

SECURITISATION, SHADOW BANKING AND THE VALUE OF FINANCIAL INNOVATION

ADAIR TURNER

**THE ROSTOV LECTURE ON INTERNATIONAL AFFAIRS
SCHOOL OF ADVANCED INTERNATIONAL STUDIES (SAIS)
JOHNS HOPKINS UNIVERSITY**

19TH APRIL 2012

The title of my lecture is Securitisation, Shadow Banking and the Value of Financial Innovation. I aim to do two things – first, consider how and why the wave of financial innovation in the area of securitised credit ended in the financial crash of 2008. And second, consider what we know about the value of financial innovation in general – whether financial innovation has a systematic tendency to be less valuable than innovation in other sectors of the economy: and how we should attempt to assess the value of financial innovation.

Ahead of the crisis, there was high confidence that financial innovation in general, and in particular its application to the wholesale markets had delivered important benefits. Central to the perceived value were the

related concepts of market completion, market efficiency and liquidity. In addition it was often asserted that the financial innovations of securitisation had beneficially enabled additional credit creation, and thus directly stimulated growth.

The market completion argument involved two underlying propositions.

- First that greater market liquidity made possible by a securitised credit system, and by the development of related derivatives such as credit default swaps, had brought the wisdom of the market to bear in the pricing of credit risk, enhancing price discovery.
- Second, that the techniques of pooling and tranching, combined with complex multi-step distribution chains, had enabled the packaging and then the placing of combinations of risk, return and liquidity, which more precisely met the preferences of investors and their risk-bearing capacity. As a result, it was argued that both market efficiency and financial stability would be enhanced.

These propositions were believed almost axiomatically – a specific expression in the financial markets of the general Arrow-Debreu

proposition that complete markets will tend to generate allocative efficiency and welfare benefits.¹

They formed a crucial part of a dominant conventional wisdom, expressed for instance in the IMF Global Financial Stability Report of April 2006 [**Exhibit 1**].

- ‘Credit derivatives enhance the transparency of the market’s collective view of credit... and thus provide valuable information about broad credit markets and increasingly set the marginal price of credit’ – the price discovery and market efficiency hypothesis.
- And ‘there is a growing recognition that the dispersion of credit risk by banks to a broader and more diverse group of investors... has helped make the banking and overall system more resilient’ – the efficient repackaging, distribution and financial stability assertion.

Alongside these theoretical arguments, however, a more empirically straightforward argument for securitisation was also often advanced – that it enabled more credit creation, by enabling economies in the use of scarce bank capital; that it enabled, for instance, the extension of

¹ Kenneth Arrow and Gerard Debreu, “*The Existence of Equilibrium for a Competitive Economy*”, *Econometrica*, 22 (1954), 265-290.

mortgage credit on a scale that would otherwise have been constrained. A proposition indeed still often asserted today – Andrew Palmer’s recent special report on financial innovation in The Economist quoting a ‘senior American regulator’ as saying **[Exhibit 2]** ‘Securitisation is a good thing. If everything was on banks’ balance sheets there wouldn’t be enough credit’.

These assumptions were profoundly shocked by the financial crisis: and in its aftermath, every aspect of the pre-crisis conventional wisdom has been challenged.

- The financial system has clearly not been more stable – it was made highly unstable.
- Much of the credit expansion seems in retrospect to have driven harmful misallocation of resources.
- And the general proposition that financial innovation creates value by completing markets has been rejected. Paul Volcker has commented that he cannot think of a useful financial innovation since the ATM; Paul Krugman that it is hard to think of any big recent financial breakthroughs which have aided society. And

Joseph Stiglitz has argued that in the run up to the crisis most financial innovation 'was not directed at enhancing the ability of the financial sector to perform its social functions'.

So my purpose tonight is to consider the specific phenomenon of securitisation and shadow banking which developed in the run up to the crisis, and the more general issue of whether and under what conditions financial innovation creates value. I will structure the lecture in four sections.

- First, a definition and description of both 'securitisation' and 'shadow banking', highlighting some of the underlying drivers and characteristics that could manifest themselves in future in new specific forms.
- Second, an analysis of how and why shadow banking played a central role in the 2008 financial crisis, suggesting that 'securitisation' per se *might* have had some potential to be a useful financial innovation, but that the developments of 'shadow banking' were inherently dangerous.

- Third, a more general consideration of financial innovation. Here I will argue that, while there clearly can be beneficial financial innovation, there are fundamental reasons why innovation and finance tends to be less likely to produce beneficial social impact and more likely to produce rent extraction, than innovation in other sectors. But arguing also that, within finance, our greatest concern should be focused on innovations which relate to the credit and money creation process, because it is there that financial innovation can produce not just zero social value but large negative externalities.
- Fourth and finally, some summary conclusions, a hypothesis, a research suggestion and implications for optimal public policy.

1. Securitisation and shadow banking

First then, the development of securitisation and shadow banking. For regulators, it is a priority to understand this phenomenon. In autumn 2008 the commercial banking system suffered a major crisis; and since then we have made considerable progress towards better regulation of commercial banks – the Basel III capital and liquidity reforms and the steps towards making all banks resolvable without permanent tax

payers' support. But looking back to the year 2007 to 2008 it is striking that many of the initial stages of the crisis did not concern commercial banks per se, but institutions and activities in what we now label the shadow banking system **[Exhibit3]**. The key developments included:

- In June 2007, liquidity pressures at two hedge funds sponsored by Bear Stearns Asset Management, leading to the imposition of gates on investor redemptions, sudden increases in margin calls and sudden falls in asset prices.
- In August, major losses at hedge funds which the market had thought were following low-risk market-neutral strategies, as a result of knock-on consequences from margin calls in structured credit portfolios.
- The closure in February 2008 of hedge funds Carlyle Capital and Peloton in the face of additional collateral calls on mortgage backed securities.
- Gradually growing problems throughout 2007 to 2008 in the liquidity and solvency position of off-balance sheet structured investment vehicles (SIVs) and conduits which had taken leveraged positions in structured credit products, and which had

funded those with liabilities far shorter than the contractual maturity of the assets, many of these liabilities (ABCP) bought in turn by money market mutual funds.

- The rescue of Bear Stearns in March 2008 and the failure of Lehman Brothers in September, the latter the key trigger for the dramatic intensification of the crisis. Both of them broker dealers/investment banks rather than commercial banks.
- The emergence in Summer 2008 of major stresses among money market mutual funds, which had previously seemed to promise investors an attractive combination of enhanced return, immediate fund access, and capital certainty, with Reserve Primary Fund 'breaking the buck' on 16 September 2008.
- The development between August to October 2008, of a new form of liquidity run: a run as much in the secured lending markets (such as repo) as in unsecured funding.
- And, throughout late autumn 2008, significant deleveraging by hedge funds, whose sales of credit securities into a falling market helped drive a downward spiral of trading book asset values, which in turn undermined confidence in the solvency of major banks.

Understanding the phenomenon of shadow banking, and how it relates to the long prior development of securitised credit extension, is therefore a priority for the Financial Stability Board this year, and in particular the FSB's Standing Committee on Supervisory and Regulatory cooperation (SRC) which I chair. We are committed to deliver to G20 leaders by the end of this year policy proposals that will address shadow banking drivers of financial instability.

In a recent lecture at Cass Business School in London, I therefore addressed in detail the definition and nature of the shadow banking system.² This lecture is intended as a companion to that one, and I will not repeat in detail the analysis set out there. But reiterate the most important points – on the definition of shadow banking, on its relation to the wider development of securitisation, and on the fundamental drivers of instability potentially created by these developments.

The FSB has defined 'shadow banking' as 'credit intermediation occurring outside or partially outside the banking system, but involving maturity transformation and leverage, the defining characteristics of banking'. That reflects the following logic **[Exhibits 4A to E]**.

² Adair Turner, *Shadow Banking and Financial Instability*, Cass Business School, March 2012.

- The financial system intermediates flows of finance between non-financial providers of funds – typically households and corporates – and users of funds – typically households, corporates and governments. These flows can be in debt form (loans, bonds, or other credit securities) or in equity form, or in various hybrids of the two.
- A key role within this financial intermediation system is performed by fractional reserve banks **[Exhibit 4b]**, which take deposits from households and corporates, and lend money to households, corporates and sometimes to governments. These banks are both leveraged – their debt liabilities a high multiple of their equity – and maturity transforming – their liabilities much shorter term than their assets.
- But many financial flows occur outside banks and have always done **[Exhibit 4c]**. These include equity flows which can go direct from households to corporates, or via intermediating institutions such as insurance companies or investment funds. And they can include non-bank credit intermediation – the direct purchase or the intermediated purchase of government or corporate bonds. These flows are all forms of non-bank financial intermediation, but we don't label them shadow banking if, as is often the case, they do

not involve the distinctive features of banking – leverage and maturity transformation – the distinctive features which create distinctive risks.

- ‘Shadow banking’ occurs when we have credit flows outside or partially outside the banking system which involve these distinctive features **[Exhibit 4d]**. This is the case when, for instance, a money market mutual fund lends money to an asset backed commercial paper SIV, which buys the tranching debt issued by a special purpose vehicle – a chain of intermediation which is functionally equivalent to banking, and which introduces both leverage and maturity transformation, but in multiple steps, rather than within one bank balance sheet.
- This ‘shadow banking’ could, at least theoretically, exist as a standalone system parallel to but quite separate from banking. But in practice it didn’t; rather the shadow banking system which actually developed involved complex interconnections between the banking system and shadow banks **[Exhibit 4e]**.
 - With money market mutual funds (MMMFs) funding banks as well as funding ABCP conduits.
 - ABCP conduits and SIVs sponsored by banks.

- And the loans which went into securities often, but not always, originated by banks or by bank-owned subsidiaries.
- And with an extremely complex web of short-term secured funding markets – such as repo or prime broker finance – linking money market mutual funds, banks, investment bank broker-dealers, hedge funds and asset managers seeking to earn additional return via securities lending.

The shadow banking system is therefore essentially a set of activities, markets and contracts, as well as institutions; and the institutions are linked together via a myriad of multi-step chains. And it is a very complex system, as Exhibit 5, taken from the Federal Reserve Bank of New York's July 2010 report illustrates.

And it is clear that on many different measures 'shadow banking' activities grew dramatically in the US over the 30 or so years before the crisis – a growth we can track by looking at the asset side of the financial system, at its liability side, and at its internal interconnections.

- On the asset side, lending to the non-financial real economy was increasingly in securitised form – the share of mortgages which

stayed on bank balance sheets falling from 80% to 35% between 1980 and 2008 and overall volumes of securitised credit growing from 6% of GDP to 50%, **[Exhibit 6]**. This securitised credit, in addition, took an increasingly complex structured form – tranching into different slices of credit worthiness, with the alchemy of structuring apparently creating AAA securities out of lower credit quality loans.

- On the liability side, households and corporates from 1980 onwards placed an increasing share of short-term savings in money market mutual funds, and a decreasing share in plain old fashioned bank deposits **[Exhibit 7]**.
- While within the financial system itself we saw a proliferation of intra-financial system contracts, with the investment bank broker dealers growing far faster than commercial banks **[Exhibit 8]** with Asset Backed Commercial Paper values growing rapidly **[Exhibit 9]** and with repo and other secured lending markets growing in importance **[Exhibit 10]**.
- Overall as a result, non-bank financial sector assets have grown rapidly as a % of GDP, even as bank balance sheets have also grown, but more gradually **[Exhibit 11]**. A set of developments

which alongside more complex links between banks themselves, drove a dramatic increase in the aggregate value of intra-financial system assets and liabilities, relatively to those which linked the financial system outward to the real economy **[Exhibit 12]**.

So credit was extended in non-bank form; short-term corporate and household financial assets – money equivalents – were held in non-bank form, and the credit intermediation system became massively more complex.

All these developments are relevant to the phenomena we call ‘shadow banking’. But the title of my lecture draws a distinction between ‘securitisation’ and ‘shadow banking’, and since this distinction is important to some of my later arguments about the value and dangers of financial innovation, let me be clear about that distinction. Labels are of course to a degree arbitrary, but the way I wish to use the labels is as follows:

- Single name bonds – a corporate bond, or a sovereign bond, are clearly credit securities, but they have not been ‘securitised’, i.e. created out of a multiplicity of underlying loans.

- ‘Securitisation’ therefore denotes the process of pooling by which we take multiple underlying loans – such as residential mortgages, SME loans, auto loans or whatever – and create pooled credit securities.
- However ‘securitised’ credit could be and initially often was, pooled only, created out of multiple underlying loans, but not tranced into different combinations of risk and return. And it could be held to maturity without maturity transformation by long-term investors such as insurance companies and pension funds. So ‘securitisation’ is a wider set than shadow banking.
- ‘Shadow banking’ as I define it, and as the FSB has defined it, arises when we have features which introduce leverage (for instance but not solely through tranching) – and/or maturity transformation – (for instance through institutions or special purpose vehicles holding long term assets funded by short-term liabilities).

Using these definitions, the innovation wave started with securitisation in the 1970s and developed into shadow banking over the subsequent 30 years.

The drivers of this innovation were many and complex – they included, for instance some factors highly specific to the US market, such as Reg Q and the role of Fannie Mae and Freddie Mac. These US specificities help explain why securitisation developed far more extensively in the US than in Europe. And the ‘technologies’ of the innovation wave – the specific technical devices used to tranche and maturity transform – were many. But at the very core of what occurred, and of the character of the financial system which emerged, were two sets of features on which a rich academic literature has increasingly focused our attention **[Exhibit 13]**.

- First, a very strong potential demand from investors for instruments which appeared to be low risk or indeed risk free, but which nevertheless gave a return uplift above zero risk instruments, such as T Bonds. This demand was in particular stimulated from the late 1990s on by the declining real rates of interest available on risk free instruments **[Exhibit 14]**. And it made investors particularly susceptible to claims that the

techniques of pooling, tranching and retransching (e.g. CDOs²) had managed to create zero or low-risk instruments out of high-risk underlying loans.

- Second, a strong demand in particular for assets which were not only low risk but also liquid – essentially for ‘money equivalent’ assets. This, as Zoltan Pozsar has argued³, reflects the quite startling development of institutional and corporate holdings of cash or cash equivalent assets **[Exhibit 15]**, which in turn reflects developments such as the growth of securities lending. These are assets which cannot be held risk free in banks because of limits to deposit insurance. Strong demand therefore emerges for the ‘manufacture’ of money equivalent assets, achieved through secured finance against collateral, the setting of initial haircuts and the calling of a variation margin on the basis of continual mark-to-market accounting – devices which also respond to and enable the increase in counterparty risks which arises as credit risk is more intensely traded, both in its primary form and via credit derivatives. Short-term secured financing markets, such as repo, and the intense management of collateral through, for instance, re-

³ Zoltan Pozsar, *“Institutional Cash Pools and the Triffin Dilemma of the US Banking System”*, IMF Washington Papers, August 2011.

hypothecation, have therefore, as several academics have argued, played a central role within the shadow banking system.⁴

2. The social impact of securitisation and shadow banking

Given the definition and description of securitisation and shadow banking set out above, what can we say about its value added? Were these developments – these innovations – socially beneficial? Were the initial developments beneficial but the later harmful – and if so when did it all go wrong?

These are crucial questions – for regulators, for economists and for economic historians, but as Josh Lerner and Peter Tufano have set out in a recent insightful article on ‘The Consequences of Financial Innovation’, not at all easy to answer.⁵ Measuring with any precision the value of innovation is difficult in all sectors of the economy, but particularly so in finance. For at least two reasons:

- First, because unlike in many sectors of the economy, if there is a value, it is very often an indirect one. A new drug directly benefits specific patients. A new consumer good is directly valued by those

⁴ Manmoham Singh and James Aitkin, *The (Sizeable) Role of Rehypothection in the Shadow Banking System*, IMF working paper, July 2010.

⁵ Josh Lerner and Peter Tufano, *The Consequences of Financial Innovation: a Counterfactual Research Agenda*, NBER Working Paper No 16780, February 2011.

who purchase it. As a result we can directly consider consumer benefits, and apply the economic concepts of consumer surplus and revealed preference in a way which can give us some purchase on the measurement of benefits. Rarely is that the case in wholesale finance: if there are benefits, they are believed to result from the indirect impact of improved allocative efficiency, operating via multiple steps which we can only imperfectly describe, let alone quantify.

- And secondly, unlike in most other sectors of the economy, financial products and services – in particular those that relate to credit extension – can create complex macro-systemic externalities. Financial firms, and in particular banks and shadow banks, are linked via complex networks which differ from those that link, say, computer software firms or retailers. Confidence and contagion effects can produce liquidity runs. A newly designed and tested drug can, if the design and testing is badly done, be bad for some individual patients, but it cannot harm those who do not directly consume it or drag the whole economy into a recession. But banks and shadow banking systems are deeply involved in the creation of credit and money (or money

equivalents) and credit and money creation have important macro-systemic and macroeconomic effects.

The methodological problems of assessing the value of financial innovations are therefore peculiarly severe. In the face of these problems, the case in favour of financial innovation is often expressed in terms which are either axiomatic or incomplete.

- The axiomatic assumption that more complex product offerings must be good, because they complete more markets – without having actually to illustrate what the ultimate end benefits are.
- And the incomplete argument that innovation facilitates more credit extension – without considering whether more credit available is actually a beneficial effect.

Neither of these categories of argument is at all adequate or convincing. We need a better method to assess the social impact of financial innovation. That method should, I suggest, combine two elements.

- First, an unwillingness to be satisfied by high-level axiomatic argument, or to base conclusions on the assumption that financial markets will operate in an efficient and rational fashion – instead

demanding detailed chains of logic which connect innovations through to their specific final real world effects, operating within real world constraints of imperfect information. Such analysis needs to consider, for instance, whether ‘credit created’ is likely to be beneficial or harmful. And it may usefully be informed by asking to what identifiable deficiency of the prior existing financial system the category of innovation was an answer.

- Second, a strong weight placed on *macro* level empirical analysis, considering innovations not one by one but as a package. We are unlikely ever to be able to quantify the specific impact of a specific wholesale market innovation – a CDO or a CDS – but we may be able to say something on whether a package of innovations in aggregate, observed over a long period of time, appears to have had an empirically observable effect on overall economic efficiency, growth or stability.

Applying those methodologies of approach – which are broadly consistent with Lerner and Tufano’s proposal of wide ranging counterfactual analysis – leads me:

- First, to the tentative conclusion that securitisation in itself might have had the potential to be a socially valuable innovation, and might be able to perform socially valuable functions in future if developed in appropriate form.
- Second, to the conclusion that the total package of shadow banking developments had a severely negative effect, for reasons which are increasingly understood and imply the need for a strong regulatory response.

Non-bank credit intermediation and securitisation

The arguments in favour of securitisation in the early stages of its development appeared sound, and were an extension of the wider arguments in favour of a significant role for non-bank credit intermediation.

It is clearly not the case that an optimal financial intermediation system requires all credit to pass through the banking system, and indeed it never has. Indeed there is a strong case in theory for favouring a considerable role for non-bank credit intermediation – including, for instance, the direct purchase of medium and long-term credit securities

by long-term investors such as pension funds or insurance companies – since this reduces the maturity transformation burden imposed on the banking system, and can limit the introduction of leverage within the intermediation system.

It is at least possible, therefore, that the fact that the US has a smaller banking system relative to GDP, with a smaller percentage of total credit passing through the banking system **[Exhibit 16]** might deliver a benefit. The benefit may not be more credit overall, but a higher percentage of total credit delivered in a non-leveraged, non-maturity transformed fashion. And looking forward there are important questions about the best ways in which to intermediate the very large long-term capital flows required to support large global infrastructure needs – in housing, in transport infrastructure, in new and clean energy. The maturity transforming bank system may not be adequate for that task.

So non-bank credit intermediation, particularly of long-term credit, clearly has an important socially useful role. And securitisation in itself, without the subsequent development of shadow banking, may have been, and might in future be, a useful variant of non-bank credit intermediation. It extends the potential for non-bank credit intermediation to household or SME loans too small to form individual credit securities. And it

potentially supports portfolio diversification – enabling banks with regionally or sectorally-focused origination capability to avoid over concentrated credit exposure.

So how large were the benefits that ‘securitisation’ delivered (or could have delivered if developed in a different form)? I don’t think we yet know the answer. But if we apply the method I proposed above, two steps of analysis would be essential:

- **Being clear about the proposed end social benefit** – Simply saying that securitisation ‘enabled more credit creation’ is insufficient – we need to be clear what end benefit additional credit in turn achieved. On this, three points.
 - First, any argument that more credit is valuable because it drives increased demand and thus increases nominal GDP is inadequate. Clearly under certain circumstances increased demand can produce an immediate increase in real growth. But increased consumption might be at the expense of longer term savings and investment; and increased credit and thus leverage might increase system fragility and the volatility of growth. And if an economy is already at full capacity before the addition of

further credit, the increase in nominal GDP induced will translate into higher inflation, not higher real growth. We cannot simply say – ‘more credit was good for growth’ – without conducting a deep analysis of the macroeconomic counterfactual.

- Second, the securitisation which actually occurred was only partially related to the intermediation of household or corporate savings into new business investment. Predominantly it enabled additional borrowing by the household sector. It stimulated residential real estate investment, and to a lesser but still important extent commercial real estate. And increased capital investment in real estate could under different circumstances be either beneficial or sub-optimal. Again therefore the ‘it helped create credit’ argument is incomplete, without an analysis of which categories of credit, and with what implications for either consumption, or for investment by sector.
- Third, however, what additional household borrowing clearly does enable is greater life cycle consumption smoothing. Unsecured credit enables some people to bring forward consumption, borrowing from others who save: mortgage credit

enables some people to purchase houses earlier than they otherwise might. This increased ability to allocate consumption across the life cycle could be welfare optimal even if there was no beneficial impact on capital allocation and on the resulting rate of growth. Conversely, if easier credit tempted individuals into mortgage contracts they could not afford, negative direct welfare effects might result.

- **Macro-level empirical analysis** – As the above points imply, any full empirical analysis would have to consider a complex counterfactual – how the US economy would have developed without the injection of additional credit which securitisation enabled, credit focused primarily on the residential mortgage market. Without such analysis, the case in favour cannot be considered proved. There is, for instance, no macro-level evidence that the simpler credit intermediation system of the 1940s to 70s held back growth, which was faster across most of the developed world over those 30 years than over the subsequent 30. And other countries, such as Germany, have grown prosperity as fast as the US without such extensive credit creation.

Overall, therefore, the case for the positive impact of ‘securitisation’ remains tentative: this suggests the need for a far deeper analysis of the value of credit creation, an issue to which I will return in my conclusion section. But there is at least an *a priori* case in favour. And it is noticeable that in the early stages of securitisation – in the 1980s and 90s – the biggest problems of credit booms, busts and resulting instability arose not in the arena of securitised credit, but in traditional bank balance sheet credit intermediation – the savings and loans institutions in the US, the Scandinavian banks and the Japanese banks.

Shadow banking

Whatever the assessment of securitisation in itself, however, its subsequent mutation into shadow banking clearly played a major role in the origins of the financial crisis of 2008, which has imposed huge economic costs on both the US and European economies. Any macro-level counterfactual analysis of the impact of the whole package of innovations which contributed to shadow banking would, I think, clearly illustrate that if we had to choose between having the whole package and none of it, we would have been better off with none of it – no SIVs, no CDOs, no credit derivatives. Even if it could be proven (which is still unclear) that in some way this package did deliver the market

completion and allocative efficiency benefits ascribed to it ahead of the crisis, there seems no possibility that the scale of that benefit – measured at the macro level as an increase in the obtainable level of income across the economy – could be more than a small fraction of the harm produced by the induced financial instability effect.

And, increasingly, academic analysis of shadow banking has provided us with a good understanding of why these negative stability effects were so large. Three inter-related and mutually reinforcing factors were important.

- First, the ability of a complex multi-step originate and distribute system to manufacture apparently risk-free or low-risk instruments on a scale which was objectively impossible.
- Second, its ability to generate excessive maturity transformation in forms not recognised by regulators.
- Third, the way in which secured financing techniques, applied within both the formal banking system and within shadow banks, can turbo-charge the inherent potential procyclicality of any credit and money creation process.

(i) Local thinking, myopia, market pricing and 'risk free' assets

Debt instruments are inherently characterised by a skewed distribution of potential returns **[Exhibit 17]**. There is a significant probability of full payout, but with no upside and a downtail of potential loss. In the good times, however, only the zero loss part of the distribution is observed. There is, therefore, an inherent danger that if investors are myopic they can wrongly infer from recent observations of zero or low defaults that an instrument is zero or low risk, suffering from what Gennaioli, Shleifer and Vishny have labelled 'local thinking', until bad news brings a sudden and disruptive change in beliefs.⁶ The complex multi-step system of securitised and shadow banking credit intermediation increased the danger of such misperceptions in three ways:

- It reduced the incentives for good credit underwriting at inception, or for good credit analysis at each stage of the distribution and investment chain – the originator no longer liable for loss, and intermediaries reassured by the existence of liquid markets that they could exit any deteriorating positions fast.

⁶ Nicola Gennaioli, Andrei Shleifer and Robert Vishny, *Neglected Risks, Financial Innovation and Financial Fragility*, September 2010.

- The complexity of tranching increased the depth of credit analysis required to assess the true credit worthiness of each credit instrument, with no matching increase in analytical capability or incentives to conduct that analysis.
- And the assumption that the market price of credit – as expressed for instance through the credit default swap spread – provided useful information on credit worthiness, further reduced incentives for credit analysis, and exposed the system to self-reinforcing swings in sentiment, and as a result to multiple equilibria effects. CDS spreads did indeed, as the IMF said, ‘increasingly set the marginal price of credit’, but far from providing ‘valuable information about broad credit conditions’ provided no useful warning of the impending disaster, suggesting instead that the banking system had never been lower risk than in early 2007 **[Exhibit 18]**.

As a result, as Gennaioli, Shleifer and Vishny argue **[Exhibit 19]**, at least in some cases, credit securities owed their very existence to neglected risk’. An unregulated shadow banking system was thus able to generate excessive credit claims, and to produce across all investors

in aggregate, perceptions of risk and return which were collectively impossible, giving the underlying risks present in the real economy.

The market completion and efficiency argument for increased financial intensity, for more liquidity and a wider array of available instruments, thus collapses in the face of real world imperfections. As Shleifer has put it ‘the standard argument for financial innovation is that there are gains from trade, but that model crumbles if you suppose that people do not fully understand the risks’.

(ii) Excessive maturity transformation and near money creation

Banking systems create credit and private money **[Exhibit 20]**. Essential to that process is maturity transformation – if the credit extended were repayable immediately, the matching money created could not effectively be used. And maturity transformation is potentially welfare enhancing because it enables the non-financial real economy to finance projects with long-term credit liabilities while holding short-term financial assets: it should therefore facilitate long-term investment.

But it is an inherently risky process, if all the depositors want their money back simultaneously, they cannot have it. As a result, unregulated

banking systems are susceptible to deposit runs which, as Douglas Diamond and Phillip Dybvig illustrated in a classic article, can be entirely rational for the individual even if (before the onset of induced fire sales) the bank is in some meaningful sense solvent.⁷ Moreover, as Jeremy Stein has illustrated in a recent article, under conditions of imperfect information where Modigliani Miller conditions do not fully apply, banks face private incentives to do more maturity transformation and create more apparently risk-free liquid assets (money) than is socially optimal.⁸ In response to this, significant divergence between private incentives and social optimality, banking has only been made stable with a combination of policy interventions which combine prudential capital and liquidity requirements, central bank lender of last resort liquidity insurance, and deposit insurance schemes.

Maturity transformation can also, however, be performed by a chain of shadow banking entities **[Exhibit 21]** with, for instance, a household or corporate holding an instantaneously available investment in a money market fund, which indirectly funds a long-term mortgage. Essentially, therefore, the shadow banking system can create forms of ‘private money’ held either by the non-financial real economy or by financial

⁷ Douglas Diamond and Philip Dybvig, “*Bank Runs, Deposit Insurance and Liquidity*”, Journal of Political Economy 1983.

⁸ Jeremy Stein, “*Monetary Policy and Financial Stability Regulation*”, Quarterly Journal of Economics

intermediaries, in a fashion analogous to the banking system's own creation of deposit money. And wherever there is maturity transformation and private money creation, there is a potential for runs.

(iii) Banking system procyclicality turbo charged by secured funding

The ability of banks to create both credit and private money can be subject to strongly procyclical and self-reinforcing effects **[Exhibit 23]**, especially when credit is extended to support the purchase of constrained supply assets that can increase in value, such as real estate. As Hyman Minsky described,⁹ more credit lent drives up asset prices: higher asset prices tend to mean lower losses on credit extended: banks thus have more equity capital to support further borrowing and the behaviour of both lenders and borrowers is influenced by the assumption that the good times will continue, that asset prices will continue to rise and loan losses will remain low... until some shock to confidence occurs and the factors all operate in reverse direction.

The innovations of shadow banking and in particular the increasing dominance of overtly secured finance, combined with mark-to-market accounting, acted to hard wire this procyclicality.

⁹ Hyman Minsky, *Stabilising an Unstable Economy*, (Yale University Press, 1986); *The Financial Instability Hypothesis*, Working Paper No 74, The Jerome Levy Institute, May 1992.

In the classic bank cycle illustrated **[Exhibit 22]**, the asset side of the bank balance-sheet (the loan) may be secured against the asset financed: but on the liability side (the deposits) there is no automatic link between funding availability and asset value **[Exhibit 23]**. In a secured financing system, that link is created with, for instance, **[Exhibit 24]** a money market fund providing finance to an intermediary via a repo contract, within which the changing value of the collateral posted must always exceed the loan outstanding.

In such a system, as Hyun Shin and Tobias Adrian have argued, procyclicality is potentially hard wired through the haircuts or margins applied to the secured finance **[Exhibit 25]**.¹⁰ When asset values fall, and even if percentage haircuts or margins remain unchanged, more collateral must be posted, less finance is available, positions have to be liquidated to meet collateral calls, and further asset price reductions may result. In addition, heightened awareness of risks may lead to increased percentage haircuts being demanded. As a result, Hyun Shin and Tobias Adrian have argued, leverage in a secured finance-based

¹⁰ Tobias Adrian and Hyun Song Shin: *Money, Liquidity and Monetary Policy*, FRBNY Staff Report No 360, January 2009.
Liquidity and Leverage, FRB NY Staff Report No 328, January 2009.
Hyun Song Shin: *Financial Intermediation and the Post-Crisis System*, BIS Working Paper No 304, March 2010.

shadow banking system is even more procyclical than in commercial banks.

And as a result, Gary Gorton and Andrew Metrick have argued, changes in required haircuts in the repo market in 2008 **[Exhibit 26]**¹¹ were among the most important drivers of the financial crisis – the crisis being best understood in their analysis as a ‘run on repo’ rather than as a run on traditional bank deposits. They therefore argue that to make the shadow banking system permanently more stable, will require us to extend to secured financing markets, such as repo, the disciplines of regulation, deposit insurance and/or restricted institutional charters which we have applied in the past to banks.

Overall, therefore, any empirical judgement on the macro effect of the overall package of shadow banking innovation – relative to the counterfactual in which none were developed – is surely massively negative. The development of shadow banking entailed large scale and multi-faceted financial innovation, pursued with great energy by highly skilled and highly paid people, which has had a severely adverse social welfare effect – producing first an unsustainable credit boom, and then a

¹¹ Gary Gorton and Andrew Metrick: *Securitised Banking and the Run of Repo*, NBFR Working Paper No 15223, August 2009.
Haircuts, May 2010.
Regulating the Shadow Banking System, Brookings Papers on Economic Activity, Fall 2010.

recession, negative equity and unemployment. What was privately profitable, at least in the short term, was not socially optimal, as a result of market imperfections, myopia, and important divergences between what is rational at the level of the individual economic agent, and what is optimal in terms of collective systemic macro effects. It is difficult to think of any wave of innovations in any other sector of the economy, about which we would be likely to reach such a negative judgement.

3. The social value of innovation: why is finance different?

That conclusion raises the question: what is it that makes financial innovation different, why can we not rely on free market forces to ensure that private financial innovation is socially useful: and what if any categories of financial innovation have been and are capable of being useful?

To begin to address these questions it is, I suggest, useful to distinguish two categories of reason why financial innovation can make private money but public harm. These two categories are sometimes linked in practical terms, but they are conceptually separate.

- First a set of reasons why some financial innovation might be of zero social value, even if it did not produce actually negative externality effects.
- Second, factors which can make financial innovation a driver of systemic financial instability, and thus not just zero but negative effects on society.

(i) Arbitrage, rent extraction and zero social value

Across the economy, there are many activities which are – to use the terms proposed by the British economist Roger Bootle – ‘distributive’ rather than ‘creative’ in nature.¹² Distributive activities are those essentially involved with the redistribution of economic value from one group of people to another, rather than with increasing the size of the economic cake. They are found in many sectors, not just in finance. The clever lawyer who wins the case for his client achieves a redistribution of money from the opposing client, but does not create social value. Indeed, though it may be possible to describe some jobs as, in Bootle’s terms, almost entirely and directly ‘creative’ (e.g. a doctor providing the value of better health care), the majority of jobs in the developed market economy are partly distributive and partly creative, and often creative in indirect ways. The salesman who gains an order

¹² Roger Bootle, *The Trouble with Markets, Saving Capitalism from Itself*, (Nicholas Brealey, 2009).

for Company A is involved in an activity whose first order effect is distributive, but it may be indirectly creative if Company A is more efficient than Company B so that its growth relative to Company B will make the economy more productive. The case for the market economy is not therefore that *all* activities are 'creative', but that capitalism is a better system than any alternative for placing some limits on the proportion of the economy devoted to distributive activities, and for ensuring at least some creative activities.

Bootle suggests, however, that the potential for purely distributive activities is greater in finance than in other sectors of the economy. This reflects the fact that much financial innovation, in both retail and wholesale sectors, can take the form of **[Exhibit 27]**:

- Regulatory arbitrage, which seeks to enable private firms to take more private risk with less capital or liquidity insurance than the regulators consider appropriate, thus increasing the value of the implicit put option from the private industry onto public support.
- Tax avoidance and arbitrage, which increase the private wealth of either financial intermediaries or their customers, but at the expense of the generality of tax payers.

- The sale of products which depend crucially for their attractiveness on a misunderstanding of true risk and return. This in particular often involves the presence of intransparent embedded options. These enable the delivery of apparently low risk enhancements to return across many time periods, but at the expense of potentially very large occasional losses – losses which in many cases arise when neither the seller nor the individual agent buyer is any longer around to be held responsible.
- And excessive churn in asset management activities, often generating no apparent improvement in asset performance over low cost index products, but swelling total profits across the financial intermediation system.

Together these features create the danger that the financial system will perform its intermediation functions at unnecessarily high economic resource cost, and attract to itself a sub-optimally high share of high-skilled individuals. Together they create a necessary role for regulation aimed at the defence of customer interests.^{13 14}

(ii) Negative externalities: systemic instability

¹³ Raghuram Rajan suggests in his recent book *Fault Lines*, (Chapter 6, *When money is the measure of all things*) that in addition the multi-step nature of financial intermediation (particularly in its securitised shadow bank forms) can create an emotional distance from real world effects which makes it easier for individually good people to engage in activities which are of little or sometimes negative social value.

¹⁴ Such regulation has not in the past typically extended to analysing the fundamental question of the industry's economic efficiency: i.e. whether it is delivering its intermediation functions in a resource cost efficient fashion. Arguably it should: but we would need to be aware of the extreme difficulties of precision in such analysis.

But it would be possible to imagine these rent extraction factors at work without that producing the negative externalities of concern to the prudential regulator. Tax arbitrage redistributes economic resources, but it does not directly reduce them. Excessive churn in asset management can make future pensioners poorer and asset managers or broker-dealers richer, but it does not reduce the size of the economic cake.

Rather, the forms of financial innovation which are of concern to the prudential regulator are those which have a potential to generate large negative externalities, producing not merely redistribution of an unchanged economic cake but harmful instability in overall patterns of economic growth. Such a potential is, I think, unique to finance: within finance it is concentrated in those activities which relate to credit rather than equity intermediation: and specifically to credit intermediation, which involves leverage and maturity transformation.

- It is unique to finance because financial intermediation is concerned with market contracts which link the present to the future under conditions of inherent irreducible uncertainty. Financial markets are therefore central to macroeconomics – in a way that markets in current goods and services are not. And at the very core of macroeconomics is the proposition that what holds

for an individual does not necessarily hold for a collection of individuals operating as an economic system.¹⁵

- Within financial intermediation it is most likely to arise when debt contracts are involved, precisely because debt contract rights to fixed returns create a potential for rigidities which are not created by equity contract rights to residual returns. As a result, periods of apparent irrationality in equity markets (such as the dot-com boom of 1998 to 2002), while generating large losses for individual investors, are (provided not themselves debt financed) far less likely to produce serious instability than booms and busts in credit markets.
- And within credit intermediation, the greatest dangers lie where there is also leverage and maturity transformation, the defining characteristics of banking systems, which the shadow banking system also generated but in more complex and imperfectly understood forms. It is when innovation is focused on the core functions of money and credit creation that it has the potential to exacerbate the Minsky cycle, and to generate not merely rent extraction but massive negative externalities.

¹⁵ Paul McCulley, *The Shadow Banking System and Hyman Minsky's Economic Journey*, PIMCO, May 2009, makes this point very clearly.

In fact, in practice there can be links between the ‘distributive’ factors and the ‘negative externality’ factors. Regulatory arbitrage can increase systemic dangers, since it enables the credit intermediation system to run with smaller capital or liquidity buffers than the prudential regulators consider appropriate. And both regulatory and tax arbitrage tend to produce complex organisation structures, which make it difficult for regulators and for markets to see what is going on. Complex products with embedded options not only achieve rent extraction but often proliferate counterparty exposures and reduce transparency, increasing the danger of confidence and contagion effects.

But the conceptual distinction between the ‘distributive’ and the ‘negative externality’ dangers for financial instability is still useful and important, because it focuses our attention on the product and market arena where there are the greatest dangers of severely negative effects – the arena of credit intermediation, and of credit intermediation with maturity transformation and leverage, whether in classic bank or shadow bank form.

Finance is different because of the greater opportunities for ‘distributive’ rent extraction; but banks and shadow banks are even more different, because they are central to the money and credit creation process.

(iii) Beneficial financial innovation

That does not mean, however, that financial innovation has no potential to add social value – but it may indicate that the greatest likelihood of beneficial financial innovation is more likely to lie away from those activities deeply implicated in money and credit creation processes. In this context the preliminary conclusions on the value of financial innovation which Lerner and Tufano present in their recent paper are suggestive.

Lerner and Tufano start with the extreme methodological difficulty of assessing the value of financial innovation which I mentioned earlier – the existence of complex chains of causation and the presence of potential externalities – negative or positive – which make it difficult to assess the value of a specific innovation by considering its direct specific effects. They therefore argue for evaluating the impact of financial innovations using macro level counterfactuals – in the same way that the economic historian Robert Fogel applied what became known as ‘cliometrics’ to the assessment of the impact of industrial innovations such as the railroads.

Using that style of analysis, Lerner and Tufano suggest that a combined quantitative and qualitative analysis is likely to conclude that two major post war financial innovations were beneficial.

- The development from the 1940s onwards, of venture capital financing techniques, which enabled dispersed wealth holdings (held for instance in pension funds) to fund entrepreneurial new venture investment.
- And the development of mutual funds, which enabled savers with modest holdings of wealth to invest indirectly in diversified securities portfolios, rather than being either confined to bank deposits or to undiversified securities portfolios, or to face excessive transaction costs.

Let us suppose – as seems reasonable – that Lerner and Tufano are right in assessing both these developments as beneficial – as creating positive social as well as private value. Two features of these innovations strike me as interesting.

- First, they can both be related to a challenge created by exogenous circumstance to which a response was required. The relevant exogenous circumstance was, I suggest, the considerable reduction in wealth inequality which occurred between the 1920s and the 1970s, resulting from a combination both of trends in pre-tax remuneration, and of progressive income and inheritance taxes. This development created the need – if savings were to

continue to flow to productive investment – for intermediation mechanisms which would aggregate moderate savings and achieve their investment in diversified portfolios. Such a need was less pressing in earlier phases of market capitalism, when great wealth inequalities allowed higher national investment to be funded by direct individual rich investors.

- Second, both of these innovations related essentially to the flow of equity intermediation, and it is inherent to the nature of equity contracts – rights to a flexibly determined residual profit – that they have less potential to create financial instability than debt contracts – which introduce potential rigidities and procyclicalities.¹⁶

In contrast, it is unclear to what important exogenous challenge the explosion of shadow banking was a required response, and the fact that financial innovation was concentrated on activities central to or closely related to the money and credit process maximised the potential for severe negative externalities.

¹⁶ Lerner and Tufano present their analysis of mutual funds as encompassing also money market mutual funds, whose development is implicated in the development of shadow banking and multi-chain maturity transformation. But an analysis of the impact of ‘mutual funds’ should I believe treat equity funds and money market funds as two completely distinct categories, with different drivers of development and quite different impact. It is for instance noticeable that while equity (or bond) mutual funds have a precise equivalent in most European countries (unit trusts) responding to the same underlying need, the role of money market funds is distinctly more limited (and different) in Europe, reflecting the absence in Europe of the regulatory arbitrage factors (e.g., Reg Q limits on bank deposits interest) which drove early MMMF developments in the US).

4. Conclusions and hypothesis implications for policy

In summary I would like to suggest two firm conclusions, one hypothesis to stimulate further debate and research, a caveat to that hypothesis, and a proposal for further research questions. And finally some policy implications.

(i) Conclusion I

Finance is different because the opportunity for purely 'distributive' activities is greater than in other sectors of the economy. And banking and shadow banking are even more different, because they are integrally involved in the money/credit creation process, which has an inherent potential to create instability and severe negative externalities.

(ii) Conclusion II

As a result of both the 'distributive' and 'negative externality' effects we have good a priori reasons for believing that the financial industry can attract a sub-optimally high percentage of high-skilled talent, and will be characterised by a greater divergence between marginal private profit (and thus remuneration) and social value than is found in other sectors. That implies that we should be very cautious in our interpretation of the meaning of financial sector value added in the national income accounts,

and very wary of any belief that increased size in the financial sector is a desirable end per se.¹⁷

(iii) Hypothesis for debate

It is likely that increased financial intensity – whether measured by financial assets or trading volumes as a percent of GDP, or by the number and complexity of financial products or the degree of interconnectedness of the financial system, is a positive driver of social welfare up to some point, but tends to become negative beyond that. The great economic transformation of the last 250 years was accompanied by financial innovations – joint stock banks, stock markets, corporate bonds – and it is impossible to imagine the complex exchange economy without a complex financial intermediation system. Richer countries tend to have somewhat larger financial sectors as a percent of GDP, and in some countries further financial deepening would almost certainly be beneficial – India needs to extend basic banking services more effectively to rural areas. But we cannot assume by axiom that increasing financial intensity is limitlessly beneficial simply because it must be ‘completing more markets’ or ‘making markets more efficient’. Beyond some point the benefits must be subject to declining marginal

¹⁷ See Andrew Haldane, *What is the Contribution of the Financial Sector*, in *The Future of Finance*, the LSE Report, 2010, for a discussion of the methodological difficulty of measuring the value added of the financial sector.

returns and the dangers of offsetting distributive and externality effects probably increase.

- In the arena of securitisation and shadow banking, the purported benefits of market completion were the increased availability to investors of their precise desired combinations of risk, return and liquidity. Even if this had been delivered without increased risk, this beneficial impact must surely have been subject to declining marginal returns [**Exhibit 28**]. But in fact the very complexity involved in pursuit of this market completion, and the related increase in financial system interconnectedness, increased the dangers of underestimated risks and thus the dangers of financial instability. As a result the net impact of increasing *attempted* market completion may be a function subject first to declining and then eventually to negative marginal returns.
- And it is possible (though here the hypothesis is even more speculative) that the same logic may apply to increased market liquidity. There are strong reasons for believing that reasonably liquid markets, which enable investors to buy and sell securities (or foreign exchange or commodities) in reasonably large quantities, rapidly, at low bid-offer spreads, are of social value. But the benefits of ever further liquidity, market efficiency and price

discovery, must be subject to declining marginal returns. It is therefore not clear that high frequency trading, based on computer algorithms, can possibly deliver significant positive social value – price discovery at the nano-second interval cannot possibly give a significant allocative efficiency benefit over price discovery on a second-by-second basis. And there must be at least some danger that the increased role of algorithmic trading, without which high frequency trading is impossible, could contribute to increased volatility or mispricing. At the limit, an equity market in which 100% of trading was driven by algorithms of an arbitrage or momentum (rather than fundamental value) nature would become a self-referential random number generator. Increased liquidity of markets – normally treated as an iconic variable which we should always seek to maximise – may also logically be subject to first rising and then falling social returns. **[Exhibit 29]**

(iv) Caveat

However, while divergences between private and social value can occur across the financial system, we need to keep most focused on those financial activities which relate to the money and credit creation process, recognising that outside these activities, there may be unnecessary but also not dangerous activities. It is unclear what positive social value

high frequency trading delivers, and if it delivers no value, but makes its individual traders richer, then some subtle and unnecessary rent extraction process is at work. But rent extraction occurs in many sectors of the economy, and regulators cannot and should not pursue some precise target of social optimality – they lack both the analytical and policy tool precision to achieve that end. If HFT turns out to be pointless but also not dangerous to stability, the case for regulatory intervention may still be poor.

What really matters is the credit intermediation process, maturity transformation and leverage, and the ways in which innovation, complexity and interconnectedness can drive macro instability. It is here that we should focus our greatest attention.

(v) Two research questions

I am giving this lecture in a university. So I must end by suggesting questions for further research. Two strike me as under explored in the economic literature:

- What can we say about the optimal balance of debt versus equity instruments in the economy? In attempting to assess the impact of ‘securitisation’ I stressed that we could not conclude that it had been beneficial simply because it had helped ‘create more credit’,

that we needed to ask whether and how far the new credit created had had a beneficial effect. The balance between debt and equity instruments in an economy is a centrally important issue: more debt gives more apparent certainty, which both savers and borrowers may value: but more debt makes the system potentially more fragile. We used to assume that the free market chosen level of debt within the economy was axiomatically optimal: in the wake of the crisis we can no longer do so.

- And what can we say about the optimal scale of maturity transformation in the economy? Like credit, maturity transformation can be social welfare enhancing, up to some degree. But if there is 'too much' maturity transformation, the system will be highly unstable. But how much is 'too much'? I am not aware of any convincing answers to that question within the economic literature. Indeed what is striking is how little we know about how much maturity transformation there is, and about trends in it, let alone about whether these trends are optimal.

If all financial intermediation was performed by one bank, we could precisely observe aggregate maturity transformation. But once we have multiple intermediating banks and non-banks, each performing a slice of maturity transformation, our ability to

understand the aggregate level and aggregate risks is imperfect. It seems almost certain, however, that aggregate maturity transformation performed by the financial system increased greatly over the 30 years pre-crisis – a phenomenon we can observe by ignoring the complexities of the multi-step intermediation system, and looking instead at non-financial sector assets and liabilities. In the UK, as in the US, the 50 years pre-crisis saw a huge expansion of residential mortgages, funded by deposits, and in the US by money market funds **[Exhibit 30]**. The mortgages were contractually long term: the financial assets which funded them, predominantly very short term. A huge increase in aggregate maturity transformation must have occurred, but we failed to understand that or to appreciate the growing risks. In future we must do better.

So what follows for policy? Well Hyman Minsky was, wisely, cautious of believing that any regulator could precisely offset the instability which the operation of private incentives, innovation and changing risk appetite would unleash.

'In a world of business men and financial intermediaries who aggressively seek profit, innovators will always outpace regulators: the authorities cannot prevent changes in the structure of portfolios from

occurring. What they can do is to keep the asset-equity ratio of banks within bounds by setting equity absorption ratios for various types of assets. If the authorities constrain banks and are aware of the activities of fringe banks and other financial institutions, they are in a better position to extenuate the disruptive expansionary tendencies of our economies.'

The vital policy implications of the story of shadow bank financial innovation are indeed that we should seek to constrain the instability potentially created by credit and money creation processes, by credit and asset price cycles. That implies:

- Much higher bank capital and liquidity requirements than we had in place before the crisis – the Basel III reforms. These constrain banks' 'asset-equity' ratios at the institutional level.
- Appropriate constraints on shadow bank credit and money equivalent creation – for instance through 'asset-equity' controls at the contract level – minimum initial haircuts. These will be considered by the Financial Stability Board this year.
- The development of macroprudential countercyclical levers which can lean against the strength of the credit and asset price cycle. The UK's interim Financial Policy Committee has recently

recommended to Parliament that it should have the power to vary across the cycle both total bank capital requirements and the riskweights applied to specific types of asset (such as real estate). It has also flagged that regulating margins on secured financing contracts might be desirable in future, within the context of internationally agreed approaches.