

An Overview of the Crisis:  
Causes, Consequences and Solutions\*

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**Abstract**

What caused the crisis? Initially many thought that it was due to incentive problems in the U.S. mortgage industry. However, after the large economic meltdown following Lehman Brothers' bankruptcy in September 2008, it seems that much more was going on. We argue that there was a bubble in real estate prices in the U.S. and a number of other countries. The main causes of the bubble were loose monetary policy, particularly by the U.S. Federal Reserve, and global imbalances. The combination of cheap credit together with the easy availability of funds contributed to create the bubble. Many other factors such as subprime mortgages, weak regulatory structures, and high leverage in the banking sector exacerbated the effects of the crisis. We consider possible reforms aimed at minimizing the occurrence of future crises in the governance structure of central banks, measures to reduce global imbalances, and changes in banking regulation.

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## 1. Introduction

As Carmen Reinhart and Kenneth Rogoff remind us in the title of their book, *This Time is Different: Eight Centuries of Financial Folly*, financial crises are nothing new (Reinhart and Rogoff 2009a). However, they often come as a surprise to many people because in most countries they appear only periodically. The current crisis has come as a particular shock partly because it has been over seventy years since the Great Crash of 1929 and the Great Depression that followed. There have been crises in many other parts of the world in the last few decades. Many of these were in emerging or middle income countries such as Argentina, Mexico, and Turkey, but not all. The crises in Japan and in Scandinavia in the 1990's stand out as being particularly severe. However, they had little impact on U.S. policymakers and institutions. For example, after Sweden's Riksbank started to publish a Financial Stability Review, about forty other central banks followed their lead. One notable exception was the U.S. Federal Reserve.

This paper considers the causes and consequences of the crisis started in the summer 2007 and how the financial system should be reformed in terms of institutions and regulations to prevent such damaging episodes in future. Despite its severity and its ample effects, the current crisis is similar to past crises in many dimensions. Reinhart and Rogoff (2008a, 2008b, 2009a, 2009b) document the effects of banking crises using an extensive data set of high and middle-to-low income countries. They find that systemic banking crises are typically preceded by credit booms and asset price bubbles. This is consistent with Herring and Wachter (2003) who show that many financial crises are the result of bubbles in real estate markets. In addition, Reinhart and Rogoff find that crises result, on average, in a 35% real drop in housing prices spread over a period of 6

years. Equity prices fall 55% over 3 ½ years. Output falls by 9% over two years, while unemployment rises 7% over a period of 4 years. Central government debt rises 86% compared to its pre-crisis level. Reinhart and Rogoff warn that the global nature of this crisis will make it far more difficult for many countries to grow their way out.

A thorough overview of the events preceding and accompanying the current financial crisis is provided in Adrian and Shin (2009), Brunnermeier (2009), Greenlaw et al. (2008), and Taylor (2008). The seeds of the crisis can be traced to the low interest rate policies adopted by the Federal Reserve and other central banks after the collapse of the technology stock bubble. In addition, the appetite of Asian central banks for (debt) securities contributed to lax credit. These factors helped fuel a dramatic increase in house prices in the U.S. and several other countries such as Spain and Ireland. Taylor (2008) documents that these were the countries where monetary policy was loose according to standard measures. In 2006 this bubble reached its peak in the U.S. and house prices there and elsewhere started to fall. Mayer, Pence and Sherlund (2009) and Nadauld and Sherlund (2008) provide excellent accounts of the developments in the housing market preceding the crisis.

The fall in house prices led to a fall in the prices of securitized subprime mortgages, affecting financial markets worldwide. In August 2007 the interbank markets, particularly for terms longer than a few days, experienced considerable pressures and central banks were forced to inject massive liquidity. Conditions in collateralized markets also changed significantly. Haircuts increased and low quality collateral became more difficult to borrow against. The Federal Reserve and other central banks introduced a wide range of measures to try to improve the functioning of

the money markets. During the fall of 2007, the prices of subprime securitizations continued to fall and many financial institutions started to come under strain. In March of 2008 the Federal Reserve bailed out Bear Stearns through an arranged merger with J. P. Morgan. Public funds and guarantees were required to induce J. P. Morgan to engage in the transaction.

Although the financial system and in particular banks came under tremendous pressure during this time, the real economy was not much affected. All that changed in September 2008 when Lehman's demise forced markets to re-assess risk. While Lehman's bankruptcy induced substantial losses to several counterparties, its more disruptive consequence was the signal it sent to the international markets that credit risk in the banking sector and financial industry was a serious concern. Reassessing risks previously overlooked, investors withdrew from the markets and liquidity dried up.

In the months that followed and in the first quarter of 2009 economic activity in the U.S. and many other countries declined significantly. Unemployment in the U.S. and a number of other countries rose dramatically as a result. The general consensus is that the crisis is the worst since the Great Depression.

In what follows we analyze in more detail the causes and consequences of the crisis as well as the need for a series of reforms in the financial system. In particular, we start discussing the causes of the crisis in Section 2 and we focus on the real estate bubble in Section 3. The effects of the crisis on the real economy are analyzed in Section 4 and those on the financial system in Sections 5 and 6. Section 7 considers the role of banking regulation in the current crisis while Section 8 considers how the crisis will evolve. Section 9 considers reforms to limit risk taking in the public sector, Section 8 looks at

how global imbalances can be reduced, and Section 11 looks at other key reforms.

Finally, Section 12 concludes.

## **2. What caused the crisis?**

From August 2007 until September 2008, there was fairly wide agreement that poor incentives in the U.S. mortgage industry had caused the problem. According to this explanation what had happened was that the way the mortgage industry worked had changed significantly over the years. Traditionally, banks would raise funds, screen borrowers, and then lend out the money to those approved. If the borrowers defaulted, the banks would bear the losses. This system provided good incentives for banks to carefully assess the creditworthiness of borrowers.

Over time, that process changed and incentives were altered. Instead of banks originating mortgages and holding on to them, brokers and also some banks started originating them and selling them to be securitized. This process is termed the “originate to distribute model.” The originators, the brokers and the banks, were paid based on the number of mortgages that they approved so their incentives were to approve as many mortgages as possible. Since they were selling them off, it wasn't their problem in the long run if the borrowers defaulted.

The second stage in this new originate to distribute mortgage system was securitization. The entities that undertook securitizations such as investment banks would pool a whole set of mortgages together. These would be taken from across the country so they would have good risk properties in terms of diversification. The securitizing investment bank would then tranche them so that the risk was spread differentially, depending on the

particular tranche owned. The buyers of the most junior tranche would be allocated any default losses first. Then as more losses were accumulated these would exhaust the lowest tranche and start to be allocated to the next most senior one and so on up the seniority chain. There would have to be a large amount of losses before the most senior ones would bear any losses so they were regarded as fairly risk-free and were rated triple-A. More junior tranches had lower ratings.

Initially with this new system, the most junior tranches were retained by the investment bank or other entity doing the securitization. If there was a problem, they would be hit first. The reason for this was to provide good incentives to those doing the securitization to ensure that the originations and the subsequent sale were done properly. Increasingly what happened, though, was that all tranches were sold off, including the junior ones. This took away the incentives for the financial institutions doing the securitization to check that everything was done properly. In a careful empirical study, Purnanandam (2009) found that mortgages that were originated under the new originate to distribute model were of significantly lower quality than those originated under the traditional system where they were held on the originating bank's balance sheet.

Another important incentive issue concerned the ratings agencies. Since buyers of the tranches used ratings as part of the input to their decisions, an important question was whether the ratings agencies were checking the process properly. Many argue that they were not because they began to receive a large proportion of their income from undertaking ratings of the securitized products. The suggestion is that they started to lose their objectivity and to give ratings that weren't justified.

According to the mortgage incentives view of the crisis, the whole procedure for checking the quality of the borrowers, and the mortgages underlying the securitizations broke down. This view of the world suggested that it would be fairly simple to solve the crisis and stop it from reoccurring. If the government regulated the mortgage industry to ensure everybody had the correct incentives, then this would prevent the problem in the future.

It seems from the statements of the Federal Reserve and the Treasury at the time that initially this was the view that they took. However, as the crisis continued and in particular after the default of Lehman, the dramatic collapse in the global real economy made this view that subprime mortgages were mainly to blame less and less plausible.

At the end of 2008 and beginning of 2009 the economies in many countries in Asia and in Europe were drastically affected even though their banks had very little exposure to U.S. securitizations and remained strong. In Japan, for example, GDP fell by around 4 percent in the first quarter of 2009. Less extreme drops in industrial production and GDP than those experienced in Japan were occurring all over the world and the world economy began to gradually seize up. As this happened it became much more difficult to believe that what caused all of this was an incentive problem in the U.S. mortgage industry. What was going on then?

### **3. The real estate bubble**

We shall argue that the basic problem that caused the crisis was that there was a bubble in real estate in the U.S. and also in a number of other countries such as Spain and Ireland. What happened is that the bubble burst, and this caused the huge problems in the securitized mortgage market and in the real economy. The bubble was large and global in

many ways. In 2005 *The Economist* surveyed the widespread increase in property prices and warned:

[T]he total value of the residential property in developed economies rose by more than \$30 trillion over the past five years to over \$70 trillion, an increase equivalent to 100% of those countries' combined GDPs. Not only does this dwarf any previous house-price boom, it is larger than the global stock market bubble in the late 1920s (55% of GDP). In other words it looks like the biggest bubble in history.<sup>1</sup>

Figure 1 shows the Case-Shiller 10-city index since 1990. The figure illustrates the dramatic acceleration in house price increases in the early 2000s and their fall since July 2006. Figure 2 shows the year-on-year change in this index.

The next question is: What caused the bubble? We argue that there were two main causes. The most important reason that the bubble was so big in the U.S. was the policies of the Federal Reserve back in 2003-2004. What they did to avoid a recession after the collapse of the tech bubble in 2000 and the 9/11 terrorist attacks in 2001 was to cut interest rates to the very low level of one percent. Taylor (2008) has argued that this was much lower than in previous U.S. recessions relative to the economic indicators at the time captured by the "Taylor rule". During this period housing prices were already rising quite rapidly. For example, it can be seen from Figure 2 that the Case-Shiller 10-City composite index was growing at a rate above 8 percent throughout this period. The Federal Reserve created a significant incentive for people in many parts of the country to go out and borrow at one percent and buy houses going up at much higher rate. In addition there were various other public policies that made it advantageous to buy. These included the tax advantages of being

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<sup>1</sup> "In come the waves," *The Economist*, June 16, 2005.



able to deduct interest on mortgages compared to the non-deductibility of rent payments, plus a number of other policies to encourage poor people to buy houses. All these factors created a large demand for houses that led to increases in house prices as shown in Figure 2. Even when the Fed eventually started to raise interest rates in June of 2004, it was still worth borrowing because house prices continued to rise at a rate above 8 percent until 2006 as shown in Figure 2. Thus the Fed's low interest rate policy was the first factor that really caused prices to take off.

The U.S. was not the only country that experienced a bubble in property prices. Spain and Ireland also had very large run ups in property prices. Taylor (2008) argues that these countries also had loose monetary policies relative to the Taylor rule. He points out that Spain, which had the largest deviation from the rule, also had the biggest housing boom as measured by the change in housing investment as a share of GDP. Other countries in the Eurozone such as France and Germany did not have a housing boom because their inflation rates and other economic indicators were such that for them the European Central Bank's interest rates did not correspond to a loose monetary policy.

Loose monetary policy was not the only factor. As Allen and Gale (2000, 2007) have argued, growth in credit is important for asset price bubbles. The second important element in addition to low interest rates in the U.S. was global imbalances. These helped cause a growth in lending in the countries with loose monetary policy.

Why are there global imbalances? This is a complex issue. However, we will argue that an important factor was the Asian Crisis of 1997. Many Asian economies, which had done very well, like South Korea, Thailand, and Indonesia, fell into serious difficulties. In the case of South Korea it was because its firms and banks had borrowed too much in foreign

currency. They turned to the International Monetary Fund (IMF) for help to see them through these difficult times.

In exchange for providing financial assistance, the IMF required South Korea to raise interest rates and to cut government spending. That is the exact opposite of what the U.S. and Europe have done when faced with a very difficult crisis. One potential reason why this happened is that the IMF is a European and U.S. dominated institution. The head of the IMF up to now has always been a European while the head of the World Bank has always been an American. Asian countries are not represented at the highest levels. That was part of the arrangements that were made when the Bretton Woods agreement was negotiated at the end of the Second World War (even though it is not explicitly stated anywhere in the treaty), when Asian countries were not as important as today in the world economy. The Asian countries did not have much weight in the governance process and their quotas (i.e. effectively their shareholdings) were small. All this implied that when the IMF imposed harsh policies on the Asian countries at end of the 1990s, there was no effective mechanism for these countries to protest and argue that they had fundamentally sound economies.

The consequence was that many Asian countries such as South Korea realized they had to become economically independent so that they would not need to go to the IMF to obtain relief from a crisis in the future. To achieve this independence, they accumulated trillions of dollars of assets. Figure 3 shows this accumulation of reserves by Asian countries (here China, Hong Kong, Japan, Singapore, South Korea and Taiwan). In contrast, Latin American and Central and Eastern European countries did not increase their reserves during this period.

The motivation for accumulating reserves of China, which is the largest holder of reserves, is probably more complex than this. First, although they were not so directly affected by the Asian crisis, similarly to other Asian countries, China realized that it would be risky to seek help from the IMF should they need it in the future. Second, and perhaps more importantly, it seems that China started accumulating reserves initially to avoid allowing its currency to strengthen and damage its exports. Over time China's reserves have continued to increase. As of the end of the third quarter of 2009, they stood at the level of \$2,273 billion. This was an increase of \$141 billion or 6.6% over the previous quarter. One reason for this continuing growth is the potential political influence this gives them, particularly with the U.S. China has been increasing its military spending over the last few years. Acquiring such large reserves gives them an alternative means of security.

How were the Asian countries to invest these reserves? One possibility could have been firms' equity. However, it became difficult in particular for the Chinese to buy companies. For example, when the Chinese state oil company CNOOC wanted to buy Unocal in 2005 the transaction was blocked by the U.S. authorities on the grounds that Unocal was a strategic firm. This happened on a number of other occasions. Thus, the Chinese ended up having to invest mainly in debt instruments. They bought a large amount of Treasuries, Fannie and Freddie mortgage-backed securities, and many other debt securities. Similarly, other countries acquiring reserves also invested large amounts in debt securities. It can be argued that the large supply of debt helped to drive down lending standards to ensure that there was enough demand for debt from housebuyers and other borrowers.

Loose monetary policies and the increase in debt instruments available because of global imbalances were in our view two important factors responsible for the real estate bubbles. However, other factors contributed to the bubble. One of these was the yen carry trade. This involves investors borrowing at zero interest rates in Japan and investing somewhere else such as in Australia and New Zealand at much higher rates. The carry trade involved an exchange rate risk, but most of the time it was possible to earn a significant return. There is not much information on how large the outflow of funds the yen carry trade involved but it may well have helped contribute to the rise in property prices in Australia, for example.

#### **4. The effects on the real economy**

Why did the collapse of the bubble create so many problems? The whole global economy went into a downward trend. It can be argued that what went wrong is that people made the wrong decisions for a number of years, based on the assumption that asset prices would remain high and would continue to rise. In the U.S., the aggregate saving rate fell to zero and many people borrowed to finance consumption. The leverage ratios of households, firms, and institutions went up. When the large fall in asset values occurred, people realized they were overleveraged and they had saved too little. They started saving to pay down debt and build up their assets.

The problem was because there had been a bubble for some time, the real value of assets became very uncertain. For example, stock prices were very volatile. In these circumstances, it became difficult for people to estimate how much their stock was worth in the long run. At the start of 2009, it would not have been surprising if the stock market went

up 50 percent in the next few months. It also wouldn't have been surprising if it went down 50 percent.

Another example of price volatility was provided by commodities. In the summer of 2008 oil was trading at \$147 dollars a barrel. Then the price went down to around \$40 in a short space of time. This volatility made decision making very difficult. For example, should individuals buy a fuel efficient hybrid car that costs significantly more, or rather something less fuel efficient but cheaper on the assumption that oil prices were going to be low in the long run? Firms faced similar problems in making their investments.

In addition to the uncertainty about stock prices and commodity prices, exchange rates were also very volatile. In the summer of 2008, the pound sterling was over \$2. Then it went down to \$1.40. The Euro was at \$1.60 then. It went down to about \$1.25 before rising again. This movement in exchange rates contributed to the general uncertainty and to the slowdown of any economic activity.

To summarize, it was very difficult for anybody trying to make long run economic decisions because of the great uncertainty about future price levels, both in the short and the long run. In our view, this was one of the main factors that chilled the global economy. This was true for consumers as well as for firms. That is why sales of consumer durables like cars and investment goods like machine tools stalled in many countries. Since these represented a large proportion of exports and imports, world trade collapsed.

## **5. The effects on the financial system**

Of course, price uncertainty was not the only problem. Another major cause of the economic difficulties lay in the problems encountered in the financial system and the

interaction between the real economy and the financial system was particularly damaging. Let us next focus on the financial system. The crisis started in the summer of 2007 with the meltdown in subprime mortgages as discussed above. This caused a major problem because these mortgages were held by institutions that are badly hurt by asset price falls. When individuals hold stocks in a mutual fund for their retirement, it is not such a large problem if there is a significant fall because on average the money is not needed for many years. However, the mortgages were held in institutions with mainly debt liabilities. Many of them were held in investment banks or structured investment vehicles (SIVs) that were financed to a large extent by rolling over short-term debt. As soon as prices fell, there was a significant problem because lenders didn't know whether they were going to be paid back. The problems started in securitized subprime mortgages but then spread to many other parts of the financial system.

These credit risk problems led to a flight to quality with many people wanting to buy government securities. In response to this great desire for high grade securities, central banks introduced many programs to essentially allow financial institutions to swap a wide range of securities for Treasuries. As a consequence, the Federal Reserve's balance sheet expanded from about \$800-\$900 billion before the start of the crisis to about \$2,000-\$2,500 billion during the crisis.

To summarize, there were two basic problems. The first is that there was great uncertainty concerning the value of assets and people did not know the prices that should be guiding long term economic decisions. The second problem was that the financial system faced enormous difficulties because of the short term financing structure of many of the financial institutions where a large proportion of debt instruments were held.

## **6. Why did the financial system perform so poorly?**

The financial services industry is the most regulated sector in practically all economies. In the U.S., the Federal Reserve, the Office of the Comptroller of the Currency (OCC), the Securities and Exchange Commission (SEC), The Federal Deposit Insurance Corporation, and a number of other regulatory bodies are responsible for regulating the financial sector. What happened? Why did things get so out of control? Why did this crisis come as such a surprise to regulators?

The first important point is that banking regulation is very different from other kinds of regulation. For example, with environmental regulation there is wide agreement that the basic problem is one of a missing market. If a firm pollutes, it does not have to compensate the people who are damaged. That missing market means that without any controls or regulations, there is a lot of damage done to the environment. Given this, it is possible to come up with the best ways to control pollution such as quantitative controls or trading permits. Antitrust is another important area of regulation. There the problem is monopoly. It is necessary to make sure that firms aren't monopolistic and everybody agrees that this is the problem.

With banking regulation, the problem that is being solved is not clear. Is the problem one of panics, future deterioration in the value of assets, contagion or what? In fact, there is no wide agreement that there is even a problem. Many central banks work with dynamic stochastic general equilibrium models that don't include a banking sector. The view underlying these models is that the real economy works efficiently and the financial system is unimportant except for pricing assets (see, e.g., Muellbauer (2009)). Given this initial

prevailing view, it is perhaps not surprising that so many central banks completely failed to predict the crisis.

The current structure of banking regulation is more a series of answers to accidents in the past rather than the implementation of a clear regulatory design. In the Great Depression, the economic situation was so bad that people said, “We have to make sure that this never happens again.” Thus, they adopted a whole range of measures to stop any kind of problem. In the U.S., legislators put in place the Glass-Steagall Act separating investment and commercial banking, they founded the Securities and Exchange Commission (SEC), they put in place all the SEC Acts, and the financial system became heavily regulated. In other countries, regulation was also increased and in some such as France, financial institutions were nationalized. This regulation and government ownership was successful in terms of stopping crises. From 1945 until the early 1970’s, there were no financial crises in terms of banking crises, except for one in Brazil in 1962 that occurred together with a currency crisis (see Bordo et al. (2001)). So it is possible to stop crises by stopping financial institutions from taking risks.

However, the alternative to private institutions taking decisions about risks is basically that the government decides who gets credit. This was done in different ways. Some countries like France nationalized the banks and the government directly made decisions. In the U.S., the government introduced so many regulations that banks couldn't take many risks and so low risk industries were allocated credit. As a result, the financial system stopped fulfilling its basic purpose of allocating resources where they are needed. In the 1970s it became clear how inefficient this was and financial liberalization started in many countries. However, this led to a revival of crises. Since then, there have been crises all



around the world (see, e.g., Boyd, De Nicolo, and Loukoianova (2009)). This historical evolution has led to a set of regulations designed to stop particular problems rather than a well thought out way of reversing market failures in the financial system. Whenever there was a problem, the regulators put in place a regulation.

## **7. Banking regulation**

In order to design effective banking regulation it is necessary to have a clear idea of what are the benefits and what are the costs. The benefit of regulation is that it can potentially stop very damaging crises; but the cost is that the regulation needed to prevent these crises effectively prevents the financial system from doing its task of allocating resources. In turn that slows down growth, innovation and ultimately damages efficiency.

A good example of what happens if there is not a clear idea of the benefits and costs of regulation is the Basel Agreements. It is not clear what problem the agreements are trying to solve from the documents. Similarly, there is no explanation as to why the capital requirement ratios are set at the level they are. It seems rather that they have been set at the ratios that banks had used in the past. Banks and governments have spent billions of dollars designing and implementing the agreements. Not surprisingly, however, the agreements did not prevent the crisis and seem to have had very little effect in reducing its severity.

What are the market failures in banking? There are three main ones in our view.

1. The inefficient provision of liquidity.
2. Persistent mispricing of assets due to limits to arbitrage.
3. Contagion.

We will consider each in turn.

The first problem is inefficient liquidity provision (see, e.g., Allen and Gale (2004); Allen and Carletti (2006) and Allen, Carletti and Gale (2009)). Throughout the current crisis we have seen that the financial markets have not been providing liquidity effectively. That is why central banks have been stepping in and designing many programs trying to provide liquidity to the banking system as well as to individual institutions in difficulty. Going forward it is necessary to have a better understanding of why is it that markets don't provide liquidity properly. The basic problem is that liquidity is costly to hold. The only way to get people to hold it in a financial system without government intervention is if there is significant price volatility. But it is price volatility that causes crises. When prices fall to low enough levels this can bankrupt financial institutions.

The second market failure, which is a very important one, is persistent mispricing of assets due to limits to arbitrage. One of the big issues in the current crisis is how much the mortgage-backed securities, and securitized assets more generally, are worth, since the market does did not seem to price them correctly for long periods of time. If markets are efficient, market prices can be trusted as they reflect asset fundamentals correctly. The basic idea behind market efficiency is that if something becomes underpriced, there is a profit opportunity. Investors can buy the underpriced security and make a profit. That incentive provides the arbitrage mechanism to make sure that prices rise to the correct level. In the crisis this mechanism appears to have broken down. In particular, it seems that there were limits to arbitrage. A good example is what happened in the fall of 2007. The prices of the mortgage-backed securities went down. Some investment banks and hedge funds thought the securities were cheap and bought more. But the problem was that the prices kept on going

down and this caused difficulties for many investors. It became too risky to arbitrage the securities. The mispriced securities became the so-called “toxic assets.”

The same phenomenon of limits to arbitrage occurred in the dotcom bubble: The prices of many securities, particularly those involved with the internet, were too high but investors did not short them. The reason was that if investors had shorted them in 1997 or 1998, when their prices were high, they would have been bankrupted because prices kept on going up. This excessive risk from taking such positions is what we mean by limits to arbitrage. It is necessary to understand these limits much better than we currently do and to have mechanisms for overcoming them so that markets are always efficient and market prices can be trusted.

The third market failure is contagion (see, e.g., Allen, Babus, and Carletti (2009) for a survey). This is the failure that central banks often use to justify intervention, as, for example, in the case of the arranged takeover of Bear Stearns in March 2008. As Chairman Bernanke stressed in his speech at Jackson Hole in August 2008 (Bernanke (2008)), Bear Stearns would have defaulted if the Federal Reserve had not saved it. That would have led to a whole chain reaction where many other financial institutions would have gone bankrupt. There might have been a complete collapse of the financial system. Probably, given the circumstances the financial system was in at the time and the uncertainty about the degree of interconnectedness of Bear Stearns, it was the right decision to save it.

Immediately after the arranged takeover of Bear Stearns, the Federal Reserve opened up the discount window to the investment banks. The *quid pro quo* for this was that they would allow Federal Reserve teams to inspect their books find out their positions. Six months later in September, the Fed had a much better idea of the interconnectedness of these

banks. When it became clear that Lehman Brothers would not survive on its own, the Fed ultimately decided to let it fail as it presumably expected that its failure would not generate the classic kind of contagion. In fact there was contagion but it was quite complex.

The first thing that happened was that Reserve Capital, the oldest money market mutual fund holding a significant amount of Lehman debt, “broke the buck.” In other words, the value of Reserve Capital’s shares fell significantly below the mandated level of one dollar a share. Investors in other money market funds realized that there could be a wave of similar problems and started withdrawing their funds. Within a few days the government was forced to provide a guarantee of all money market mutual funds.

In addition to these direct contagion effects, there were very damaging indirect effects. The realization that the government might allow a financial institution to fail caused a loss of confidence in many financial services firms. The volumes in many important financial markets fell significantly and there was a large spillover into the real economy. Figure 4 shows how GDP fell significantly in the fourth quarter of 2008, particularly in Japan and Germany. This underlines the importance of the process of contagion. At the moment, however, our understanding of the indirect contagion effects is rather limited. A much better understanding of the many different aspects of contagion is needed.

Going forward it is important that banking regulation is structured to solve the market failures that are present in the financial system. It is necessary to understand the best way for central banks to intervene to restore liquidity in crucial markets like the interbank market. Market structures need to be designed to try to make them as efficient as possible so as to avoid extended episodes of mispricing of assets. Finally, regulations have to be designed in

order to minimize the pernicious effects of contagion. Capital regulation appears to have an important role to play in this respect.

## **8. How will the crisis evolve?**

The crucial question now is what is going to happen going forward. One often hears it stated that the recent crisis shares many similarities with the Great Depression. Although this is true in many respects, it is difficult to draw meaningful comparisons as institutions, technologies, and many other aspects were very different in the 1930s from how they are today. Looking at more recent times, the most similar crisis to the current one is the crisis that occurred in Japan in the 1990s. As in the current crisis, Japan experienced an enormous bubble both in stock prices and in property prices. In the mid-1980s, the Nikkei was around 10,000. By the end of the decade in December 1989, the Nikkei peaked at just under 40,000. That was almost 20 years ago and yet in most of 2009 the Nikkei has traded in the range of 7,000 to 11,000. In other words, it was around a quarter to a fifth of where it was 20 years ago. That suggests there was a bubble in 1989.

As for the bubble in real estate, the extreme example is that at the peak of the boom, the few hundred acres where the Imperial Palace stands in Japan had the same value as all the land in Canada or California (see Ziemba and Schwartz (1992), p. 109). Real estate prices fell 75 percent over 15 years. This fall caused enormous problems in the real economy and Japan went from having one of the most successful and the fastest growing economies in the world, to having one of the slowest growing.

The question is whether the burst of the bubble in real estate in the U.S. will have as bad consequences as in Japan. Many people argue that the bubble in the U.S. was not as

large as the one in the U.S. in the sense that there wasn't such an increase in asset prices to the very high absolute levels seen in Japan. Stock prices in many countries fell to around a half of what they were at the peak at the end of 2007. Since then they have recovered substantially. Whether the decline will be a long-lived phenomenon, like in Japan, or just a liquidity problem so that prices return to where they were in a year or two as they did after the crash of 1987 is still unclear.

A number of experts argue that in the U.S. property prices were about 25 percent above trend. Using the Case-Shiller indices property prices were about a third down at the minimum. This does not necessarily mean, however, that the price adjustment is finished and the economy will start to return to normal as it did eventually in Japan. The reason is that Japan has a very different kind of economy. The way that firms and banks are governed and react to shocks is very different from the U.S. In Japan firms are much more stakeholder-oriented so that they don't care so much about the shareholders. They care about the workers, the suppliers and other stakeholders.

There are surveys confirming this view. For example, managers of large companies in Japan, Germany, France, the U.S., and the U.K. were asked what firms should do if hit by an adverse shock. Should firms cut dividends and keep stable employment or maintain dividends and lay off workers? The answers were quite different across countries. Figure 5 shows that in Japan, the vast majority of managers agree that firms should cut dividends and maintain employment in bad times. In Germany and France, it is not quite as extreme, but clear majorities believe that too. In the U.S. and the U.K., it is the complete opposite: even in bad times firms should lay off workers and maintain dividends.

In the last 20 years, this focus on shareholders has worked well for the U.S. and the U.K. because it has allowed resources to be reallocated in the economy very quickly. If resources were being used inefficiently somewhere, they could be transferred to other firms. In Japan in the 1990's and 2000's, the firms weren't able to do that. Similarly, in the European economies resources do not seem to be reallocated very easily. How these two different corporate governance structures will perform in recessionary times though is not clear. Since the start of the crisis, firms in the U.S. have laid off many workers and, as shown in Figure 6, unemployment has increased from 4.7 percent to 10.2 percent. This significant increase in unemployment, and the consequent fear of further unemployment that this triggers, has already had is likely to continue to have serious macroeconomic effects going forward.

How does what happened in the U.S. compare to what happened in the other countries? The aggregate statistics for unemployment in Figure 6 show that U.S. unemployment has gone up significantly more than in the other countries. In Germany, unemployment is little changed from the start of the crisis. Workers do not feel as threatened and their consumption has not fallen as much as in the U.S. A similar pattern has occurred in France. Japan is an interesting case. Although, as mentioned above, the Japanese have traditionally had a great commitment to full employment, a few years ago, they introduced a temporary worker category. All these temporary workers have now been laid off and many have suffered significantly as a result. For example, many lived in company housing that they were forced to leave.

To summarize, focusing on value creation for shareholders works well for the efficiency of the economy in boom times as it facilitates the reallocation of resources to their

most efficient uses. However, in crisis times laying off workers has the potential to create macroeconomic instability. A rapidly rising unemployment rate can cause significant feedback effects. A critical issue when comparing Japan's experience in the 1990's with U.S. experience now is how big these feedback effects will be in the U.S. Japan had a lost decade with slow growth but did not have a large contraction in GDP and increase in unemployment. In the U.S. it is too soon to say how large the feedback effects will be in the end.

### **9. Excessive risk taking in the private or public sectors?**

Going forward, what should governments do to minimize the risk of a future financial crisis? What reforms in addition to changes in banking regulation should be undertaken? There has been a tremendous focus on the private sector and what the private sector did wrong in terms of taking excessive risk. However, if the basic cause of the crisis was the real estate bubble and central banks played a role in creating that, it is really the public sector that took the main risks. If there had not been a bubble in real estate prices there would not have been a problem with subprime mortgages. If property prices had remained stable or continued to rise at a slower rate the default rate would have been at manageable rates. It is therefore important to try to prevent central banks from creating a similar problem going forward. In particular, we need to develop a system that provides a check on central banks to lessen the chance that they take risks in the way that the Federal Reserve did when it set interest rates so low in 2003 and 2004.

After the inflationary experiences of the 1970s, many countries made their central banks independent. The rationale was that if they are independent, they will not succumb to



political pressure to cut interest rates and cause an inflationary boom every time there is an election. This independence has worked very well for preventing inflation. However, this crisis has demonstrated that central bank independence may not be good for financial stability. There are a few people making decisions that are very important and there is very little in the way of checks and balances. For example, it seems that one person, Alan Greenspan, played a large role in the decision to cut interest rates to one percent in 2003 and to maintain them there until 2004 so as to minimize the effects of the recession. According to reports at the time there was not much dissension within the Board of Governors in terms of votes against the position he took. The low interest rate policy worked in the short run, but at the cost of an enormous recession several years later. There should at least have been more public debate about the wisdom of the low interest rate policy at the time.

Another example of the lack of checks and balances relates to quantitative easing. This refers to the action of many central banks, and in particular the Federal Reserve, of creating money to buy back long-term government bonds and other securities. Quantitative easing has not been used much before, and yet there has been very little discussion on its potential benefits and costs. For example, how likely is such a policy to increase inflation? Does it increase likelihood of another crisis, this time perhaps a currency crisis? When it was used in Japan in 1990s, quantitative easing did not solve the problems the economy was facing but neither led to inflation. Probably, though, it led to a larger yen carry trade than would otherwise have occurred.

To illustrate the riskiness of quantitative easing, suppose that after increasing the money supply there is a burst of inflation. Then what the Fed is likely to do is to start soaking up liquidity by selling the bonds that they have bought. However, this may be

difficult. Suppose, for example, the Chinese and other foreign holders of U.S. Treasuries decide to take some of their money out of the U.S. and start increasing their euro and yen investments. It is quite conceivable that in this kind of scenario there will be a run on the dollar and subsequently stagflation. There has been very little public discussion of these risks. There is little in the current governance mechanisms that ensure there is a balanced debate about whether what the Federal Reserve is doing is a good idea. We believe it is desirable to have a better system of checks and balances to restrain risk taking in the public sector.

A good illustration of the deficiencies of the current system is provided by Chancellor Merkel's June 2, 2009 speech in Berlin concerning quantitative easing. She heavily criticized the Federal Reserve and the Bank of England for their programs of quantitative easing arguing that this kind of unconventional monetary policy could sow the seeds of the next crisis. It is highly unusual for a German Chancellor to discuss monetary policy so this was a significant break with tradition. The next day Chairman Bernanke issued a statement that he respectfully disagreed with the Chancellor's views. In subsequent weeks there were stories in the press that there were internal doubts in the Fed about quantitative easing because of the inflation risk. This unusual sequence of events shows that more formal checks and balances are needed to prevent the Federal Reserve and other central banks from taking large risks. The current governance arrangements in the U.S. break with its long tradition of checks and balances within government.

One possible reform is to impose a mandate of financial stability on the Federal Reserve. This might help to ensure the risks involved for financial stability in undertaking

various policies would be more thoroughly discussed and assessed. Ensuring that there is a staff that focuses on financial stability issues may help to achieve this.

Another possibility is to create a Financial Stability Board with its own staff and resources separate from the Federal Reserve that would not be dependent in any way on them. Representatives from this Board could participate in Federal Open Market Committee meetings and could be given several votes. Since their focus would be on financial stability issues they would necessarily focus on the risk created by the public sector. The Federal Reserve would be independent from politicians but there would be checks and balances. We believe some kind of reform along these lines would be helpful going forward.

## **10. Preventing global imbalances**

As mentioned above, the IMF arguably exacerbated the problem of global imbalances through the harsh policies that a number of countries were forced to undertake in the 1997 Asian Crisis. There was no reliable mechanism to stop this because the Asians are underrepresented in the IMF governance process. Today, the Asian countries have become much richer. They are the ones with very large reserves amounting to several trillion dollars. They are the countries with the economic power and this should be reflected also in the governance process of the important international organizations.

In the current crisis Asian countries such as South Korea have done much better than they did in 1997. Rather than raising interest rates and cutting government expenditure as the IMF forced them to do then, South Korea cut interest rates and allowed a large fall in the value of their currency. In contrast to the 1997 crisis when unemployment rose to more than 9 percent, it has only changed slightly in the current crisis. The reason that they were able to

pursue these policies is that their large reserves meant they could make their own decisions and did not have to approach the IMF. They ran their reserves down but they always maintained a large balance.

While it is individually advantageous for countries to self-insure by accumulating reserves, this is an inefficient mechanism from a global perspective. The countries that are accumulating reserves must lower their consumption to do so and there must be other countries that run deficits to offset these surpluses. In practice the U.S. was the main country that did this. The resulting buildup of debt and its role in triggering the crisis meant that this was very undesirable. This raises the question of what are the alternatives to self-insurance through the accumulation of reserves.

The IMF can perform an important role by providing funds to countries that are hit by shocks. If countries could always rely on being treated fairly and equitably and not being forced to implement harsh measures, they would not be a need to accumulate large levels of reserves. In order for this to happen the IMF needs to reform its governance structure so that Asian countries play a much larger role. This should be accompanied by an increase in Asian staff at all levels. Unfortunately, current proposals do not go far enough in this regard and it seems unlikely that the IMF will be sufficiently reformed to make large reserves in Asia unnecessary in the short to medium run.

A number of Chinese officials have made proposals for a global currency to replace the dollar. This kind of approach has the great long run advantage that reserves can be created initially without large transfers of resources and the attendant risk of a crisis. All countries could be allocated enough reserves in the event of a crisis so that they could survive shocks. The problem with this proposal is that there would be a need for an

institution to implement the currency. It would need to be like the IMF. There would again be the issue of whether Asian countries would be properly represented.

A more likely medium term scenario is that the Chinese Rmb becomes fully convertible and joins the U.S. dollar and the euro as the third major reserve currency. With three reserve currencies there would be more scope for diversification of risks and China itself would have very little need of reserves in just the same way that the U.S. and Eurozone countries do not need significant reserves. In our view this is the most practical solution to the global imbalances problem. With the help of the U.S. and Eurozone governments, China should start moving in the direction of making the Rmb fully convertible as soon as possible.

## **11. Other key reforms**

So far we have suggested three important reforms. The first is that banking regulation should be based on a coherent intellectual framework of correcting market failures. The second is that the Federal Reserve and other central banks need to be subject to more checks and balances than is currently the case. The third is that either the IMF needs to be reformed so that Asian countries can rely on being treated better than in the 1997 Asian Crisis or more plausibly that we move towards a situation where the Rmb joins the U.S. dollar and the Euro as the third reserve currency. In this section we consider several other key reforms.

*“Too big to fail” is not “Too big to liquidate”*

One of the most important principles guiding policy during the current crisis has been that large institutions are “Too big to fail.” The notion is that if Citigroup is allowed to fail,

this is going to cause many other institutions to fail all through the financial system. This is the contagion problem discussed earlier. The way that this policy has been implemented is that governments have bought preferred shares and common stock in many institutions that would otherwise have failed. They have made clear that these institutions will be provided with the capital that they need in order to survive.

In our opinion this is the wrong way to deal with the “Too big to fail” problem. As Lehman Brothers’ demise illustrated, contagion is a very real problem and large banks and non-bank financial institutions should not be allowed to simply go bankrupt. However, “Too big to fail” doesn’t mean that we should allow these institutions to survive. It’s a very bad precedent to provide failing banks with the funds they need to survive. In the future, it is likely that banks and other financial institutions will grow and become large knowing that they will not be allowed to fail. These banks will be willing to take large risks since they receive the payoffs if the gambles are successful while the government bears any losses.

However, “Too big to fail” does not mean “Too big to liquidate.” Financial institutions should definitely be prevented from failing in a chaotic way. The government should step in and take them over in order to prevent contagion. But rather than allowing them to continue, these institutions should be liquidated in an orderly manner, even if this may take several years. That would allow the other institutions that didn’t fail and that were well-run to expand and take over the failed institution’s business. Propping up the weak ones that did badly is not a good idea in the long term. It rewards risk taking and, perhaps more importantly, it prevents prudence from being rewarded. Well-run banks that survive should be allowed to benefit.

An important aspect of the scheme needed for the government to prevent contagion by temporarily taking over failing institutions is to have bankruptcy rules for financial institutions that allow the equivalent of prompt corrective action for banks. With a bank, the government can step in before it goes bankrupt and take control. There doesn't have to be a vote of the shareholders. Such a mechanism is needed for all financial institutions. That's what the government should have been able to do with Bear Stearns and Lehman Brothers. This would have prevented the great uncertainty that occurred when they failed.

*Resolution of large complex cross-border financial institutions*

A major difficulty in designing a framework that allows financial institutions to be liquidated is how to deal with large complex cross border institutions. In particular, there is the problem of which countries should bear any losses from an international mismatch of assets and liabilities. This has proved a thorny problem for the European Union in designing a cross border regime to support its desire for a single market in financial services. For countries without political ties like the EU it is an even more difficult problem. Designing such a system is one of the most urgent tasks facing governments.

One possible way to proceed would be to eliminate cross border branching. Then any subsidiaries would be regulated by the host country. These regulators would be charged with ensuring that they were comfortable with any imbalances between assets and liabilities in their country. They would be responsible for intervening should a foreign subsidiary or home institution come close to failing and would be responsible for covering any shortfalls of cross border assets and liabilities that failure would lead to.

The issue of cross border resolution is one of the most important and urgently needs to be addressed. Current proposals have made very little progress on this issue.

*Limited government debt guarantees for financial institutions*

In the current crisis bank bondholders have effectively had a government guarantee. An important issue is whether this is desirable. Such a guarantee prevents disorder in bond markets, but again the guarantee provides undesirable long term precedents. Going forward holders of bank debt will know it is guaranteed and will not have any incentive to exert market discipline. If failing banks are taken over and liquidated in an orderly manner as discussed above, it should be possible to impose losses on long term bondholders and other debt holders. This should provide incentives for market discipline by bondholders.

*Limits on leverage of financial institutions*

Many financial institutions started the crisis with very high levels of leverage. It has been widely argued that the deleveraging of these institutions during the first stages of the financial crisis considerably exacerbated the effects of the crisis (see, e.g., Adrian and Shin (2009) and Greenlaw et al. (2008)). We agree with this view. Some limitations on the leverage of financial institutions seem desirable. However, implementing such restrictions in practice may be problematic. The issue will be exactly what should be included in debt and what should be included in equity. Financial innovation will undoubtedly be used to try and circumvent the restrictions.



### *Contingent convertible debt (CoCos)*

It has been widely suggested that convertible debt should be issued by banks that could be converted into equity in the event of a crisis. In this case it would not be necessary for banks to raise capital in difficult times as it would already be available. The issue of this kind of security by Lloyds in the U.K. is an example. This certainly sounds attractive but the securities suffer from a number of potential problems. First, there will be issue of whether moral hazard is increased by such instruments. Second, why not use equity from the start instead? One argument is that equity is costly. This is widely assumed to be true in academic studies. Why exactly is equity costly? It is often suggested that it is because of tax advantages. If this is the case it may be better for governments to eliminate tax subsidies for debt as discussed next.

### *Removal of tax subsidies for debt*

The tax system in many countries subsidizes the use of debt in many ways. For example, corporations including banks and other financial institutions use debt because interest is deductible for income tax purposes at the corporate level. This bias towards debt should be removed. If this means financial institutions are willing to use much more equity, then financial stability will be considerably enhanced. It is not clear what exactly is the public policy rationale for having interest deductibility at corporate level.

In the U.S. mortgage interest is tax deductible for individuals. These kinds of incentives for households to use debt are not desirable in a financial stability context. They should also be removed.

### *Reform market structures*

A number of commentators have argued that the over-the-counter markets for many derivative contracts such as credit default swaps are opaque so that it is difficult to assess counterparty risk. The suggestion is that these markets should be moved onto exchanges so that the counterparty risk could be more systematically dealt with and eliminated. These suggestions have a lot of merit. The problem is whether socially valuable niche markets for derivatives that do not have sufficient volumes to trade on exchanges will be eliminated as a result of such measures. Reforms of over-the-counter markets should be carefully considered.

### *Competition policy should carefully implemented in the financial services sector*

There has long been a tension between competition policy and financial stability (see Carletti and Vives (2009)). It is only in recent years that competition policies have been implemented in many countries. Often for stability reasons, countries have avoided implementing competition in the banking sector as rigorously as in other sectors.

An interesting question that has been raised during the crisis is why is it that in normal times financial services firms make such large profits. One possibility is that it is because competition policy is not enforced properly. Although on the face of it financial markets are very competitive, the nature of deviations from perfect competition is rather different than in markets for goods. One example is “front running”. This is based on knowledge of order flow by brokers and other participants in the market, which is extremely valuable. For example, if a large buy order is executed then this will typically drive up prices because market participants will deduce that the buyer has good

information. If the processor of the order can trade before the large buy order is executed then it is possible to make money. Aggregated over time this front running can be extremely profitable. In the equity markets in the U.S. this is illegal. There are very careful records kept of when orders are received and brokers can't trade on their own account before they execute the customers' orders. However, front running is not illegal in the U.S. bond markets.<sup>2</sup> The large investment banks have set up trading platforms for bonds that give them an advantage in terms of knowledge of order flow. This has the potential to allow large profits from front running.

It is important that deviations from perfect competition such as front running be carefully investigated and regulated. Front running in the bond markets should be made illegal just as it is in the equity markets. However, this is just one example where deviations from perfect competition are different in financial services. There are many others that need to be understood and prevented.

*Capital adequacy regulation should be based on market capital as well as accounting capital*

Capital adequacy rules have an important role to play in preventing contagion and other problems. However, one aspect of their current implementation is that regulatory capital is based on accounting book capital. When Wachovia failed last year its accounting capital was well above regulatory limits even though the market was no longer willing to provide funds. This example underlines the importance of using market capital in regulation, in addition to accounting based regulatory capital.

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<sup>2</sup> We are grateful to Krishna Ramaswamy for pointing this out to us.

### *Mark-to-market or historic cost accounting?*

Financial institutions have traditionally used historic cost accounting for many of their assets. This is problematic if assets fall in value as they may be able to hide this fact for significant periods of time. A good example is the S&L crisis in the U.S. in the 1980's. This kind of episode encouraged a move to mark-to-market accounting in by the IASB and U.S. FASB (see, e.g., Allen and Carletti (2008a) and Plantin, Sapra, and Shin (2008)). During the current crisis where it is not at all clear that market prices reflect fundamental values, mark-to-market accounting has come under severe criticism by financial institutions and has been relaxed by the FASB under political pressure from Congress as well as, even if partly, from the IASB.

How should the advantages and disadvantages of mark-to-market accounting be balanced? As long as markets are efficient, mark-to-market accounting dominates. However, if as during times of crisis they cease to be efficient, market prices do not provide a good guide for regulators and investors. The key issue then becomes how to identify whether financial markets are working properly or not. Allen and Carletti (2008b) suggest that when market prices and model based prices diverge significantly (more than 2% say), financial institutions should publish both. If regulators and investors see many financial institutions independently publishing different valuations they can deduce that financial markets may no longer be efficient and can act accordingly.

### *A role for public sector banks in a mixed system*

Some countries such as Chile with its Banco Estado have a publicly owned

commercial bank that competes with private sector banks. In times of crisis, such a bank can expand and help stabilize the market as all market participants know that it is backed by the state and will not fail. At the moment, that's what the Fed is effectively doing by buying large quantities of commercial paper. They have in effect become one of the largest commercial banks in the world. But the officials in charge of the Fed do not have much expertise in running a commercial bank. The Fed does not know much about credit risk. It would be better to have expertise in the public sector which allows the state to perform commercial banking functions during times of crisis.

## **12. Concluding remarks**

If the speculation above that the most similar recent crisis to the current one is Japan in the 1990s is correct, the implication is that the after effects of the current crisis will be long lived. The problem is that when bubbles burst it is not just the effects on the financial system that are damaging. Prices have been wrong and finding the correct new prices can take a long time, particularly if the bubble was largely in real estate. During the adjustment period economic activity can be badly affected.

Many reforms in a wide range of areas are needed to prevent another crisis from occurring. Unfortunately, there is very little consensus on what was the cause of the crisis and what needs to be done to prevent another one occurring. In this paper we have outlined the view that the crisis was caused by loose monetary policy and global imbalances and have suggested a number of reforms. Much work remains to be done in detailing these policies.

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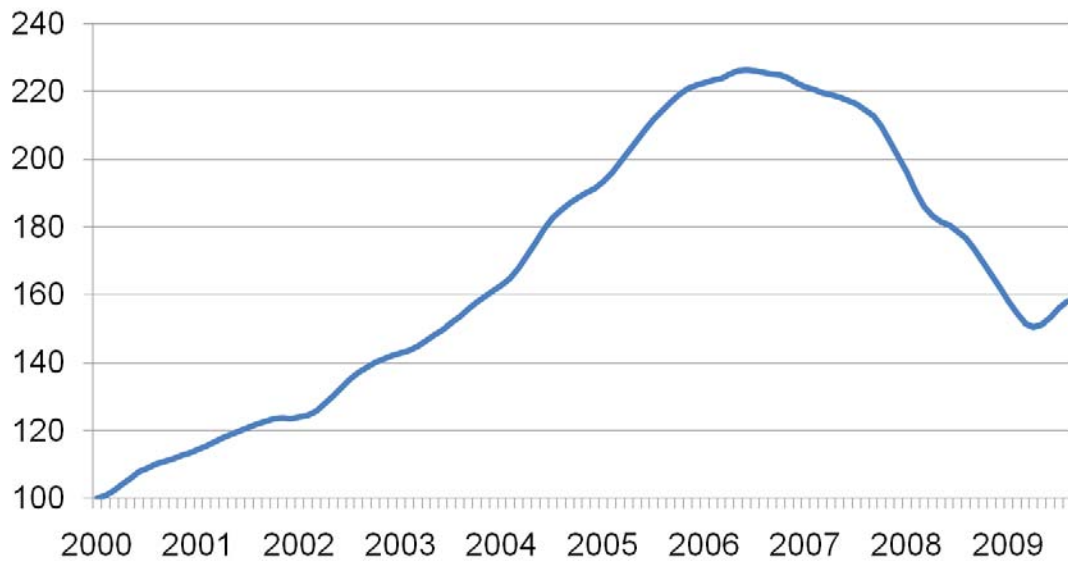
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# Figure 1

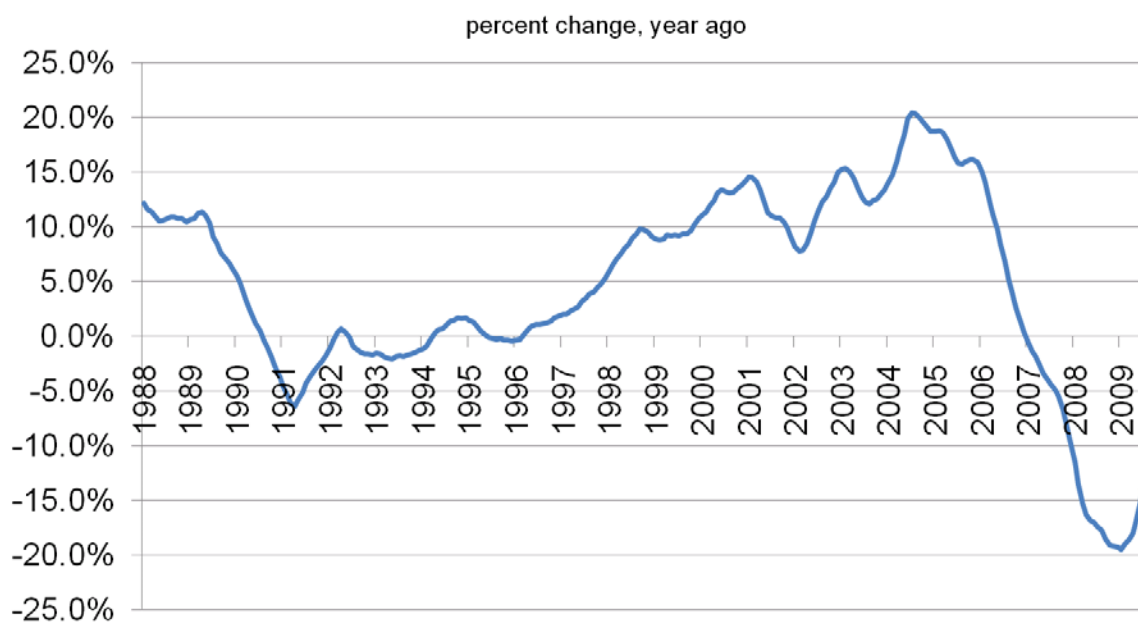
## The Case-Shiller 10 Cities Composite Index



Source: S&P

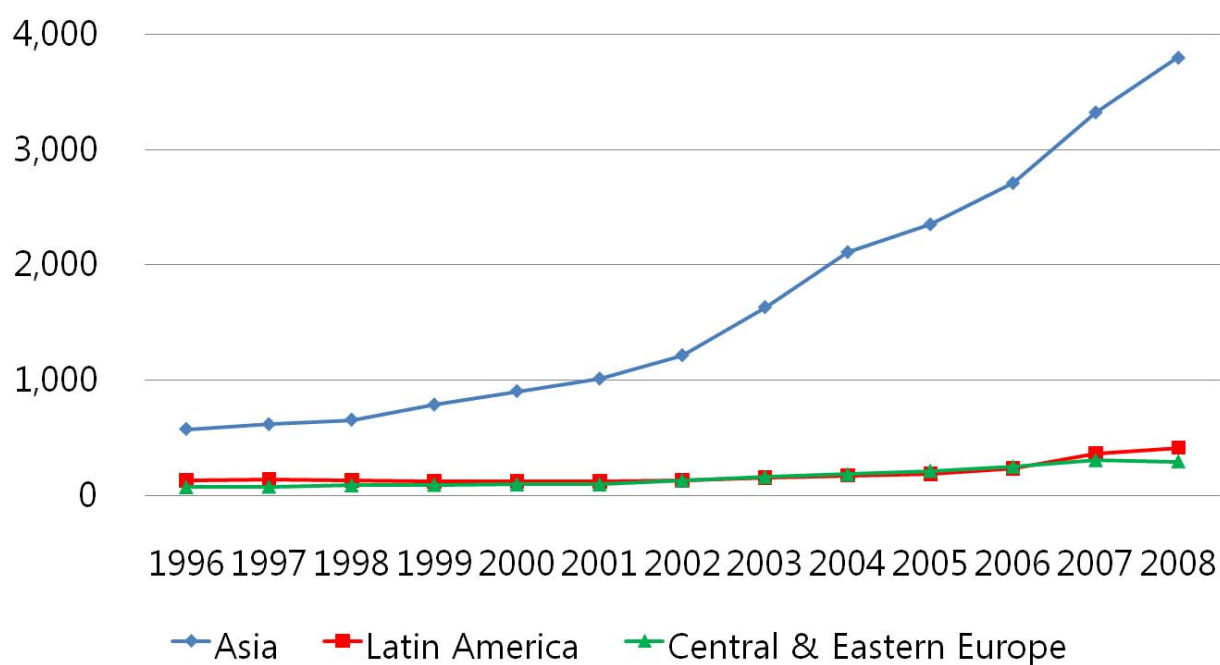
## Figure 2

Changes in the Case-Shiller 10-City Composite Index Year-on-Year



### Figure 3

#### A Comparison of Foreign Exchange Reserves in Different Regions

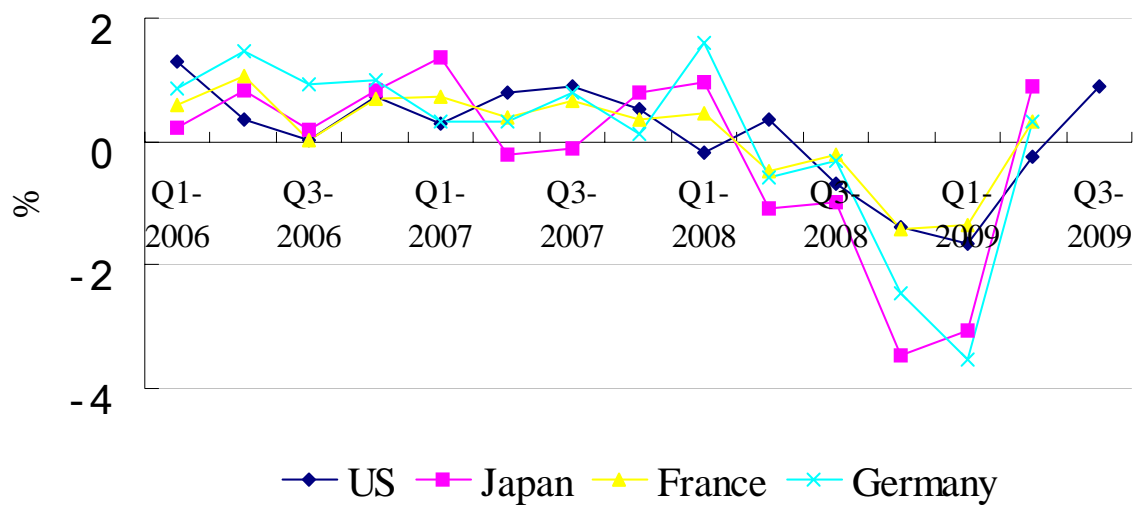


Source: IMF website.

Asia is the six East Asian countries China, Hong Kong, Japan, Singapore, South Korea, Taiwan – province of China.

# Figure 4

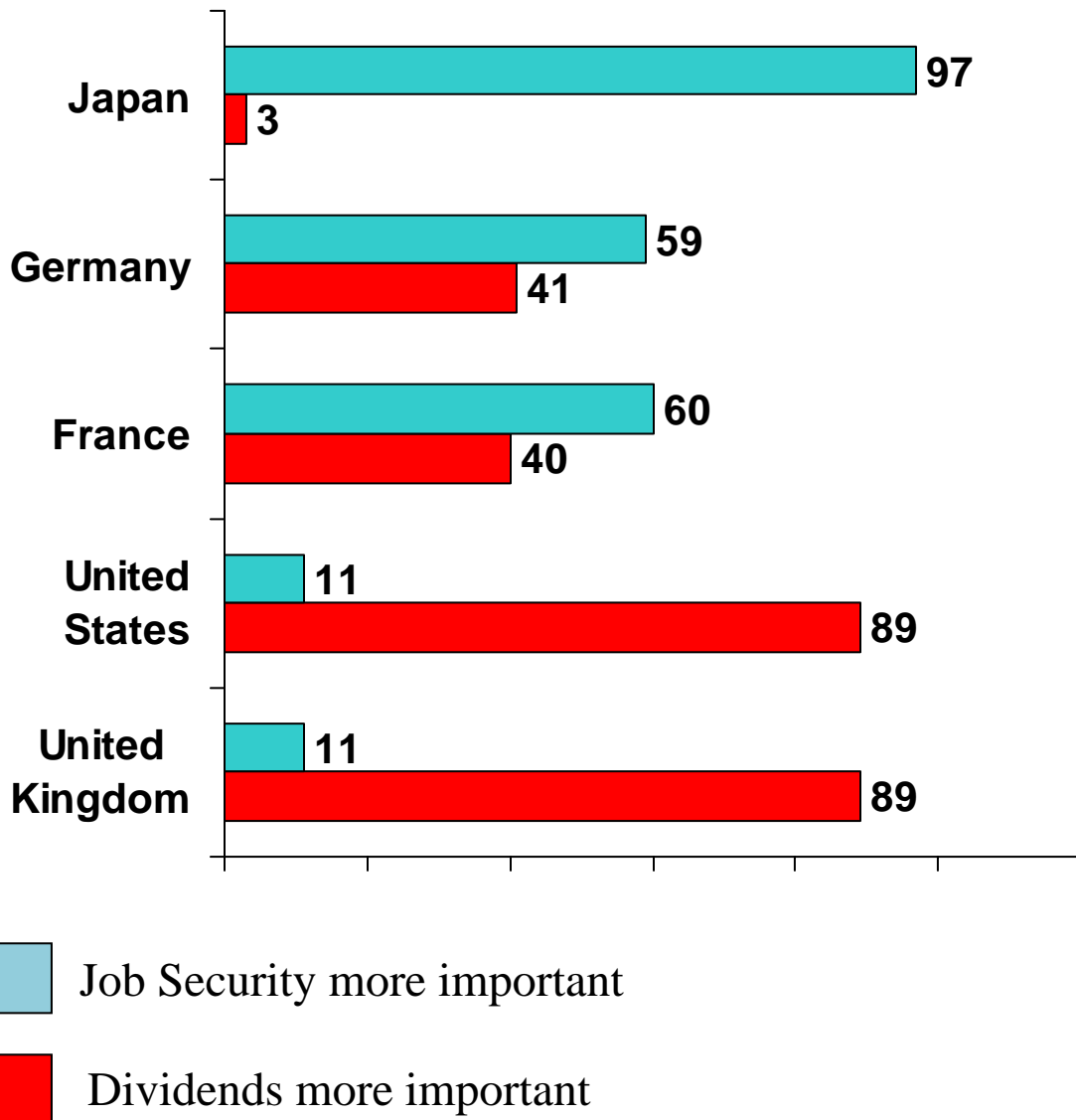
## Quarterly Changes in GDP (Annualized)



Source: OECD

**Figure 5**

Job Security or Dividends?

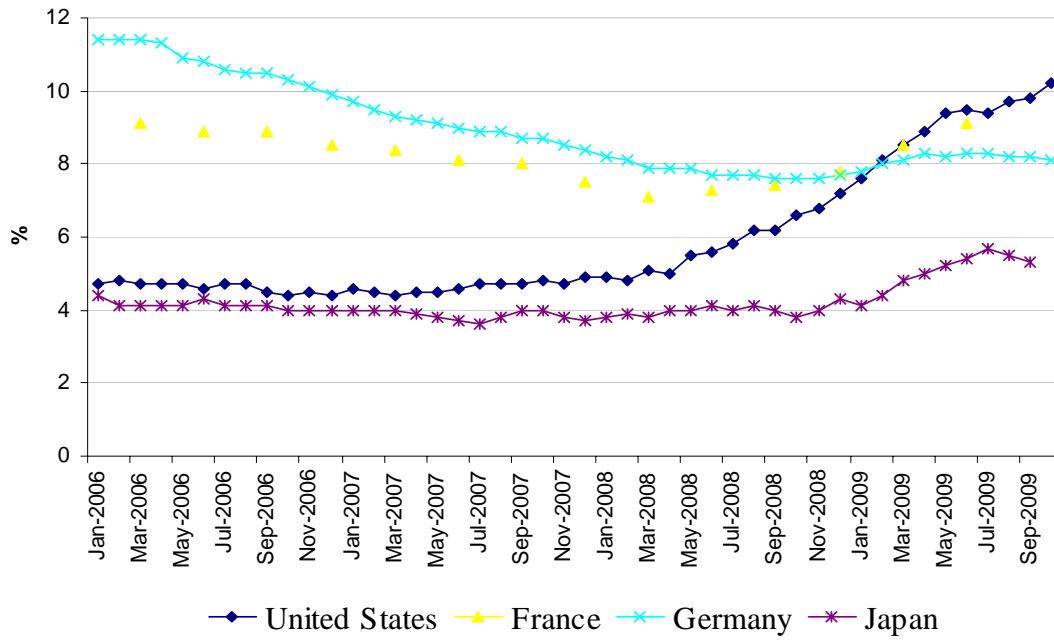


Number of firms surveyed: Japan, 68; United States, 83; United Kingdom, 75; Germany, 105; France, 68.

Source: Masaru Yoshimori, "Whose Company Is It? The Concept of the Corporation in Japan and the West." *Long Range Planning*, Vol. 28, No. 4, pp. 33{44, 1995.

# Figure 6

## Unemployment Rates



Source: OECD