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# **Debt and monetary policy: comments on Jagjit S Chadha, Luisa Corrado and Jack Meaning's paper "Reserves, liquidity and money: an assessment of balance sheet policies", and further thoughts**

Alec Chrystal<sup>1</sup>

It is interesting to return to the topic of debt and monetary policy after a gap of around 13 years. When the Bank of England held a conference on this topic in 1998, the world seemed very different (see Chrystal (1999a)). In the United Kingdom, a very large national debt had been problematic in the period after the Second World War, but by the late 1990s the size of the debt was not even a minor concern and the composition of debt was thought to be orthogonal to monetary policy. The ballooning debt and the interest-rate-lower-bound problem that succeeded the 2007-8 financial crisis changed all that. The scale of public debt has returned as a major concern, debt purchases have become a monetary policy instrument (viz. QE and LSAPS) and the composition of debt has been added to the agenda of monetary policy makers (viz. "Operation twist").

My conference invitation came with a request to make some broader remarks and I plan to do just that, though I will start with a few thoughts about the Chadha et al (2012) paper. I will then offer some comments on the sustainable size of public debt, followed by a discussion of the composition of debt. Finally, I will make a few remarks on the incentives faced by different agencies relating to debt management.

## **Chadha et al discussion**

This paper is a very impressive piece of work. It contains a detailed DSGE model. It then adds liquidity constraints and shows (by means of calibration) what happens to the economy following a liquidity injection. The clear result is that the liquidity boost stimulates real activity, and the implication is that a liquidity injection, such as via QE or LSAPS, would do the same.

There are three main comments that I wish to offer on the paper. Firstly, I am no theorist, but I do have some worries about attempts to make DSGE appear better able to deal with real world financial problems. The whole point of this type of model is that it assumes long-lived representative agents who have solved an inter-temporal optimisation problem. Finance has no direct role in this world and debt structures do not matter. As Robert Lucas has observed, such models are incapable of explaining financial crises, viz:

*"The problem is that the new theories, the theories embedded in general equilibrium dynamics of the sort that we know how to use pretty well now—there's a residue of things they don't let us think about. They don't let us think about the U.S. experience in the 1930s or about financial crises and their real consequences in Asia and Latin America. They don't let us think, I don't think, very well about Japan in the 1990s. We may be disillusioned with the Keynesian*

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<sup>1</sup> Cass Business School, London.

*apparatus for thinking about these things, but it doesn't mean that this replacement apparatus can do it either. It can't."*<sup>2</sup>

This statement was written before the 2007-8 financial crisis, but the inability of this standard model to deal with these events led to widespread criticism of the economics profession.

The whole point of developing DSGE-style models was to get away from arbitrary assumptions that had been common in Keynesian-style models, such as that consumers were constrained by their current income. So the question that comes to mind is: is it better to try to make DSGE models more realistic by adding some (arbitrary) financial constraints such as cash-in-advance or a liquidity shortage, as Chadha et al do? Or should we be building a new generation of models that have fragile financial structures at their core, and where crises or banks runs are one of the equilibria (as, for example, if Diamond and Dybvig (1983) could be embodied in a macro model)? Indeed, does it make sense to use a DSGE framework at all if agents are going to be arbitrarily constrained? I have no problem with the research agenda that builds models with firm micro foundations, but I feel that we have to be cautious about applying these models to solving the types of crisis that the model set-up essentially assumes away.

My second point on Chadha et al is that the simulations of the calibrated version of their model should come as no surprise. If liquidity constraints have been imposed so that consumption and investment spending are reduced in some way, then injecting liquidity in a QE-style operation will obviously boost spending, and thus activity. This does nothing to prove that QE works, or even how it works, but it does show how liquidity constraints affect the outcome in the model and what happens in the model when they are reversed. This may well give insights into some real-world mechanisms that might operate from time to time, but cannot confirm whether QE really did work this way, or worked at all.

Thirdly, the injection of liquidity into the banking system plays a key role in the Chadha et al model, and the liquidity injection works primarily through increases in bank lending. However, in the UK experience of QE this does not appear to be the main channel. As Chart 1 shows, bank loans to UK private non-financial companies (PNFCs) fell sharply in the quarters after March 2009 when QE was introduced, and bank lending to the corporate sector continued to fall throughout 2009, 2010 and 2011. The corporate sector did raise external finance but this was through securities issues. Chart 2 shows that this fall in bank loans applied to small and large firms alike even though SMEs are much less able to access external finance other than through the banking sector. Chart 3 shows that bank lending to the household sector was also static in the period after QE, and thus this does not look like a major channel of impact either.

It is worth bearing in mind at this point that if QE is to affect GDP it must lead to some boost in at least one of the categories of aggregate demand: consumption, investment, government spending or net exports. Charts 1 to 3 suggest that there was no boost to C or I coming via bank lending as a result of QE. G would not have been affected either. A decline in sterling may have helped to boost net exports. BUT the fall in sterling that certainly did follow the financial crisis started in 2007 and was over by early 2009. (This is shown in a chart offered by another presenter at the conference.) If anything, sterling strengthened somewhat after the introduction of QE in March 2009. This suggests that sterling weakness was not the result of QE, but may instead be associated with the massive disintermediation flows that hit the City of London from the summer of 2007 and peaked in late 2008.

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<sup>2</sup> Lucas, Robert E., Jr. Keynote Address to the 2003 HOPE Conference: My Keynesian Education, in *History of Political Economy* (2004) 36(4), pp. 12-24.

A further point worth noting is that while QE may not have increased bank lending, it may have worked by keeping it from falling even further. This is a possibility, and this clearly does apply to the effects of emergency intervention to save the banks in 2007 and 2008. However, by the end of 2008 the banking system had been stabilised and seemed in no further danger of collapse (at least in the United Kingdom and the United States). It is much less clear that the introduction of QE in March 2009 can be thought of as stopping bank lending from falling even further and faster than it would otherwise have done. Thus, I repeat my doubts that QE worked in the UK case by encouraging bank lending. While QE certainly did raise bank deposits and bank reserves relative to where they would otherwise have been, there is nothing that the banks could do collectively to reduce the level of their reserves: only actions from the Bank of England can do that. Indeed, there were widespread claims in the media that banks were continuing to contract their balance sheets and in the process tightening their loan criteria. In short, I am sceptical that QE (in the United Kingdom) worked via a stimulus to bank lending. There are, however, other channels through which it might work.

Joyce et al (2011) list five possible channels:

1. The policy signalling effect.
2. The portfolio balance effect.
3. The liquidity premium effect.
4. The confidence effect.
5. The bank lending effect.

The mechanism in Chadha et al seems closest to the fifth of these channels, the bank lending effect, though it may also have some elements of the third channel, the liquidity premium effect. Chart 4 shows a measure of the risk premium in the UK interbank market as indicated by the £ LIBOR-OIS spread. This was at its peak in late 2008 following the Lehman collapse. It could be, however, that QE played some role in the last leg of this spread's reduction, between March and September 2009, though it had no further effect after that. But as we have seen, this did very little to encourage banks to increase their lending (or narrow their own spreads), and thus could have had little effect on aggregate demand.

None of this is intended to suggest that QE had no effect at all. Chart 5 shows that there was a sharp pick-up in equity prices after March 2009, and this coincided with the introduction of QE in the United Kingdom and LSAPs in the United States. The likely channel here is the portfolio balance channel (channel 2 above). The way this is likely to work is that sellers of bonds receive an increase in their bank balance and they then decide to spend some of this on other assets such as equities and corporate bonds. Joyce et al report a 400bp fall in investment-grade corporate bond yields, a 2,000bp fall in junk bond yields and a 50 per cent rise in equity prices in the three months after QE started. Unfortunately, this cannot all be attributed to the UK QE operation, as the US introduced LSAPs at about the same time, and US equity prices moved in line with UK equity prices. However, it does seem plausible to conclude that QE did have some effect via the portfolio balance channel, and this might have been accompanied by a policy signalling effect and a confidence effect, though these are rather hard to disentangle.

So far, my comments have been responses to the stimulating paper by Chadha et al, but my remaining remarks will be more general thoughts on the conference theme.

## **The size of government debt**

The dramatic build-up of public debt that followed the financial crisis (especially in Europe and the United States) has returned the size of sustainable public debts to the top of the political and economic agenda. In several countries, including the UK, a process of fiscal

consolidation has been initiated in order to restore public debts to what are perceived to be manageable levels. The Eurozone has been gripped with a public debt crisis that has been rumbling on for over a year. This has led to the introduction of fiscal austerity measures in many countries, including Ireland, Greece, Italy, Spain and Portugal. So what level of debt is manageable? There is no simple answer to this question except that it depends.

It is worth bearing in mind that in virtually no country was the build-up of debt a deliberate plan ahead of the crisis. However, in all cases it was thought essential to avoid cutting public spending and raising taxes at exactly the moment when economies were at their most vulnerable. Indeed, tax smoothing is why periodic rises in public debt have been thought to be optimal.<sup>3</sup> No one would question the need for a build-up of public debt at time of war when the very survival of the state may be in doubt – so is a cataclysmic financial crisis that threatens the real economy via a failing banking system that much less serious a threat? Most governments took the view that they had to do whatever was necessary to halt the collapse and then work on repairing their own balance sheets slowly over time as the economy recovered.

The problem for some then turned out to be that bond markets came to doubt that the public debt trajectories were sustainable. As in the second generation of currency crisis models, debt crises can be generated by self-fulfilling expectations, rather than by the inevitability implied by key fundamentals.

Somewhat arbitrary ratios of debt to GDP are often quoted as being “sustainable”. The 1997-2010 UK Labour Government had a target public debt level of 40 per cent of GDP (on average over the cycle), while the EU Maastricht Treaty specified a maximum of 60 per cent (even though this level was consistently exceeded by some EU member countries). Reinhart and Rogoff (2009) provide evidence for the view that debt levels start to get problematic once they exceed 100 per cent of GDP, viz:

“[E]merging market countries with overall ratios of public debt to GNP above, say, 100 per cent run a significant risk of default” (page 22). But Japan currently has a debt ratio of around 200 per cent without any obvious financing issues, and the United States’ debt ratio is around 100 per cent of GDP and heading upwards. The United Kingdom had a debt to GDP ratio around 250 per cent of GDP at the end of the Second World War but managed to work its way out of this situation without coming close to default. So clearly the tipping point is not any specific number, but depends on many other factors.

One of these factors is probably who holds the debt. Niall Ferguson (2008) neatly describes the origin of bond markets in the wars between the Italian city states of the Middle Ages. Armies were often manned by mercenaries, and they had to be paid. Taxes were unpopular and hard to collect, so the rulers issued bonds:

*“The cost of incessant war had plunged Italy’s city-states into crisis. Expenditures even in years of peace were running at double tax revenues. ....Florence was drowning in deficits. You can still see in the records of the Tuscan State Archives how the city’s debt burden increased a hundred-fold from 50,000 florins at the beginning of the fourteenth century to 5 million by 1427. It was literally a mountain of debt--hence its name: the monte commune or communal debt mountain. The mountain was equivalent to more than half the Florentine economy’s annual output. From whom could the Florentines possibly have borrowed such a huge sum? The answer is from themselves. Instead of paying a property tax, wealthier citizens were effectively obliged to lend money to their own city government.*

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<sup>3</sup> Lucas and Stokey (1983) is the *opus classicus* on this theme.

*“A crucial feature of the Florentine system was that such loans could be sold to other citizens if an investor needed ready money....even though the bonds were no more than a few lines in a leather bound ledger.....In effect, then, Florence turned its citizens into its biggest investors. By the early fourteenth century, two thirds of the households had contributed in this way to financing the public debt, though the bulk of the subscriptions were accounted for by a few thousand wealthy individuals” (pages 70-72).*

Similarly, the United Kingdom financed its Napoleonic and World Wars by bond sales to domestic residents.<sup>4</sup> In these circumstances many of the debt holders are subscribing out of a sense of patriotism and are typically holders for the long term. This clearly helps to make the debt sustainable, and at affordable interest rates. In some cases insurance has been provided by exchange controls, which prevent domestic residents from switching their savings into overseas assets, and other credit controls. Direct controls may be needed as a further weapon in the Eurozone debt crisis, as they could be preferable to defaults.<sup>5</sup>

High public debt has been reduced in the past (as a proportion of GDP) not by running budget surpluses but rather by a combination of inflation, real growth and artificially low interest rates (or cheap money policies). The latter have been aided by exchange controls and/or direct controls on credit flows. These are all achievable when the debt is domestically held and denominated in local currency.

Matters are much less straightforward when the debt is externally held and/or denominated in foreign currency, or indeed in the currency of a supranational monetary union, as in the Eurozone. Governments have ways of encouraging domestic banks and long-term savings institutions to hold their debt, but they have no such hold over foreigners. Foreign holders are much more likely to wish to move their funds elsewhere or demand a substantial risk premium. Foreign currency debt externally held is even more problematic, as it cannot be inflated away, and home currency depreciation simply raises the home currency value of the debt. This was an important factor in the Eurodollar debt crisis of the early 1980s, the Mexican debt crisis of 1995, the Asian crisis of 1998, the Argentine crisis of 2001-2, and the Icelandic crisis of 2008.<sup>6</sup>

All of this suggests that very careful attention needs to be paid to the size of external holdings of public debt, and not just to its total size. The evidence of Reinhart and Rogoff (op. cit.) supports this suggestion:

*“Over half of the observations for countries with a sound credit history are at levels of external debt to GNP below 35 percent...By contrast, for those countries with a relatively tarnished credit history, levels of external debt to GNP above 40 percent are required to capture the majority of observations” (page 25).*

Further work may be required to determine if foreign currency debt makes a country even more vulnerable than external debt in domestic currency, but it would seem highly likely that it does. Even the United States might be much less sanguine about its external debts if it had to borrow in foreign currency, and Japan would be much more concerned about the size of its debt if it could not borrow at low interest rates in domestic currency from its own citizens. However, many smaller countries have no option but to borrow in foreign currency if they can

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<sup>4</sup> During the Second World War, the UK had bilateral loans from the US, but this was inter-governmental and not part of any international market issue.

<sup>5</sup> It is worth recalling that Malaysia successfully deployed capital controls in September 1998 in order to protect itself from contagion during the 1999 Asian crisis.

<sup>6</sup> In the cases of the Asian and Icelandic crises much of the external debt was private, but this did not make it less problematic.

borrow at all, and at rates determined in world markets (apart from any borrowing from supranational organisations, such as the IMF). Also worthy of further study is the impact of external private, as opposed to public, debt, and a part of this story must be the extent of currency mismatch which can transfer an exchange rate shock into a balance sheet shock.

I now return to the issue of the sustainability of sovereign debt. One aspect of this has not received the attention it deserves, but is rather left implicit in much of the discussion. This is the size of the debt service costs. Clearly, the real constraint on sovereign debt size is the cost of servicing the debt, as this either has to be paid out of tax revenues or leads to further accumulation of debt. Debt to GDP ratios can fall so long as nominal GDP grows at a rate higher than the interest rate on the debt, even if there is no attempt to pay down the debt by running budget surpluses.

Chart 6<sup>7</sup> shows the UK's public net debt, and the debt interest as a percentage of GDP from 1692 to 2011. There is clearly some correlation between these two series, but not a perfect one. Debt clearly rises at times of war, and debt service costs rise as a result. UK net debt and the debt service ratio both peaked at the time of the Napoleonic war with France. Debt also rose sharply during the First and Second World Wars, but the debt service ratio was much lower after the Second World War than the First, even though the size of the debt was much greater. This was achieved by the "cheap money" policy of the time, which was maintained in the early post-War period by a policy of rationing and direct controls behind a wall of foreign exchange controls. Private credit was subject to controls that ensured that the public sector was able to finance its own needs without forcing its interest costs unsustainably high. This policy was later criticised as having "crowded out" private investment, but at least it succeeded in avoiding a disrupting sovereign debt crisis such as many other countries have faced with much lower debt levels.

An interesting feature of the UK evidence is that the peak debt service ratio was around 10 per cent of GDP. This might be close to the limit of sustainability, though ratios below 5 per cent would seem to be the range to which they tend to return, and debt service ratios of about 2 to 3 per cent of GDP seem to be around the level where governments appear happy to let debt alone without seeking to cut it further.

Comparable data for the US debt level and debt service ratio are shown in Chart 7.<sup>8</sup> These data are from 1862, with projections added for the years from 2011 to 2016. Again the main surges in debt are associated with the Civil War, the First and Second World Wars, the New Deal of the 1930s and the recent financial crisis. However, the peak in debt-service ratio came in the 1980s with the combined effects of the Reagan deficits and the Volker tight money policies, which sharply raised borrowing costs at a time of growing (but not exceptional) debt. Even here the debt service ratio never much exceeded 3 per cent of GDP, and currently, while the debt to GDP ratio is expected to settle at a little above 100 per cent, the debt service to GDP ratio is not projected to reach 3 per cent by 2016. Clearly, this outcome is contingent on the United States Government's being able to continue to issue debt at interest rates in the 2 to 3 per cent range, but market conditions could change, as they did for countries like Greece and some others in the Eurozone.

I have already mentioned the self-fulfilling nature of some sovereign debt crises. However, it should be obvious that Greece would not have the problems it does if it could borrow on the same terms as Germany or the United States. Public debt at 150 per cent of GDP is clearly

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<sup>7</sup> The data source is: <http://www.ukpublicspending.co.uk/index.php>. Please note that the data from this source show an upward blip in debt service in 1715. This is plausible, as this was the year of the First Jacobite Rebellion; however, the data reported in Goodhart (1999) do not show a surge of the same magnitude, so this information needs to be used with due caution.

<sup>8</sup> The data source for this chart is: <http://www.usgovernmentdebt.us/>.

unsustainable if the interest rate on the debt is 20 per cent (as has been the yield on Greek bonds recently), because this would require a debt service ratio around 30 per cent of GDP, but at 3 per cent interest, the debt service ratio would be 4.5 per cent of GDP and would be manageable, at least for a while.

One of the puzzles in the Eurozone debt crisis is why the debt of all the member countries traded on virtually identical yields right up to late 2008. Chart 8 shows this, as well as how the divergence grew sharply once the markets formed a belief that some countries could default or even leave the Eurozone. It also becomes clear why some commentators have proposed a collectivisation of Eurozone debt in the form of Eurozone bonds which would be collectively guaranteed by the member states. With credible collective agreements this could lead to all member states being able to borrow on similar terms to Germany, as they could before the financial crisis. At such interest rates, the debt crisis would be transformed, in that it would buy time to get budgets back under control.

## Debt composition

In 1998 the consensus was that debt composition was of minor importance and was of no real concern to the monetary authorities. Some may still hold that view, but they are presumably in the ranks of academia rather than in the corridors of power. For QE to have any effects it must be true that central bank liabilities are not perfect substitutes for central government liabilities, and for Operation Twist to have any effects it must also be true that short-term government debt is not a perfect substitute for long-term government debt. The jury is probably still out on what these effects are, but the policy makers must think that these shifts are stimulative of aggregate demand through some channel.

Since we are talking largely about net public debt, it may also be worth including public assets in this story, since direct capital formation may also be one of the tools at the disposal of policy makers (not the central bank but the fiscal authorities in this case). This presumably comes under the heading of “credit easing”, but it does suggest that debt composition may not be the only game in town if asset composition can also be used as an instrument. The direct transmission to aggregate demand can easily be seen here, so this type of policy may be more effective, even if it does not classify as monetary policy.

I want to make some other points in the time available.

It used to be the standard view in the United Kingdom that there was a difference between debt sales to banks and debt sales to the non-bank private sector. The logic of this was based on the “counterparts identity” which linked changes in the broad money supply to various sectoral deficits. Budget deficits financed by debt sales to banks were thought to increase the money stock and thus be more inflationary than deficits financed by debt sales to the non-bank public. This view led to some strange policies (especially in the days of monetary targeting) like “overfunding”, where more debt was sold than was strictly needed to finance the deficit, in order to compensate for debt sales to banks (see Chrystal (1999b)). This way of thinking about debt sales never seemed to catch on outside the United Kingdom (except in the extreme form of what happens when deficits are funded by debt sales to the central bank). Indeed, the evidence provided for the United States by Kuttner and Lown (1999) suggested that debt sales to banks actually reduced bank loans to the non-bank private sector and thus had a negative effect on private demand. The UK QE policy from March 2009 was not targeted on buying gilts from banks, as banks held very few to start with, but banks have subsequently built up their holdings in order to comply with regulatory liquidity requirements. Hence it seems safe to conclude that funding budget deficits by debt sales to banks should not be a special concern, though QE-type purchases of debt (of any kind) from banks may well contribute to some form of credit channel of monetary policy, as

banks will then be likely to look to buy substitute assets – as, indeed, would any other financial institution (as discussed above).

A different literature sees the composition of debt as in part a commitment device to ensure that the fiscal authorities have incentives to maintain fiscal discipline. In this context it is clear that issuing index-linked debt gives the authorities an incentive to keep inflation under control. However, it also provides inflation insurance for long-term savings institutions such as pension funds whose future liabilities (at least for defined benefit plans) are linked to future money wage growth. In general, governments seem unwilling to issue a significant proportion of their debt in indexed form and this may be precisely because of worries that this would make it harder to inflate the debt away. But there is clearly a social benefit in having some inflation-linked debt in existence, as it provides one possible measure of a risk-free real interest rate, even if this is distorted by the thin market turnover in this type of debt.

Some of the debt literature also concludes that short-term debt is a better commitment device than long-term debt. This is presumably because the authorities have to worry about rollover risk. They have to stick to fiscal discipline as they know they will have to be returning to the market on a regular basis. However, from a debt manager's perspective it would seem preferable to issue more long-term debt, as this reduces worries about short-term adverse market movements. In general, though, debt managers will want to fund at minimum cost and the optimal policy will depend to some degree on the term structure of interest rates. The incentives for shorter-term funding will increase if the yield curve is steeply sloped. Balancing this, however, should be the efficiency benefits of having a deep and liquid market in government debts instruments at all maturities. The private sector prices off the gilt curve (or equivalent in each national market), and so it is important for financial market participants to have this benchmark.

Rather less obvious is why, for any given debt structure, it will have any measurable effect on aggregate demand if the central bank buys long debt and issues short debt instead. This could work through the channels listed above, but it is tempting to consolidate the balance sheets of the central bank and Treasury, and conclude that nothing much is changed by central bank “twist” operations, so effects will be minimal.

A final thought on debt composition is that there may be other goals that the authorities could achieve through innovative types of debt issuance. A longevity bond is one such that would offer a payout that varies with life expectancy. It is obvious why pension funds would want to buy such bonds. Government may also want to be buyers, as this enables them also to hedge against pension and social security risks. Life insurance companies would be the obvious issuers of such instruments. However, the only point to be made here is that there are many possible reasons for thinking about government (or central bank) sponsored debt issues as having a variety of purposes, and myriad possible structures (or linked derivatives).

## **Conflicting incentives**

Finally it is worth raising some issues about potential conflicting incentives. These could be conflicts between the monetary policy and financial stability (or regulatory) functions of central banks, or conflicts between the interests of central banks and those of the fiscal authorities.

Monetary and fiscal authorities always say that they are working together, and central banks always say that there is no conflict between their monetary policy and financial stability roles. However, it is not hard to think of situations where conflicts of interest could arise. Fiscal authorities will generally want to keep their debt-service costs low, but monetary authorities may wish to see high interest rates in order to keep inflation under control. Tight monetary policy can also threaten financial stability, so different parts of the central bank may be pulling in different directions. Of course, all the authorities will have the same long-run

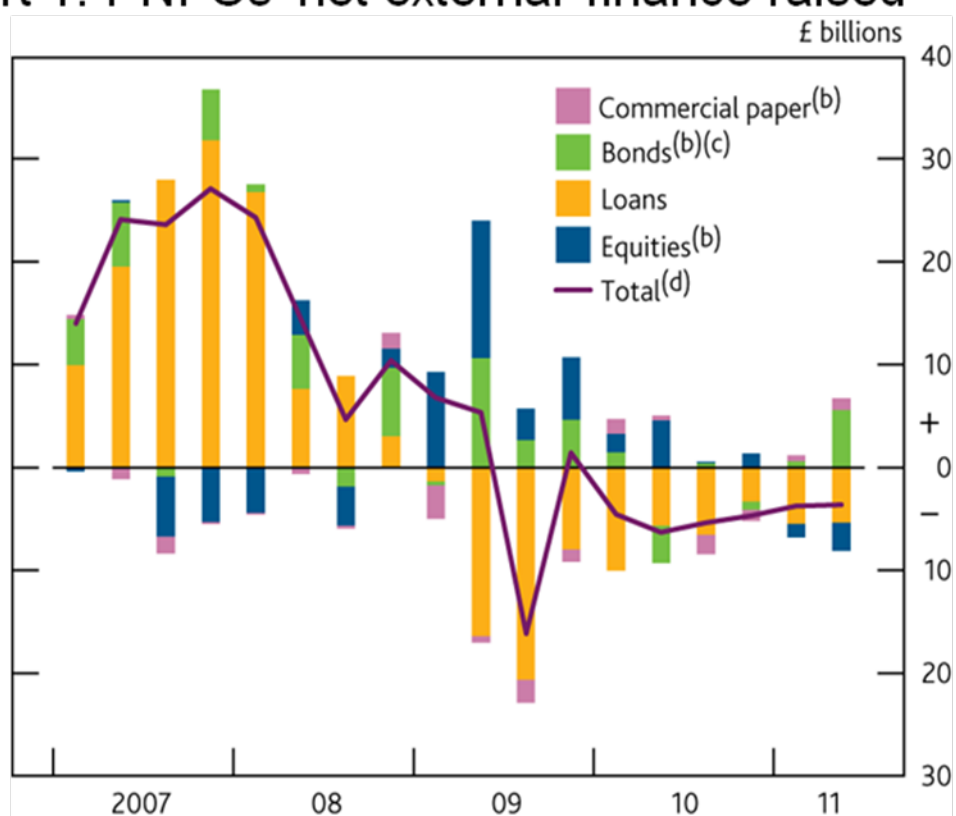
interest, which is to achieve a steadily growing economy that is at potential, with low and stable inflation. However, their incentive mismatch may result from deviations from trend and may depend on the causes of those deviations. An example of this conflict arose in the United States in the late 1970s and early 1980s when Paul Volker's tight monetary policy led to very high interest rates and high funding costs for the US Treasury.

A contemporary difference could arise about the term structure of debt. Monetary authorities seem to want to shorten the duration of outstanding debt (at least that held outside the public sector). However, many fiscal authorities with big debts may be wise to fund at the long end of the yield curve if they can, as this will minimise rollover risk. Problems may also arise if the QE and twist episodes are being unwound at a time when the fiscal authorities still have to finance or refinance large debts. Central bank sales of debt could make it harder for the fiscal authorities to refinance cheaply when yields are on the rise.

## **Conclusion**

Overall, the message is that the debt level and debt structure are now of great interest to monetary policy and fiscal policy makers alike. This makes monetary policy much harder to separate from fiscal policy, and the overlap is much greater now than it has been for several decades. These concerns seem likely to be with us for a long time, and certainly for at least the next decade. Much research work remains to be done to understand more fully how debt and monetary policy interact, but what is clear is that the dividing lines between monetary and fiscal policies are now much harder to draw than they seemed only five or so years ago.

Chart 1: PNFCs' net external finance raised<sup>(a)</sup>



(a) Includes sterling and foreign currency funds.

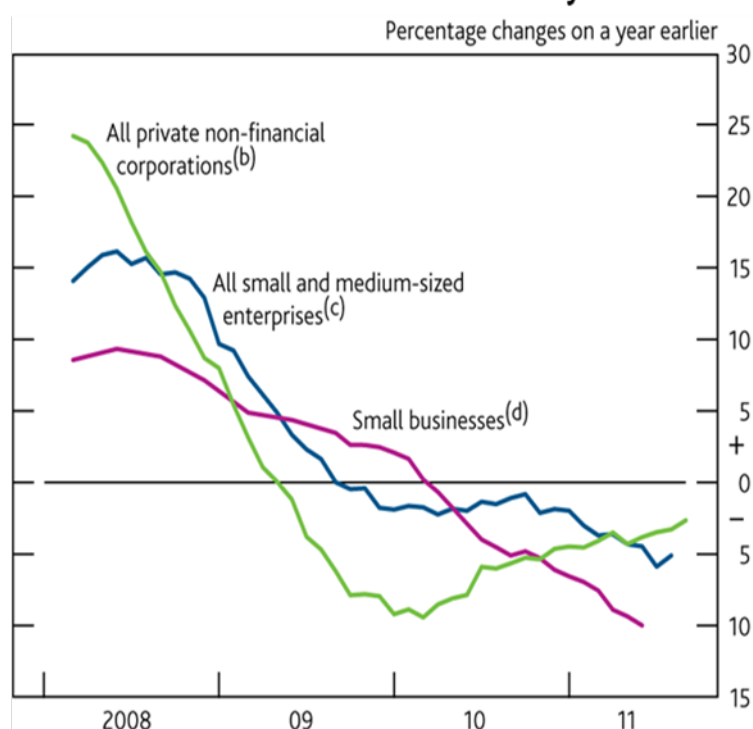
(b) Non-seasonally adjusted.

(c) Includes stand-alone and programme bonds.

(d) As component series are not all seasonally adjusted, the total may not equal the sum of its components.

Source: Bank of England, *Inflation Report*, August 2011.

## Chart 2: Loans to UK businesses by size<sup>(a)</sup>



(a) Rate of growth in the stock of loans. Data are non-seasonally adjusted.

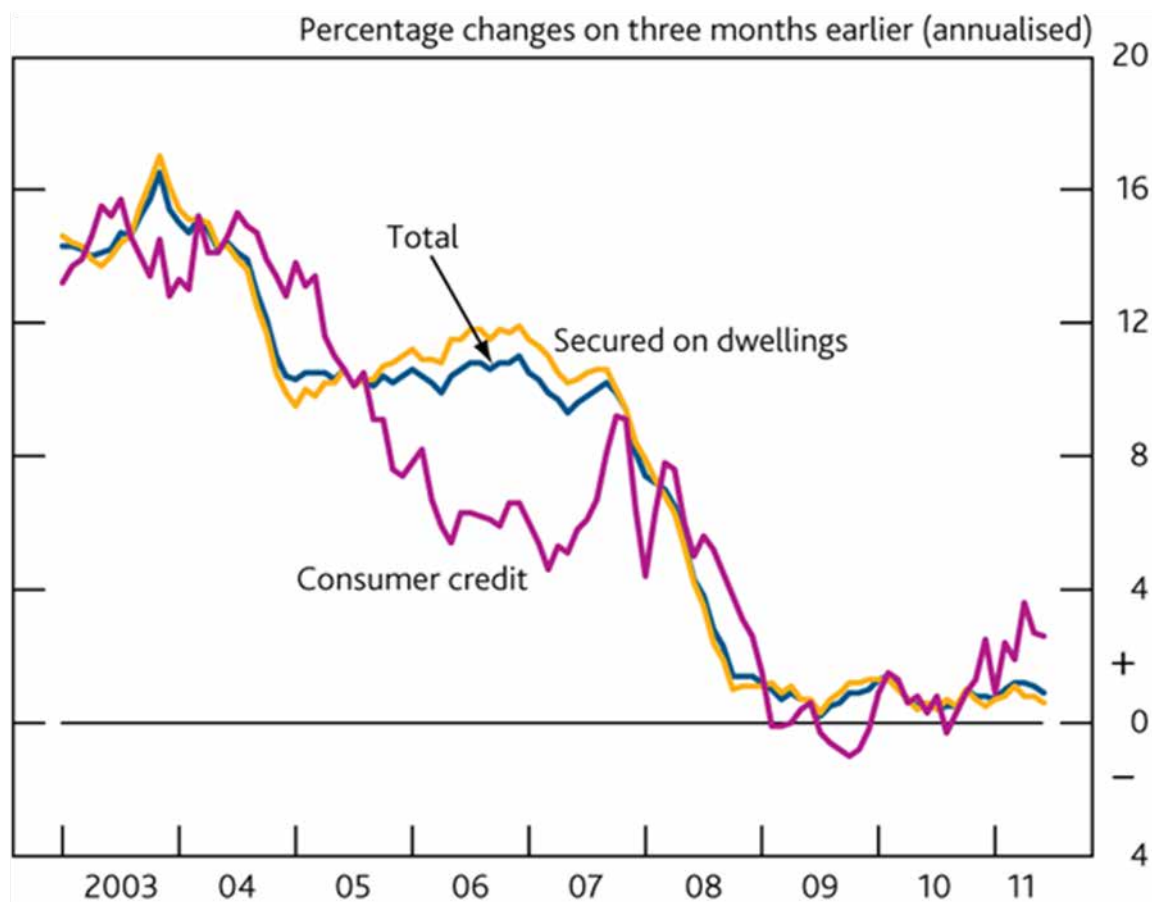
(b) Data cover both sterling and foreign currency loans. The latest observation is September 2011.

(c) BIS data and Bank calculations. Stock of sterling and foreign currency lending, expressed in sterling terms, by four UK lenders to enterprise with an annual bank account debit turnover of less than £25 million. The latest observation is August 2011.

(d) BBA data. Stock of sterling lending by seven UK lenders to commercial businesses with an annual bank account debit turnover of up to £1 million. Data are quarterly until September 2009 and monthly thereafter. The last observation is June 2011: [www.bba.org.uk/statistics/article/small-business-support-december-2010/small-business/](http://www.bba.org.uk/statistics/article/small-business-support-december-2010/small-business/).

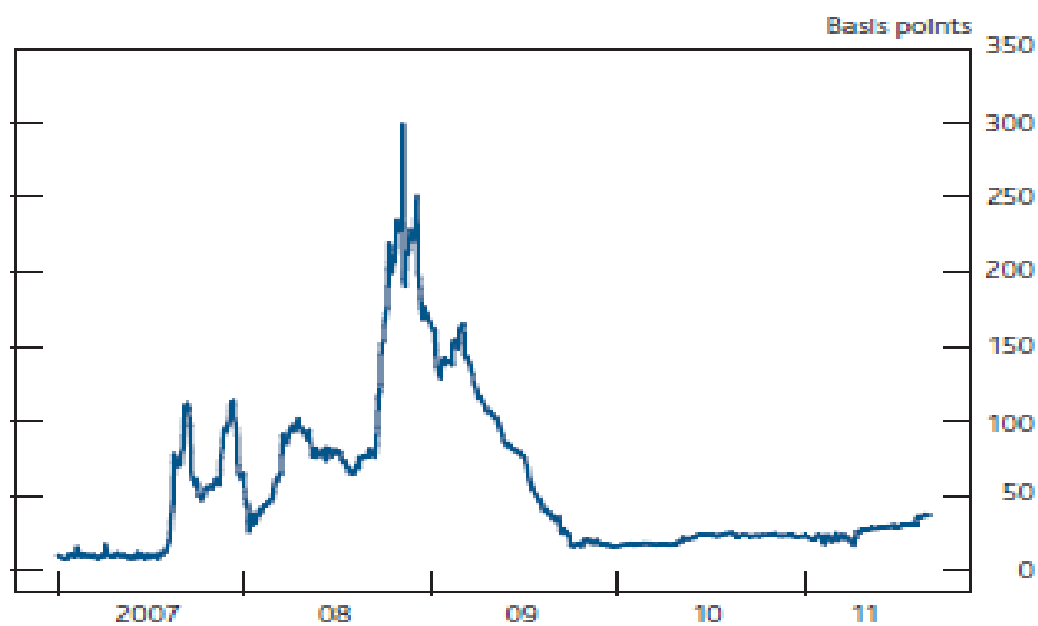
Source: Bank of England, *Inflation Report*, November 2011; British Banker's Association (BBA), Department for Business, Innovation and Skills (BIS) and Bank calculations.

## Chart 3: Loans to individuals



Source: Bank of England, *Inflation Report*, August 2011.

Chart 4  
Sterling three-month Libor-OIS spreads



Sources: Bloomberg and Bank calculations; Joyce et al, 2011.

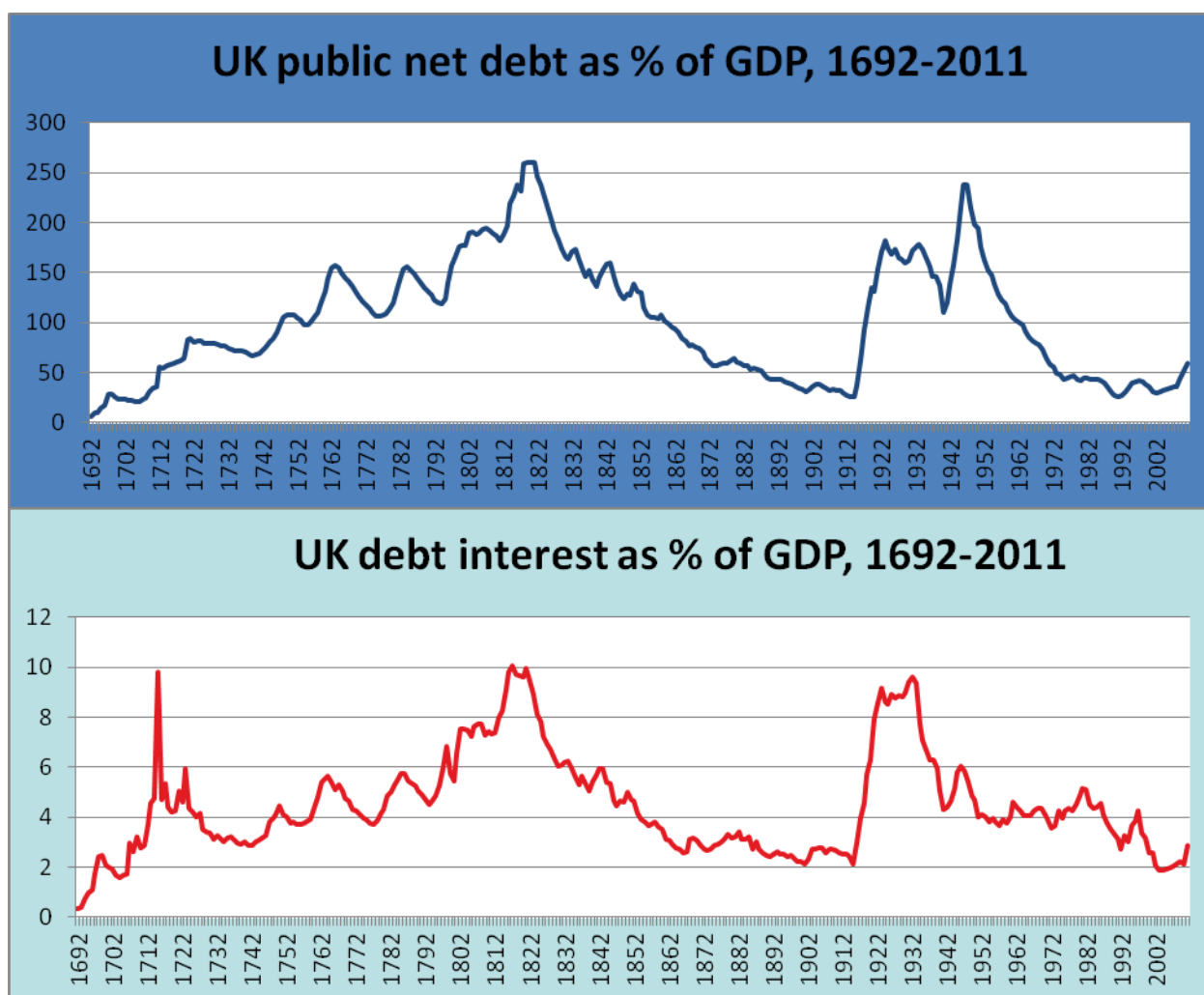
Chart 5: International equity prices<sup>(a)</sup>



(a) In local currency terms.

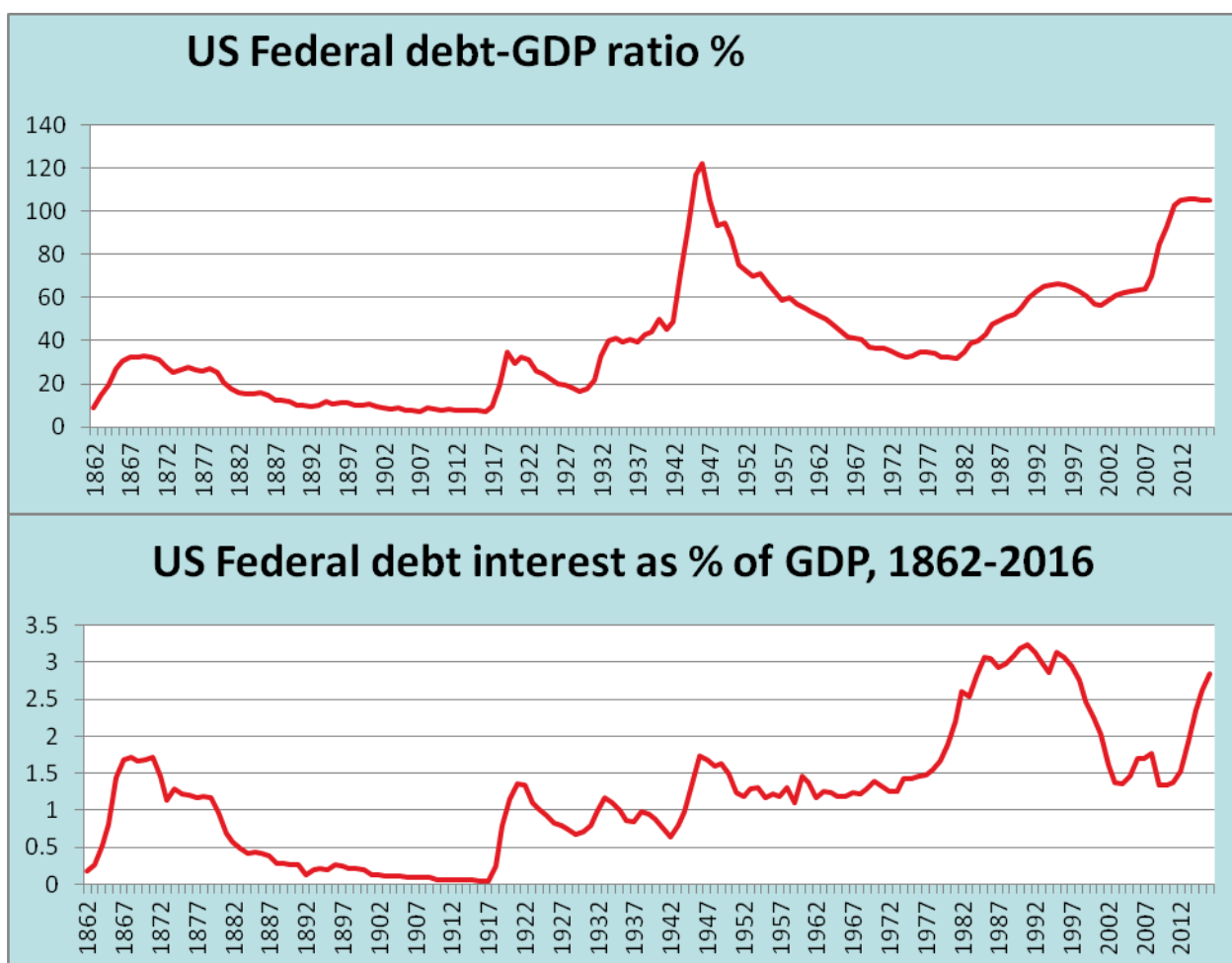
Sources: Bank of England, *Inflation Report*, November 2011; Thomson Reuters Datastream.

Chart 6



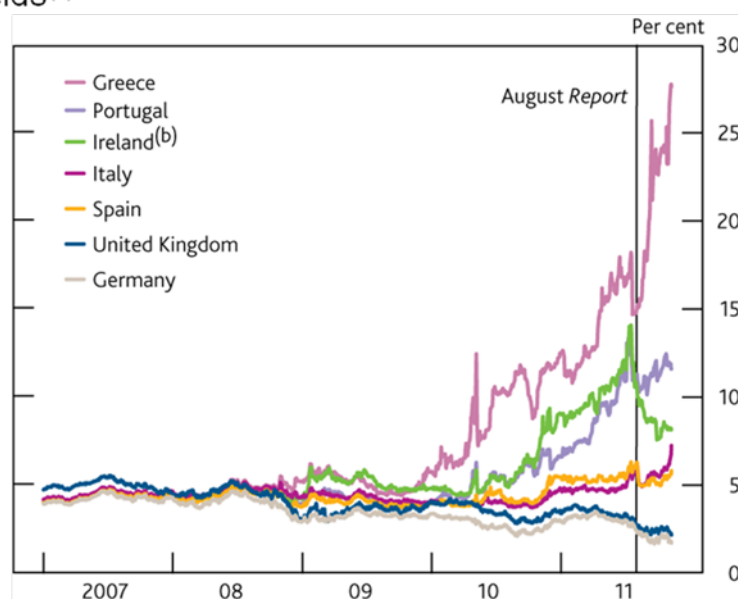
Source: <http://www.ukpublicspending.co.uk/index.php>

Chart 7



Source: <http://www.usgovernmentdebt.us/>

Chart 8: Selected European ten-year spot government bond yields<sup>(a)</sup>



(a) Yields to maturity on ten-year benchmark government bonds, unless otherwise stated.

(b) Yield to maturity on the nine-year benchmark government bond between 16 March and 25 October 2007, and from 12 October 2011 onwards.

Source: Bank of England, *Inflation Report*, November 2011; Bloomberg.

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