University of Kent

School of Economics Discussion Papers

The Financial Crisis:

What have macroeconomists learnt?

Jagjit S. Chadha

December 2010

KDPE 1012

The Financial Crisis: What have macroeconomists learnt?*

Jagjit S. Chadha†

Abstract

I outline a simple roadmap for work in micro-founded models. Rather than abandoning the route to further micro-foundations and returning to *ad hoc* economics, the techniques we have used over the past two decades to develop micro-founded business cycle models will allow us to develop models with meaningful financial frictions and thus address once again the question of monetary and fiscal policies with active rather then passive financial sectors. Macroeconomics and finance are likely to remain bound together.

Keywords: Future of macroeconomics, DSGE models, crisis.
JEL Classification: E42, E52, E58.

*I want to thank Bernhard Nietert for commenting on an earlier draft of this lecture, which was delivered on 28th October 2009. And to David Cobham, John Driffill, Bernd Hayo, Jan Int'Veld, Werner Roeger, Glenn Rudebusch, Partha Sen, István Székely and Mike Wickens for helping me clarify my thoughts, which were first aired at the Money, Macro Finance Conference 2009 at a special session on the *Future of Macroeconomics*, organised by David Cobham. All remains error and opinions are mine alone. The European Commission also helped greatly by allowing access to their datasets. This talk was given as the *Studium Generale* at the University of Marburg for the 2009/10 session and is published in *Die Eskalation der Finanz- zur Wirtschaftskrise*, Fritz Knapp Verlag.

†Professor of Economics, Chair in Banking and Finance, University of Kent at Canterbury. E-mail: jsc@kent.ac.uk.

1 Introduction

Thank you so much. I am delighted and honoured to address the University and the Town of Marburg. One of the clear dividing lines in many UK cities is the distinction between what we call "Town and Gown". This is for want of a better word a schism between the lives of those who belong to the local community and those whose main function is scholarship. It seems to me on my third visit to Marburg that such things are relatively less pronounced here and, to some extent, I suspect the Studium Generale plays a role in stabilising the delicate equilibrium between the needs of Town and Gown. Of course by asking someone whose work concentrates on the area of macroeconomic and finance, you are perhaps in danger of re-opening these ancient schisms. But you may, of course, have my bones (eventually) if you wish. This distinction between Town and Gown has been to some degree mirrored in much recent thinking on macroeconomics and finance and my main theme today is that this distinction will come to be increasingly blurred in future years.

Let us first remind ourselves how the events of 2007 to 2009 were typically relayed; you will forgive me for using the BBC, or Aunty as we call it in the UK, to describe the collapse of Lehman Brothers:

http://www.youtube.com/watch?v=gNUILhofHNA

Although often prone to sensationalism, news journalism in this case was not far off the mark. The financial crisis of 2007-2009 has indeed been an event of first order importance and ranks alongside era-defining episodes such as the Wall Street Crash of 1929 or the oil price shocks of the 1970s. The scenes of turmoil in financial markets have changed fundamentally our view of finance, the role of government and that of free-market economics. Many old macroeconomic debates have been re-ignited, for example, between Keynes, Monetarists and even Austrians (who argued in favour of the creative destruction wrought by recessions), which is at its heart a debate between the economics of depression and normal times.

In this lecture, we shall consider briefly not only the causes of this financial crisis but also the implications for the real economy, by which we mean (i) the everyday spending and savings decisions for individuals; (ii) the hiring and firing patterns and investment plans of firms and (iii) our (the West's) increasing reliance on demand and supply from the rest of the world. The crisis has also brought into sharp relief the role of the government and that of the state, more generally, in acting

as a stabilising force in the midst of the crisis. But has also caused us to ask some very hard questions about the extent to which policy design contributed to the crisis. Is there any validity in the notion that policymakers, with a premature bout of celebration, dare one even say hubristic, about the end of the business cycle, created the exuberance that proceeded the fall? Or was the crisis simply the failure of finance itself? The crisis has also triggered a major debate about the correct point on the trade-off between free and regulated markets. We will consider some preliminary answers to these questions.

2 The Crisis

We have had a remarkable two year switch back ride. The financial crisis, let us not forget, started when BNP Paribas closed three funds in August 2007, temporarily as it turned out, when they argued that it was no longer possible to value accurately the portfolios of assets and liabilities. From that date interbank markets froze (Figure 1) and to some great extent are still in the midst of an Ice Age in both interbank and overall commercial bank lending - central banks on the other hand are making out like bandits, it has been a long time since they have been quite so busy. Liquidity between private agents has been restricted whilst the public sector has been asked to step in and provide financial support.

You may recall that rumblings throughout the earlier part of that year from Christmas '06 onwards on the trading floors was that a sub-prime crisis was about to erupt. In a variety of tongues – the spectre of sub-prime entered our vocabulary. For a brief time, the most actively watched website on the floor was 'www.mortgage_imploder-ometer.com' as it tracked rather excitedly the number of US mortgage providers that had gone bankrupt and these bankruptcies seemed to drive the then rather esoteric VIX volatility index. The most tangible analyses of the crisis at the time concentrated on the real economy either (i) from the perspective of analysing the household balance sheet (which was dissaving at an alarming rate, by which we mean consuming more than current income and running down any stock of savings); (ii) the wild path of fundamentals required to justify many asset, and in particular house, prices; or (iii) an analysis of global savings and investment, which suggested that capital was flowing uphill (from poorer to richer nations) at an alarming rate. It was reasonably clear to many careful commentators that demand in the advanced economies would fall. Perhaps what was not clear *ex ante* was the epicentre of the crisis was ultimately to be in the financial sector. And it is the failings in the financial sector that have caused us to ask the questions as to what does

finance do and why does it matter when it cannot do it anymore?

Let us rehearse the arguments about why finance matters. Finance allows individuals and firms to disconnect in time and space their abilities to earn and their abilities to spend and hence concentrate on one or other at any particular moment. The advantages of specialisation are clear – everyone can benefit from the greater production of goods and services by allowing agents inter-temporal as well as geographical options to share resources. Finance also allows us to share risk, so that we can offset our idiosyncratic shocks (that is individual rather than aggregate surprises or shocks) to income, fires or illnesses. But we do know that the efficient allocation of funds from savers to borrowers is subject to severe informational constraints and also various temptations to renege: the avoidance of these problems requires significant regulation, institutional capability and investment in reputation-building. These kind of first order problems do not in general sort themselves out and it is possible even to write about the vast sweep of economic development itself in terms of the history of solutions, failed or otherwise, to these types of problems.

Financial institutions allocated capital and geared up there asset creation on the back of ever smaller slithers of capital (Figure 2). Do note that these ever smaller slithers were not illegal but in compliance with regulatory standards. This meant that when the losses from the real economy started to pile up the actual value of risk far exceeded the provisions made in many cases. This meant that banks quickly became threatened with bankruptcy. This is because although banks have capital, they had lent many times their capital in inflated asset price markets. So when and if losses mount, capital is quickly threatened and the consequent fall in bank share prices further reduces available bank capital. Banks can no longer lend to private sector and can no longer lend to each other to offset idiosyncratic shocks to their own deposit and asset structure. And this illiquidity results in a severe contraction in interbank lending and private sector financial flows with the result that household consumption is constrained by current income, firms' investment plans are constrained by current profits and jobs are lost as demand falters.

And so as financial institutions tottered and in some cases fell, as we have just seen, we were drawn to a number of questions, one of which was asked by Her Majesty the Queen herself on a visit to the London School of Economics as to why no-one foresaw the crisis. But to which we might add: what were its causes, what were the appropriate policy responses and what lessons can we draw for the future? All these questions are perhaps also need to be answered, i) how has the crisis

affected the views held by macroeconomists and ii) how should the crisis affect our view on modelling? On this first question as to why no one foresaw the crisis we are left to define what we mean by economics itself. Is it a predictive or a forensic science? Put in terms of the medic: are we to predict how many will die from swine flu or are we to say after the fact that someone has died from swine flu or from smoking? In other words, at what level of granularity are we trying to predict or understand human behaviour? Do we set ourselves the objectives of providing a mapping for every individual's life plan or more simply using the differences between what we expect given the current state of models and what then actually happens to understand whether it is our models that are wrong or people's decisions? Furthermore given the knowledge of our less than perfect knowledge how should we design our decision rules to bring about a Panglossian outcome or to try and do the least harm possible?

Let me rehearse the basic reasons for the crisis:

i) A long business cycle expansion, leading to (temporarily) self-fulfilling prophecies of stability or moderation;

ii) a(n) (Asian) saving glut which promulgated capital inflows to consumer-based societies and lowered required rates of return and inflated asset prices;

iii) a boom in financial engineering that was able to create liquidity and 'excessive' levels of bank leverage;

iv) monetary and fiscal policy that ran the domestic economy at more than full capacity, in the belief that inflation was the only feasible indicator of macroeconomic health, whilst inflation itself was increasingly providing a misleading signal;

v) a regulatory framework that was not sufficiently aware of risk in the whole system and system of bank regulation that did understand fully the trading picture and capital structure of the institutions it supervised.

Arguably, the newspaper of record for this crisis has been the *Financial Times* and that has gloried in the publication of a series of inflammatory articles criticising the practice of economics and modern macroeconomic methodology in particular, as a result of identified crisis factors (i) to (v). The basic argument in popular circles is that there has been that there has been too little empirical work on estimating policy useful parameters e.g. fiscal or bank multipliers, the extent to which an initial spending shock increases overall activity in the economy. In any case, whatever anyone's model might have said quantitatively the qualitative answer surely involved an increase in public debt (Figure 3). And so rather than being guided by a consensus model policymakers

had to fly by the seat of their pants, which highlighted the popular view that the whole direction of modern macroeconomics had been misguided. This is because it tries to articulate decision-rules for representative agents on the basis of well-posed microeconomic problems. So rather than trying to estimate what the response of inflation is to the output gap, modern macroeconomists might ask ourselves what combination of frequency on firm re-pricing decisions and inflation targets will deliver the observed relationship between output and inflation. It is further argued that this approach is a problem because neither disequilibrium phenomena nor the information problems of asymmetric information can be considered, which ultimately negates the need for banking or financial technologies. It is argued that if financial intermediation has no asymmetric information problem to solve then a veil can be placed over its activities. But we ought not to throw away our micro-foundations and let me briefly explain why this is a direction towards which we should continue to travel.

Lest we forget, the reasons for this agenda are fundamental and its perpetrators Nobel Prize-winning: Bob Lucas, Finn Kydland and Edward Prescott. The combination of time series econometrics and designing policy simply do not mix, as the Lucas critique tells us. To remind you all: once you base a policy rule on the estimated behaviour of a system of equations, that system will change in its behaviour in order to exploit the new policy rule. So in other words, if I observe the pattern of behaviour of players in a game of football and then, as the policy maker, ask those players to play rugby I should not expect the ball to continue to be just kicked it will also be picked up and run with. This is the heart of the Lucas critique. The successive failure of so many monetary regimes is a stark warning. Models derived from utility functions and microeconomic foundations are well suited to understanding the consequences of particular modelling choices (e.g. the move from rational expectations to bounded rationality or indeed to signal extraction problems under some form of costly state verification process) as these decision rules will incorporate the consequences of any arbitrary choice of monetary or fiscal rule, good or bad. Models of learning have some moved on at speed, as have models to consider fiscal-monetary interactions and question of the open economy with incomplete asset markets and various forms of price stickiness.

And so a moment's thought will tell us that we have more than reasonable of thinking about (i); (ii) and (iv). Where I think we have been less good is at integrating models of banking and/or liquidity and/or money and/or payments into dynamic general equilibrium theory. So rather than just saying that there is some problem with our

analysis of banking, we integrate this analysis into an overall view of how people spend and save, how firms invest and how governments operate their policy. Only then can we fully understand the consequences. And this is where the crisis hits us hardest as a profession. We have perhaps been too easily swayed by the a theorem in economics that tells us that all wealth represents claims on others income and a little bit too slow to develop models in which changes in expected profit or access to liquidity tilt consumption or investment plans. We have also perhaps been too quick (or perhaps too clever) to dismiss the importance of either wealth effects or debt stocks as constraints on future public or private sector behaviour. We also have not properly agreed on a model of macro-finance which we can use to study monetary-fiscal-liquidity interactions in the same way we have with price stickiness. And, in terms of thinking about policy, too reliant on the ubiquitous active interest rate rule to consider the wider role of central banks as regulators of aggregate liquidity to the financial sector.

And so should we abandon this paradigm and pick-up the heterogeneous agent framework with bankruptcy and, ultimately, partial equilibrium analysis? Partial here simply means that we analyse one market and its potential failure without fully considering other markets or indeed the overall utility of the representative household. In other words let macroeconomics meet its maker. Possibly, but there remains much to do with the existing general equilibrium framework. We can think hard about how to get banks supplying liquidity to liquidity constrained agents but simultaneously having to guard their capital structures. We might more realistically want agents to running debt over many periods and allocate funds from current and expected income. We might also want to think about correct way to price the term structure and assets more generally where there is risk to macroeconomic payoffs. There are I think many promising attempts to accomplish all these tasks in a dynamic general equilibrium structure but as ever there is much work to be done.

So we have traced out the evolution of this global crisis. We do seem now to recognise that there had been a global boom, or at the very least, an expansion that some believed would be never ending. That the balancing of income per head across the world requires disproportionate levels of economic growth when countries start from different initial conditions and this disparate momentum can place a significant strain on equilibrium real rates and relative prices. Look, for example, at the movements in long term bond yields and the sensitivity of commodity prices to small disruptions in supply or demand. These sharp movements in real rates can impact both on asset prices and the extent to which

both the financial sector and the non-financial private sector may wish leverage the purchase of assets. Monetary and fiscal policy rather than acting to counterbalance these trends towards higher asset prices and the seeming disappearance of business cycle uncertainty seemed rather too eager on taking the credit (sic) for a moderation more apparent than real.

The possibility of unintended consequences remains writ large. The more we reduced risk and stabilised the macroeconomy, the more the economy travelled down the risk curve in search of higher yields. With more money willing to take on ever more risk at a lower rate of compensation for risk, the less risky the world appeared. But although the price of risk fell, by which I mean the insurance premium required to take on a financial obligation fell – the more risk was actually being taken on. It is rather like witnessing the response of an addict to ever larger quantities of amphetamine, at first everything feels better but in the end everything ends up worse.

Before going on to the implications, a quick word of warning: Zou Enlai, the first premier of the People's Republic of China, once said when asked about the implications of the French Revolution that: it remains too far early to tell. And that is something we should carry in our minds when we think about the road map out of this financial hole.

3 Next Steps

So at the University where the Brother Grimm brought together the stories that fed our primitive fears, of those twentieth century giants Heidegger, Ortega Gassett and Boris Pasternak, I am pleased to note that Wilhelm Röpke seems alive and well. We need a market economy but one which is appropriately regulated. Let me suggest some governing guidelines:

Financial intermediation is a key economic activity but inherently one where there are imperfect solutions to the problem of asymmetric information. This means that savers cannot be sure who will be using their money or what rate of return they will achieve. It means that borrowers have an incentive to portray themselves in a better light than a full view might suggest. We solve these problems by having borrowers pay collateral to lenders as a form of surety and we should educate investors that excess returns (or alpha in the language of finance) cannot be bought without taking on more risk. Excess alpha is like a unicorn – a pretty nice idea but only for the fairy tales. So we need to ensure the right kind of information is available about both sides of the financial contract and that the correct amount of money is placed on the table to hedge (or insure) against the risks taken. So banks need to have

adequate, but not too much, capital and sufficient liquidity to meet short run asset rollovers. Those taking risks with client money must operate under contracts that provide some better symmetry for their returns in good times and in bad.

We have learnt that monetary and fiscal policies are not only weapons of last resort. They are ongoing stabilisation tools that give private sector agents the right kind of incentives to spend, invest and save over the economic cycle and in response to secular trends. In this sense monetary and fiscal policy need to operate in a manner to take the heat out of boom so that they have sufficient power to generate heat in the cold depths of a recession. So let us imagine a world in which a foreign country starts to build excess savings and then uses those to buy capital in Europe and these bid up asset prices with a lending boom. What should monetary and fiscal policy do? Should it ignore the extra demand created in Europe and argue that it is simply the operation of free markets or should it ask whether some of the domestically generated demand is too great and reign it is with higher interest rates and primary surpluses on fiscal account? You will know my answer.

What kind of regulation is required for the financial sector? Is it to be a form of severe prescriptive quantity rationing that was widespread in the immediate postwar years? It seems to me that dirigisme may be back with a vengeance. Do we want regulators who are in essence bureaucratic and demand certain thresholds and health and safety regulations to be put into place? Or do we want regulators who will facilitate financial activity with appropriately set capital and liquidity requirements, who do not wish to throw away the models but ask what the models are used for and why it was their simplistic use that was the problem. One proposal is to split the financial sector into utilitarian and risky components. But as the utilitarian (managers) and risky (speculators) components will always have to trade with each other, the real question is whether placing them in the same institution, different institutions or letting some array whereby all types may exist together might be most appropriate.

What role does transparency play? In the sense that we can expect the prices of financial assets to reflect the relative probabilities of pay-offs across all states of nature, or put more simply the riskiness of investments. So if we can create sufficient liquidity private views about pay-offs get traded into the general level of asset prices and they represent fair value. And so if we know enough about financial institutions behaviour, order books and contracts for their key employees might we be able to decide which are the good and bad financial institutions. Those institutions would gain from having a lower risk

premium attached to their activities and pay lower interest rates and be able to capture market share with lower costs. A similar argument can be used to justify higher levels of capital adequacy.

Perversely, following a crisis in which so many new assets have been learnt about, might there be an insufficient range of savings vehicles and assets pricing payoffs in the world? If savers only have one safe asset e.g. 10 year US Treasury Notes then the price of these assets and the behaviour of the issuer may have cause to be distorted. Particularly as Central Banks have also had to step in and increase demand by (temporarily) buying government bonds and expanding their balance sheets (Figure 4). Better still to have a range of risk-free assets and some in the host country of the savers so that all financial transactions are not necessarily international. It is thus the lack of financial development in emerging economies which may arguably lie at the heart of the problem of this financial crisis and not, perversely, the excess of financial development. An example from the most recent *IMF Article IV* report from October 2006 for China suffices to illustrate the point, which reports that the foreign exchange rate market remains tightly managed, there seems to be little development of bond markets even at maturities of less than one-year and little or no availability of bonds in the one to ten-year maturity range and equity markets seem not to allow firms to access the market. Overall the IMF view was that the "limited role of capital markets in China... reflects the dominance of state banks in intermediation, but these markets are plagued with regulatory and governance problems". Obviously a report from late 2006 may well be rather out of date but it does clearly illustrate the point about a lack of liquid assets in newly emerging economies at the high watermark period of so-called financial excesses. So rather than shunning financial market development, global policies ought also to think more about deepening capital markets and encouraging the development of assets across the risk spectrum, particularly in parts of the world where surpluses are being generated.

And last but not least what about macroeconomics? We have learnt that it is not only one interest rate that matters and that financial activity can both amplify and attenuate the business cycle. That each of policy, financial markets, households and firms can make serious errors. We therefore ought not to fine-tune the design of policy within the context of models where the sole source of market failure is just price rigidity. When we throw in financial activity, many of the old certainties seemed to have dissolved. Models will have financial counterparties, liquidity requirement and macroeconomic risk. Answers in these richer models will at the same time have to be simpler and yet more robust.

Tentatively, the kind of monetary policy regime we should have will look a lot more like one with twin pillars and the cost of active fiscal policy in a crisis may well be a rather conservative fiscal policy in normal times.

So in the end I have told a Fairy Story. Is it the case that the evil witch of finance has cast a spell and we all go to sleep for a Century? No. Because the magical quality of finance – the ability to disconnect spending and income decisions - is required for a market economy. We need someone to help get capital from savers to risk-takers and, most importantly, back again. We need to save for our old ages and for to pay off those debts incurred earlier in life. We cannot ourselves literally live parallel lives but finance allows some important parts of the space-time continuum to be bent. So I think it is not the witch who is evil, nor the trolls nor the people who fall under its spell. The evil here is one of neglect. The greatest lesson so far from this crisis is simply that we all, macroeconomists included, will have to understand and monitor finance considerably better than we did before.

OCTOBER 2009

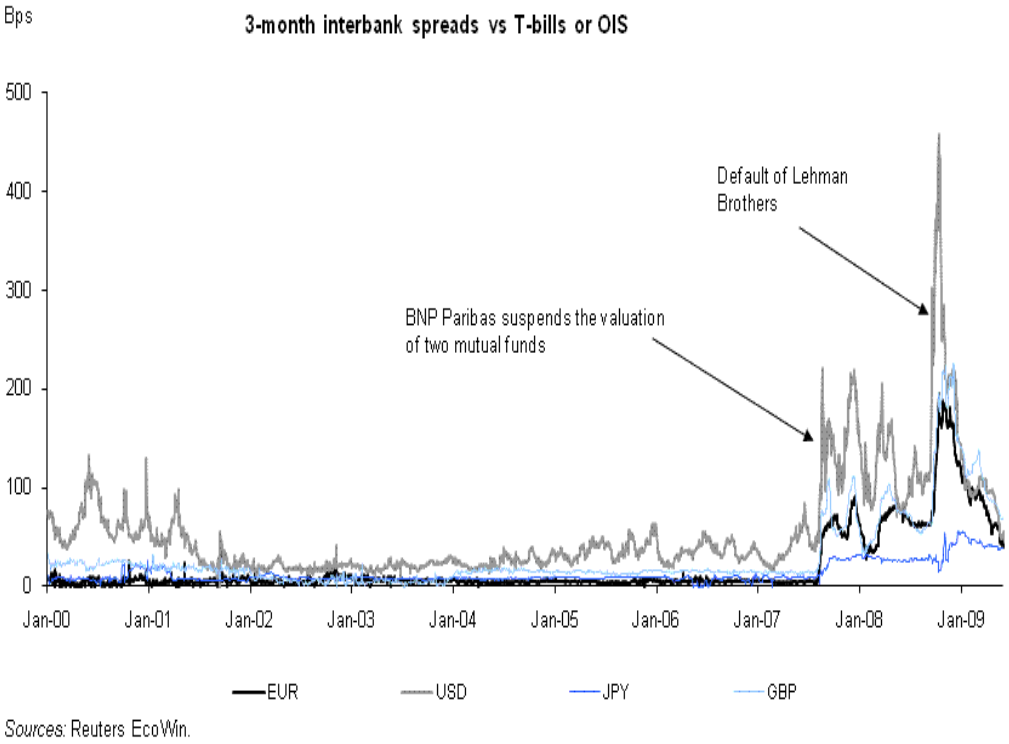

FIGURE 1: INTERBANK BANK LENDING SPREADS OVER POLICY (source: European Commission)

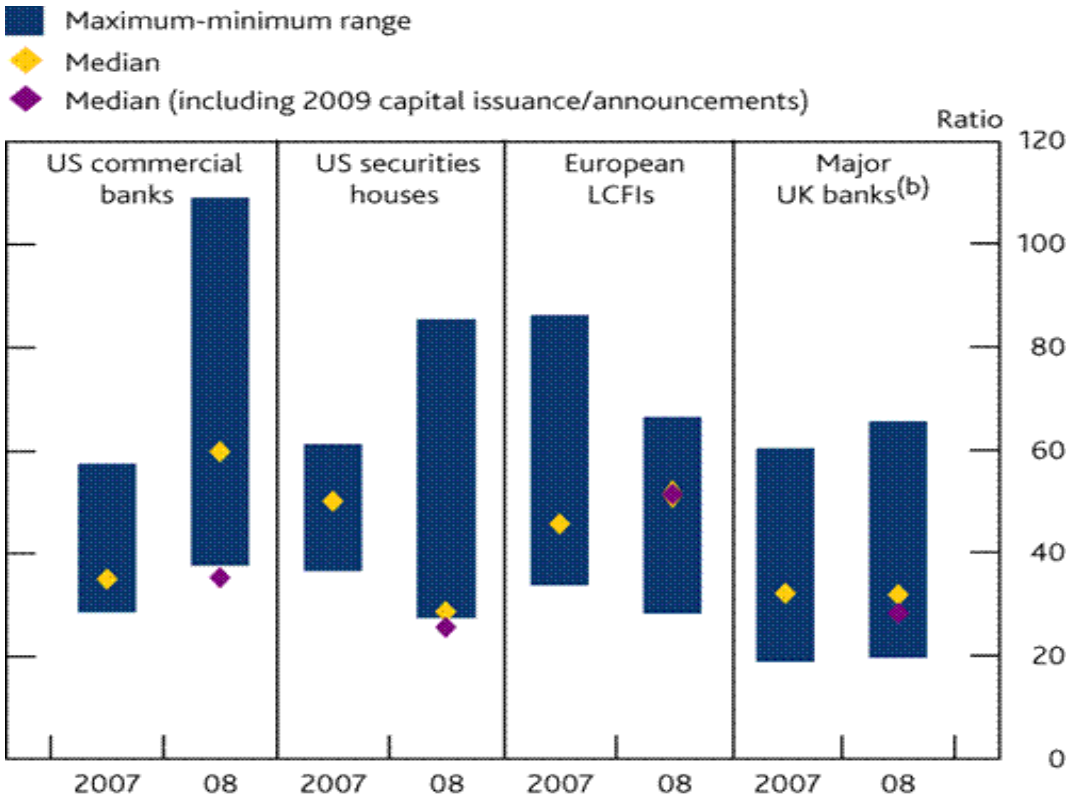

FIGURE 2: BANK GEARING RATIOS AT THE PEAK OF THE LENDING BOOM (source: Bank of England)

Debt

FIGURE 3: INCREASE IN PUBLIC DEBT (Source: European Commission)

Sheets

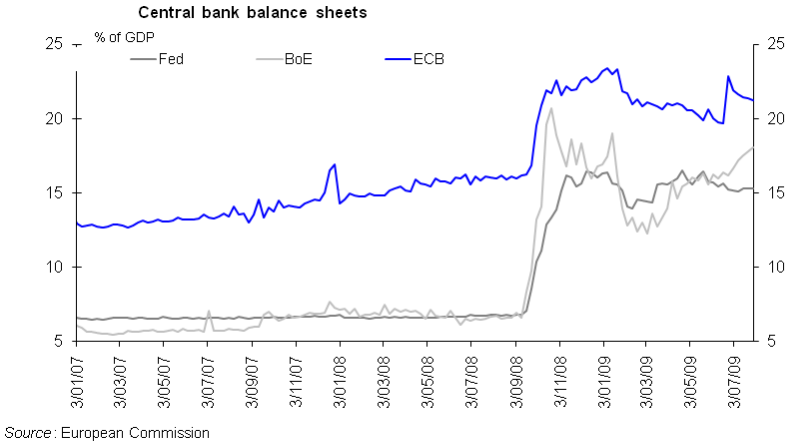

FIGURE 4: INCREASE IN CENTRAL BANK BALANCE SHEETS (Source: European Commission)