International Banking Crisis

1. Introduction

The international financial system has witnessed numerous banking crises over many recent decades with varying causes and severities. Depending on the role the banking sector plays in the overall financing of business activities in a market, the impact of a banking sector that is paralyzed has a different impact on the rest of the economy. It ranges from affecting mostly small to medium sized firms being unable to finance their business activities to a full blown financial crisis where most of the financial services are compromised for the economy as a whole much like the current global financial crisis that initially ignited by a sub-prime crisis in the U.S.. The nature of the banking crisis also varies. Those that are arising mostly out of liquidity short-falls with otherwise sound solvency characteristics are short-term in nature and it can be helped by official intervention by monetary authorities via rescue packages (e.g. emergency loans at penalty rates, increasing central bank discounting windows, etc. However, to solve those that arise due to structural deficiencies arising from bad investment decisions (solvency issues), a much more fundamental approach is required[1]. The narrow definition of a banking crisis is when a series of financial losses, collapses of asset prices, etc. threaten the integrity of the banking system and so government intervention to protect failing institutions is required. Using this strict definition of a banking crisis, incidences of such episodes have been relatively scarce in developed countries. Recent crisis episodes thus include the current U.S. sub-prime crisis, the banking crisis in Spain in 1980s and Scandinavia and Japan in the 1990s. In emerging markets, there have been many more incidences of banking sector problems in recent years. These include the Asian financial crises of 1997-1998, the Russian episode of 1998, and the Argentinean crisis of 1998. If the definition of banking crisis is widened to include incidences of isolated banking sector difficulties, the savings and loans crisis in the US during the mid-1980s and the severe financial losses of a number of financial institutions in Australia in the late 1980s and early 1990s would also qualify.

Schwartz (1986) separates financial crises into 'real' and 'pseudo'. The former is associated with a fear that the payment system is unavailable at any price (due to a paralyzed banking system that is unable to perform the payments system function), which leads to a flight to liquidity (cash and near cash). This liquidity squeeze, due to the fall in bank deposits, will lead to a credit squeeze, and so has the potential of causing a recession for the economy. In order to prevent this, it is necessary for decisive action by monetary authorities to re-inject liquidity back into the financial system. For example, a central bank can replace commercial banks in providing loans to businesses that normally rely on bank credits that have dried up. This will decrease the probability of bank runs as depositors are guaranteed the availability of liquidity, which is provided by the central bank that has the power to generate (i.e. print)

[1] For example, the 700 billion USD rescue package that was just passed (October 2008) the house approval in the U.S. is designed to absorb non-performing asset holdings (Collateralized Debt Obligations, or CDO's) of banks in the hopes that increased liquidity in the system would encourage them to resume normal intermediating activities. This would be similar to the RTC (Resolution Trust Corp, http://en.wikipedia.org/wiki/Resolution_Trust_Corporation) solution in the late 1980's in the U.S. that was set up to absorb the assets of failing Savings and Loans institutions. Similarly some of the countries during the Asian Financial Crisis, set up government owned and operated Asset Management Companies (AMC's) that were designed to liquefy bad assets of banks. These measures are designed to inject both liquidity and capital back into the banking system.

money[2]. The latter does not lead to the system wide crisis, but rather involves a decline in asset values in many sectors, stemming from unusually large cases of mistaken (or miscalculated) investments.

By the very nature of banks' intermediation business, they are exposed to various mismatches between their assets and liabilities, and their liquidity mismatch could especially have the potential to create a systemic crisis in the banking sector. Due to these vulnerabilities, during the times of a sharp rise in systemic risk, banking panics would result and would spread to the economy as a whole. Banking crises occur when a majority of banks in a country are experiencing financial difficulties and are unable to make new lending. Banking crises were common occurrences for both advanced and developing countries.

A typical scenario of a banking crisis for an emerging market economy would proceed as follows:

Macroeconomic shock → deterioration of borrowers' repaying capacities → Accumulation of NPLs → Bank insolvencies → Bank runs → Contagions of crisis (i.e. Banking crisis) → credit squeeze → more general financial crisis ('real' crisis).

2. Consequences of banking crisis

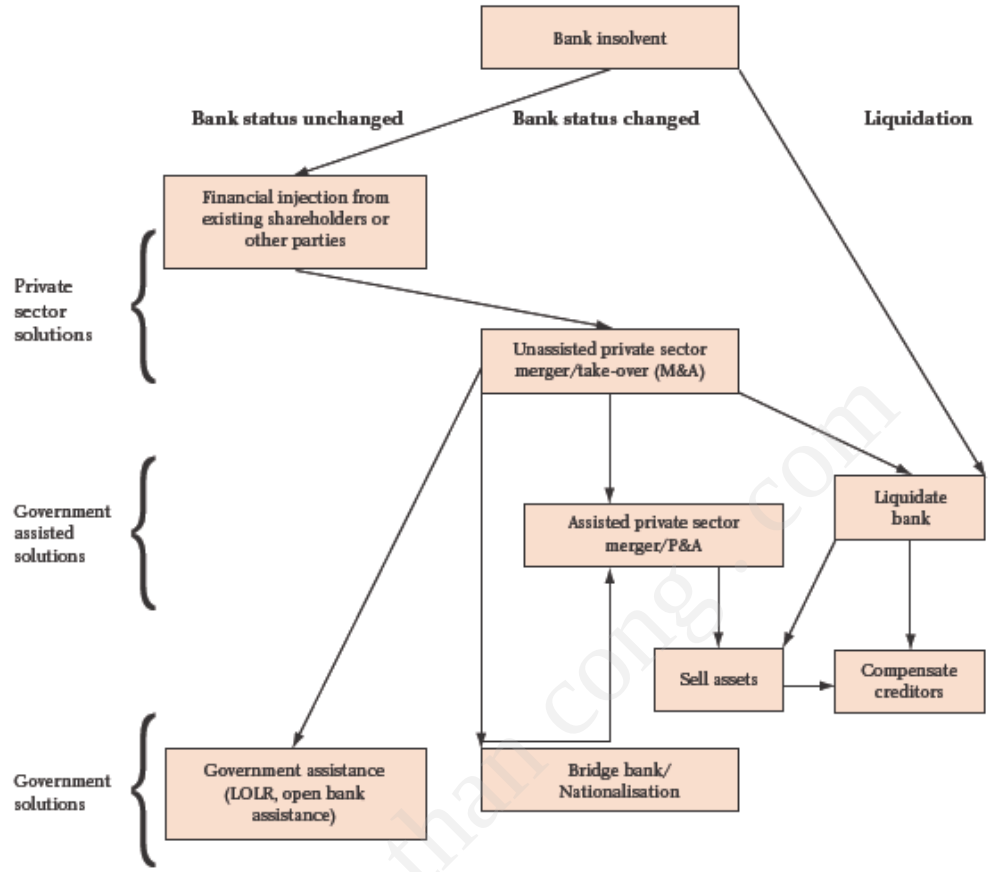
In the case of 'real' banking sector crises, the fundamental functions of the banking sector are effectively compromised, leading to a system-wide breakdown of financial activities. Essentially, crises add to systemic risks, as any reduction in lending activity adversely affects economic activity, especially in emerging economies that are over-reliant on bank credits. Lending cut-backs by problem banks would lead to a credit crunch for small-to-medium sized firms. In addition, there is the possibility of a negative spill-over effect to other banking markets. This is more relevant in recent times due to the internalization of banking activities across many countries and the increasing liberalization of previously closed economies.

Figure 1 below summarizes various methods of bank crisis resolution.

[2] In relation to the current developments in the U.S. sub-prime crisis, various central banks have initiated this step. The Republic of Ireland provided guarantees for all liabilities (i.e. deposits) of six Irish banks via legislation. This was followed by EU finance ministers announcing on 7 Oct 2008 that they would raise the minimum bank deposit guarantee from 20,000 to 50,000 Euros across 27 EU countries.

Figure 1.

Diagram 1:
Decision tree in crisis resolution



Source: Hoggarth et al (2003)

The potential and actual costs of resolution are very high. Direct costs include the costs of resolving the crisis, such as the usage of public funds for rescuing failing banks (for recapitalization, USD700 billion for the U.S.'s sub-prime crisis) and the opportunity costs of such funds. Such uses of public funds involve opportunity costs and create a moral hazard problem[3]. The resulting financial crisis and adverse selection problems would lead to inefficient resource allocation. Indirect costs are essentially the losses incurred due to depressed economic activity during crises, and the IMF measures these as the difference between GDP growth trends (assuming no crises) and actual growths during crises. Table 1 shows both direct and indirect costs. The first column shows the average duration of crises, which is 4.2 years for all countries in the sample. Rather unexpectedly, high-income countries (group 1) took more time to recover from bank crises than mid- to low-income countries (group 2). Non-performing loan ratios are shown in the second column, which is as high as 27.8% in group 2, but is lower at 13.5% in group 1. The direct cost of crisis resolution is shown in the fourth column. It is measured as both fiscal and quasi-fiscal costs per GDP and the average for all countries was 16%, whereas the indirect cost was 14.4%. In both cases

[3] The moral hazard problem is relevant if an asymmetric payoff from investments exists. Banks who invest in high risk assets (lending to risky projects) benefit when investments perform but do not pay the costs when default occurs if there is implicit/explicit guarantee provided by monetary authorities. This will create incentives for banks to engage in higher risk investment activities than otherwise, leading to potentially higher costs of resolution when they face difficulties.

costs were higher for group 2. In addition, for those crisis episodes that combined banking and currency crises, crisis resolution costs were substantially higher compared to banking crises alone (5 and 3 times more costly in terms of direct and indirect costs, respectively).

Table 1: Direct and indirect costs of banking crisis resolution

	Duration: Years	Non-performing loans (% of total loans)	Bank credit/GDP (%)	Fiscal and quasi-fiscal costs / GDP	GDP Gap: Trend - Actual
High-income countries	5.5	13.5	71.8	12.1	13.2
Medium and low-income countries	3.7	27.8	38.4	17.6	15.0
Average all countries	4.2	22.4	48.1	16.0	14.4
Of which: twin crises	4.1	26.1	46.5	22.9	23.1
Banking crisis alone	4.3	17.7	50.8	4.6	7.9

Source: Extracted from Tables 1 and 3 from Hoggarth et al (2002)

Table 2: The fiscal cost of bank crises

Country	Period	Fiscal cost (% of GDP)	Country	Period	Fiscal cost (% of GDP)
1 Argentina	1980-1982	55.1	**21 Mexico**	1994-ongoing	19.3
2 Argentina	1995	0.5	**22 New Zealand**	1987-1990	1
3 Australia	1989-1992	1.9	**23 Norway**	1987-1993	8
4 Brazil	1994-1996	13.2	**24 Paraguay**	1995-ongoing	5.1
5 Bulgaria	1996-1997	13	**25 Philippines**	1983-1987	13.2
6 Chile	1981-1983	41.2	**26 Philippines**	1988-ongoing	0.5
7 Colombia	1982-1987	5	**27 Poland**	1992-1995	3.5
8 Cote d'Ivore	1988-1991	25	**28 Senegal**	1988-1991	9.6
9 Czech Republic	1989-1991	12	**29 Slovenia**	1992-1994	14,6
10 Ecuador	1996-ongoing	13	**30 South Korea**	1997-ongoing	26.5
11 Egypt	1991-1995	0.5	**31 Spain**	1977-1985	5.6
12 Finland	1991-1994	11	**32 Sri Lanka**	1989-1993	5
13 France	1994-1995	0.7	**33 Sweden**	1991-1994	4
14 Ghana	1982-1989	3	**34 Thailand**	1983-1987	2
15 Hungary	1991-1995	10	**35 Thailand**	1997-ongoing	32.8
16 Indonesia	1992-1994	3.8	**36 Turkey**	1982-1985	2.5
17 Indonesia	1997-ongoing	50	**37 Turkey**	1994	1.1
18 Japan	1992-ongoing	20	**38 United States**	1981-1991	3.2
19 Malaysia	1985-1988	4.7	**39 Uruguay**	1981-1984	31.2
20 Malaysia	1997-ongoing	16.4	**40 Venezuela**	1994-1997	22

Source: Patrick Honohan and Daniela Klingebiel (The World Bank), "Controlling Fiscal Costs of Banking Crises," April 17, 2000

3. Causes of Banking Crises

3.1 Micro Issues (bad bank management)

Inefficient risk management

The essence of banking is in the risk management. By definition, banks are exposed to various mismatches in financial assets. These include mismatches between assets and liabilities in terms of currency denomination, duration, interest rate base, and liquidity. Vulnerability to liquidity and currency risks is higher in emerging market banks because of the lack of access to long-term liabilities and the lack of market instruments for liquidity transformation, used to achieve risk sharing (i.e. underdeveloped financial market). Short-term foreign currency (hard currency) borrowings tend to finance domestic borrowers (i.e. domestic currency assets are financed by hard currency, e.g. Mexico 1995 and Turkey in 1994).

The usual measures appropriate for liquidity management are to hold excess capital (in addition to the minimal CAR requirement) and to hold other liquid assets such as government securities, money market instruments that are highly liquid. To manage currency mismatches, banks should avoid heavy reliance on short-term foreign currency borrowing to finance longer term assets and should develop broader, longer-term debt markets. In addition, sufficient levels of foreign currency reserve holding (315b USD in by the central bank in China) would provide as a buffer against any currency crisis.

Moral hazards: Distorted incentives

The existence of asymmetric incentives leads to excessive risk taking behavior by banks. This is especially true when bank owners have small stakes in the bank (i.e. they have a very high debt-to-equity ratio) and/or managers carry very little personal responsibility for the risks they take. In some of the emerging markets, this problem is more severe as the ownership structure of banks is very narrow and is often a part of a larger business structure (a conglomerate). In such circumstances, banks are simply a source of finance for the conglomerate and, as such, there would be little diversification of loan portfolios, with the survival of the banks being more or less assured by cross-subsidiary guarantees. In addition, in some emerging markets, most commercial banks are government owned, operated and are run effectively as quasi-fiscal agencies based on political criteria with disregard for commercial principles, which undermines their solvency and the soundness of other better-run banks in the sector.

In general, bank owners (share holders) benefit most when risk taking activities of banks pay off, and so they should be the ones who lose most in times of restructuring. That is, there should be no automatic recapitalization of privately owned banks by the government, and this will lead to owners appointing capable managers in order to minimize financial difficulties. Thus, the level of bank capital acts as a source of good governance as well as a cushion against loan write-offs (and write-downs). Thus, further recapitalization of banks is needed to enhance owners' incentive structure.

Moral hazard problems also exist for depositors. The existence of government bail-outs and other guarantees would lessen the need for depositors to monitor the risk taking behaviour of banks and they will pay little attention to creditworthiness of banks. For those countries that have a compulsory deposit insurance scheme, the same lack of vigilance on the part of depositors is observed. To encourage appropriate incentives, it may be necessary to

consider i) partial insurance rather than full insurance, so that depositors will not be fully protected, ii) risk weighted insurance, where the cost of insurance depends on the level and the types of investment risks that banks take, and iii) deposit insurance through mutual liability.

Moral hazards: Heavy government involvements and connected lending

In some economies, banks are owned and operated by the government. If so, these banks' lending decisions are not governed by the market mechanism, but rather they are made on policy grounds without any regard for the profitability or the solvency considerations of the lending banks. Even if banks are in private hands, many national governments have used the banking sector to achieve the aim of allocating funds to desired industry/firms. At the early stage of a market economy, the necessary market forces that will guide the flow of funds (price mechanism) are weak and so the market mechanism needed to achieve efficient resource allocation is absent. Under such a circumstance, an active government involvement ensures that key sectors of the economy receive priority funds from the banking sector. This can be achieved by i) ownership of banks by governments, ii) appropriate regulations that require 'policy loans' to key segments of the economy, iii) moral suasion, where unofficial pressure is applied to banks to comply with government's wishes.

Inevitably, a loss of efficiency will result due to resource misallocation and this might lead to the accumulation of non-performing loans in banks. More importantly, the banking sector will be denied the opportunity to become competitive and will remain inefficient, uncompetitive, and with little incentive to compete and innovate. Not surprisingly, countries with high government bank ownership tend to have less efficient banking sectors with higher level of NPLs. When banking crises occur, a government will be obliged to bail out failing banks and the rescue costs will interfere with economic growth. The policy measures to manage this source of problem are i) enhancing the transparency of government involvement in the banking sector, ii) corporatization (or privatization) of government owned banks, and iii) sharing the burden of policy loans across all banks if there is a need for such loans.

Weakness in accounting and legal framework

First, a less stringent requirement on the classification of NPLs can lead to the unwanted accumulation of NPLs. In some countries the term NPL is based on non-payment only and not on a continuing credit risk analysis of the borrowers. In principle, banks are required to carry out credit risk analysis on their borrowers on a continuing basis so as to detect any possibility of a loan default caused by deterioration in the borrower's loan servicing capacity. If the relevant definition of NPL is based solely on the non-payment of loans, by the time a loan is classified as NPL it is too late for the bank to initiate any pre-emptive measure to avoid eventual defaults.

Second, loose loan provisioning requirements are also responsible for banking sector problems. Loan loss provisions (the portion of a loan portfolio set aside in liquid assets to cover contingencies, which varies between 10-30%) act as a safety buffer against the adverse effects of loan defaults on the solvency of banks. Due to the opportunity cost involved, too high a provision rate would drag bank profitability. On the other hand, too low provisioning would not shield banks from insolvency should there be an unusually severe level of defaults.

Third, relaxed disclosure requirements allow for the non-reporting of high-risk taking activities, which also contributes to the accumulation of NPLs.

Fifth, weak and ineffective supervision provided by regulators would allow unsafe lending practices to go unchecked. If the types of regulation and relevant laws preventing

financial frauds, taking higher risks, etc. can be relatively easily avoided, the bank owners/managers would have an incentive to avoid costly regulations. In addition, government-affiliated banking sector supervisors may have an incentive not to reveal the full extent of the banking sector problems.

Inevitable consequences of weak and ineffective accounting and legal framework include i) understatement of the true nature of NPLs, ii) collusion between banks and borrowers (in the case of connected lending) to disguise the extent of NPLs through loan restructuring, etc., iii) lower NPL provisioning, iv) higher costs of public bailouts through capital injection, and possibly v) 'looting' behaviour (e.g. crisis in the U.S. and Chilean banking crisis in the late 1970s) by managers. Overall, these weaknesses will lead to the underestimation of the severity of banking sector problem, and hence much needed remedies for the ailing banking sector are neither sought nor seemed to be justified.

Thus, it is necessary to i) toughen the NPL classification, ii) increase NPL provisioning, and iii) initiate and enforce public disclosure requirements of bank performance and the risk characteristics of bank operations.

Inadequate preparation for financial liberalization

Financial sector deregulation in the advanced economies started in the early 1980s, which was followed by emerging market liberalization and globalization from the late 1980s and early 1990s. Regardless of the market maturity, deregulation and liberalization lead to a more volatile financial environment initially. This is due to the availability of previously inaccessible investment outlets and to more risk taking due to the increased level of competition within the banking sector. A natural consequence of this is to observe increased levels of instability in the financial market, which is a process that all newly deregulated financial systems go through. The advanced markets that experience financial instability are, in general, better equipped to handle banking sector difficulties compared to emerging markets.

In the case of emerging markets, it is of vital importance that liberalization proceeds in a manner that allows local market participants (banks, non bank financial institutions and regulators) to keep pace with the introduction of new financial products, processes, more competition both internally and (more importantly) externally. In general, the financial liberalization of a previously protected banking sector would result in i) higher volatility of domestic interest rates, ii) rapid credit expansion shortly after liberalization (due partly to higher domestic real interest rate) due to capital inflows that might lead to a lending boom, iii) intensified competitive pressures would lead to excessive risk taking (liberal use of off-shore derivative products, etc.). In addition, inadequate preparations on the part of the financial supervisors to oversee new developments would exacerbate the banking sector difficulties. Also, sudden withdrawals of foreign capital due to loss of confidence, etc. expose domestic banks to unforeseen liquidity risks.

Normally, the preconditions for financial liberalization are i) a sufficient degree of competitiveness in the local financial markets (banking sector in particular), ii) the carrying out of "fit and proper" test on new entrants to banking sector, iii) a strengthening in supervision sufficiently so that the supervisors are well equipped to handle more complex and new banking activities. However, if liberalization precedes the above necessary steps, it is important to initiate policy measures to slow the rate of capital inflow and the speed of financial engineering down so as to allow the supervisors to catch up to new developments.

3.2 Macroeconomic Environment

Macroeconomic volatility

Crises of confidence in the banking sector may arise due to causes external to that sector. Even efficient and properly supervised banking systems could be subjected to crisis episodes if the macroeconomic environments under which they operate become hostile. These include lending booms, sudden slowdowns in the growth of the economy and/or exports, loss of an export market, sharp changes in exchange rates and interest rates, asset price and real estate price bubbles that develop and burst, inflation volatility, etc. These will adversely affect borrowers' capacity to service loans and the performance of other types of bank assets would also deteriorate leading to a loss of confidence in the banking system.

Some of these are beyond control of authorities. However, governments must adopt macroeconomic policies that could address the systematically distressed banking system. That is, a government must attempt to initiate policies that reduce volatility originating domestically, fight inflation, achieve low interest rate environment, reduce budget deficit, allow banks to achieve risk reduction through diversification of activities, ease restrictions on the portfolio diversification of local banks, allow more market-based competition through deregulation, entry of foreign banks, develop vehicles of risk transfer (derivatives, insurance) and liquidity enhancement (securitization), etc.

Exchange rate regime

Until recently, many emerging market economies were operating under some version of a fixed exchange rate system, and banking sector problems could originate from the real appreciation of a local currency as a result of mismanagement of the domestic macroeconomy. Inflation caused by macroeconomic mismanagement will lead to real appreciation[4] and a balance of payment deficit, higher local interest rate, lower credit availability and lower quality of bank assets. This will lead to inevitable pressures to devalue the currency, which will result in depositors switching to foreign currencies leading to further liquidity pressures. Hence, allowing some degree of nominal flexibility in exchange rate movements would partially shield the local economy from external shocks.

Lending booms and bubbles

Lending booms usually follow deregulation and financial liberalization. The liberalization of a previously isolated banking sector will receive capital inflows[5] and this

[4] Under fixed exchange rate regime, the two countries involved in the arrangement must follow the same monetary policy stance. The weaker of the two can not have independent monetary policy that results in significant deviation of inflation rate, nominal interest rates, etc. from its counterpart without risking abrupt adjustment to the level of the fixed exchange rates. For example, assume that Australian dollar is fixed at parity against the US dollar (i.e. 1 AUD = 1 USD) and the two economies are at equilibrium with 0% inflation. Now, the Australian central bank (RBA) carries out monetary policy easing which would ultimately lead to annual inflation of 10%. Purchasing power parity (PPP) would suggest that the value of the AUD must fall by 10% for the duration of one year. This implies that the AUD should really be worth only 0.90 USD, but if the Australian government wishes to keep the fixed rate at parity, the AUD is overvalued by 10% at the current exchange rate. In other words, the AUD has appreciated in real terms with all the consequences of external economic performances associated with appreciating domestic currency. Even worse, RBA's foreign currency reserve (USD assets) will dry up if speculators determine that this situation is unsustainable and create continued excess supply of the AUD.

[5] Many emerging market financial sectors were not accessible by multinational financial institutions even though potentially significant profitable opportunities existed. The combination of sustained higher economic

will lead to the relaxation of lending controls that quite often ends up with the total credit extended in the economy well in excess of the level that is required for sustaining the current projected level of economic growth. Inevitably, excess credit would end up in the more speculative segments of the economy, such as the stock market and real estate market, which has the potential of leading to excess capacity in the real economy due to overinvestment. Thus, in the financial markets, excess demand for financial assets created by lending booms would ultimately lead to speculative bubbles. During the boom period it is difficult to distinguish between good credit risk and bad credit risk, and this also provides an appearance of profitable lending activities of banks. However, when a sharp decline in asset prices eventuates (bubble bursting), non-performing loans (NPLs) of banks will accumulate as the market value of their collateral declines. Thus, sharp declines in asset prices are a good indicator of impending banking crisis.

Measures to discourage lending booms include firstly the sterilization of capital inflows. The dismantling of capital controls is usually associated with capital inflows, which can be a source of lending boom unless effective sterilization measures are in place. Sterilization is the practice of a government issuing domestic currency denominated government bonds to absorb excess liquidity introduced by foreigners' inward capital investments. However, effectiveness of sterilization depends on the depth of government debt markets, which is lacking in most of the emerging markets. Alternatively, governments can raise reserve requirements to absorb excess liquidity. However, this has the effect of adversely affecting efficient and weak banks as a whole and is inappropriate under a deregulated environment.

Contagion of financial crisis

Due to financial integration, a banking crisis in one country may spill over to other countries in the same region. Empirical evidence suggests a higher level of international linkage amongst advanced markets since 1987 and since 1997 for East Asian markets. However, through market deepening, the adverse effects of volatility spillovers can be diminished.

4. Current Global Financial Crisis

4.1. Important factors of the sub-prime crisis

The important factors that played a vital role in the creation of the bubbles and their subsequent collapse include:

1. Record low interest rate in the U.S. following the 9/11 event which led to easy credit availability in the U.S.
2. Housing sector boom fuelled by low mortgage loan rates.
3. Increase in global demand for U.S. securities that led to supply of funds to the Wall street.
4. Unregulated mortgage industry that was dominated by small to medium size mortgage originators who made 'liar' loan to sub-prime customers.

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growth rates and a reliance on bank credits for corporate financing in many of the emerging markets provided a very attractive alternative to the overcrowded and less profitable intermediation markets in advanced economies. Upon liberalization of their banking sectors, multinational banks entered these markets leading to substantial capital inflows, which in most cases were concentrated in speculative segments of the economy and that ultimately led to lending booms.

5. Unregulated investment activities of investment banks who packaged and sold CDO's based on MBS's
6. Lowering of the ratings standards on CDO's by the ratings agencies

4.2. Mechanics of MBS and CDO

Mortgage loans represented one of the safest forms of assets for commercial banks and the most important asset class for the purpose built institutions such as Freddie Mac and Fannie Mae in the U.S. The housing prices in the U.S. traditionally had shown steady growth rates for many decades and had been consistent with those of household income growth rates. In this environment of (moderately) rising housing markets, lenders face little risk as loan defaults can be handled by the foreclosure sales of the affected properties that would bring in sufficient funds to more than cover the loan defaults.

Traditionally, small to medium size mortgage lenders (originators) originate loans and sell them to Freddie Mac and Fannie Mae (FM&FM) and investment banks, and make more loans using the proceeds of the sales. FM&FM then package these mortgages that generate constant monthly cash inflows (interest payments) and sell shares in these packages (Mortgage Backed Securities) to institutional investors. FM&FM controlled this multi-trillion dollar MBS market and they dictated strict conditions on the mortgages they would buy. So, in order to sell their mortgage loans mortgage originators were forced to apply these though lending standards so as to ensure the borrowers' ability to replay– checking loan applicant's job, job security, current assets, character, credit history, history of tax returns, etc. The credit risk analysis is labour and time intensive and used to take up to 90 days per application. Anyone other than prime applicants who can afford down payments on the loan and showed capacity to repay would be denied a loan. Therefore sub-prime loan market didn't exist during the domination of the market by FM&FM.

Investment banks also participated in the MBS market and they went one step further and created Collateralized Debt Obligations (CDO) that are essentially shares in packages of different MBS's. The share of the Wall street in the MBS market was very small until late 2002.

> MO makes loans → FM&FM buy the mortgages and create MBS → Institutional investors buy these shares in MBS.

The MBS was popular with institutional investors because of the relatively high yields and low risk and this was made possible by the sound lending decisions by the mortgage originators that kept loan defaults to a minimum and buoyant housing sector since 2001 thanks to the low interest rate environment.

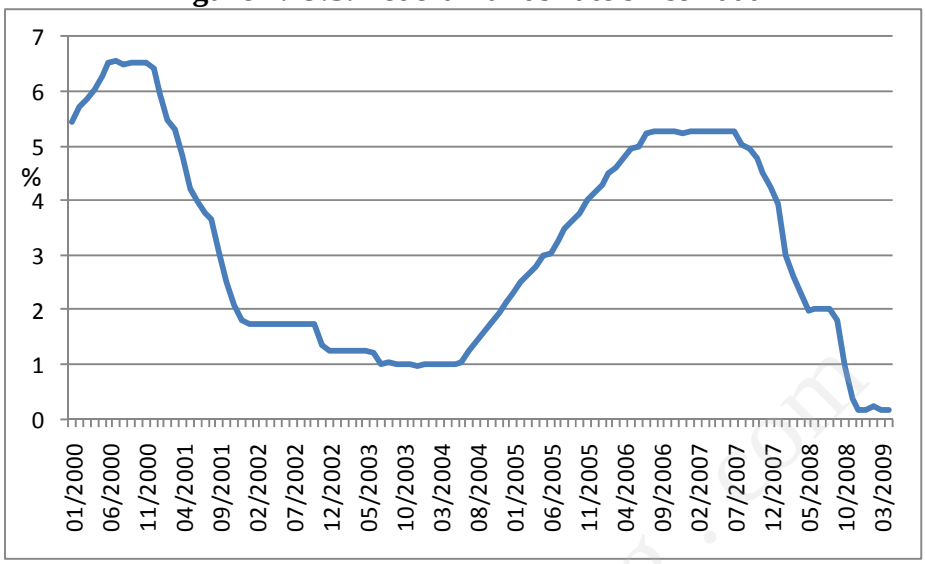
4.3 The housing market bubble and sub-prime mortgage

<u>Setting the scene</u>

In the wake of both the "dot-com" bust and the terrorist attacks of September 11, the United States had fallen into recession. In order to stimulate growth in the economy and end the recession, the U.S. Federal Reserve lowered interest rates to 1%, which was a level that had not been seen since the 1950s and 1960s (see Figure 2). The Fed, in their bid to create

economic growth, chose to maintain an environment of lower interest rates for much longer than had historically been done in prior recessions.

Figure 2: U.S. Federal funds rate since 2000



This low-rate environment had three main effects that contributed to the global financial crisis. First, investors who had traditionally purchased safe U.S. Treasury securities now found that the yields on these securities were too low for them to be attractive as investments. These investors were typically pension funds, insurance companies, sovereign funds, mutual funds, and so on. This led to an environment where there was surplus capital seeking a safe investment alternative with higher yields than government securities. Second, the low rates allowed the banking sector to borrow cheaply and increase their total leverage. This effect was further compounded by cheap credit from foreign sources such as China, Japan and the Middle East. Third, the low-rate environment led to a surge in housing investment.

Investment in housing in the United States had been rising with the stock market during the late 1990s, and property prices had begun increasing on a real, after-inflation basis. After the bust in equities, the presence of cheap credit permitted an ever-increasing number of families to either refinance their existing mortgages, to expand their property asset portfolios, or to enter the property market for the first time.

Many families obtained their loans through mortgage brokers, who took a commission for connecting the household borrowers with large lending institutions or through mortgage originators. In most cases, these lenders then on-sold these mortgages to FM&FM and to a less extent investment bankers on Wall Street, and also took a fee for doing so. In the absence of a significant yield on government securities, Wall Street had realized that the appetite of the market for safe, higher-yielding investments could be filled with investments derived from mortgage payments and were drooling on the prospects of further MBS business. Historically, default rates on residential mortgages in the United States were very low, and so investments based on these mortgages were deemed to be safe also. An MBS is an example of how FM&FM and investment bankers were able to structure these mortgages into an investment product. First, the lenders used their ability to borrow cheaply to purchase large numbers of mortgages at once. The mortgage payments were used to pay down the debt that the banks had taken in order to purchase the loans. Second, the lenders then pooled (i.e. combined) these mortgages together in special purpose vehicles (separate legal entities) based on their perceived risk characteristics and return profiles. By combining large numbers of

mortgages together, the potential default of any one loan (or small subset of loans) would have a minor impact on the value of the pool of mortgages. Third, investment bankers then collected a slice from each of many MBS's and then created yet another packaged security, a Collateralized Debt Obligation. Fourth, using financial engineering techniques, the banks created different levels of possible investment in the pool of mortgages, which were then sold to investors as fixed income securities.

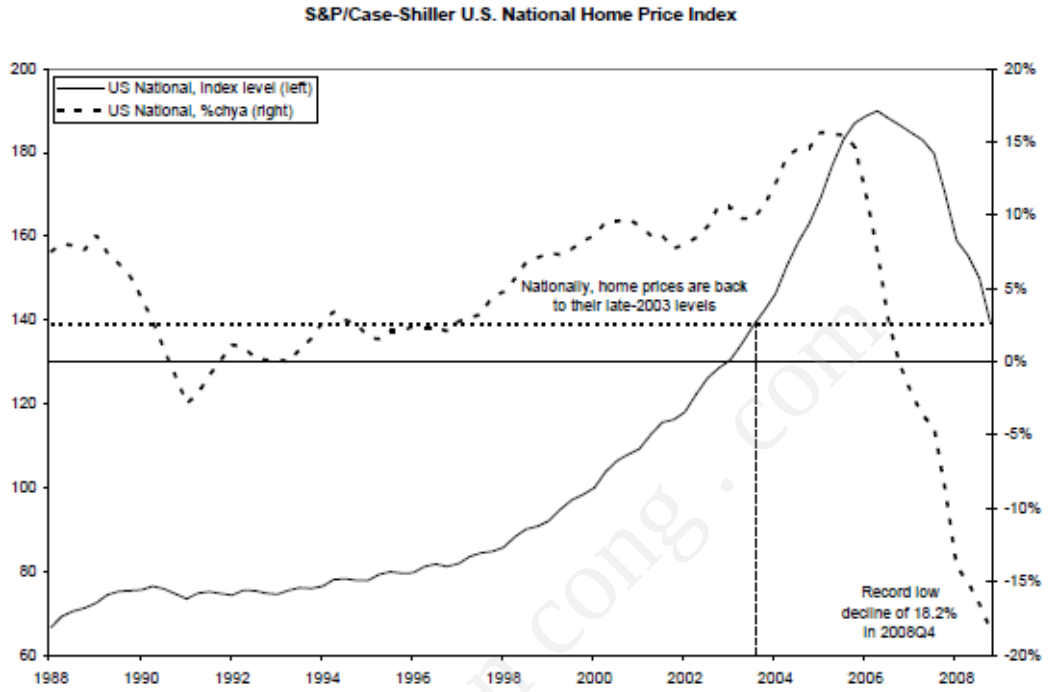
These different levels of a CDO are known as "tranches", and were ranked based on their riskiness. The junior tranches are the riskiest, but also offer the highest rate of return. In the event of a sufficient number of defaults in the mortgages that back the CDO, the junior tranches no longer receive their income, whereas the more senior tranches continue to be paid. The most senior tranche of a CDO is the safest, also but offers the lowest rate of return. In order to achieve a AAA rating for the senior tranche from the various rating agencies, the banks would insure the senior tranche against some of the default risk in the underlying securities through the use of Credit Default Swaps (CDS). Furthermore, in the event of default, the bank would foreclose on the loan, offer it up for auction, and recover its value. This most senior of tranches was then marketed to the same investors that were looking for a safe alternative to investing in the low-yielding U.S. Treasury securities. Given the insurance and the low rate of historical defaults in the U.S., this marketing strategy proved very popular with these investors and the demand for such investments grew. However, this increase in demand soon outstripped the supply of quality (or "prime") mortgages that were available for purchase and subsequent pooling into CDOs.

The role of the investment banks was relatively unimportant compared to the volume of MBS's generated by FM&FM. However, during the period of 2003-2004 both of these companies were involved in damaging accounting scandals that led to the departures of their top managements which left them paralyzed. Their demise in the MBS market presented a golden opportunity for the Wall street investment banks. They took over the rein and started to dominate the MBS and CDO markets. New mortgage originators and brokers saw substantial unmet demands for mortgage loans from sub-prime borrowers. The new breed of mortgage originators did not wish to abide by the FM&FM's stringent lending guidelines found investment bankers easy buyers of their mortgage loans. They started to target aggressively sub-prime borrowers and the normal process of credit analysis was completely ignored. The so called 'liar loans' were issued to borrowers who had no or insufficient income and bad credit scores. Borrowers were required only to state their income (stated income rather than verified income) and often mortgage lenders overstated the applicants' income without their knowledge. Loans were issued to people without a deposit, without proof of income, and without other documents that would normally be required for a loan application to be accepted. Despite being of much lower quality and of much higher default risk, these low quality (or "sub-prime") loans were still accepted by Wall Street. The lending activities of the mortgage originators were unregulated and so there were no measures in place to discourage sub-prime lending.

The investment bankers structuring the CDOs knew that house prices in the United States had historically risen and predicted that this would continue. Therefore, in the event of default of some of the mortgage loans underlying the CDO, the bank would once again foreclose on the loan and auction the property off to recover their value. It was believed that, due to the property market boom, the value recovered from the auctioned property might in fact exceed the value of the loan. This further reduced the risk of the process, which encouraged Wall Street to seek more mortgage assets to pool into CDOs, lenders to make more sub-prime loans, and mortgage brokers to find more sub-prime loan candidates. Each of these parties made their profits from the fees that they took at the different stages of the process. As the mortgage loans to sub-prime borrowers increased rapidly so did the excess

demand for houses which resulted in further sharp rise in hose prices in the U. S. (See Figure 3).

Figure 3: U.S. house price index



Source: http://www2.standardandpoors.com/spf/pdf/index/CSHomePrice_Release_022445.pdf

This process was helped by the rating agencies who competitively lowered their standards for issuing their top ratings and most of the CDO's issued by investment banks received the top ratings despite them being based on sub-prime mortgages.

In the face of the prospect of continuously rising housing prices and the Wall street's appetite for mortgages regardless of the underlying risks led to the excessive use of home equity lines of credit by home owners. Mortgage borrowers regularly refinanced their loans and increasing home equity due to rising house prices allowed them to withdraw funds against their home equity. Home owners used their homes as an ATM and in 2004 a total of 900 US$ billion was withdrawn. This led to further stimulations in domestic spending.

Start of the collapse

This inevitably led to a scenario where large numbers of families, who would not normally have been granted housing finance, began to default on their mortgages and walk away from the properties. The banks, as either holders or representatives of the CDOs, foreclosed on the loans as intended and placed the properties up for auction. However, given the large number of properties that began appearing on the property market at once, housing supply exceeded demand and the market values of these properties consequently began to fall. There was sufficient excess supply that the investment banks holding the CDOs were unable to recover the full value of the mortgages that backed them, which wiped out not only the junior tranches, but in some cases the senior tranches also. As more sub-prime families defaulted on their mortgages, the slump in the housing market grew, which in turn led to large losses on CDO instruments for their investors.

Mortgage defaults spread from those who were unable to pay their mortgage payments to those that were financially capable of doing so. The families behind these mortgages may have taken out a mortgage of several hundred thousand USD in order to purchase their house and property. Although still able to meet the repayments, the value of their property may have dropped to below one hundred thousand USD due to the slump in housing prices. Rather than continue to pay down a loan worth much more than the value of their home, these borrowers now had an incentive to default and seek alternate, cheaper accommodation. This further exacerbated the problems of the housing market, helping to turn a slump into a crash, and leading to massive write-downs on the value of CDO investments by their holders.

Upon realizing that their past CDO purchases were souring, the pension funds, insurance companies, sovereign funds, and mutual funds that had typically invested in them stopped doing so. This left many investment banks with pools of mortgages they were unable to sell on to other investors. As noted earlier, these banks had highly leveraged themselves in order to purchase the mortgages in the first instance. The increasing default rates and the decreasing property values, however, led to a situation whereby it became questionable as to whether the banks still holding these CDOs would be able to make payment on the loans that they themselves had taken out. Fear increased within the financial markets, and banks ceased lending to each other on the concern that their counterparty bank would be unable to make payment on the loans. As banks hoarded their own cash and ceased lending activities to each other, lending to non-financial corporations also slowed. This in turn led to a slowing in the economy that became known as the "Credit Crunch" and eventually the "Global Economic/Financial Crisis". Another contributor to the crisis was the accounting rule known as marking to market of assets. This required necessary adjustments of asset values to current market values. Holders of CDO's were forced to reduce the value of their CDO holdings as the market values of houses that formed the asset packages collapsed. This led to a sharp reduction in capital adequacy ratios of many banks putting them at risk of insolvency.

As noted previously, the senior tranche of mortgage-backed CDOs were usually insured to some extent against default through the use of Credit Default Swaps. The CDS is a derivative instrument that typically requires the holder (buyer) to pay a regular insurance premium to the writer (seller) over the life of the swap. In the event of a default in the underlying mortgage securities, the CDS writer pays to the swap holder a large, one-off amount that the underlying debt security was insured for. Although acting as credit risk protection for the holder of mortgage securities, a CDS also allows speculative positions to be taken on the credit market, which further facilitated the spread of the sub-prime mortgage crisis. The writer of a CDS essentially bets that there will be no default, and that they will continue to receive their regular premium income from the holder of the CDS. For a given mortgage with a face value of $200,000, there is no limit to the potential amount of 'insurance' that has been written covering this contract. This permits bets to be placed on the mortgage market that are many times in excess of the value of the underlying securities.

Firms that wrote many such contracts, such as American International Group and Lehman Brothers, did so in the belief that the premiums received from contracts written across a broad range of underlying mortgage securities would be sufficient to cover the required payouts in the event that some number of those securities defaulted. However, as default rates climbed systematically across the entire U.S. economy, the premiums became inadequate to cover the payouts. Among other failures, this led to the bankruptcy of Lehman Brothers and the government takeover of American International Group, which further exacerbated the lack of confidence within the financial markets and that threatened it with total collapse.

On the other side of the equation, some hedge funds directly benefitted from the collapse of the housing market by investing heavily on CDS's on CDO's. They were able to collect the difference between the market values and the full face values of the underlying mortgages as a cash settlement.

Process of the U.S. financial crisis

Housing market bubble collapse → defaults on sub-prime loans → Accumulation of NPLs of Banks, accumulating losses for CDS sellers, accumulation of losses on CDO's → Bank (both commercial and investment) insolvencies → Contagion to European banking system → credit squeeze, malfunctioning money markets, financial market failure → more general economy wide crisis.

4.4 Lessons to be learnt

The most important failing of the system in the run up to the sub-prime crisis was the lack of understanding of the underlying risk of the financial engineering products of CDO's and CDS's. Even the former chairman of the Fed Greenspan admitted that he did not have a full understanding of the risks involved for a CDO.

In addition, the two most important players in the process were unregulated. The Wall street investment bankers who replaced FM&FM from 2004 as the buyer of the most of the mortgages didn't enforce the same level of stringent requirement on the mortgages due mostly to the explosion in demand for CDO's they issued from international as well as the U.S. investors. Mortgage originators practiced indiscriminate lending and the Wall street investment bankers purchased these mortgages to satisfy the needs for more CDO's.

The CDS market was also unregulated. A CDS is essentially an insurance product. However, instead of the usual 30% asset backing required for the contingent event, CDS sellers set aside only 3-5% so that the sellers can issue more CDS's given current cash reserves.

During boom periods of low interest rate, easy credit availability, booming economic conditions and financial markets, it is difficult to distinguish the good risk from the bad. However, the toxic combination of increasingly complex nature of the MBS and CDO markets, the increasing demand for such products and the unregulated nature of the markets involved including the mortgage origination market led to the excessive risk taking by all participants involved.

However, all of these excessive and aggressive mortgage lending to sub-prime markets and thus the creation of the housing bubble would have been avoided had there been strong and explicit regulation on mortgage lending. Introduction and enforcement of the 'ability to pay' principle which requires a careful credit risk analysis instead of relying on applicants' 'stated income' would have prevented the creating of the bubble in the first place. This highlights the need for an effective regulation that provides a control for uncontrollable human greed.

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Review Questions

1. Briefly explain the functions performed by commercial banks in the economy.

2. What are the characteristics of banking that help explain their vulnerability of a sharp rise in systemic risks.

3. Briefly list and explain the consequences of the banking crisis.

4. Why are emerging market banking sectors more vulnerable to banking crisis and it consequence more severe?

5. Explain the link between bank lending booms and banking crisis. What are the measures to stop this?

6. Explain the consequences of government involvements in lending decisions and connected lending.

7. Outline the link between the accumulation of NPLs of banks and insufficient accounting reporting standards.

8. Why is the choice of exchange rate regime for emerging economies so important in understanding banking crisis?

9. Are banking crisis more common in financially liberalized economies than heavily regulated banking sector? Explain your answer with an example of a recent banking crisis.

10. Outline the factors that contributed to the U.S. sub-prime crisis.

11. Briefly discuss the role of the Wall street investment banks and the Collateralized Debt Obligations in the U.S. sub-prime crisis.

12. “Advanced banking systems are unlikely to experience episodes of banking crisis as banks in these systems are capable of effectively managing various inherent risks associated with their operations.” Discuss.