Lionel Robbins Memorial Lectures

Market Efficiency and Rationality: Why Financial Markets are Different

Lord Turner
Chairman of the Financial Services Authority, the Climate Change Committee and the Overseas Development Institute

London School of Economics and Political Science

Tuesday 12 October 2010

Lecture I considered the objectives of economic policy, and in particular the assumption that the aim and measure of economic success is growth in GDP per capita. It argued that beyond some level of average income, the correlation between average GDP and human wellbeing or happiness is uncertain and complex – and that the rich developed countries of the world probably reached this point within the last several decades, after two centuries of a great transformation in which growth in measured income did bring clear human welfare benefits.

As a result the instrumentalist argument used to justify high inequality and free markets because they deliver an increased growth rate has become invalid.

In this second lecture I will turn to the issue of means, and in particular the role of markets.

Suppose that increasing GDP per capita were a sensible objective – and not just for middle and low income countries, but for high income as well – how confident are we that free markets are the way to deliver such growth? And in particular how important is financial market liberalisation and what other consequences, good or ill, might free financial markets bring with them?

The proposition that markets drive economic efficiency is central to much economics.

- Adam Smith illustrated that the "invisible hand" of the market drives efficient allocation of resources in a system of division of labour.

- Friedrich Hayek illustrated the central importance of the price system as an information processing mechanism more powerful than any centrally planned system could ever be.

- Kenneth Arrow and Gerard Debreu illustrated that complete and perfect markets deliver a Pareto efficient equilibrium, in which no one person could be made still better off without making someone else worse off.

- And the development of the Efficient Market and Rational expectations Hypotheses suggested that financial markets are in fact efficient, and that the conditions required for efficiency and for rational and stable equilibria apply even in contracts between the present and the future, which financial markets provide.

Together these ideas have provided the intellectual underpinning to the powerful ideology of market liberalisation and deregulation which became increasingly dominant over the last several decades, the "Washington Consensus" in which almost all economic activities – from manufacturing to electricity production, from retailing to health provision – could be made more efficient if markets were allowed to operate, and in which structural reform to labour markets, free trade and product market liberalisation were the key elements of a universally applicable formula. And in which free financial markets – the unrestricted flow of long and short term capital – and financial deepening – a wide array of different financial markets and services – were essential to the efficient allocation of capital.

The political ideology was free market capitalism: the intellectual underpinning was the concept of market completion – the idea that the more market contracts could exist and the more freely, fairly and transparently they could be struck, the closer we could get to the most efficient possible outcome, most favourable to human welfare.

One of the consequences of the capital account and financial market liberalisation which followed was a quite startling increase over the last 40 years in the relative scale of financial activities within the economy, with dramatic increases in capital flows, financial market trading volumes, and the size of financial institution balance sheets relative to real non-financial activities.

In the years which ran up to the Asian crisis, capital flows to and from emerging countries grew rapidly, with an upsurge in equity portfolio flows, debt security flows, and cross-border bank claims **(Exhibit 1)**. After the setback of the 1997 crisis, these capital flows resumed an even stronger upward path **(Exhibit 2)** An upsurge matched by longer term growth of financial capital flows between developed nations **(Exhibit 3)**, accompanied over the last 30 years by a quite striking increase in the volume of foreign exchange trading activity relative to global GDP and trade **(Exhibit 4)**.

The crisis of 2008, meanwhile, came after several decades in which financial activity within developed economies – whether measured by total bank assets to GDP, or by the scale of credit and derivatives trading, or the scale of interest rate derivatives trading, had increased dramatically **(Exhibits 5 & 6)**.

On a whole series of measures, therefore, the sheer scale of financial activity has increased dramatically, both in absolute terms and relative to real economic variables such as GDP, over the last 30 years. This followed several decades in which no such trend had been apparent.

That increasing scale of financial activity reflected in part the globalisation of world trade and long-term capital flows and the world of floating exchange rates which followed the breakdown of the Bretton Wood system in the early 1970s. But it was also deliberately fostered by policies of financial liberalisation. The size and sophistication of financial sectors were seen as important positive drivers of national and global growth.

Drivers which in turn had the side effect of a dramatic increase in financial sector remuneration relative to remuneration in the non financial economy – investment banking, financial trading and hedge funds becoming the number one choice for highly skilled people who wanted to get rich. Thomas Philippon and Ariell Reshef, for instance, **(Exhibit 7)** illustrate how the ratio of financial sector pay to that paid for jobs of apparently equivalent skill has increased dramatically in the last 30 years, as indeed it did in the 1920s. And the growth of a larger and highly remunerated financial sector has been – in both the US and the UK – a key driver of the overall increase in inequality discussed in Lecture I. But with this not a fact which troubled the instrumental conventional wisdom: since in that conventional wisdom it was obvious that this increased financial intensity and complexity, and the high pay which went with it, must be increasing the allocative efficiency of the economy, driving an overall increase in prosperity at least as large as that accruing to the high paid bankers themselves.

The crucial issue which we now need to address, after two terrible crashes in just 12 years, is whether this increasing scale of financial activity truly has been in its net effect beneficial, which elements are beneficial and which are harmful, and what trade-offs are required in public policy between any benefits of increased financial liberalisation and the instability which seems at times to accompany it.

My focus in this lecture will therefore be on the financial market aspects of liberalisation and deregulation. But it is useful to place that within the wider context of the overall debate about the role of free markets in economic development. Over the last 200 years, as discussed in Lecture I, **(Exhibit 8)** there has been an extraordinary and unique transformation in human living standards across the world, with some countries achieving such high levels of income that further income growth may not be at all that important, others still mid-way through that transformation or at an early stage in it.

How important to this transformation have been free markets: does the long term historic record support the intellectual self-confidence of the Washington Consensus? It certainly supports a general preference for some category of market economy **(Exhibit 9)**.

- Fully planned economies, with neither market determined prices nor entrepreneurial freedom, have been remarkably unsuccessful – or at least subject to an atrophy effect with initial spurts of growth turning later to stagnation, inefficiency and corruption.

- And it is clear that access to foreign markets has typically played a major role in successful models of rapid economic catch-up – to that extent free trade is important.

- And private entrepreneurship is clearly a powerful lever for driving the efficient delivery of the myriad of consumer goods and services which rich consumers desire. Restaurants and fashion goods in non-market economies were almost universally dire; and entrepreneurship has been far more effective than state planning in driving the innovations of information technology.

So the overall case that markets have played a central role in this great transformation is a strong one. But it is also clear that there has been no one route to prosperity, and that some countries have achieved rapid economic growth while breaking many of the rules of the Washington Consensus.

- The US achieved rapid industrial growth before the First World War behind high tariff barriers.

- Japan in the 1950s to 70s and Korea in the 1960s to 90s achieved economic breakthrough while breaking many of the rules of the subsequent Washington Consensus – with elements of state sponsored industrial strategy and significant tariffs.

- China is stunningly successful with an eclectic economic model which combines elements of intense market competition and elements of state direction.

As Ha-Joon Chang points out in *"23 Things They Don't Tell You About Capitalism"*,[1] Thing 7 is that few successful rich countries got rich following the precepts of pure free market economics. The fact that Britain in the 19th Century was among the nearest to the pure free market model should not blind us to how rare that model has actually been.

So the general conclusion is that an assessment of the effectiveness of markets in driving economic efficiency and growth needs to be based on good economic history – on the open-minded analysis of a complex and varied set of historical experiences, not on a theoretical assumption that markets deliver efficiency because general equilibrium theory tells us that they should.

But my focus today is not on all markets, but on financial markets in particular. Has financial market deregulation and the increase in financial intensity delivered an efficiency and growth dividend and/or has it had other consequences, and are they desirable? Is there in economic history a clear correlation between the financial intensity of an economy and the overall rate of economic growth?

[1] Ha-Joon Chang. *23 Things They Don't Tell You About Capitalism*, Allen Lane, 2010.

At the macro level there is no clear and universal positive relationship. Carmen Reinhart and Kenneth Rogoff in their recently published survey of eight centuries of financial folly, crashes and debt defaults ('This Time it's Different'), identify the period 1945 to the early 1970s as one of 'financial repression' in which the role of the financial system was subdued in many countries.[2] And in some countries, for instance one might argue in India, that 'financial repression' probably was one among a package of market restrictive policies which hampered economic growth. But equally there were countries which in that period achieved historically rapid growth with fairly 'repressed' financial systems (for instance Korea). And in the developed economies – the US, Europe and Japan – this period of financial repression was one of significant and relatively stable growth, comparing fairly well with the subsequent 30 years of increased financial activity and financial liberalisation.

And there does not appear to be any compelling quantitative proof that increased financial innovation over the last 30 years in the developed world has had a beneficial effect on output growth. Indeed, a recent paper by Moritz Shularick and Alan Taylor documents the growth of leverage and credit extension which liberalisation and innovation has helped facilitate, but finds little empirical support for the proposition that this liberalisation and innovation has led to a corresponding increase in trend growth rates for the countries in their sample.[3]

So the broad historical macro facts do not provide compelling evidence that an increase in the financial intensity of market economies is necessarily, always and limitlessly beneficial for growth, even if we did believe that it was the desirable objective.

To progress beyond this very general conclusion, however, we need to get more specific, both as to theory and the empirical record. This lecture aims to do that, addressing five issues in turn **(Exhibit 10)**.

- The theory of efficient and rational markets: and compelling reasons for disbelief.
- Lessons from the Asian crash of 1997.
- Lessons from the developed world crash of 2008.
- Financialisation and income distribution: just why are bankers paid so much?
- And some conclusions for policy and for the discipline of economics.

[2] C. Reinhart and K. Rogoff *This time its different: Eight centuries of financial folly,* Princeton , 2009
[3] M. Schularick and A.M. Taylor : *Credit booms gone bust: Monetary policy , leverage cycles and financial crises 1870-2008* ,NBER Working Paper No15512, November 2009

1. Efficient and rational markets: neoclassical versus Keynes / Minsky Theories

The predominant neoclassical school of economics has perceived increased financial activity – greater market liquidity, more active trading, and financial innovation – as a broadly positive development. This is because extensive financial activity is essential to "complete" markets.[4] **(Exhibit 11)**. The first fundamental theorem of welfare economics, demonstrated mathematically by Kenneth Arrow and Gerard Debreu[5], illustrates that a competitive equilibrium is efficient. But this is only true if markets are complete, i.e. if there are markets which strike all possible desired contracts, including insurance contracts and investment contracts linking the present and the future, as well as markets for current goods, services and labour. Therefore, the more liquid are financial markets and the more extensive is financial innovation, the more efficient the economy will be. Thus within this theory:

- More liquid commodity futures markets are beneficial because they enable users and producers of commodities to hedge their risk more efficiently.

- Liquidity in the credit default swaps market enables investors and issuers of corporate debt to achieve and continuously adapt their desired risk profile.

- The complex structured credit markets which grew from the mid 1990s were beneficial because they enabled investors to select precisely that combination of risk, return and liquidity which matched their specific preferences.

- And the wider the set of options for linking suppliers of funds with users of funds – including via the provision of market liquidity which enables investors' time horizons to diverge from the contractual maturity of the instruments themselves – the more efficient will be the allocation of capital.

- In each case therefore 'innovation brings us closer to the Arrow-Debreu nirvana where all possible markets exist and are complete'.[6]

Moreover, these advantages of financial markets apply not merely within an economy, but between countries. The less restricted and deeper the markets for capital flows between countries, the more efficient the international allocation of capital will be, with globalisation and financial liberalisation therefore naturally and beneficially linked.

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[4] I am indebted to Jonathan Portes , Chief Economist at the UK Cabinet Office for sharing with me an unpublished article which provides a particularly clear description of the differences between the Neoclassical and Keynes / Minsky approaches

[5] K. Arrow and G.Debreu, Existence of an equilibrium for a competitive economy, Econometrica,vol.22, 1954

[6] The quote is from Jonathan Portes's paper

These propositions do not mean that there is *no* role for regulation of financial services and financial markets **(Exhibit 12)**. Neoclassical theory specifically identifies that competitive equilibrium conditions can be prevented by the existence of market imperfections and recognises, as per the Lancaster-Lipsey conditions, that if a specific market is imperfect, liberalisation of other markets might be suboptimal.[7] But the neoclassical approach does tend to dictate a particular regulatory philosophy, in which policymakers ideally seek to identify the specific market imperfections preventing the attainment of complete and efficient markets, and in which regulatory intervention should ideally be focused not on banning products or dampening down the volatility of markets, but on disclosure and transparency requirements which will ensure that markets are as efficient as possible.

These propositions, and the strongly free market implications drawn from them, have played a major role in academic economics over the last several decades, though with dissenting voices always present. But they have been even more dominant among policymakers in some of the finance ministries, central banks and regulators of the developed world. Keynes famously suggested that 'practical men, who believe themselves quite exempt from any intellectual influences, are normally the slaves of some defunct economist'. But the bigger danger may be that the reasonably intellectual men and women who play key policy-making roles are often the slaves to a simplified version of the predominant conventional wisdom of the current generation of academic economists.

Certainly in the case of the UK Financial Services Authority, the idea that greater market liquidity is in almost all cases beneficial, that financial innovation was to be encouraged because it was likely to expand investor and issuer choice, and that regulatory interventions have to be specifically justified by reference to the specific market imperfections which they are designed to overcome, formed key elements in our institutional DNA in the years ahead of the crisis. And the predominant tendency of the International Monetary Fund, both at the time of the Asian crisis and in the run up to 2007 to 2009, was to stress the advantages of free capital flows and financial innovation, making reference to theories of market completion and allocative efficiency.

But this benign view of limitless financial deepening – of increased trading activity and innovation – is rejected by what we might label the Keynes/Minsky school of thought. Keynes, most famously in Chapter 12 of The General Theory, argued that liquid financial markets did not ensure allocative efficiency through the attainment of a rational competitive equilibrium, but were instead subject, for inherent and unavoidable reasons, to self-reinforcing herd/momentum effects. Professional investment was, he famously said, like a pick the prettiest girl photo competition, in which the successful competitor was the one who correctly and most rapidly predicted the preferences of the other competitors **(Exhibit 13)**. "It is not a case of choosing those which, to the best of one's judgment, are really the prettiest, nor even those which average opinion genuinely thinks the prettiest. We have reached the third degree where we devote our intelligences to anticipating what average

[7] Richard Lipsey and Kelvin Lancaster *"The General Theory of the Second Best* , Review of Economic Studies 1956

opinion expects the average opinion to be. And there are some, I believe, who practice the fourth, fifth and higher degrees".[8]

Keynes therefore believed that the professional investor or trader, be it in equity markets, currency markets, or, he would have said today, the CDS market, is 'forced to concern himself with the anticipation of impending changes, in the news and in the atmosphere, of the kind by which experience shows that the mass psychology of the market is most influenced'. And he argued that pure speculation, unattached to fundamentals, could drive self-reinforcing bubbles, which not only served no useful allocative role, but which produced important destabilising effects.

The potential scale of these self-reinforcing bubbles, and the economic harm which they can do, has been extensively documented **(Exhibit 14),** first as early as 1852 by Charles MacKay in *"Extraordinary Public Delusions and the Madness of Crowds",* later by Charles Kindleberger in *"Manias, Panics and Crashes"*, and more recently by Robert Shiller in *"Irrational Exuberance"*, presciently issued at the height of internet boom[9] [10] [11]. Together they and other writers have documented a historic record littered with equity, debt, property and other markets which have moved far away from equilibrium levels – huge booms followed by huge crashes.

Booms which Hyman Minsky argued persuasively are inherent to the institutional structures and incentives of finance capitalism, with continued good economic times likely to produce a shift in the relative balance of financial activity away from the those focused on hedging risks and on allocating capital efficiently, and towards purely speculative activities which end in sudden collapses, debt deflation traps and major economic disruption. [12]

There are three somewhat distinct but also complementary sets of explanations put forward for these disequilibrium dynamics **(Exhibit 12)**.

- The first stresses the fact that human decision making cannot be seen as an entirely rational process, but is at times inherently instinctive and influenced by crowd psychology. The reasons for this are rooted in evolutionary biology and the design of our brains. "When making difficult intertemporal decisions", as Andrew Haldane writes in his recent lecture Patience and Finance "We are quite literally in two minds".[13] We have a pre-frontal cortex capable of patient rational analysis: and a limbic system, which disposes us to instinctive, emotional and very short term responses. We are creatures of our evolved nature, and while

[8] John Maynard Keynes , *The General Theory of Employment , Interest and Money* , 1936 , Chapter 12
[9] Charles MacKay, *Extraordinary Public Delusions and the Madness of Crowds*, first published 1852, Wilder Publications 2008.
[10] Charles Kindleberger, *Manias, Panics and Crashes*, 1978.
[11] Robert Shiller*, Irrational Exuberance*, Princeton 2000. See also *Market Volatility*, MIT Press, 1992
[12] Hyman Minsky, *Stabilising an Unstable Economy*, Yale 1986.
[13] Andrew Haldane, *Patience and Finance*, Oxford Beijing Business Forum, Beijing, September 2010.

that nature gives us a unique ability for rational thought, it also makes us naturally susceptible to herd effects – because keeping in with the herd, the crowd, the tribe, is an impulse which at some stage in our evolutionary history was positive for survival. As George Akerlof and Robert Shiller explain in "Animal Spirits", human psychology drives the economy, and we need to understand it as it is, not as the rational expectations hypothesis assumes it.[14] There is no fully rational Homo Economicus.

- The second set of explanations, however, do not require that human beings act in an individually irrational fashion, but simply that information and contracting relationships are imperfect. For with information imperfections and imperfect structures of principal/agent relationships, it is quite possible for each individual to act in what seems to them, and indeed is, a perfectly rational self-interested fashion, but with the collectively resulting price movements subject to herd and momentum effects which take prices far from equilibrium levels. In Keynes' pretty girl competition, after all, practising the fourth, fifth and higher degrees is entirely rational. This school of thought, therefore, does not need to reject the neo classical assumption of an "rational economic man" but differs from the efficient market and rational expectation schools in recognising that information imperfections are so inherent that no amount of market completion and increased transparency will ever overcome them.[15] Thus for instance the work of Roman Frydman and Michael Goldberg, has illustrated that the essential assumption of the rational expectations hypothesis – that there is a best model of how the economy works and that every rational agent will discover it and work in line with its assumptions – is logically impossible: and that as a result periodic significant divergencies of market prices from equilibrium values are bound to occur.[16]

- Third and finally, one crucial reason why imperfect knowledge of the future is the only knowledge possible is that the future is characterised by inherent irreducible uncertainty, not by mathematically modelable risk. That distinction, which goes back to Frank Knight's "Risk, Uncertainty and Profit", and to Keynes' "Treatise on Probability" is fundamental, but too often ignored not only by mainstream economics but by Keynes' "practical men". **(Exhibit 16)**[17] [18]. In the application of "Value at Risk" concepts to the assessment of market trading risk, for instance, major investment banks putting huge amounts of money at risk, worked on the assumption that the observed frequency distribution of market price movements over recent periods carried strong inferences for the probability distribution of future possible movements. This assumption turned out to be three-fold dangerous:

[14] George Akerlof and Robert Shiller, *Animal Spirits, How Human Psychology Drives the Economy*, Princeton 2009
[15] See Joseph Stiglitz, *Information and the Change in the Paradigm of Economics*, Nobel Prize Lecture, December 08, 2001.
[16] Roman Frydman and Michael Goldberg, *Beyond Mechanical Markets*, forthcoming from Princeton University Press.
[17] Frank Knight, *Risk, Uncertainty and Profit*, (1921).
[18] J M Keynes, *A Treatise on Probability*, (1920)

- first because the assumption was frequently made, for ease of modelling, that the distributions were "normal":

- second because the reliance on observations of the recent past introduced a systematic tendency to pro-cyclical risk assessment:

- but third because the very idea that in social science we can derive the objective probability distribution of future outcomes from observation of past outcomes is a philosophical category error, since no probability distribution of future outcomes objectively exists. As Mervyn King and others have put it in a recent paper, since beliefs and behaviour adjust over time in response to changes in economic and social environment, "there are probably few genuinely 'deep' (and therefore stable) parameters or relationships in economics, as distinct from in the physical sciences, where the laws of gravity are as good an approximation to reality one day as the next".[19] **(Exhibit 17)**.

It is therefore notable that the school of thought which we might broadly label as Keynes/Minsky is not characterised by a single unifying theory equivalent to that of neoclassical equilibrium. As a result, it is not easy to derive from this way of seeing the world, or rather these ways, a simple and universally applicable set of criteria for deciding appropriate regulatory intervention, such as can be derived from the neoclassical approach. But I will argue in my concluding section that it is better to live in the real world of complexities imperfectly understood, than to construct for ourselves an intellectually elegant set of assumptions which do not fit real world phenomena. And the evidence of the crises of 1997 and of 2007 to 2009, to which I will now turn, suggest that we should be highly sceptical of the benefits of general and limitless financial liberalisation.

2. The Asian crisis of 1997

In relation to the 1997 crisis **(Exhibit 18)**, the crucial contested issue in economics is the benefits and disadvantages of short-term financial capital flows. As already shown, these flows increased dramatically in the decade running up to the 1997 crisis and the dominant conventional wisdom of the time – as expressed for instance in the attitude of the International Monetary Fund (IMF) – was that these flows were positive. This was based on the neoclassical argument that capital flows in general (including short-term portfolio flows as well as long-term direct investment) help achieve a more

[19] Mervyn King et al *uncertainty in macro economic policy making: art or science?* Royal Society Conference, March 2010.

efficient global allocation of capital, linking savers to business investments in a more efficient fashion.[20]

Indeed it was right in the middle of the Asian crisis – at its Hong Kong meeting in September 1997 – that the IMF proposed that capital account liberalisation should be made a binding commitment of IMF membership, going beyond the commitment to current account convertibility included within the IMF's original founding articles.

But while this was the conventional wisdom, a wide variety of studies have cast doubt on whether free movement of capital, and in particular of short-term capital, is at all positive for growth. The challenge has been launched on both empirical and theoretical grounds.

- The empirical evidence has been very usefully assessed by a working group of the Committee on the Global Financial System (CGFS),[21] **(Exhibit 19)**. It notes that 'despite the numerous cross country attempts to analyze the effects of capital account liberalisation, there appears to be only limited evidence that supports the notion that liberalization enhances growth' and some of the protagonists in this debate, such as Dani Rodrik and Jagdish Bhagwati would go further and say that there is no compelling evidence at all.[22],[23] Even those who broadly support capital account liberalization have therefore tended to argue that liberalization *could be* beneficial under specific circumstances, rather than that it has been demonstrably beneficial in all cases

- Dani Rodrik and Arvind Subramanian have highlighted one reason why the apparent case for financial globalisation might not apply in today's circumstances. In the first period of financial globalisation – the 40 years or so before the First World War – international capital flows, to a significant extent, took the form of outflows from rich developed countries (in particular the UK) and inflows to commodity producing countries which lacked adequate domestic savings to develop their industries. But as Rodrik and Subramanian point out, this is not the recent pattern. Net capital flows indeed have been as likely to be *from* poorer developing countries *to* rich developed ones as vice versa, and developing countries' savings rates have usually not been a binding constraint on growth. The case in favour of capital flows, therefore, has to assert that intensive two-way flows of capital facilitate a more efficient allocation, rather than asserting that a net flow of finance to developing countries is key to the development process.

[20] See Stanley Fischer *Capital account liberalisation and the role of the IMF* in *Should the IMF pursue capital accounting convertibility*? Essays in International Finance, Princeton 1998.

[21] *Capital flows and emerging market economies* , CGFS Papers No 33, January 2009
[22] D. Rodrik and A. Subramaniam, *Why did financial liberalisation disappoint* , March 2008
[23] J. Bhagwati, "*The capital myth: the difference between trade in widgets and dollars*" , Foreign Affairs, May 1998

- Meanwhile, many analyses have illustrated that short-term financial capital flows, particularly into debt securities and via cross border bank lending, can be extremely volatile, subject to what Reinhart and Rogoff label "bonanzas" followed by "sudden stops". **(Exhibit 20)**. Bonanzas seem to be strongly influenced by self-reinforcing herd effects, with some investors caught up in over optimistic stories about a country's prospects, while others quite rationally seek to ride the self-reinforcing appreciation of the local currency or asset markets for as long as the bonanza lasts. Sudden stops and outflows meanwhile are even more strongly self-reinforcing, with a contagious collapse of confidence affecting not only countries where there is a least some new information which might reasonably carry inference, but other countries treated by investors as in the same broad category. As a result, domestic asset markets in emerging countries and foreign exchange markets can be characterized by multiple and fragile equilibria, such as illustrated in the movement of Thai bhat, Korean won and Indonesian rupee rates in 1997 **(Exhibit 21)**.

- In addition, volatile short-term capital flows can complicate the conduct of domestic monetary policy, facing authorities with a choice between allowing undesirably rapid growth of domestic credit and money, or of accepting an exchange rate appreciation which can undermine the competitiveness of traded sectors in a fashion not justified by long-term fundamentals. Moreover, short-term capital inflows, in particular of bank debt, can drive disruptive asset price booms in local markets, such as commercial real estate.

- As a result, a compelling argument has been developed that the balance of benefits and disadvantages of capital flows varies by type of flow – an argument well summarised in the CGFS paper. This suggests a hierarchy in which long-term capital flows are better than short term; direct investment is better than portfolio; and equity is better than debt, with short-term inter-bank flows the least beneficial and potentially most disruptive.

These arguments together make a compelling case for believing that:

- The positive benefits of short-term capital flows may be very slight, even in the absence of shocks.

- These benefits can be significantly outweighed by the adverse impact of financial shocks.

Against this criticism, the counter defense of capital flow liberalization has not sought to deny the reality of potentially volatile capital flows, but has argued that this potential arises only because of fundamental deficiencies in, for instance, the credibility of government's fiscal and monetary policy, or the quality of domestic financial system regulation and governance **(Exhibit 22)**. These arguments recognise – in line with the Lancaster and Lipsey second best theory – that market liberalisation can be harmful if applied in a context where many other market imperfections and distortions exist. But

this insight is then used to support the argument that capital flow liberalisation *can* be a good thing, provided that appropriate supplementary reforms are made, and in the appropriate sequence. An argument which enables believers in the free market creed to hold that the faults in the system revealed by 1997 ultimately lay not in too much market liberalisation, nor in the inherent instability of markets, but in inadequately complete application of good free-market precepts.

This argument between those who believe that the potentially harmful volatility of financial markets is inherent and unfixable, and those who believe that it can be fixed if credible policies are in place and well communicated, is an old one. In 1943, in a paper which input to the Bretton Woods deliberations, the economist Ragnar Nurkse reviewed the floating exchange rate regimes of the early 1920s, and concluded in particular that movements in the French franc exchange rate between 1924 and 1926 illustrated 'the dangers of cumulative and self-aggravating movements… (which)… instead of promoting adjustments in the balance of payments, are apt to intensify any natural disequilibrium and to produce what may be termed "explosive" conditions of instability'. But Nurkse's account was met by the counter-argument of Friedman et al, that this apparently self-fulfilling unstable speculation was a rational response to the uncertainties of French policy, and that the key lesson, therefore, is the need for policy to be appropriate, well communicated and credible.[24]

Faced with these alternative arguments, it becomes impossible, as Barry Eichengreen has noted, ever to *prove* which argument is correct, except if we were able to look directly into the minds of financial speculators and possibly, given Andrew Haldane's insight that the individual speculation might be "of two minds", not even then **(Exhibit 23)**. But while proof is ultimately unattainable, there are three compelling arguments for not seeing the 'conditions and sequencing' argument as at all conclusive:

- Dani Rodrik and Arvind Subramanian's point that even if such "conditions and sequencing" could in theory remove the disadvantages of short-term capital flows, we have to make decisions in a real world, where governments are equipped with imperfect tools and are subject to short-term political pressures, and where their ability ever to get 'conditions and sequencing' right is inherently imperfect.

- The evidence of economic historians, such as Charles Kindleberger, who have documented the tendency of many different types of markets to be subject to manias, panics and crashes.

- And the explanations advanced by John Keynes, Hyman Minsky, George Soros, Joseph Stiglitz, Robert Shiller and others, as to how a combination of rational incentives and

[24] See Barry Eichengreen *Globalising Capital*, Princeton 2008 page 49-55 for discussion of this debate.

psychological tendencies can be expected to produce self-reinforcing momentum effects.[25]

Overall, therefore, the case that short-term capital flow liberalisation is beneficial is (as Jagdish Bhagwati argued in his famous 1998 article, *The Capital Myth: The Difference between Trade and Widgets and Dollars*) based more on ideology and argument by axiom than on any empirical evidence. Though it is also undoubtedly, as Bhagwati argued, based on interests. For what we saw in respect to capital flow liberalisation in the 1990s (as with domestic financial liberalisation in developed countries) was the assertion of a self-confident ideology, which also happened to be in the direct commercial interest of major financial services firms with powerful political influence in the major and developed economies, in particular the US.

That combination of ideology and interests has proposed an over-simplistic conventional wisdom of self-equilibrating exchange rates and optimal capital flows. Instead we need to recognise that in global short-term capital and related FX markets we face the risk of potential instability and overshoot. What we should do about that is less obvious. It does not necessarily follow that comprehensive capital flow controls are the required answer: there is a reasonable argument that while the theoretical and empirical case against constraints on short-term capital flows is quite poor, the pragmatic case against them (or at least against their comprehensive application) is quite strong, simply because they may be unenforceable and tend to produce other distortions.[26] But we need to at least to recognise the world as it is, not as efficient market models assume it: and in that real world foreign exchange markets and short-term capital flows are not necessarily self-equilibrating, but at times subject to inherent and self reinforcing instability.

3. The developed world financial crash of 2007 to 2009

Acute awareness of that potential instability, revealed by the 1997 crash, produced a policy reaction in some emerging market countries which played a contributory role in the origins of the 2008 crash **(Exhibit 24)**. Developing countries sought to insure themselves against future crises via policies that delivered large current account surpluses and the accumulation of Forex reserves. And the investment of these reserves in low-risk instruments – such as US treasury bonds and agency debt – drove down global risk-free rates, facilitating credit extension in several developed countries – in particular the US – and provoking a search for yield uplift, which was met (so it seemed) by the cleverness of complex financial innovation.

[25] In addition to earlier references, see George Soros *The New Paradigm for Financial Markets,* George Soros, 2008

[26] See Richard Cooper, *"Should capital-account convertibility be a world objective?"* in "*Should the IMF Pursue capital account convertibility?*", Princeton 1998, for a discussion of this argument.

But these macro imbalance-driven developments interacted with, and gave further impetus to, trends in developed economy financial systems which were already underway and whose common feature was a quite startling increase in the scale and complexity of financial activities. I showed earlier the huge increases in the value of foreign exchange trading activity relative to global GDP from the early 1970s on: some of this related to emerging market currencies, but most of it to the currencies of the major developed economies. I also showed the huge increase in inter-financial institution balance sheet claims, which began in the 1970s and continued up to the crisis. From the 1980s and 1990s on, these trends were accompanied by:

- The emergence of a huge market in interest rate derivatives, with the notional value of over-the- counter (OTC) interest rate contracts rising from close to zero in 1987 to over $400 trillion in 2007 **(Exhibit 25)**.

- Huge growth from the mid-1990s in a series of inter-related credit markets. New 'technologies' of pooling and tranching enabled the growth of an over $2 trillion market in private label asset-backed securities, supporting a new 'originate and distribute' model of credit extension **(Exhibit 26)**. Global credit derivative contracts (CDS) outstanding grew from zero in the mid-1990s to over $60 trillion in 2007, with the scale of this 'hedging' activity massively outpacing the growth of the underlying credit instruments which CDS enabled investors or issuers to hedge **(Exhibit 27)**. And Collateralised Debt Obligations (CDOs) grew from zero in the early 1990s to over $250 billion by 2005, with the notable development of synthetic CDOs – credit exposures manufactured through the use of the CDS market, rather than out of the underlying liabilities of non-financial counterparties **(Exhibit 28**).

- And the immense growth of commodities futures trading; with for example, the volume of oil futures trading growing from far less than the volume of physical oil produced and consumed in the world in the early 1980s to over ten times the volume in 2008 **(Exhibit 29)**.

So just as with the growth of international capital flows and of related Forex trading, so too with many other financial activities, the last two to three decades have seen a dramatic increase in the scale of financial activity relative to the real economy, accompanied complex financial innovation.

And just as with international capital flows, so with increased financial intensity and innovation, the predominant official view before the crisis was that this increased financial intensity had delivered important economic benefits.

A chapter in the IMF's Global Financial Stability Review (GFSR) of April 2006, devoted to assessing 'The influence of credit derivatives and structured credit markets on financial stability', set out clearly the policymakers' conventional wisdom, which in turn rested quite explicitly on the key assumptions of neoclassical theory **(Exhibit 30)**:

- It noted with approval that credit derivatives 'enhance the transparency of the market's collective view of credit risks…[and thus]…provide valuable information about broad credit conditions and increasingly set the marginal price of credit'. In the neoclassical model, such price transparency delivers greater market efficiency and takes us closer to the efficiency-maximising equilibrium.

- It also noted with approval that such greater transparency 'improves market discipline', mirroring some arguments for short-term capital flows, which see market discipline on domestic policy makers as a strongly positive function.

- And it argued that these benefits, far from being accompanied by any dangers of instability, were likely to be accompanied by greater financial stability, since more complete markets make possible a better dispersion of credit and liquidity risks to those investors whose preferences and own liabilities make them the most suitable holders. 'There is a growing recognition', it therefore noted, 'that the dispersion of credit risk by banks to a broader and more diverse group of investors has 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'.

In this confidence in the benefits of financial liberalisation, the IMF was not alone. There were of course some economists who raised fundamental objections to the conventional wisdom – William White, Raghuram Rajan, Nouriel Roubini and Robert Shiller, for instance.[27] And specific concerns were often expressed, including within the IMF Global Financial Stability Report (GFSR) from which I have quoted, about specific developments in particular credit markets and about the capacity of risk management systems always to cope with increased complexity. But the predominant view in policy-making circles was not only sanguine about increased financial intensity and financial innovation, but positive. And the dominant intellectual ideology of the day was largely embraced by regulators who as a result were highly susceptible to the argument that if a particular regulation threatened financial innovation or market liquidity it was by definition inappropriate.

It is now obvious that this dominant ideology was wrong, failing to allow for the potential downside of induced instability. And it failed to consider this possibility because based on the assumption that financial markets are rational and equilibrating, rejecting or ignoring the Keynes/Minsky insight that financial markets can be subject to self-reinforcing swings of irrational exuberance and then despair.

Thus we have seen, the IMF, along with many other authorities, welcomed the increased transparency of credit prices provided by the CDS market, and saw it as a benefit that the marginal price of credit (i.e. the pricing of loans to the real economy) could more accurately reflect 'the market's

[27] See e.g. Raghuram Rajan, *Has Financial Development made the World Riskier"*, Jackson Hole, 2005

collective view of credit risk'. But that market collective view of credit risk proved to be subject to an extreme irrationality which played havoc with the real economy. **Exhibit 31** shows CDS spreads for a composite of major financial groups between 2002 and 2008. It illustrates that the collective market view was that risks to bank credit-worthiness had fallen steadily between 2002 and 2007, reaching a historical low in the early summer of 2007, the very eve of the worst financial crisis for 70 years. Neither CDS spreads nor bank equity prices provided any forewarning of impending disaster: instead they validated and strongly reinforced a surge of over-exuberant and under-priced credit extension to the real economy.

CDS prices did indeed help bring the marginal price of credit in line with the collective judgement of the market: the problem was that the market's collective judgment was wrong. Just as with international capital flows, so in the market for credit securities and credit derivatives, intense financial activity can generate bonanzas of over-exuberant financing, followed by sudden stops and contagious loss of confidence.

But alongside this now obvious point, it is also worth noting that even the supposed benefits of increased financial intensity – the benefits which we might wish to trade off against the dangers of instability – are at best unproven **(Exhibit 32)**. As with capital flow liberalisation, so with the explosion of the complexity of structured credit and credit derivatives, the argument that it delivered allocative efficiency benefits, or direct welfare benefits because investors were better able to meet their preferences for precise combinations of risk, return and liquidity, has tended to be made by axiom, with no attempt to consider how great the value of such benefits could possibly be.

Of course it would be extremely difficult to measure that benefit in any empirical fashion, other than via very macro analysis, such as Schularick and Taylor's to which I referred earlier. But we should at least recognise that any benefits must be subject to declining marginal returns: that if liquidity up to a point is beneficial, there must be a point beyond which still further increases in liquidity can only deliver the most minimal incremental benefit. In an article in the Financial Times last August, Professor Benjamin Friedman of Harvard University questioned how much economic value added could possibly arise from arbitrageurs being able to spot microscopic divergences in market prices a few seconds (or now with algorithmic trading, milliseconds) before other arbitrageurs do the same – reaching as it were, a Keynesian 'pretty girl' judgement a millisecond before everybody else reaches the same judgement.[28] Professor Friedman's challenge has, I believe, been too often absent in our response to arguments which condemn possible regulatory approaches on the grounds that they will reduce liquidity in specific markets.

It is therefore clear that in financial markets, market completion and increased liquidity may under circumstances bring with them the downside of increased instability, and it seems likely that any

[28] Benjamin Friedman , *Over mighty finance levies a tithe on growth*, Financial Times , 26 August 2009

benefits of market liquidity and completion must be subject to diminishing marginal return. I will come back later to what this might imply for optimal policy. But turn now to consider one other striking impact of increased financial intensity **(Exhibit 33)**, the extent to which it has been accompanied by high factor incomes and returns for both labour and capital, and as a result has been a significant contributor to the increased inequality considered in Lecture I.

4. Financial intensity and income distribution

The value added of financial activity forms part of GDP – entering either as an end product/service consumed directly by individuals, and as an intermediate product/service used as input to the production activities of other businesses. Working out what that contribution is, and what meaning to attach to the figures estimated within national income accounts, is extremely complex. Indeed, as I shall return to in Lecture III, the meaning of calculated GDP is in general far less clear than often supposed. But the complexities and uncertainties are at their most acute in respect to financial services – a fact reflected in the title of Andrew Haldane's contribution to the recent LSE Future of Finance report, "What is the Contribution of the Financial Sector: Miracle or Mirage?"

But if we take the figures at face value, what is striking is the increase in the relative role of the financial sector over the last 160 years of market capitalism. In the UK, over those last 160 years, the measured gross value added of the financial sector appears to have out performed whole economy growth by over 2% per annum **(Exhibit 34)**. Some out-performance is not surprising – for reasons I'll return to under Conclusions, some financial deepening is likely to be a value creative feature of the early and middle stages of economic development. But what is striking, is the pattern within the 160 years **(Exhibit 35)**: very large out performance from 1856 to 1913, then underperformance 1914-70 and then out performance over the last 38 years. And while the growth rate of the overall economy was lower in the 1914 to 70 period, that included two hugely destructive world wars. 1945 to 70 was a period of rapid growth, but of much lower financial intensity than in the subsequent years.

Trends in the US show a somewhat similar but more dramatic pattern **(Exhibit 36)**: a 160 year increase in financial intensity from 1% to 8% of GDP, but with in particular two very strong upswings – in the 1920s and over the last 30 years – and, as with the UK, a period from 1945 to 70 of rapid overall economic growth but nothing like as much financial intensity as in the last 30 years.

These increases in financial intensity have been accompanied by high factor income for those involved:

- By a dramatic increase in the level of the financial sector pay relative to that in the non financial economy – Philipon and Reshef's figures which I showed earlier **(Exhibit 37)**.

- And with financial corporations also appearing to deliver high though volatile returns to shareholders, Haldane's chapter in *The Future of Finance* drawing attention to a dramatic increase in return on equity in UK finance, as we moved from the financial repression of the 1940s to 60s to the financial deregulation of the 1970s onwards **(Exhibit 38)**.

Why did this increase in return to both high skilled labour and to capital occur? The dominant ideology of market completion and liberalisation assumes by axiom that it must have derived from an increase in the importance of value creative financial activities within the economy – the need in a more complex world for finance to perform more complex functions, the development by finance of "technologies" which have contributed to improved allocative efficiency and economic growth. But there are at least four other potential explanations **(Exhibit 39)**.

- First, the fact that retail financial services (but also some wholesale services to institutional investors and corporates) are subject both to opacity of margins and to deep asymmetries of knowledge and market power between producers and consumers: a classic formula for super normal returns.

- Second, the widespread presence across financial products and contracts of complex and opaque options. Structured products which appear to provide the holy grail of "alpha", i.e., higher return without higher risk, but only do so because several years of superior return come with the hidden danger of occasional dramatic losses: a dramatic loss however for which the producer carries no liability. And the put option of too-big-to-fail, the ability of banks and shadow banks to run levels of leverage which maximise the put option of limited liability, with debt providers exercising inadequate discipline because confident of public bail out.

- Third, the widespread prevalence of regulatory and tax arbitrage activities. "Creative" in the investment bank parlance is used far too often to describe activities – undoubtedly requiring considerable mathematical, logical and legal skill – which are in Roger Bootle's terms purely distributive. This redistribution is achieved via either:

    - Regulatory arbitrage: the design of products and legal structures to alter the regulatory treatment even when the economic substance is unchanged: and which thus undermine regulatory attempts to limit the too-bit-to-fail put option.

    - Or tax arbitrage, the design of products and legal structures to reduce tax payments without any change in economic activity, redistributing income from the generality of tax payers to the employees and shareholders of financial companies.

- And, fourth, the ability of the financial system collectively, via its own intra-financial system trading activities, to create volatility against which the non-financial economy then has to

hedge, paying the financial system for the service: an initially zero sum activity (proprietary trading against one another) which then becomes positive sum for the financial industry and negative sum for all others.[29]

What then is the balance between the real value added and the distributive rent extraction? Frankly we don't know. But we do know that there is more potential for finance to generate redistributive rents than exists in most other sectors of the economy.

And a lot of those rents stick to the high skilled employees. The shareholders get high returns but at the expense (on Haldane's figures) of higher risk. It is the explosion of investment bank and trading remuneration which is the more striking phenomenon, and the phenomenon now attracting very significant social concern.

Within the conventional wisdom of beneficial market completion, no basis for concern can exist **(Exhibit 40)**. High skilled labour will deliver high marginal product, and get highly paid as a result, but theory tells us that it cannot in efficient markets be paid more than its marginal social product. So while you may think that those prop traders are making money at your expense, at the end of some long and complex chain of market completion and increased allocative efficiency, GDP will have increased by at least the amount that they have been paid: they are richer and no-one else is worse off. If bankers are paid more than research scientists, that must be because their marginal social product is higher.

But this logic is invalid for two reasons:

- First, because the presence of 'distributive' activities can make marginal private product far higher than social – indeed, if complexity brings with it instability, marginal private product can be high even when marginal social product is negative.

- Second because pay is influenced by the measurability of marginal product as well as by the size of marginal product. In many areas of economic activity marginal individual product is incredibly difficult to calculate: how much is that research team really contributing to the company's long term health, and how much each individual scientist within it? Is that Human Resource manager really producing value creative improvements in employee morale and motivation? But in financial trading, the return seems clear and quantified at the end of the year. And it is because that quantification is apparently clear that the dynamics of labour market negotiation mean that a lot of the benefit sticks to the employee.

[29] See Vayanos D and P Woolley, *An Institutional Theory of Movement and Reversal*, LSE Working Paper, November 2009.

The higher the share of complex financial services in our economy, the greater therefore the danger that highly skilled people will be attracted to activities whose social impact is simply distributive, but where the private returns are very large.[30]

5. Conclusions

So the impact of financial market liberalisation **(Exhibit 41)** and indeed the importance of market liberalisation more generally, is much more complex than the dominant conventional wisdom of the last several decades has asserted. What overall conclusions can we draw, for correct understanding, for policy, or for the discipline of economics? I suggest four **(Exhibit 42)**.

- First all imperfect markets are different. Tolstoy's novel Anna Karenina opens with the famous line "All happy families are happy in the same way: all unhappy families unhappy in

[30] This of course is not the same as saying that all financial activity is "socially useless": indeed financial systems perform a vitally important and valuable role in any market economy, and their development played a crucial role in the great transformation of the last two centuries. But it does mean that a financial system could grow beyond its socially optimal size. And when combined with the indirect nature of finance's value to the economy, it creates the danger that finance can become unconstrained by the ethical constraints which in other areas of the economy can limit the proliferation of purely redistributive or harmful activities.
Finance (both wholesale and retail) involves many activities which are (in Roger Bootle's terms) "creative", (see Lecture I) but to an even greater extent than in other sectors, the "creative value" is delivered indirectly and in association with distributive activities. Thus providing liquidity through market-making in commodities or foreign exchange can play an economically valuable role in facilitating creative economic activities (e.g., value creative physical trade), but this "creative" effect is achieved indirectly and in association with activities (position-taking to make a profit) which are also distributive. While this mix of directly distributive and indirectly creative activities is found in many sectors of the economy, it is a particularly dominant feature of financial activities. And that fact that the value creation is indirect means that participants are usually detached from any direct experience of the end productive results, and typically measure their success in entirely monetary terms.
As Raghuram Rajan points out in Fault Lines (Chapter 6: When money is the measure of all things) this detachment from any direct contact with the end value created, means that profit and pay received tend to become the sole measures of success, unbalanced by the other factors which enter the motivation of people in other areas of the economy (e.g., the restaurateur who wants to get rich but is also proud of his food and service: the saleswoman who wants to get the order, but is also proud of the product she is selling). The sole focus on monetary measures for success, in turn tends to create a culture in which ethical constraints on potentially harmful or aggressively redistributive activities are weakened.
As Raghuram Rajan puts it "the personal checks and balances that most of us bring to bear when we are employed in other activities – we ask ourselves if we are producing a socially useful product – operate less well in finance because, with few examples, making money is the raison d'être of the financier". This absence of naturally arising checks and balances both creates a potentially legitimate role for regulatory intervention, not only to ensure that financial systems are stable, but also to lean against clear rent extraction activities. It also however, raises important issues for the top management of financial institutions. It is, for instance, unclear how top management of wholesale banks can credibly seek to convince society that their activities are "socially useful" if significant profits are earned from activities whose primary functions are to minimise tax or to arbitrage regulatory constraints and which are thus entirely distributive.

their own specific way". And in Paul Krugman's neat adaptation "All perfect markets are perfect in the same way: all imperfect markets imperfect in their own different way". But truly perfect markets only exist in economists' models: the real world is one of imperfect markets. But within imperfect markets there is a range – from those which work well enough for a laissez-faire approach to be broadly valid, to those where market failure or imperfection is extreme and inherent. The market for restaurants works pretty well: the best way to ensure a range of restaurants which provide us with variety, incentives for good service, the enjoyment of changing ambience and menu – is to let entrepreneurship do its business, let thousands of flowers bloom, some to succeed and some to wilt. Anyone who doubts that didn't visit a restaurant in the Soviet block before the Berlin Wall came down. But other markets are inherently more imperfect, and inherently volatile: and financial markets – which link the present to the future under conditions of inherent irreducible uncertainty – are hugely susceptible to imperfection, irrationality and the proliferation of distributive rather than social value creative activities.

- Second, the benefits of financial market liberalisation and deepening vary by stage of development. I said earlier that part of the growth in the value of financial services within GDP, shown in Exhibits 34 to 36, almost certainly was conducive to economic growth. The development of the British banking system probably was, as Walter Bagehot argued in Lombard Street, one among the factors which gave the British economy an advantage against some continental economies – part of the package which drove the early stages of the great transformation **(Exhibit 43)**.[31] A number of studies have illustrated either cross-sectional or time series correlations between the development of basic banking and financial systems and economic growth.[32] The development of a banking system able to connect savings to investment opportunities in rural India, is important to Indian growth. And in China, both growth in credit as a percent of GDP and the development of health and life insurance markets, will better enable households to smooth consumption across the life cycle and to pool insurance risks, and could play a key role in freeing Chinese people from the burden of excessively high savings rates. That would allow them to enjoy the fruits of economic growth, and help to unwind a huge source of global macro imbalance and potential instability.[33]

  But it is quite possible to believe that liberalisation delivers significant benefits up to a point but not beyond that point, that there is a point of optimality, that good basic credit provision matters a lot, but credit derivatives are less important. That a functioning market providing adequate hour by hour liquidity is valuable, but that there is no social value in being able to buy and sell within a millisecond.

[31] Walter Bagehot, *Lombard Street (Chapter 1; Introductory)*, first published 1873.
[32] See , e.g. I.R.G.King and R.Levine *Finance and growth: Schumpeter might be right*, Quarterly Journal of Economics" 1993 , and Rouseeau and Sylla, *Emerging Financial Markets and Early US Growth*, NBER WP 7448.
[33] See Raghuram Ragan's "Fault Lines".

At the early stages of growth, growth matters to human happiness, and at the earlier stages of financial liberalisation, financial liberalisation stimulates growth and widens the range of choice available.[34] Later on in the development process, the last increment of extra growth matters much less to human welfare: and further financial liberalisation is less likely to deliver increments in growth, and more likely to produce the proliferation of rent extraction opportunities.

- Which brings me to the third conclusion **(Exhibit 43)** which is that in rich economies stability matters a lot, and minor further increases in allocative efficiency matter less. So policy should be heavily focused on ensuring macro economic and financial stability and very wary of financial innovation if it carries with it any risk of increased instability. A conclusion indeed of general importance within rich economies, to which I will return in Lecture III,- the need for policy to focus on creating stable environments within which human freedom to chose can be exercised, and in which downsides and setbacks are minimised, rather than focused on driving a maximisation of GDP as the overriding objective in itself.

- Finally what implications follow for the discipline of economics? **(Exhibit 44)**. It's a topic to which I will return at the end of Lecture III, looking at the implication for economics of both the definition of economic objectives and the analysis of economic means. But from tonight's analysis of the nature of financial markets, and of the failure of the conventional wisdom in the crash of 2008, four implications follow: **(Exhibit 44)**

    - First, economics must study human behaviour as it is, not as we find it easy to model. Robert Lucas, **(Exhibit 45)** leading exponent of the rational expectations hypothesis, has referred to a theory as something that can be put on a computer and run, enabling "the construction of a mechanical artificial world populated by interacting robots which economics typically studies".[35] But if economics studies that world and those robots, it won't tell us about the real world. The real world is populated by humans whose brains include a pre-frontal cortex capable of ratiocination, and a limbic system in which we are coded by evolution to act in deeply instinctive and emotional ways. Economists have to study that reality.

    - Second economists must study financial markets as they actually operate, not as we assume them to operate – observing the way in which information is actually processed, observing the serial correlations, bonanzas and sudden stops, not

[34] It is important to note that the availability of credit can be welfare enhancing directly through the increased choice it allows people rather than because it directly increases growth. Indeed, wider credit availability in China could slow GDP growth (through reducing the savings rate) but would (i) allow people more choice on the timing of consumption((ii) allow more income to flow through to increased consumption and human well being.
[35] Robert Lucas, *Professional Memoir*, Page 21, 2001.

assuming these away as noise around the edges of efficient and rational markets. And that means that descriptive economics, such as Akerloff and Shiller's *Animal Spirits,* is as important as mathematical.

- And means also that economic history matters, that economic students should read Charles MacKay and Charles Kindleberger, and study the history of the Wall Street Crash, as well as study theory and the maths required to formalise it.

- Finally, good economics should not attempt to arrive at any all encompassing model or theory, because the real world isn't like that. Should we understand the instability of financial markets in terms of human behaviour and brains which are part emotional and part rational? Or in terms of information asymmetry so deep that financial markets would be unstable even if populated by Lucas' robots? Or in terms of Knightian inherent irreducible uncertainty? The answer is all three. Real world economics cannot be monolithic.

And that puts it at a disadvantage in the competition of ideas. Because many people are drawn to all encompassing intellectual systems, elegant in their basic theoretical structure, and appearing to provide clear and consistent answers to all policy questions: that's why in Bhagwati's terms ideology matters as well as interest, why in Keynes' words "practical men are usually the slaves of some defunct economists". But we need to fight against the lure of complete systems, accepting and communicating the fact that while good economics can help us understand the world, mitigate specific risks, and think through appropriate responses to continually changing social problems, good economics is never going to provide the certain, simple and complete answers which the pre-crisis conventional wisdom claimed.

END