1-4% for RPI inflation excluding mortgage interest payments, the wide band being somewhat reminiscent of the bands for oft-changed money targets. But there was an additional constraint that involved reaching a level below 2.5% by the end of that Parliament. By 1995 this target was modified to 2.5%, when the target was moved from RPI to CPI in December 2003, the target was once again changed to 2%. Under both targets, from 1997 onwards there was a 1% band of error allowed before the Governor's pencil would have to be sharpened for letter writing.

The key development was perhaps not just the adoption of a target but the Executive offering operational central bank independence to the Bank of England and its newly formed Monetary Policy Committee. There had been an enormous and influential research effort over the past two decades devoted to understanding the case for the adoption of central bank independence. Much of this research has passed into received economic wisdom about the appropriate formulation of monetary policy. As explained in the previous chapter, it became clear that the absence of a credible commitment by the monetary authorities to price stability would induce a positive (and costly) bias to equilibrium inflation outcomes. An independent central bank with a credible commitment to price stability was widely thought to be the way to establish such credibility. This key debate was particularly instrumental in the UK. It provided the stimulus for a series of reforms to the monetary constitution of the UK in the 1990s, following exit from the ERM in 1992, and culminated with the granting of operational independence for the Bank of England in 1997.

Despite overwhelming theoretical evidence, the empirical evidence of the impact of operational central bank independence has been limited, offering at best qualified support for the benefits of such a framework. We were fortunate therefore that the incoming Labour government in the UK in 1997 decided to make a surprise announcement about the creation of operational independence for the Bank of England on its fifth day of office. Although a decision to reform some aspects of the monetary constitution was expected, the crucial and final step of operational independence for the Bank of England was a complete surprise to the financial markets on the morning of May 6 1997. We should further note that the announcement did neither entail any reduction in the central target for inflation nor any change in the measure of inflation. It involved a number of procedural changes, with the main force of the policy initiative being that of operational independence. Ben Bernanke (2003) argued that (t)he maintenance of price stability -- and equally important, the development by the central bank of a strong reputation for and commitment to it - serves to anchor the private sector's expectations of future inflation.

The decision to grant independence on that day was a surprise to the markets, HM Treasury, and to the Bank of England itself. In fact, the Chancellor's decision to grant operational independence was only openly discussed with incoming Prime Minister Blair on polling day itself, May 1 1997. The Labour Party's Business Manifesto published on April 11 1997 had proposed the following reform to the Bank of England, which falls well short of operational independence:

We propose a new monetary policy committee to decide on the advice which the Bank of England should give to the Chancellor.

In the week following the announcement, the Economist Newspaper actually complained that the reform was not signalled in the Labour Party manifesto and was not debated or discussed as a serious policy initiative. This decision surprised everybody, including the Bank of England and the Treasury. Certainly, in subsequent interviews the officials at the Bank of England have admitted both market and personal surprise at the announcement. Howard Davies (2000), then Deputy Governor at the Bank of England, admitted in an interview that the announcement was t]o the market's surprise.

Governor Sir Eddie George also admitted in an interview that he was not expecting immediate operational independence and drew a link to the likely impact on longer-term interest rates: "I was very surprised by the timing -- the decision to move [on independence] immediately on taking office the markets believed that the politicians would not let go of the decisions on implementation of monetary policy. And this was damaging. It meant that inflation expectations did not adjust to the extent that they might have done to the decline in actual inflation." The impact on expectations is shown by the fact that bond yields dropped 50 basis points on the announcement by the incoming government in May 1997. Chadha, McMillan and Nolan (2007) examined the consequence for longer term interest rates, and found that inflation-fighting preferences were highly likely to impact on interest rates and explained well the significant decrease in interest rates. The value of central bank independence looks clear -- it can significantly reduce medium and long nominal rates for both government and private sector liabilities.

3. Aspects of Economic Performance

Far ahead, ten year, inflation expectations, as measured by the prices of conventional and (RPI) index-linked bonds provide an indication of the extent to which it is believed that the policy regime will deliver stable inflation. And we can see for the most part stable long run inflation expectations from this source and surveys. Note that RPI inflation started to rise from 2005 onwards, in part as the result of house components and mortgage interest rate payments and this tended to drag up long term RPI inflation expectations without necessarily indicating a loss of credibility. Indeed, if we examine other survey measures of inflation expectations from this period: belief in the targets seemed to be sustained.

The performance of CPI inflation seems to have been a tale of two sectors: service and goods. With increasing market penetration from the emerging world at lower finished goods prices, goods sector inflation became persistently negative in this period and played a role in explaining how relatively easy it was to maintain low inflation in this period. Lewis and Saleheen (2014) estimate that switching to emerging-market-sourced goods reduced manufactured import price inflation by just under 0.9 percentage points per annum on average, and overall import price inflation by around 0.6 percentage points per annum. Although part of the story for low inflation in this period also arises from the exchange rate and the increasing productivity of the distribution sector (Nickell, 2005), it is also quite possible that forward looking agents were setting prices and mark-ups in line with the inflation target. So if the real side of the economy and the expected sequences of output gaps were in broad agreement with price stability, what about the monetary and financial sector?

McLeay and Thomas (2014) show that money and credit both grew faster than nominal GDP throughout the long expansion (and during the decade before) and that credit grew faster than money. These authors and Chadha et al (2010) provide an interesting insight into the financial crisis of 2007, in that it was preceded by credit growth originating from wholesale funding of the banking system. These results are consistent with stories about a global savings glut, a narrowing of risk premia on a wide class of assets and the search for yield that helped drive credit and housing bubbles prior to the US sub-prime crisis. In effect, the UK banks' 'customer funding gap' was filled by an abundance of funds channelled through the wholesale interbank market, much of which originated overseas and these flows rapidly reversed when the interbank markets froze in 2007/8 with the onset of the financial crisis. Milne and Wood (2014) also provide evidence of a substantial credit expansion, especially in lending secured on property. Yet they show that this led to only relatively modest losses for UK banks on residential mortgage lending in the crisis period of 2008-2013. Instead most losses on UK bank sterling lending were associated with commercial property lending.

The global lowering of real interest rates resulted directly as a market clearing response to the burgeoning savings in many emerging economies. The Figure shows how global real rates fall from a to c when we add a large net supply of savings from overseas to a domestic market in which rates would otherwise clear at a higher level. The current account deficits in the debtor countries are simply part of the same phenomenon. This lower real interest rate raises the value of assets, which exactly represent the discounted cash flows over the life of the asset. If the discount rate falls, and indeed if risk falls, asset prices must rise. As well as considering whether household wealth rises with house prices, the value of these assets mean to their holders is that they provide collateral against which temporary shocks to income can be smoothed.

With significant flows from abroad Key et al (2014) have explored one aspect of the international position at that time. How the United Kingdom was able, despite a current account trade deficit and apparent net external liabilities, both to earn a positive balance of net income from abroad almost every year and to improve its net

external position during the Long Expansion. The puzzle is that the current account deficit, particularly in the 10 years leading up to the financial crisis does not square with the stability of net external assets over that period, unless there were higher systematic capital gains on the UK's assets compared with its liabilities. Indeed, between 1997 and 2012 the UK seems to have earned a total of capital gains or unidentified income worth nearly 20 per cent of 2012 GDP despite the fact that its net asset position is shown as a debtor. A substantial component of the improvement in the net income flow between the early 1990s and the middle of the next decade appears to have been a consequence of regulatory changes.

Much of the activity in banking, credit and financial flows found its way into the UK housing market. We can note that during the Long Expansion, there was a tripling in the average UK house price. And whilst liabilities on dwellings continued to grow as the background to this expansion, most of the measured increase in total household wealth can be explained by the increase in residential wealth. And yet the increase in wealth might be more apparent than real. Imagine an individual who lives for three periods, which saves £50 per period. At the end of the first period, she buys a house for £100 of which £50 is her equity and £50 is a mortgage. In the first and third periods of her life, we can imagine she lives in her parent's home and children's homes respectively. In the final period of her life she sells her house for £100 and pays off her mortgage. At the end of the three periods she has accumulated £150 of wealth, which does not sound very rational but let us suppose her planned funeral is lavish.

Next consider in period 2, that another individual is born who also saves £50 in period 2 and seeks to buy the house from the older person in the third period, his equity and debt of £100 is simply a transfer to the first individual. What determines the house price? Well it ought to be something like the present value of the (imputed or actual) rents that will accrue to the owner of the house over its lifetime, which is function of the risk-free rate, a risk premium and any expected growth in rents. So let us suppose that the growth of rents and fall in real rates imply that the house price doubles. And if this doubling occurs between the second and third period, the older individual will be left with an additional £100 of wealth. They can have a more lavish funeral or donate their wealth to an academic institution. But overall is society better off? Examine the position of the young individual who now has to take on £100 more of debt in order to meet the higher price. The increase in the house price is simply a transfer from the young to the old (in this case from male to female!) or from those who are short (in need) housing to those who are long (in possession). We can extend the number of families so that another is born in period 3 and then from that period on, we always have old, middle-aged and young individuals and we can think of the vertical line as a family and exchange between individuals has no net implications for overall wealth, which is always simply a function of accumulated savings.

What is clear, whether increases in house prices increases net wealth (permanent income) or not, the increase in prices has been associated with an increase in the quantity of private sector financial claims: with counterparty growth of credit and debt, which may sum to zero. But leaves each side of the contract vulnerable to two types of constraints. The debtor, may find themselves constrained if they reach their borrowing limit or if there are unexpected changes in interest rates that make debt plans unsustainable. On the other hand, the creditor may face the prospects of default or unanticipated falls in the returns from saving, which would undermine his or her future expenditure plans. It is the structure of these claims and their fragility of to all kinds of income, oil price, interest rate, or default, house price shocks that made the economy vulnerable.

3. Inflation Targeting: Flexible, Augmented Nutters?

As we have earlier discussed, the policy ineffectiveness proposal suggested that policy would have to be news, or unanticipated, if it was to influence the private sector's previously formulated plans. The surprise of central bank independence would casually seem to be a natural extension of that form of reasoning. Indeed, some years later the surprises announcements about quantitative easing were carefully scrutinised for their impact on market expectations of future policy rates. On Independence Day in May 1997, there seemed to a large downward shift in long term rates, as market participants viewed the new regime as credible and more likely to stabilise inflation than a inflation targeter subject to political interference. Furthermore it was argued by King (1997) - prior to the adoption of operational independence - that the 'appropriate design of institutional arrangements (may) provide incentives for central banker to pursue the first-best state-contingent policy'. We shall examine the merits of this claim and also consider the debate on whether central banks ought to have paid more attention to the evolution of asset prices in setting policy.

The dynamic inconsistency of optimal rules was discussed in the previous chapter in which it seems likely that the incentives for the policy maker to renege on previously announced rules will become clear to the private sector and so lead to an inflation bias in policy. Recall that although the monetary authorities have goals for

output and inflation stabilisation, they may also have an incentive to raise output above its potential. Such an inflation bias can only be solved with a credible commitment technology that rules about this incentive: the gold standard provided a pretty good example. Under a gold standard the central bank's note issuance, a liability, was convertible to gold, an asset, and so excessive note issue would threaten a bankruptcy of the bank. The governor of a central bank who would want the institution to remain in existence would simply not have an option to increase note issuance beyond a credible level of backing or support. The monetary solution to this problem for a fiat money world was suggested by Walsh (1995) who suggested linking a financial penalty on the central bank or its Governor(s) that was equivalent to the public's calculation of the inflation bias. One obvious way to do would be to set salaries and pensions in line with the CPI target and not link them to CPI outturns and ensure that misses in inflation on either side would take away from income. But such a tight target might induce central banks to behave in King's memorable classification, like inflation 'nutters', a point to which we shall return, who do not respond sufficiently to output shocks.

Another alternative would be to appoint a central banker in the spirit of Rogoff (1985) who does not offer a full commitment technology but is known to have strong anti-inflation preferences. In this world, such a central banker offers a better inflation stabilisation option than discretion or, say it quietly, a politician but at the costs of a less flexible response to other types of shocks, supply or asset price or otherwise. Such a conservative central banker is preferable to both simple discretion where inflation is pre-determined by private sector expectations and not 'controlled' by the policy-maker and the world of the inflation or employment 'nutter' where either one objective dominates the other and leads to higher welfare losses when measured in terms of variances in both inflation and output. But even this solution is not better than the optimal state contingent policy, which eliminates the inflation bias and lowers output volatility to its primitive level. The phrase - optimal state contingent policy - is cumbersome but simply implies that the policy-maker can be trusted by private sector agents to act on shocks in such a manner all the time and with regard to their long run reputation or the historical judgement of their actions that are in line with the social optimum. Such a policy has been termed 'timeless' by Woodford (2005) and by many central bankers as a fair reflection of what they seek to do on behalf of society, perhaps even as custodians of the social norm of price stability.

It has been argued that an inflation target with transparent monitoring rather than simply being about appointing a conservative central banker actually helps implement the optimal policy. This is because rather than simply imposing costs on inflation target misses through public embarrassment: does the Governor want to sit in the Press Conference and bow his or her head at the appropriate angle and for the appropriate length of time in apology? Or should we impose financial costs to ensure good central bank behaviour via some elaborate claw back of salary and pensions in the event of inflation targets being missed? Rather it was felt that the inflation targeting under operational independence would allow people to assess ex post outcomes relative to ex ante targets would act to tie the hands of policymakers to the target over time and prevent any dynamic inconsistency.

This emphasis on the link between expectations and outcomes placed considerable weight on the need for central bank communication and transparency. Superficially so that plans and outcomes could be clearly assessed. But more subtly it was also a way of 'controlling' forward-looking agents so that targets became easier to hit. Consider a forward-looking agents deciding on wage demands, price setting and the composition of their asset holdings. If such a person believes (has credibility) in the inflation target and understand what policy responses will be implemented in response to various states of nature that are expected with some probability but not yet revealed they can make plans that are consistent with the inflation target.

In fact a parallel debate even started about whether inflation targets were really optimal because it could be that price level targets might well be able to establish a clearer path for the price level, so that agents would know what the CPI index number would be well into the future. Inflation is simply about stabilising the change in the price level and if there are occasionally larger or smaller changes in the price level we let bygones be bygones, which means that looking to the very long run we do not know what the exact price index number will be: controlling the rate of drift in a ship may not get you exactly to the port of your destination, it was argued. A price level target would allow us to expect that the price level of 100 in today's terms would be 110 in 2020 or 114 in 2022 and plan with a greater degree of precision. It was also argued that because we had pinned down the actual price level so far in advance, in the event of any large downward shock where, for example, today's price level falls to 95 - in the case of credibility - we would actually start to expect a return back to the normal path and more rapid price rises than if a strict inflation target was maintained. It was probably at this point, we started to over-engineer the problem!

Even the arguments on the need for transparency went further. If agents understood the policy target and the

responses of the central bank to various states, which is called the reaction function. Then actual policy decisions need no longer be a surprise to be effective as they will already have been factored into decisions made by private agents. So policy effectiveness seemed to have been turned on its head with the normal stream of policy meetings and choices thought to be have been more effective if they had no 'surprise' element. These arguments were taken to extreme levels by some analyses of policy making by the FOMC, which showed very little surprise element from futures contracts based on the Federal Funds rate (Carlson et al., 2006). There was perhaps a further consequence of this fall in the uncertainty attached to policy rates that the funding costs of financial intermediation were not only low but also did not engender any great risk. The apogee of this approach was when the FOMC raised the Federal Funds rate in 25 basis point steps over 17 consecutive meetings from 2004 to 2006 with none acting to surprise the markets. With hindsight, it might have been better not to have attempted to over-engineer an artificial degree of certainty in the path of policy rates as there is always some uncertainty about the world that is yet to be resolved.

The real debate on policy in this period was between those who thought that even inflation targeters should 'lean against the wind' of asset price changes and those who felt that inflation targeting, perhaps with some flexibility was a sufficient policy. Many have outlined the basic response to asset price fluctuations in an inflation targeting world. Financial factors, including asset prices, matter for the formulation of monetary policy in so far as they provide information for current and future capacity utilisation and consequently inflationary pressures. Furthermore a compression in financial spreads and other market-determined interest rates could be thought of as an increase in the neutral policy rate. In various applications of models in which an external finance premium affected monetary conditions it was generally found that it was not necessary to target asset prices in order to locate a more stable or preferable equilibrium. Part of the reason is that in the real world, of course, asset prices are likely to be conditioned on a forecast of policy itself and so targeting may even reduce the efficacy of policy: think of putting your feet on the accelerator and brake of your car at the same time.

Responding directly to asset prices was rather tricky: was it a fundamental asset price change or a bubble? I still place little trust on anyone who tries to tell me in real time about any asset price change being one or the other: we do not know. This means that we might be responding to perfectly valid re-appraisals of the value of an asset based on the present value of its returns. Even if we were sure that there was an asset boom and we raised rates to offset the boom there would be two further problems. First, how much would we have to raise policy rates by to reduce asset prices and to what extent will these rate rises be costly in terms of output losses? Secondly, the resultant crash in asset prices will require a rapid fall in rates while the previous impetus from rate rises is still working its way through the monetary transmission mechanism and policy will once again be acting as brake and accelerator, which is not a good thing. Bean (2003) argues that the best response is not to try and offset the credit boom while it is happening but 'the optimal policy is in effect to ignore the asset boom, but to mitigate the fallout when it collapses. Furthermore the expectation of a looser monetary policy in the event of a future credit crunch raises expected inflation. Consequently there is an upward bias to inflation'. Obviously the model developed was not to be taken literally but the idea that a credit boom and bust was best left to be cleared up after the fact was certainly the dominant monetary policy idea.

Svensson (2009) in his survey of how the financial crisis impacted on the operation of flexible inflation targeting thinks that little has changed. That is not to argue financial factors are not important. Financial factors can be thought to impact in quite an important way on the monetary transmission mechanism - that is how policy rates impact on the real economy - and need to be carefully studied to ensure that all information from them are incorporated in the policy stance. Indeed even prior to the crisis, it was felt that financial stability might be thought of as an occasionally binding constraint on monetary policy - which meant that if and when a crisis emerged monetary policy may end up being constrained while the crisis was being cleaned up. Such an approach may mean that we have to lengthen the horizon over which interest rate policy aims to get the economy back to normal and plan over ever longer horizons: a kind of smoothing result, which economists do tend to like. Even directly responding to asset prices could be assumed to fit in with a need to ensure stability in capacity utilisation over the long run.

We can translate some of these ideas and re-visit our Figures on Brainard. As well outcomes in terms of inflation on the vertical axis we have economic risk on the horizontal axis. There is Bliss Point to the North of A, where inflation is at target and there is no risk. Each concentric circles map point of indifference but where circles nearer the Bliss Point is preferred. If the economy starts at Point A, the policy maker must decide where to drive the economy. The line ABC traces the constraint facing this policy maker because when she tries to inject more demand in the economy she cannot be sure of the economy's response and so there is more uncertainty to be faced. So even though point C would eliminate the inflation losses, point B is to be preferred. This economy ends up with a bit more macroeconomic risk and an undershoot in inflation and is where some people think the economy ought to have been run during the Long Expansion. That is with tighter monetary policy and somewhat lower inflation. It is possible to think of the economy in the Long Expansion as having moved to point C where

there were no inflation losses but economic risk was larger than it might have been.

Indeed it might be possible to get the same kind of result if the policy-maker was thought only to care about inflation and did not agree to having risk in their calculation of welfare. In this case the indifference curves would be horizontal lines but the policy maker would feel - perhaps with some hubris - that they had maximised rather than traded off some welfare. Finally, the policymaker may think that they did not bring about any increase in economic risk as a result of their own policy, but that it was quite a separate matter from monetary policy. In this world the policy maker will think that they have arrived at the Bliss Point but unmeasured or ignored or Knightian risk is driving the economy to increasing bad equilibria. With inflation broadly on target but (financial) risk severely underestimated by policy makers (Chadha, Clarke and Mortimer-Lee, 2007), we arrived in a position where the economy seemed to be on track but lay on a fragile foundation.

4. Money and the Models

Although there is widespread agreement that in the long run there is, more or less, a one-to-one relationship between money growth and inflation and no relationship between money growth and real quantities, there is little consensus on the relationship, if any, between money and shorter run economic developments. And so the role monetary aggregates might play in the conduct of monetary policy over the short run in cases where money, its components or the interest rates at which various money markets clear might give a varying degree of guidance to short run movements in output and inflation. In this respect the European Central Bank follows a two-pillar approach. The first of these gives a prominent role 'broadly based assessment of the outlook for future price developments' and economic analysis and shock and the second pillar relies on a monetary analysis of trends (Stark, 2008). By contrast the Federal Reserve has in the past explicitly eschewed any role for money in the conduct of monetary policy. The Bank of England has also placed a less prominent weight on money, not least because financial liberalisation and changing payment technologies have masked the inflationary signal from growth in observed money aggregates.

But at the same time the role of banks, other financial institutions and the financial system - that provide loans and help determine asset prices - are often given particular prominence in discussions on the transmission mechanism of monetary policy. And so a significant corpus of economists have not given up entirely on the idea that the monetary aggregates can sometimes contain information about the future state of the economy, as well as about the transmission mechanism of monetary policy and may help identify risks to the economic outlook. To borrow an analogy from Kiyotaki and Moore (2001) 'the flow of money and private securities through the economy is analogous to the flow of blood...money is the blood that dispatches resources in response to those (price) signals (p. 5)'. More recently, and especially in the light of recent turbulence in world financial markets, economists have been re-examining the role that money, and more generally credit, can play independently of the policy rate. One avenue that has been explored, is motivated by the role of money, or credit, as a supply of payment services to credit constrained consumers. The price, as a premium above the policy rate, of such loans reflects the marginal costs to banks of their supply and so it responds to increases in the efficiency of supply relative to the demand for loans. This relative price can move out of line with the policy rate set by the central bank when there are independent sources of fluctuations in the ability of financial intermediaries to supply credit or liquidity, for example, as a result of their efficiency in screening loans (monitoring) or the value of posted collateral.

Understanding the role of money and credit in judging economic fluctuations may lead to more use of money as an instrument. Following the financial crisis, central banks used central bank money, or at least central bank liabilities, extensively as an additional instrument of monetary policy, which fitted well with a need to augment interest rate policy at the zero lower bound or indeed simply to deal directly with a malfunctioning financial system that otherwise have shifted the supply curve for money and its counterparts too far to the left. The new instrument of central bank balance sheets fits very well into the development of game theoretic *nostra* for central bankers. This is because complementary instruments may well augment the signalling impact of both the current level of interest rates and the expected path of interest rates. Note that one popular solution to the problem of controlling a forward-looking system of rational agents is to make it easier for those agents to forecast future policy and so condition their plans in line with the policymaker's objectives. And so any strategy that is consistent with signalling a long period low interest policy rates may help reduce real rates over a longer horizon and so raise price level expectations away from deflationary stimuli.

Money Matters

As we have examined before the long run neutrality of money is a central plank of monetary policy making (Lucas, 1995). Although it is quite a simple matter to find long run non-neutralities in many standard New Keynesian models, it is also generally accepted that long run non-neutralities should not be exploited as there is no clear enhancement in the welfare of the representative household. But if we place aside the long run or steady-state, day to day or month to month, perturbations in the money market will lead to temporary changes in the market clearing level of (overnight or short-term) money market rates and, because of various forms of informational uncertainty or indeed structural rigidity, may lead to temporary deviations in the expected real rate from its natural level and thus act on aggregate demand. The key question though is the extent to which shocks emanating from the money markets, and more broadly the markets for financial assets and claims, can be stabilised by an interest rate rule or indeed whether an additional tool may be required.

In the seminal analysis of this question, Poole (1970), took a standard IS-LM framework and analysed the impact on output variance from setting either interest rates or the money supply in the presence of stochastic shocks to either or both of spending or money market equations. He showed that, in general, neither instrument would necessarily stabilise the economy better than the other as it depended on the relative magnitude of shocks in these sectors and the sensitivity of output to these respective shocks. An often overlooked implication of his analysis was that in general some use of both instruments was likely to stabilise the output better than one instrument alone, a point to which we shall return, but one that is perhaps echoed by the experience of policy makers worldwide as they have had to augment interest rate tools direct expansion of the central bank balance sheet.

The BIS, did though from a disinterested position, as it did not have to set monetary policy, regularly expressed concern about what we might call a worrying triplet. This triplet comprises high internal and external debt levels, high asset prices and rapidly growing broad money aggregates. White (2009) added to worries about whether it was sensible to partition monetary and financial issues with a further concern: the horizon over which policy sought to stabilise that was also part of the problem. "...Central banks have put too much emphasis on achieving near term price stability (p.2)' at the expense of considering in detail what the implications may be for longer run macroeconomic stability coming from the build-up in domestic and international 'imbalances'. Of course, central banks have explored the notion of flexible inflation targeting, where, financial considerations may operate as an occasionally binding constraint which would, in principle extend or contract the horizon over which inflation would be brought back to target.

Any direct discussion of a special role for financial intermediation leads us to reconsider, in the first instance, the relevance of Bernanke and Blinder's 1988 model of credit and demand. In comparison with the two asset world of the LM curve where there is simply a choice between money and bonds, if credit is not a perfect substitute for bonds then the quantity of loans and the external finance premium will matter for the determination of macroeconomic equilibrium. In other words the spending equation will be not only be determined by the single interest that ensures equilibrium in the money market but also the interest rates in the broader credit (or loan) markets and so the allocation of funds across narrow and broad money by financial institutions, which will matter for the level of aggregate demand.

This important point was mostly neglected in the first part of the great DSGE (micro-founded macroeconomics) revolution of monetary policy making that took place over the subsequent two decades, in which the Modigliani-Miller theorem held continual sway, as issues about the structure of the real economy's price rigidities and the correct monetary policy strategy took centre stage with financial intermediation and monetary quantities having no special role to play in explaining the current level and likely path of the short-term policy rate. Money was not only neutral and played no direct role in the equilibrium outcomes studied by monetary theorists but was actually just pinned down by optimal real choices and so did not even have any information content.

From the policy perspective the prosaic answer of the Bundesbank and, latterly, of the ECB is that money does indeed matter. And so it is broad money growth that is associated equiproportionally with growth in nominal expenditure and that timely and accurate analysis of monetary dynamics constitutes (arguably) the most important part of the central bank's information set. Indeed, the Governor of the Bank of England, in a paper written while he was Deputy Governor, Mervyn King (2002) argues that money is important because it is an imperfect substitute for a wide variety of assets and so a change in its quantity will induce some rebalancing of financial portfolios and impact on nominal demand with both direct effects on real assets and indirect effects, as financial yields will change. In other words, the yields from many financial assets may enter the broad money demand function. And with some prescience, argues that money may matter simply because it relaxes

transaction costs and promotes liquidity, a point taken up many academics subsequently.

As pointed out by Goodhart (2007) and by Kiyotaki and Moore (2001) money (aggregates) should be made to matter in general equilibrium models as they affect consumption decisions of liquidity constrained households and the spreads across several financial instruments and assets. And as Woodford (2007) states 'money matters' in such circumstances as it may be the root of disequilibrium and instability in the economy originating from the financial sector.

The quantity of money plays little or no active role in modern macroeconomic models, in which money tends to be pinned down exactly by plans formulated by households and firms for demand and production, which then determine output and inflation outcomes directly. In this sense the money stock does not appear to provide any independent source of macroeconomic fluctuations. Typically, it is the price of money, the short term policy rate, that regulates aggregate demand and is used as the instrument of monetary policy, with money supplied elastically to meet any idiosyncratic money market shocks. In such models the policy interest rate is sufficient to determine the constellation of market interest rates, and money (or credit) exerts no independent effect on the economy, via these other interest rates, and so becomes less worthy of study (Goodhart, 2007). Accordingly, current monetary policy practice is somewhat ambivalent about the role of monetary aggregates.

5. Concluding Remarks

The noughties, or naughties, provided quite a party for the financial markets. The long economic expansion seemed rather than to increase the probability of a bust, seemed to suggest that the probability of a bust had permanently fallen. Perhaps even we had discovered the secret of growth without limit. Or even perhaps, as some baby boomers were thinking: life without death. The inflation targeting regime had offered a route towards locating an optimal rule. Central bankers could provide descriptions and explanations of what they did that might act to tie their hands. Or perhaps they would always do the right thing, ignore political suasion, and just 'get on with' securing price stability.

Agents could understand, even perhaps having been taught by past, current or future central bankers, why policy makers did what they did. And the interest rate reaction function when specified in terms of responses to inflation and output could not only be widely and easily understood but deviations in exact responses or the horizon over which targets would be met, could be thought of as ways to generate extra degrees of freedom in order to deal with off-model judgements and events related to increasingly obvious levels of financial fragility. Policy makers were not complacent and thought hard about how to deal with the consequence of financial bubbles and their bursting. But did not perhaps understand the extent to which the long expansion had itself created a sense of invincibility and allowed risks to escalate to such an extent that the foundations of the economy has become unhinged. The events of August 2007 and over the next year quickly brought that sense of invincibility to an end.

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