

TOO MUCH DEBT, FINANCIAL SYSTEM STABILITY AND WIDER ECONOMIC IMPACTS

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It's a great pleasure to be here in Chicago for this conference on shadow banking. Shadow banking can mean many specific things. In essence, it entails credit intermediation outside or partially outside the formal banking system, but with the leverage and maturity transformation which are the defining characteristics of banks. Shadow banking enables credit creation additional to what the formal banking system alone delivers. In my comments this evening I want to focus on the broad issue of credit creation and resulting leverage, commenting on shadow banking's crucial role within that wider context.

I will set out a comprehensive argument and propose specific policy implications. To do that without undue length, I will make many of the arguments in summary form, referring for background support to previous two lectures:

- To one I delivered at the Stockholm School of Economics in September this year [Turner, September 2013]. In that lecture I considered the economic function of debt contracts, and the danger that a free market banking system might create credit in sub-optimally large quantities.
- And to one given at the School of Advanced International Studies in Washington DC in April 2012 [Turner, April 2012]. That lecture analysed the impact on the credit intermediation system of securitisation, credit structuring, and the complex combination of activities which we label shadow banking. It argued that these innovations had increased the inherent fragility of the credit intermediation system.

My comments tonight seek to integrate those two analyses.

But I am also very aware that the key argument I will make is not original, but draws heavily on the work of, in particular, Steve Cecchetti and Claudio Borio. I am concerned however that the global regulatory reform agenda, and macro prudential approaches at national level, still do not adequately respond to their key finding – that the credit cycle is fundamental to macro-economic performance as well as to narrowly defined financial stability and that free market financial systems can generate too much debt. I want to consider what policy implications should follow from those findings.

I will propose the following conclusions:

1. Financial deepening is not necessarily and in all respects beneficial. In particular if what we mean by 'financial deepening' is an increase in total private sector credit to GDP, or of banking

(and shadow banking) assets as a percent of GDP, it is almost certain that beyond some level further 'financial deepening' can be negative for long-term growth and human welfare. Free markets can produce too much debt.

2. Different types of credit perform different economic functions of different social value. Both economics textbooks and academic literature predominantly assume that credit flows from households to 'entrepreneurs/businesses' to fund new capital investment: but in modern banking, (and shadow banking) systems, only a small proportion of credit expansion performs that function. And free markets can be biased towards other categories of credit creation which do not contribute in the same way to growth.
3. Both aggregate levels of private sector leverage and the balance between different categories of credit are therefore issues of primary importance to macro-economic stability, and not just to more narrowly defined 'financial stability'.
4. The innovations of securitisation, credit tranching, derivatives, mark-to-market accounting, secured short-term financing, and VAR based risk management systems had two consequences. They facilitated the creation of additional credit: and they increased the potential fragility of the financial system and its susceptibility to runs.
5. Financial regulation reform needs to address issues of financial system stability, reducing the probability of major systemic shocks and of disorderly firm failure. Reforms introduced to date have focused on those objectives, and have made significant progress, but further strengthening is required, particularly in the shadow banking arena.
6. But central banks/macro prudential regulators must also be able to deploy policy levers in pursuit of wider macro-economic stability, leaning against credit and asset price cycles, and constraining levels of leverage, overall and by specific category of credit. Both pre-emptive interest rate policies and the use of macro prudential policy levers are likely to be appropriate. Those latter levers should include direct borrower constraints (e.g. maximum LTV or LTI limits) as well as levers working via bank capital requirements.
7. This has major implications for central bank roles, and for the balance between rules and discretion. It implies that 'monetary stability' and 'financial stability' cannot be considered as entirely separate activities, each with their quite distinct set of policy objectives and tools.

The first three conclusions also carry implications for the policies needed to navigate our way out of our current post-crisis travails. Increased private sector leverage in the pre-crisis period, followed now by attempted deleveraging, is the main reason why we face anaemic growth and deflationary threats. Faced with those threats the full range of policy responses, including some previously considered taboo, should be considered. [Turner, February 2013]. And it is vital to avoid facile assumptions of symmetry: the fact that excessive debt created the problems doesn't mean that rapidly reducing public or private borrowing will now solve them. But this evening I will not comment on the policies required to manage out of the post-crisis predicament. Instead my focus this evening is on how we should manage the future financial system to ensure that we do not repeat our pre-crisis errors.

One final comment before I turn to my argument. My implications for policy may seem remarkably interventionist to propose here in Chicago, in the home of Chicago school free market economics. But it is striking that one historic figure of Chicago economics – Henry Simons – argued for a more radical intervention than I am suggesting: he proposed the abolition of fractional reserve banks. [Simons 1936] And John Cochrane of today's Chicago school has recently argued that private credit creation

imposes a negative externality and that we should consider imposing a tax on credit intermediation [Cochrane 2013].

Both Simons and Cochrane thus treat the markets for credit and money as very special cases. And rightly so, for the principles in favour of free markets, strong in so many other sectors of the economy, are far weaker in credit and money markets. In these, for inherent reasons, private and social optimality can dramatically diverge.

1. RISING FINANCIAL INTENSITY IN THE PRE-CRISIS ERA

The 2008 crisis was preceded by several decades of rising financial intensity – of ‘financial deepening’ in many advanced economies (Exhibit 1). Financial system assets grew relative to GDP. Trading activity grew relative to underlying real economic activity. Financial innovation brought us structured credit securities and derivatives. The measured value added of financial services grew as a percent of GDP.

Within this rising financial intensity, changes in the provision of credit were particularly important. Two different dimensions of change can be distinguished.

- First, the growth of real economy private sector leverage, with either household or corporate debt (or both) growing significantly as a % of GDP in many countries. Exhibit 2 provides just one of many possible illustrations – the growth of UK household debt from 15% of GDP in 1964 to over 90% by 2008.
- Second, the increasing complexity of the credit intermediation process. This complexity reflected the development of securitisation and shadow banking, with credit intermediation between real economy savers and borrowers passing through multiple steps along complex intermediation chains. As a result, intra-financial system assets and liabilities exploded in size relative to GDP. Banks themselves became more leveraged. And wholesale short-term funding became more important. Exhibits 3 and 4 provide some illustration of these effects. In Exhibit 3 we can see rising real economy leverage, but also the even more rapid growth of intra-financial system leverage. Exhibit 4 illustrates the increasing complexity of the U.S. intermediation process, as various categories of shadow banking related assets grew far more rapidly than traditional bank balance sheets.

Ahead of the crisis, the predominant view of economists and policymakers was that both of these dimensions of change were either neutral or benign. Modern macro-economics and central bank monetary models to a large extent ignored the trends, treating the financial system as a neutral veil. Financial regulators, and global authorities such as the IMF, largely welcomed them, assuming that increased financial intensity was positive for allocative efficiency and effective risk management, since it completed more markets, facilitated price discovery, and made possible the dispersion of risks into the most appropriate hands. [IMF 2006]

That conventional wisdom collapsed in 2008: a financial system which had been ignored or lauded produced a massive crisis and severe post crisis recession. It is crucial we learn the lessons. To do so, a crucial question we must answer is whether both of those two pre-crisis trends were important, or only those developments which made the financial system itself more fragile.

- Did the crisis occur because we allowed the credit intermediation system to become dangerously complex and risky, with over leveraged banks too reliant on short-term funding,

and with the innovations of securitisation, derivatives and shadow banking, making the system more fragile?

- Or was it also a crisis produced or exacerbated by too much leverage and by particular categories of credit creation within the real economy?

I will suggest that both dimensions of change were vitally important. And that our policy response cannot focus solely on issues of financial system risk and stability narrowly defined, but must also address the wider issue of the credit cycle and macro-economic stability.

2. FINANCIAL MARKETS ARE DIFFERENT

Much pre-crisis orthodoxy assumed that financial markets are efficient. Financial market completion and increasing financial intensity thus seemed axiomatically beneficial.

The crisis has brutally reminded us that this is not true. Financial markets of all sorts can be subject to self-reinforcing momentum effects which can reasonably be described as 'irrational'. Charles Kindleberger's work describes multiple examples of irrational booms and busts across the centuries [Kindleberger, 1978]. And Robert Shiller's work has provided compelling evidence that market price movements do not always reflect rational fundamentals. [Shiller, 2000]

But that might still leave the case for a broadly free market approach compelling in many areas of finance. Any policy intervention introduced by imperfect public authorities can itself create new distortions; and the case for a market economy is not that it is perfect, but simply better than the alternative.

And when market irrationality is confined to equity markets, the adverse consequences may be limited, and acceptable. Exhibit 5 shows the movement of the NASDAQ index during the Internet boom and bust of 1997 to 2002, first soaring from 1500 to over 5000 before falling back again to 1500. I think it is clear that the upswing owed a lot to irrational exuberance. And some misallocation of real resources undoubtedly resulted. But the rapid fall from the exuberant peak did not produce a major macro-economic recession: and as Bill Janeway has argued, the process of innovation involves and indeed may require surges of over optimistic exuberance and resulting Schumpeterian waste. [Janeway, 2012]

As long as financial market irrationality is confined to equity markets, a broadly benign attitude may remain justified.

It is when the inherent potential imperfections of financial markets infect the market for credit creation and debt contracts that major adverse macro-economic consequences can result.

3. DEBT CAN BE DANGEROUS: FREE MARKETS MAY CREATE TOO MUCH

The distinctive character of debt contracts means that free markets left to themselves can produce 'too much' debt relative to the size of income flows, and thus relative to GDP. They can also produce too much of particular categories of debt. And high private sector leverage can wreak serious economic harm.

Debt contracts, inefficient markets and cycles of credit creation

Debt contracts can perform important and beneficial economic functions. In my Stockholm lecture I explored the extensive academic literature which has described those functions and benefits. Debt contracts overcome, or at least respond to, the difficulties of 'costly state verification' (either ex-ante the project assessment or ex-post the project realisation), which make a pure equity economy infeasible. [See e.g. Townsend, 1979] Without debt as well as equity contracts, it would have been far more difficult and perhaps impossible to achieve the mobilisation of the capital required for the initial industrial revolution, for subsequent advanced economy growth at the frontier of technology, or for economic catch up by emerging economies towards advanced economy living standards.

But there are also strong arguments for believing that free financial markets and banking systems can create debt contracts in excessive, sub-optimally large quantities. This reflects both investor myopia and imperfections of information and incentives along chains of principal/agent relationships.

- The myopia argument has been set out by Gennaioli, Shleifer and Vishny [Gennaioli, Shleifer and Vishny 2010]. It derives from the asymmetric character of the frequency distribution of debt contract pay-outs, which creates the potential for "local thinking". Investors in the good times may focus solely on the part of the distribution in which contracts pay out 100 per cent, ignoring the currently unobserved possibility of losses. As a result many credit securities may be issued which "owe their very existence to neglected risk".
- The role of imperfect incentive alignments between principals and agents was explored earlier this year by Jeremy Stein. [Stein, 2013(a)] As he demonstrates, such misalignments, deriving in particular from the put options inherent in debt contracts, could drive credit creation cycles even in the absence of more "behavioural" factors.

These imperfections could produce sub-optimally excessive debt creation even if all debt contracts took a direct form – linking savers with borrowers without bank intermediation. But the danger of excessive credit creation is greatly increased if we have fractional reserve banks, able to create credit and money de novo, rather than simply intermediating the flow of already existing money. And it is still further increased once we recognise different categories of credit and the different economic functions that they perform.

Economic theory has tended to concentrate on one particular category of credit, performing one particular economic function. In undergraduate and advanced text books, and in most academic papers, to the extent that the banking system is present at all, it is assumed that banks take deposits from households and lend the money on to 'entrepreneurs/businesses', allocating available funds between alternative capital investment projects.

In the real world however, bank credit creation can also serve other purposes. (Exhibit 6)

- It might indeed fund new capital investment projects; or fund human capital investment (e.g. through student loans)
- But it can instead fund the purchase by businesses or investors of already existing assets
- And it can fund household mortgages, in some cases stimulating new residential construction, but in many cases financing competition for the ownership of already existing houses

- And in the form of consumer credit, it may fund consumption by impatient, or in some cases simply poorer, households.

The balance between these different categories of credit varies by country. But in advanced economies, the categories which do not finance new capital investment tend to dominate. In the UK in 2009 only about 15% of total credit was clearly devoted to the capital investment projects on which economic theory has tended to focus. (Exhibit 7)¹

Conversely, the majority of credit in most advanced economies finances commercial and residential real estate purchase. That fact greatly increases the danger that free market banking systems will be susceptible to self-reinforcing cycles of credit creation and subsequent destruction.

- Credit extension will appear least risky to lenders when it can be secured against assets which have alternative use value: lending against real estate meets this criterion; lending to finance specific use equipment, training, or research and development does not.
- And if real estate assets are location-specific, their new supply will be highly inelastic in the face of price increase, with real estate values primarily driven by the value of irreproducible land, rather than by construction costs.
- As a result a free market credit creation system can have a sub-optimal bias towards the financing of existing assets, in particular real estate.
- And it can be susceptible to strong self-reinforcing cycles, in which credit extension drives asset prices, which in turn stimulates both credit supply and demand, as a consequence of changes in the net worth and expectations of both borrowers and lenders. (Exhibit 8)

Adverse effects of too much – and the wrong sort of – debt

Free-market banking and shadow banking systems may generate sub-optimally high levels of debt, overall and particularly in specific sectors. That might cause economic harm even in the upswing of the credit cycle: but it is in the periods of post-crisis deleveraging that the harm becomes most significant.

In the upswing of the cycle, an adverse impact might result from the bias towards lending against collateral which has an alternative uses value. Real estate lending might be preferred at the expense of other business projects. A recent paper by Chakraborty *et al* presents evidence of such a crowding out effect, suggesting that when house prices rise rapidly (in part as an endogenous consequence of mortgage lending) banks tend to reduce lending to commercial and industrial companies. [Chakraborty, Goldstein and Mackinlay, 2013] How significant such effects might be merits further research.

The far more serious and more certain impact of excessive leveraged however arises in the aftermath of financial crises, as asset prices, credit demand and credit supply fall in a reverse of the upswing's

¹ The other categories of credit provision – in particular household debt which facilitates life cycle consumption smoothing – may also deliver welfare benefits, but these benefits are different in nature from the growth enhancing benefits typically ascribed to the efficient funding of capital investment projects

self-reinforcing cycle. In the downswing, two aspects of credit market dynamics become drivers of still further deflation.

- First, the rigidities of default and bankruptcy processes, which as Ben Bernanke has noted would never be observed in a world of complete markets, but which in the real world can drive asset fire sales, and disruptive business failures. [Bernanke, 2004]
- Second, and probably still more important, the impact of ‘debt over-hang’ as households and corporates, faced with lower asset prices and reduced income prospects, focus on deleveraging at the expense of consumption or investment.

These two features – both inherent consequences of the non- state contingent character of debt contracts – create the danger of the self-reinforcing “Debt Deflation” cycle which Irving Fisher described. [Fisher 1933]

The fundamental reason why the global financial crisis has been followed not only by a deep initial recession but also by a long period of anaemic recovery, is the strength of the debt overhang effect. Private sector credit growth which was previously running far faster than nominal GDP in many countries has trailed far behind since 2008 (Exhibit 9) and while this may in part reflect credit supply constraints, dramatically reduced credit demand has been at least as important.

Attempted deleveraging by the private sector has as a result injected a strong deflationary impulse to advanced economies with consequences which we should have anticipated give Japan’s experience after its private sector credit boom turned to bust in 1990.

- As Richard Koo [Koo, 2009] has persuasively described, attempted deleveraging by Japanese corporates, produced a corporate sector financial surplus to which government deficits were the naturally arising but also necessary offset, but with the inevitable consequence that public debt to GDP rose relentlessly. (Exhibits 10 & 11) At the total economy level indeed, leverage did not decline, but simply shifted from the private to the public sector. That same pattern has now been repeated in Spain, Ireland, the U.S. and the UK. (Exhibit 12)
- And just as in Japan, policy makers seem now to have been left with only imperfect policy levers available with which to respond.² The potential for fiscal stimulus seems constrained by public debt sustainability concerns; and the effectiveness of monetary policy constrained both by the zero bound and by the inelasticity of some private sector households and corporates to interest rate changes, given their focus on balance sheet improvement.

Real economy private sector leverage matters because it can create a harmful debt over-hang problem; the implication is that public policy should aim to prevent the emergence of excessive leverage during the upswing of the cycle.

² In fact, fiscal plus monetary authorities combined never run out of ammunition with which to stimulate nominal demand, as long as they are willing to consider the full range of possible policy options including overt money finance of increased fiscal deficits. [See Turner, February 2012] Given the potential disadvantages of such a policy (particularly in terms of the precedent it sets), however, the case remains strong for ensuring that pre-crisis policy restrains excessive leverage growth, in order to limit the dangers of a post crisis debt overhang.

In the Euro zone today, problems in Greece and Italy may reasonably be ascribed to inadequate control of past public budgets and debt levels. But in Spain, Ireland and the Netherlands, as also in the UK and the US, public debts levels have risen post crisis because of the pre-crisis growth of private leverage.

And it is the level of private sector leverage that matters and not just its rate of growth, because the level determines the scale of attempted post crisis deleveraging.

These conclusions of course are by no means original. Claudio Borio's work has stressed the centrality of credit driven cycles to macro-economic fluctuations. And his "core stylised feature Number One" is that the essence of the problem is "credit and property prices" [Borio, 2012]. Steve Cecchetti has argued that financial systems can create too much debt, and in his latest work is exploring the specific role of debt secured against tangible assets [Cecchetti, Mohanty and Zampoli 2011; Cecchetti and Kharroubi 2012].

But the conclusion is so important that it bears being repeated and stressed:

- Free market competition can produce too much credit and a suboptimal mix of credit types. Credit creation beyond some level – particularly when focussed in real estate or other existing asset categories – can create a negative social externality.

4. BUT WHAT ABOUT THE EVIDENCE FOR BENEFICIAL FINANCIAL DEEPENING?

Too much leverage can have harmful economic effects. This conclusion appears to contradict the significant body of economic analysis which has found evidence that financial deepening delivers beneficial effects. Ross Levine's literature survey of 2004, for instance, suggests a broadly favourable impact of financial deepening, not only in general but also if we focus quite specifically on Credit to GDP or Bank Assets to GDP [Levine 2004]. Levine's analysis suggests a positive relationship between these ratios and economic growth.

Recent papers by Steve Cecchetti, however, provide empirical support for the theoretical arguments presented above, with increasing credit to GDP appearing to have a positive impact on growth up to some point but negative beyond it (Exhibit 13). Cecchetti's analysis suggests that we should replace previous assumptions of a limitless and linear relationship between financial deepening and growth, assuming instead an inverse U function. The findings of research by Alan Taylor, Oscar Jordá and Moritz Schularick are also compatible with this conclusion. [Taylor and Schularick 2009] [Jordá, Schularick and Taylor, 2011] [Taylor, 2012]

Further empirical research is clearly desirable. But the theoretical arguments for Cecchetti's inverse U hypothesis are compelling. There are strong reasons for believing that the existence of debt contracts plays a crucial role in facilitating capital mobilisation; but an equally strong case that beyond some level increasing debt intensity is likely to cause harm; and that free market finance left to itself will create debt which moves the economy beyond that optimal level.

The specific examples that Levine uses to illustrate his findings are indeed fully compatible with that conclusion. They illustrate the potential benefits of financial deepening starting from very low levels of credit intensity.

- As Levine argues, countries like India, with private credit to GDP averaging 19.5% over the period 1960–1995, would almost certainly have benefited from financial deepening.
- And there are some countries today – such as India and Indonesia – which still have credit to GDP ratios likely to place them on the rising section of Cecchetti’s curve.
- But that is wholly compatible with the conclusion that at higher levels of debt to GDP, further financial deepening could have harmful economic reflects. The fact that economics largely ignored that possibility prior to the crisis was a major failure.

5. COMPLEXITY, SHADOW BANKING AND THE ORIGINS OF THE CRISIS

The disadvantages of excessive credit creation considered above could arise even if all credit was extended by traditional banks. There were debt and banking crises long before the development of securitisation, credit structuring and derivatives. The Japanese and Scandinavian banking crises of the early 1990s owed nothing to the increase in credit intermediation complexity which occurred in the decades running up to the 2008 crisis.

But that increase in complexity played a crucial role in precipitating the crisis and increasing its severity. It both facilitated excessive credit extension to the real economy and made the financial system itself more fragile.

This conference is focused on shadow banking. And it is possible to get tied in knots debating what exactly we should include in shadow banking and what not. I will therefore avoid that debate. But focus instead (as did my April 2012 lecture at SAIS) on the wide ranging sets of changes and innovations which together contributed to a dramatic increase in the complexity of the global financial system and in particular of the credit intermediation process.

Those changes included:

- The securitisation of an increasing proportion of loans, and the resulting increase in credit trading activities. This established transparent prices for credit risk, set in at least sometimes liquid markets. It made possible, and in some cases unavoidable, the widespread application of mark-to-market accounting.
- The increased use of credit structuring and tranching, creating combinations of risk and return attractive to specific investor groups.
- The development of multistep credit intermediation, delivering through numerous contracts and institutions the intermediation and maturity transformation previously performed within one bank balance sheet. Thus, for instance, investors holding instantly available deposit-like accounts in money market mutual funds, indirectly funded 30 year mortgages, via complex chains involving multiple institutions (e.g. SIVs and hedge funds) and multiple contract markets (e.g. ABCP and repo).
- The application of apparently sophisticated risk management techniques to control individual agents’ risk in this more complex world, and to minimise capital requirements. These techniques included increased use of secured financing contracts, with collateralisation and

margin calls: mark-to-market accounting to track up-to date exposures, and the use of Value at risk (VAR) models to determine the appropriate level of trading book capital and haircuts.

- The increasing use of derivatives – whether FX, interest rate or credit related – to hedge risks and to manage regulatory capital.
- An increased role of short term wholesale funding contracts, both secured and unsecured, as firms became increasingly involved in a complex mesh of intra-financial system assets and liabilities.

These developments and innovations fed upon one another. And crucially, they did not result in the development of a discreet new shadow banking system, parallel to but separate from formally regulated banks, but rather to a complex interrelated system in which commercial banks were deeply involved in and affected by these changes.

The barriers between commercial and investment banks eroded. Commercial banks sponsored off-balance-sheet shadow banking vehicles (e.g. SIVs). Large commercial banks were major traders of credit securities and derivatives. Short-term wholesale funding played an increasing role for banks as well as non-banks. Bank balance sheets ballooned as intra-financial system assets and liabilities proliferated.

The predominant belief ahead of the crisis was that these developments were beneficial.

- Securitisation and credit structuring were believed to have enabled the dispersion of risks into the hands of those best placed to manage it.
- Market liquidity and transparent pricing were deemed good for allocative efficiency. The IMF noted with approval that credit derivatives *“enhance the transparency of the markets collective view of credit risks... [and thus]... provide valuable information about broad credit constraints and increasingly set the marginal price of credit”*. [IMF, 2006]
- Improved risk management techniques were believed, again in the words of the IMF to have *“helped make the banking and overall financial system more resilient. The improved resilience may be seen in fewer bank failures and more consistent credit provision”*.
- And the fact that the system enabled credit creation outside of bank balance sheets, was seen as a positive benefit, ensuring that credit grew fast enough to support economic growth. Indeed even after the crash, in 2012, the Economist Magazine reported a “senior American regulator” stressing that *“securitisation is a good thing. If everything was on bank balance sheets, there would not be enough credit.”*

Clearly however something went badly wrong: the financial system suffered its biggest crisis for 70 years. And as the crisis developed over 2007-08, many of the initial crystallisation events involved not plain old fashioned bank balance sheets, but hedge funds, broker dealers, money market funds, margin calls on derivatives, and the repo market.

So what went wrong? I think three factors were particularly important

- First, the unstable interaction of credit securities trading, transparent pricing, mark-to-market accounting, secured financing and VAR models. Each of these were seen as positive factors – improving price discovery and risk control. But as Hyun Shin, Marcus Brunnermeier and

others have explored [Shin, 2010] [Brunnermeier and Pedersen, 2009] they can interact in ways which take the potentially self-reinforcing credit and asset price cycle, and effectively hardwire and turbo charge it. (Exhibit 14) If credit prices were always set in an entirely efficient fashion, rationally and smoothly anticipating future risks, the new credit system might indeed have delivered benefits. But if credit prices can move in the fashion shown on Exhibit 15, with CDS spreads signalling as late as spring 2007 that the financial system had never been less risky, before surging to irrationally high levels, then the same design features can make the overall system more fragile.

- Second, the adverse consequences of multistep credit intermediation. This aggregation dramatically increased the gross value of contracts outstanding, and increased the number and complexity of contractual links. It thereby increase the risk of both the “local thinking” described by Gennaioli Shleifer and Vishny, and of the misaligned principal/agent relationships described by Stein. It undermined incentives for good credit underwriting, and increased the potential for the origination and distribution of credit securities which “owed their very existence to neglected risk”.
- Third, the double edged impact of market completion through innovation of new contract forms. Any new financial contract which makes possible risk management and reduction, also makes possible increased position- taking, and can thus increase gross risks. Credit derivatives could indeed be used to hedge and manage risks, but they can also be used to take positions unrelated to underlying exposures, inflating still further gross contractual exposures. At the height of the crisis indeed, synthetic credit exposures were created for the sole purpose of providing a match to desired short CDS positions. Financial risk was generated far beyond that inherent in underlying real economy credit exposures.

In several ways therefore, the very features of the pre-crisis credit intermediation system which had been lauded as delivering market completion, price discovery and risk management benefits, combined to create a system which was more fragile, more susceptible to sudden equilibria shifts, and with hardwired mechanisms for magnifying the impact of initial shocks. The dramatic wholesale market runs of autumn 2008, in both secured and unsecured funding markets, were the almost inevitable eventual consequence.

In addition however it is worth noting that the system did deliver one of its purported stated benefits: it facilitated greater credit creation. But if, as Section 3 and 4 argued, additional credit creation beyond some threshold can be negative for growth and welfare, that too could be a harmful effect.

6. ADDRESSING FINANCIAL SYSTEM STABILITY RISKS: NECESSARY BUT NOT SUFFICIENT

Section 5 argued that the multiple developments and innovations which we might cover under the broad heading “shadow banking” combined to make the credit intermediation system more fragile. That is hardly surprising, since a non-regulated banking system would also be highly unstable. Private incentives encourage maximum leverage, increasing the dangers of insolvency: run risk is inherent in a system which delivers extensive maturity transformation.

A key objective of prudential regulation is therefore to reduce the fragility of the credit intermediation system itself, to pursue the objective of “financial system stability”. In this context I want to use that term to mean:

- A reduced risk of destabilising runs
- A reduced risk of a self-reinforcing solvency crisis in which threats to the solvency of one bank result in actual or perceived risks to the solvency of others.
- And a reduced probability of a large bank, or other important credit intermediary, suffering disorderly failure, or near failure only prevented by taxpayer bailout.

Most of our current regulatory reform agenda is essentially focused on achieving these objectives. Much has already been achieved, but some further strengthening is essential.

Reforms focused on the formal banking system have been significant and essential, combining:

- The much higher capital requirements introduced by Basel III. These need to be reinforced by robust reforms to the trading book capital regime, an area where pre-crisis regulatory capital requirements were woefully inadequate to absorb risk.
- Tighter constraints on maturity transformation risks, addressing in particular reliance on short-term wholesale finance, both secured and unsecured. The Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR) will both be crucial in this regard. In addition we may need to consider other more direct constraints on wholesale short-term funding.
- The creation of effective resolution regimes, maximising our ability to resolve major banks without disruptive knock-on effects, but also without relying on tax payer support.

Reforms focussed on the shadow banking system have progressed more slowly, essentially because we are not dealing with a clear defined set of institutions, but with a complex and continually evolving mesh of multiple institutions and markets. Crucial steps here include:

- Measures to ensure that links between the formal and shadow banking systems are transparent and reflected in adequate capital support. The FSB/Basel Committee programme of reforms has largely achieved this objective.
- Measures to address clearly crucial nodes in multistep maturity transformation chains. In this context, money market mutual funds are particularly important and it is unfortunate that progress in the most important market, the U.S., has been slow.
- But also, and crucially I believe, measures to address one of the most fundamental risks of shadow banking widely defined, the danger within a system of securitised and traded credit of the self-reinforcing cycle illustrated on Exhibit 14. Here I believe that the imposition of minimum haircuts on secured finance and securities financing transactions is the way to go, mitigating at least to a degree the dangers of hard-wired procyclicality inherent in secured financing markets. Much good preparatory work on the options was done by the Financial Stability Board's Workstream 5: and some measures are edging forward. But I agree with Jeremy Stein in his recent conclusion that *while currently planned measures are "likely to be helpful in fortifying individual regulated institutions ... they fall short of a comprehensive market-wide approach to the fire sales problems associated with securities financing transactions"* [Stein, October 2013]

It is therefore essential that we complete and strengthen further the agenda of bank regulatory reform, and drive forward to effective shadow banking regulation.

But also that we recognise that reforms focused solely on “financial system stability” may be insufficient. For it would be possible to envisage a future scenario in which we managed very significantly to reduce the probability of a large scale financial system crisis, or of major bank failure, but reverted – once economic recovery is well advanced – to a slow but relentless rise in real economy leverage, which would eventually result in deflationary deleveraging and macroeconomic harm.

We could have banks sufficiently well capitalised that they could survive the next Minsky turning point without taxpayer subsidy; but with real economy credit and asset price cycles which still caused significant harm.

I want to suggest therefore, that in the macro prudential arena, we cannot avoid going beyond “financial system stability” narrowly defined, to a wider focus on the macroeconomic impact of increasing and potentially excessive debt levels.

7. CONSTRAINING CREDIT CREATION: MONITORING AND THRESHOLDS

The implication of Sections 3 and 4 is that the level of private sector debt relative to income, and its composition as between different categories of credit, are matters of fundamental economic importance. That is quite contrary to the pre-crisis orthodoxy which assumed that private sector leverage levels and trends could be either: (i) ignored because financial system balance sheets were neutral veils of no macro importance; (ii) assumed optimal by definition since private competition was bound to produce a socially optimal result.

We need to reject that pre crisis orthodoxy. In a perfect world, we would be able to replace it with simple rules, telling us the level of private debt to GDP which is “too much”, and seeking to constrain debt below that level. Steve Cecchetti’s 2011 paper reached a tentative conclusion that *“When corporate debt goes beyond 90% of GDP it becomes a drag on growth. And for household debt, we report a threshold of 85% of GDP, though the impact is very imprecisely estimated.”*

If these tentative indicators are broadly right, they mean that several advanced economies have already entered the “too much debt” zone.

We should however be careful of believing that we can arrive at any precise or universally applicable rules. Reinhart and Rogoff have made a strong case that higher levels of public debt to GDP can create sustainability concerns, necessitating fiscal consolidation which might be adverse for growth. [Reinhart and Rogoff, 2009] But recent debates about the precise empirical evidence have warned us of the dangers of fixing upon one specific figure – such as 90% - and assuming that it is the crucial threshold. For both public and private sector debt, multiple factors make simple and universal rules impossible.

- For both public and private debt, the level at which leverage becomes problematic (or at the limit quite unsustainable), must reflect future nominal income growth potential. The faster that nominal GDP – and as a result household or corporate income levels – can be expected to increase, the more manageable is any given debt stock relative to current income.
- Within private debt, the level of leverage which is concerning needs to be considered separately for household and corporate sectors but with a potential interdependence. If both sectors are highly leveraged, post-crisis attempts to delever by both sectors simultaneously will have greater deflationary impact.

- And as the recent post-crisis experience demonstrates, the issues of public and private debt sustainability can be closely linked. As the IMF has recently suggested [IMF 2013], relatively high levels of public debt may only carry severe disadvantages if accompanied by high private debt. The inverse may also apply.

Further empirical analysis may shed more light on these issues. But it seems unlikely that we can ever establish precise 'danger thresholds'. This has implications for the rules versus discretion debate with which I will conclude.

But the impossibility of precise rules cannot justify a policy of ignoring private leverage levels. The theoretical reasons for believing that there must be a point beyond which higher private leverage causes increasing harm remain strong even if that point cannot be precisely identified.

- In the advanced economies we should therefore have paid attention to the large increases in leverage underway in many countries even before the explosion of complexity and innovation which triggered the crisis. In the UK, household debt to GDP rose from 15% in 1964 to 95% in 2008 (Exhibit 2); in the U.S., total private sector leverage rose from around 70% in 1945 to over 200% by 2008 (Exhibit 16). Those increases made those economies greatly more vulnerable to post crisis deleveraging and deflation.
- And in some emerging economies today, including in particular China, there are dangers that increasing private sector leverage could expose them to similar risks. (Exhibits 17 and 18)

8. CONSTRAINING CREDIT CREATION: POLICY LEVERS

We should therefore monitor carefully trends in private as well as public sector leverage and assess their possible implications for future macro-economic stability. But we also need to deploy policy levers which can constrain private sector leverage levels in order to protect macro-economic stability, going beyond those measures which we would take if focussed only on financial system stability more narrowly defined.

We could seek to do this by more pre-emptive monetary policy – using interest rates to affect credit creation and asset prices, rather than focussing solely on current price stability; alternatively or as well, we could deploy macro prudential policy levers. There are important advantages and disadvantages of each (Exhibit 19)

- The theoretical case for using interest rates, reflects the belief that the essential problem was as described by Knut Wicksell – that credit creation will be excessive if financial interest rates are allowed to fall below the “natural rate of interest”, which is determined by the marginal productivity of real capital investment. [Wicksell, 1894] And this case is reinforced by a pragmatic argument that – as Jeremy Stein puts it – interest rates “get into all the cracks” [Stein, 2012], or as Claudio Borio expressed it, “it reaches the parts of the system which other instruments cannot reach”. Arbitrage processes ensure that a change in the policy interest rate affects all interest rate based contracts in some way. By contrast, macro prudential levers are by their nature focused on particular institutions, contracts or markets and will inevitably stimulate innovations designed to circumvent their effect.
- Conversely however, the effectiveness of the interest rate lever can be undermined by significant differences between the interest rate elasticity of response of different sectors of

the economy. Once a real estate boom gets going, and both borrowers and lenders develop expectations that asset prices will grow rapidly over the medium term (at say 10% per annum), interest rate changes of normal monetary policy magnitude may have little impact; and the increase needed to slow the boom may well constrain other categories of credit growth long before the real estate is constrained. “Too many buildings and not enough machines”, as Raghuram Rajan put it recently [Rajan, 2013], may sometimes be the inevitable consequence of a reliance on interest rates alone.

For these reasons, I believe that the optimal policy response must involve both a greater willingness to use interest rates pre-emptively, in pursuit of non-price stability related objectives³ and the deployment of macro-prudential tools. Those levers, however, need to be more robust and more extensive than those so far agreed within the global regulatory reform programme.

- Countercyclical capital buffers (CCB) are clearly important and included within Basel III. But I have two concerns about the current Basel III specification.
 - First, that the 2.5% increase in required capital ratios may prove too small to achieve the desired effects.
 - Second, that as currently written the guideline for CCB deployment focusses solely on the rate of growth of credit relative to its own past trend. This implies that a rate of credit growth permanently faster than nominal GDP might be acceptable just as long as the growth rate was steady. If, as I have argued, levels of leverage matter as well as rates of change, this will prove insufficient.
- We also, I suggest, need to be able to apply macro prudential tools on a credit category specific basis. As argued above, the negative social externality of credit creation is most likely to arise when credit is extended against specific categories of collateral, in particular real estate. An optimal response would therefore focus on this specific category of credit, seeking to lean against the bias of the system. Logically, we should therefore consider setting risk weights or capital requirements against commercial or residential real estate higher than those which purely private assessments of risks would consider appropriate. Such risk weights or requirements would be applied either continually across the cycle, or take the form of sectorally specific counter-cyclical buffers.
- In addition, however, I believe that central banks as macro prudential regulators should have in the policy toolkit direct borrower constraints such as maximum loan to value (LTV) or loan to income (LTI) ratios. The UK's interim Financial Policy Committee (FPC) on which I sat until March this year, debated whether we should ask Parliament to include such tools within the FPC legal powers. The majority was against that at least for now: I was in the minority which favoured their inclusion. They are being deployed with some success in several emerging economies. Without them – however imperfect and potentially subject to arbitrage – the dangers of harmful credit and asset price bubbles, busts, and post-crisis deleveraging would be significantly increased. That must in particular be case given the capacity of shadow banking systems to create credit outside bank balance sheets.

³ It would of course be possible to argue that monetary policy objective could still be defined as price stability, but simply pursued over a far longer time frame. But note that an uncontrolled credit and asset price boom may never result in a future increase in price inflation, but rather in a future fall in inflation below target as a result of post crisis deleveraging.

Finally I think it important to note the implication of the finding that “there can be too much private debt” for the “financial system stability” focussed reforms which I discussed in Section 6.

I noted there that one thing the innovations of the last 30 years almost certainly did achieve, was more credit creation than would otherwise have occurred. And the benefit of increased credit supply was quite overtly cited as a reason to be careful about some stability focused restraints on risk taking. I remember even in autumn 2008, when debating arguments for and against constraints on naked CDS contracts, and for and against skin-in-the-game requirements, being told that we had to be wary of anything that interfered with market liquidity and with the resulting ability to support real economy credit creation.

But if real economy credit creation, left to itself, might go beyond optimal levels, constraining it may be beneficial. The implication is that if we believe specific reforms, such as minimum haircuts on a wide range of secured financing contracts, are essential to guard against financial system stability risks, we should not be dissuaded from them by assertions that credit growth will be impaired.

9. MARKET INTERVENTIONS AND THE CHICAGO SCHOOL

Applying such policy measures would certainly amount to a major rejection of a wholly free market approach. It would reflect the conclusion that free market finance can generate too much credit, in particular in specific credit categories.

That may seem a provocative conclusion here in Chicago, home to the Chicago School of rigorous free market economics. But there is a strong strain of historic Chicago School thinking which saw banking and credit creation as special cases, to which the general propositions in favour of free markets did not apply. Indeed Chicago economist Henry Simons, strongly laissez faire in most of his economic thinking, believed that by treating credit creation as an economic activity like any other, we had as it were committed a category error, failing to recognise that credit and money creation is a natural public function, or at very least a function of vital public interest. Simons indeed, in his famous paper on “Rules and Authorities” argued that the ideal economy would be one in which no debt contracts existed. [Simons, 1936] Regretfully conceding that that was not practical, he nevertheless argued strongly for the abolition of fractional reserve banks, supporting the Chicago Plan for 100% reserve banking. This would, he hoped, at least dramatically reduce the role of debt contracts within the economy.

And in a striking recent contribution, John Cochrane, a Chicago economist certainly not normally associated with interventionist policies, has argued that we should consider taxing credit intermediation to reflect the negative externality which excessive private credit creation imposes on society. [Cochrane 2013].

10. RULES, DISCRETION AND INTEGRATION

I suspect, however, that Cochrane would still diverge from the conclusions I set out in Sections 7 and 8, and on reasonable grounds. For the implications I drew would leave central banks/macro-

prudential authorities (and my assumption is that these are one and the same institution) with hugely wide discretion as to both objectives and instruments.

- They would be focused not solely on the attainment of price stability, but also on constraining credit and asset price cycles. They would pay attention not just to the pace of credit growth, but also to levels of leverage, but it would be impossible to set a definitive rule on how much private leverage (overall or by category) was too much.
- And they would be free to use either pre-emptive interest rate policy (even if this produced some short-term divergence from current price stability objectives) and a fairly wide array of macro-prudential policy tools (covering banks, shadow banks and borrowers) in pursuit of these objectives.

This would be a dramatic change from the pre-crisis orthodoxy, which had gravitated increasingly to the elegant clarity that central banks should achieve a defined price stability objective using (primarily or entirely) one instrument, the policy interest rate. That pre-crisis orthodoxy allowed clear central bank mandates and accountability: my conclusions in Sections 7 and 8 would create far muddier waters.

The crucial question is then, whether we can adjust policy objectives and tools to address the central importance of credit cycles and levels of leverage while avoiding carte blanche discretion and achieving reasonable accountability.

I do not have a clear answer to that question, but let me end by suggesting three pointers to the debate:

1. One way to proceed would be to place a significant reliance on permanent measures, applied constantly across the economic cycle, which would lean against the bias of the free market towards excess credit creation, while avoiding too detailed micro-management of time varying measures. This might involve:
 - Taxes on credit intermediation of the sort which Cochrane has proposed. Or, as he also argued, at very least the removal of the significant bias in favour of debt which most tax systems currently introduce.
 - Capital requirements on banks that are set deliberately higher than appears necessary from the point of view of financial system stability narrowly defined. This would indeed be an indirect way of imposing a tax, forcing banks to hold more non tax deductible equity and less tax deductible debt.
 - Underwriting standards in mortgage markets, for instance via maximum LTV or LTI limits, which would simultaneously lean against the bias towards real estate lending and which might also serve consumer protection purposes.

Each of these proposals could have merit, and would tend to produce at least a somewhat less credit intensive economy. But they would still leave the public authorities overall with difficult discretionary decisions – how high should be the tax rates, capital requirements or underwriting standards. And I suspect that applied on a constant basis across the cycle, they would prove insufficient. Taxes and capital requirements imposed on the formal banking

sector would, I think it certain, induce a shift of activity to innovative shadow bank forms; and constant rather than time varying LTV or LTI limits might be insufficient to offset harmful real estate booms, and tighter than desirable in the downswing.

2. While across the board constant policy measures may therefore help to dampen both the credit cycle and resulting levels of leverage, and thus reduce the frequency and severity of more discretionary interventions, I suspect that they cannot be a complete solution. The challenge then becomes how to place discretion within some framework of accountability. Here I can do no better than endorse the approach now taken by the UK which:
 - Defines in legislation those macro prudential policy levers which the Financial Policy Committee will be able to deploy.
 - Places the use of those policy levers within a clearly defined governance framework, combining a decision-making committee with both internal and external members, and clearly defined procedures for reporting publicly the analysis and logic which has led to the committee's decisions.
3. There remains merit in distinguishing within central banks two somewhat different objectives: *(i)* the attainment of price stability over the medium term; and *(ii)* longer term management of both the financial system stability and the potential wider macro-economic consequences of long trends in credit supply and leverage. Price stability remains an important objective in itself. But if interest rates have a role to play in credit cycle management, because they "get into all the cracks", then the distinction will not be absolute. Mechanisms for coordinating monetary and macro-prudential policy, and for basing them on a somewhat integrated analytical foundation, will be required. Price stability mandates may need amending to recognise that on some occasions central banks may divert from pure price stability objectives for clearly stated and justified macro prudential reasons. Indeed not only are such developments likely: they are already occurring. The Bank of England now has a forward guidance policy which involves a contingent commitment to a path of interest rates subject to three "knock outs"; and one of those knockouts relates to financial stability.

I am well aware that my 3 points provide no more than initial stimuli to a difficult and important debate. But we cannot avoid that debate: we cannot stick to the elegant clarity of the pre-crisis world.

In that world central banks increasingly saw their objective as price stability, defined as a low and stable rate of increase of price indices for the goods and services which enter GDP. And they were highly successful in achieving that objective: in terms of price stability there was (and indeed still largely is) a Great Moderation. But that Great Moderation did not prevent a huge financial crisis, which caused severe economic harm.

The idea that central banks can have one objective (price stability) and one instrument (the policy interest rate) was predicated on the assumption of modern macro-economics that the financial system was a neutral veil and that credit and money aggregates did not matter.

The crisis taught us how wrong that assumption was. Credit cycles and levels of leverage are factors of primary macro-economic importance. Our policy frameworks will have to evolve to reflect that fact.

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