BANK OF ENGLAND

Speech

It pays to be paranoid: the importance of fiscal space

Speech given by

Richard Sharp, Member of the Financial Policy Committee, Bank of England

University College London

Thursday 30 November 2017

The views expressed are those of the speaker, not those of the Bank of England or the Financial Policy Committee. The FPC has not discussed and does not have a formal position on the issues discussed in this speech. As set out in the FPC Communications Code, on topics where the FPC has not reached a formal position, members are free to express their views publicly.

It is indeed a great pleasure for me to be here at UCL this evening. As it happens I'm indebted to this institution for educating members of my family and I fully appreciate that it is recognised as one of the finest universities in the world. I believe its eminence is in no small part due to the values with which it is imbued. It is clear that many of those, although ahead of their time when UCL was established, are now the common values which permeate every reputable organisation around the world – including the Bank of England. In particular, UCL was the first university in England to admit students on merit without regard to race, religion, class or gender. As you well know, it famously owes its inspiration in this respect to Jeremy Bentham whose body, and body of works, you possess. A founder of utilitarianism whose precepts we in some way still follow in our cost-benefit analyses, he was a forerunner in understanding the importance of institutions of state embracing transparency.

He cautioned that "*secrecy being an instrument of conspiracy ought never to be the system of a regular government*". Consistent with Bentham's philosophy, the Governor of the Bank of England, Mark Carney, speaking in Liverpool a couple of weeks ago, said "*we are helping to make discussions of the economy more accessible"* and that "*we are doing this to make the Bank more open and accountable*".[1]

Which leads me to my presence this evening. I serve as an external member of one of the Bank's policy-making committees, the Financial Policy Committee (FPC). I'm conscious that although we make decisions over peoples' lives we are, for practical purposes, unknown. Moreover, I am aware that although our mandate – the maintenance of financial stability in the United Kingdom – is of the utmost importance, few outside the Bank itself and the Treasury Select Committee are aware of the personal views individual members have.

Why is financial stability important? Financial stability is essential for economic growth; the very perception of present and future financial stability encourages investment and therefore makes a vital contribution to national welfare. Hence, tonight I am seeking to discuss the risk to financial stability arising from UK indebtedness; and to explain to you why that now, ten years after the global financial crisis, it may be a matter of concern. But before I speak about debt, let me give you a brief overview of the FPC.

It was the global financial crisis which was the catalyst for the creation of the FPC. The UK's system to guard against financial instability which had been in existence before the crash – the "Tripartite system" involving the Treasury, the Financial Services Authority (FSA) and the Bank of England – had demonstrably failed. The success of the Bank of England's independent control of monetary policy inspired the change which was deemed necessary: to place the tools and responsibility within a single institution – the Bank of England.

Within the Bank of England, the newly created Prudential Regulation Authority took over the FSA's responsibility for microprudential regulation and bank supervision. The Government also decided to locate within the Bank of England a sibling committee to the existing and successful Monetary Policy Committee

[1] Carney (2017)

(MPC): the Financial Policy Committee. Parliament has tasked it with identifying, monitoring and taking action to remove or reduce risks to the financial system, and, subject to that, supporting the Government's economic policies, including its objectives for growth and employment.

The MPC having been seen to benefit from the presence of external members, it was felt appropriate that the FPC should similarly include external members. I am one of those members, having been on the Committee since its formal inception and now being midway through my second three-year term. In particular, external members should work towards preventing the presence of institutional group think.

This institutional group think was held to be one of the failures of the prior regulatory system. Hence, we have found that Parliamentarians have rightly challenged the external members, in particular, to be vigilant to avoid group think wherever possible and appropriate. In this context, I commend to you the recent remarks on group think and the inherent difficulties in balancing diversity with committee effectiveness made by Martin Taylor, a fellow external FPC member.[2]

As Martin pointed out, a feature of the FPC enshrined in statute is that unlike the MPC it must seek wherever possible to make decisions by consensus. It logically follows from this that as a Committee we should seek to speak with one voice and to that end the sole spokesperson for the committee is the Chairman of the Committee: the Governor of the Bank of England. Hence my comments tonight are not the view of the Bank, nor the view of the FPC – they are my personal opinions alone. I would like to emphasise this point.

It was Gordon Brown as Chancellor who decided some twenty years ago that the Bank should have independence. In his memoirs he writes "*the argument that convinced me independence was essential was a basic one – that for too long in Britain, political expediency had dominated economic decision making. Too often interest-rate decisions were made cynically for the here and now to deal with a political problem or in response to just one economic event. An operationally independent Bank would depoliticise the process. The long term would take precedence over the short term […] The overriding priority was to move Britain from its post-war stop-go economic volatility towards a new macroeconomic stability*." [3]

Since then, the Bank of England has built and cherished its credibility and trust. This trust rests on its impartial, apolitical approach to fulfilling its mandates. But while the monetary policy mandate operates within precise parameters delivered by the Chancellor, inevitably given its nature, the financial stability mandate is vaguer and less objective. That said, we do know that the cost of the financial crises has been immense. Had the UK economy grown at its pre-crisis trend, it would be 14% bigger than it is now (Chart 1). That is about £272bn, somewhat larger than the size of the Scottish, Welsh and Northern Irish economies combined.[4] There should be no doubt: it pays to be vigilant.

[2] Taylor (2017)
[3] Brown (2017)
[4] As measured at gross value added (GVA). GVA + taxes equals GDP. ONS (2016)

When considering financial stability risks and indebtedness, I entirely agree with Alan Blinder and Willem Buiter that central banks should "stick to their knitting" and avoid engaging in the political aspects of fiscal policy.[5] For my part, I fully recognise that it is not for a member of the FPC to get into these issues because they are for the Government to resolve.

But I do not regard it as beyond our remit to engage with the financial stability risks emanating from long-term fiscal strategies. As the wise Stanley Fischer admonished us at a conference celebrating the independence of the Bank last month: "never say never".[6] In this light, it is not inappropriate for an FPC member to explore the implications of our debt position for the financial system's resilience to economic shocks or adverse market movements – just as it is for the Office for Budget Responsibility (OBR), which I will address later, to consider the risks to the UK's fiscal position.

The aftermath of the financial crisis shows just how valuable fiscal space – the capacity for the government to use fiscal policy in a crisis – can be. The FPC also contributes to the protection of fiscal space. For example, by raising the resilience of banks and putting their investors on the hook for losses we have replaced the risk of public bailout.

Why do I have concerns about the threat to our financial stability arising from our national indebtedness? For three reasons:

- First, the level of debt in the UK and across the world has increased considerably since the global financial crisis; in this context, given that the UK is a very open economy it is worth remembering that it is vulnerable to spillovers from the rest of the world. External financing and demographics present additional challenges.

- Second, a highly indebted government has less capacity to react to crises: we cannot assume that further shocks do not materialise; and, evidence demonstrates that fiscal space is a vital national resource to have available to counteract such a shock. Reducing fiscal space, therefore, means financial stability is harder to achieve.

- Third, in seeking to address unsatisfactory real growth prospects, the need for spare debt capacity should not be underestimated. The uncertainty inherent in assessing financial stability risks also makes it difficult to get this trade-off right.

[5] Buiter (2015) and Alan Blinder's presentation at the Riksbank in 2016.
[6] Fischer (2017)

Debt in the UK and the world

Let us first look at national and international debt positions and how we got there. Historically, the UK has faced elevated levels of national debt measured against GDP as a result of wars, this being true in the 18th, 19th and 20th centuries (Chart 2). For example, after World War 2 debt exceeded 200% of GDP. The UK has typically addressed this challenge through inflation, ie devaluing debt, and real economic growth, which has increased debt manageability. Interestingly, only a handful of years since WW2 actually showed a fiscal surplus, ie 'paying off' debt.

The global financial crisis led to UK net borrowing that was unprecedented in the post-war era: 9.9% of GDP in 2009 (Chart 3). Since the crisis cumulative incremental borrowing has amounted to over £1 trillion (Chart 4), leading to a debt-to-GDP level of 85.8% – that is just over £1.7 trillion – in the 2016/17 fiscal year.[7] What matters is the ability to serve this debt. Net debt interest payments of £35bn per year at present are forecast to reach £42bn in five years' time.[8] Looking at the interest payments excluding the interest the Bank of England returns to the Government on the Bank's gilt holdings, shows that debt servicing costs over the last few years have been the highest for a generation – and that is despite the benefit of borrowing at historically low interest rates (Chart 5).

Flexing assumed interest rates is instructive. Chart 6 shows the OBR's forecast of net interest payments, assuming the average interest rate on the national debt was at the levels seen in 2007 and 2000: roughly 5% and 7% respectively. In these scenarios interest repayments would reach about £70bn and £100bn in today's money in 2021-22 based on the anticipated debt level at that time. To make this somewhat more tangible: at these interest rates, interest payments would considerably exceed the planned government spending on infrastructure, defined as total public sector net investment. To you and me, that's building schools, roads, houses, and hospitals, as well as investing in new equipment in the public sector, say for the NHS or national defence.[9]

There are two factors that may mitigate the impact of any rise in interest rates in the UK. The first is that UK government debt has by far the longest average maturity among comparable developed countries (Chart 7). This means any increase in yields on newly issued bonds will take time to feed through to the average interest rate paid on total UK debt. If we assume yields returned now to those seen in 2000 – an increase of about 4 percentage points – debt repayments in 2021-22 would be about £55bn in today's money.

The second factor to consider is that higher yields may be associated with higher economic growth, making debt more manageable. Chart 8 maps nominal GDP growth and 10-year gilt yields since the 1950s. What becomes immediately apparent is that rising interest rates have historically been associated with higher

[7] See the OBR's Economic and Fiscal Outlook – November 2017.
[8] Ibid.
[9] House of Commons Library (2017). Public sector net investment is net of depreciation – ie wear and tear – of the existing capital stock.

nominal GDP growth. In fact, nominal GDP growth had been higher than the government's borrowing cost until 1980. This has helped to reduce the very high post-war debt-to-GDP ratio.

But the picture since then has looked different: though the trend has been one of falling yields, they have frequently been above nominal GDP growth for prolonged periods, especially after recessions when borrowing needs were highest. So, even though economic growth and yields tend to move up or down together, we cannot necessarily assume that higher yields will always be compensated for by higher growth.

Turning to the global picture, total pre-crisis government debt, which was then approximately $28 trillion, had risen to $50 trillion by 2015. Unfortunately economic growth has not kept pace: total government debt stood at 63% of global GDP in 2006 and by 2015 had risen to approximately 80% (Chart 9). This increase is in contrast to household debt: whereas household debt was fuelling the asset bubble and debt fragility leading up the global financial crisis, it has declined since the crash as a proportion of GDP. The picture varies by country (Chart 10). Perhaps particularly interesting in this context is China as it was largely Chinese growth that supported the world economy during and after the financial crisis, contributing around 30% of world GDP growth since the crisis (Chart 11). Total debt in China, private and government, has increased more than in any G7 country since the crisis – up until 2015 this had grown to $25tn. The FPC has identified this rapid growth as a risk to financial stability.[10]

I have focused so far on debt as a percentage of GDP, which is how it is usually cast. But this may mask differences in different countries' ability to raise tax revenues. Chart 12 shows that the debt burden has increased significantly as percentage of annual tax revenues. The UK went from the lowest debt-to-income ratio in our peer-group of G7 countries to middle of the pack. It may be worth noting that on this metric, we, and most other G7 countries, are in debt positions similar to reported Greek national debt in 2006.

Naturally, borrowing rates may not stay low. Though forward rates indicate that market interest rates are expected to stay low for some time, we need to recall that markets can be wrong in their assessments. Countries that need to sell debt externally are particularly exposed to the risk of a loss of financial credibility, consequent rising market risk premia, and a market driven spiral into debt unsustainability. As an example of this, it is worth recalling that it was only five years ago that Portugal was threatened by interest rates of 14 percent – even though the ECB's risk-free interest rate was then at record lows (Chart 13).

Even countries that borrow a negligible amount of money from abroad, such as Japan, face challenges that could test debt sustainability. The demographic shift of an ageing and shrinking population attacks government budgets on two fiscal flanks: simultaneously reducing tax revenue and increasing expenditure. The 'old age dependency ratio' – the proportion of the working age population to the elderly – is forecast to

[10] Financial Stability Report (2017)

decline in all major advanced economies (Chart 14). Using the latest numbers available, accounting for our pension payments as a contingent liability adds 320 percentage points to the UK debt-to-GDP ratio.[11]

Fiscal space

Evidence has demonstrated, and broadly economists agree, that fiscal intervention has a positive multiplier effect immediately after an economic shock. This seems intuitive considering that unemployed resources are readily available to stimulate economic growth. Astute fiscal intervention should have a positive effect in engaging those available, but unemployed, resources to stimulate GDP growth. This is especially the case if monetary policy is constrained.[12] Paul Krugman, for example, has repeatedly made this argument eloquently and convincingly.[13]

At the Jackson Hole Economic Symposium this year, Auerbach and Gorodnichenko provided an empirical underpinning to the logical theory that fiscal stimulus can be valuable in a recession. They find that compared to the baseline of no stimulus, debt-financed fiscal expansion in a crisis can sufficiently stimulate GDP to lead to a lower ex-post debt-to-GDP ratio. Note the stress on 'crisis'; they do not find a similar effect in normal times.[14]

Following this line of thought, it makes sense that entering a crisis with sufficient fiscal space can have a sizeable impact in protecting an economy. Romer and Romer in a paper produced last month examined how the scale of monetary and fiscal policy space affects the aftermath of the crisis. "*The decline in output is less than 1 per cent when a country possesses both types of policy space but almost 10 per cent when it has neither*" they write.[15]

However it is by no means a universally accepted hypothesis that the long-term effect of fiscal intervention is positive. The respected and authoritative economist Robert Barro for example alerts us to the risk that the negative fiscal multiplier associated with debt repayment can outweigh the positive multiplier effects of the initial expenditure. Barro's seminal work on Ricardian Equivalence implies that the fiscal multiplier associated with deficit spending is reduced even in the short term as the private sector makes cutbacks in anticipation of future higher taxes – in this view, deficit spending has the same effect on overall growth as raising taxes by the same amount.[16]

That said, the balance of economists, including Barro, debate a fiscal multiplier between zero and one for debt-financed stimulus outside of crises. It tends to be higher in relatively closed economies with small

[11] Numbers as of 2010. ONS (2012)
[12] DeLong and Summers (2012)
[13] See, for instance, https://krugman.blogs.nytimes.com/2015/09/15/keynesianism-explained/
[14] Auerbach and Gorodnichenko (2017)
[15] Romer and Romer (2017)
[16] Barro (1974). Ricardian Equivalence holds under the assumption – *inter alia* – that taxes are non-distortionary. It also leaves open what the money is spent on, eg to stimulate demand or increase potential supply. This means deficit spending under Ricardian Equivalence *per se* does not have a fiscal multiplier associated with it, as it depends on what the money is spent on.

automatic stabilisers, such as the US, than in open economies with larger automatic stabilisers, such as the UK.[17]

The effectiveness of fiscal stimulus may also be impaired when debt is already high, reducing the fiscal multiplier. Research at the European Central Bank and the IMF, for example, suggests that the higher debt-to-GDP ratios, the less effective any additional stimulus becomes.[18] This is intuitive: the private sector is more likely to cut consumption and investment the more worried it is about high government debt levels. This intuition is further supported by Coenen et al, who find that the more persistent stimulus becomes the less effective it is relative to short-term fiscal measures.[19]

More generally, we are all familiar with the work of Reinhart and Rogoff regarding the effect of the level of debt on growth. Notwithstanding its statistical reworking, it continues to highlight that the debt overhang when national debt-to-GDP hits 90 per cent has the potential to undermine economic growth. Further work focused on the EU finds a similar "turning point". Mencinger et al "*calculated that the debt-to-GDP turning point, where the positive effect of accumulated public debt inverts into a negative effect, is roughly between 80% and 94% for the 'old' member states".*[20] All else equal, lower economic growth undermines financial stability as banks find it harder to build capital, borrowers to repay loans, and investors seek higher yields, and therefore riskier investments.

Collard et al (2015) go one step further than Reinhart and Rogoff, and propose a framework to estimate a country's *maximum* sustainable debt: the point at which the government debt position does not just become a drag on growth but becomes unstable. For the UK, they estimate a maximum debt-to-GDP ratio of 126%. Moody's use a similar framework to assess fiscal space.[21] It is instructive to put this into the context of the impact of debt on financial crises: the £1 trillion of borrowing since the financial crisis I mentioned earlier – though not all due to the crisis – would exhaust the vital fiscal space Collard et al suggest the UK currently possesses (Chart 15).

Let me turn now to the OBR. In order to ensure that the banking system in the UK is resilient and capable of withstanding an economic shock, the FPC has instituted a process of stress testing the banks and the banking system. The OBR, similarly established as an impartial and independent entity, has conducted a similar exercise with respect to the UK macroeconomy.[22] In fact, it used the Bank of England's annual stress test for banks for this purpose. In July this year the OBR highlighted a number of issues which it suggests the Government may want to consider when managing its fiscal risks. These are consistent with the concerns I am raising:

[17] See Batini et al (2014) for a review of the literature.
[18] Ilzetzki et al (2011), and Nickel and Tudyka (2013).
[19] Coenen et al (2012)
[20] Mencinger et al (2015)
[21] Moody's (2011)
[22] Office for Budet Responsibility (2017)

- The more vulnerable starting fiscal position;
- The need to prepare for near-inevitable future shocks;
- And, the challenges of doing so in an environment they refer to as 'austerity fatigue'.

Quantitatively, in the OBR's fiscal stress test the national debt is nearly £600bn higher than under its baseline forecast in five years' time. This would lead to a debt-to-GDP ratio of 114%, well above the Reinhart and Rogoff 90% threshold, and not far away from Collard et al's estimated maximum debt sustainability ratio.

Uncertainty

Though the OBR's stress test can give us an idea of the magnitude of the fiscal space that may be needed in the future, it cannot predict the source, magnitude or timing of future shocks. The current environment makes this, and macroeconomic policy making generally, particularly challenging. Globally, leading central bankers acknowledged uncertainty. Last month, for example, Janet Yellen, the chair of the Federal Reserve, observed that current levels of inflation were "a surprise".[23] And even in China, the Governor of the People's Bank of China, Zhou Xiaochuan, has recently raised the risk of a "Minsky moment" flagging uncertainty with respect to Chinese asset values.

In early 2016, we entertained Nicholas Taleb at the Bank of England to discuss the risks of unanticipated, rare events – fat-tail events. As he said at that time, we need to accept that conventional statistical tools cannot be relied on to predict tail events as they may lead to the wrong conclusions and risk assessment. Earlier in this speech I said it paid to be vigilant. Taleb commented that, indeed, "it pays to be paranoid".[24] The financial crisis illustrates the risk of ignoring fat tails: for example, some claimed they were seeing market movements so rare their models predicted it's more likely to win the lottery 20 times in a row than to experience the losses that befell them.[25] To paraphrase Wilde, this looks more like collective carelessness than misfortune. The FPC, of course, is charged with being careful.

I'm certainly conscious that markets are at the present pointing to limited volatility; and options markets do not point to any national debt tail risk. But benign markets can deceptively extinguish paranoia and unfortunately, as we should certainly remember and Keynes famously said, markets can remain "*irrational a lot longer than you and I can remain solvent".* So, I'm now taking the liberty of ignoring benign present market conditions.

This is with good reason. As a financial practitioner for well over 30 years, uncertainty is no surprise to me – for example, when I started in finance Venezuela was a AAA credit! Let me remind you of the definition of a

[23] Yellen (2017)
[24] A video of Nassim Taleb's presentation can be found here.
[25] Financial Times (2007) for the claim; see Dowd et al (2008) for the comparison to the lottery.

AAA rating: "*An obligor […] has extremely strong capacity to meet its financial commitments.*"[26] Venezuela is now in default.

Moreover, I've seen some of the smartest brains in finance destroy capital on failed investments as a result of unforeseen and unforeseeable events. Hence, as a policy maker concerned with financial stability, it is important to me that we recognise that the UK's debt levels may be stretched given the risk that unexpected shocks may materialise. To my mind low market interest rates and a persistent excess of global liquidity could be creating an illusion of readily available spare national debt capacity; a point of view which one unanticipated shock could challenge. The global financial crisis taught us that fragilities can be more real than apparent and that global spillovers means that broadly shared systemic fragilities can lead to disastrous contagion and amplification.

We are all, inevitably, victims of our own history and I recall for my part, not only the economic crisis of ten years ago but also the economic crisis of the 1990s, and the economic crisis of 1976 when the UK, being described as "bust", had to borrow emergency funding from the IMF.[27]

Before the crisis of 1976 there had been a consensus that a highly interventionist approach to economic management would provide sustainable growth. The financial crisis in 1976 led to an acknowledged need for what can only be described as a policy U-turn away from Keynesian debt-driven policies to ensure prosperity.[28]

Following the 1976 crisis, there had been until the global financial crisis a relatively unqualified victory of the capitalist free-market model to generating prosperity.[29] Then the global financial crisis threw old certainties into doubt. We all know that now the quest for global prosperity and real growth is presenting policy challenges.

In this context it is worth noting that many brilliant economists are offering wildly different solutions.[30] Some of these include advocating debt-financed government expenditure, for example infrastructure, as a mechanism to address secular stagnation. It is not for me to adjudicate on this debate. But our shared experience of crises should lead us to recognise that high-conviction policymaking in an uncertain economic environment is perilous. The uncertainty which Janet Yellen and Zhou Xiaochuan acknowledge as policy makers, permeates the macroeconomic environment and should influence our risk-taking calculus as we consider macroeconomic policies to generate growth.

[26] Standard & Poor's (2017)
[27] Roberts (2016)
[28] As the Prime Minister at the time, James Callaghan, admitted: "*We used to think that you could spend your way out of a recession and increase employment by cutting taxes and boosting Government spending. I tell you in all candour that that option no longer exists, and that in so far as it ever did exist, it only worked on each occasion since the war by injecting a bigger dose of inflation into the economy, followed by a higher level of unemployment as the next step.*"
[29] Seldon, Arthur (2004)
[30] See, for example, Larry Summer's blog on the on-going debate in the economics profession.

In this context, the challenge to the financial stability policymaker is to assess the cost of losing valuable fiscal space to promote financial stability if any debt-financed expenditure fails to produce the promised growth. Unfortunately the OBR evidence indicates that at present our national resilience is fragile and as such our margin for error is small.

Conclusion

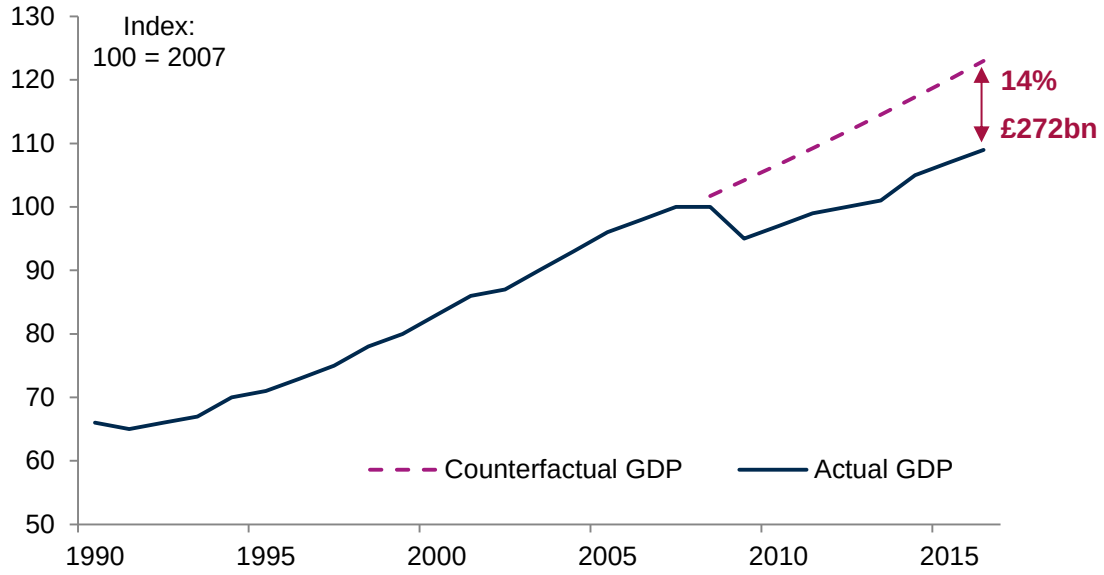
In summary, my argument has been that fiscal space is a vital national asset, and that financial stability considerations should lead us to prioritise protecting it. The UK has addressed the global financial crisis by incurring a cumulative additional debt of £1 trillion since 2008 amounting to 53% of current GDP. Our successful ability to dampen the recessionary effects was inherent in the fact that we evidently have been able to maintain financial credibility and a superior credit rating during this challenging period.

Within the broad sweep of factors affecting fiscal sustainability, the UK has both strengths and weaknesses: we are heavily indebted and some way away from a fiscal position capable of restoring our pre-crisis debt-to-GDP ratio. We are suffering from anaemic growth notwithstanding low spare capacity in the economy. Moreover we have a persistent trade deficit leading to the need to be capable of attracting foreign capital to maintain a stable financial system. On the other hand our debt has a very long maturity, we control our currency, we are not as demographically challenged as some other countries, the rule of law underpins a strong institutional capability incorporating independent monetary policy decision making. And, importantly, we are an open democracy which attracts FDI.

The FPC is charged with monitoring risks to financial stability. Quite frankly it is relatively easy to address visible systemic vulnerabilities; it is of course much harder to address the unknown unknowns. What does seem to me to be apparent is that we have a debt level which gives us limited capacity for national manoeuvre. Financial stability being essential for growth, the FPC has been working hard to address the financial vulnerabilities exposed by the crash. The systemic health of the nation is now significantly stronger. But *in extremis* we may yet need national financial resilience.

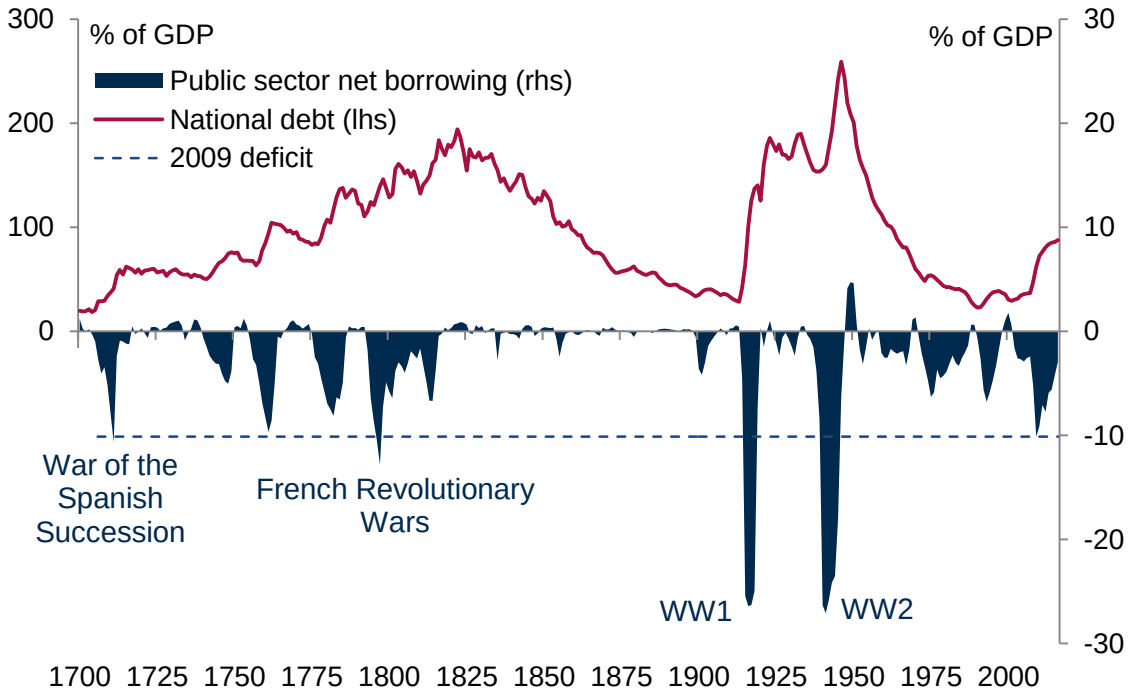
The FPC's remit is to monitor and protect financial stability. It is not for the FPC or for an FPC member to assess the specific fiscal policies of the day. My comments should only be considered as contributing to the discussion of fiscal strategies in ensuring that, as one evaluates such strategies, it is important to remain aware of the fact that if we lose our fiscal space, financial stability is jeopardised.

Chart 1: Actual UK real GDP and counterfactual GDP based on pre-crisis trend growth[(a)]



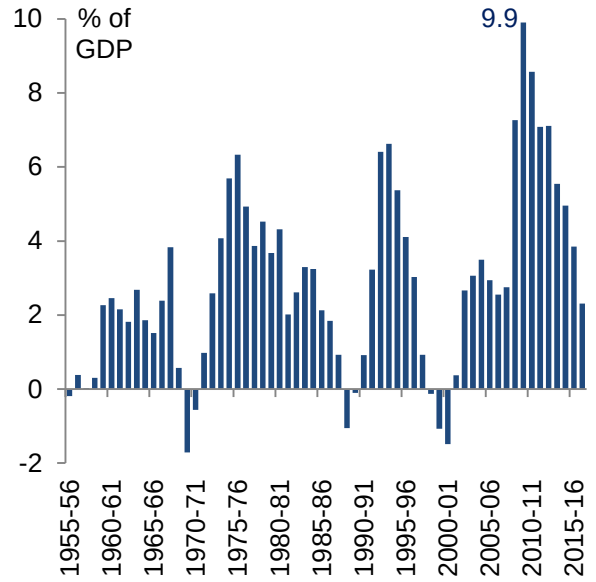
Sources: Bank of England, Institute for Fiscal Studies, Bank calculations.
(a) 2007 trend growth taken from the IFS '2007 Green Budget': 2.4%.

Chart 2: National debt and public sector net borrowing since 1700[(a)(b)]



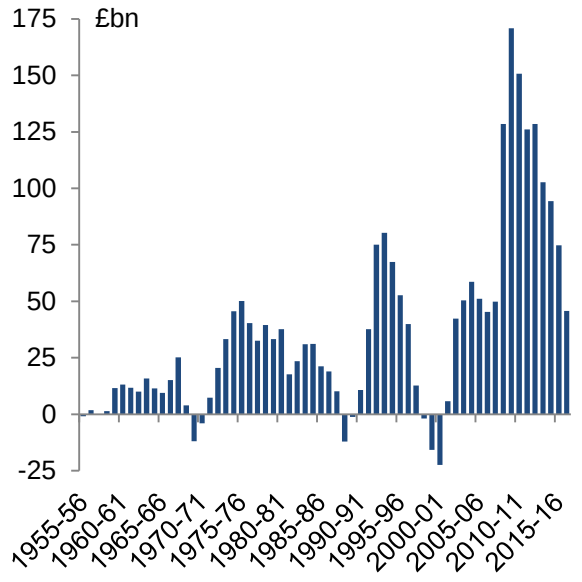
Source: Bank of England

Chart 3: UK net borrowing as per cent of GDP



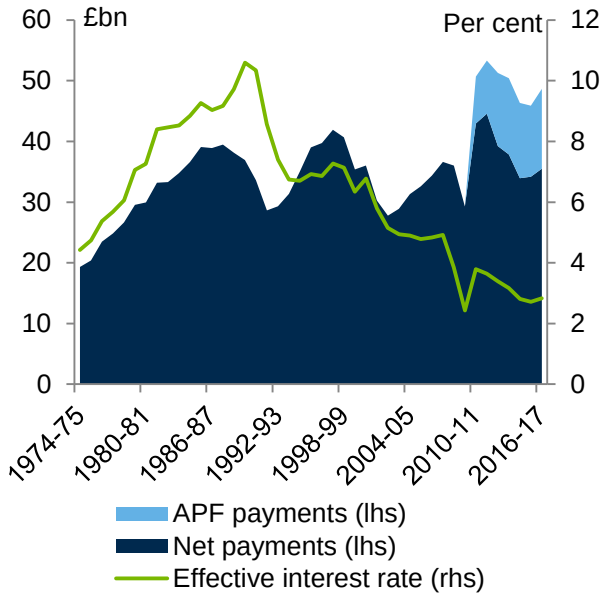
Source: Office for Budget Responsibility

Chart 4: UK net borrowing in £bn (2016-17 prices)



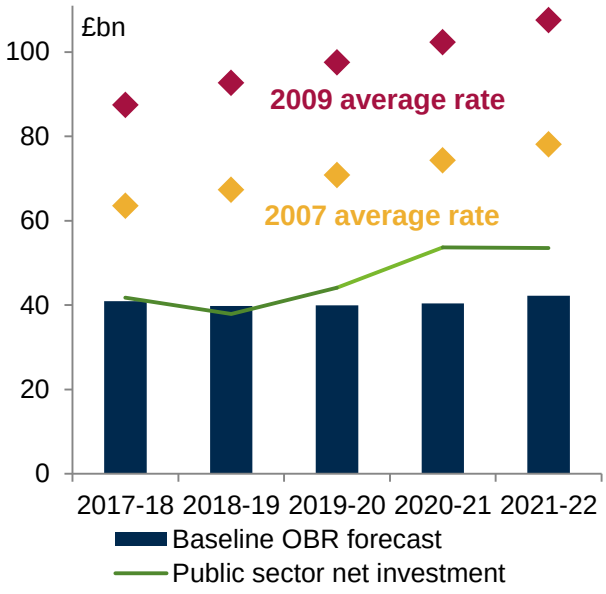
Source: Office for Budget Responsibility

Chart 5: Gross UK debt interest payments (2016-17 prices)[(a)(b)]



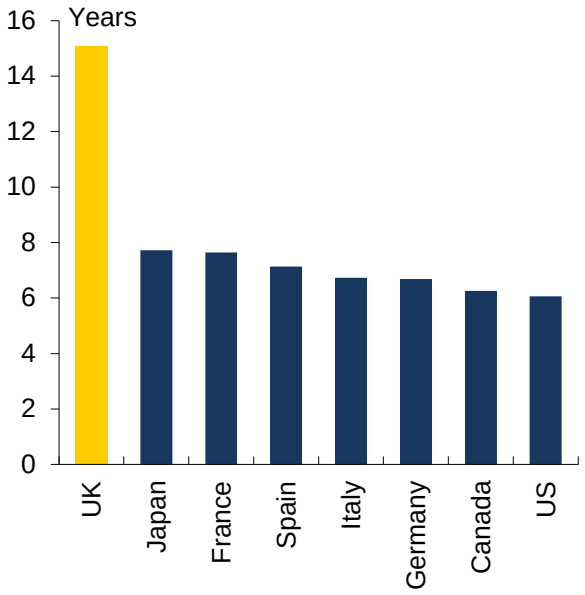
Source: Office for Budget Responsibility
(a) Gross interest payments are the sum of Asset Purchase Facility payments and net payments, as published by the OBR.
(b) The effective interest rate is the ratio of gross interest payment to total national debt.

Chart 6: Counterfactual UK net interest payment forecasts at 2007 and 2000 average interest rates[(a)(b)]



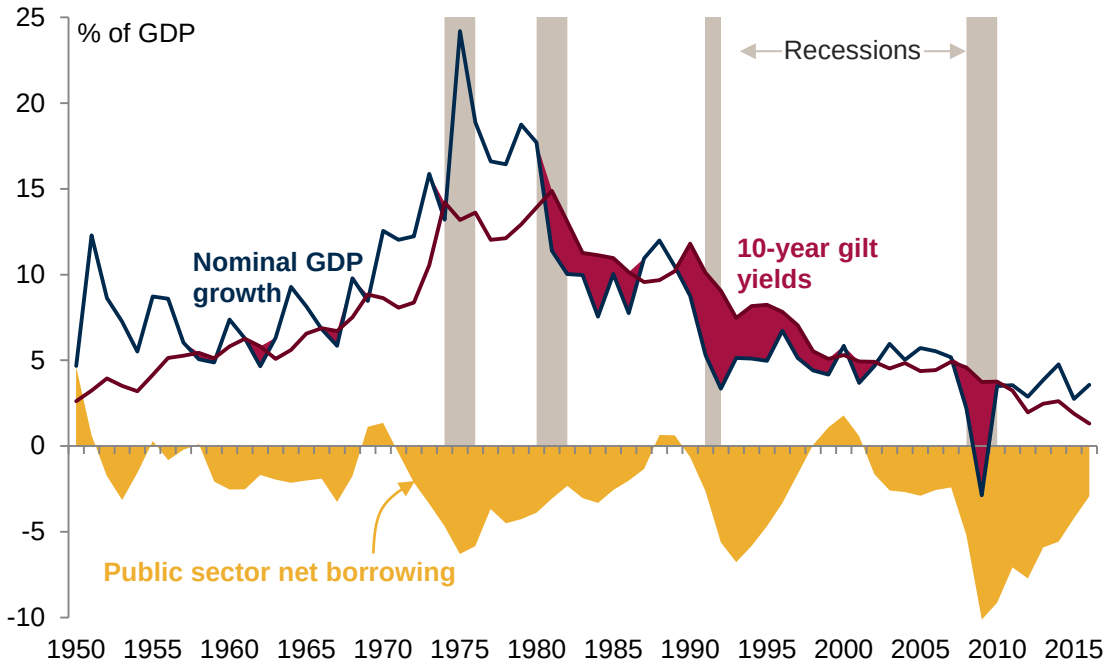
Source: Office for Budget Responsibility, Bank calculations
(a) Applies the average interest rate of the stock of national debt (debt repayment / total debt) in 2007 and 2000 to the OBR's forecast of future national debt. The average interest rate on the stock of national debt in 2007/8 was 4.9%; in 2000/1 it was 6.8%.
(b) Does not include payments to the Asset Purchase Facility.

Chart 7: Average term-to-maturity of government debt of selected countries (2016, or latest available)



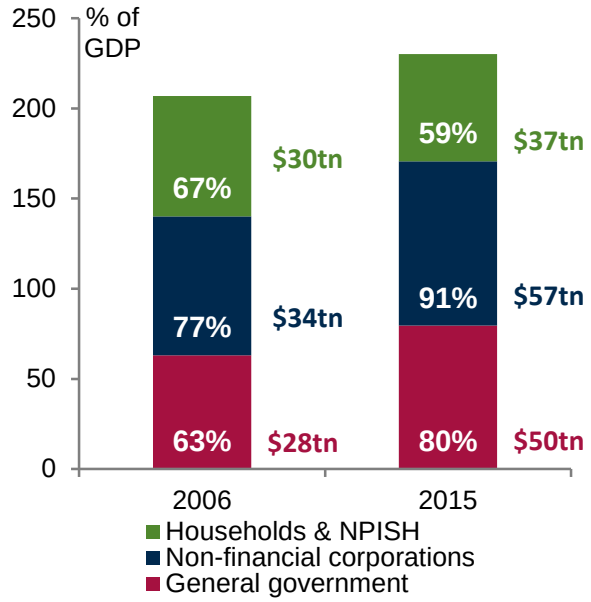
Source: Bloomberg L.P.

Chart 8: Nominal GDP growth and 10-year gilt yields[(a)]



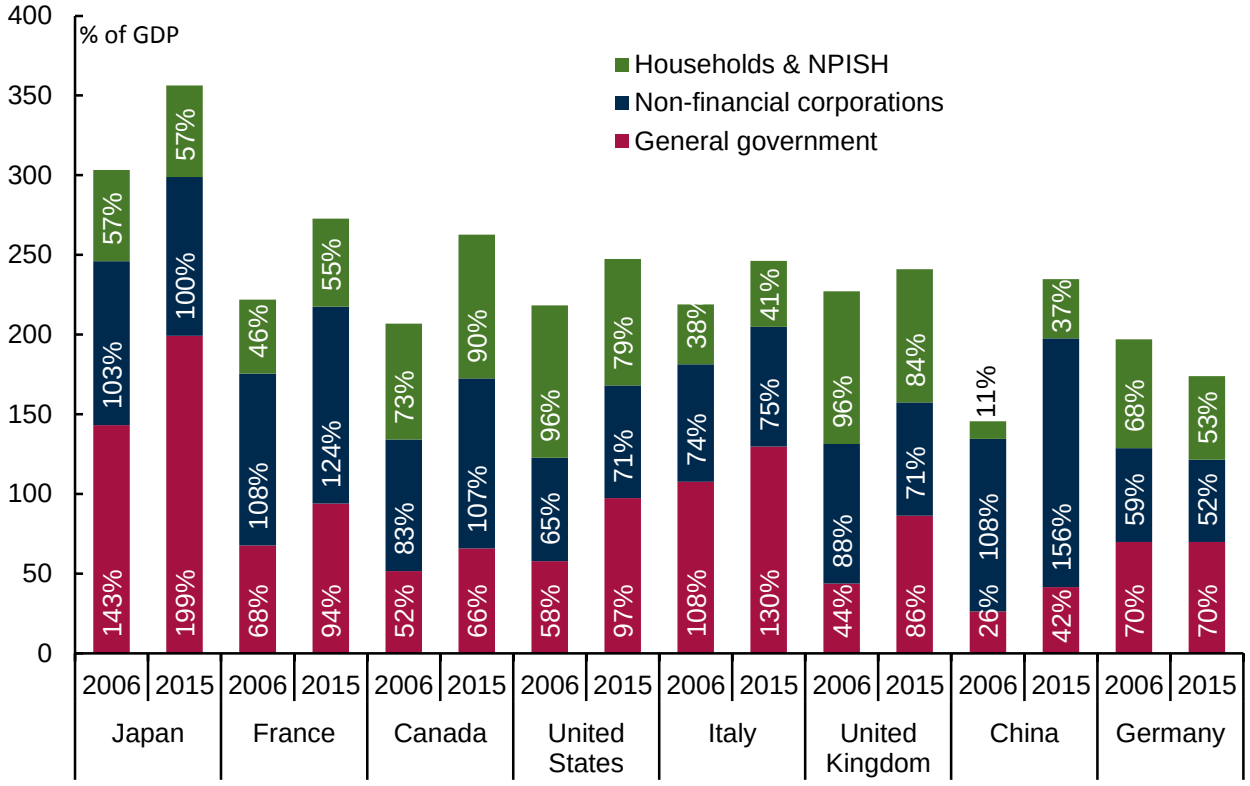
Source: Bank of England
(a) 'Recessions' (shown as shaded bars) are defined for the purpose of this chart as negative *annual* real GDP growth.

Chart 9: Global debt in 2006 and 2015[(a)(b)]



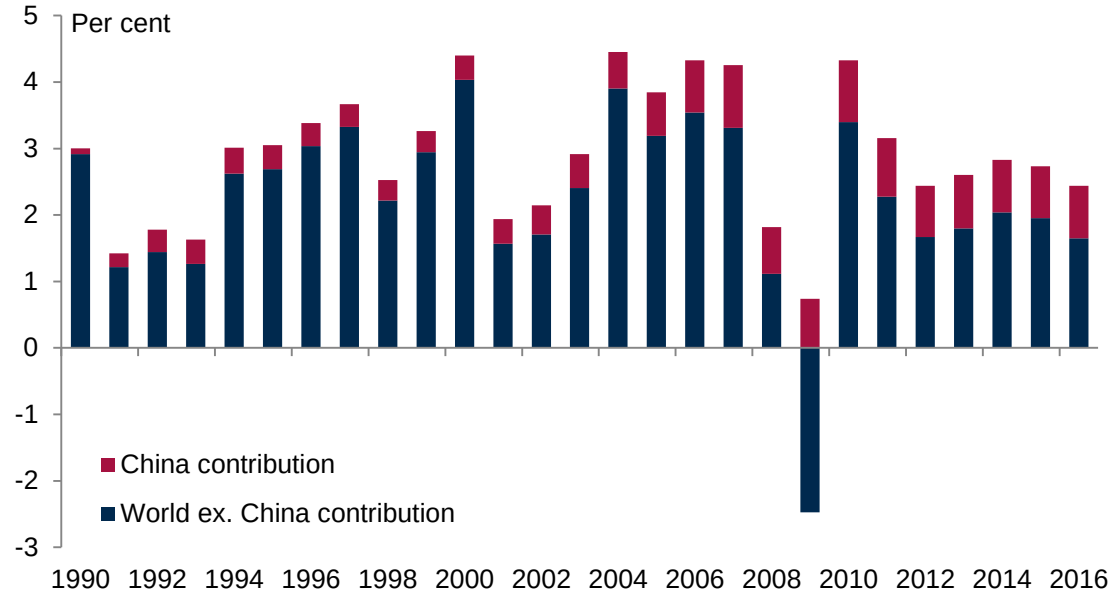
Source: BIS, World Bank, Bank calculations
(a) Includes all 42 countries reporting to the BIS, except India, South Korea and South Africa due to data limitations.
(b) NPISH: non-profit institutions serving households.

Chart 10: Debt position of G7 countries and China by sector[(a)]



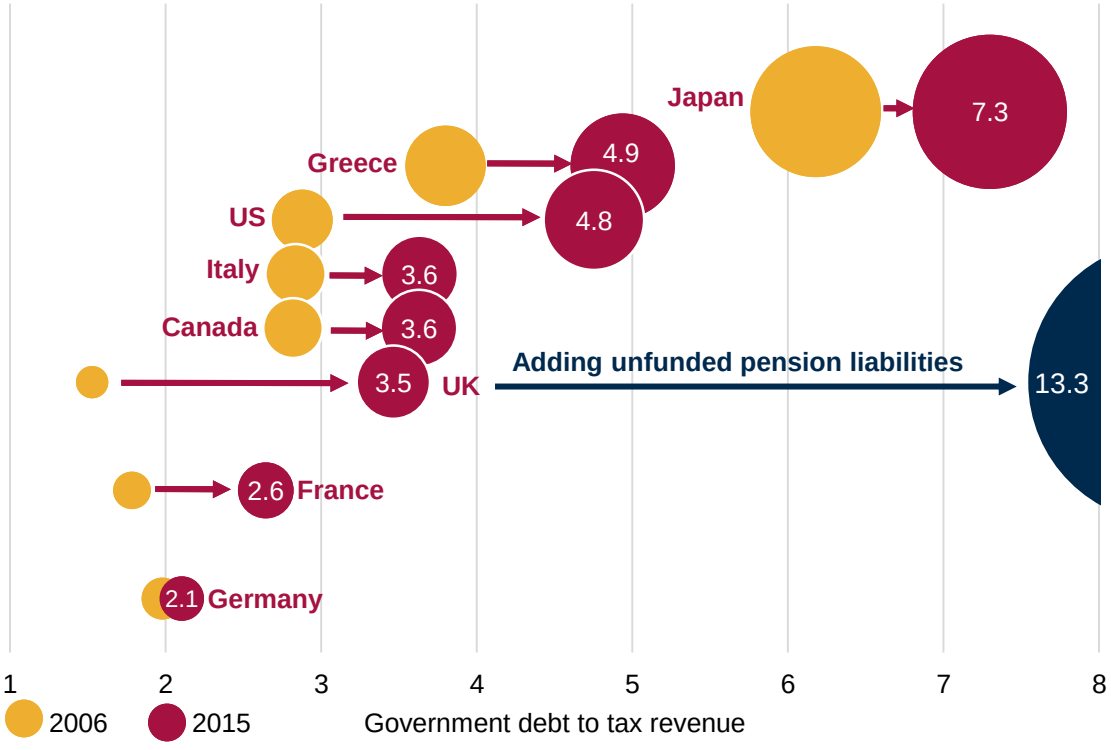
Source: BIS, World Bank, Bank calculations
(a) NPISH: non-profit institutions serving households.

Chart 11: World GDP growth[(a)]



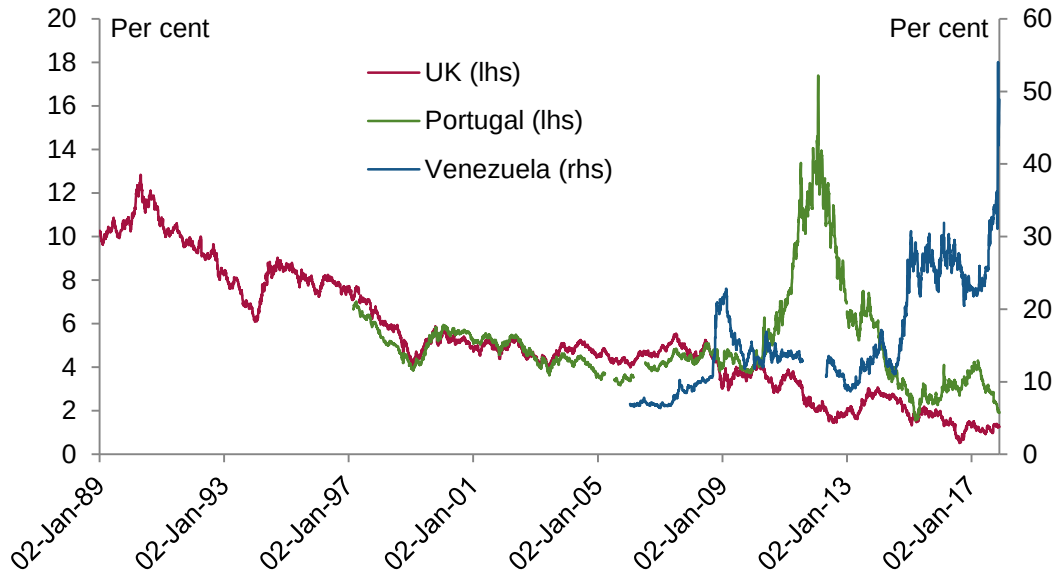
Source: World Bank
(a) At constant 2010 USD exchange rates.

Chart 12: Ratio of government debt to tax revenue from 2006 to 2015, G7 economies and Greece[(a)]



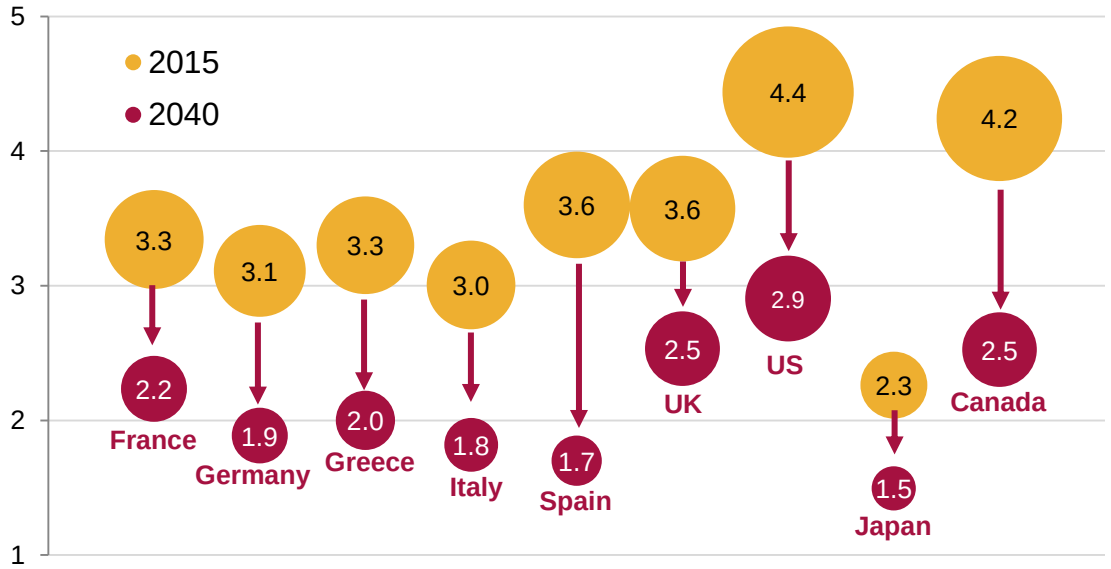
Source: ONS, OECD
(a) The blue circle shows the debt-to-tax ratio (inc. national insurance contributions) if 320% of unfunded contingent pension liabilities, as identified by ONS (2012), are added to the 2015 UK debt position.

Chart 13: 10-year government bond yields



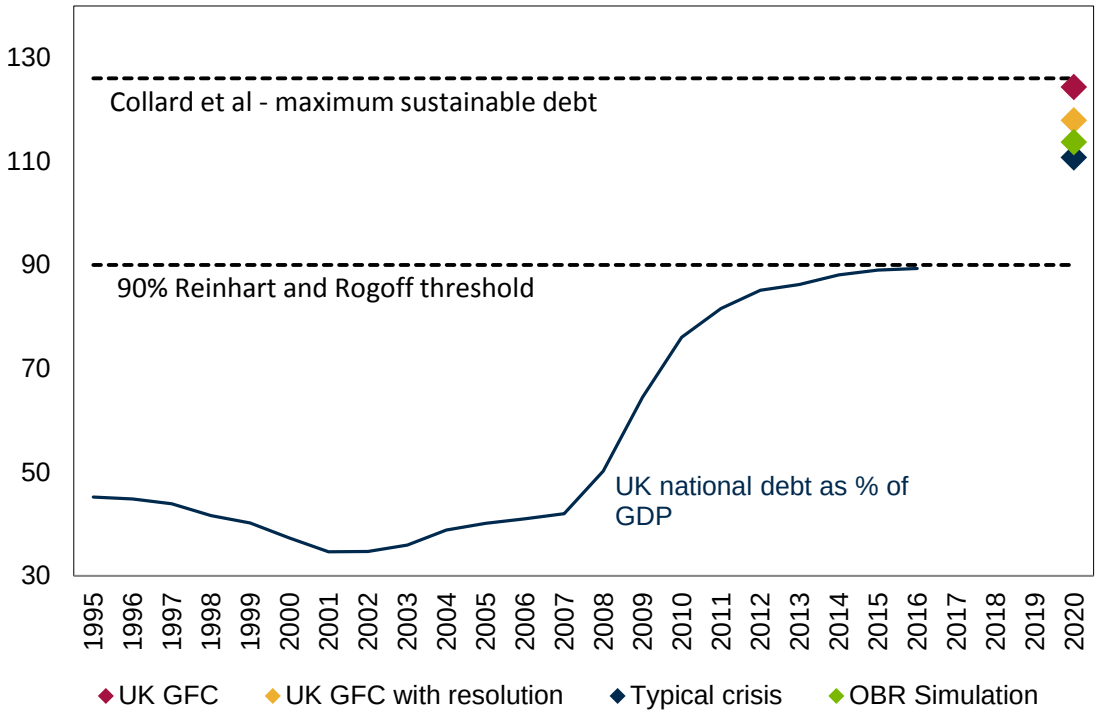
Source: Bloomberg L.P.

Chart 14: Current and forecast old-age dependency ratios (working-age population relative to population of 65+ population)



Source: OECD

Chart 15: Potential impact of another financial crisis on the debt-to-GDP ratio



Sources: Eurostat, Office for Budget Responsibility, National Audit Office, Laeven and Valencia (2012)
(a) 'UK GFC' adds the debt incurred since the financial crisis; 'UK GFC with resolution' adds the debt incurred since the financial crisis less the cost of government bank bail-outs; 'Typical crisis' adds the cost of a typical crisis as found in Laeven and Valencia (2012); 'OBR Simulation' adds the impact of the OBR's fiscal stress test.

References

Auerbach, Alan and Gorodnichenko, Yuriy. 'Fiscal stimulus and fiscal sustainability', 2017. *Presented at the Jackson Hole Economic Policy Symposium.*

Barro, Robert. 'Are government bonds net wealth?', 1974. *Journal of Political Economy*.

Batini, Nicoletta et al. 'Fiscal multipliers: size, determinants, and use in macroeconomic projections', 2014. *International Monetary Fund.*

Brown, Gordon. 'My life, our times', 2017. *Bodley Head.*

Buiter, Willem. **'**Unemployment and inflation in the euro area: why has demand management failed so badly?', 2015*. ECB Forum on Central Banking*.

Carney, Mark. 'Opening remarks at the Bank of England Future Forum 2017', 2017. *Bank of England.*

Coenen, Günter et al. 'Effects of fiscal stimulus in structural models', 2012. *American Economic Journal: Macroeconomics*.

Collard, Fabrice et al. 'Sovereign debt sustainability in advanced economies', 2015. *Journal of the European Economic Association.*

DeLong, Bradford and Summers, Larry. 'Fiscal policy in a depressed economy', 2012. *Brookings Papers on Economic Activity.*

Dowd, Kevin et al. 'How unlucky is 25-sigma?', 2008. *CRIS Discussion Paper Series.*

Fischer, Stanley. 'The independent Bank of England – 20 years on', 2017. *'20 Years On' conference organised by the Bank of England.*

Financial Stability Report, June 2017. *Bank of England.*

Financial Times. 'Goldman pays the price of playing big', 2007.

House of Commons Library. 'Infrastructure policies and investment', 2017.

Ilzetzki, Ethan et al. 'How big (small?) are fiscal multipliers?', 2011. *International Monetary Fund.*

Laeven, Luc and Fabián Valencia. 'Systemic crisis databank: an update', 2012. *IMF Working Paper***.**

Mencinger, Jernej et al. 'Revisiting the role of public debt in economic growth: the case of OECD countries', 2015. *Working Paper.*

Moody's Analytics. 'Fiscal Space', 2011.

Nickel, Christiane and Tudyka, Andreas. 'Fiscal Stimulus in times of high debt: reconsidering multipliers and twin deficits', 2013. *European Central Bank Working Paper Series*.

Office for Budget Responsibility. 'Fiscal Risk Report', 2017.

Office for National Statistics. 'Regional gross value added (income approach), UK: 1997 to 2015', 2016.

Office for National Statistics. 'Pensions in the national accounts – a fuller picture of the UK's funded and unfunded pension obligations', 2012.

Roberts, Richard. 'When Britain went bust: The 1976 IMF crisis', 2016. *OMFIF Press*.

Romer, Christina and Romer, David. 'Why some times are different: Macroeconomic policy and the aftermath of financial crises', 2017. *Working Paper*.

Seldon, Arthur. 'The collected works of Arthur Seldon', 2004. Edited by Colin Robinson. *Liberty Fund.*

Standard and Poor's. 'S&P global ratings definitions', 2017.

Taylor, Martin. 'The committee of public safety', 2017. *Bank of England.*

Yellen, Janet. 'The U.S. economy and monetary policy', 2017. *Group of 30 International Banking Seminar.*