

## **THE DEBT HANGOVER**

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Economists have not covered themselves in glory recently when it comes to forecasting. Tonight I want to put that right by making a prediction that is big, bold and frighteningly precise. Liverpool Football Club will finish this season third in the league. Manchester United will top the table followed by Arsenal. Having been top for most of last year, Chelsea will finish the season near the foot of the table. Newcastle United, meanwhile, will finish fourth.

I know what you are thinking. Even by economists' standards, some of those predictions sound implausible. Liverpool third? So let me explain. The season I have in mind is not the English football season; it is the financial reporting season. And the table to which I refer is not the Premiership points table; it is the league table of English football club debt<sup>1</sup>. Rarely has securing a slot in the top four held less allure. Debt is the subject of my talk tonight.

We are living through an extraordinary period for the economic and financial system. Events of recent years will be seen by financial historians as among the most significant in the past millennium. At the worst point of the crisis, savers and borrowers around the world came close to losing confidence in financial institutions. The resulting panic has had deep and long-lasting consequences for global activity. The statistics are striking.

Between July 2007 and March 2009, the equity prices of global banks fell by 75%. That is a loss of market capitalisation of around \$5 trillion. In the UK, banks' equity prices fell by over 80%. Taken alongside falls in other asset prices, the loss of global wealth peaked at over \$25 trillion, or almost 45% of global GDP. At that point, asset price falls in the UK and US were as large as during the Great Depression (Chart 1).

Knock-on effects to the real economy were no less dramatic. Peak to trough, output in OECD economies has fallen by around 4%. In the UK, output is likely to have fallen by around 6%, peak to trough. The present value of those losses, carried forward across generations, would be a significant multiple of those falls. Today's Great Recession is the most significant economic event since the Great Depression.

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<sup>1</sup> Deloitte (2009), "Safety in numbers: Annual Review of Football Finance".

That this Great Recession did not become a second Great Depression is in large part the result of policy actions. These have been unprecedented in speed and scale. Monetary policy around the world has been loosened dramatically. And direct support for the financial system has been equally swift and large, at around a quarter of global GDP. In the US and UK, it is nearer three-quarters of GDP (Chart 2).

### **The Road to Recovery**

The good news is that these measures appear to be working. The recovery in global financial markets and the world economy over the past year has been almost as remarkable as the preceding fall. Certainly, it has been far earlier and far sharper than during the Great Depression (Charts 1 and 3). Having fallen off a cliff, the bounce in financial markets has been more startled bunny than dead cat.

From their trough almost a year ago, global banks' equity prices have risen by over 130%, recovering more than half of their losses. For UK banks, the recovery has been even more dramatic, rising 140%. Since 1900, there has been only one 9-month period when the rally in UK financial sector equity prices has been greater (Chart 4).

This rebound in asset prices has been broad as well as steep, spanning the maturity and risk spectrum. Yields on safe securities have fallen across all maturities. Policy rates in the UK fell to their lowest levels since the founding of the Bank of England. And long-term real interest rates in the US and UK, at around 1%, are around half their average level over the past decade.

Moving up the risk spectrum, the price of both investment and sub-investment grade corporate bonds has risen since March last year, by 20% and 60% respectively. Global equity prices have risen by over 70% over the same period. The rise in UK equity prices is one of the largest in the 316-year history of the Bank of England (Chart 4). Residential and commercial property prices in the UK have turned. And global wealth losses on private sector securities, at around \$6 trillion, have fallen by a factor of four over the past year alone.

What explains this remarkable recovery in risky asset prices? Three factors seem to have been important, all of which can be traced to policy actions by the authorities:

- First, the rate at which the future cashflows on risky assets are discounted has fallen due to lower short and long-term global real interest rates. Using a standard asset pricing model, this discount rate effect accounts for perhaps around one fifth of the rise in UK and euro-area equity prices and one third of the rise in US equity prices since March last year (Chart 5).
- Second, as fears of a repeat of the Great Depression have abated, the premium that investors require to compensate for this risk – the risk premium – has fallen, boosting expected future cashflows on risky assets. This more than accounts for the rise in UK and US equity prices over the past year (Chart 5). It also accounts for a significant proportion of the rise in risky debt prices: a year ago, corporate debt prices were signalling larger losses on company securities than seen during the Great Depression (Chart 6).
- Third, improved liquidity in financial markets has lowered decisively uncertainty about future market prices. This has lowered the compensation investors require for such risk – the liquidity premium – boosting asset prices. This accounts for around a half of the fall in spreads on sterling investment grade corporate bonds since March last year (Chart 7).

Mirroring the recovery in asset prices, there is now convincing evidence of global output having turned in the second half of 2009. The IMF projects that the global economy will grow by 3.9% in 2010, having contracted by 0.8% in 2009. Surveys of manufacturing in the major economies are at levels last seen prior to the crisis.

This combination of a stronger real economy and buoyant financial markets has generated a dramatic turnaround in fortunes of the banking system. Global banks' net income in 2009 is expected to be around \$60 billion, compared to a loss of roughly that amount in 2008. Income from market-making in various financial products has been especially lucrative, given higher bid-ask spreads and client activity (Chart 8).

This windfall gain has helped repair banks' over-extended balance sheets. Global banks have boosted their Tier 1 capital ratios by almost 3 percentage points since the start of 2009. UK banks' Tier 1 ratios have increased by around 3.4 percentage points. Liquidity ratios among global banks have also risen, with sterling liquid assets relative to total asset holdings more than trebling among UK banks.

On the back of this positive news, the authorities in some countries have begun withdrawing extraordinary levels of support. More than half of the capital provided to the US banking system was repaid in 2009. The US authorities have also announced their intention to wind down several special liquidity facilities, as has the European Central Bank. This exit is far sooner than might have been expected six months ago. Stability, if not normality, is beginning to return.

### **Debt Overhangs and Debt Hangovers**

If that were the end of the story, it would be a happy ending. But there are good reasons for believing this story has some way to run. For while the *flow* of news over the past year has been positive, some of the *stock* problems which were the root cause of the crisis remain intact. The lasting legacy of this crisis is too much debt held by too many sectors against too little capital.

Economists have a special word for this type of problem – a debt overhang. Its economic effects are fairly well understood. Debt operates rather like a tax. Debt servicing costs, like a tax, reduce the disposable income of the borrower. Too much debt means a higher debt “tax” and a greater drag on activity – lower lending by banks and spending by households and companies. Debt and taxes also affect incentives. Set too high, they may dissuade people from working and investing.

These effects are often captured in a relationship called the Laffer curve. Higher tax rates may boost tax revenues, but only up to a point. After that point, the tax take could actually fall due to the disincentive effects of higher tax.<sup>2</sup> In that event, both the taxpayer and the tax collector are worse off. The same applies to debt. There is a

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<sup>2</sup> Laffer, A (2004), “The Laffer Curve, Past, Present and Future”, available at [www.heritage.org](http://www.heritage.org).

debt Laffer curve. If a debt overhang is sufficiently severe, the interest burden weakens debtor incentives to repay. In the event borrowers and lenders find themselves on the wrong side of the debt Laffer curve, both are worse off.<sup>3</sup>

Non-economists sometimes have a different word for an overhang. Conveniently, this is found by simply transposing the syllables. What we face today may be called a debt overhang, but what it will feel like is a debt *hangover*. Like a hangover, it will slow activity in the period ahead. If it is severe enough, it may diminish incentives to work and invest. Too wild a financial party risks borrowers finding themselves on the wrong side of the Laffer curve the morning after.

The McKinsey Global Institute has recently looked at the debt accumulated by ten developed economies over the past decade, including the UK and US.<sup>4</sup> Since 2000, gross debt in these ten economies has increased by around \$40 trillion, a rise of 60%. The sectoral contributions to this rise in debt are roughly equally split between households, companies, the financial sector and governments.

The accumulation of debt has perhaps been greatest within the financial system. Among UK and US banks, leverage has increased dramatically over the past century. The ratio of assets to equity rose from single digits at the start of 20<sup>th</sup> century to over twenty by its end.<sup>5</sup> Despite recent capital raising, banks' leverage remains high absolutely and relative to the past, at between 20 and 50 times equity (Chart 9).

Among households, debt-to-income ratios have risen materially over the past twenty years. In the UK, household debt-to-income ratios rose from around 100% in 1988 to a peak of around 170% in 2008. In the US over the same period, the household debt-to-income ratio rose from 80% to 135%. From different starting points, similar trends are evident in Spain, Canada and South Korea. Most households in these countries still have significant net wealth, however; in the UK, total assets are five times household debt.

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<sup>3</sup> Krugman, P (1989), "Market-based Debt Reduction Schemes", in J Frenkel (ed.), *Analytics of International Debt*, IMF. .

<sup>4</sup> McKinsey's Global Institute (2010), "Debt and Deleveraging: the Global Credit Bubble and its Economic Consequences".

<sup>5</sup> Haldane A G (2009), "Banking on the State", available at [www.bankofengland.co.uk](http://www.bankofengland.co.uk).

Those debt trends are repeated in parts of the corporate sector. Among UK companies, debt as a fraction of companies' total financial liabilities has risen from around 20% in 1988 to around 34% today. In certain sectors, the run-up in debt has been more dramatic – for example, among US and UK commercial property companies whose leverage has more than doubled in the past decade. It is also true of some companies subject to leveraged buy-outs including, of course, Liverpool Football Club.

Finally among sovereigns, the picture up until recently has been benign with public debt flat relative to GDP. But the crisis means that picture is set to change dramatically. Among the G7 countries, the IMF forecast that public debt ratios will rise from around 80% of GDP in 2007 to around 125% by 2014. In the UK and US, public debt ratios are forecast by the IMF to double, mirroring the pattern following past financial crises.<sup>6</sup>

Taking together the debt position of the financial sector, households, companies and sovereigns paints a sobering picture. Total debt ratios relative to GDP rose significantly in all ten countries studied by McKinsey's, from an average of around 200% in 1990 to over 330% by 2008.<sup>7</sup> Over the same period, UK debt ratios more than doubled, from just over 200% to around 450% of GDP.

To date, servicing these debts has been cushioned by policymakers' actions. Government debt and equity have substituted for private debt and augmented private equity to support impaired balance sheets, especially among financial firms: a third of capital raised by banks since the crisis began has come courtesy of government. And through monetary measures, interest costs have been lowered dramatically: debt servicing has fallen, often dramatically, across many sectors.

These extraordinary policy measures have acted like a painkiller for debt problems. But painkillers offer only temporary relief. Loans from government to repair balance sheets need ultimately to be repaid. And monetary stimulus will need ultimately to be

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<sup>6</sup> Reinhart, C M and K Rogoff (2009), *This Time is Different – Eight Centuries of Financial Folly*, Princeton University Press.

<sup>7</sup> Data are not available for all ten countries, so period averages are based on slightly different samples.

withdrawn. Public policy can act as a balm for debt problems, not a long-run cure. So how severe might the hangover be once the painkillers have worn off?

As a thought experiment, consider the impact on debt servicing costs of long-term interest rates reverting to a more normal level (say, 5%) assuming debt levels remained as they are. At current mortgage spreads, UK households' long-term debt servicing costs would almost double relative to income, rising to over 13%.<sup>8</sup> In other words, income gearing would be close to levels reached in the early 1990s recession.

Aggregate numbers may under-estimate the burden on deeply indebted households. Around a third of UK households have debt servicing costs which exceed 20% of income. For those households, debt servicing appears not to have fallen in the past two years, with higher mortgage spreads offsetting the effects of lower interest rates (Chart 10).

For companies the picture is similar. A normalisation of long-term interest rates would increase UK companies' debt servicing costs from 17% of profits currently to around 33%. That is significantly below the levels reached in the early 1990s, when debt servicing peaked at 58% of profits. But the distribution of debt across companies again paints a less promising picture. In 2007, around 25% of UK firms made insufficient profits to cover their interest payments (Chart 11). This is a long tail.

For sovereigns, debt servicing costs among the G7 economies are currently low, at around 3% of GDP. But were medium-term interest rates to normalise, against a backdrop of rising debt ratios, the combined effect would be significant. Over the medium term, debt servicing relative to GDP in the G7 economies would double.

Finally, banks' refinancing burden in the next few years has grown as a result of a shortening of debt maturities during the crisis. The average maturity of US banks' rated debt is estimated by Moody's to have fallen from 6.7 years to 3.2 years since 2005. Among UK banks, it has fallen from 6.8 years to 4.3 years. The resulting near-term refinancing schedule is estimated by Moody's at \$7 trillion over the next three

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<sup>8</sup> Bank of England *Financial Stability Report*, December 2009.



years. Among UK banks, it is in excess of £1 trillion between now and 2014. As hangovers go, this one is large and will linger.

### **Dealing with Today's Debt Hangover**

The road to balance sheet repair is likely to be long and winding for both the real economy and financial system. Adjustment needs to be neither too fast nor too slow. Too fast and lending and spending fall, jeopardising today's recovery. Too slow and balance sheet fragilities persist, jeopardising tomorrow's stability. So what principles should guide the transition? Let me highlight two drawn from the past.

The first comes from monetary policy. Over the past 30 years, many economies have sought to bring down inflation – so-called disinflation. The optimal rate of disinflation is usually felt to be gradual to limit damage to short-run growth. But there is an important exception to this gradualist rule. If a downward inflation surprise comes along, it is optimal to pocket this windfall as this accelerates the path to low inflation without harming growth. Disinflation is “opportunistic”.<sup>9</sup>

The same general principles apply to the repair of indebted balance sheets. Take banks. Over the medium-term, their capital ratios are likely to need to rise. If this is achieved too fast, by constraining lending, it poses a risk to growth. As with disinflation, there is a strong case for gradualism. But if a positive profit surprise comes along, this windfall should be pocketed, front-loading the path to higher capital without harming lending and growth - an opportunistic approach to stabilisation.

Global banks have recently received just such a profit windfall, as full-year results for the main banks are beginning to attest. There is a strong case for banks, in the UK and internationally, pocketing this windfall rather than distributing it to either staff or shareholders. This would allow banks' balance sheets to be repaired while supporting lending to the real economy. It is prudential opportunism.

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<sup>9</sup> Orphanides, A and Wilcox, D W (1996), “The Opportunistic Approach to Disinflation”, Board of Governors of the Federal Reserve System.

So far during this crisis, there has been little evidence of such prudential opportunism. Among global banks, net income fell by over 20% between 2006 and 2007. Over the same period, dividends grew by 20%. In 2008, global banks made losses totalling \$60 billion, but on average still made dividend payouts of over \$60 billion.

Although it sounds peculiar, this behaviour appears to be deeply rooted. Table 1 summarises payouts to shareholders by companies in the UK and US since 1965, both banks and non-banks. Five features are notable:

- First, payout ratios to shareholders from banks' profits have consistently been high. Since the mid-1960s, the payout ratio has generally exceeded 50%. At times in the distant past it has been higher still: the average payout ratio to Bank of Scotland shareholders over the period 1800 to 1995 was around 70%.<sup>10</sup>
- Second, there is little evidence of payout ratios being higher for financial than for non-financial companies. Such high payouts are themselves something of a puzzle because, at least in theory, the payout ratio ought not to affect the value of a firm.<sup>11</sup> This may be a collective action problem, with firms fearful of sending an adverse market signal through lower payouts.
- Third, for both financials and non-financial firms, the flow of dividend income is much less volatile than firms' stream of profits. In other words, there is evidence of firms systematically smoothing dividend payouts to shareholders.<sup>12</sup> This may also reflect a problem of collective action.
- Fourth, the profits stream of the financial sector is significantly more volatile than for non-financial companies. That appears largely to be the result of large-scale, one-off losses by banks. This is as we would expect, given their greater leverage.

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<sup>10</sup> Cameron, A (1995), "Bank of Scotland 1695-1995", Mainstream Publishing.

<sup>11</sup> Modigliani F and Miller M (1961), "Dividend Policy, Growth and the Valuation of Shares", *Journal of Business*, 411-33..

<sup>12</sup> For some of the earliest evidence, see Lintner, J (1956), "Distribution of incomes of corporations among dividends, retained earnings and taxes", *American Economic Review*, 97-113.

- Fifth, as a result, the dividend payout ratio for banks is more volatile than for non-banks.

This behaviour is unlikely to support banking stability. It risks profits being distributed as dividends when they are most needed to augment capital ratios and boost confidence. In 1996, the Chief Executive of a famous company observed: “We are an old-fashioned business, not a quoted plc, and we don’t pay dividends to shareholders”. The chief executive? Peter Robinson. The company? Liverpool FC. Perhaps banks should have heeded the message.

If they had, this crisis might have felt rather different. If UK banks had reduced dividend payouts ratios by a third between 2000 to 2007, £20 billion of extra capital would have been generated.<sup>13</sup> Had payouts to staff been trimmed by 10%, a further £50 billion in capital would have been saved. And if banks had been restricted from paying dividends in the event of an annual loss, £15 billion would have been added to the pot. In other words, three modest changes in payout behaviour would have generated more capital than was supplied by the UK government during the crisis.

Opportunistic behaviour is also needed to repair banks’ liquidity positions. Reversing the fall in the maturity of banks’ balance sheets will require a front-loaded terming out of their debt liabilities. There is some evidence of banks doing so. But given the scale of the refinancing mountain, this will be an uphill struggle.

There is also some evidence of companies tapping capital markets opportunistically to help repair their balance sheets. Corporate bond issuance by non-financial companies during 2009 was around \$1.2 trillion globally, the highest on record. Manchester United have recently become one of the first firms to do so in 2010. Surveys of households suggest some of the windfall of lower interest costs is being used to repay debt. Opportunistic repayment or refinancing is the financial stability equivalent of repairing the roof while the sun is shining and it is important it continues.

The second lesson comes from past debt crises, in particular among developing countries. If a borrower has a large debt overhang, there is a case for restructuring the

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<sup>13</sup> Bank of England *Financial Stability Report* (op.cit.).

claim from debt into equity – a debt-for-equity swap.<sup>14</sup> In some cases, such swaps are no more than recognition that an impaired debt is, in substance, an equity claim. But more than that, debt-for-equity swaps can potentially benefit both lender and borrowers by airlifting a debtor to the safer side of the debt Laffer curve.<sup>15</sup>

A number of global banks have begun putting such a strategy into practice. Around a hundred debt exchanges were carried out by global banks during 2009, typically converting debt instruments into equity or retiring debt below face value, so reducing leverage in the financial sector. That these swaps were voluntary and market-based is evidence of their benefit to both lender and borrower.

Debt-for-equity swaps could be used to tackle the debt overhang in other sectors. There are already some examples of voluntary debt-for-equity exchanges among companies. For example, Chelsea Football Club recently announced a large-scale swap, which accounts for their plummet down the debt league table. In principle, mortgage contracts could also be adapted to lessen the burden on over-indebted households by allowing lenders to convert their loan into an equity stake, as suggested, for example, by the charity Shelter.<sup>16</sup>

### **Preventing Tomorrow's Debt Hangover**

Once today's debt hangover is solved, how is tomorrow's to be prevented? As debt crises have been with us for a millennium, it is fanciful to think they could be eliminated. But could the party be moderated in frequency and scale? In seeking new ways to tackle this old problem, two possible avenues would be the re-orientation of *regulatory policy* on the one hand and better designed *debt contracts* on the other.

First, regulatory policy. Since at least the 1970s, public policy has not sought actively to moderate fluctuations in the credit cycle in most G7 economies. Moderating the business cycle was believed sufficient to hold credit in check. The experience of the past decade, in the UK and elsewhere, has called that into question. In the UK, credit

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<sup>14</sup> Krugman (op.cit).

<sup>15</sup> For example, Zingales, L (2008), "Plan B", *Economists' Voice*.

<sup>16</sup> See, for example,

[http://scotland.shelter.org.uk/getadvice/advice\\_topics/paying\\_for\\_a\\_home/mortgage\\_arrears/mortgage\\_to\\_shared\\_equity](http://scotland.shelter.org.uk/getadvice/advice_topics/paying_for_a_home/mortgage_arrears/mortgage_to_shared_equity)

grew at three times the rate of money spending over that period, sowing the seeds of the credit crisis, while inflation and growth remained remarkably stable.

In tackling this problem, one option is a re-orientation of regulatory policy towards curbing the cycle in credit supply. For example, regulatory requirements on banks could be raised to lean against a credit boom and lowered in the teeth of a credit downturn. In the public houses for credit, intake would be monitored, opening hours restricted and the Happy Hour abolished.

This approach has become known in policy circles as macro-prudential policy.<sup>17</sup> Although the name is new, it is in the time-honoured policy tradition of “removing the punchbowl” from the party as it is getting started – a fitting analogy if the aim is to prevent a debt hangover. Had such a party-pooper been in place over the past decade, today’s debt headache would plausibly have been less acute.

Regulation might also be used to lean against the collective tendency of banks to payout high even when profits are low. Among regulators internationally, there are proposals to introduce capital conservation rules, requiring banks to distribute less of their profits in adverse states of the world. By ensuring prudent profit retention on a collective basis, these rules ought to be in the long-term interests of banks and their shareholders, as well as the authorities.

A second, complementary, approach for containing or cushioning fluctuations in the credit cycle would be to rethink the design of contracts – if you like, lowering the alcohol content of debt instruments. Some debt contracts are ill-suited to the needs of their customers, with the debt servicing burden rising at just the point borrowers are least able to pay. For example, the “teaser rate” mortgages offered to households in the US generated an automatic and correlated spike in income gearing as rates were reset. This amplified repayment and default risk.

A better-designed debt contract would automatically adjust repayment terms when the borrower found the going getting tough. Debt would become, in the language of economics, state-contingent – contingent on the borrower’s state of financial health.

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<sup>17</sup> Bank of England (2009), “The Role of Macro-Prudential Policy”, available at [www.bankofengland.co.uk](http://www.bankofengland.co.uk).

By cushioning fluctuations, these instruments have the potential to stabilise automatically debt dynamics. And by averting costly default, they potentially benefit both creditors and debtors.

There has been recent interest among banks in issuing state-contingent instruments – so-called contingent capital. These instruments convert into equity in the event of a pre-defined stress trigger being breached. So these instruments offer repayment insurance to banks at the point it is most valued. They are, in effect, a contractually pre-committed form of debt-equity swap.

The design of contingent capital needs further consideration - for example, the definition and calibration of the trigger thresholds. Nonetheless, experience to date offers encouragement. The contingent capital instruments issued at the end of last year by Lloyds Banking Group have risen in price since being issued. If contingent capital became more widespread, banks' capital ratios would be automatically stabilised over the cycle, lowering the chances of future banking crises.

As several academics have argued, the same basic principles could be applied to the debt contracts issued by households, companies and even sovereigns. Take a typical mortgage contract. A rise in the value of a property relative to the loan gives the borrower equity against which they can borrow. This provides an incentive to trade-up, raising house prices and generating further equity. This amplifier operates symmetrically, as falling collateral values reduce refinancing options and drive down prices. Economists call this effect the financial accelerator.<sup>18</sup> It adds to cyclicality in credit provision and asset prices.

US economist Robert Shiller has suggested it might be possible to devise mortgage contracts that slow, or even reverse, this financial accelerator<sup>19</sup>. Instead of being fixed in money terms, imagine a mortgage whose value rose with house prices. So the repayment burden would rise automatically with asset prices to slow a credit boom and fall in a recession to reduce the chances of mortgage default. Mortgages would operate like a contractually pre-committed debt-equity swap between households and

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<sup>18</sup> Bernanke, B and Gertler, M (1989), "Agency costs, net worth and business fluctuations", *American Economic Review*, 14-31.

<sup>19</sup> Shiller, R J (1993), *Macro Markets*, Oxford University Press.

banks. They would automatically stabilise household loan-to-value ratios. By reducing the amplitude of the credit cycle, they ought to benefit both borrower and lender.

Governments cannot issue equity. But this does not prevent them issuing debt with equity-like characteristics. For example, Robert Shiller has also suggested governments should issue GDP bonds, with coupons which vary with GDP. These would lower the public debt servicing burden at the point in the cycle when public deficits are likely to be largest. In this way, they would help smooth public expenditure and taxation over time. To date, GDP bonds have only been issued by some emerging markets. But in principle, they could serve as a quasi-automatic stabiliser for any country whose public debt experiences cyclical or crisis-related fluctuations.<sup>20</sup> Given recent events, perhaps their day is nearing.

## **Conclusion**

It is said that the longest journey begins with a single step. Events of the past twelve months have been a first step – and a big one. But they are just the start of the journey for the financial system and economy as balance sheets are repaired. This adjustment needs to be fast enough to repair balance sheets, but not so fast as to risk a setback for the financial system or real economy. What a hangover requires is neither a day in bed nor a night on the tiles. Having taken one big step forward, we should guard against taking two steps back.

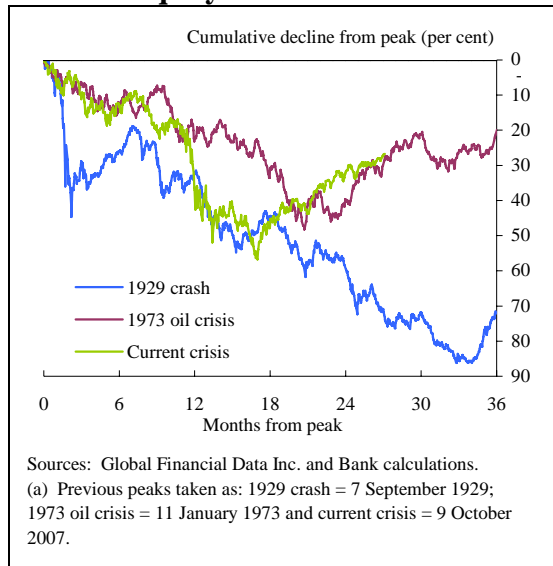
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<sup>20</sup> Kamstra, M and Shiller, R J (2009), “The Case for Trills: Giving People and their Pension Funds a Stake in the Wealth of a Nation”, *Cowles Foundation Discussion Paper No.1717*.

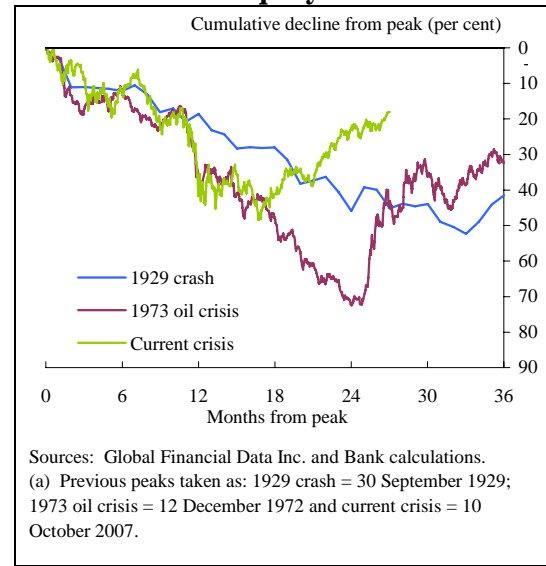
## ANNEX

### Chart 1: Equity indices during crises

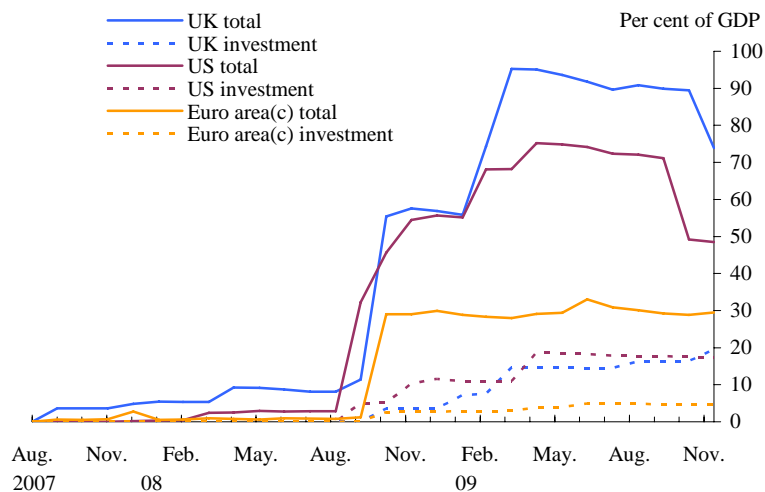
#### S&P 500 equity index



#### FTSE All-share equity index

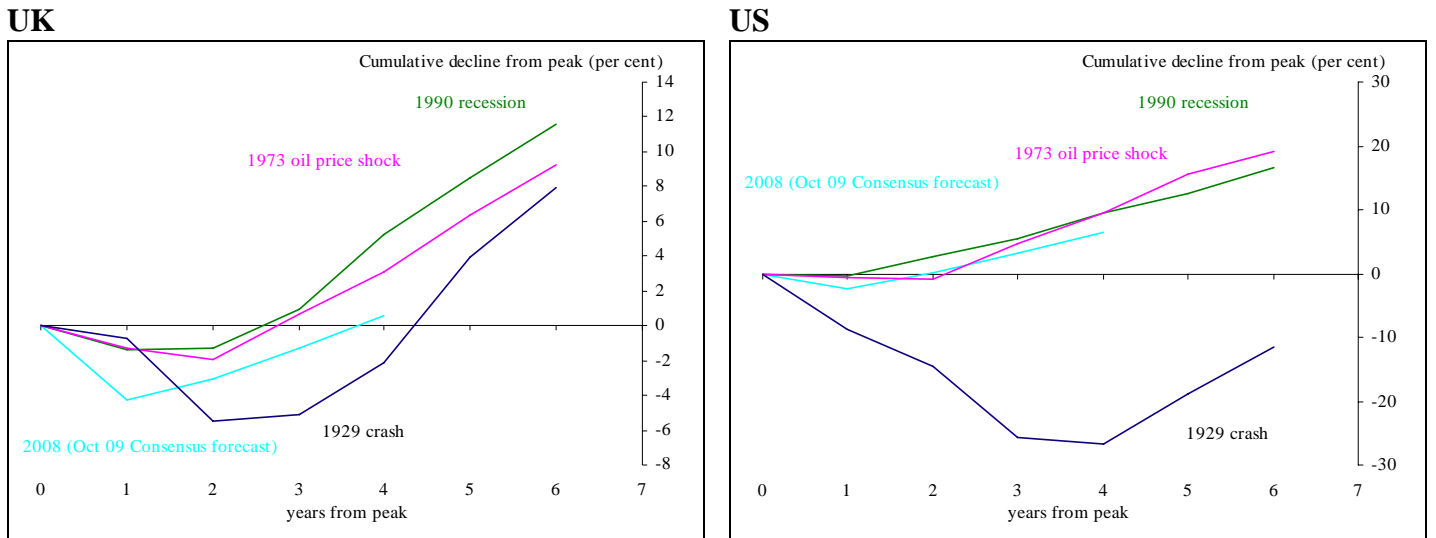


### Chart 2: Public sector interventions during the financial crisis (a)(b)

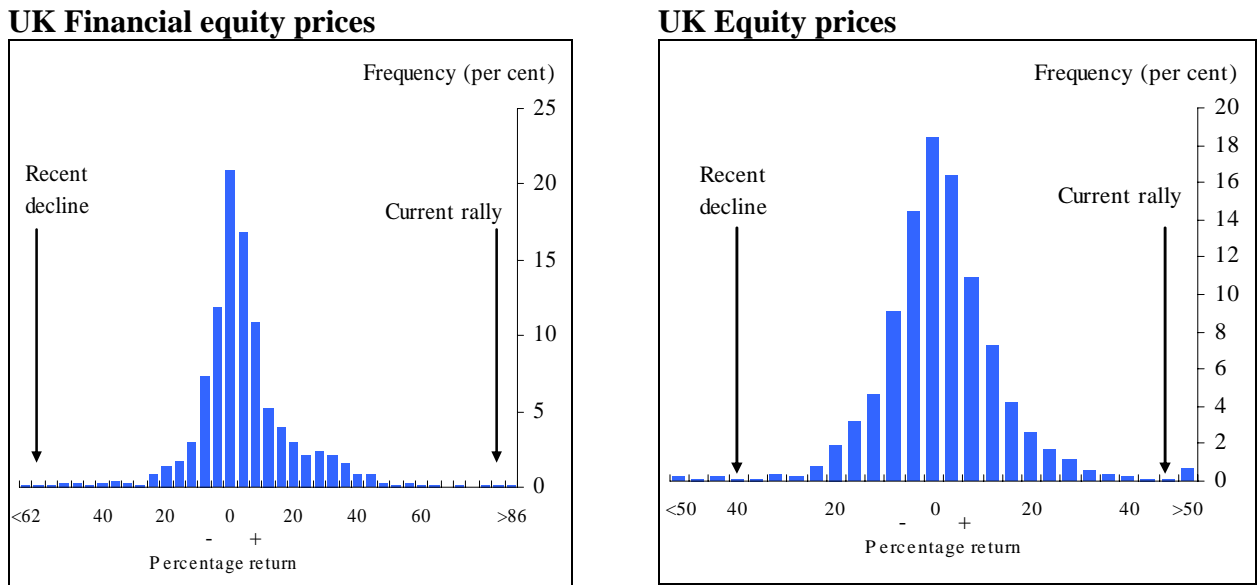




**Chart 3: GDP developments during recent crises**

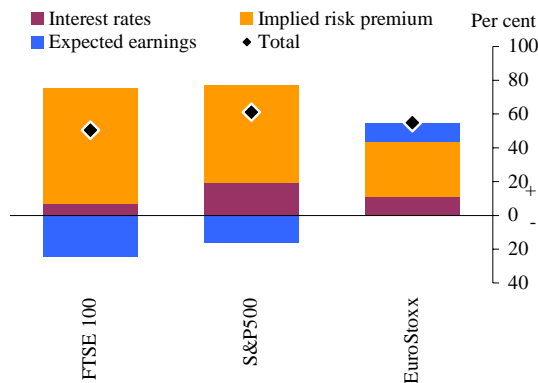


**Chart 4: Recent decline and rally in UK equity prices in an historical context**



Sources: Bloomberg, Global Financial Data and Bank calculations

**Chart 5: Changes in international equity indices since trough <sup>(a)</sup>**

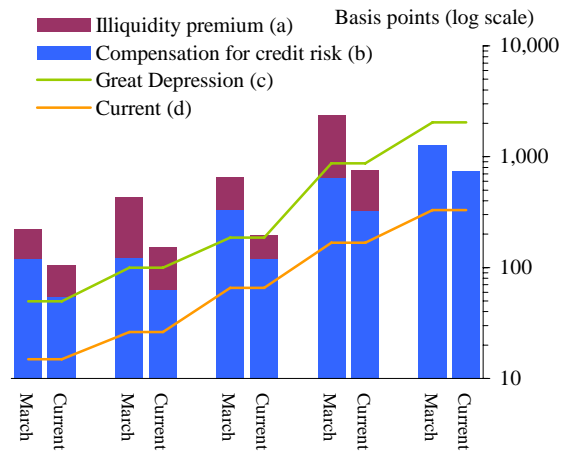


Sources: Bloomberg, IBES, Thomson Datastream and Bank calculations.

(a) Based on a three-stage dividend discount model. See Panigirtzoglou, N. and Scammell, R. (2002), 'Analysts' earnings forecasts and equity valuations', *Bank of England Quarterly Bulletin* (Spring), pages 59-66.

(b) Taken as 9 March 2009.

**Chart 6: European corporate bond spreads**



Sources: Citigroup, Moody's Investors Service, UBS Delta and Bank calculations.

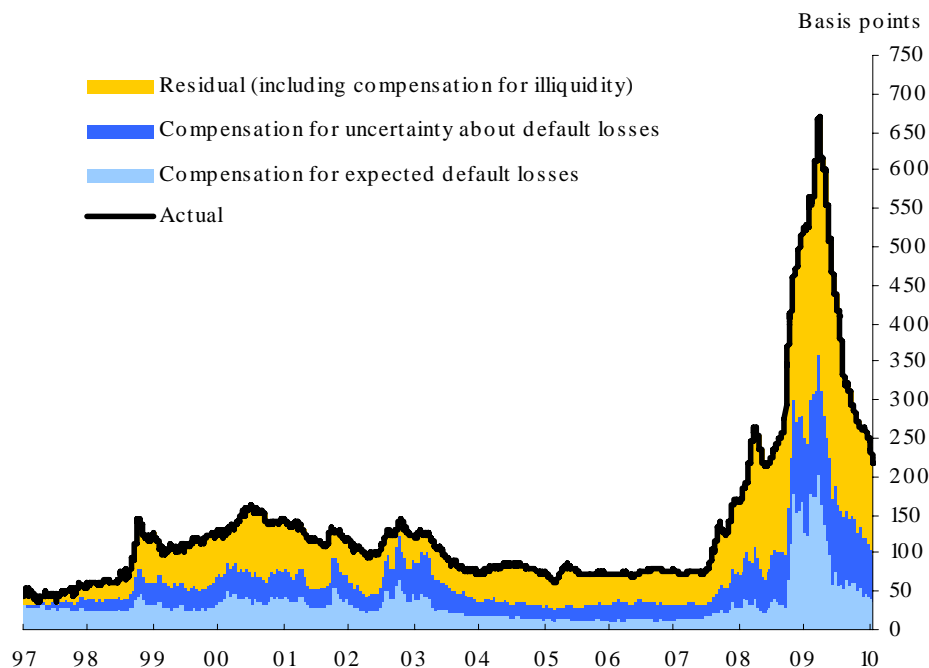
(a) Spread of iBoxx €corporate bond index over iTraxx Europe credit default swap index.

(b) iTraxx Europe five-year credit default swap index.

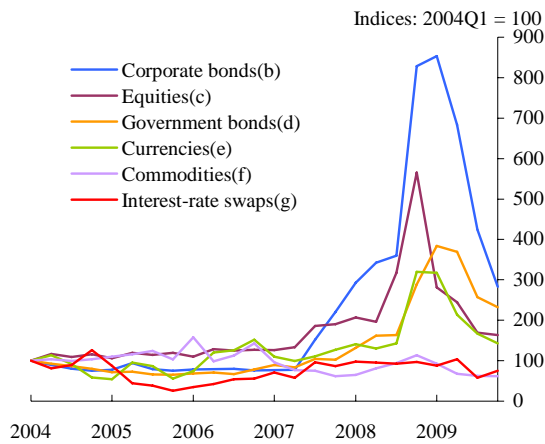
(c) Credit risk premium for realised default rates on US corporate bonds issued in 1931.

(d) Credit risk premium for Moody's current default probability forecast for European corporates.

**Chart 7: Decomposition of sterling-denominated investment-grade corporate bond spreads**



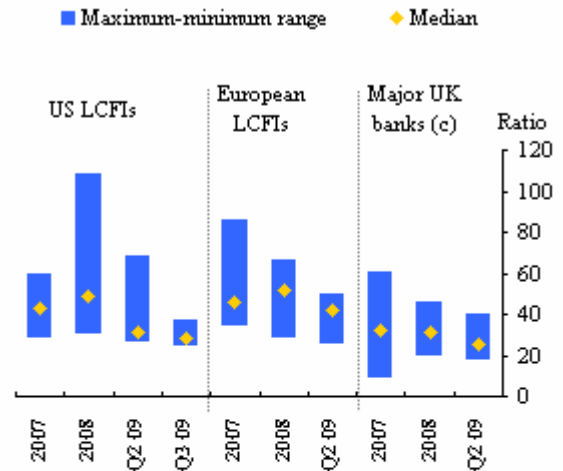
**Chart 8: Bid-ask spreads on selected assets**



Sources: Bloomberg, UBS Delta and Bank calculations.

- (a) Quarterly averages of daily bid-ask spreads. 2009 Q4 based on quarterly average to date.
- (b) iBoxx €Corporates.
- (c) S&P 500.
- (d) iBoxx €Sovereigns.
- (e) Euro/dollar exchange rate.
- (f) Gold price.
- (g) Euro five-year swaps.

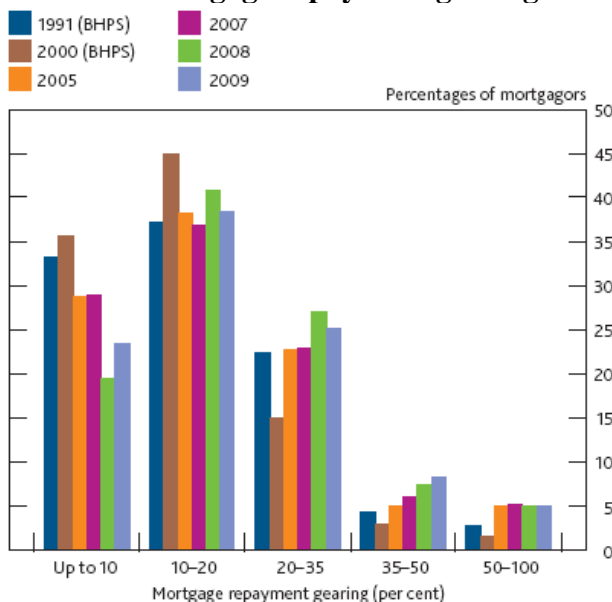
**Chart 9: Major UK banks' and LCFI's leverage ratios <sup>(a)(b)</sup>**



Sources: Published accounts and Bank calculations.

- (a) Assets adjusted on a best-efforts basis to achieve comparability between institutions reporting under US GAAP and IFRS. Derivatives netted in line with US GAAP rules. Off-balance sheet vehicles included in line with IFRS rules.
- (b) Assets adjusted for cash items, deferred tax assets and goodwill and intangibles. For some firms, changes in exchange rates have impacted foreign currency assets, but this cannot be adjusted for. Capital excludes Tier 2 instruments, preference shares, hybrids and goodwill and intangibles.
- (c) Excludes Northern Rock.

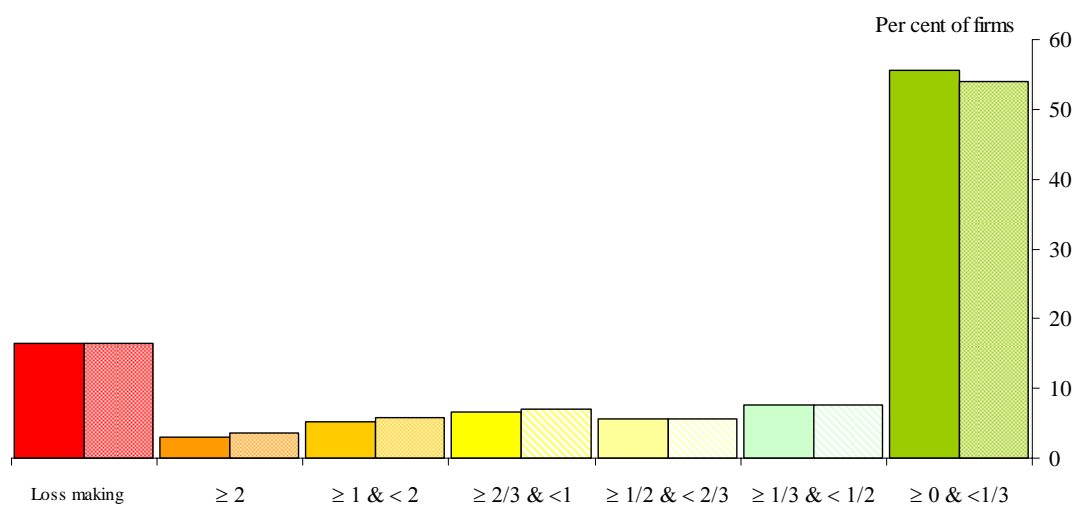
**Chart 10: Mortgage repayment gearing <sup>(a)(b)(c)</sup>**



Sources: British Household Panel Survey, NMG Financial Services Consulting survey and Bank calculations.

- (a) Mortgage repayment gearing is calculated as total mortgage payments (including principal repayments)/gross income.
- (b) Calculation excludes those whose gearing exceeds 100%.
- (c) Reported repayments may not account for endowment mortgage premia.

**Chart 11: Distribution of income gearing (2007 and 2008)**



**Source:** Bureau van Dijk and Bank calculations

<sup>1</sup> Solid bars show distribution of income gearing in 2007. Shaded bars show distribution of income gearing in 2008. Income gearing is defined as interest paid divided by earnings before interest payments.

**Table 1: Dividends and earnings in the UK and US**

		Dividend payout ratio		Dividend growth	Earnings growth
		Mean	Standard deviation	Standard deviation	Standard deviation
UK 1965 to 2008	Non-financials	56.65	10.07	1.83	2.84
	Banks	50.99	14.43	2.61	6.46
US 1973 to 2008	Non-financials	43.58	8.83	0.95	2.30
	Banks	42.27	9.91	1.91	6.03

Source: Thomson Datastream and Bank calculations.