Causes of the global financial crisis, fact and myth : lessons for regulators and bank management

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[1] The views expressed are mine and do not necessarily reflect those of Ernst & Young. I also thank Mark London for some PD estimates and an unnamed bank for their PD data.

1. Introduction

The markets are emerging from a financial crisis which has proved more severe than any since the Great Depression. It is therefore important to take stock and review the causes and draw conclusions about ways to strengthen the system going forward.

Much of the attention, certainly in terms of official pronouncements post crisis, has been on bank capital but this was just one of the issues. Also, in terms of the crisis causes, there has been much focus on Basel II and in particular its complexity. This is a confusion because Basel II was not in force during the build up to the crisis (it was introduced 2007/8). This risks distorting the policy prescriptions because it has turned the debate away from focusing on the incentive effects of regulation, which were a very real aspect of the cause of the crisis, with the simplicity of Basel I non-risk based requirements top of the list.

Also the focus on bank capital has tended to drown out other issues such as market failure of the securitisation market and risk concentrations, with lessons for bank management and regulators. Focusing back on the actual causes of the crisis is important to ensure that policy actions tackle the right fundamental issues and do not prepare the ground for future crises.

Background

The backdrop to the crisis was the scale of global imbalances (see Obstfeld et al and Portes). Chinese surpluses and US deficits led to inflows of funds into the US, keeping markets very liquid. At the same time low cost imports from the far east kept western inflation down, which led the central banks to maintain an accommodating monetary policy for too long allowing asset price bubbles, particularly in property, to develop. The received wisdom in the central banks was that asset price bubbles (without higher inflation) should not trigger tighter monetary policy. Within the Eurozone, interest rates were particularly inappropriate for the periphery countries fuelling their property bubbles.

Another aspect of the over confidence and asset price bubbles was the increase in leverage of the private sector (households and banks) in many western economies and in some this was also accompanied by high public sector deficits. A further contributor given the low interest rates (from the accommodating monetary policy) over a long period was search for yield.

Political dimensions were also important. The pressure within the US for an increase in mortgage lending to lower income groups encouraged the development of the sub-prime mortgage market and would have made regulatory action to halt the growth politically unpopular.

These all provided a backdrop to the crisis but the question is how did they lead to a crisis of such proportions and what are the lessons. The dimensions here were the size of losses and the global nature combined with the inability of banks to absorb the losses, which led to confidence effects across the western banks.

The first issue therefore is the cause of the losses by players at the heart of the crisis and then fanning out from the centre to affect banks more widely. A central element in this was the multi trillion structured products market underpinned by US mortgages and the question is what are the wider lessons from this and have they been dealt with. The second issue is the size of the concentrated positions of the banks and again what are the lessons for regulators and bank management. The third is what were the lessons for bank regulation.

2. Market failure

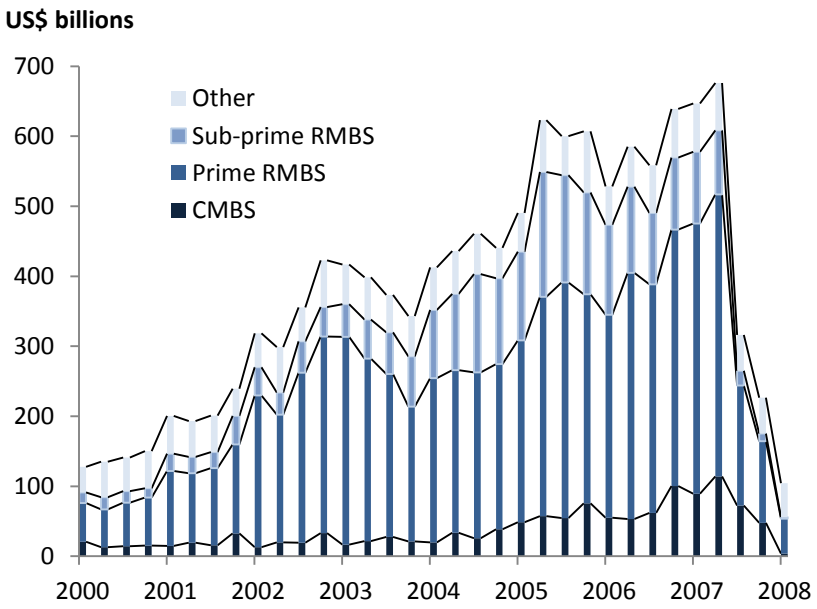
One important lesson from the crisis, which seems to have only partially been taken on board, is the importance of making sure that huge global markets are built on solid foundations which cannot be eroded as demand and optimism increases. Whereas substantial emphasis has been placed on making the OTC derivatives markets more transparent and lower risk, with margining, use of CCPs and trade reporting, there has been less focus on the fundamentals of the securitisation market which was at the heart of many of the losses in the first phase.

Global losses by the banking system in the early years of the crisis were dominated by write-downs on structured products. The losses on structured products started the run on confidence in the banking system and the liquidity pressures – banks knew that large losses were in the system but did not know how badly affected individual banks were and became reluctant to engage in interbank lending beyond the very short term. Loss of confidence in structured products also removed an important funding mechanism from the banks tightening liquidity further. Structured products also contaminated the money market mutuals causing a run and damaging the commercial paper market in the US. This in turn led to difficulties with structured investment vehicles which invested in structured products and were funded by commercial paper again causing a drain on bank liquidity.

The massive growth in the structured product markets, in particular retail mortgage backed securities (RMBS), has been well documented. By 2007 new issuance in the RMBS market had reached around USD 1.7 trillion[2]. Substantial write downs occurred from 2007 and it is important to consider why such a large market deteriorated in this way, to prevent a repeat with another market in the future.

There were three important features of the structured product markets which laid the foundations for the losses. The first is that the market changed radically in the matter of a few years. As the volumes exploded, the market outgrew the capacity to fuel growth using high quality loans in the pools and the proportion of sub-prime loans in the RMBS pools increased. Subprime mortgage originations tripled between 2000 and 2006 reaching USD 600bn. By 2006 sub-prime accounted for 20% of mortgage originations. The absolute size of the subprime market was USD 1.3 trillion in 2006. (Dell' Arica et al).

Figure 1 - Quarterly Global issuance of ABS



Source: Bank of England/

[2] SIFMA research report September 2008.

Secondly and perhaps more perniciously, because it was less apparent to investors, was a decline in lending standards and due diligence over the same period. Dell' Aricca et al show that denial rates on sub-prime loan applications fell sharply at the same time as the riskiness of individual loans was increasing. Fitch (2007) reports a review of the loan files for a small sample of the early defaulting 2006 vintage retail mortgage backed securities. They found that in many instances the loans were affected by poor lending decisions or misrepresentation by the borrowers – with evidence of fraud or misrepresentation in almost every file. They concluded that poor underwriting quality or fraud could account for a quarter of the under performance of the late vintage RMBS. The areas covered included misrepresentation of occupancy, incorrect calculation of debt-to-income ratios, as well as acceptance of little evidence of a sound credit history. This deterioration in lending standards and lack of adequate review of borrower information would have been largely non-obvious to investors.

In effect two markets existed at different time periods. In 2004 lending standards were higher and more effective and the proportion of sub-prime lending was less. By 2006/7 not only was the proportion of subprime loans in the RMBS pools higher but the amount of due diligence around the loans had reduced. This was crucial because only a small percentage of fraud had to be added to a pool's risks to fundamentally change the risks of the structure given the waterfall.

Thirdly there was the issue of opacity. This was in part because of the length and complexity of the prospectuses. Prospectuses could be 500 pages long with the information organised differently in each. The length of prospectuses made the underlying deterioration in lending standards and effective due diligence regarding borrower documentation difficult to see. For example, each RMBS structure had a different waterfall, different pre-payment triggers, different pool characteristics etc. Opacity of the securitisation market was also an important part of the suddenness of the collapse. The market was structured so that no one party could see all the information on default rates in the pools; only investors in a particular structure could see the data on the performance of the loans in the pool. This undoubtedly helped to delay the recognition that default rates were rising in the pools (from 2005) when interest rates in the US started to increase, which in turn delayed the necessary adjustment of market prices until 2007 when the adjustment happened suddenly.

Another aspect of opacity was the nature of the structures themselves. As the quality of the loans deteriorated so structures became more highly tranched and further enhancement was added with use of mono-line insurance to produce AA A securities at the top of the waterfall. The different types of instrument also proliferated with CDOs, CDO squared etc.

The securitisation market in Europe has been moribund since the crisis with most securitisations being created to use as collateral with the ECB. However, different structures are being created in the shadow banking world (see Jackson 2014) and it is important that the market is reinvigorated for banks to provide liquidity when the central banks exit from quantitative easing. However, it is essential that the global market to which European banks and investors are exposed is future proofed against a deterioration in quality and due diligence. The risk is that as the global market expands it will again outgrow high quality loans for the pools.

It is not at all clear that the G20 reforms have future proofed the structured product market. There are new 'skin in the game rules' but in Europe the rules are very focussed on bank holders rather than investors at large. Article 405 of CRDIV provides that a European institution (bank or investment firm) will have a punitive capital charge if it invests in a securitisation in which the originator/sponsor or original lender does not hold a minimum 5% of net economic exposure in the transaction. In the US the rules are broader. The Dodd-Frank Act requires all securitisers to retain an unhedged economic interest of at least 5% of the credit risk transferred.

With bank deleveraging following the crisis and the agreement on Basel III much credit activity has shifted to the shadow banking market and this could fuel securitisations; it is already fuelling structured funds, where the risks of the funds are tranched. Banks and other investors could end up with exposures not directly but through other funds with exposures to the underlying securitisations. There could be a variety of different types of exposure underpinning the structures.

This makes solid foundations for the securitisation market extremely important. The IIF (2009) proposed adoption of standardisation in the area of contracts and prospectuses for securitisations but the recommendations have not found their way into the regulatory agenda. In other markets,

standardisation of documentation and contracts has transformed the market, reducing search costs for participants. For example standardisation was introduced into the swap market with the ISDA agreements to make the market manageable. However, the reforms for securitisation almost certainly need to go further than just standardisation into other areas to improve transparency - possible use of exchanges, for example. Mechanisms have become standard for other markets to ensure that the market is efficient. Equities, where fair pricing is highly reliant on the quality and timing of information disclosure, are covered by disclosure standards for companies and are traded on exchanges. For the securitisation market a mechanism to ensure pooling of default rates across structures of a similar type would be important to improve market functioning.

The IIF also recommended that the ratings agencies should have an industry body which would ensure appropriate validation of models used for rating structured products. This too did not become part of the regulatory agenda. In the US the focus has been on reducing reliance on ratings but they still remain part of the system.

With the market likely to become more disparate with involvement of shadow banks, is it possible to tighten the regulations covering the whole market structure ? In OTC derivatives the G 20 has made sweeping changes to all aspects of the market covering non banks as well as banks. However, short of prescription one way to drive change in the market would be to lay down standards that had to be met before securitisations could count in the liquidity pools of the banks or for lower capital requirements.

There are important principles regarding the market structure-

- There should be a mechanism such as trading on exchange to encourage more liquidity in the market and more transparency regarding the liquidity.
- There should be standardization of prospectuses, contracts and structures.
- A mechanism is needed to pool default rates across structures underpinned by similar assets to improve market efficiency.
- There should be standards and an oversight mechanism for models used to rate securities.
- Allowance into liquidity pools of banks could be used to enforce standards around loan quality in pools, low level tranching and high due diligence.

Regulation of banks

There has been much focus in various commentaries on the Basel II more complex risk- based requirements as a contributor to the crisis, which has led to pressure for adoption, at one extreme, of just a simple leverage ratio or a much simpler overall approach. This makes disentangling the real effects very important to ensure that incentives are changed in the right direction.

Basel II, for the major European banks, was adopted in 2008 after the build-up to the crisis had already happened (indeed the crisis had already broken) and Basel II has still not been adopted in the US. The weaknesses of bank regulation stem from the earlier Accord. It is therefore important to examine the effects of Basel I on the build up of exposures when considering how regulation should be changed going forward.

Basel I – a quasi leverage ratio

In terms of banking book treatments Basel I (adopted in 1988) was in many respects like a leverage ratio. Except for mortgages and limited allowance for collateral almost all private sector exposures carried the same risk weight - 100%, which delivered an 8% capital charge. This encouraged the use of securitization to alter the risk profile of banks' portfolios relative to the capital being carried. A bank could move the better quality risk exposures off the book, increasing the riskiness of the remaining exposures relative to capital, while leaving its capital adequacy (under the Basel 1 calculation) apparently unchanged. This was most marked in the US. Ten years after Basel I was introduced the Basel Committee conducted a major study of its effects (Jackson et al, 1999). This study concludes that capital arbitrage was being used to exploit the large divergence between the economic risks in

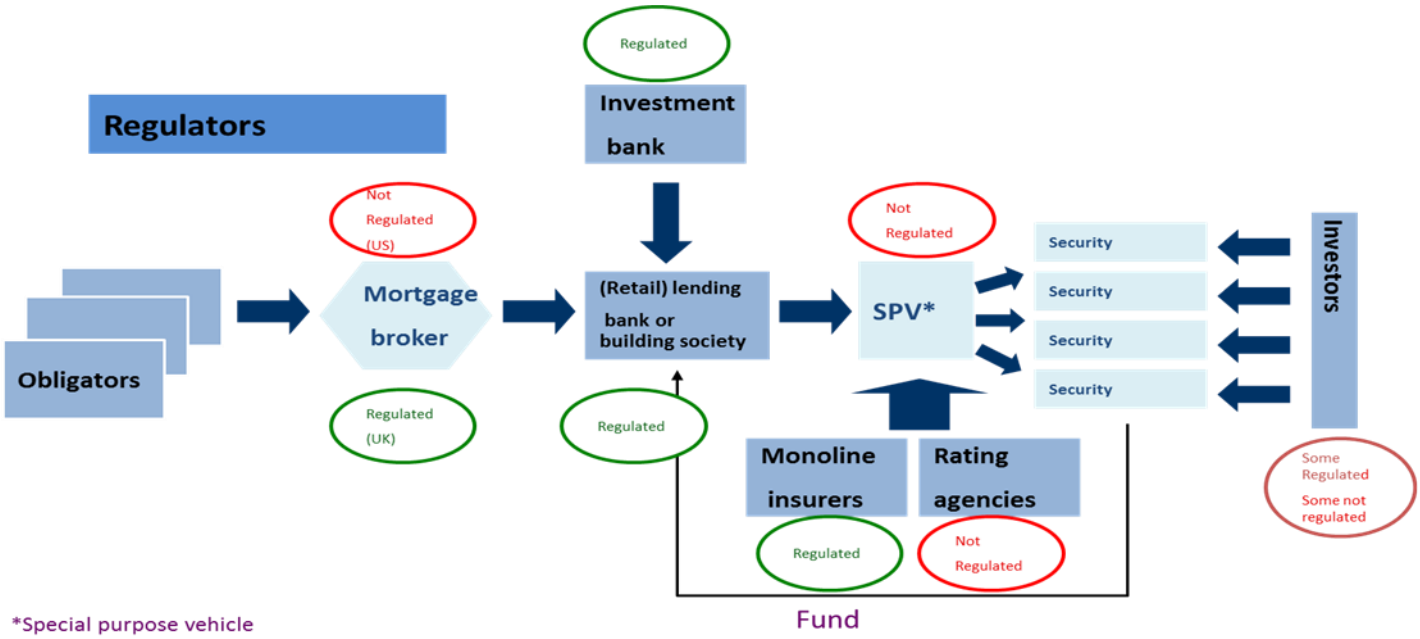
bank portfolios and the Basel 1 measure of capital, with low risk portfolios relatively penalized and high risk treated too lightly. It identifies different forms of regulatory arbitrage -

- Cherry picking – simply focusing on origination of lower quality assets.
- Securitization with partial recourse – the sale of assets to a special purpose vehicle (SPV) which financed the purchase of the assets through the issue of asset backed securities (ABS).
- Remote origination – the SPV generating the assets rather than the bank originating.

The paper reaches the view that Basel I was transforming the balance sheets of the US banks. High quality assets like low LTV mortgages, credit cards, auto loans etc had been moved off the balance sheets of the banks in contrast to Europe where they were still held. A simple apparently comparable metric across banks was giving a misleading picture of how much risk was being carried relative to capital.

Even more pernicious from a financial stability viewpoint was the encouragement that Basel 1 gave to banks sponsoring structures with low quality assets in the pools to ensure that the assets were originated outside the banking system. This was perverse because it meant that these lower quality loans did not go through the bank's lending standards and other checks. Under Basel I, if the SPV itself originated the loans, the credit enhancement provided by the bank was treated as an exposure to the SPV and carried only an 8% requirement against the enhancement rather than the 100% if it had itself originated the loans. This paved the way for the origination of mortgages by mortgage brokers to feed the US residential mortgage backed securities (RMBS) growth in the run up to the crisis. In Europe, in contrast, loans for the most part continued to be originated by the banks themselves before being placed in the vehicles. Figure 2 shows the end-to-end originate to distribute model prior to the crisis and the extent to which different parties were unregulated.

Figure 2 – Originate to distribute model for mortgages



The lesson from this is that simple leverage-like requirements have driven regulatory arbitrage in the past encouraging banks to move higher quality exposures off the balance sheet – reducing the quality of the exposures on the book. This in turn will have made some banks much more vulnerable when the crisis hit. The leverage-like requirements also drove activity into structures which bypassed bank lending standards. The incentive effects of any changes as a result of the crisis therefore need to be considered carefully and the following principles should be applied.

- Regulation that encourages banks to hold higher risk assets in the books, selling the better quality, should be avoided.
- Regulation which encourages loans feeding structures to be originated by shadow banks rather than banks should also avoided.

This means that leverage ratios must be a backstop to fully risk-based requirements. Regulations also need to be scrutinized to ensure they do not encourage origination outside the banking system to feed structures.

Trading books versus banking books

Basel III has rightly dealt with issues regarding the quality and quantity of bank capital and the absence of liquidity buffers which had pre-dated Basel II. Under Basel I half of the 8% of capital against risk weighted assets could be made up of non equity instruments – subordinated debt, general reserves. The problem with this was that subordinated debt did not prevent failure it merely absorbed loss after failure. In addition a change to the rules in 1998 meant that half of the remaining 4% could be made up of hybrid instruments. This meant that some banks carried only 2% of equity against risk weighted assets. A paper on bank capital (Jackson, Perraudin, and Saporta) showed that this was far too low – even 4% of equity might equate only with a BBB rating. This has now been addressed with capital levels being driven up by Basel III and with focus on core Tier 1. Bank minimum capital was also an unusable buffer- it could not be drawn down without a bank losing its license- this too has been addressed with the capital conservation buffer. Banks liquid asset holdings were also too low. In particular, banks were holding structured products in their treasury operations which proved to be highly illiquid. This has been dealt with under Basel III with the new liquidity requirements.

However, the cause of the very low capital held by many banks against structured products and loans being warehoused to go into structures as well as leveraged loans was the allowance for almost anything to go into the trading book treatments as long as this fitted with the accounting treatment. In 1997, the market risk amendment to Basel I (Basel Committee on Banking Supervision, 1996) for trading books had introduced requirements which rightly could be much lower than the banking book requirements because they recognized the short periods that were needed to sell or hedge trading book assets. The assumption was that in normal times this would be possible overnight and in more difficult times within 10 days. In contrast the banking book requirements were based on a one year assumed holding period. This meant that holdings of securities from securitizations as well as loans and even the credit enhancements for securitizations could benefit from the lower trading book charges as long as they were designated as trading book exposures. There was no liquidity test to ensure that only liquid assets could be treated within the trading book requirements. The result was that capital to cover a ten day holding period was being set aside to cover exposures which in actuality had to be held for far longer – potentially years. This remains a weakness in the capital regime which has as yet not been addressed. Banks with large losses uncovered by the regulatory capital levels have found that inclusion of illiquid exposures in the trading book treatments was the cause. The Basel Committee fundamental trading book review is still ongoing but it is not clear that this point will be dealt with.

It would be better to exclude illiquid positions from the trading book capital treatment rather than ratchet ever higher all the trading book requirements – moving the requirements for liquid positions away from the economic risk and distorting activity.

This points to a general principle-

- Trading book capital treatments should only be used where a bank could point to active trading in the asset or class of assets.

Wrong data series

The 1997 the market risk amendment to Basel 1 had allowed the use of VaR models and the securitizations and loan exposures were entered into the calculations as if they were corporate bonds with a similar rating. This led to a fundamental underestimate of the risks. This has been dealt with by enhanced focus on model validation by different authorities.

Point in time modeling

Another issue that was highlighted in the crisis was the danger that point in time modeling of risk created too small a capital buffer in good times, leaving a bank unprotected when conditions changed. In the VaR models for the trading books, banks were able to use a one year data window for the past history of exposure prices but the problem was that this led to an underestimate of risks in a benign period. Market volatility (ie magnitude of price movements) comes in phases with low volatile periods a shock then amplitude (much higher volatility which persists) then the market settles down eventually and goes back to a low volatile period. The problem with this was that the VaR estimates reduce substantially to reflect only the low volatile environment when conditions are benign, which could persist for a number of years. The capital is then too low for the next shock. The capital requirement then expands but this is too late to act as a buffer for the initial losses and indeed the expansion in the requirement (procyclicality) puts further strain on the industry. This has now been addressed through the focus in Basel 2.5 on stress VaR not just VaR.

The arguments which had been advanced for the use of the original point in time measure were the improved accuracy and risk signals. The same arguments had been advanced to justify use of point in time IRB modeling for banking books under Basel II by some authorities. The lessons concerning the dangers of point in time modeling have not been fully absorbed. Whereas point in time modeling of VaR has been dealt with creation of stress VaR which recognizes that conditions can change, the same adjustment has not been made for loan book probability of default.

On banking books, Basel II was much more cautious in terms of recognition of modeling than had been the case for the trading books under Basel I. The VaR approach to modeling (whole book models setting the extreme loss under different confidence intervals with correlations allowing diversification effects) was not adopted even though this was the approach used in bank economic capital models. Banks were allowed to set only the mean of the distribution – the PD (probability of default), LGD (loss given default) and EAD (exposure at default). The Basel Committee set the functions which translated the mean into the extreme loss. The LGDs had to be downturn and the PDs long run but some authorities encouraged point in time modeling of PDs from a mistaken belief that it improved risk signals and was more accurate –it could be compared to current arrears rates. This creates the same potential issue as with the VaR of underestimated risk in good times and procyclicality. It also potentially damages risk signals in firms. Although this was not a cause of the crisis because Basel II came in in 2008 for the major European firms it does need to be addressed. It is less of an issue in the US because the structure of the market is so different. Banks do not hold as many long term exposures in the banking books because of the shape of the markets and in particular do not hold as many high quality or secured exposures in the banking book where cyclicality of PDs is highest. Mortgages are securitized through the federal agencies, auto loans are securitized, student

loans are securitized, credit cards are securitized and large corporates go direct to the bond markets. This is not true of the European markets.

It is possible to illustrate the risks of point in time modelling for banking books by taking the example of one type of cyclical loan, the mortgage. The probability of default for mortgages is low for all types in a boom because house prices are rising and unemployment is low. The difference between traditional mortgages and higher risk mortgages, such as buy to let or self certify, therefore is slight distorting signals of risk and building up too little capital in optimistic times. Chart 1, below, plots point in time estimates for a traditional mortgage book (90% LTV) against a through the cycle average. It also plots estimates for point in time PDs and a through the cycle average for a buy-to-let mortgage book with similar LTV. The figures are based on a number of representative portfolios. What the data shows is that point-in-time PD estimates for much higher risk buy-to-let books can be lower in booms than for traditional mortgages but accelerate much more sharply in recessions, to much higher levels. The PD estimate in effect switches over and in the recession the buy to let book looks much higher risk (when arrears rates have started to rise sharply) whereas in the boom the reverse seems to be the case.

The point-in-time estimates therefore give a distorted view of risk relativities in the boom and if used for pricing would lead to long term losses. Chart 2 shows actual point in time estimates for a single bank portfolio of non-prime versus prime mortgages provided by a major bank. It also shows how the point in time PD underestimates the risk differentials in a boom.

Chart 1: Stylised PDs for Buy to Let versus Traditional Mortgages

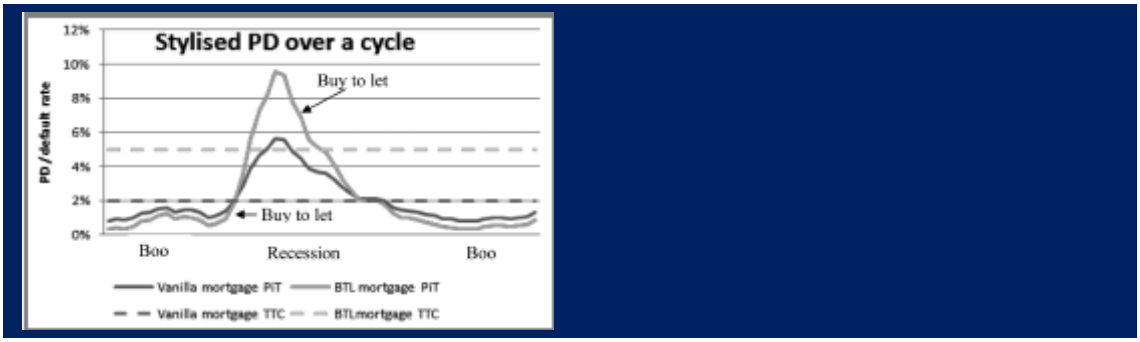
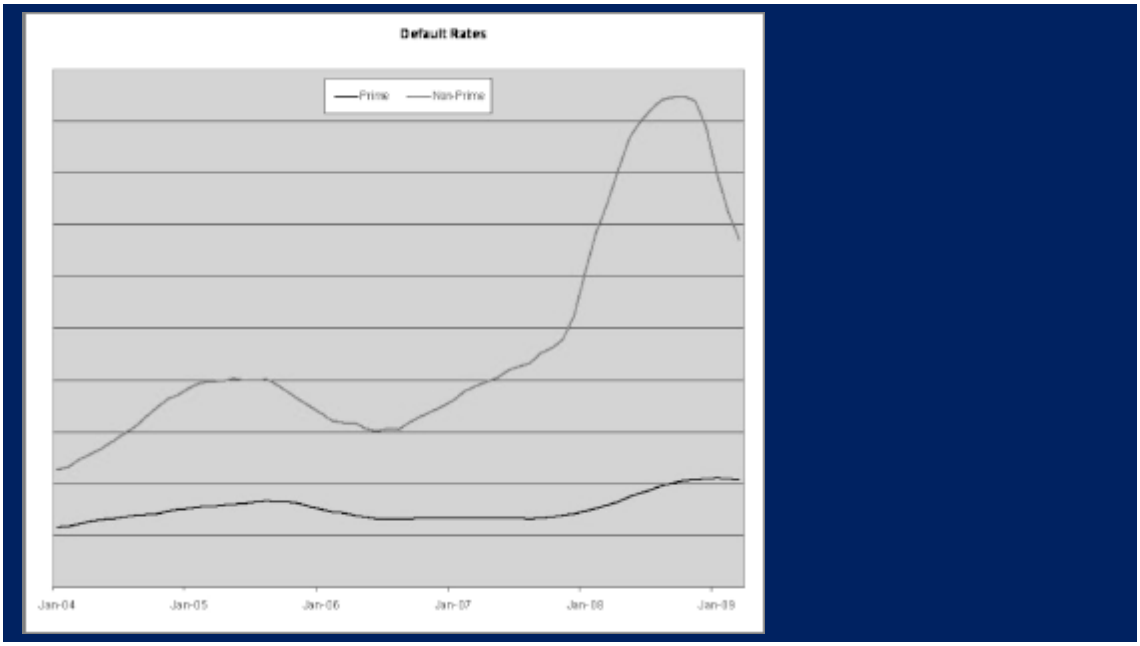


Chart 2: Point in Time PDs for a Single Bank's Prime versus Non-Prime Portfolios



More conservative banks had favoured more through the cycle methods of modelling so that pricing and exposure decisions were taken on a more accurate view of the risk over the life of the loan.

Banks which had adopted more through the cycle approaches to credit modelling under Basel II could see the degree of risk and the relativities more easily. Some banks have adopted a scalar approach enabling them to see both the point in time measure and the through the cycle – the point in time measure is scaled to give a through the cycle measure given the point in the cycle. This gives the best of both worlds: a volatile measure that will show risk deterioration but also a more stable measure which will show the true risk on longer term loans. Scalar models can be built very successfully.

The question here is that given the risks of point in time modelling should the authorities simply set a flat PD requirement for mortgages by imposing a high floor. This would lose all the information in the PDs by LTV band – higher LTV mortgages are more likely to default because the property cannot be sold to repay the loan – as well as borrower score. This would have incentive effects – reducing incentives to skew books to lower risk mortgages. It would be far better to require scalars to re-balance a point in time PD into a through the cycle PD using a cyclical adjustment.

Bank concentrations and risk governance

Risk concentrations by the banks and some insurers were at the heart of the crisis. Yet again a banking crisis has been caused by large exposures to various kinds of property/secured market. These markets cause problems because of the safety banks see in the security even though the value of the security is itself volatile. Because the exposures are secured much larger risk concentrations are accepted. In this area the industry suffers therefore from not just a Herring-type disaster myopia (see Herring, 1986) but in many cases a false sense of security drawn from the asset backed nature of many loans.

Banks are focussing on concentrations to industries and instruments and single names but more emphasis needs to be placed on identifying concentrations in risk factors across a bank. There can be common elements underpinning a range of different exposures- oil countries, oil companies, oil contracts, oil futures for example. Also second and third round effects in a severe market period can create further connections across risks. A focus on approaches to concentration risk through Pillar II of Basel II is therefore important but also a focus on the techniques for assessing and alerting senior managements to risk concentrations. Improved business level reverse stress testing can be helpful in cutting through the plausibility filter applied to risks before they reported higher.

A general overhaul in risk governance was needed to improve risk transparency and challenge within banks. In many areas improvements to the risk governance framework have been made. Boards are now much more engaged, and CROs and have more status and an end to end view of risk. They now almost universally report to the CEO or jointly to CEO and board risk committee. They are involved in decisions on new products and in many banks liquidity risk, have a seat at the table on strategy and often cover operational and reputation risk. This widens considerably their pre-crisis sphere of influence which was credit and market risk once on the book (See EY/IIF surveys on risk governance).

However, there are a range of elements where the changes are still being embedded which will be important going forward to reduce the likelihood of future crises. The EY survey shows that although most banks have changed risk appetite many are struggling to link individual business decisions to it. Choice of metrics is critical in terms of ability to cascade it down through an organisation – many banks chose metrics which could not be allocated across all business units. The FSBs focus here on extreme future loss is helpful because this can be allocated across risk types and across business units. Accountability of the business units for all risk ie going far beyond a requirement not to exceed limits is an important part of making the system more robust and an effective risk appetite allocation system containing all risk is an important part of this.

Banks are also focused on what the culture is across the whole organisation and are trying to review it and if necessary change it.

All these enhancements do need improved methods of assessing forward risk and the banks are working to improve risk transparency more broadly. The role of economic capital models is being downplayed with much more focus on multiple metrics. One important metric is stress testing which needs to be risk sensitive but faster – more able to be used as a management tool. In some banks in can take three months to turn a stress test round which is too long to make it a regular guide to

decision making . There are large programmes in banks to enhance stress testing capabilities with use of central functions, improved approaches and more focus on the P& L and the whole balance sheet.

Another area is incentives within banks and there is increased focus on risk adjusted return and culture influencing promotions and rewards. Measurement issues exist in this area as well, but the most prominent issue is coordination across the industry. Without a global approach banks with tough compensation arrangements risk losing their best staff to banks operating from more lenient regimes.

The authorities do need to use their tools to encourage better risk management within the firms. Risk officers in banks believe that the regulatory use of internal models for banking books has transformed risk assessment leading to a common lingua franca across banks and much larger budgets to improve data and modelling. They are concerned that a move to downgrade use of internal models would erode the quality of this universal approach.

Conclusions

It is important that the authorities carry out a stock take of the causes of the crisis and whether the changes to date have covered the weaknesses in the global system and will help to prevent a crisis going forward.

There are certain areas which have received far too little attention such as the structure of the securitisation market and use of trading book capital treatments for illiquid assets as well as point in time modelling of risks.

There are others where a misunderstanding of the drivers of the crisis creates the potential for the wrong solutions gaining ground. The most prominent issue here is the focus on Basel II and complexity as a cause where the distortions driving the markets came from Basel I and its simplicity.

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