



BANK OF ENGLAND

Speech

“Don’t just do something, stand there” ... (and think)

Speech given by

David Miles, External Member of the Monetary Policy Committee, Bank of England

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The views expressed are my own and do not necessarily reflect those of the Bank of England or other members of the Monetary Policy Committee. I should like to thank Rodrigo Guimarães and Chuan Du for excellent assistance.

Introduction

I became a member of the Monetary Policy Committee over 6 years ago; I will leave the Committee at the end of August having by then gone through 75 monthly meetings. When I joined the Committee Bank Rate had recently been cut to ½% and asset purchases had just begun. At that time it seemed extremely unlikely that interest rates would remain at this emergency setting for very long and it was not expected that asset purchases would go very much further (though in retrospect only a piffling £75 billion had then been purchased).

No one on the Committee in mid-2009 would have thought it even remotely likely that by mid-2015 the following would be true:

- Bank Rate would still be at 0.5%;
- Financial market prices would imply that Bank Rate even three years further ahead – mid 2018 – might only be around 1.6%;
- Assets purchased would have added up to £375 billion and none would have been sold;
- Inflation would be about 0%.

All this is a sign of the enormous and lasting disruption that came after the financial crisis of late 2008. It is probably too early to be looking for an epitaph for that financial crisis. But if I had to settle on one today it might be that of Christopher Wren: *si monumentum requiris circumspice* – if you are looking for a monument then just look around you.

And what would you see? In the UK you would see levels of economic activity and of productivity that are around 15% below what you might have expected if the economy had continued on the trajectory it was on in the years preceding the crisis; real wages are probably around 20% below that trend. You would also see a level of inflation that was a long way from the target of 2% – though it seems likely to me that we are heading back towards the target and that the reasons for the current inflation undershoot are both fairly easy to understand and their effects relatively benign (things which are most surely *not* true of the deviations from trend in wages, productivity and GDP).

This enormous disruption to economic activity – and the uneven, volatile but ultimately downwards path for inflation which came after it – is why we have needed an extraordinarily expansionary monetary policy. This expansionary stance was largely put in place in the UK by the end of 2009 and then held for 6 years and

counting¹. Up to our recent meeting², I have not yet voted for a single change in Bank Rate – a potential source of some embarrassment as I ponder in years to come the question “what did you do on the MPC?”. A simple answer might be – vote for hundred billions of asset purchases (so not exactly “er...nothing”). But I think a better answer might be that I heeded a good piece of advice, which is: don’t just do something, stand there³ (and think)...

I do have one more meeting on the Committee and it will coincide with the MPC’s August Inflation Report. It also comes at a time when I think the case for beginning a gradual normalisation in the stance of monetary policy is stronger than at any time since I joined the committee over 6 years ago.

I will return to this later. But first I want to step back and reflect on what lessons we should take about central bank policy from the past 6 or so years. I will then come back to the question of what to do next.

Looking back: lessons from the global financial crisis

Dealing with the aftermath of the financial crisis has proved exceptionally hard. Self-evidently if we can avoid the enormous costs of such crises in the future – or at least significantly reduce the probability of facing them – we should. There are two ways in which that could happen. First, by increasing the scope to use monetary and fiscal policy to offset the large negative impacts on the economy of a financial crisis. Second, by reducing the chances of a crisis occurring. Obviously you can proceed on both fronts and there has already been significant action – the capital of banks has risen and the range of macroprudential and monetary policy tools available in a crisis (including the availability of central bank liquidity) has been widened significantly.

I believe that now the benefits of taking further action to reduce the chance of financial crises are likely to be larger than the benefits of further increasing the range of policy tools to deal with the aftermath of a crisis. There are several reasons for saying this.

First, there was in fact substantial scope to use monetary policy and fiscal policy after the crisis hit in late 2008. The fiscal deficit did rise enormously and the automatic stabilisers were allowed to work, which is one reason why the deficit has come down less rapidly than was anticipated. Bank Rate was put to near its floor by March 2009. But that was not the end of the story. £375 billion of asset purchases followed and the Funding for Lending Scheme (FLS) was launched in 2012. The steady – and ultimately very large – fall in the cost of credit to the private sector came some time after the cut in Bank Rate and was, I believe, greatly facilitated by the Bank of England purchases and by the FLS (See charts 1, 2 and 3). I do not think it is so

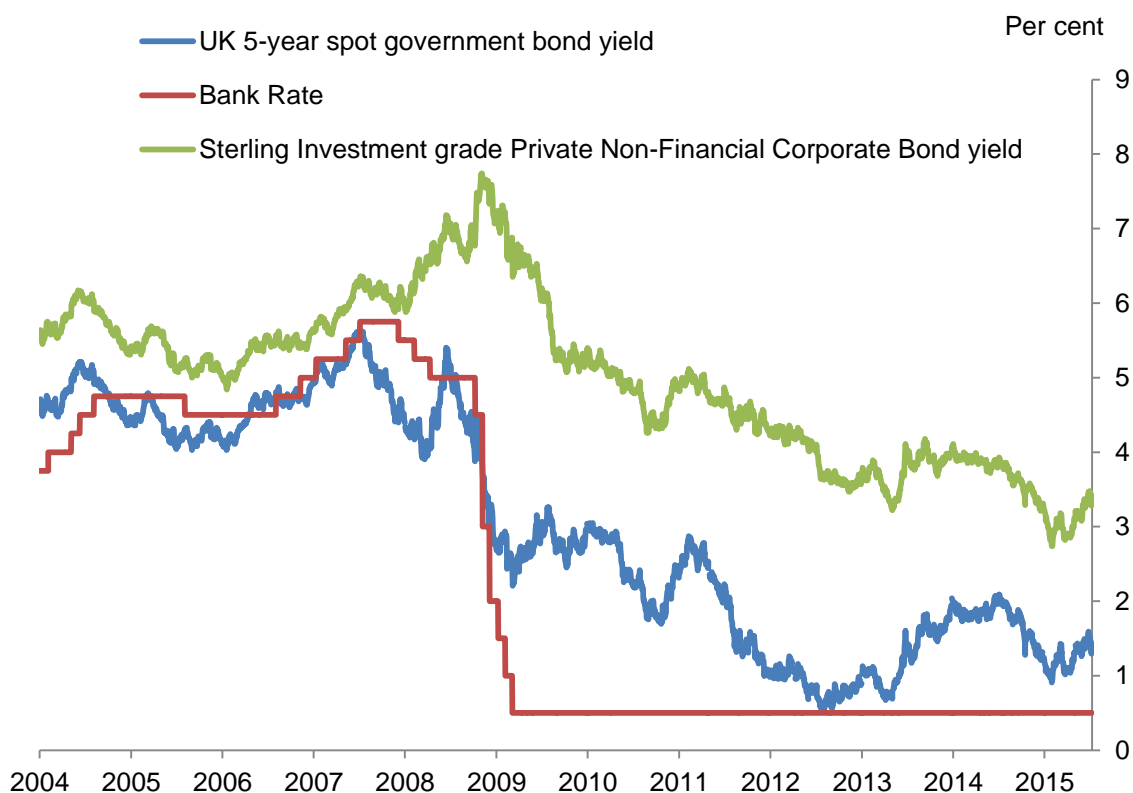
¹ By the end of 2009 Bank Rate had been at 0.5% for three quarters, and a total of £200bn of asset purchases had been announced.

² The July 2015 meeting, minutes of which will be published on July 22nd.

³ There is some doubt about who exactly said this first. I like the idea that it was the actor and polymath Peter Ustinov, because of what prompted him to say it. He became fed up in the 1950s and 1960s with being on stage with young actors who were much impressed by what they saw as the message of the method school that they needed to be hyper active to be great actors.

clear that in the UK the zero lower bound on the interest rate was a major constraint on monetary policy. Throughout my entire period on the Committee I have never felt that there was no room left to make monetary policy more expansionary. On those occasions when I felt monetary policy should have been more expansionary I voted for more asset purchases – often being in the minority. I believe others on the Committee took the same view that we were not out of ammunition. That is relevant when you consider the case for raising the inflation target to make more room to cut nominal interest rates in the aftermath of a big downturn. To my mind putting up with (on average) an inflation rate 2 or 3 percentage points higher so that on rare occasions you can cut nominal rates further is not very attractive in terms of weighing costs against benefits⁴.

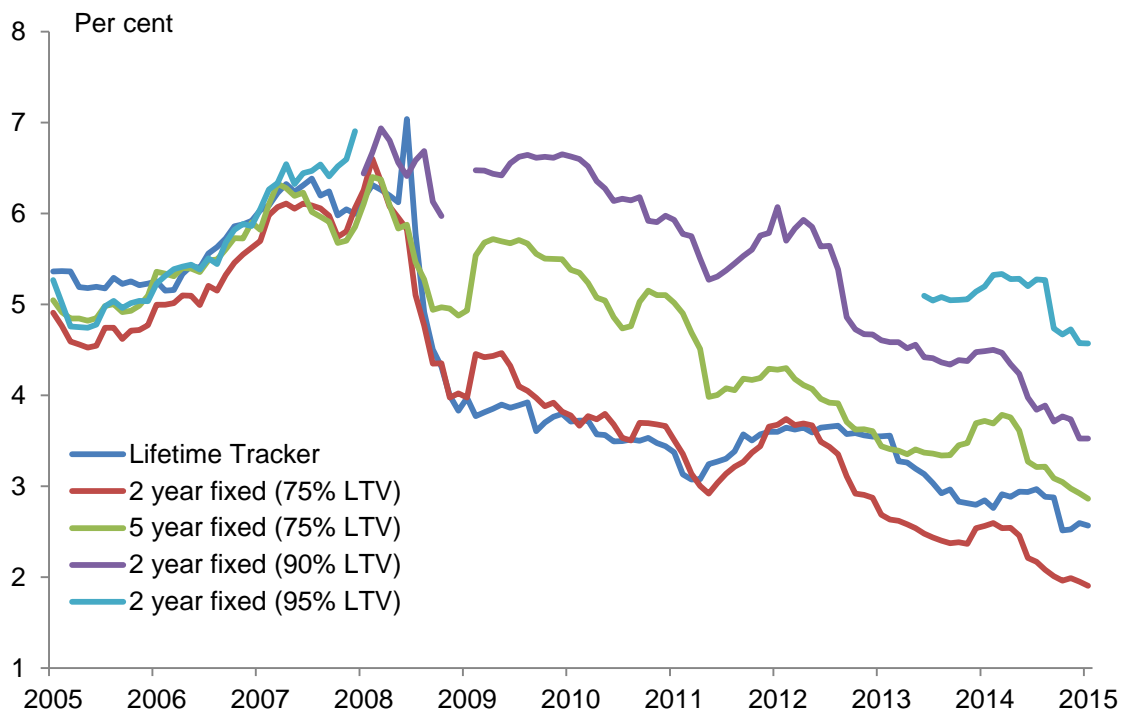
Chart 1: Sterling Government and Sterling Corporate Bond Yields



Sources: Merrill Lynch, Bloomberg and bank calculations

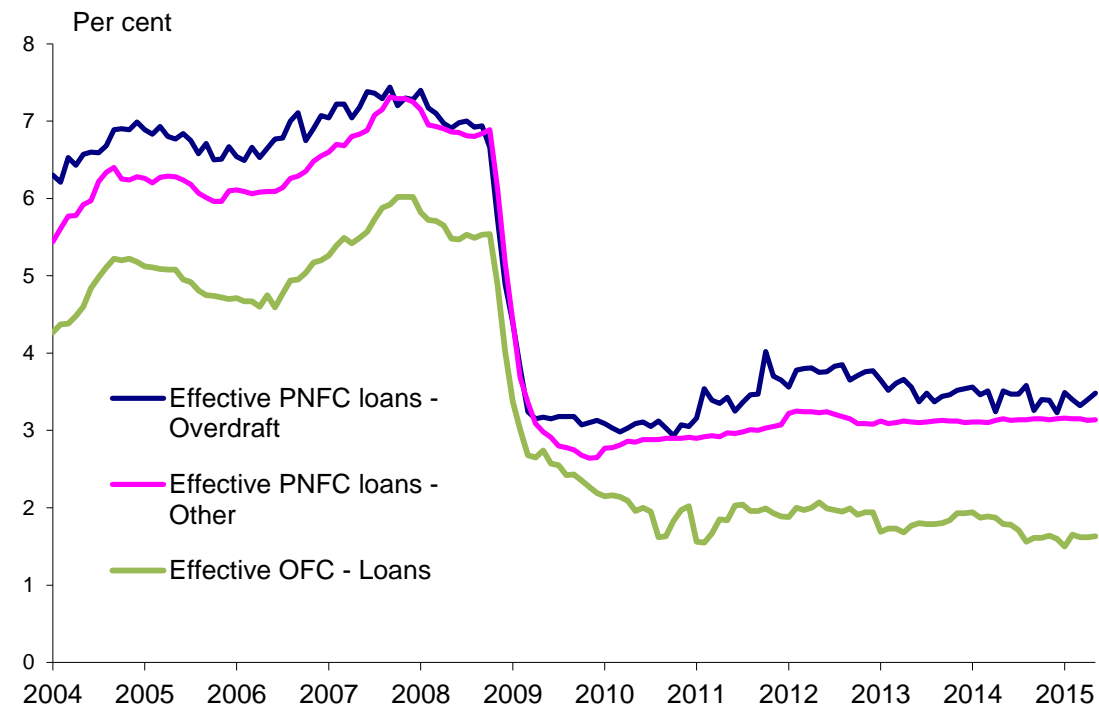
⁴ The case for raising the inflation target is stronger if you believe unconventional policy – asset purchases – is ineffective. But I believe there is evidence against that (for a survey see Joyce, Miles, Scott and Vayanos (2012)). There might be a case for raising the inflation target if the natural real rate of interest rate has fallen significantly and permanently, but neither is clear at this moment. I will return to the outlook for the natural interest rate later.

Chart 2: Quoted Mortgage Rates



Source: Bank of England

Chart 3: Corporate Rates



Source: Bank of England

There may yet be some benefits from enhancing the scope for more monetary and fiscal activism to deal with the aftermath of the next crisis. Such further benefits as may exist are all to do with giving yourself room to deal with the mess after it has happened. But I believe that reducing the chances of a mess happening in the first place is likely to yield greater benefits. And the main reason for saying this is that the simplest, and arguably most effective, policy may well have low long run costs. That policy is to gradually change the funding structure of banks so that they are much better able to deal with shocks by relying less on debt and more on equity. That also changes the incentives to take risk in the first place. I want to explain why this is the better way forward and in particular why it is a better strategy than relying on monetary policy – interest rates – to guard against overheating in the financial sector⁵.

There are two fundamental reasons why having financial intermediaries fund their acquisition of assets with significant amounts of equity makes sense. First, it directly addresses the problems of improving incentives and preventing even limited falls in expected asset values triggering big rises in perceived risks of insolvency. Consider why the very large fall in asset values after the dot.com bubble burst did not have such devastating effects on the US economy.⁶ It was because all that frenzied activity was largely financed by equity and not debt. People who had funded much of the dot.com bubble lost money, but this did not trigger a whole series of insolvencies in the financial sector and disrupt the flow of credit to the wider economy.

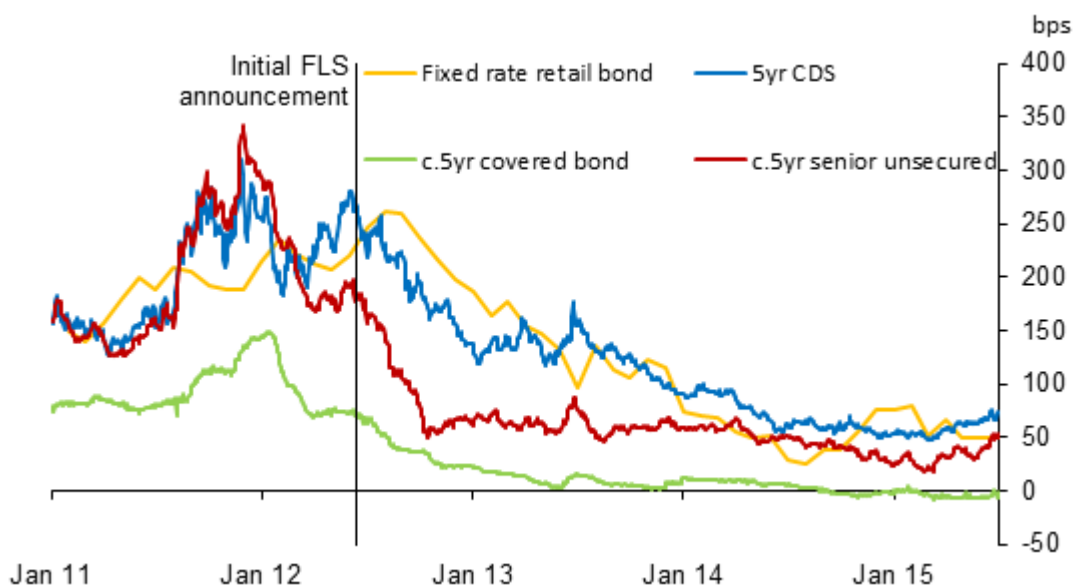
Second, the long run cost of even rather big increases in the amount of equity funding of financial intermediaries is plausibly quite small. Substantial changes in the use of equity funding have already taken place since the crisis – and on some metrics required capital is as much as ten-times greater than pre 2008⁷. And yet there is little evidence that the overall cost of bank funding has increased substantially. The paths of bank lending rates, both in absolute terms and relative to Bank of England Rates, have tended to fall (charts 2 and 3). And direct measures of the cost of bank funding have been on a steady declining path as capital ratios have risen (chart 4).

⁵ What you are about to hear is neither an example of banker bashing nor a bashing of those in charge of regulation before the crisis. I am in a uniquely bad position to do either sort of bashing having been a non executive director on the board at FSA and an employee of Morgan Stanley at the time of the crash in Sept 2008. I am not sure this makes me a banker; economists at investment bank had a role part soothsayer and part court jester so are not really bankers at all.

⁶ This is the main theme of Titman (2013). Work by Mian and co-authors (2010, 2011, 2013), for the US, and IMF (2012) for a large panel of countries, show the importance of debt for the real costs of crises.

⁷ See Carney (2014), Appendix Table 1.

Chart 4: Indicative measures of UK banks' long-term funding spreads



Sources: Bank of England, Bloomberg, Markit Group Limited and Bank calculations.

Simple finance theory suggests why, starting from very low levels of equity (high debt leverage), the impact of large proportionate changes in the use of equity on the overall cost of funds is likely to be small.

Consider the impact of doubling capital – or halving leverage – using the simplest possible back of the envelope calculation of a bank’s weighted average cost of funds. Suppose we start with leverage of 40 and cut it to 20 (that is with equity initially of 2.5% of total assets rising to 5%). Let’s imagine that the cost of debt financing is 5% and the required return on equity (its cost) at the original level of capital is 15%. First, if we assume that these costs will not change (a pretty big and unrealistic ‘if’ for a dramatic change in leverage), this will lead to total cost of financing increasing from 5.25% ($0.975 \times 5\% + 0.025 \times 15\%$) to 5.5% ($0.95 \times 5\% + 0.05 \times 15\%$), a rise of only 0.25pp. 25 basis points is what people used to think of as one typical MPC rate change at its monthly meetings.

And this is an extreme case in which the costs of equity and debt do not change. Theory suggests they should change so as to reflect the shift in riskiness as equity rises – debt becomes safer and equity returns less variable. At the extreme (and if the conditions for the famous Modigliani-Miller (MM) theory hold) there would be no change in the weighted cost of funds. The table below shows the effect of different assumptions on the degree to which MM effects apply:

Variations in the weighted cost of funds from a doubling in equity finance from 2.5% of total assets to 5%

Initial cost	Cost with Zero MM	Cost with 25% MM	Cost with 50% MM	Cost with 75% MM	Cost with 100% MM
5.25%	5.5%	5.44%	5.375%	5.31%	5.25%
Change in cost	+25bp	+19bp	+12.5bp	+6.25bp	0bp

There are many reasons why MM does not hold for banks – tax, asymmetric information, segmented markets (Allen and Carletti (2013)), unique features of bank liabilities in the form of deposits (see DeAngelo & Stulz (2014)). A combination of the limited liability of shareholders and deposit insurance almost certainly makes MM not hold for banks. But many of these factors may mean that while MM does not hold, the private cost of banks using more equity is *not* a true social cost. (This is certainly true if rises in a bank's cost of funding from using more equity arises because of the interaction between limited liability and deposit insurance)⁸.

In some research I did a few years ago (Miles et al 2013) we estimated that the MM offset was about 50%, which would mean that the rise in the weighted average cost of bank funds from a doubling in the use of equity is about 13bp. Even with zero MM offset it is only 25bp – a small fraction of the fall over recent decades in measures of the world real interest rate on relatively safe debt (King and Low (2014)).

Now this is a naïve calculation – it is standard corporate finance 101 – and it does not capture things that are in some ways unique to banks. And even if the cost to banks of having much greater use of equity may not be very large, it might still drive activity to institutions that are not technically banks but do bank-like things. Might it then be that a better way to control risk taking and financial fragility is to use the blunt instrument that nonetheless gets into every corner of the financial system: changes in the general level of interest rates driven by monetary policy committees at central banks?

⁸ We also need to factor in offsetting general equilibrium effects not present in MM that might make the cost of equity lower. One example is the model of Begeau (2015), where a preference for safe and liquid assets by households breaks MM and implies that increases in capital requirements can reduce overall bank funding costs and increase bank lending because of the price effects in equilibrium from scarcity of bank debt.

This gets to the heart of the respective roles of macro prudential policy (which in the Bank of England is set by the Financial Policy Committee, FPC) and monetary policy (where decisions are made by the Monetary Policy Committee, MPC).

My own view is that skewing monetary policy towards trying to stop financial instability problems is, in general, unlikely to be the right answer. Yet many seem to think that the crash showed that having narrower aims of monetary policy – centred around an inflation target – was somehow proved wrong.⁹ I think that view fails to look at the deep reasons for the crash, which to my mind were the existence of excess leverage (too little equity funding) in banks. Excess leverage is not something effectively countered by a general rise in the level of interest rates. Higher interest rates will tend to increase required returns on *both* debt and equity and so it is not at all clear they encourage the use of relatively more equity. Capital requirements – a macro prudential tool – get to the heart of the problem.

I investigated the relative advantages of using monetary policy and capital requirements to address problems of excess risk taking in some recent work with a colleague at the Bank of England, Chuan Du¹⁰. Let me briefly give you the essence of what we found.

Asymmetric information (banks know more about the nature of their assets than those who provide them with debt) and limited liability give banks the incentive to gear up and take on riskier lending projects. Assets are riskier than would be the case if those that provide debt funding to banks could see exactly the nature of the banks' assets and its risks. The reason is that limited liability puts a floor under returns to providers of equity but if things go well they get all the upside. That is fine if providers of debt can gauge the risks. But if they cannot (and surely depositors in banks cannot) this generates inefficient outcomes – risk is higher than it should be and some loans are made which do not have good risk-return characteristics.

Forcing banks to use more equity through higher capital requirements can mitigate some of these moral hazard concerns. Banks become more prudent in their lending criteria because there is more to lose when the project goes sour. But there is a downside. With higher capital requirements, banks will take on fewer lending projects, and some prospective bankers may even be discouraged from forming a bank in the first place.

So according to this logic (spelled out more precisely in Du and Miles) bankers are right to say:

1. For them raising equity is costly; and
2. Imposing a higher capital requirement will reduce aggregate lending.

⁹ In a speech in 2010, Ben Bernanke argued that the Fed's interest-rate policies in 2003-2005 can't explain the size, timing, or global nature of the housing bubble. In a recent blog post on 28 April 2015 Bernanke counters John Taylor's arguments that US monetary policy was a major source of the housing bubble and other financial excesses by arguing it was not too easy during 2003-2005.

¹⁰ See Du and Miles (2014).

Both statements are correct. But both miss the point. There may be **too much** lending in the unregulated state. Equity may look costly to banks but it has an overall beneficial side effect in better aligning the interests of shareholders with those of other claimants on the bank. To put the point another way: there is an inherent tendency in banking markets for there to be excessive risk taking. (I sketch in a more formal way the key mechanism behind this in the Appendix where I also show how monetary policy or capital requirements can be used to get to the right level of risk taking).

In my work with Chuan Du we focused on two policy instruments that could be used to get the right level of risk taking in the financial sector:

1. The risk-free rate of interest on funds placed with the central bank – a monetary policy tool;
2. A leverage ratio cap imposed by the regulator on banks – a macro prudential tool.

We found that these two instruments operate as imperfect substitutes in promoting better lending decision by banks. A tightening of either instrument can improve 'prudence' – by dis-incentivising banks against taking on too much risk; but only at the cost of decreased 'participation' – whereby more banks will choose to forego the opportunity to lend.

One can use a mix of the two instruments. But the trade-off between 'prudence' and 'participation' is different. Our work suggest that on the whole using capital requirements is more efficient as a way to get the level of risk taking right in the economy than using monetary policy (interest rates).

This is the road we have gone down in the UK. We have seen big increases in capital requirements. But we started from extremely low levels of required equity funding for banks, so it is not so clear that even after a ten-times increase¹¹ we have reached the right resting place. For what it is worth, I suspect we have not yet got there (See Miles et al 2013; Du and Miles 2014). The FPC will continue to monitor the appropriate level of capital for UK banks.

Lessons about Monetary Policy: QE, ZLB and deflation

The global recession led many central banks to lower their policy rates to near zero. With the exception of in Japan, this was pretty much uncharted territory for monetary policymakers.

As I noted, Bank Rate had just fallen close to its effective lower bound when I joined the MPC, and asset purchases were just underway. (I will refer to the effective lower bound (ELB) rather than “the zero lower bound” (ZLB), since the effective lower bound may be slightly above or slightly below zero – though likely

¹¹ Carney (2015)

close to it). The predictions from mainstream theoretical macroeconomic models for what would come next were not comforting. They raised concerns about our capacity to stimulate the economy when policy rates are at the effective lower bound and the risks of a liquidity trap. Eggertsson and Woodford (2003, EW) had analysed what happens at such low levels of policy rates and the likely effectiveness of asset purchases. They suggested that on hitting the lower bound an economy could suffer a deep deflation and recession and that asset purchases were not likely to help much. Their analysis suggested that the effective way to avoid deflation in such circumstances would be to commit to future inflation overshooting the target.

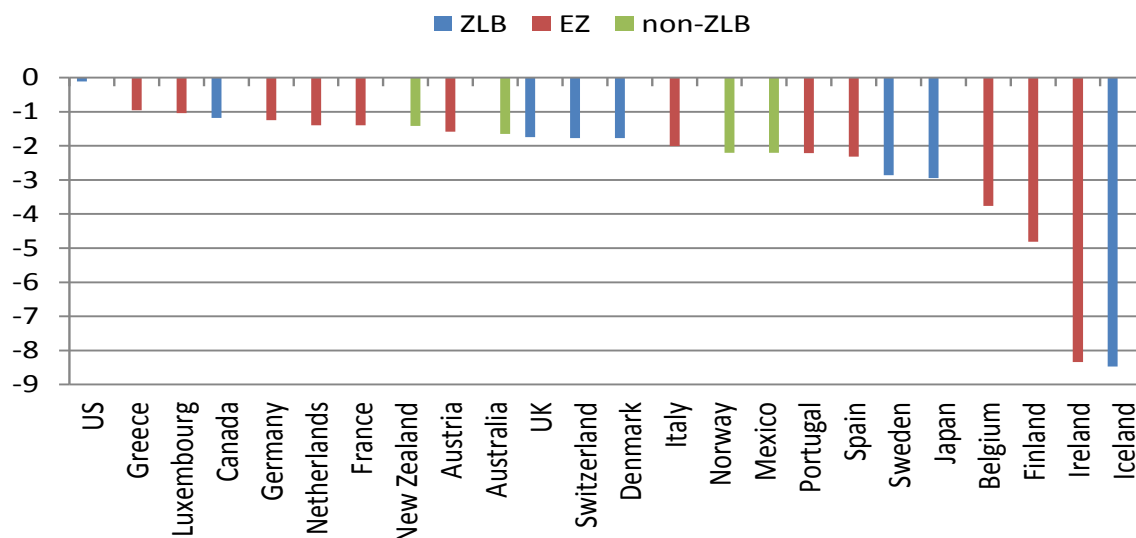
I found these predictions somewhat unrealistic, partly because they hinged on the sensitivity of the timing of spending to shifts in the real interest rate (in economists jargon, that there was a significant inter-temporal marginal rate of substitution), and that the central bank had no more tools to ease policy other than affecting expectations about where it would set interest rates once they came off the floor. In many of these models there was no role for QE to have any effect.¹² But like Bernanke, who even before the recent experience with QE by many central banks was an advocate of its usefulness, I believe that it was an effective tool, particularly at a time of severe market disruptions. As Bernanke famously put it “the problem with QE is that it works in practice, but it doesn’t work in theory” (Brookings Institution (2014)).

I also doubt that there is a deflation cliff at the ELB¹³. The evidence for thinking that deflation risks become great at the ELB is actually quite weak. There were no dramatic deflations among OECD economies (except for Ireland, which saw an exceptionally sharp fall in economic activity), and there was no clear difference in the change in inflation rates between countries that were constrained by the ELB and those that were not. Inflation fell in most OECD countries in 2009, but only a few experienced outright deflation.

¹² Although EW themselves are upfront about our ignorance on how expectations are formed, and hence on how they could be affected by QE.

¹³ More recently, Cochrane (2014) has shown how the EW analysis hinges on arbitrary equilibrium selection mechanism. Cochrane shows that there are (infinitely many) equally valid alternative paths for inflation and output following the onset of a ZLB period using the same framework as EW. His analysis shows that a ZLB deflation cliff is by no means an unambiguous implication of the stylised framework of EW, but rather one possible path and that the difference between them is how expectations are formed. It is an empirical question: what happens to inflation and inflation expectations when the economy hits the ZLB.

Chart 5: Change in CPI inflation between 2008 and 2009

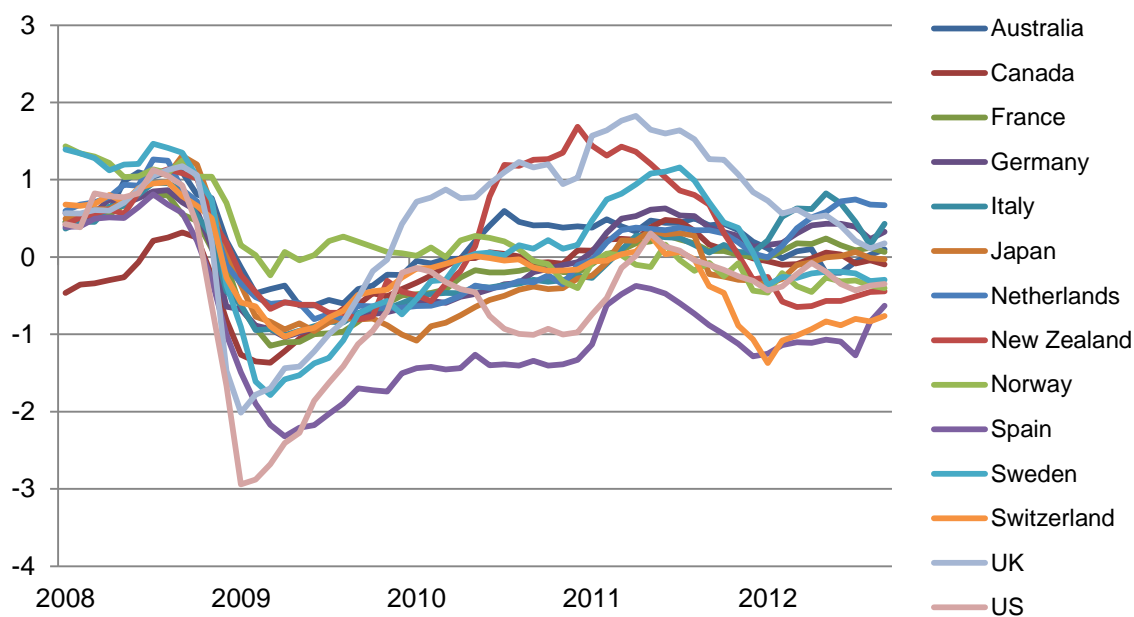


Source: Reuters Datastream

Chart 5 shows the change in CPI inflation between 2008 and 2009. Inflation in Iceland fell by more than 8 percentage points, but it had been 17% for 2008. The only large deflation was in Ireland, with -5.8% for 2009; inflation for the euro zone was 0.9%.

Short term expectations of inflation fell only temporarily; there were no big deflation fears. Neither actual nor expected inflation displayed the deflation cliff at the effective lower bound. Chart 6 shows the difference between the 1-year ahead inflation expectation of professional forecasters and their average inflation expectations over the period 2003-2007. Within 18 months of the crash of September 2008 inflation expectations in most countries have moved back close to their pre-crisis average, and stayed there for the next few years.

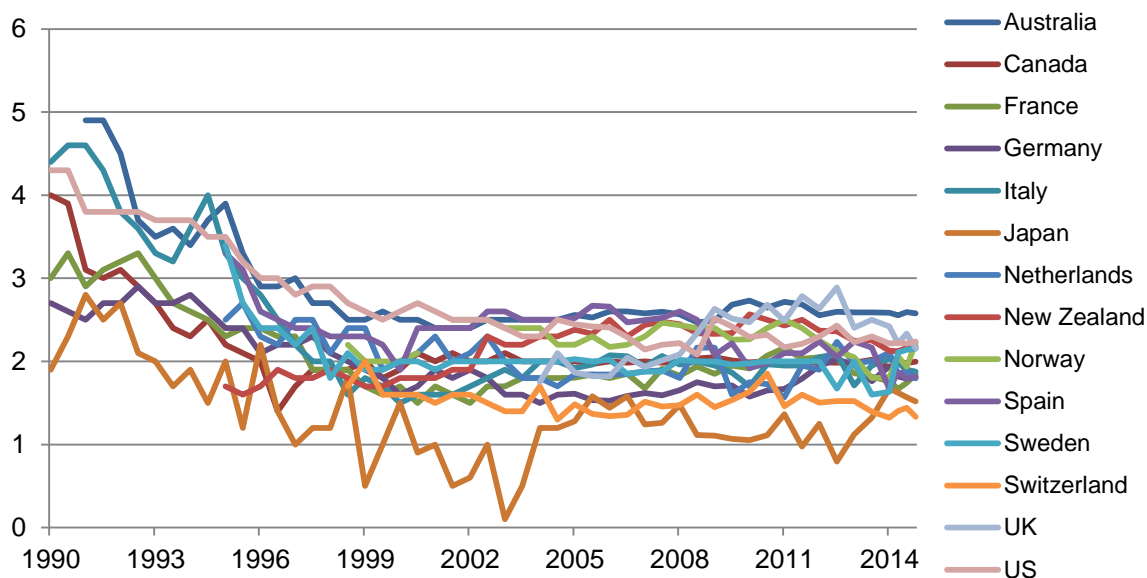
Chart 6: 1-year ahead CPI inflation expectations relative to 2003-2007 average



Source: Consensus Economics

Chart 7 shows economic forecasters' expectations of average inflation over a five year period starting in five years. With the exception of Japan's de-anchoring of inflation expectations well ahead of the global recession, there has been no substantial change in long term inflation expectations: they are all within 0.5 p.p. of their 2003-2007 averages (except for Spain, which has been between 0.5 and 1 p.p. below).

Chart 7: 5-year, 5-year CPI inflation expectations

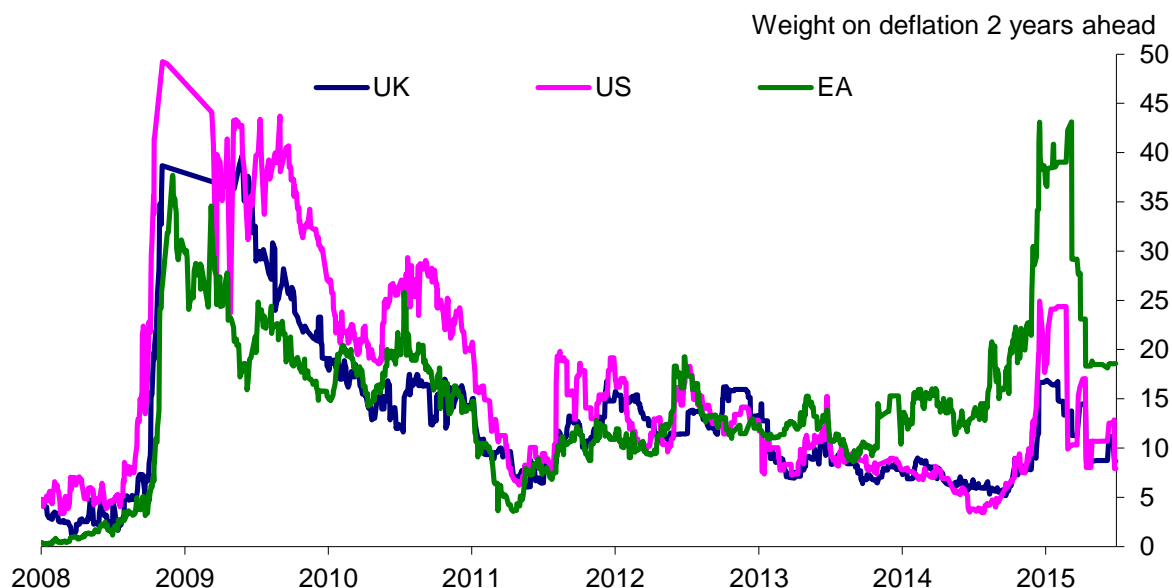


Source: Consensus Economics

Countries that aggressively eased monetary policy, by cutting interest rates sharply and adopting QE, showed few signs of de-anchoring in long term inflation expectations.

In the UK and in the US the implied probability of deflation two years ahead (based on option prices) fell rapidly after monetary policy was eased aggressively in early 2009. Even though UK inflation is now close to zero the implied market probability that it should be negative two years ahead is under 10%. (Chart 8).

Chart 8: Implied deflation probabilities from option prices¹⁴



Source: Bloomberg and Bank calculations

The near term for monetary policy

Even though I think the deflation risks are much exaggerated, we still have to deal with the aftermath of the financial crisis.

In the UK we have set an uber expansionary monetary policy to offset the hit to demand and the shocks to the cost (and availability) of borrowing for companies and households. The big policy question is for how long should we keep policy at this setting. In the UK we are now in a much better place than we have been: unemployment is down to just under 5.5%; annualised GDP growth has been near 3% for several quarters; consumer and business confidence has risen sharply over the past year or so; the household saving rate is

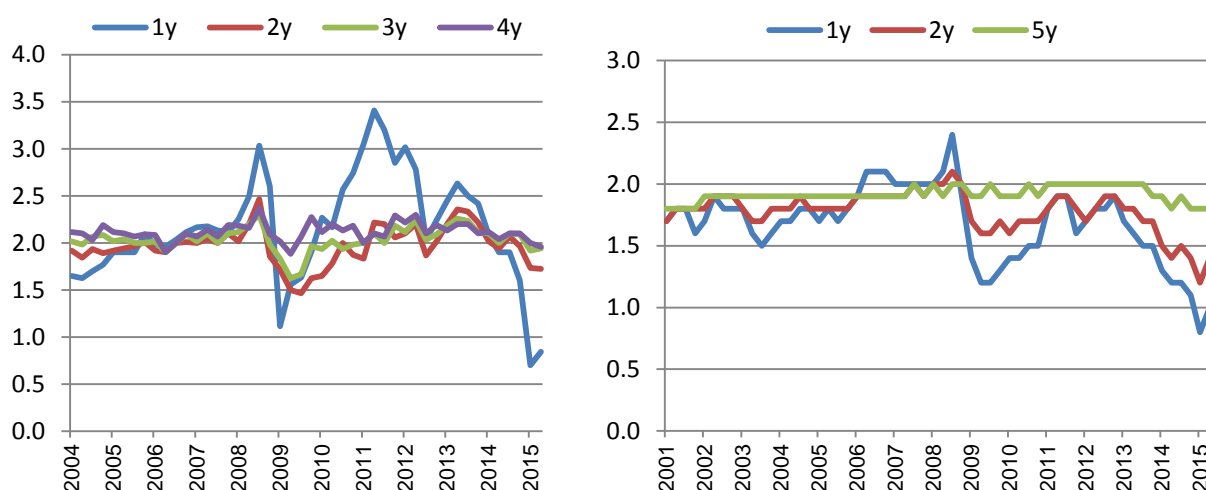
¹⁴ Caveat: The UK inflation options are based on RPI rather than CPI inflation. We assume market participants think there's a wedge of around 1pp between the two measures in the long run, so the UK line shows the weight on RPI being below 1% (i.e. negative CPI). But that's likely to be a strong assumption as, if Bank Rate is cut when the risk of deflation is high, one might expect RPI to fall by more than CPI as a consequence of the mortgage interest payments component of RPI (as we saw in the crisis). This may bias upwards our measure of the weight placed on deflation in the UK relative to that for the US and euro area.

low and suggests that spending is not being held back by expectations of low near term inflation; wages are rising; the availability of finance has increased and its cost fallen; corporate profitability looks solid.

It is not all good news. There are clear risks and a sudden return to a more normal level of interest rates is not very sensible. But one risk I think is very much overplayed - the risk of deflation and the problem of being without monetary tools to deal with it. I have already discussed the (lack of) evidence for a deflation cliff near the lower bound for interest rates. Is there yet a significant risk that being near the lower bound with low inflation can lead to de-anchoring of inflation expectations and a downward deflationary tendency?

There is not much evidence from recent levels of inflation expectations in the UK that this is a substantial risk.

Chart 9: Term structure of inflation expectations in UK (left) and Euro Area (right)



Source: HMT Survey of Professional Forecasters, ECB Survey of Professional Forecasters

Chart 9 shows that inflation expectations 2, 3 and 4 years ahead in the UK are close to the inflation target. The drift in short term expectations in the euro area has been somewhat more pronounced, though expectations of inflation five years ahead are only 0.1 p.p. below their pre-crisis average. To my mind there are no clear signs that the recent low inflation – driven significantly by falls in commodity prices that boost spending power – are creating significant risks of self-perpetuating deflation. I think it has been right to leave monetary policy unchanged as inflation in the UK fell sharply to zero and even dipped beneath it, just as it was right not to change policy when inflation temporarily rose to above 5 percent in the Autumn of 2011. “Don’t just do something, stand there... (and think)” has not been such a bad piece of advice.

Where might the path of Bank Rate be heading?

By early 2018 – according to our May Inflation Report central forecast – the UK economy will have been growing at about its long run average rate for the best part of 4 years; spare capacity will have long gone, and the impact of commodity price changes and exchange rate changes will have largely fallen out of the inflation figures. 1.3% was the level of Bank Rate for early 2018 implied by market yields at the time of the May Inflation Report. At that level of Bank Rate, would inflation be steady at close to target or instead rising away from it?

That question could be couched in terms of so called r^* (the appropriate interest rate to keep inflation on track and demand in line with productive capacity) or about persistent headwinds to demand. I can see a set of factors that would make you think that the appropriate level of Bank Rate consistent with the target then (early 2018) was significantly lower than in the past – some of these factors are global, some much more UK specific.

Let me mention 4, not entirely independent ones, and consider how big they might be 3 years from now

1. Higher credit spreads
2. Fiscal headwinds
3. Secular stagnation – which is to some extent a global phenomenon
4. Demographics

Credit spreads – Credit spreads are higher than they were in the years leading up to the crash. But they have fallen sharply over recent years (Charts 1, 2 and 3). My own assessment of this factor is that it is now worth maybe 50-75bp when turned into a Bank Rate equivalent, and that is relative to the 1997-2007 average.

Fiscal headwinds – Estimating how great a drag on growth fiscal adjustments have been is fiendishly difficult, in part because it involves specifying a counterfactual path for taxes and spending. Using Bank economic models I estimate that if the government sticks to its budget plans by 2018 fiscal headwinds might have knocked about 0.9% off the level of output. Fiscal policy may be dragging on annual growth by around 0.2 – 0.3% in each of the next three years. To offset that, Bank Rate might need to be around 75bps lower.

Global secular stagnation – One version of this is presented by Summers (2015) which states that the desire to save relative to the incentive to invest will be persistently greater than it used to be. It's not clear why this would be so, and I am doubtful it holds in the UK. We have a low household saving rate and it has been on a falling trajectory for the past few years. UK investment has been weak but we have had slack in the economy, and that will probably be largely gone by 2018. It is very hard to know how much of the very low level of real interest rates across the world in recent years is a temporary (albeit quite persistent)

phenomenon and how much is due to secular stagnation. Maybe it is nonetheless as big a head wind in the UK as fiscal drag. It is hard to tell. If that were right we should knock another 50 to 75bp off the old r^* .

Demographics – The effect on savings of demographic transitions has also been invoked as a major factor for explaining falling real interest rates. Carvalho & Ferrero (2015) present a model in which the aging population, particularly through increasing longevity, leads to a decrease in r^* and argue that empirically it can explain Japan's persistent deflation experience. I am sceptical about the effect of demographics, particularly in explaining a large change in r^* in such a short period. And the demographic trends in the UK are nowhere near as pronounced as in Japan or some other European economies.

Now this is all rather subjective and back of the envelope. But taking my crude estimates of how much the equilibrium neutral interest rate might have fallen it adds up to between 175bp and 250bp. That is what one might knock off the old neutral Bank Rate, which I think was somewhere around 5% (nominal). That would give one a range for nominal r^* at the start of 2018 of between about 2.5% and a bit above 3%. This is some way north of the conditioning assumption used at the time of the May Inflation Report of just under 1.5%.

One has to be humble here; no one should feel certain of the right answer. As always there are unpredictable things that can have a significant impact on the appropriate monetary policy; no-one today can be at all sure how recent events in Greece and China will impact the UK. But r^* a couple of years down the road is, to my mind, clearly higher than 0.5%, though likely significantly below the old "normal". If you pushed me for a figure I would say 3% or so. And a gradual path to that level is what I would choose if I had to set the path of Bank Rate now; and by "gradual" I do not mean that it takes 10 years to get there.

But of course we don't have to fix a path for Bank Rate – the MPC sets today's Bank Rate. Yet waiting too long to start on a path back to a more sustainable rate is a bad mistake. What you really need to avoid is sharp rises in interest rates. The cost of raising interest rate sharply is particularly high in the UK, where a large proportion of household debt is in the form of variable interest rate mortgages and where many people would struggle to adjust to sudden and significant rises in monthly payments. Given that, and given that many of the after effects of the mess of 2008 do seem to have faded (e.g. the drying up of bank credit), I think a first move up in Bank Rate soon is likely to be right. I do not attach great weight to the idea that starting this process will create great risks of dropping back into very weak growth, falling into negative inflation and engendering a splurge in risk avoiding behaviour. I attach more weight to the risks of waiting too long and then not being able to take a gradual path to a more normal stance for monetary policy.

One thing the MPC will not do (and never has) is just follow another big central bank; it is a daft idea that we cannot raise rates in the UK before the US and also cannot be long behind them.

The time to start normalisation is soon; that is not something to shrink from. I have been called a "dove" in the past, even an "arch-dove" so some might think it bizarre for me to say this. But they should not; the

“hawk – dove” labels are pretty silly because they suggest some unchanging genetic tendency towards favouring one type of policy; anyone who was like that would be very ill suited to be on the MPC. In some ways the “doves and hawks” stuff is just a harmless shorthand; but there are times when it is (as H L Mencken rather nicely put it) a geyser of pish-posh. As conditions change you change your view on what is right; and things have changed a lot in the UK in the past year or so and very largely for the better. Now is closer to the right time to start a gentle amble back towards a more normal setting for monetary policy.

Conclusions:

1. The best way to handle the risks of incurring huge costs from another financial crisis is to control leverage in the financial sector.
2. Using interest rates to do that is not as efficient as the more direct route of using capital requirements; there is not a strong case for having monetary policy routinely directed towards preserving financial stability.
3. There is little evidence that the risk of deflationary spirals become very large at interest rates close to the effective lower bound.
4. We are now close to the time when it is appropriate to raise rates.

References

- Allen, F. and E. Carletti (2103). "Deposits and Bank Capital Structure", working paper Imperial College London.
- Begenau, J. (2015). "Capital Requirements, Risk Choice, and Liquidity Provision in a Business Cycle Model", Harvard Business School working paper.
- Bernanke, B. (2010). "Monetary Policy and the Housing Bubble", <http://www.federalreserve.gov/newsevents/speech/bernanke20100103a.htm>
- Bernanke, B. (2015). "The Taylor Rule: A benchmark for monetary policy?", <http://www.brookings.edu/blogs/ben-bernanke/posts/2015/04/28-taylor-rule-monetary-policy>
- Brookings Institution (2014). "Central Banking After the Great Recession: Lessons Learned and Challenges Ahead: A Discussion with Federal Reserve Chairman Ben Bernanke on the Fed's 100th Anniversary." January 16, 2014; <http://www.brookings.edu/events/2014/01/16-central-banking-after-the-great-recession-bernanke>.
- Carney M, (2014), The future of financial reform. Speech given at the Monetary Authority of Singapore Lecture, 17 November 2014. <http://www.bankofengland.co.uk/publications/Pages/speeches/2014/775.aspx>
- Carvalho, C. and A. Ferrero (2014). "What Explains Japan's Persistent Deflation?", unpublished working paper University of Oxford.
- Cochrane, J. (2014). "The New-Keynesian Liquidity Trap", mimeo U. Chicago.
- DeAngelo, H. and R. Stulz (2014). "Liquid-Claim Production, Risk Management, and Bank Capital Structure: Why High Leverage is Optimal for Banks", working paper.
- Du C. and Miles D. (2014). "Interaction between Monetary Policy and Regulatory Capital Requirements", CEPR Discussion Paper No. 10200, www.cepr.org/active/publications/discussion_papers/dp.php?dpno=10200
- Eggertsson, G. and M. Woodford (2003). "The Zero Bound on Interest Rates and Optimal Monetary Policy", *Brooking Papers on Economic Activity*, 1.
- IMF *World Economic Outlook* (2012), Chapter 3, April.
- Joyce, M., D. Miles, A. Scott and D. Vayanos (2012). "Quantitative easing and unconventional monetary policy - an introduction", *The Economic Journal*, Vol: 122,
- King, M. and D. Low (2014). "Measuring the World Real Interest Rates", NBER working paper 19887.
- Mian, A. and A. Sufi (2010). "Household Leverage and the Recession of 2007–09", *IMF Economic Review*, vol 58.
- Mian, A. and A. Sufi (2011). "House Prices, Home Equity-Based Borrowing, and the US Household Leverage Crisis", *American Economic Review*, vol 101
- Mian, A., K. Rao and A. Sufi (2013). "Household Balance Sheets, Consumption, and the Economic Slump", *Quarterly Journal of Economics*, vol 128.
- Miles D, Yang J, Marcheggiano G, (2013), Optimal Bank Capital, *The Economic Journal*, Vol:123, ISSN:0013-0133, Pages:1-37
- Summers, L. (2015). "Reflections on Secular Stagnation", Speech at Julius-Rabinowitz Center, Princeton University February 19. <http://larrysummers.com/2015/02/25/reflections-on-secular-stagnation/>

Titman, S. (2013). "Financial Markets and Investment Externalities", *Journal of Finance*, vol 68.

APPENDIX:

Here is a simple model to illustrate the tendency for unregulated outcomes to create too much risky bank lending.

Suppose every bank has the opportunity to invest in a portfolio of loans that will provide a good-state return (y_h) with probability p , and a bad-state return (y_l) with probability $1 - p$. Assume that the probability of success (p) is uniformly distributed between the interval $[0,1]$. Banks can find out that probability before they lend. Each bank's probability of success p_i is a private signal known only to itself that cannot be credibly communicated to its depositors. Depositors are nevertheless aware of the probability distribution for p and are capable of figuring out the incentives involved. All agents are risk neutral, and have access to a risk-free Central Bank deposit facility which remunerates funds at the policy rate $1 + r$.

Let e denote the equity of a bank as a percentage of its total assets. This is perfectly observed by depositors. Normalising total assets to 1 means that a bank with e_i will need to raise $(1 - e_i)$ in deposits. It does so by offering a promised rate of interest to depositors (R) that is greater than the outside option available (r). We assume further that in the bad state a bank would not be able to honour its debt obligations, such that depositors will only get y_l instead of the promised return $(1 - e)(1 + R)$ – in other words holders of bank equity have limited liability. Given the presence of both asymmetric information and limited liability, it can be shown that the promised rate on deposits (R) will be a function of a bank's capital (e), and that banks with lower starting capital are more prone to excessive risk taking.

For banks to be maximising their profit the following condition holds:

$$\hat{p}(y_h - (1 - e)(1 + R)) = e(1 + r)$$

Where \hat{p} is the lowest acceptable p for the bank to actually engage in lending. If $p_i < \hat{p}$ then the bank would prefer to forego the opportunity to lend and simply deposit its funds at the central bank facility. Note that \hat{p} will be a function of e .

Depositors will require the following condition to hold:

$$\frac{(1 + \hat{p})}{2}((1 - e)(1 + R)) + \left(1 - \frac{(1 + \hat{p})}{2}\right)y_l = (1 - e)(1 + r)$$

Where $\frac{(1+\hat{p})}{2}$ is the depositors' conditional expectation of p given that $p > \hat{p}$. The left hand side of this equation is the expected return on bank deposits; the right hand side is what money deposited at the central bank earns.

So we have two equations, and two unknowns \hat{p} and R (both non-linear functions of e).

A numerical illustration:

Suppose banks start out with capital of 2.5%. The good-state outcome on bank lending is 1.15; the bad-state outcome is 0.75; and the safe rate available at Bank of England is 5%.

What is the efficient outcome?

The first-best threshold \hat{p}_{fb} (the cut-off point for p if banks were 100% equity funded, or if p was perfectly observed by households) is defined by:

$$\hat{p}_{fb} \times (1.15) + (1 - \hat{p}_{fb}) \times (0.75) = 1.05$$

So $\hat{p}_{fb} = 0.75$. Ideally any lending which has a probability of success less than this level will not be done. So the average p of all banks engaged in lending activities (the conditional expectation of p given that $p > \hat{p}$) is 0.875, which is half way between the lowest acceptable success probability of 0.75 and the best possible of 1. This means about 12.5% of loans do not pay off in full. That is the efficient level of risk-taking, it is what we would want banks to do.

What level of p do banks find acceptable given asymmetric information and limited liabilities?

For simplicity, suppose for now that depositors are unsophisticated and will only demand a promised interest rate of 5% on deposits (the same as the risk-free rate at the central bank). Then at a gearing of 40 (=1/0.025), the answer is:

$$\hat{p} \times (1.15 - (0.975) \times (1.05)) = 0.025 \times (1.05)$$

So \hat{p} is only 0.21 ! The average p observed in the banking sector is then only 0.6 (half way between 0.21 and 1), so that fully 40% of loans do not pay off in full. This is hugely more risky lending than is optimal.

Now this assumes dumb behaviour of depositors. So suppose depositors are smart and risk-neutral. What would the equilibrium then look like? (i.e. What is the solution when you solve the two non-linear optimality conditions?)

The calculations involved are a bit more complicated (and this is what Du and Miles (2014) is all about). But the answer is that the lowest acceptable p at a level of equity funding of 2.5% of total assets (so a leverage ratio of 40) is 0.55. This means the average success rate on loans is 78% – much lower than the right degree of risk-taking which would make the proportion of loans that pay off in full about 88% (the first-best scenario).

This leads to the simple thought experiment, what happened when either r or e is increased? Here is what happens when you raise e :

e	Average p	R
0.025	0.78	13.1
0.05	0.79	11.7
0.075	0.81	10.6
0.1	0.82	9.7
0.125	0.83	8.9
0.15	0.84	8.1
0.2	0.86	6.9
0.25	0.87	5.8

We get nearer to the “right” answer for the average success probability observed in the banking sector (0.875) by raising e . If we get e up to 10%, the average p becomes 82% and R drops from over 13% to under 10%. If we go for 20% equity funding the average p is now close to the efficient level (86% relative to the first-best level of 87.5%); the rate that is offered on deposits now falls to 6.9%.

How about using monetary policy to get the right level of risk taking in the banking sector? The table below shows the impact of raising the rate set by the central bank above its assumed neutral level of 5% (leaving leverage at 40).

r	Average p	R
0.05	0.78	13.1
0.06	0.8	13.4
0.07	0.82	13.7
0.08	0.84	13.9
0.09	0.86	14.1
0.095	0.87	14.2
0.05	0.78	13.1
0.06	0.8	13.4

At 6% the proportion of good loans raises to 80%, but the interest rate banks need to offer on deposits goes up to almost 13.5%. To get the proportion of good loans up to 86% (something which could be achieved at an unchanged interest rate but with a capital requirement of 20%) means the central bank needs to raise the interest rates from 5% to 9% and the interest rate offered on bank deposits has to be just over 14%.

In practice one can use a mix of monetary policy (raising r) and capital requirements (raising e). Our work suggest that on the whole using a lot higher equity requirements and not using r much is best for overall economic activity.