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THE GLOBAL FINANCIAL CRISIS

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Abstract

Until Lehman Brothers' bankruptcy in September 2008, the conventional wisdom was that the crisis was the result of problems in the financial sector. However, after the dramatic falls in industrial production in countries such as Japan and Germany starting in the last quarter of 2008, it became clear that the origins of the crisis were deeper. This paper argues that there was an economic crisis that was due to the bursting of a property and stock bubble in the US and a number of other countries. Just as in Japan in the 1990's, this greatly affected the real economy. The problems in the financial system were a symptom rather than a cause, but there was a strong feedback effect into the real economy. The structure of the global financial system and the nature of banking regulation have been severely inadequate. The paper suggests reforms in the structure of the IMF, the governance of central banks and the form of banking regulation.

Resumen

Antes de la quiebra de Lehman Brothers en septiembre del 2008, la sabiduría popular decía que la crisis se originaba en problemas en el sector financiero. Sin embargo, tras las drásticas caídas de la producción industrial en países como Japón y Alemania a partir del último trimestre de ese año, quedó claro que había que buscar más profundo. Este documento argumenta que hubo una crisis económica al explotar una burbuja inmobiliaria y accionaria en Estados Unidos y otros países. Al igual que en Japón en los noventa, los efectos en la economía real fueron enormes. Los problemas del sistema financiero fueron más un síntoma que una causa, aunque hubo una fuerte realimentación hacia la economía real. La estructura del sistema financiero global y la naturaleza de la regulación de la banca mostraron graves fallas. Este estudio sugiere reformas para la estructura del FMI, la gobernabilidad de los bancos centrales y la forma de la regulación bancaria.

1 INTRODUCTION

Financial crises have been pervasive for many years. Bordo et al. (2001) find that their frequency in recent decades has been double that of the Bretton Woods Period (1945-1971) and the Gold Standard Era (1880-1993), comparable only to the period during the Great Depression. Nevertheless, the financial crisis that started in the summer of 2007 came as a great surprise to most people. What initially was seen as difficulties in the U.S. subprime mortgage market, rapidly escalated and spilled over first to financial markets and then to the real economy. The crisis changed the financial landscape worldwide and its full costs are yet to be evaluated.

The purpose of this paper is to consider the causes and consequences of the 2007 crisis and how the financial system should be reformed in terms of institutions and regulations. Despite its severity and its ample effects, the 2007 crisis is similar to past crises in many dimensions. In a recent series of papers, Reinhart and Rogoff (2008a, 2008b, 2009) 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. While Reinhart and Rogoff stress that the major episodes are sufficiently far apart that policymakers and investors typically believe that “this time is different,” they warn that the global nature of the 2007 crisis will make it far more difficult for many countries to grow their way out.

A thorough overview of the events preceding and during the 2007 financial crisis is provided in Adrian and Shin (2009), Brunnermeier (2009), Greenlaw et al. (2008), and Taylor (2008). Its seeds 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, Ireland and the U.K. 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 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 Sterns 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. Reassessing risks previously overlooked, investors withdrew from the markets and liquidity dried up.

In the months that followed and the first quarter of 2009 economic activity in the U.S. and many other countries declined significantly. Unemployment rose dramatically as a result in some economies. The general consensus is that the 2007 crisis was the worst since the Great Depression.

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. 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 originating mortgages and holding them to maturity, brokers and also some banks started originating mortgages and selling them to securitize. That led to a new process called "originate and distribute model." In this new model, the originators, either brokers or banks, were not affected by borrowers' defaults as they were selling the mortgages before maturity. Moreover, they had incentives to originate and sell as many

mortgages as possible, as they were paid based on the number of mortgages that they approved rather than on their performance.

The second stage in the process of this new originate and distribute mortgage system was securitization. The securitizing entities such as investment banks would pool a whole set of mortgages together from across the country so that they would be well diversified. Then they would tranche those pools to spread the risk differentially. The buyers of the most junior tranche would be allocated the first default losses. Then as more losses were accumulated, they would start to be allocated to the next most senior one and so on up the seniority chain. The most senior tranches would bear losses only very rarely so they were regarded as fairly risk-free and were rated triple-A. More junior tranches would have lower ratings.

Initially, the securitizing institutions would hold the most junior tranches in order to maintain the right incentives along the securitization chain. However, at some point also the junior tranches started to be sold off thus breaking up the incentive mechanism of the securitization process. As shown empirically by Purnanandam (2009), found that mortgages that were originated under the new originate and distribute model were of significantly lower quality than those originated under the traditional system where mortgages were held by the originators till their maturity.

Another important incentive issue concerned the ratings agencies. Many argue that as rating agencies started to receive a large proportion of their income from undertaking ratings of the securitized products, they lost their objectivity and started giving ratings that weren't justified.

To sum up, according to the mortgage incentive view of the crisis, the whole procedure for checking the quality of the borrowers, and the mortgages underlying the securitizations broke down thus triggering the 2007 crisis. In line with this, the solution to stop the crisis and avoid it occurring again in the future would be to regulate the mortgage industry and restore the appropriate incentive mechanisms.

This seemed to have been the view of both the Federal Reserve Bank and the U.S. Treasury at the start of the 2007 crisis. However, the deepening of the crisis and the dramatic collapse in the global real economy following the default of Lehman Brothers made this mortgage view less plausible.

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. Drops in industrial production and GDP, although less severe, occurred 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.

3 THE REAL ESTATE BUBBLE

We argue that the basic problem that caused the crisis in 2007 was that there was a huge bubble in real estate in the U.S. and also in a number of other countries such as Spain, Ireland and the U.K. The crisis started after the bubble burst and caused the problems in the securitized mortgage market and in the real economy. The magnitude and the geographic global dimension of the bubble is illustrated in Figure 1, which shows the dramatic acceleration in house price increases in the early 2000s and their fall since July 2006.

We argue that there were two main causes for the bubble. The most important reason was the policy of low interest rate by the Federal Reserve since 2003. Such policy was originally motivated by the collapse of the tech bubble in 2000 and the 9/11 terrorist attacks in 2001. Interest rates were cut to the very low level of one percent at a time when housing prices were still growing at significantly more than the inflation rate of 3 percent. In 2003 the year-on-year changes in the Case-Shiller 10 City Composite Index rose ranged from 12.1 percent to 15.3 percent. This created an incentive for people to buy houses as they could borrow at one percent and buy assets whose value was growing much faster.

Some various other aspects contributed to the high demand for houses. These included the tax advantages of being able to deduct interest on mortgages compared to no deductibility of rent payments, and policies aimed at encouraging poor people to buy houses. All these factors created a huge demand for houses and led to a substantial increase in house price in the U.S. Besides the situation in the U.S., in some European countries such as Spain and Ireland there were also large property bubbles. Here the interest rate policy of the ECB was low in relative terms rather than absolute terms.

The second important element that triggered the bubble in the U.S. and elsewhere was global imbalances. This problem started with the Asian Crisis of 1997, when many solid Asian economies fell into serious difficulties. For example, South Korea started having problems because firms and banks had committed the “original sin” of borrowing too much in foreign currency. When they had difficulties they turned to the International Monetary Fund (IMF) 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 deep crisis.

One potential reason for this harsh imposition lies in the governance structure of the IMF. The IMF is a European and U.S. dominated institution. So far, its head has always been European, while the head of the World Bank has always been an American. That was part of the carve-up of responsibilities in the negotiations leading to the Bretton Woods agreement at the end of the Second World War (even though it is not explicitly stated anywhere in the

treaty). Asian countries were not represented at the highest levels as they were not so important economically and politically at that time. As they did not have much weight in the governance process, there was also no effective mechanism for the Asian countries to protest against the harsh policies imposed by the IMF during the Asian crisis.

The response of the Asian countries was to become economically independent so as not to rely on the IMF in the future. To do so, they started accumulating trillions of dollars of assets. Figure 2 shows this accumulation of reserves by China, Hong Kong, Japan, Singapore, South Korea and Taiwan. This is the line marked Asia. In contrast, Latin American and Central and Eastern European countries did not increase their reserves during this period.

The Asian countries invested these huge reserves mostly in debt instruments as they experienced difficulties in buying equities. An example was the blocked acquisition by the Chinese state oil company CNOOC of the American Unocal. The U.S. authorities blocked the transaction on the grounds that Unocal was a strategic firm. As a consequence, Asian countries turned to debt instruments, in particular Treasuries, Fannie and Freddie mortgage-backed securities, and many other debt securities. A similar pattern of the provision of debt happened in other countries such as Spain and Ireland. This huge demand for debt and the consequent huge supply of debt helped to drive down lending standards to ensure that it was all taken up.

Other factors contributed to the emergence of the bubble. One of the most important was the yen carry trade, which allowed investors to borrow in Japan at zero interest rates and invest somewhere else such as Australia and New Zealand at much higher rates. This led to a large outflow of funds from Japan and is likely to have contributed to the property bubble in Australia, for example, although the precise magnitude of the yen carry trade is not known.

4 THE EFFECTS ON THE REAL ECONOMY

The collapse of the bubble led the whole global economy into a downward trend. One potential reason for this is that people made the wrong decisions for about a decade, based on the assumption that asset prices would keep on going up. In the U.S., the aggregate saving rate fell to zero. Owning houses or stocks was much better than saving. Many people even started borrowing to finance consumption. The leverage ratios of households, of firms, and of institutions went up. When there was the big fall in asset values, people found they were overleveraged and they had saved too little. Then they had to start saving to pay down debt and build up their assets.

All this caused a huge uncertainty about the value of stocks, properties, and inputs to the production process so that it was very difficult for people and firms to take decisions. For example, stock prices have been incredibly volatile in both directions. In January and

February 2009, they were falling. There was a dramatic drop with the S&P going to 686 by the beginning of March 2009. Then the price went up about 30 percent in the next few weeks. It became very difficult for people to estimate the long run value of their stock.

Another example of price volatility is commodities. In the summer 2008 oil was trading at \$147 dollars a barrel, and then the price went down to around \$40 in a short space of time. Similarly, exchange rates have also been volatile. In the summer of 2008, the pound sterling was over \$2 and it went then down to \$1.40. The Euro was at \$1.60 then. It went down to about \$1.25 before rising again.

To sum up, the huge uncertainty about price movements froze economic decisions of people as well as of firms, thus chilling the global economy. Sales of consumer durables like cars and investment goods like machine tools have stalled since 2008, and only now they seem to have recovered, although slowly. Bloom (2009) provides a formal analysis of how a macro uncertainty leads to a rapid drop in aggregate outcomes as it induces firms to temporarily pause their investments.

5 THE EFFECTS ON THE FINANCIAL SYSTEM

In addition to price uncertainty, a major cause of the economic difficulties experienced during the crisis was that the financial system showed major shortcomings. The crisis started in the summer of 2007 with the meltdown in subprime mortgages as discussed above. This caused a problem because these mortgages were held by debt-based institutions that were like investment banks or structured investment vehicles (SIVs) financed to a large extent by rolling over short-term debt. When prices fell, lenders didn't know whether they were going to be paid back and thus stopped rolling over their debt.

The problems started in securitized subprime mortgages but then spread to many other parts of the financial system because of the interaction with the real economy. The credit risk problem led to a flight to quality with many people wanting to buy government securities. Central banks tried to deal with the greater desire for high grade securities allowing financial institutions to swap a wide range of securities for Treasuries. As a result 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 afterwards.

To summarize, there were two basic problems. The first was that people and firms didn't know the prices that should be guiding economic decisions. The second problem was the financial system had enormous problems and the two interacted.

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 (FDIC), and a number of other regulatory bodies are responsible for regulating the financial sector. However, despite the pervasive regulation, the 2007 crisis came as a surprise to the regulators. How was this possible?

The first important point is that banking regulation is very different from other kinds of regulation. For example, there is wide agreement that environmental regulation is needed because there is a missing market. If a firm pollutes, it does not have to compensate the people who are damaged. Regulation is then needed to avoid the pollution of the environment. Antitrust is another important area of regulation. There the problem is monopoly. It is necessary to make sure that firms aren't monopolistic.

With banking regulation, the problem that is being solved is not at all clear. In fact, there is no wide agreement that there is even a problem. Before the crisis, many central banks worked with dynamic stochastic general equilibrium models that don't even include a banking sector. The view underlying these models is that the real economy is going to work fine and the financial system is unimportant except for pricing assets (see, e.g., Muellbauer (2009)). In line with this, contagion, panics and more generally crises are not a problem justifying regulation. Given this approach it is not surprising that so many central banks completely failed to predict the crisis that started in 2007.

The current structure of banking regulation is the result of ad hoc measures introduced in response to past crises. Many regulatory measures and bodies (the Glass-Steagall Act separating investment and commercial banking, the Securities and Exchange Commission (SEC) and all the subsequent SEC Acts) were introduced after the Great Depression to try and avoid such a deep crisis in the future. This regulation 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 (see Bordo et al. (2001)). This shows that one way to stop crises is to stop financial institutions taking risks.

The problem is that the alternative to private institutions taking risks is that the government intervenes in the allocation of credit. This can be 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 restricting banks' possibilities to take risk that mostly 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 mishmash of regulations designed to stop particular problems rather than a well thought out way of reversing market failures in the financial system. We would argue that the actual financial regulation is rather unfortunate as it requires much time and effort for banks to comply with it, but doesn't actually do much in terms of benefits solving market failures as evidenced by the failure of the regulation to prevent the crisis.

7 BANKING REGULATION

In order to design effective banking regulation it is necessary to know what are the benefits and what are the costs. The benefit of regulation is that it can potentially stop damaging crises. But the cost is that in order to do so the financial system needs to stop allocating resources efficiently to the detriment of growth and innovation.

A good example of what can happen when the benefits and the costs of financial regulation are not clear is the Basel Agreements. There is no clear statement in the documents of what market failures the Agreements intend to solve. Equally there is no explanation in the Agreements for the imposed levels of capital ratios. They seem to have been chosen simply at the levels that banks had used in the past. Not surprisingly then, capital regulation was unable to prevent the 2007 crisis.

In our view there are three main market failures in banking, which we will consider in turn:

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

The current crisis has underlined that financial markets may not been able at times to provide the efficient amount of liquidity (see, e.g., Allen and Gale (2004) and Allen and Carletti (2006)). That is why central banks stepped in and designed many programs to inject liquidity into the banking system. The reasons behind the inefficient provision of liquidity are not fully understood yet. The basic problem is that liquidity is costly to hold. Without government intervention, people are willing to hold liquidity in a financial system only if there is significant price volatility. But it's price volatility that causes crises. When prices fall to low enough levels this can bankrupt financial institutions.

The second market failure is persistent mispricing of assets due to limits to arbitrage. One of the big issues in the 2007 crisis was to understand the pricing of mortgage-backed securities. If markets are efficient, market prices reflect the true value of the underlying stock. If something gets underpriced, there is a profit opportunity. Investors can buy the underpriced security and make a profit. This incentive provides the arbitrage mechanism to make sure that prices rise to the correct level.

In the 2007 crisis this mechanism seems to have stopped working in 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. Investors then doubled up. But prices kept on going down and investors made big losses. It became too risky to arbitrage the securities. The mispriced securities became the so-called “toxic assets.” The same happened during the dotcom bubble. Prices were too high, and kept going up for a prolonged period so that arbitrage was not possible. That is the limit to arbitrage: prices keep moving in the wrong direction instead of going back to fundamentals. It is important to understand the limits to arbitrage better and have mechanisms for overcoming them so markets are 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 market failure that central banks often use to justify intervention. An example is the intervention of the Federal Reserve to help arrange the takeover of Bear Stearns. The argument used to justify it was that otherwise Bear Stearns would have defaulted. That would have led to a whole chain reaction where many other financial institutions would have gone bankrupt, and possibly to a complete collapse of the financial system (see Bernanke (2008)). It is of course difficult to judge if these arguments are correct. The Federal Reserve had two days to figure out the degree of interconnectedness of Bear Stearns, and they couldn't really do it in that time.

Immediately after the arranged takeover of Bear Sterns, the Federal Reserve opened up the discount window to the investment banks. The *quid pro quo* for this was that these institutions would allow Federal Reserve teams to inspect their books to find out their positions. When six months later in September 2008, Lehman Brothers got into trouble and could no longer survive on its own, the Fed had a much better idea of the interconnectedness of these banks. Apparently, they believed there would not be the classic kind of contagion if they allowed Lehman to go bankrupt. In fact there was contagion but it was quite complex.

After Lehman Brothers collapsed, Reserve Capital, the oldest money market mutual fund, “broke the buck” as it held a significant amount of Lehman debt. 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 suddenly realized that there could be a wave of

similar problems and withdrew massively from money market mutual funds. Within a few days the government was forced to provide a guarantee of all money market mutual funds. At the same time, AIG was on the point of default. In this case the government decided they could not take another risk so, they saved AIG to prevent an even larger contagion.

In addition to these direct contagion effects, there have been 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. Up to that point the crisis had been largely confined to the financial sector with relatively few effects on real economic activity. Figure 3 shows how GDP fell significantly in the fourth quarter of 2008, particularly in Japan and Germany. This underlines the importance of contagion, but there is still much scope for a better understanding of the indirect effects of contagion.

Going forward it is important that banking regulation is structured to solve these and other market failures. There is the need to better understand the optimal form of central bank intervention to restore liquidity in crucial markets like the interbank market. Market structures need to be designed to try to make markets as efficient as possible and avoid future extended episodes of mispricing of assets. Finally, regulations should be introduced to minimize the pernicious effects of contagion. Capital regulation would appear to have an important role to play here.

8 HOW WILL THE CRISIS DEVELOP?

An important question is what will happen going forward. The 2007 crisis has been often compared to the Great Depression. While there are certainly analogies between the two crises, institutions, technologies, and many other aspects were very different 75 years ago. This limits the conclusions that can be drawn from this analogy.

The most similar recent crisis is the one occurred in Japan in the 1990s. The reason is that Japan is the second biggest economy and had a large bubble both in stock prices and in property prices. In the mid-1980s, the Nikkei was around 10,000 and it peaked at just under 40,000 in December 1989. Recently, the Nikkei has been trading in the range of 7,000 to 10,000. This means that it is still around a quarter to a fifth of where it was twenty years ago.

Similarly, property prices were very high. At the peak of the bubble, the value of the few hundred acres that the Imperial Palace stands on 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 the U.S. will provoke similar effects as in Japan. Some argue that the bubble in the U.S. was smaller than the one in Japan in the sense that asset and property prices did not increase as much. Concerning stocks, there was a reverse of the tech bubble in stock prices in 2001. Afterwards stock prices increased significantly from 2003 to 2007. Early in 2009 stock prices had fallen to around a half of what they were at the peak of 2007, to then go up again by more than fifty percent by the end of 2009. Whether this is a long-lived phenomenon, like in Japan, or just a liquidity and mispricing problem and prices are going to snap back fully in a year or two as they did after the crash of 1987 is too early to say. Many believe that prices will go up to the levels before the crisis once the government has cleaned up the financial system. Concerning property prices in the U.S., many experts argue that they were about 25 percent above trend. The Case-Shiller index in Figure 1 shows that property prices were about 30 percent down in mid-2008. The adjustment since then may imply that the price adjustment is terminated and the economy will start to go back to normal as it did eventually in Japan. However, this is not necessarily the case. The reason is that Japan has a very different kind of economy in terms of corporate governance. Japanese firms are much more stakeholder-oriented than their U.S. counterparts. This implies that Japanese firms care more about the workers, the suppliers and other stakeholders than about shareholders. This implies that firms in Japan react very differently to shocks and crises relative to firms in the U.S.

Evidence of this is provided by the answers to some surveys where the question asked is (e.g., Yoshimori, 1995): "What's the prevalent view in your country? If times get bad, should firms maintain dividends and lay off workers or should firms cut dividends and keep stable employment?" Figure 4 shows that the answer to this question differs significantly across countries. In Japan, the answer is that firms should cut dividends and maintain employment." In the U.S. and the U.K., it's the complete opposite. Firms should fire the workers and keep dividends up.

In the last 20 years, the focus on shareholders has been very beneficial to the U.S. and the U.K. because it allowed resources to be reallocated in the economy very quickly. This fast reallocation was not possible in Japan in the 1990's and 2000's. However, the situation in the current crisis is very different. U.S. firms have been firing many workers since 2008, unemployment has gone up, and that has the potential to have dramatic macroeconomic consequences. The unemployment rate in the U.S. was 4.7 percent in July 2007, and it had risen to around 10 percent by the end of 2009. In addition, unemployment can trigger fears of additional future unemployment.

Figure 5 points further to the differences in terms of unemployment between the U.S. and other countries. The figure shows the layoffs in companies in the auto industry and in white goods or consumer durables in different countries. Both industries were hit quite badly. As the figure shows, there have been many more layoffs in the U.S. compared to the other countries. Germany is the country with the lowest number of layoffs. In fact, Volkswagen is increasing employment.

The aggregate statistics for unemployment in Figure 6 confirms that U.S. unemployment has gone up dramatically. In contrast for Germany the line is basically flat. This implies German workers do not feel threatened and can continue consuming. The different corporate governance structure across countries may then also explain the different needs of the various countries to introduce stimulus packages during the crisis.

To sum up, 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. How big the feedback effects will in the long run be in the U.S. is yet to be measured.

9 EXCESSIVE RISK TAKING IN THE PRIVATE OR PUBLIC SECTORS?

Reforming financial regulation is certainly one of the most important priorities at the current time. Other measures should, however, be adopted. There has been a lot of blame on the private sector, in particular on the excessive risk taken by banks. However, in light of the view that there was a bubble and that central banks played a big role in creating this, then it is also important to think how to avoid such a problem in the future. In other words, it is also important to avoid the problem that the public sector will take risks again.

After the inflationary experiences of the 1970s, many countries made their central banks independent. The main rationale was that independent central banks were less likely to succumb to political pressure to cut interest rates and cause an inflationary boom at every election. This has worked very well for preventing inflation. However, this crisis has demonstrated that central bank independence is not good for financial stability. In essence there are very few checks and balances on central banks. In the Federal Reserve, for example, basically Alan Greenspan could decide on his own to cut interest rates to one percent in 2003. In those days there wasn't much dissension within the Board of Governors. The low interest

rates avoided a recession in the short run, but fueled the bubble and thus led to a much bigger recession after the crisis that started in 2007. It is necessary to have better governance mechanisms that guarantee proper debates on the decisions concerning interest rates. The current mechanism seems highly inappropriate.

Again, there has not been much discussion on the use of quantitative easing. This allows the Federal Reserve to effectively print money and buy back long-term government bonds. Although this may be beneficial in the short run, it may lead to excess liquidity and thus inflation in asset prices in the longer run. Quantitative easing has not been tried very much. It was used in Japan in the 1990's, but did not help cure the problem. It didn't lead to inflation in Japan either but it did probably lead 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. At that point the Fed has to start soaking up liquidity again by selling the bonds that they have bought with the program of quantitative easing. However, it is clearly much easier to buy than it is to sell. If, 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 diversifying their investment into euros, and yen, then there is likely to be a run on the dollar.

This is just an example to illustrate the problems that can originate from an inappropriate policy and an inappropriate governance mechanism in the public sector.

10 PREVENTING GLOBAL IMBALANCES

As mentioned above, the IMF arguably helped cause the problem of global imbalances through their harsh policies in the 1997 Asian Crisis. At the time there was no mechanism to stop this from happening because the Asians were not as important politically and were underrepresented in the IMF governance process. Today, the situation is that the Asian countries are among the most important economically. The Chinese have almost \$2.5trillion, the Japanese have another trillion, South Korea has several hundred billion.

Asian countries have also been quite resilient to the 2007 crisis. For example, 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 increased slightly in the current crisis. The reason is that they could use their large reserves to pursue these policies without any approach to the IMF.

While it is individually advantageous for countries to self-insure by accumulating reserves, this is a very inefficient mechanism from a global perspective. One possibility is that

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 deficit country. The resulting buildup of debt and its role in triggering the crisis shows that this was not desirable. Another possibility is that countries building up reserves borrow long term and invest short term. These alternatives raise the question of what are the alternatives to self-insurance through the accumulation of reserves.

The first clear alternative is to reform the IMF so as to guarantee that countries that are hit by shocks are treated properly if they need help. If countries could always rely on being treated fairly and equitably and not being forced to implement harsh measures, they would not 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 nearly far enough in this regard and it seems unlikely that the IMF will be sufficiently reformed to make large reserves 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 that they could survive shocks. The drawback of 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 fairly 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 a 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.

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 the IMF needs to be reformed so that Asian countries can rely on being treated in the same way as European countries so they do not need to build up enormous reserves. In this section we consider several other key reforms.

11.1 “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, for example, 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 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.

We would argue that 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 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, what is going to happen is that banks and other financial institutions will grow and become large. They know they are then “Too big to fail,” and everything’s going to be fine for most of their employees and customers. Firms that form a business relationship with them know they are going to be able to continue. The banks will then 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 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 and possibly over a long period of time. That would allow the other institutions that didn’t fail and that are well-run to expand and take their 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 such a scheme for allowing the government to prevent contagion by taking over failing institutions is to have bankruptcy rules for non-bank 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. It is necessary to have that for all the 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.

11.2 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.

11.3 Limited Government Debt Guarantees for Financial Institutions

In the current crisis bank bondholders have effectively had a government guarantee. There is an important issue of whether this is desirable. Such a guarantee prevents disorderly wholesale runs. However, this again 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 nationalized 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.

11.4 Removal of tax subsidies for debt

The tax system in many countries subsidizes the use of debt in many ways. For example, in the U.S. mortgage interest is tax deductible. These kinds of incentives to use debt are not desirable in a financial stability context. They should be removed.

11.5 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 they are based on accounting capital. When Wachovia effectively failed, 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 capital.

11.6 Mark-to-Market or Historic Cost Accounting or Something Else?

Financial institutions have traditionally used historic cost accounting for many of their assets. This is problematic if assets fall in value as they are 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., Plantin, Sapra, and Shin (2008) and Allen and Carletti (2008a)). 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.

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.

11.7 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. During the 2007 crisis, that is what the Federal Reserve was effectively doing. They became one of the biggest commercial banks in the world. But the people in the Fed did not have much expertise in running a commercial bank. They didn't 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 one starting in 2007 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.

In the current crisis not only have residential property prices fallen significantly but also commercial property has fallen. That may well cause the same kind of problems in commercial-backed securitizations as with subprime securitizations. The other major problem is corporate defaults.

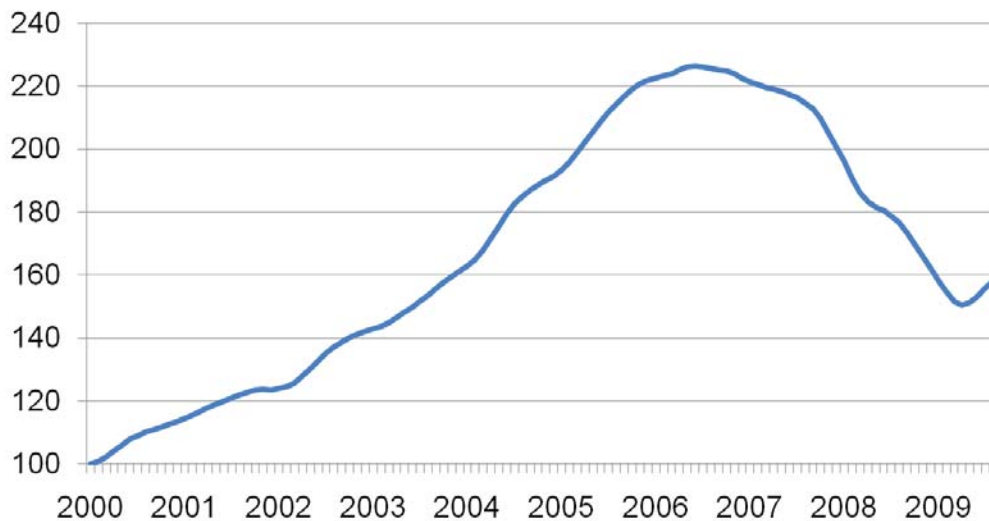
REFERENCES

- Adrian, T. and H. Shin (2009). "Liquidity and Leverage," *Journal of Financial Intermediation*, forthcoming.
- Allen, F., A. Babus, and E. Carletti (2009). "Financial Crises: Theory and Evidence," *Annual Review of Financial Economics* 1, forthcoming.
- Allen, F and E. Carletti (2006). "Credit Risk Transfer and Contagion," *Journal of Monetary Economics* 53, 89-111.
- Allen, F and E. Carletti (2008a). "Mark-to-Market Accounting and Liquidity Pricing," *Journal of Accounting and Economics* 45, 358-378.
- Allen, F. and E. Carletti (2008b). "Should Financial Institutions Mark to Market?" *Bank of France Financial Stability Review* 12, October 2008, 1-6.
- Allen, F. and D. Gale (2004). "Financial Fragility, Liquidity, and Asset Prices," *Journal of the European Economic Association* 2, 1015-1048.
- Bernanke, B. (2008). "Opening Remarks," *Maintaining Stability in a Changing Financial System*, 2008 Federal Reserve Bank of Kansas City, Jackson Hole Symposium, 1-12.
- Bloom, N. (2009). "The Impact of Uncertainty Shocks," *Econometrica*, 77, 623-685.
- Bordo, M., B. Eichengreen, D. Klingebiel and M. Martinez-Peria (2001). "Is the Crisis Problem Growing More Severe?" *Economic Policy*, April 2001, 53-82 + Web Appendix.
- Boyd, J., G. De Nicolo, and E. Loukoianova (2009). "Banking Crises and Crisis Dating: Theory and Evidence," working paper, University of Minnesota.
- Brunnermeier, M. (2009). "Deciphering the Liquidity and Credit Crunch 2007-08," *Journal of Economic Perspectives* 23, 77-100.
- Greenlaw, D., J. Hatzius, A. Kashyap and H. Shin (2008). *US Monetary Policy Forum Report No. 2*.

- Herring, R. and S. Wachter (2003). "Bubbles in Real Estate Markets," *Asset Price Bubbles: The Implications for Monetary, Regulatory, and International Policies* edited by William C. Hunter, George G. Kaufman, and Michael Pomerleano, Cambridge: MIT Press.
- Mayer, C., K. Pence, and S. Sherlund (2009). "The Rise in Mortgage Defaults", *Journal of Economic Perspectives* forthcoming.
- Muellbauer, J. (2009). "Household Decisions, Credit Markets and the Macroeconomy: Implications for the Design of Central Bank Models," working paper, Bank for International Settlements, Basel.
- Nadauld, T., and S. Sherlund (2008). "The Role of the Securitization Process in the Expansion of Subprime Credit", working paper Federal Reserve Board.
- Plantin, G., H. Sapra, and H. Shin (2008). "Marking-to-Market: Panacea or Pandora's Box?" *Journal of Accounting Research* 46, 435-60.
- Purnanandam, A. (2009). "Originate-to-Distribute Model and the Subprime Mortgage Crisis," working paper, University of Michigan.
- Reinhart, C., and K. Rogoff (2008a). "This Time is Different: A Panomeric View of Eight Centuries of Financial Crises," NBER Working Paper 13882.
- Reinhart, C., and K. Rogoff (2008b). "Banking Crises: An Equal Opportunity Menace," NBER Working Paper 14587.
- Reinhart, C., and K. Rogoff (2009). "The Aftermath of Financial Crises," *American Economic Review* 99, 466-72.
- Taylor, J. (2008). "The Financial Crisis and the Policy Responses: An Empirical Analysis of What Went Wrong," working paper, Stanford University.
- Ziemba, William T., and Sandra L. Schwartz, 1992, *Invest Japan*, Chicago, Ill: Probus.

Figure 1

The Case-Shiller 10 Cities Composite Index

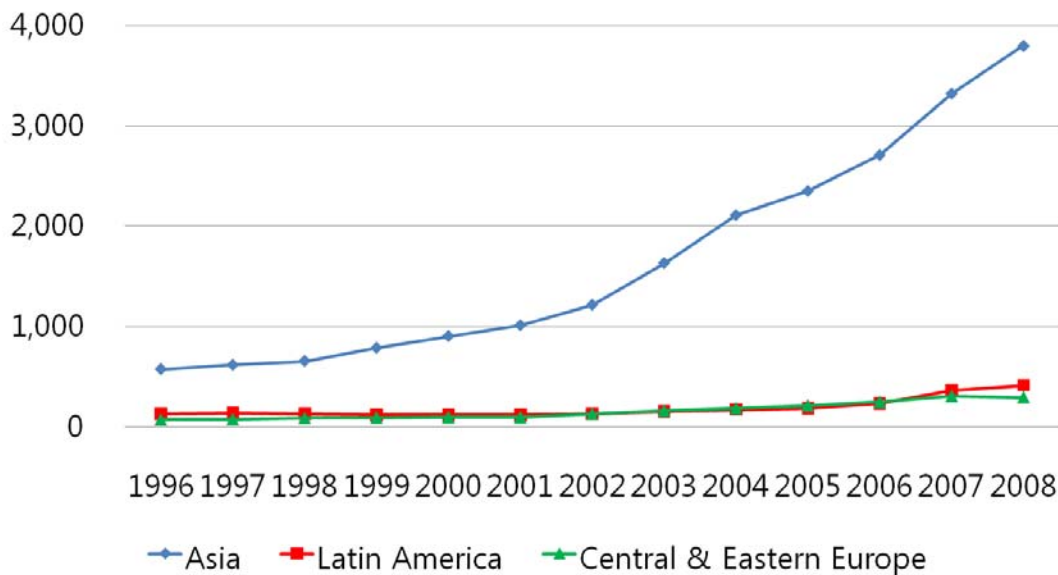


Source: The S&P – Case-Shiller website

Figure 2

A Comparison of Foreign Exchange Reserves in Different Regions

US\$ billions



Source: IMF website.

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

Figure 3
Quarterly Changes in GDP

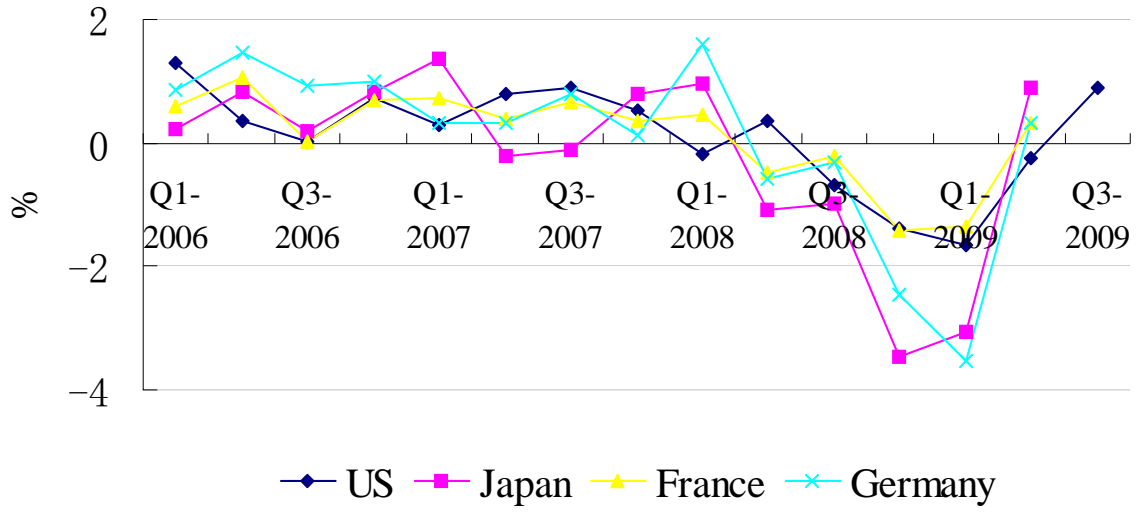
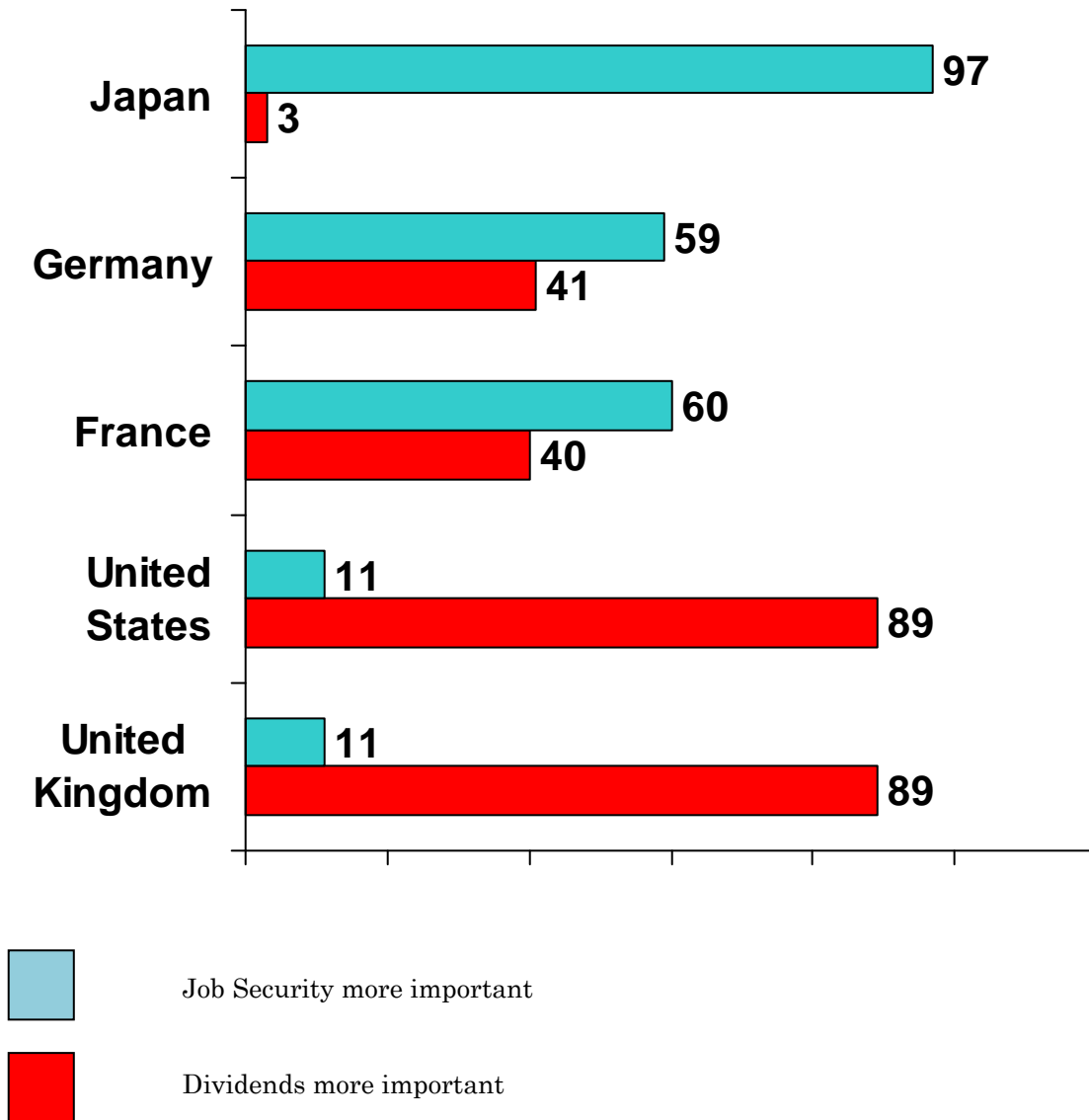


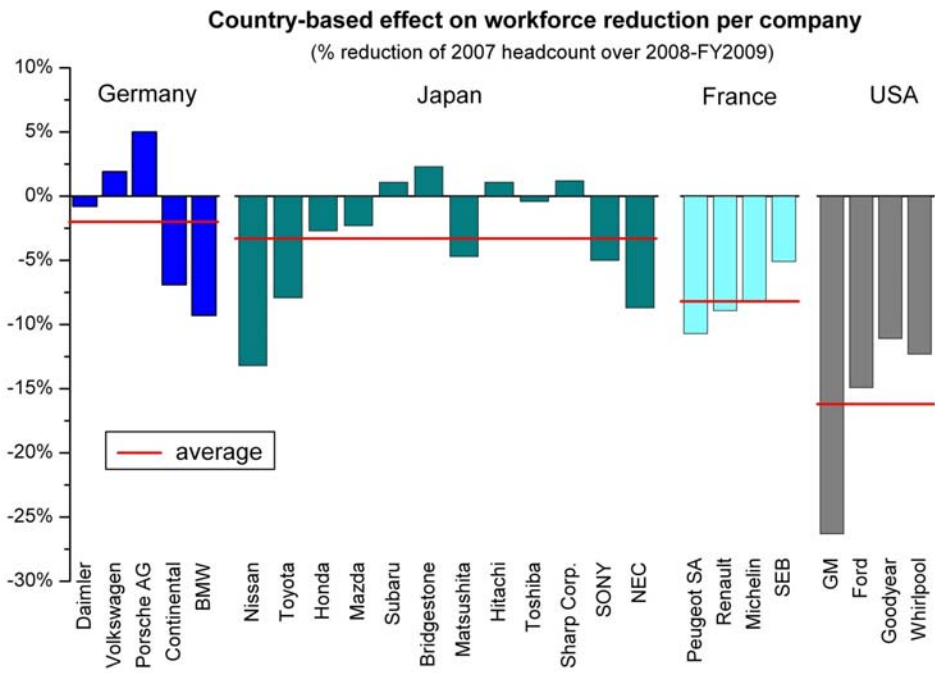
Figure 4
Job Security or Dividends?



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.

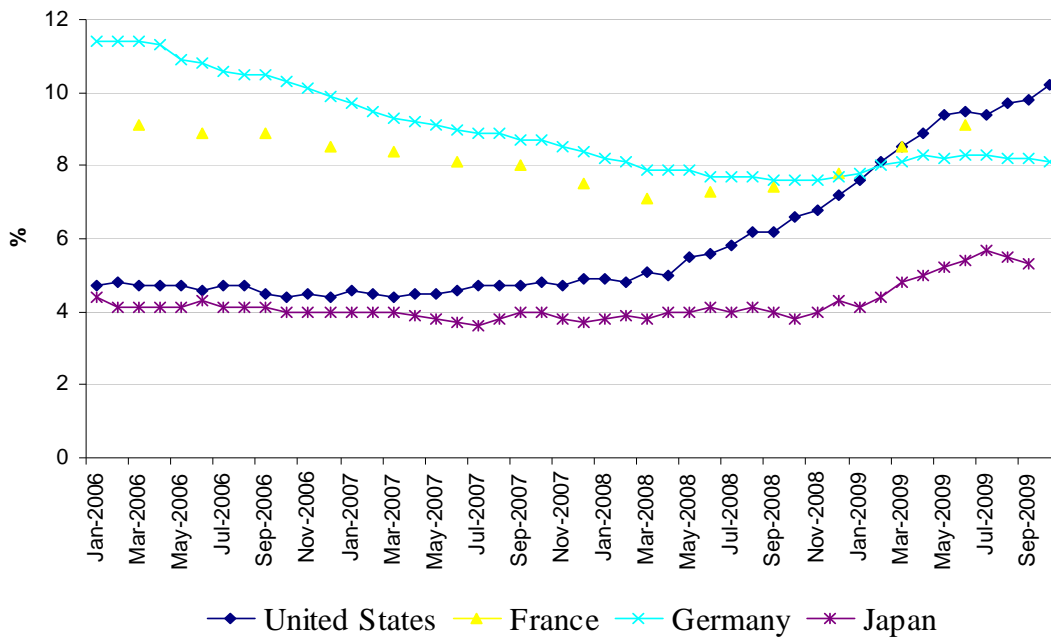
Figure 5



Source: Company reports.

Figure 6

Unemployment Rates



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