AView of the Liquidity Crisis [1]

Where did the credit crisis come from? Who or what is to blame? How will it be resolved? What needs to be done to help resolution? These are the issues I want to talk about today.

It is always useful to start with the macroeconomic environment. In a sense, this is a crisis borne out of previous crises. Let me explain. An important difference between the recent period of sustained growth and previous periods is the low level of both short and long term real interest rates over the last 5 years, certainly relative to the last two decades.

The low short rates resulted from extremely accommodative monetary policy as industrial country central banks cut rates sharply to stave off deflation after the recession of 2001, and were not equally quick to raise rates as economies improved. By contrast, the long rates fell following the collapse in investment in both emerging markets and developed countries after the crises in 1998 and the ICT bubble in 2001**.** Emerging market governments became more circumspect and increased budgetary surpluses, even while cutting back on public investment. For instance, in Philippines, investment fell from 24% of GDP in 1996 to 17% in 2006, while its savings rose from 14% to 20%. From borrowing 10% of its GDP, it now pumps out 2.5 percent as a current account surplus.

Moreover, as industrial economies recovered, corporate investment did not pick up, at least not to the extent warranted by the growth. As a result, the worldwide excess of desired savings over actual investment – the so-called savings glut -- pushed its way into the main

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[1] Remarks by Raghuram G. Rajan, Eric Gleacher Distinguished Professor of Finance, Graduate School of Business, University of Chicago.

markets that were open to investment, housing in industrial countries, lifting house prices and raising residential construction.

The US was not by any means the highest in terms of price growth. Housing prices have reached higher values relative to rent or incomes in Ireland, Spain, the Netherlands, the United Kingdom, and New Zealand for example, though not in Germany or Japan. Then why did the crisis first manifest itself in the US? Probably because the US went further on financial innovation, thus drawing marginal buyers into the market.

With steadily rising housing prices, easy financing brought more low-income households into the market. There was certainly a logic to the financing, and it went something like this; With such a strong housing market, all I need is to get this buyer into the house. I can structure the loan so that she has to pay very little over the first few months – the so called negative amortization loans. By the time she has to pay anything significant, the house will have appreciated 10 percent, and she will have the equity to refinance or make future payments.

Indeed, credit quality mattered little when housing was buoyant. If the buyer could not make even the nominal payments involved on the initial teaser rates, the lender could repossess the house, sell it quickly in the hot market, and recoup any losses through the price appreciation. In the liquid housing market, so long as the buyer could scrawl X on the dotted line, she could own – indeed, loans to the bottom of the pyramid were called NINJA loans, loans to those with NO Income, No Jobs, and No Assets. There were also called “liar loans” because they required little documentation and verification of statements. A whole new set of buyers came into the market in the United States.

That originations declined substantially in credit quality is amply demonstrated by a study by my colleagues Atif Mian and Amir Sufi. As the next slide show [debt to income ratios], debt to income ratios for borrowers started increasing starting in 2001, but particularly increased for the lowest decile. My colleagues conduct an interesting experiment. They look at zipcodes that had the most rejected mortgages in 1996, suggesting credit quality was low but demand was high. The next slide [differential growth in originated] shows these areas experienced the greatest surge in lending, even though relative income growth and employment was lower in these areas. The next slide [differential growth in house prices] shows these areas had a higher relative growth in house prices. And finally, if you turn to the next slide[differential growth in default rates], they show these areas also had a larger increase in mortgage default rates

What was going on? Who was taking the other side? Rational lenders would understand that eventually house prices would have to slow down. They would not want to be holding on to these loans when the music stopped. But the next slide [sub prime interest spread] shows that despite the increase in supply of sub-prime mortgages, spreads continued to decrease, suggesting strong demand. Where was the demand for debt coming from?

Go back to the savings glut. Financial institutions in countries with excess savings like Germany and Japan were looking to invest the US dollars they had earned. Many of these institutions were constrained to invest in high quality debt instruments. With US Treasuries paying really low rates, they were looking for extra yield, but with little additional risk. It was not just the foreigners. Low interest rates made even usually staid domestic institutions like insurance companies hungry for yield. And the innovative US financial sector supplied them exactly that.

So how do you convert a pig – the Ninja loan – into a princess – the AAA bond the investors wanted? You securitize it. The original mortgage had been bundled into a pool, and then securities of different seniority sold against it, with the equity tranche bearing the first loss. This is a reasonable process, allowing risk to be split into tranches so that those with more risk appetite can hold riskier pieces. However, the financial engineers were not content to stop here. They created more complicated pools, bundling the securities sold by the mortgage pools into securities pools, and selling tranched claims against them. So as the next chart [Figure 1] shows, $ 100 of sub-prime mortgages were converted into a large number of AAA bonds and sundry lesser quality securities. Then those lesser quality securities were pooled and further securities issued against them to get more AAA bonds. Thus were born the CDO, the CDO squared and so on. Over 95 percent of securities thus generated were rated A and above, and 80 percent rated AAA.

What were the buyers thinking you may ask? Well, many were arm's length buyers who simply did not have the capacity to delve deeper. Moreover, many were insurance companies and pension funds that had fixed obligations. In this era of low interest rates, they were really desperate for higher risk-adjusted yields to meet their looming obligations. The highly rated tranches were exactly what they wanted, especially if the AAA tranche of the CDO paid 40 basis points above corporate AAAs. They did not investigate the details of the underlying collateral, even if they could get the information or knew how to, for the rating was guarantee enough – many investors were effectively corporate bureaucrats, and no one ever got fired for buying US AAA. Of course, there is an old adage in finance – there is no return without risk – but this was forgotten in the frenzied search for yield.

And rating agencies went along, certifying securities and even advising issuers on how to dress their securities up so that they would just meet the rating agencies' hurdle. I should mention as an aside that it has now become a minor industry for some finance professors to explain to financial institutions what exactly they own and how much it is worth.

The role that securitization played is best brought out by some slides from a paper by another colleague, Amit Seru and his co-authors (Keys, Mukherjee and Vig). They exploit the fact that, as the next slide shows, [adhoc rules of lending] an individual FICO credit score of 620 is considered an appropriate threshold for securitization. Indeed, as the next slide shows, [rules of thumb in lending] the number of mortgages originated with FICO scores 620 and above is about 80 percent higher than FICO scores just below. So the key difference they exploit in their study is that a FICO score of 620 means securitization, while a FICO score of 619 means significantly lower probability of securitization. The question they ask is did this impact outcomes? Indeed it did.

As the next slide [delinquency] shows, the mortgages just above 620, which theoretically should be higher credit quality, defaulted significantly more, than the mortgages just below 620. What is particularly interesting is that the difference is primarily in the no-documentation loans, the NINJA loans I spoke about earlier. For full documentation loans, loans that were less apt to be influenced by the frenzy, the relationship is the right one, as the next slide shows [delinquency: full documentation]. The point seems to be that securitization itself was not the problem, it was the willingness of loan buyers to suspend disbelief and buy any junk that was dressed up that distorted incentives for originators, and this led to the problem we now face.

The boom went on till the Fed started raising rates. With fewer buyers able to afford normal mortgages, the first reaction of lenders was to increase the volume of exotic loans so as to keep the buyers coming. So like the cartoon characters who run off a cliff but stay in place for a while with their legs pumping furiously, the housing market stayed in place for a while with lower and lower quality loans being furiously pumped out. But eventually the housing market gave, and houses stayed on the market longer and longer. U.S. builders were quick to cut building, but sales fell even faster than construction. And so they are now sitting on about 10 months of inventory, perhaps significantly more because sale cancellations tend to be undercounted. Estimates suggest it will take a year to two years to clear the back log, with a further fall of about 7 to 10 percent in house prices to bring about balance.

As more and more teaser rates started resetting higher, and as buyers had negative equity in the house, more and more of them started defaulting. Given that repossessed houses could not be sold, the underlying credit quality of the buyer – whether they had a job, whether they had income, whether they had assets, started mattering more, for that would indicate whether they were liable to default.

So as liquidity drained from the housing market, everything changed for financial markets. Securitized mortgage pools were easy to understand and undifferentiated when the housing market was liquid – they all had low risk. But as liquidity started drying up and defaults increased, pools became differentiated based on how careful the originator had been, how well documented the loans were, who they were to, etc. Information about the quality of underlying pools started mattering more and much of it was hard to get at. Ratings became suspect.

This is what the next slide [key mortgage market developments] shows. Later securitizations, even though rated AAA, were much more suspect, and fell substantially in price relative to earlier AAA. This immediately created a problem for those who owned mortgage backed securities, and wanted to borrow against them, or sell them. In the same way as a used car salesman has to sell a car at a significant discount because the buyer suspects the car may be a lemon, once the mortgage pool has become differentiated and information asymmetries have arisen, arm's length buyers like foreigners are reluctant to buy, and lenders are unwilling to lend, without knowing much more.

But if mortgage pools became harder to value, the securities issued by CDOs and CDO squared became doubly hard to value, because not only were they subject to the same underlying information asymmetries besetting the underlying mortgages, but also because they were leveraged claims on these assets, which were really complicated to value when defaults rose. Thus illiquidity in the housing market created information risk, which coupled with complexity risk, destroyed liquidity for asset backed securities in the financial market.

Moreover, for a number of complex securities, default risk was actually much higher than foreseen because there was far less diversification in assets than originally thought. Put another way, if house prices fall 20%, losses on portfolios of mortgage backed securities will be substantial – say at the very least 15% on the most recent mortgages. But the BBB securities issued by these portfolios will be completely wiped out, so the CDOs that think they have diversified by buying BBB securities across the country will also be wiped out, as will all the securities issued by the CDOs, including those rated AAA in the past.

The uncertainty about who owns what and how much is reflected in the unusually high spreads between the London Inter Bank Offer Rate, the rate banks use to lend to each

other, and the fed funds rate, as the next slide shows [signs of severe stress]. Indeed, to restore normalcy demand to these markets, we need full disclosure, as well as deep pocketed investors who have the capability of investigating these assets closely, understand how to value them, and therefore can put a price on them and take them on their books. Unfortunately, the obvious such investors, the large money center banks, have been preparing their balance sheets to take on other commitments that might devolve on them. These include loans to private equity transactions that they were earlier hoping to sell easily in liquid financial markets, the assets of the special investment vehicles they have set up that are no longer finding commercial paper financing, as well as mortgages they were preparing for sale. Thus credit conditions are tightening across the board as the next slide suggest [loan officers].

So financing in the asset backed paper market will take time to reappear, which means there will be less financing for housing. Ultimately, the resolution will come about as savvy investors such as hedge funds and large banks go “bottom fishing” in markets and establish prices even for complex securities. Prices will recover, and eventually, so will housing. In the meantime, defaults will continue to rise as more loans reset to higher rates – about 350 billion subprime over the next year -- and as more loans made in the later, more lax, periods come to the fore. As the next slide shows, going by past housing crises, we are just in the initial stages of foreclosures, though clearly these risks are already anticipated in financial asset prices [foreclosure activity]. Also, we still do not know the extent to which rising house prices have created a sense of economic well-being amongst the American public that has offset stagnant median wages. To the extent that that has been important, we could be in for a rougher economic ride, both economically and politically.

On the financial side, the good news, at least at first glance, for the United States is that a substantial amount of the financial losses have been exported to foreign balance sheets, as this slide from a paper by my colleague Anil Kashyap and co-authors suggests [allocation of losses]. About half the sub-prime exposure is on foreign balance sheets, so the estimated loss of about $ 400 billion they impute on the next slide should be equally shared [implied losses]. But the bad news is that foreigners, having been burn by this experience, are souring on US assets, which is depressing the dollar. US monetary policy does not have much room, because foreigners, worried about US inflation and a falling dollar, will demand higher long term interest rates to hold US assets. If this keeps up, it will offset any benefits of lower short term interest rates.

How will all this end? Eventually markets will start working again. The constant talk of bailouts to housing is, in my view, unhelpful because it postpones adjustment. It does make sense however, to consider ways of speeding up the renegotiation of debt where house owners have some prospect of servicing lower amounts, or where they would pay if the principal was cut to reflect the negative equity they now have. Any ways to speed up voluntary settlements, including the use of bankruptcy court, should be contemplated.

I also believe that house prices have to adjust more quickly. But how do you make them adjust without precipitating more negative equity and more defaults? In the past, the solution was inflation – which would allow the real price of houses to fall without overly depressing the dollar price, even while eroding the value of debt and preserving incentives to service it. Perhaps this is what the Fed intends with its interest rate cuts and its seeming insouciance towards inflation.

There is a lot of blame to go around for this crisis. I have already referred to the bureaucratic investors who bought blindly if the rating was high enough, the rating agencies who were all too willing to bless packages with their rating, to the predatory lenders who originated “liar” loans, and to the home owners who lied to get into the houses. The regulatory authorities who did little to intervene cannot be absolved.

But I also want you to spare a thought for the bankers and investment bankers who were paid enormous bonuses if they brought in profits. The surest way to make profits in finance is to take on risk, which is why their paymasters attempt to limit the risk they take through risk management. But as the cycle grows old without risks showing up, and as the Goldman Sachs of the world make enormous profits and bonuses by taking precisely the kind of risks that the risk manager says the banker should not take, the risk manager loses credibility and power. He is the old worry wart, fighting the last war, to be ignored because times have changed.

Moreover, there are so many ways of making money while seemingly not taking risk. For instance, a manager can enter the credit derivative market to sell guarantees against a company defaulting. Essentially, he will collect a steady premium in ordinary times from people buying the guarantees. Given that premium income is not volatile, he will look like a genius, making money for nothing and returns for free. With very small probability, however, the company will default, forcing the guarantor to pay out a large amount. The investment managers are thus selling disaster insurance or, equivalently, taking on “peso” or “tail” risks, which produce a positive return most of the time as compensation for a rare very negative return.

Indeed, this could generate similar behavior to that of the bureaucratic fund manager. I buy the AAA tranche of a CDO, not because I am confused by the rating, but because I am selling a deep, out of the money put option, which will give me a steady return most of the time, but default with serious adverse consequences occasionally. By the time it defaults, I have hopefully made my money and am enjoying my own private beach in the Bahamas. A number of managers including Stan O Neill of Merrill Lynch did generate higher returns for their firms for some time, but alas we now realize it was hidden risk. Of course, his parting compensation did nothing to dissuade the rest of the flock from following his example in the future.

The broader point I am making is that we need to think about incentives of financial market participants as an important factor in the current crisis. How to improve those incentives will, no doubt, be an important issue for discussion in the years to come. I would be happy to take any questions now.