



BANK OF ENGLAND

# Speech

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## **Getting Credit Flowing: A Non-Monetarist Approach to Quantitative Easing**

Speech given by

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At the Dean's Lecture Series, Cass Business School, London

26 October 2009

## **GETTING CREDIT FLOWING:**

### **A NON- MONETARIST APPROACH TO QUANTITATIVE EASING**

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It is a rare occasion to have well over a hundred people, including many younger people with presumably more exciting things to do, show up on a Monday evening for a speech about monetary policy. Or rather, it would be rare, were it not for the well-known commitment of City University's students to economics, and for the challenging economic situation that we find ourselves in today. Despite being gratified by tonight's turnout, I can hope that at least the latter reason for popular attention to macroeconomic policy will abate before long.

The worst threats from the crisis of 2008-09 are behind us, and there are even indications that the recession – now a severe but normal one – is coming to an end. The aggressive and unconventional monetary policy measures undertaken by the Bank of England (along with those by the UK government and by other major central banks and governments) played the critical role in ruling out the worst outcomes which might have come out of the financial panic of 2008-09. The negative impact on the real economy from the financial panic was obviously of historic and awful proportions, but limiting the impact and precluding an even greater worsening of conditions was a success of policy. As a number of my MPC colleagues have argued in recent weeks, the Bank's Quantitative Easing [QE] policies contributed both to this prevention of a deflationary spiral and the subsequent improvement in credit conditions, asset markets, and inflation expectations.<sup>2</sup> To this I would add that QE eased the successful implementation of fiscal policy stimulus, which was also constructive.

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<sup>1</sup> I am grateful to Neil Meads for excellent research assistance and suggestions, and to Roger Vicquery for assistance with section 2. The views expressed here are solely my own, and not those of the MPC, any of its members, of the Bank, or of PIIE.

<sup>2</sup> See Bean (2009), Dale (2009), and Miles (2009). In particular, they present evidence on how the spread between interest rates on Gilts and OIS has come down in the UK, unlike in other countries, which have not engaged in the size and nature of QE undertaken by the Bank. That lower spread indicates normalization of credit conditions.

Yet, how QE actually worked, what its long-term implications will be, particularly for inflation over the longer-term, and what the experience of QE has taught us about the UK economy remain controversial or at least obscure. What I would like to do tonight is to give you a somewhat different interpretation of the unconventional monetary policy measures undertaken by the Bank than perhaps has been heard before, putting it into a comparative context globally and historically. In so doing, I hope to shift the focus away from some concerns that are unfounded, like the idle chatter one sometimes hears about printing money causing inflationary periods, and towards some concerns I have that are quite real. In particular, I am concerned that the UK financial system as currently structured, as well as damaged by the crisis, may not be ready to support the coming handover of recovery to private-sector impetus from public-sector stimulus. That would not put us back into a downwards spiral, but it would mean that any recovery could be shorter, weaker, and more erratic than it otherwise should be.

In summary, I will argue that unconventional monetary policy should be thought about in terms of its impact on specific credit markets as well as its general impact on portfolios. In other words, we should focus analytically on the direct market impacts of targeted credit market interventions at least as closely as, if not rather than, on the gross sums 'spent' on QE. So doing leads to the conclusion that the Bank's QE will not lead to unacceptably high inflation at any time horizon - a more empirically justified view than the forecasts generated by mechanistic monetarism. This approach also implies that QE policy, if needed in future, might increase its effectiveness by buying selected assets beyond gilts, as pursued by central banks in some other countries.

The limitations of the UK financial markets for financing of domestic non-financial corporations, however, have been brought into sharp relief by QE's practical constraints in that regard. This is one area where there is an uncomfortable parallel with Japan's situation in the 1990s: the relative limits in the UK on the availability of non-bank financing for smaller companies may constrain the emergence of a sustainable private-sector led recovery. Such structural problems due to the underdevelopment of the UK domestic credit market is another reason that the excessive concentration and other structural deficiencies of the UK financial system should be

addressed directly – that is independently of and in addition to the compelling arguments for so doing to promote financial stability.

**Unconventional measures in response to credit crisis** – It is worth understanding the circumstances under which QE and other unconventional monetary policy measures were undertaken in late 2008 and earlier this year. Credit markets were locking up in ways and to a degree that was completely unexpected, even by those who forecast a recession or crash, with asset prices across almost the entire range of investments and countries moving downwards together, and liquidity disappearing. Interest rates were being cut aggressively, but the severity of the shock limited the positive impact of such measures in two ways: first, central banks including the Bank of England would have cut rates more than they did, had they been able to do so without running out of room as interest rates approached zero; second, and to my mind much more importantly, the impact of interest rate cuts on the real economy was greatly diminished because of the panic and dysfunction in the financial system.

Central banks understandably threw whatever it was they had at the problem, which included guarantees to various intermediaries and on specific kinds of transactions, expanding facilities to provide liquidity and to discount a wider range of assets for a wider range of counterparties than normal, and creating central bank reserves to purchase assets in the secondary markets. QE is an example of this last category, which for the Bank has meant purchasing long-term government bonds from the private sector (mainly insurance companies and pension funds).

The goal of all these measures by all central banks was ultimately to turn around the economy and prevent disaster. But the proximate target was to restore normalcy to credit markets. The whole problem in credit markets stemmed from the fact that fewer and fewer securities and loans were seen as being worth what they were previously thought to have been worth *and* that investors felt unable to determine the relative worth of these assets due to problems with transparency, liquidity, counterparty risk, and so on. Being unable to price assets was the key issue turning this into a crisis; otherwise it would have been just a decline in security values, harmful to consumption and investment in the short-term, but not a systemic threat or a source of

panic. So central banks including the Bank of England pursued policies to provide a secure counterparty, reduce uncertainty, and provide sufficient liquidity for transactions to go through. They made markets where markets were collapsing.<sup>3</sup>

The reason for recapping this is to emphasize what these unconventional measures including QE were not. They were not attempts to expand the money supply per se, especially since the velocity of money was declining and unpredictable during the crisis. They were not optimal policy setting exercises, where an interest-rate setting rule told central banks by how much more they should have cut rates below zero, and the amount of reserve creation or asset price purchases was calibrated to be equivalent.<sup>4</sup> The unconventional measures were first attempts to get ahead of mounting credit market breakdowns with aggressive direct interventions, and then to convince investors to move back into riskier asset classes, and thereby reflate the economy.

I give the analogy that normal monetary policy by interest rate setting is like driving a new Range Rover down the M4 on a commute: one knows how long it will take to get to the desired exit; the ride is smooth, well-marked and familiar; any particular causes of delays beyond normal traffic are clearly visible and swiftly cleared. Unconventional monetary policy, including QE, is like making the same trip but: doing so in an urgent hurry; driving a 10 year old used Vauxhall Vectra with a cranky transmission; down a rural road because the M4 is closed; without a good map or signage, and with all kinds of strange surprises blocking traffic. You will get where you are going using QE, but you are not sure how long it will take to get there, and you will not enjoy the ride. In other words, we can be confident that the coefficient of QE's effect on nominal income is positive, and therefore that the British economy would have been stuck in a far worse place had QE not been implemented, but we cannot pretend to have precise knowledge of the size or timing of QE's impact.

**Evidence against mechanistic monetarism and inflationary threats** – Given this reality-based understanding of QE, the punditry and prognostications that talk about high inflation threats from

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<sup>3</sup> Nishimura (2009) gives a similar take on what has been pursued by the Bank of Japan.

<sup>4</sup> Interest rate rules are not robust guides to monetary policy in times of deflation and rapidly changing potential output under any financial circumstances. See Kuttner and Posen (2004).

large-scale creation of bank reserves *in response to a deflationary financial crisis* seem rather dubious. If the Bank could create inflation easily under such circumstances, and if the majority of market participants and households believed that – not just the nutters – then we would be more than halfway home. If only it were that easy. People are rational, and they realize that we cannot do that.<sup>5</sup> Long historical experience in the UK and elsewhere, supported by research showing that what seems true in the data in this case is true, bears this out even for normal times, let alone for times when the financial sector is so troubled and there is downward pressure on wage growth and prices.

Remember, monetarism was tried as a guide to monetary policy in the UK and in the US in the 1980s. In both economies, as well as elsewhere around the world, the relationship between narrow money (which central banks can control) and broad money (which central banks cannot) was not dependable for setting policy, and the relationship between growth in either monetary aggregate and inflation was even more dubious.<sup>6</sup> Money might have some use as an indicator variable (Nelson (2003); Goodhart (2007)), but as much of credit conditions as of inflation. Even supposedly monetary targeting central banks, such as the Bundesbank and Swiss National Bank, used monetary growth aggregates in this fashion and no more.<sup>7</sup> Despite hundreds of person-years of economists' time with the latest econometric techniques available, sponsored by institutions with monetarist leanings, no more robust relationships between monetary aggregates and outcomes we actually care about in prices and output have been found. In fact, some recent research suggests that even in the very long-run, the last refuge of economic theories from empirical work, monetary growth is unrelated to prices (Sargent and Surico (2008)).

Yet, given the extremely large scale of asset purchases by many central banks today, amounting to £175 billion in QE by the Bank of England, is there an inflationary threat? If one believes seriously in a kind of mechanistic monetarism, then the key issue is how much has (and will)

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<sup>5</sup> Miles (2009) points out the converse, with which I also agree, that QE can have a positive effect on nominal demand even in the absence of showing up in monetary aggregate growth (though one should watch that indicator carefully).

<sup>6</sup> The research of Benjamin Friedman, Charles Goodhart, and Frederic Mishkin, and their co-authors, in the 1980s established this definitively, at least to most empirically driven observers' satisfaction.

<sup>7</sup> See Laubach and Posen (1997); Bernanke and Mihov (1997); Clarida and Gertler (1997).

money growth exceeded the required to accommodate the real development of the economy. I would like to present to you now some evidence from past periods of quantitative easing and large-scale reserve creation, when there arguably was excessive monetary growth, and how little it mattered for inflation. While one cannot prove a negative with data, it is to mind the best approach to look empirically for parallel periods in order to understand and forecast from our current circumstances, rather than to rely on an unsubstantiated belief in so-called first principles, monetarist or otherwise.

There are various ways to measure such ‘excessive’ monetary growth. We identify periods of potentially excessive monetary growth in the G7 economies by comparing a moving average of the growth rate in broad money with the long-run historical average for a given economy. When the annual growth rate of broad money moves outside a one-standard deviation confidence interval from trend, we note that as a period of excessive growth.<sup>8</sup> So for the UK, we can identify six periods of excess money growth according to this measure, seen in Figure 1, all ending before 2000.

Using this measure, what can we learn? Figure 1 for the UK and the parallel figures (2-7) for the other G7 countries plot inflation outcomes over time. The dots on the lines indicate the actual period of excessive growth, while the line continues for two years after the end of excessive monetary growth.<sup>9</sup> When looking at any of these G7 countries, the only periods where excessive monetary growth led to sustained rises in inflation were during the early and mid-1970s. As we all know, there was a lot more going wrong with macroeconomic policy in those times, and many more upwards pressures on prices then, than we have today. In other instances, excessive monetary growth was not followed by high inflation, and sometimes even followed by inflation declines. Note that this sample includes instances of excessive monetary growth on this measure during the last decade for France, Germany, Italy, and the US, so the absence of connection

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<sup>8</sup> This is similar to the procedure in Bordo and Jeanne (2002), who identify booms and busts by comparing a moving average of the growth rate in asset prices with the long-run historical average to a confidence interval estimated with respect to the mean and variance of the historical time series. We have intentionally set the bar low to find instances of excessive monetary growth by saying even brief moves away from trend should be so classified. Redoing these calculations so as to only capture instances where monetary growth is well above trend for several months or more does not affect the pictures presented, though it reduces the number of cases.

<sup>9</sup> I am grateful to Roger Vicquery for coming up with this presentation of the data.

between monetary growth and inflation is not an artifact of there having been no high monetary growth instances in recent years.

Turning more directly to parallels with the current situation, the pattern remains the same. We can identify two recent instances where central banks consciously created large amounts of central bank reserves on a similar scale to that being pursued by the Bank under QE this past year.<sup>10</sup> Most similarly, the Bank of Japan officially began what it termed Quantitative Easing in March 2001, buying huge numbers of Japanese government bonds and creating reserves in the banking system. As can be seen in Figure 8, the spike in narrow money growth did not result in an increase in broad money or credit growth, let alone an increase in the price level. Looking in close up at the period of 1999-2003 (Figure 9) shows how Japan stayed mired in deflation despite QE. The Bank of Japan has since indicated that it believes those QE measures undertaken were largely ineffective, and certainly not inflationary (Shirakawa (2009)).

A second example is the massive intervention of the People's Bank of China to maintain a fixed exchange rate of the yuan against the US dollar over the period since the Asian Financial Crisis. People's Bank holdings of foreign exchange reserves (essentially dollars) increased at an annual rate of 30% from 2003-08, despite a gradual devaluation of the yuan against the dollar over the second half of this period. Leaving aside the international and financial implications of the Chinese peg for tonight's purposes, this should in theory have been inflationary. Yes, most of these interventions were sterilized through issuance of government debt notes and central bank bills, but on such a scale, some would have been expected to feed through into narrow money if not into price setting via expectations and asset prices more broadly. As shown in figures 10 and 11 (again, looking at the longer period for China and close up on the period of highest intervention), while narrow money did grow, albeit not as fast as foreign exchange reserves, that did not result in high broad money growth or high inflation for China.

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<sup>10</sup> One could add in a third instance, the Federal Reserve response to the 9/11 attacks and the stock market crash of 2001, when the Fed injected liquidity aggressively. While the US (and world) economy was definitely buoyed by those measures, their duration was short and their impact did not show up in inflation or broad money growth either.

I am not trying to prove with academic rigor (which these charts admittedly do not attain) that money is endogenous or some other fundamental concept. What I am trying to do is make the practical point that there is no evidence from relevant periods of UK or other major economies' economic history that QE will result in high or sustained inflation. That conclusion is robust to more intensive econometric investigation of the available data. That conclusion is also supported by evidence from the period of QE in Japan earlier this decade which is the closest parallel to the present situation and the QE policy pursued by the Bank of England this year. Thus, high inflation is not what we should be worrying about.

**A disturbing parallel to Japan in UK funding of non-financial corporations** – So what should be worried about? An economic policymaker should always be looking around the corner for what risks lie ahead, beyond making her most accurate possible projection for the outlook. Unfortunately, I have a clear candidate for the next target of concern: the ability of the UK financial sector to provide sufficient support for the coming recovery.

Aggressive macroeconomic stimulus from fiscal and monetary policy was the right response to the panic and subsequent recession, but there are limits to how far and how long public policy stimulus can substitute for private sector sources of demand and growth.<sup>11</sup> Even if macroeconomic policy stimulus has not reached its limit, it would be preferable for many reasons, not least of sustainability, for private demand to be the driver of growth after the worst of a recession is over. That is also the natural response of a market economy, absent major policy mistakes and financial disruptions.

On many fronts, including the end of financial panic, the coming end of destocking, positive developments in labor markets and global demand, as well as the easing of credit conditions and the normalization (if not more) of asset prices, the UK economy is now in line for that natural recovery. That is the recovery that most other advanced economies are already beginning to experience. Were UK households were to adjust their spending to save more out of their

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<sup>11</sup> These limits bind more strongly for fiscal policy than for monetary policy, and the more that fiscal policy credibly respects its limits, the more room monetary policy has for maintaining a supportive stance. But that is a topic for another day.

incomes for a while longer, that would be a drag on short-term growth, but it certainly would be reasonable and constructive – and would not be a threat to lasting recovery. If government programs continue to support the livelihoods and adjustment or retraining of the unemployed, that is right, just, affordable, and positive for growth in the short-term. And if the Bank of England continues to keep inflation over the medium-term at or near target, and thus the UK well out of deflation – which we will – the basis for recovery is sound.

Credit conditions though, while easier than they were a few months ago thanks to the Bank's and the Government's actions, are remain tight for many businesses. This reflects to some extent the well-recognized fact that banks and other lenders are rebuilding their balance sheets (thanks in part to salutary pressure from supervisors and regulators) and are tightening their lending standards (thanks in part to salutary pressure from supervisors and regulators). Even here, there are some positive signs in that better allocated credit will be a source for more sustainable growth going forward, and that some UK financial institutions have raised new capital from private sources limiting further shrinkage of balance sheets. In addition, credit always tightens particularly for small- and medium-enterprises [SMEs] in a recession or when banks have difficulty, so we should neither expect nor even want a return to the lending conditions of 2006-07 anytime soon.

Taking all that into account, however, the major question for me going forward about the UK outlook remains the availability of credit to non-financial companies, particularly to SMEs, when the upturn comes. Absent enough credit, correctly allocated, there will be insufficient investment in the UK economy even when prospects improve, unavailability of sufficient funds for businesses' trade and short-term liquidity needs, and a reduction in the formation of new businesses. This kind of dislocation for the real economy is what explains why financial crises have historically been so costly, beyond their direct impact on wealth and short-term demand. When there are persistent financial sector problems, there are persistent negative effects on aggregate supply and on the potential rate of growth for an economy going forward, even after the recession ends. Some of that harm is inevitable, especially when financial crises of the scale we experienced occur, but the extent of the lasting damage is far from entirely out of our hands.

That is why in testimony before the UK Treasury Select Committee (2009c) as well as before the US Congress' Joint Economic Committee (2009a), I have argued that that the banking system must be largely fixed before macroeconomic stimulus is needed to be withdrawn. The alternative is likely to result in a still-born recovery, a double-dip (though less severe) recession, and/or persistently slow growth. What we have learnt from the US Savings and Loan Crisis of the 1980s, the Asian financial crisis of 1997-99 and from Japan's Great Recession of the 1990s, and what we are seeing right now, is that those economies which either fix their banking systems quickly or which have a wide range of alternative channels to impaired banks through which to provide capital to businesses, recover faster and stronger. It helps to have at least one spare tire in the financial system, as Greenspan (1999) observed.

I am concerned because the financial system in the UK does not seem to have a spare tire for the provision of capital to non-financial businesses when the banking system has popped a leak. QE puts this unfortunate fact into clear relief. Other central banks were able to buy a wide range of assets from the private sector, under the heading of 'credit easing,' as described in Bernanke (2009), to good effect.<sup>12</sup> The Bank of England, prior to my joining the MPC, decided to purchase only gilts (essentially, being 95%+ of purchases) under the QE program. One of the primary reasons given for so doing was the relative thinness of UK markets for corporate bonds, commercial paper, and other corporate securities issued by non-banks. I appreciate the constraint, but that limitation on QE reveals a major long-term structural problem in UK financial markets which could be of potential harm as the UK economy begins to recover.

In fact, in this aspect the UK has an uncomfortable parallel with the Japanese financial system when the Japanese economy began to recover in the mid-1990s and was unable to sustain it. Severe macroeconomic policy mistakes also played a role there, and those are thankfully absent

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<sup>12</sup> Blanchard, et al (2009) describes the mechanism as follows: "Interventions, either through the acceptance of assets as collateral, or through their straight purchase by the central bank, can affect the rates on different classes of assets, for a given policy rate." Gagnon (2009) gives a comparative description of what the major central banks did purchase with what effects over the last two years. McCauley (2009) gives a succinct explanation of how QE strictly on government bonds, assuming stock effects, differs from credit easing reliant on flow effects.

at present, so the parallels should not be exaggerated.<sup>13</sup> The similarity between Japan then and the UK now with regards to the financial system, however, should not be overlooked either, just because other factors are not the same. The closer one looks, the more worrisome this specific parallel becomes, given the concentration of the UK banking system in a few major, mostly still troubled, banks, and the relative underdevelopment of alternative non-bank channels for getting capital to non-financial businesses in the UK.

Look at the UK financial sector in comparative context. Table 1 presents a few aspects of structures in the G7 economies financial markets prior to the current crisis. On the first row, stock market capitalization as a percent of GDP places the UK up there with the US and Canada, and thus putatively in the securities-based camp versus the more bank reliant economies of Japan, Germany, et al. This is completely misleading, given that at the height of Japan's bubble, its stockmarket capitalization was more than three times the size of Japanese GDP (and thus more than twice the Anglo-Saxons' ratio), but the subsequent recession demonstrated the Japanese difficulties with bank dependence. The second row shows that the UK has by far the smallest private sector bond market capitalization relative to GDP, far below that of any other G7 economy. So that alternative credit channel is underdeveloped.

The third row presents the size of national markets in short-term private sector securities, that is commercial paper and the like, and UK markets are again near the bottom, far closer to Japan on this score than the US. Another missing tire. Finally, rows four and five show two different measures of banking sector concentration, a direct measure of the assets of the three largest banks as a share of assets of all commercial banks, and the number of banking institutions per million persons. On these measures, too, the UK is far closer to Japan than to the US, and has among the most concentrated banking system. Of course, the emergency measures undertaken in response to the financial crisis have led to bank mergers, which have exacerbated the situation. So not only are their few alternatives to the banks for financing in the UK, even within the banking system there are few alternative banks within the UK if something goes wrong with those major banks.

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<sup>13</sup> See Posen (2009b) and the references therein for a discussion of the policy lessons from Japan's crisis.

In theory, every investment project, and thus every potential loan or security issuance, should be assessed completely on its own merits, and individual loan officers at commercial banks or intermediaries at investment banks make those decisions. Thus, it need not be inherent that dominance of bank financing over alternative forms of capital raising for businesses, or that concentration of the banking system rather than having multiple banks, will lead to credit constraints on non-financial business in a given country. In practice, however, the absence of alternative financial institutions and forms from an economy's financial infrastructure does two harms: first, when the previously dominant institutions are impaired, there is no ready substitute for their lending; second, when the size minimum for businesses to get access to commercial paper or bond markets is higher, more SME's are highly vulnerable to business cycles to temporary financial conditions. Thus, the inability of QE to get credit flowing through markets other than gilts (except indirectly) implies that we should be concerned that the banking structure in the UK may impede credit flowing more broadly in the recovery.

**The short- and long-term needs to restructure UK banking and finance** – Normally, when it comes to comparative financial market performance, the UK is considered to be at or near the top, especially given the British financial sector's comparative advantage in international competition for financial services and the justified dominance of the City as a global financial center (with Edinburgh around as well). Embodying 'Anglo-Saxon finance' to the world, however, is not the same thing as delivering finance domestically for non-financial corporations. This point should not be a total surprise. Students of British economic history know that the perceived failures of the City to provide sufficient capital to British business in favor of catering to growth and export of financial services themselves is a long-standing theme, leading to the Macmillan Commission of 1931 and the Wilson Commission of 1980, along with many political and academic diatribes since the 1870s. While I am not in a position to evaluate those historical contentions for exaggeration and bias, the divergence between the structure of the British financial system *today* and the present and coming financing needs of British business is to me apparent and troubling.

It is what any given sector or technology does to improve the functioning of the economy as a whole that makes a significant difference to productivity growth, not what a strategic or high-value added sector, even a very large one such as the financial sector in the UK, itself produces. In the IT revolution in the 1990s, the source of the US productivity boom was the adoption and utilization of IT throughout the economy, not the production of computers themselves. In the coming years for the UK, it will be the ability of the financial system to support private capital formation and investment in innovative activities that matters for national economic performance, not the growth of financial sector employment or financial innovation that does not yield benefits to non-financial institutions and households.

The functioning of the UK financial system is therefore of importance and direct relevance to the work of the Monetary Policy Committee, as I understand our duties. A banking system as we have in the UK today, with large segments still in public sector hands, a high degree of concentration of assets, and still needing capital (though progress has been made on that front) is a structure that bodes poorly for the sustainability of the coming economic recovery. It also is a structure that could impede the return of trend growth in the UK to its previous rate, and which could if things worsen put on persistent deflationary pressure (as the ongoing banking structural problems did and do in Japan).

This is a completely independent reason for the critical re-evaluation of the current UK banking structure, including of having too few big banks, than that raised by financial stability concerns – though it points in largely the same direction.<sup>14</sup> We need a financial system that is subject to sufficient competitive pressure such that it provides enough traditional lending to non-financial business, rather than one beset by too big to fail institutions who engage in relatively unproductive speculative behavior. And we need this structural change in the UK in order to generate sustainable growth in the coming years, not just to diminish systemic risk, though either alone would be reason enough. The UK public debate should not limit itself to regulatory fixes changing incentives for the current banking institutions, however constructive those regulatory

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<sup>14</sup> I share the broad thrust of Paul Volcker (2009) and Governor King's (2009) views in this area, that too big to fail is a major source of problems and that structural as well as regulatory reform is needed, as I have stated independently in Posen (2009b) and elsewhere.

reforms may be. Given the extent of public guarantees, bailouts, and even ownership for the UK banking system at present, we can choose to come out of this crisis with a better financial infrastructure than with which the economy entered this crisis. The point of a financial system, and of quantitative easing when that system breaks down, is to keep credit flowing.

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Figure 1: CPI Inflation During Periods of Significant Broad Money Growth<sup>(a)</sup>: United Kingdom

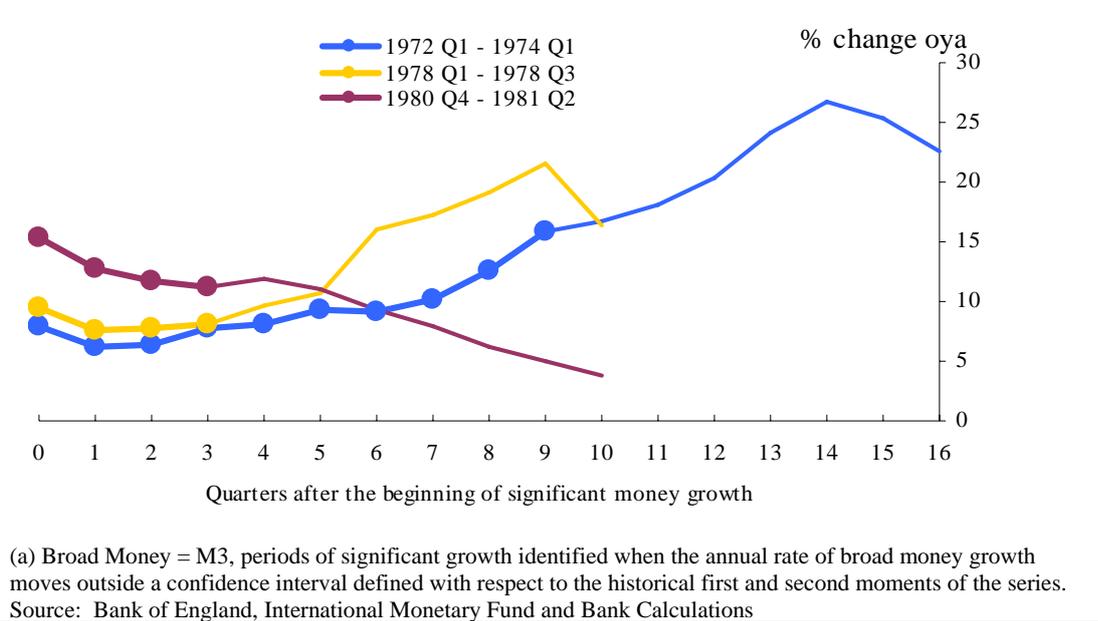


Figure 1.1: CPI Inflation During Periods of Significant Broad Money Growth<sup>(a)</sup>: United Kingdom

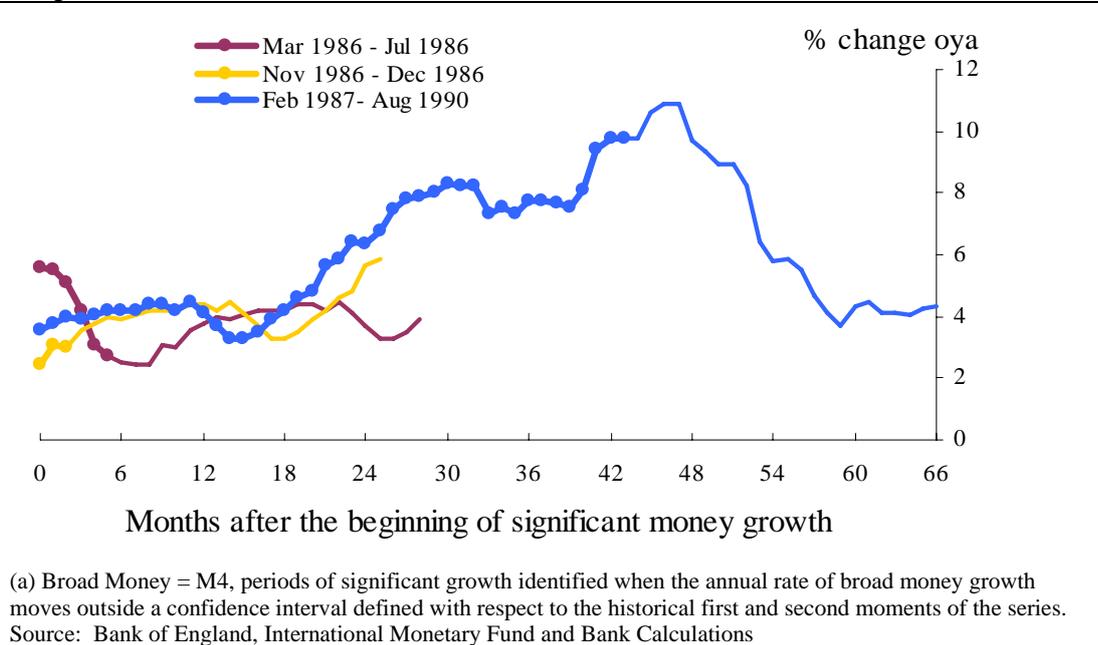
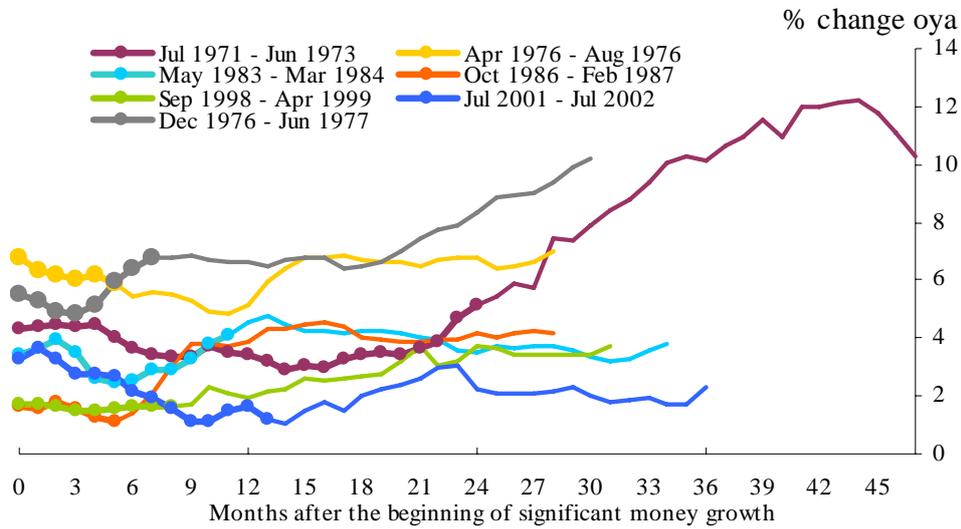
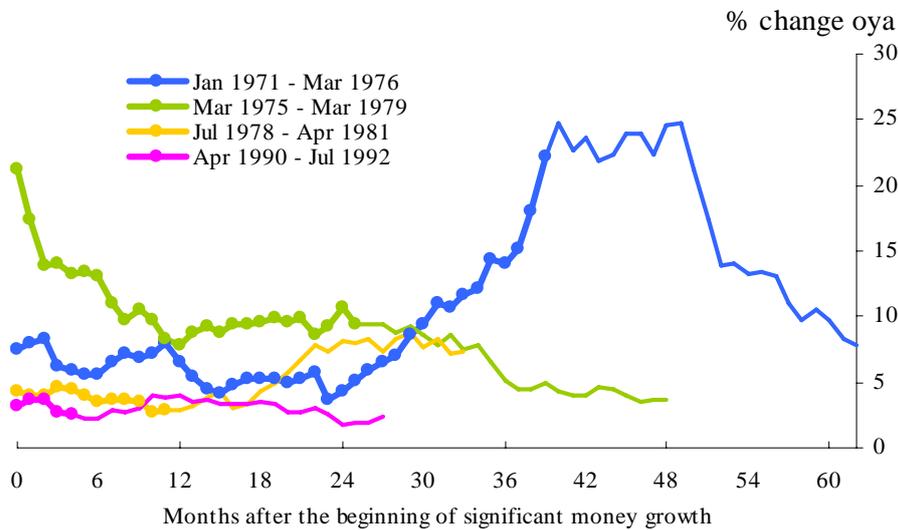


Figure 2: CPI Inflation During Periods of Significant Broad Money Growth<sup>(a)</sup>: United States



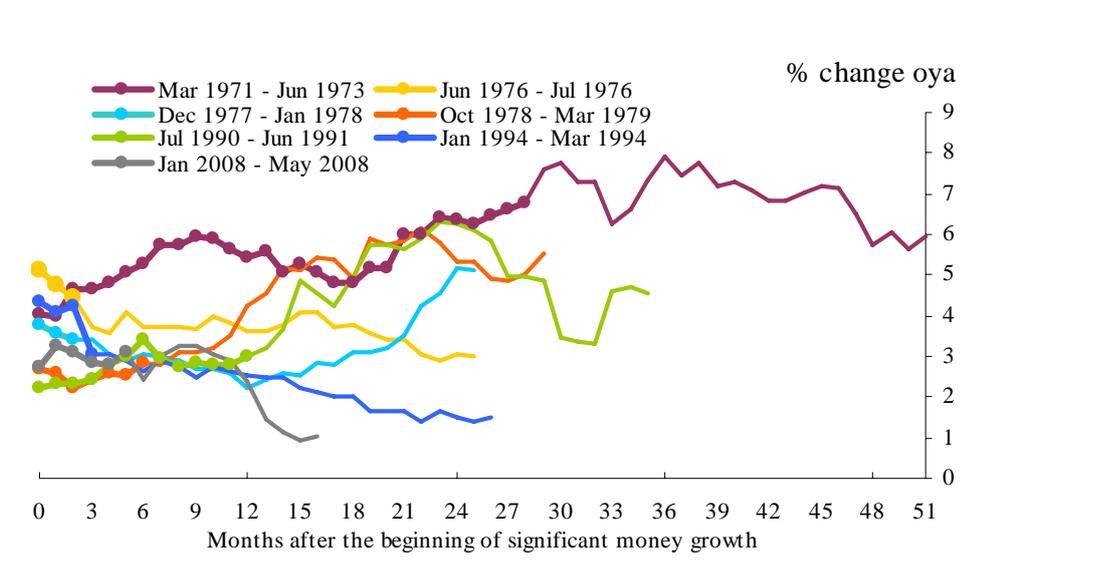
(a) Broad Money = M2, periods of significant growth identified when the annual rate of broad money growth moves outside a confidence interval defined with respect to the historical first and second moments of the series.  
Source: Federal Reserve, International Monetary Fund and Bank Calculations

Figure 3: CPI Inflation During Periods of Significant Broad Money Growth<sup>(a)</sup>: Japan



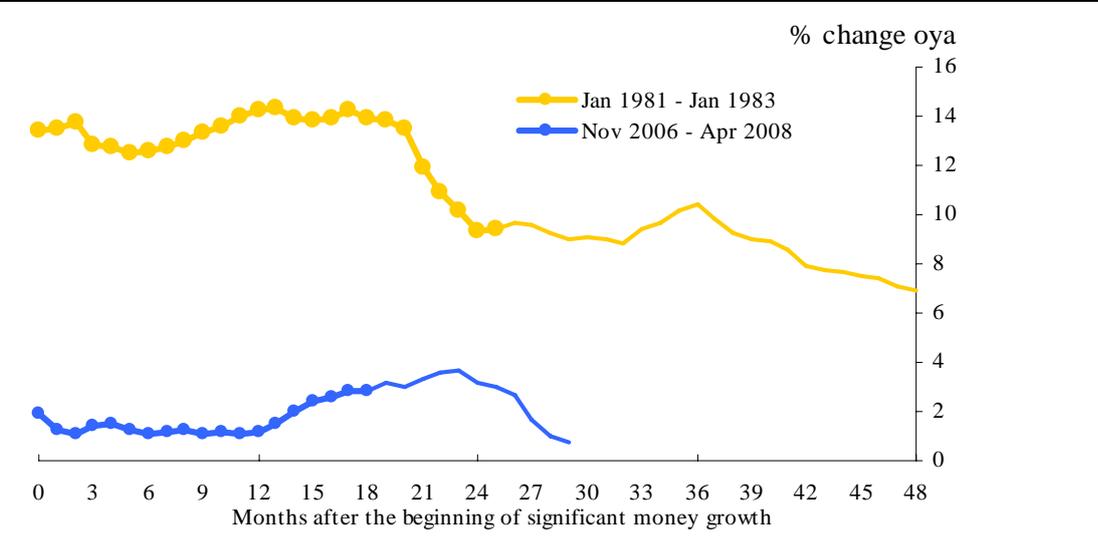
(a) Broad Money = M2, periods of significant growth identified when the annual rate of broad money growth moves outside a confidence interval defined with respect to the historical first and second moments of the series.  
Source: Bank of Japan, International Monetary Fund and Bank Calculations

Figure 4: CPI Inflation During Periods of Significant Broad Money Growth<sup>(a)</sup>:  
Germany



(a) Broad Money = M3, periods of significant growth identified when the annual rate of broad money growth moves outside a confidence interval defined with respect to the historical first and second moments of the series.  
Source: Deutsche Bundesbank, International Monetary Fund and Bank Calculations

Figure 5: CPI Inflation During Periods of Significant Broad Money Growth<sup>(a)</sup>:  
France



(a) Broad Money = M3, periods of significant growth identified when the annual rate of broad money growth moves outside a confidence interval defined with respect to the historical first and second moments of the series.  
Source: Banque de France, International Monetary Fund and Bank Calculations

Figure 6: CPI Inflation During Periods of Significant Broad Money Growth<sup>(a)</sup>: Italy

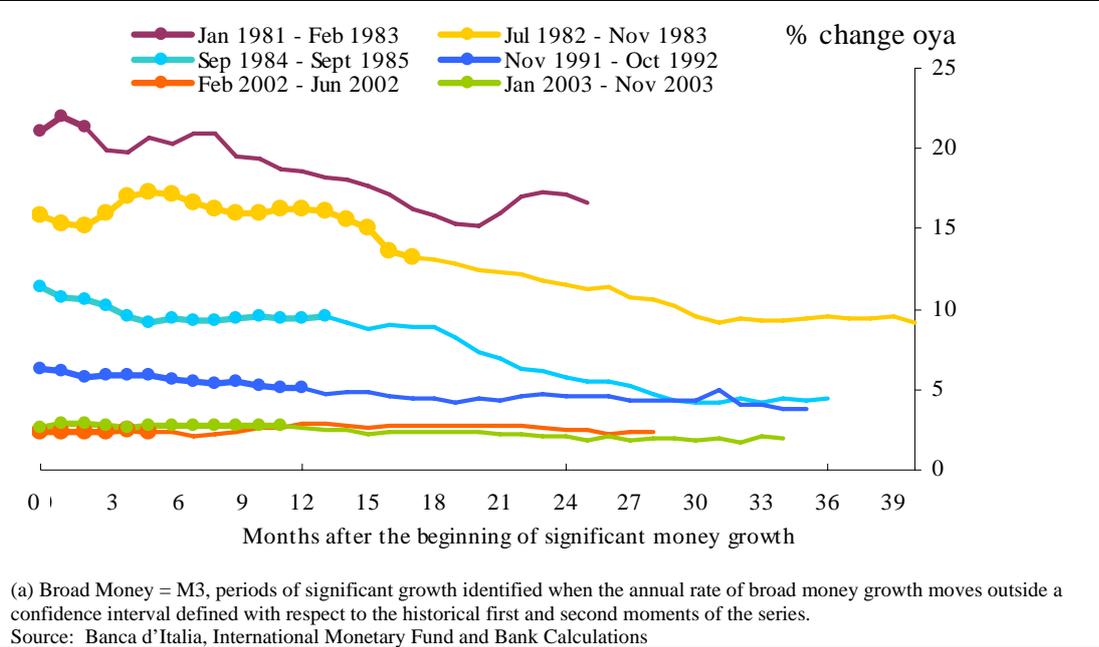


Figure 7: CPI Inflation During Periods of Significant Broad Money Growth<sup>(a)</sup>: Canada

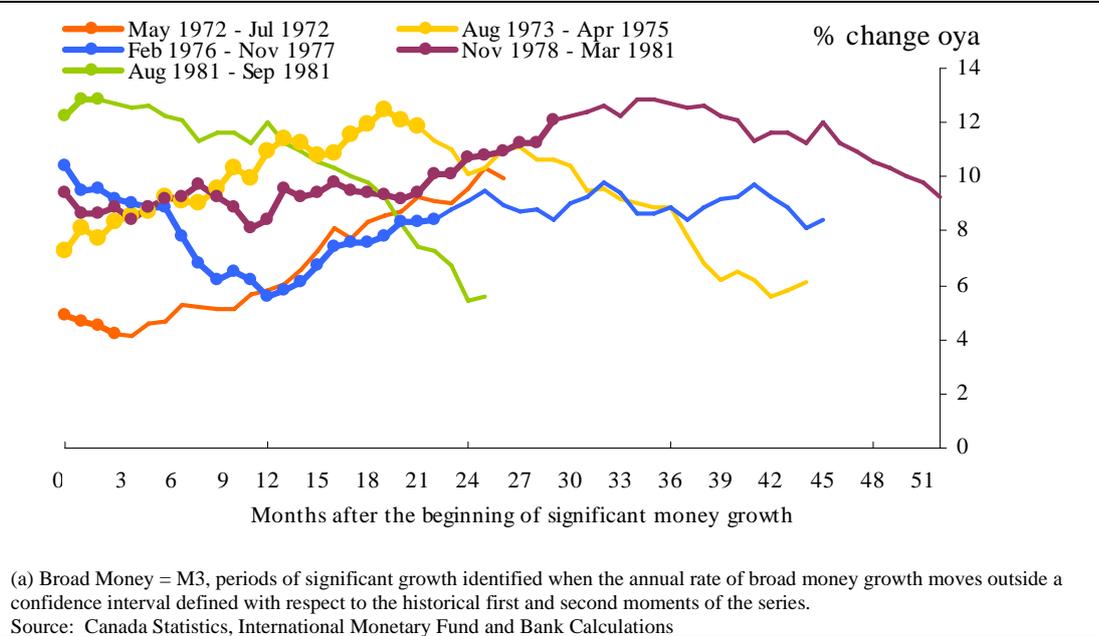


Figure 8: Money Supply Growth and Inflation: Japan 1994 - 2005

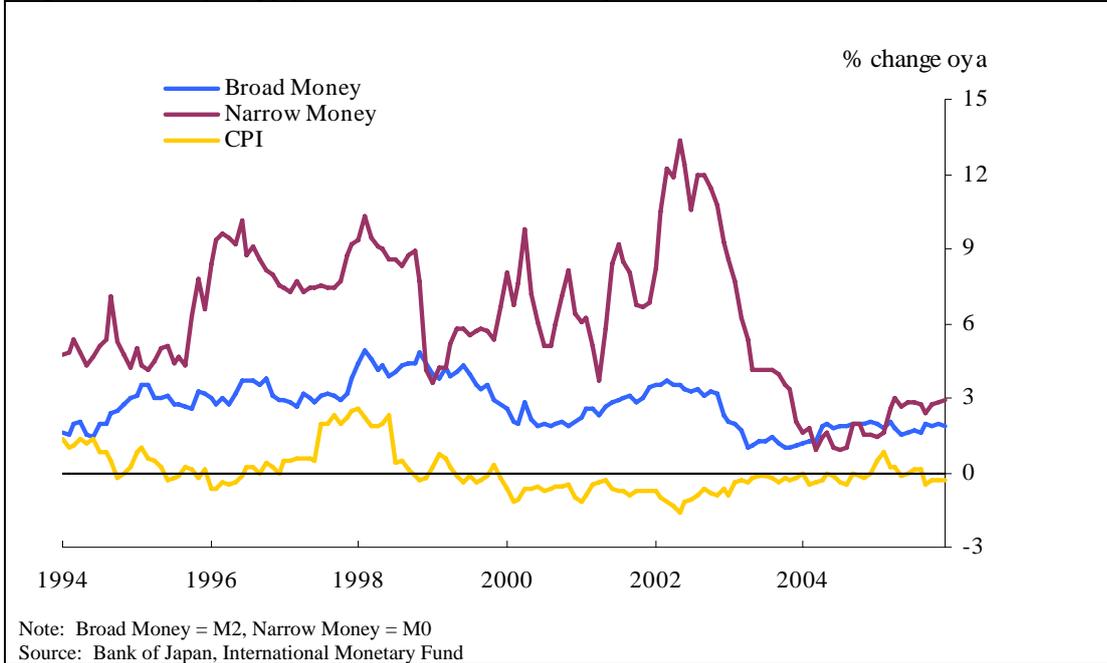


Figure 9: Money Supply Growth and Inflation: Japan – Beginning of the “Zero-rate Policy” (1999-2003)

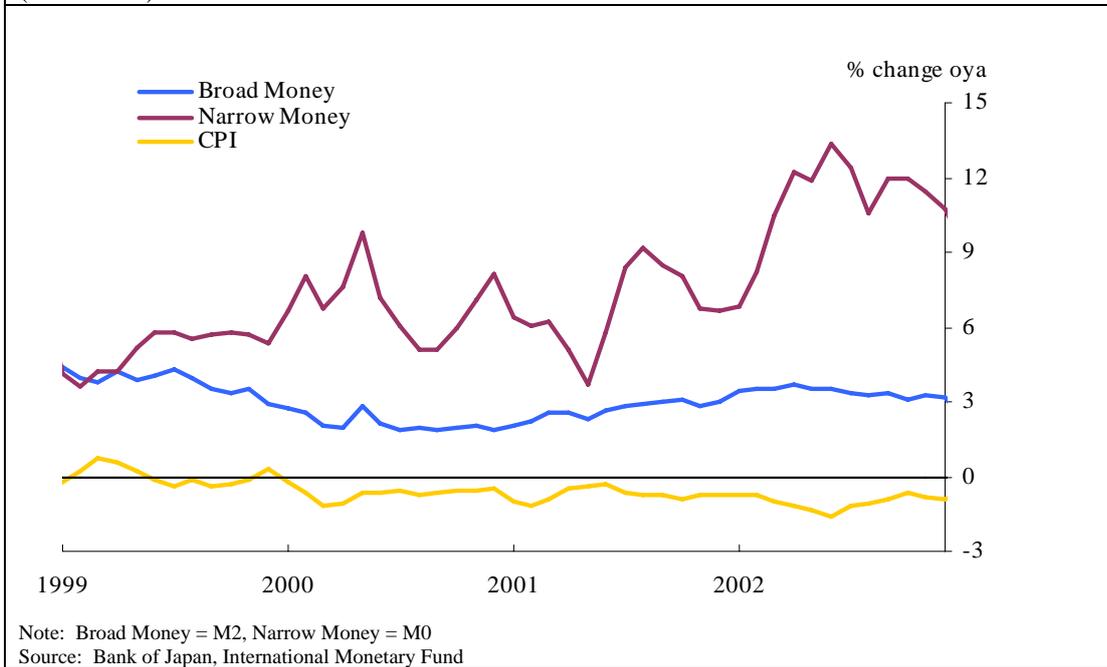


Figure 10: Money Supply Growth and Inflation: China 1999-2009

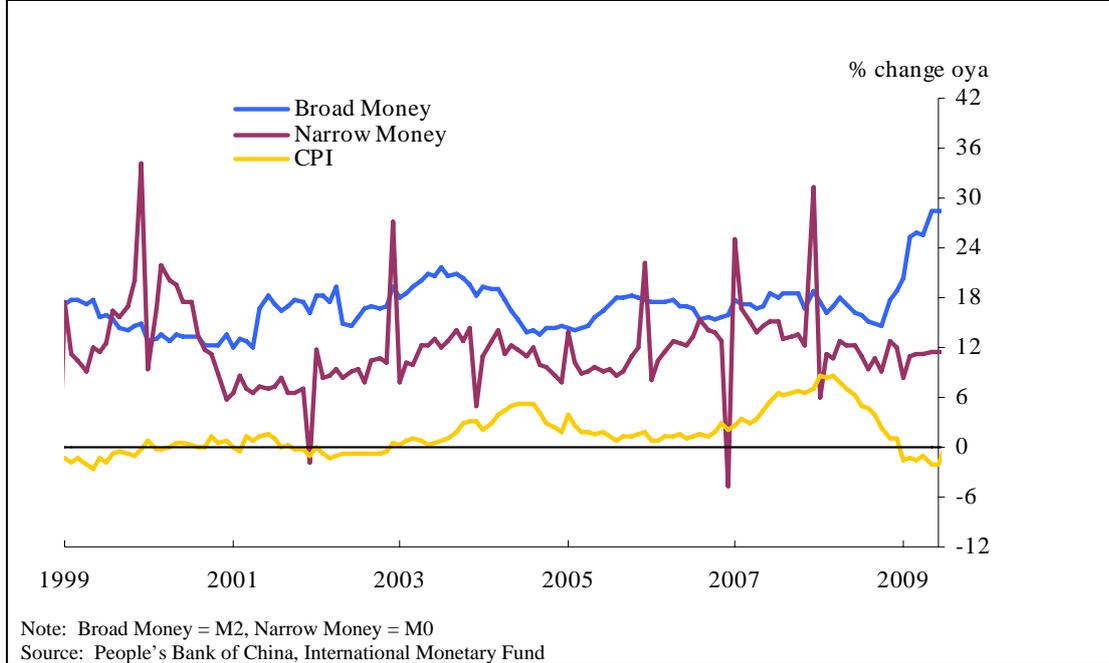


Figure 11: Money Supply Growth and Inflation: China – pegging operations on the foreign exchange market (2005-2007)

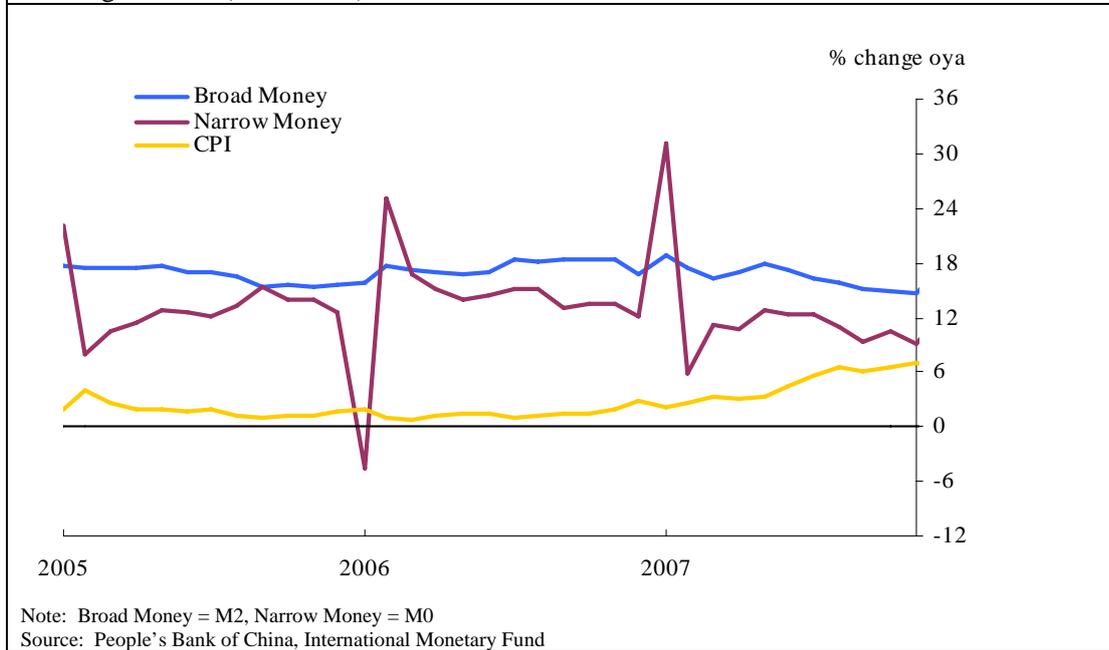


Table 1: Structure of G7 Financial Markets								
	Canada	France	Germany	Italy	Japan	UK	US	Average
<b>Stock Market Capitalisation</b> (a)	1.47	1.02	0.57	0.50	1.06	1.41	1.44	1.07
<b>Private Sector Bond Market Capitalisation</b> (b)	0.30	0.51	0.34	0.60	0.38	0.16	1.20	0.50
<b>Short term Private Sector Securities</b> (c)	0.11	0.22	0.21	0.01	0.07	0.16	0.26	0.15
<b>Banking Sector Concentration</b> (d)	0.56	0.58	0.71	0.35	0.46	0.60	0.34	0.51
<b>Banks per Million Persons</b> (e)	2.95	7.90	22.60	12.49	6.66	8.50	31.70	13.26
(a) As ratio of GDP. Data as of end 2007, Source: World Bank Financial Structure Dataset (b) As ratio of GDP. Data as of end 2008, Source: Bank Calculations and BIS (c) As ratio of GDP. Data as of end 2008, Source: Bank Calculations and BIS (d) Assets of three largest banks as share of assets of all commercial banks. Data as end of 2007, Source: World Bank Financial Structure Dataset (e) Source: Bankscope, IMF and Bank Calculations								