Fire, Flood, and Lifeboats: Policy Responses to the Global Crisis of 2007-09

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1. Introduction

The objective of this paper is to examine various policy responses to the global financial crisis of 2007-2009. The global financial crisis of 2008-09 has several stages differentiated in its scope and severity. It started as the bust of subprime mortgages and sharp declines in securitized and re-securitized those mortgages in the United States. Then it spread to other countries, to other securities markets, to financial products at large, to foreign exchange markets, and to the real activities of the global economies.

The first clear market warning came in August 2007 when interest rate spreads suddenly rose. With small seemingly sporadic fires flared up and policy measures were applied from August 2007 to September 2008. Before the failure of Lehman Brothers on September 15, 2008, the problems among financial institutions, especially investment banks, were obvious and fire flared up occasionally (August and November 2007; and March 2008), but policy responses to put out fire were effective. Policy responses during this period were, mainly conventional, but some modest unconventional, including arrangement of a rescue merger of Bear Stearns. Problems appeared to be limited to US and European investment banks that touched toxic assets.

On September 15, 2008, Lehman Brothers filed for Chapter 11, and that changed the financial markets completely. After the Lehman Brothers failed, spreads skyrocketed and prices of many securities plummeted. Several key markets, such as commercial papers, virtually disappeared. Several large financial institutions in the United States and Europe became undercapitalized if not insolvent. This was big explosion and fire in the United States and the fire spread to other countries and real side of the economy. Some European banks were nationalized and resolved, and US Treasury injected capital into several banks. Central banks acted as the lender of last resort and flooded the

markets with liquidity. Many kinds of unconventional monetary policy were applied in the United States and other countries. The interest rate spreads declined markedly after May 2009 and came down to the level of July 2007 by September 2009.

The paper will describe how events have unfolded in the United States and how conventional and unconventional policies have been applied, and then discuss effectiveness of those policies.

The rest of this paper is organized as follows. Section 2 reviews the timeline of crisis, describing several important policy responses to various shocks and market developments. Section 3 provides assessments of policy responses to the global crisis. Conventional and unconventional monetary policy will be examined; quantitative easing of the BOJ in 2001-2006 and current credit easing of the Federal Reserve will be compared; and bank restructuring efforts in the crisis will be discussed in light of the previous crisis and the literature. Assessment of policy (or a lack thereof) leading up to the Lehman Brothers failure will be examined. Section 4 discusses remaining challenges for the United States and the rest of the world in order not to repeat the crisis of 2007-2009 in the future. The paper will argue that it is important to establish an internationally-coordinated, publicly-supported (temporary nationalization), orderly resolution mechanism for troubled large, complex, internationally-active financial institutions.

2. Timeline

2.1. Interest Rate Spreads and CDS

Two kinds of spreads are shown in Figure 1. The sample period is from July 2007 (the beginning of the crisis) to September 2009 (end of the crisis?). In the crisis, the spread between 3 month London Interbank Offered Rate (Libor) and Overnight indexed swap (OIS) has been a popular measure for counterparty risk and liquidity premium.[1] Another measure of risk is the TED spread, defined by the difference between the LIBOR and the treasury bill (risk free) rate. The TED spread is a direct measure of credit risk of large commercial banks that participates in the offshore interbank market. In general the two measures are highly correlated, so that the counterparty risk—that is, a bank does not trust another bank as a counterparty—was a major cause of turmoil in

[1] Both Libor and OIS are influenced by expectations about future interest rate movement but taking the difference, it is cancelled out in the spread.

the financial markets in the global crisis.[2] The credit-worthiness of large American and European banks and investment banks was at the heart of the crisis.[3] Occasional deviations between TED and Libor-OIS may likely be due to emergence of liquidity problem.

Figure 2 shows the movements of credit default swap (CDS) premia of major banks. This is a direct measure of the default risk of individual banks. Collectively, they should have high correlation with the Libor-OIS spread that measures counterparty risk.

Figures 1 and 2 about here

2.2. Pre-Lehman

The initial stage of the burst of the US housing markets started in late 2006, but severity that would ensue was not fully obvious then. As housing prices continued to fall, some financial institutions started to experience shortage in liquidity and experience losses in its asset values. In the first half of 2007, the financial institutions that had accumulated inventories of housing-related securities with leverage had to unwind positions to obtain liquidity with substantial losses. Financial assets globally were sold by investment banks, hedge funds and other financial institutions in order to repay borrowed funds and to accumulate cash positions for possible withdrawal of funds—a phenomenon called "deleveraging." Through the deleveraging process, the downward pressure of prices spilled over to equities, bonds, and other financial assets in major countries in emerging market countries around world.

Between July 2007 and August 2008, there were three spikes in the spreads (more pronounced in the TED spread): August/September 2007, December 2007, and March 2008. The timings of spikes roughly corresponded to the suspension of the fund withdrawal by BNP Paribas on August 9, 2007 and Northern Rock crisis on September 14, 2007; Large write-downs among investment banks' quarterly reports in December 2007; and the rescue merger of Bear Stearns by JP Morgan Chase with Federal Reserve assistance in March 2008.

[2] Taylor (2009) argues that it was primarily counter-party risk rather than liquidity, since the Libor-OIS spread highly correlates with Libor-repo spread which measures counterparty risk more directly. Here, the TED spread is used to make the same argument.

[3] In the aftermath of the banking crisis of November 1997 in Japan, the so-called Japan premium increased sharply. Western banks demanded higher interest rate on Japanese banks who wanted to borrow the US dollar. See Ito and Harada (2004, 2005) for the Japanese experiences of the banking crisis from 1997-2003.

The both spreads stayed between 50 and 100 basis points from the beginning of May to end-July. In August 9, 2007, BNP Paribas temporarily stopped withdrawal of three affiliated mutual funds, due to difficulties in calculating asset values of subprime mortgage-related securities. This event made it clear to all market participants that the problem was deeper and widespread. Market spreads jumped. On August 9 and 10, the TED spread jumped from 50 basis point to 100 basis points, and the Libor-OIS spread jumped from 10 basis point to 50 basis points. The jump was attributable to the BNP Paribas shock. The spread continued to increase. The TED spread peaked at 240 basis points on August 20; the Libor-OIS spread increased to 80-90 basis points in September 2007.

The TED and Libor-OIS spreads decreased until end-October, but started to increase in November. By mid-December the TED was elevated to 200 basis points, while Libor-OIS spread rose to 100 basis points.

Although various spreads started to show a widening trend, solvency of a large financial institutions were not yet seriously questioned. However, the Federal Reserve became concerned enough about declining liquidity in the market and softening of the economic activities, it started to lower the interest rate in September 2007 followed by establishment of Term Auction Facility (TAF) on December 12, 2007. The policy rate of the United States was lowered to 3.00% by end-January. It meant a 225 basis point decline in 6 months. With these aggressive cuts in the interest rate and usage of TAF, the financial markets seemed to have regained stability.

As soon as TAF was announced, the two spreads started to decline. As TAF auction were planned and implemented, with strong messages coming out from Federal Reserve in that TAF would continue as long as necessary, the two spreads continue to decline. The effect of announcement of TAF seems to be clear in reversing the trend in the TED and Libor-OIS spreads.

The CDS shows a very gradual increase from July 2007 to March 2008. The two peaks in August/September 2007 and December 2007, which are evident in the two interest rate spreads, are barely visible in CDS. Except for Capital One, all spreads move very close to each other with a slightly increase trend until March 2008. This implies that default risk of large investment banks was judged not so high until March 2008.

The rescue merger of Bear Stearns in March 9, 2008 was another shock to the financial world. JP Morgan Chase agreed to purchase Bear Stearns on March 16 with $2 a share (a week later, revised to $10 a share), and the Federal Reserve guaranteed $29 billion for possible losses from Bear Stearns assets that JP Morgan Chase purchased. The facility of Bear Stearns assets were created in which the first $1 billion loss would be assumed by JP Morgan Chase, and the rest by Federal Reserve. The loss guarantee, or sweetener for the takeover, was unusual and surprising. It was justified as an emergency measure to rescue Bear Stearns that experienced sudden and acute shortage in liquidity. (The Bear Stearns CDS premium did not show any remarkable movement until its merger—not shown in Figure 2.)

In addition to the merger assistance, the Federal Reserve created two new facilities: Term Securities Lending Facility (TSLF) on March 11 and Primary Dealer Credit Facility (PDCF) on March 16, 2008. In addition, the policy target rate was lowered by 75 basis points to 2.25% on March 18, and lowered again by 25 basis points to 2% on April 30. As liquidity for several investment banks became dried up, the Federal Reserve recognized the need to deliver liquidity to them and PDCF was the answer.

These measures seemed to be enough to calm the market, although it took until end-April to lower the TED spread below 150 basis points. Amid the crisis of Bear Stearns, CDS spreads of Morgan Stanley and Goldman Sachs increased more than others. However, the increase was short-lived (compared to the November-December episode).

On March 19, in response to tightening housing finance, Fannie Mae and Freddie Mac were encouraged by the regulator to increase their guaranteeing mortgage-backed securities, via lowering capital requirements. However, this contributed to financial fragility of the two Government Sponsored enterprises (GSE) themselves. The GSEs are federally created institutions but privately-owned. Although the GSEs liabilities are not explicitly guaranteed by the government, their bonds (agency bonds) are believed to be implicitly guaranteed by the federal government. The yields of those bonds are only slightly above the corresponding Treasuries. In fact, many of them are held by foreign government as foreign reserves. When the financial soundness of the two GSEs became questioned in the market after June 2009, concerns were quietly expressed by the foreign government that any hint of default may result in the crash of the dollar.

Secretary Paulson requested government funds to support the two GSEs if necessary. Eventually, on September 7, the two GSEs were placed under Federal conservatorship. Implicit guarantee became explicit guarantee. Although Fanny Mae and Freddie Mac were in crisis during the summer to the first week of September, TED, Libor-OIS, and CDS reacted in any measurable way.

During the pre-Lehman period, the scope of the problem was limited to US and European investment banks that created CDOs out of subprime mortgages and investors who bought those securities from them. US dollar liquidity was needed for European investment banks in order to settle contracts and to deleverage their positions. The Federal Reserve established swap lines with ECB and Swiss National Bank on December 12 (the same day TAF was established), with ceiling amount of $20 billion and $4 billion, respectively. This shows an unusual situation in that European central banks felt the need for dollar liquidity for their domestic financial institutions. The swap lines later were increased on March 11, and would be expanded to other central banks and uncapped after the Lehman shock.

The Federal Reserve lowered the interest rate five times between September 2007 and January 2008 by 225 basis points, and another 75 basis points in March 2008, in order to help the collapsing housing market and in anticipation of slower growth due to collapsing housing market. However, the ECB and BOJ did not lower the interest rate during this period. The Bank of England started to lower the rate in December 2007.

In the pre-Lehman period, Asian financial institutions had little damages, and the Asian financial markets and currencies remained stable. In fact, there was a sense of Schadenfreude in Asia. All the problems and policy advices they received during the Asian currency crisis and Japanese banking crisis in 1997-98 should now be directed to the United States and, to lesser extent, to Europe.

2.3. Post-Lehman, US

Figure 2 shows a gradual increase in CDS for all major institutions from end-May. In August and September 2008, financial vulnerabilities of several large investment banks became obvious. By September 12, the CDS for Morgan Stanley reached the level that was experienced immediately after the Bear Stearns. CDS for other institutions had been rising, but the level on September 12 was not so alarming considering what they had gone through in March. The TED and Libor-OIS spreads were stable in the week

preceding the Lehman crash. .

On September 10, Lehman Brothers announced $3.9 Billion losses, and on September 12, Moody's and S&P threatened to downgrade Lehman Brothers. Intense negotiations on how to rescue Lehman Brothers took place among the Treasury, Federal Reserve, and major financial institutions. Bank of America and Barclays had expressed interest in purchasing Lehman, but they had demanded government assistance in loss guarantee, similar to the one given to JP Morgan when it purchased Bear Stearns in March. The federal assistance was not offered and both Bank of America and Barclays declined to purchase Lehman Brothers. Bank of America purchased Merrill Lynch instead.

Lehman Brothers filed for Chapter 11 on September 15, 2008, which sent a shock wave to the financial centers in the rest of the world. Not-so-remarkable levels of the two spreads and CDS other than Morgan Stanley (which reached 250 on September 12) and Lehman Brothers (which reached 700 on September 12) meant that most market participants had expected some sort of a rescue operation.

After Lehman's filing for Chapter 11, almost all financial markets in the United States seized to function properly. In many securities markets, buyers disappeared. The prices could not be found. Crisis spread from investment banks to money market, and adverse effects also spread to financial institutions in other countries which also put great stress on the government when they nationalized troubled financial institutions. The Treasury and Federal Reserve needed to pull off all the weapons they had to fight the crisis.

AIG debt was downgraded on September 15, for its concentration in providing CDS, while CDS for AIG skyrocketed due to heightened fear of who's next after Lehman. Downgrades meant that AIG had to put up large reserves (margin calls), which it did not have. The Treasury and Federal Reserve provided $85 billion loan to AIG, in exchange for stakes in AIG. The loan would be restructured on November 10. Increasingly, AIG became virtually nationalized as a majority of voting shares would become owned by the government.

The Federal Reserve quickly created more facilities to help provide liquidity to various types of financial institutions. On September 19, Asset-Backed Commercial Paper

(ABCP) Money Market Mutual Fund (MMMF) Liquidity Facility (AMLF) was created. This was direct response to the fact that large withdrawal of funds from MMMF started to occur in response to that a money market fund experienced to "break the buck" (a loss occurred to principal) on September 16. The MMMFs hold large quantity of commercial papers (CP), and if they liquidate the CPs, then many firms will be driven to bankruptcy due to a lack of liquidity and working capital. AMLF was to stop this possibility. In the similar direction to help the commercial paper market, Commercial Paper Funding Facility (CPFF) was established on October 7. This opens the possibility that Federal Reserve will purchase high-quality CPs, both asset-backed and unsecured, outright from issues (via primary dealers). On October 21, the Money Market Investor Funding Facility (MMIFF) was established, under Federal Reserve Act, Section 13 (3). (See the discussion on the Governance issue regarding Section 13 (3).) Under this facility, "the New York Fed will provide senior secured funding to a series of special purpose vehicles to facilitate an industry-supported private-sector initiative to finance the purchase of eligible assets from eligible investors." On November 25, the Term Asset-Backed Securities Loan Facility (TALF) was created. The facility was to "help market participants meet the credit needs of households and small business by supporting the issuance of asset-backed securities (ABS) collateralized by student loans, auto loans, credit card loans, and loans guaranteed by the Small Business Administration (SBA). Under TALF the Federal Reserve Bank of New York would led up to $200 billion on a non-recourse basis to holders of certain AAA-rated ABS backed by newly and recently originated consumer and small business loans. The Treasury essentially underwrote the loans so that the Federal Reserve balance sheet from this facility would be protected. This facility was a policy response to disappearing markets of all types of securitized products. So all these "facilities" were created to restore market functions in increasingly wider range of financial products.

The TAF allotments were also increased on September 29. Goldman Sachs and Morgan Stanley were allowed to become bank holding companies, so that they can have access to Federal Reserve discount window. It also meant that a principal regulator for them is Federal Reserve.

On monetary policy front, the policy rate was cut by 50 basis points to 1.5% on October 8, in internationally concerted interest cut. The interest payment on excess reserves started on October 9.[4] The policy rate was further cut by 50 basis points to 1% on

[4] This may be a reaction to a fact that maintaining the (average) policy rate at the target level had

October 29. On December 16, the Federal Reserve adopted a new policy rate target range of 0 – 0.25%. This is virtually zero interest rate policy (ZIRP), a reminiscent of the Bank of Japan policy from 1999-August 2000, and March 2001 to 2006. (The difference between BOJ quantitative easing and FED credit easing will be discussed in the later section.) The Federal Reserve entered the era of ZIRP with unconventional monetary policy.

The TED and Libor-OIS spread increased sharply on September 15, in the wake of Lehman's demise, and continued to increase until mid-October. The TED spread peaked at 460 basis points, and Libor-OIS at 350 basis points on October 10. CDS for Morgan Stanley shot up to 1200 basis points. Other financial institutions also experienced elevated CDS spread. The CDS became increasingly differentiated among financial institutions. In immediate months after the Lehman's failure, CDS for Morgan Stanley, Goldman Sachs, and Capital One remained high, followed by CitiGroup. Bank of America and Fells Fargo remained low. After March 2009, CDS for CitiGroup increased sharply, while others were on the gradual decline. CDS for Citi remained higher than others until September 2009, when all CDS became below 200 basis points, the level before the Lehman's filing for Chapter 11.

The TED and Libor-OIS spreads came down to at around 100 basis points in mid-January 2009. The deviation between the two spreads disappeared. The level remained at around 100 basis points until end-April. The two spreads started distinctive decline in May, becoming lower than 50 basis points in late May. The two spreads became less than 20 by end-September, clearly suggesting a normal condition (pre-BNP Paribas event) was restored in the liquidity and counterparty risk is concerned. The CDS market also shows that the markets now believes the extreme turmoil in the financial markets is over, barring another unexpected shock. However, these assessments should be qualified that the calmness has been attained partly due to ZIPR, all those "facilities" and other policy measures.

2.4. International Responses

(a) Liquidity support and asset purchase

Although the origin of the problem was in the United States, toxic assets were distributed by European investment banks and bought by European investors. US dollar swap lines were introduced as early as December 2007 with ECB ($20 billion) and

become increasingly difficult due to heterogeneity of market participants.

Swiss National Bank ($4billion). (Later they were expanded in amount and eventually uncapped.) This was a first sign of the crisis spreading from the United States to the rest of the world.

Some European banks had large exposure to toxic assets (subprime related securities, and other risky securitized assets). Other western European banks had exposures to Hungary and Latvia where the economies went into difficulties as capital outflows persisted. A large multi-national banking group, Fortis had difficulties in its assets deterioration, and its Dutch operations had to be first injected with capital in September and then nationalized by the Netherland government in October 2008. The French government recapitalized Dexis at the end of September 2008, in cooperatioin with Belgium and Luxembourg.

In the first half of October, many banks became financially fragile worldwide and many countries announced comprehensive rescue packages. (See Penetta (2009) for the list.) The concerted action was partly due to coordination under the G7 on October 10 establishing guidelines for assistance to systemically relevant institutions.

During the month of October, flight to quality has been intensified, and the US dollar appreciated against Euro as investors regarded US dollar as safe haven and US financial institutions accelerated deleveraging (repatriating to US headquarters). US dollars appreciated against almost all currencies but one, the Japanese yen. The yen appreciated due to unwinding carry trades—repaying the borrowed yen for investing in high-yielding currencies, such as Australian dollar.

Panetta et al. (2009) provides a comprehensive survey on the various measures (capital injection, liability guarantee, asset purchase, and asset guarantees) of eleven countries. They report that a total of €5 trillion euro has been committed and €2 trillion has been spent in the eleven countries. Outlay of UK assistance reached 44% of GDP; the Netherlands 17%; US 7.4%; and Japan 0.1%. Details are reproduced as Table 1. Panetta et al. (2009) conclude that when the bank CDS premia are used, then the market has regained stability (as of end-May 2009) and attribute this to the government interventions mentioned above.

Insert Table 1 about here

(b) IMF

With heightened risk aversion, institutional investors pulled their funds out of emerging market economies. Some institutional investors rushed to sell assets in emerging markets to repatriate to US and European headquarters to that they can gain liquidity—a part of deleveraging. Those countries that relied on capital inflows for real-sector investment suddenly faced with shortage of US dollars and Euros to pay back borrowings from foreign investors. This is a familiar problem that has been repeated many times in the recent history: Mexico in 1994, Asian countries in 1997-98, Russia in 1998, Brazil in 1999-2000, Argentina in 2001-02, to name just large ones. IMF suddenly became busy received many requests for assistance.

The current (as of September 30) borrowers of IMF loans under SBA between September and December of 2008, included Georgia, Hungary, Iceland, and Latvia.. Armenia, Belarus, Bosnia, Romania, Serbia joined the list in 2009. Poland agreed to have a newly created facility, flexible credit line, FCL

However, after the failure of the Lehman Brothers, the degree of risk aversion heightened suddenly, and so many financial institutions became almost insolvent and had to be rescued outright, the market was flooded with liquidity but it was not enough to calm the market. Many markets became dysfunctional—no buyer, no prices—and the Federal Reserve had to expand vastly unconventional measures. Many facilities were created to purchase securities and other assets. The Federal Reserve balance sheets quickly doubled. The Treasury, using TARP and other tools, de facto nationalize AIG and injected capital to CitiGroup, Bank of America, and other commercial banks.

(c) Real Economy

Financial shocks became widespread in various directions, US real economies (production, consumption, and investment), foreign exchange markets, and foreign countries, both advanced and emerging markets.

Although consumption and investment was softening since the collapse of the housing bubble in the United States, the financial troubles further dampened the consumer and corporate activities. The GDP growth rate turned negative in third quarter of 2008, but the magnitude of decline became more than 5% in both fourth quarter of 2008 and the first quarter of 2009—a severe recession. The Lehman failure and financial turmoil

that ensued decisively made real activities to shrink. Particularly hard hit was high-end of consumer (semi-)durables, such as consumer electronics and automobiles.

The severe recession in the United States meant US imports to decline suddenly, and major exporters to the United States to suffer from that. Since high end of consumer electronics and automobiles were the first item that consumers decided to postpone purchases, imports to the US from Japan and Germany declined disproportionately. Japan experienced unprecedented decline in industrial production and manufactured exports. Japanese economic growth became bottom of the G7 countries. German exports declined significantly also for the same reason.

(d) Exchange Rates

The large shock spilled over to the foreign exchange markets. The US dollar appreciated against almost all currencies including Euro, British Pound, and commodity based currencies. It was unusual that the currency of crisis-origin country appreciates in the midst of the crisis. This was explained by the fact that many troubled institutions needed US dollar to settle (dollar-denominated) contracts and to repatriate assets, that is exchanging revenues from sale of assets abroad into the US dollar to help the headquarter balance sheet. The only currency that appreciated against the US dollar was the Japanese yen. This was explained by two forces, unwinding of carry trades and loss cut by Japanese retail investors in high-yielding currencies that overwhelmed the repatriation of US financial institutions.

(e) Japan

Japan suddenly felt big declines in stock prices, a sharp appreciation in the yen, and sudden declines in exports in the fourth quarter of 2008 (and continue into the first quarter of 2009). The government tried to stimulate the economy by introducing several fiscal programs. The policy interest rate being already at 0.5 percent, the Bank of Japan could not produce any stimulative measures. The expanding balance sheet or targeting excess reserves that was employed from 2001 to 2006 was not revived this time. Japan experienced minus 3 percent quarter-to-quarter growth rate in two quarters in a row. Japanese banks, which had little exposure to toxic assets, started to feel pressure in the first quarter of 2009, as stock prices continue to decline and the real economy to decline. Some of them recapitalize themselves from the market, diluting existing shareholders. But, they were not in a condition to ask for government capital injection or any other government assistance.

3. Assessment of Policy Responses

3.1. Conventional Monetary Policy

(a) Policy Rate Cut

As explained in earlier section, only the United States was engaged in aggressive interest rate cut before Lehman's failure in September 2008. After the September 2008, the Bank of England aggressively cut of the interest rate from 5% in September 2008 to 0.5 percent in March 2009. ECB cut the interest rate more gradually, from 4% in July 2007 to 1% in May 2009. The more cautious policy stance at ECB may be its self-imposed policy mandate in that the reference rate of desirable inflation is "below but close to 2%" in contrast to the Bank of England target of 2%, with a symmetric tolerance band upward and downward. The inflation rate in mid-2008 was still running high in Europe, UK, and US because of commodity price increases in the preceding year.

At the beginning of the current global crisis, Japan had the lowest policy interest rate, because it had just got out from deflation. As the CPI inflation rate had become positive, the Bank of Japan cautiously raised the policy rate (call rate) in 2006 from 0.0% to 0.25%, to 0.5%. Just when the economy was out of deflation, the shock occurred and the economy seemed to be entering deflation again. The Bank of Japan cut the interest rate in October 2008 by 0.2 percentage point to 0.3 %, and again by the same amount to 0.1% in December 2008. At the same time, the Bank of Japan introduced interest payment to excess reserves. The policy rate that is equal to the interest rate of the excess reserve, so that the rate forms the floor in the interbank rate. Therefore this is virtually zero interest rate policy, but with the rate only slightly above zero. As of September 2009, the inflation rate (excluding fresh food) is about negative 2%, so that the real interest rate has become definitely positive. Therefore, Japan is again suffering from a deflation problem and the zero interest rate as the binding constraint. The policy rate cuts by the four major central banks are shown in Figure 3.

Insert Figure 3 about here

(b) Monetary Policy beyond ZIRP

In the previous episode of the zero interest rate policy (ZIRP), the Bank of Japan targeted the balance of current account (essentially excess reserves). However, in this

crisis, this approach was not taken. See the later subsection on the difference between quantitative easing and credit easing.

When all four central banks reached virtually zero interest rate, is there any role for monetary policy? This question was asked and answered in the context of finding tools to get out of deflation, before during the Japanese ZIRP experiences. Many studied the experiences of Japan and some provided advices to the Bank of Japan.

In the pre-Lehman environment, the Federal Reserve was well-prepared to combat the burst of housing bubble and deflationary impact. Chairman Bernanke and FRB staff had studied what happened in Japan and understood various options to combat deflation. (See Bernanke (1983) on the Great Depression.) Ahearne et al. (2002), Bernanke (2003) and Clouse (2000) studied and discussed the Japanese experiences and discussed unconventional instruments. Bernanke (2002) showed some confidence that deflation in the United States in the post-tech bubble burst would be avoided, and Bernanke (2003) argued that Japan could find ways to expand its balance sheet even at the zero interest rate, although he expressed sympathy to a concern of possible deterioration on the asset side, that could be helped by assurance from the Ministry of Finance.

Among the academics, Krugman (1998) offered an advice of generating expectation of higher-than-usual inflation rate during the phase of deflation so that the expected real interest rate would become lower. Eggertsson and Woodford (2004) analyzed the issue of optimal monetary policy under the zero bound of the interest rate. They argue the importance of communication for commitment on the future interest rate path. Svensson (2001) provided a policy prescription for Japan that involves unsterilized intervention with a depreciated level of target exchange rate. The foolproof way of getting out of deflation is based on export promotion and imported inflation. However, with global ZIRP, Svensson's proposal would not work, as it would become global beggar-thy-neighbor policy.

(c) Expectation Management

At the point of effective ZIRP, there still remains an important aspect of conventional monetary policy, namely inflation expectation management. For the inflation targeter like the Bank of England, maintaining the inflation target and communicating the intention of achieving it in medium-term, as usual, may still act as an anchor. In fact, the fan chart of the Bank of England had shown almost always achievement of 2%

target, with high probability, in its two-to three-year horizon. However, in the height of the current crisis, namely Inflation Report of November 2008 and February 2009, the fan chart, based on market interest rate expectations, showed that achieving the 2% target, even after three years, would be quite unlikely. The most likely projection was at around 1% inflation rate by end 2011, as shown in Figure 4 (reproduced from the Bank of England, Inflation Report). This posed a quite difficult situation for the central bank. Did the Bank of England abandon inflation targeting? Or has the Bank of England become incompetent in achieving the target?

Insert Figure 4A about here

The Bank of England started to purchase high quality securities, including Gilt in March, and the ceiling of purchase would be increased gradually.[5] By August 2009 inflation report, the fan chart was able to show that 2% target would be achieved by mid-2011 on the assumption that the policy rate is to be maintained at 0.5% and asset purchases of £175 billion to be maintained. This is shown in Figure 4B. The Bank of England took advantage of Inflation Report to anchor expectations, and employ unconventional policy of asset purchase was integrated in the framework of inflation targeting. With the inflation targeting framework, a transition from conventional to unconventional was easily communicated ("without unconventional policy, inflation target cannot be achieved"), and it would be easy to rationalize when time comes for exit ("even without quantitative easing, inflation target will be achieved.")

Insert Figure 4B about here

Expectation management posed a similar problem at Federal Reserve. Although it is not an inflation targeter, the inflation rate between 1% and 2% was considered to be an appropriate. (Chairman Bernanke once called this rage as a comfort zone.) The Federal Reserve does not publish Inflation Report, but it produces the distribution of FOMC members' personal forecasts. Forecasts are shown twice a year at the time of Monetary Policy Report to Congress (formerly, Hamphrey-Hawkins testimony). In February Report (polls taken in January), the lower bound of the range of forecasts became lower than 1 percent even in the three year horizon (forecasts for 2011). It must be more than

[5] The Bank of England announced to introduce Asset Purchase Facility in January 2009. The Bank started to purchase of high quality securities, including Gilt in March. The amount increased from £2.5 billion in March 2009 to £158.4 billion in October 1, 2009.

just a coincidence that from this report, the "long-run" forecasts were surveyed, where long-run forecasts are defined as: "Longer-run projections represent each participant's assessment of the rate to which each variable would be expected to *converge under appropriate monetary policy* and in the absence of further shocks to the economy" (footnote of the table of projection, with emphasis being added by the present author). This language is very close to those under the inflation targeting regime. The long-run projection shows the central tendency of [1.7, 2.0], while the range was [1.5, 2.0]. Federal Reserve regarded that this step was important in managing expectation and communication to the public. That is the precisely the point of having a numerical inflation target. It seems that the Federal Reserve is now a step closer to adopting inflation targeting without declaring so explicitly.

The Bank of Japan that publishes the Monetary Policy committee members' forecasts twice a year had the forecast in April publication. According to the forecasts for Fiscal Year 2010, the central tendency (trimming the max an min) is [-1.1, -0.8] and forecasts of all members is [-1.2, -0.4]. There is no long-run forecasts in the table, and any sign of expectation management to get out of deflation is visible in the document. [Next publication of the document will be at the end of October.]

The summary of the four central bank policies is shown in Table 2. Each central bank has its own way to conduct conventional and unconventional monetary policy under virtually zero interest rate environment.

Insert Table 2 about here

3.2. Unconventional Monetary Policy: QE vs CE

(a) Term Liquidity Provision and Asset Purchase

ECB started the liquidity provision in the aftermath of the Lehman failure. Its policy of enhancing credit provision and its effects on the spread are examined in Čihák, Harjes, and Stavrev (2009). Their conclusion is that the ECB transmission continued to operate during the global crisis. Lengthening of the maturity of monetary policy operations and the provision of liquidity at the fixed rate reduced money market term spreads and facilitated the policy to work. They also interpreted that the substantial increase in the ECB's balance sheet may have contributed to a reduction in the government bond term spreads.

ECB announced on May 7, 2009, to start purchasing euro-denominated covered bonds issued in the euro area. The Governing Council of the ECB decided the technical modality on June 4. The purchase would start in July and the target amount would be EUR 60 billion to be completed by June 2010. The purchase will be directly from primary and secondary markets. The high grade (AA or above) is preferred and underlying assets that include exposure to private and/or public entities.

(b) QE vs CE

The similarity and difference between quantitative easing (QE), adopted by the Bank of Japan from 2001 to 2006, and credit easing (CE) of Federal Reserve is explained by Bernanke (2009 Jan) himself.[6] Let me first paraphrase his points (all quoted statements in the following several paragraphs are his). The similarity between QE and CE is an expansion of the central bank's balance sheet. But the difference is that which side of the central bank's balance sheet is in the policy focus. The (pure form of) QE emphasizes the liability side, while the focus of CE is the composition of central bank's assets.

As the policy target, the Bank of Japan replaced the call rate with the amount of current account at the Bank of Japan, that is, essentially the excess reserve of the financial institutions. The asset side, that is the composition of loans and securities, is "incidental." The Federal Reserve's CE "focuses on the mix of loans and securities that it holds and on how this composition of assets affects credit conditions for households and businesses." The difference, Bernanke explains, stems from the difference in financial and economic conditions of Japan, 2001-2006 and the U.S. 2008: "credit spreads are much wider and credit markets more dysfunctional in the United States today than was the case during the Japanese experiment with quantitative easing." The stated policy objective of FED CE is "reducing those spreads and improving the functioning of private credit markets more generally"

[6] "Our approach--which could be described as "credit easing"--resembles quantitative easing in one respect: It involves an expansion of the central bank's balance sheet. However, in a pure QE regime, the focus of policy is the quantity of bank reserves, which are liabilities of the central bank; the composition of loans and securities on the asset side of the central bank's balance sheet is incidental. Indeed, although the Bank of Japan's policy approach during the QE period was quite multifaceted, the overall stance of its policy was gauged primarily in terms of its target for bank reserves. In contrast, the Federal Reserve's credit easing approach focuses on the mix of loans and securities that it holds and on how this composition of assets affects credit conditions for households and businesses." Bernanke (2009, Jan)

When QE was adopted in March 2001, the transmission channels from expanding the central bank balance sheet to stimulating economic activities were controversial. First, flooding the market with liquidity stabilizes the banking system by erasing fear that a bank may fail due to a lack of liquidity (as opposed to insolvency). Second, QE may reduce the long rates, if it contributes to forming an expectation of lower short rates in the future, and the long rates is more relevant to stimulating investment activities. The expectation of future ZIRP is strengthened by clarification of the strict exit condition. This channel is called "policy duration effect." Third, QE may encourage financial institutions to take more risks, by lending to less credit-worthy customers or by purchasing riskier securities, including equities and foreign-currency denominated securities. That would have effects to raise the stock prices and depreciate the yen, as well as keeping SMEs alive, encouraging venture capital to spring up, and making it easier to restructure non-performing loans. This can be called the bank lending channel. Fourth, risk-taking behavior among institutional investors and retail customers, may increase due to looser lending policy of banks. Again, equities and foreign currency denominated securities are likely choices. Thus, QE were a commitment strategy creating expectation of sustained ZIRP, might have encouraged "carry-trade" and depreciate the yen.

In the last line of thinking, Svensson (2001) advocated a foolproof way of stimulating the economy under ZIRP by conducting the targeted depreciation of the currency backed by unlimited unsterilized intervention. Although Japan engaged in massive intervention from January 2003 to March 2004, in parallel with expansion of the Bank of Japan balance sheet, both the Ministry of Finance and the Bank of Japan would deny their embracing Svensson's advice. (Deputy Governor Iwata once mentioned, in response to newspaper reporter question, that the intervention and QE were purely a coincidence.)

What are the assessments of the effectiveness of various QE transmission channels. There is near consensus that it contributed to financial stability and that policy duration effect also worked. Many agree that BOJ-QE of 2001-06 with committed (non-)exit strategy had a "policy duration" effect and contributed to flattening of the yield curve. (See Ito (2004; RBA) for controversies in Japan over adoption of QE, non-adoption of inflation targeting, and effectiveness of QE. See Oda and Ueda (2005) for policy duration effects.) There is some evidence of the yen depreciation through carry-trade, but it would be difficult to assess an incremental effect of QE beyond ZIRP. Most controversial is the bank lending channel. There is little evidence, empirical or

anecdotal, that banks lent more because of QE. Banks were worried about their liquidity positions and Basle capital ratio in 2002-2003. (The core capital of major banks was steadily eroded from 1999, when capital injection fattened their capital, to 2002, and they found that large proportion of their tier I was replaced by "tax deferred assets." The new FSA minister Takenaka, in October 2002, threatened banks to raise capital or otherwise. He was reported to have said that "No Bank is Too Big to Fail.") The banks were not making more loans, just because of increased QE in 2002-2003.

In the credit easing policy, the focus is to restore a dysfunctional bank credit market and to restore the market mechanism in the securities market. This can be better analyzed in the framework of credit channel of monetary policy, rather than the conventional interest rate channel, if such a distinction is appropriate. The credit channel, as surveyed in Bernanke, Gertler and Gilchrist (1999), emphasizes the bank lending and firms behavior of the usage of the funds in profitable projects. The credit channel is often powerful in explaining the linkage between credit quality, bank health, and firms' available resources, and creating business cycles due to bank credit availability. If the current global crisis is an extreme form of business downturn, rather than as a result of some structural breaks, the credit channel model must have a good explanatory power in explanation. Indeed, the large movement of various market interest rate spreads, such as TED spread and Libor-OIS can be interpreted broadly as the credit problem in the banking sector that affects bank lending.

One of the objectives of credit easing is to restore a normal spread in the credit market. How monetary policy responds to the heightened credit spread and whether the monetary policy could influence the spread is a topic of recent investigation.[7]

Bernanke (2009, Jan) argues that it is not possible to set a single number as policy objective in the regime of credit easing, as it is more driven by demands. He admits that this poses a communication challenge. He declares that more transparency about the condition and plan of how the balance sheet is used for credit easing.

[7] Taylor (2008) and Cúrdia and Woodford (2008) investigated whether a central bank should respond to the market credit spreads. By modifying the conventional Taylor rule to include the credit spread, Taylor showed that the Fed action of rapid easing in the current crisis can be better explained. This was named spread-adjusted Taylor rule. Sudo and Teranishi (2008) and Teranishi (2009) showed that under some circumstances, the spread-adjusted Taylor rule is an optimal monetary policy rule. In particular, Teranishi (2009) showed that the spread-adjusted Taylor rule is an optimal monetary policy under heterogeneous loan interest rate contracts in both discretionary and commitment strategy, and that a commitment policy is effective in narrowing the credit spread when the central bank hits the zero lower bound constraint.

I have three observations and interpretations of the difference between QE and CE. First, since the effectiveness of the BOJ QE in the 2001-2006 episode is somewhat controversial, this might have been a consideration in Bernanke's choice of the name of FRB policy being different from QE, but that did not stop Governor King of Bank of England to name his policy quantitative easing. Second, the mid-term and long-term rates came down and that must have positive stimulating effect on the economy. A similar effect can be achieved if expectation of sustained ZIRP—even after the time point that the regular policy rule would prescribe the rate rise—can be managed with different communication method (without expanding the central bank's balance sheet. Third, the acute difficulty in the financial and capital market, similar to the US markets post-Lehman months, existed in Japan after a major bank, and one large and one medium-size securities firms failed in November 1997. The Japanese banks suffered from humiliating Japan premium, a widened spread for Japanese banks in the dollar interbank markets. Widespread credit crunch was also reported. Since Japan was and still has a more bank-based financial system than the United States, credit crunch had a major impact on the economy. Purchasing various securities, similar to CE, would have had little impact on easing problem. Yet, with the benefit of hindsight, the Bank of Japan could have done CE-like opearations in the wake of the banking crisis of November 1997, but probably not in 2001-06. Fourth, although Chairman Bernanke dismisses the importance of the asset side considerations of the Bank of Japan QE, the scope of collateral was expanded, including corporate bonds and commercial papers. The Bank of Japan also purchased more than 2 trillion yen worth of equities from commercial banks, but the Bank stressed that it was not a part of monetary policy but for the systemic stability.[8]

(c) Governance

Unconventional monetary policy also posed weakness in governance of the Federal Reserve Board and Federal Reserve System. In the crisis environment after the Lehman's failure, several facilities were created and some important decisions were made at the Federal Reserve Board. Many "facilities" to provide financial institutions with liquidity fell into a category of unconventional policy. They were not monetary policy that was conducted by FOMC (Governors and regional Federal Reserve Bank President), but policy that was decided by Governor of the Federal Reserve Board (FRB). Specifically, discounts for individuals, partnerships, and corporations can be

[8] See Ito (2004: p.239) for detailed accounts of the Bank of Japan policy.

determined by the Governors at FRB alone: "In unusual and exigent circumstances, the Board of Governors of the Federal Reserve System, by the affirmative vote of not less than five members, may authorize any Federal reserve bank, during such periods as the said board may determine, at rates established in accordance with the provisions of section 14, subdivision (d), of this Act, to discount for any individual, partnership, or corporation, notes, drafts, and bills of exchange when such notes, drafts, and bills of exchange are indorsed or otherwise secured to the satisfaction of the Federal Reserve bank" (Federal Reserve Act, Section 13 (3).) Therefore, as monetary policy moved from conventional to unconventional policy, the power shifted away from regional Federal Reserve Bank Presidents. In light of needs for quick responses, this may be desirable. However, it posed some governance question and transparency question (no minutes available for Section 13-3 decitions) in the Federal Reserve System.

3.3. Should Lehman Brothers have been saved?

The success of crisis management in March 2008 in reaction to Bear Stearns collapse became a medium-term curse. It generated moral hazard among investors and banks that the counterparty risk is small, since the government would arrange a rescue merger. In particular, many market participants and observers come to believe that a too-big-to-fail would apply to investment banks that are larger than Bear Stearns. It also generated complacency among the regulators in that another crisis may be averted, if it ever happened.

After Bear Stearns was rescued with assistance from the Federal Reserve and the Treasury, the market maintained calm although with higher-than-normal spread for various risk. US and European financial institutions were deleveraging quickly to shrink the balance sheets. The crisis originated from the United States, and most adverse consequences were concentrated in the United States. Policy responses were on the conventional monetary policy, lowering the interest rate. However, several unconventional policy responses were also employed: creation of Term Auction Facility (TAF) in December 2007; rescue operation of Bear Stearns and creation of Term Securities Lending Facility (TSLF) and Primary Dealer Credit Facility (PDCD) in March 2008; and explicit government guarantee of GSE. These were remarkable developments in the category of unconventional monetary policy in the pre-Lehman period.

Bear Stearns in March 2008 had two important changes to the market sentiments. First,

many market participants and observers were surprised that investment banks are in serious financial conditions. Second, the rescue merger arranged by the Treasury and Federal Reserve gave assurance that the Treasury and the Fed were prepared to take extraordinary actions to prevent an outright demise of financial institutions. Counterparties would be protected and no financial domino would occur. The relatively small reaction of spreads (as explained in the preceding section, Timeline) attests the description.

With all the indications, a collapse of Lehman Brothers was a watershed. Clearly, what had happened after the collapse was not the best outcome that the financial policy was supposed to produce. Putting it more bluntly, letting Lehman Brothers file for Chapter 11 was a mistake.

However, many observers differ on what should have been done and what could have been in what timeframe. Below I summarize some of the arguments critical of Treasury-Fed policy and defense of the policy (based on my conversation with those informed).

Naïve criticism (from lender-of-last-resort believer) would go as follows: Given the financial turmoil that was caused by the collapse of Lehman Brothers, it should have been saved by a Bear-Stearns like rescue merger. It was too rigid to say "no assistance from the government this time." Ultimate costs to taxpayers, in an attempt to avert financial collapse after the Lehman's failure, turned out to be much larger than the amount of assistance that the government would be required to give to a potential financial institution to merge Lehman.

Defense of the Treasure-Fed actions would go as follows: There are three differences between Bear Stearns and Lehman Brothers. First, deterioration of the Bear Stearns liquidity position took place suddenly, so Bear Stearns did not have time to cope with the change in financial environment and the regulators were caught off guard. So, it was justified to take an extraordinary action of loss guarantee. Second, after the rescue merger of Bear Stearns, TSLF and PDCF were introduced so that a mechanism was there that Lehman could help itself. Third, a line had to be drawn somewhere to avoid moral hazard.

Further criticism to this line defense would go as follows:: It may be true that Lehman

Brothers management was at fault, but the management failure or not should not be a criterion to for rescuing an institution or not. "Moral hazard" might be evident because the Bear Stearns rescue created a notion that any investment bank larger than Bear Stearns (no. 5) would be rescued. No counterparty risk. The Treasury and Fed were to "draw a line," it should have done so immediately after the rescue of Bear Stearns, emphasizing it had been an exceptional case and would not be under no circumstances repeated. Instead, policy shift toward preventing moral hazard seems to have occurred implicitly only after the Bear Stearns handling was criticized. When the Treasury entered negotiation with financial institutions (Bank of America and Barclays) that expressed interest in taking over Lehman brothers just several days before the weekend of September 13, the potential suitors must have believed that similar sweeteners would be added to the rescue deal.

By asserting "moral hazard"—no sweetener—the Treasury created financial chaos following the Lehman's filing chapter 11. Then the Treasury and the Fed had to provide all sorts of lifeboats to many institutions: AIG, CitiGroup, Bank of America.

Even if the Lehman Brothers was to fail, either because of lack of enough collaterals or insolvency, chapter 11 was the worst form of failing a financial institution. Under Chapter 11, the bankruptcy court freezes assets, while the institution is protected from creditors. First, all the claims to the institution will be categorized and sorted out for priority before they started to be returned. The particular aspect of this temporary freeze on liability payments, especially short-term liabilities and liabilities due to swap, derivative, collateral and consignment contracts—basically customers' assets in care of the securities firm, was the source of financial domino effects. Many of the financial difficulties experienced by other investment banks, institutional investors, and hedge funds rooted in this freeze of assets and protection from creditors.

There is another international dimension to this failure. Immediately after Lehman's filing of Chapter 11 in the United States, its subsidiaries filed similar bankruptcy/rehabilitation plan in Japan and UK. Accordingly, financial regulators of Japan, and UK ordered that the Lehman's subsidiaries assets to be frozen in the boundary of each country, fearing *de facto* siphoning assets from each country to headquarters. Bankruptcy laws in the three countries are different in details and it became difficult for a subsidiary to resolve the organization within each jurisdiction. Japanese assets that belonged to customers but in swap arrangements with New York or

with London faced difficulties in unwinding.

In bankruptcy law, proprietary trading and trading accounts for customers are separated and the latter is fully protected in bankrupted securities firms (investment bank), it took months to return those assets to customers. Days may be too late for some of the institutional investors that face redemption and withdrawal of funds form retail customers.

Considering all these difficulties that ensued, it would have been much better for the financial markets that the government takes over, i.e., nationalize, Lehman Brothers. The new government-run institution would be able to honors short-term liabilities, to unwind swap arrangement, and to return assets of customers in consignment, within days if not hours.

Defense of the government action would say that there was no legal framework for the government to take over a financial institution like that. However, rebut is possible. First, the fact that a majority share of AIG was acquired by the government very quickly, de facto nationalization, shows that it seems possible for the government to take over a (near-)insolvent financial institution, if the government is determined to do so. Second, more fundamentally, the six months from the Bear Stearns rescue to the Lehman's chapter 11 had to be spent in regulatory and legal reform to make such a government takeover of a seriously troubled institution possible.

3.4. Bank Restructuring: Conventional Wisdom and Practices

A rich literature exists on how to manage and exit from the banking crisis, once the crisis erupted.[9] The best practices have been learnt from the experiences of the US Savings and Loans crisis in the 1980s; the Nordic banking crisis in the early 1990s; the Asian financial crisis of 1997-1998; and the Japanese banking crisis in 2007-2003, to name a few.

When a bank is short in liquidity, providing liquidity by accepting wider range of collateral is a first step. When the counterparty risk is hiked for some reasons, the liquidity provision by the central bank is not uncommon. In the extreme case, providing liquidity becomes a lender-of-last-resort operation. An important point here is that the

[9] To name a few, Caprio, et al. (1998), Hausmann and Rojas-Suárez, (1996), Ito and Hashimoto (2007) and Reinhart and Rogoff (2008).

central bank has to be sure that shortage is in liquidity, not in capital. The liquidity crisis can be helped by liquidity provision, but the insolvency crisis (capital becoming negative) cannot be helped by liquidity provision. During the acute crisis, it is very difficult to differentiate the two. In many times in history, liquidity provision was used time to time in many countries, sometimes successfully and sometimes resulting in insolvency. In the current global crisis, many "facilities" created by Federal Reserve fall into this category. European Central Bank, Bank of England, and Bank of Japan also expanded asset purchases from the market and from commercial banks directly, helping liquidity to banks, but the magnitude was much less than Federal Reserve.

When a crisis is caused by deteriorating asset quality, a different solution has to be sought. If writing off non-performing loans and valuation losses from assets become significant compared to capital of the bank, the government can inject capital, by subscribing to subordinated debts or purchasing new issues of common shares, to the troubled bank. Capital injection was tried twice in Japanese banking crisis of 1997-1998, and in the current global crisis in many countries.[10] The problem in capital injection is that the government tends to be shy away from taking management control, while helping banks gaining breathing space. Precisely because the government does not take control, banks tend not to take drastic reform measures. If the government tries to put too stringent restriction, no bank applies for it (also a stigma issue). So, the government tends to force several major banks—strong or weak in capital position—to accept capital injection. This was the case in March 1998 in Japan, and October 14, 2008 in the United States. However, if a stringent condition is imposed (like a cap on executive bonuses), banks will repay injected capital quickly, whether they may still need it. This happened in the United States in the current crisis. Capital injection has a side effect, that banks may not take a serious reform effort, like writing off nonperforming loans aggressively, or separating bad assets to a bad bank (collection agencies). This was the case in Japan from 1999 to 2002, when complacency eroded true capital. The United States also failed to convince banks to take advantage of TARP precisely because banks did not find it advantageous to sell assets in fire sale prices.

Blanket guarantee of deposits are often necessary to avoid a bank run. Japan introduced a blanket guarantee in as early as 1995, while the serious crisis did not happen until 1997. Even during the protracted banking crisis, there was no bank run in

[10] See Cargill, Hutchison and Ito (2000) for the experiences of the Japanese banks.

Japan. United Kingdom hesitated to provide a blanket guarantee when Northern Rock became known to have fragility in the fall of 2007. The ceiling for full guarantee was rather low, and a bank run occurred against Northern Rock until it was nationalized in February 2008. This was a costly episode eroding confidence in financial regulators. During the Asian crisis, Indonesia closed sixteen banks without full guarantees of deposits, and that causes bank run and capital flight.[11] In the global crisis, Sweden increased the ceiling of deposit guarantees to SEK 500,000 on October 6, and Switzerland did the same up to CHF 100,000 on November 5. On October 5, the German government guaranteed all private bank deposits. On September 30, deposits in six large banks in Ireland were guaranteed by the government, and this was an enhancement from a deposit insurance ceiling of EUR 100,000 only ten days earlier.

Not only deposits but other liabilities of banks can be guaranteed by the government if and when counterparty risk becomes too high. In order to maintain the interbank market and to avoid systemic risk, guarantee of liabilities, new and old, may be provided. In the current crisis, the German government and SoFFin (financial stabilization fund) used guarantees to several large institutions.

When a financial institution is near or in the state of insolvency, in many cases, the government prefers to take over and restructure it to leave it to be liquidated it. A large financial institution shutting the operation suddenly (or applying for bankruptcy and its assets being frozen) increases the risk of systemic risks and financial domino. This was actually what happened in the case of Lehman's filing Chapter 11 (see later section for this discussion). Nationalization makes it possible to resolve an institution without causing stress to creditors of short-term assets, counterparty of derivatives, while it is possible to hold shareholders and management responsible. Hesitation on the part of the government is also understandable. Outright nationalization may invite criticisms of too much intervention into the free market, of incompetence of the government in running a large complex bank, and of possible conflict of interest, if the government or public corporations are borrowers from the bank. However, nationalization has an advantage to exercise drastic reforms in selling non-core assets quickly, lowering wages and legacy costs, and possibly separating distressed assets to a bad bank. Nationalization and separating bad assets worked in S&L crisis in the United States, in the Japanese banking crisis from 1997 to 2003, in the Asian financial crisis (Korea,

[11] See Ito (2007) for a critical review of the "prior condition" for the IMF program for Indonesia in October 31, 1997.

Indonesia, and Thailand).

It is well recognized that separating distressed assets—nonperforming loans in the Japanese context and toxic assets in the US context—is a key to revive health of banks in trouble. However, it is very difficult to convince banks to sell distressed assets to the private equity fund or government-sponsored bad bank (or fund), unless the government has a strong stick, or threat of nationalization. Sometimes, actual (not just a threat of) nationalization is needed to arrive at a good bank-bad bank solution.[12] This was shown true in the S&L crisis in the 1980s; Nordic crisis of the early 1990s; and the Indonesian, Thai, and Korean crisis in 1997-98.

The failure to use Troubled Asset Relief Program (TARP) money in the United States for its original purposes is the lack of stick in the hands of the government to force banks to sell toxic assets. Valuation is inherently difficult when markets for those securities had virtually disappeared. The gap of pricing between sellers' wish and buyers' responsibility to taxpayer could not have been bridged. If the banking fragility is to continue in the United States, hesitation in nationalization, however temporary it might have been, that made difficult to force separation of toxic assets will be identified as one of the reasons,.

3.5. Summary

My major assessments of the policy responses are as follows:

(1) Credit easing, as well as conventional policy, by Fed has been very successful in avoiding the worst possible situation—a meltdown of the financial markets—in the wake of Lehman Brothers' failure.

(2) Various unconventional measures employed by European financial authorities were effective in providing liquidities averting large scale financial problems. Some of early nationalization and liability guarantees maintained systemic stability.

(3) Although unconventional policies had high costs, they established evidence that during the crisis, they are well spent in avoiding a financial disaster.

(4) Letting the Lehman Brothers file for Chapter 11 was a mistake. But, what should have been done needs careful discussion. Six months between March 2008 and September 2008 should have been used not only for firefighting, but an institutional overhaul in anticipation of some large, complex institution may become (virtually)

[12] Schäfer and Zimmermann (2009) argues that "bad banks and nationalization are not alternatives but rather two sides of the same coin."

insolvent.

(5) The inflation targeting is an effective tool for expectation management andn communication even during the phase of ZIRP.

4. Remaining Challenges

As argued in the end of Section 2, the financial markets and institutions regained normalcy in terms of risk spreads and CDS premium. However, this may be still dependent on various conventional and unconventional monetary policies. How to exit from ZIRP, CE/QE, and all other guarantees and injected capital is obviously a difficult challenge in coming months. However, to err on the side of late exit would be prudent given what the market experienced since September 2008. Still deflation may be more of a risk than inflation. A critic may point out that the last episode of keeping the interest rate low in the aftermath of the tech bubble burst might have sown the seed of housing bubble. (Taylor (2009).) Therefore, exit must not be delayed. However, at this moment there is no sign of another bubble to form due to ZIRP. The worry is misguided. Of course, as a long-run issue, it is important to examine whether and how money policy should respond to asset prices.

One of the main reasons for the subprime crisis in the United States was its antiquated regulatory framework—fragmented, duplicated, but with cracks. Investment banks were not effectively regulated by SEC, and multiple regulators invited regulatory arbitrage. Currently, it is proposed to give more power to Federal Reserve in supervising systemically important financial institutions. The issue of whether an integrated supervisor, FSA, is effective in regulation and supervision, or a central bank should play a large role in supervision has been debated in policy circles. United Kingdom, Japan, Australia and Korea, among others chose a model of FSA, while several continental European countries have a hybrid of federal regulator and national central bank.

When normalcy in the financial market is restored and the supervision framework is straightened out, a fundamental question of how to avoid “too big to fail” while systemic stability is maintained has to be debated in the international arena. In order to avoid too big to fail, the government has to have a tool to nationalize a large, complex, internationally-active financial institution for orderly resolution. However, if the government-led resolution frameworks for Europe, US and Asia are not coordinated, the

resolution becomes difficult (recall the difficulty caused by Chapter 11 and corresponding frameworks in US, UK and Japan for the Lehman resolution).

Now that G20 becomes a permanent forum for discussing financial architecture, the leadership in G20 is needed to steer discussions into a direction of relevance. Engaging important emerging market economies is important, but 20 may be too large a number for effective discussion.

IMF is again criticized that it may overlook signs of vulnerability among emerging markets that are now under its program—Iceland, Hungary, Belarus, and Latvia, to name a few. Could it be ever possible to make an early warning? The call for early warning was heard in the aftermath of the Mexican crisis of 1994, again after the Asian crisis, and this time. If every crisis is different, it is almost impossible to predict a crisis. On the other hand, too much short term debt in comparison to foreign reserves seems to be a robust indicator for vulnerability. This was recognized by Asian countries and they have piled up foreign reserves since 2000. It seems their accumulating foreign reserves, however costly in terms of fiscal operation, are worthwhile in avoiding any crisis in East Asia in the current global crisis.

G20 and IMF should shift a focus to establishing a global resolution mechanism for a large, complex, internationally-active financial institution in order to avoid moral hazard, while maintaining the systemic stability. This is the most important lesson from the Lehman's filing for Chapter 11, and the most important lesson for global financial supervision and regulation in the future.

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Figures&Tables

Figure 1　TED spread and Libor-OIS spread, July 2007 – September 2009

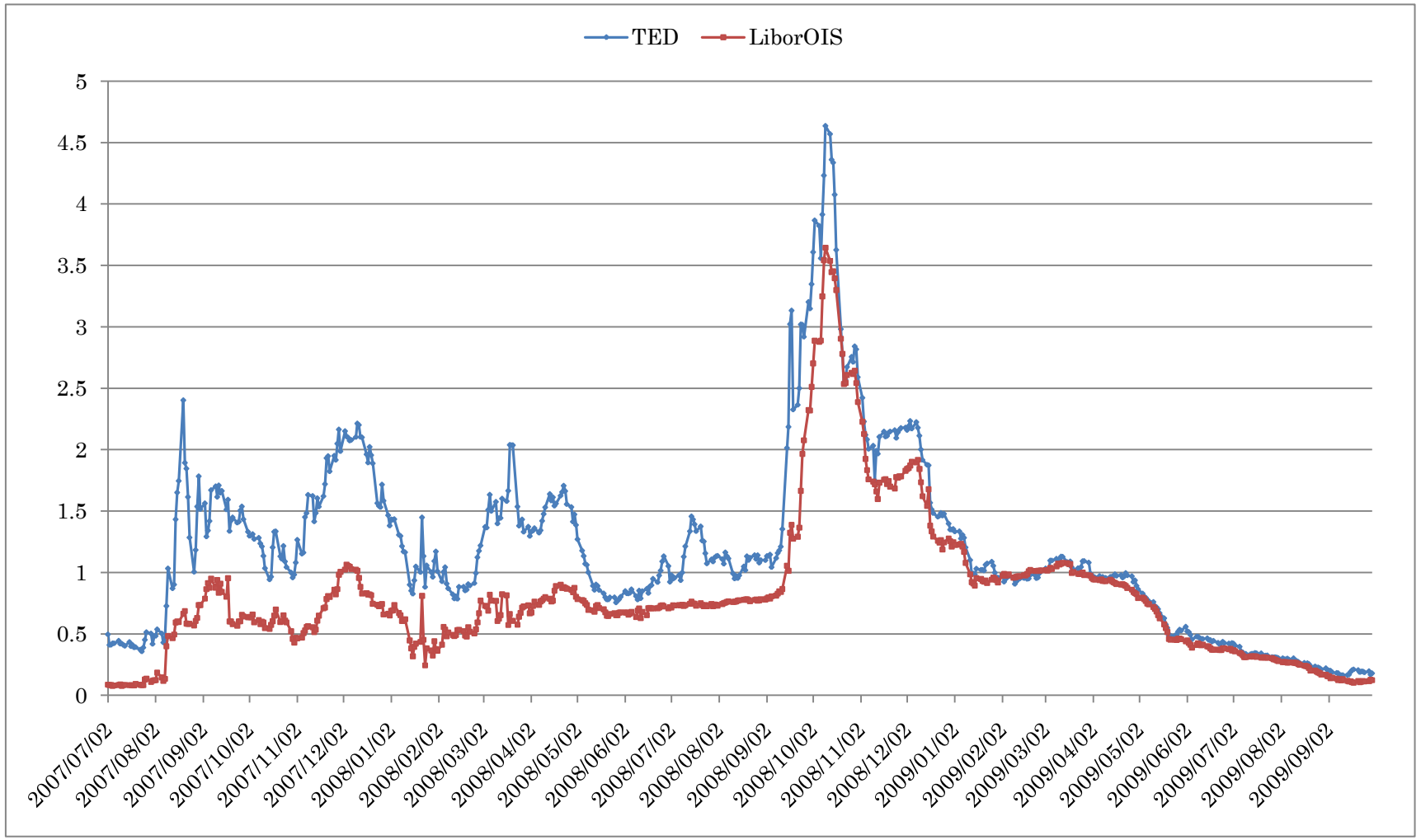


Figure 2: CDS for representative banks

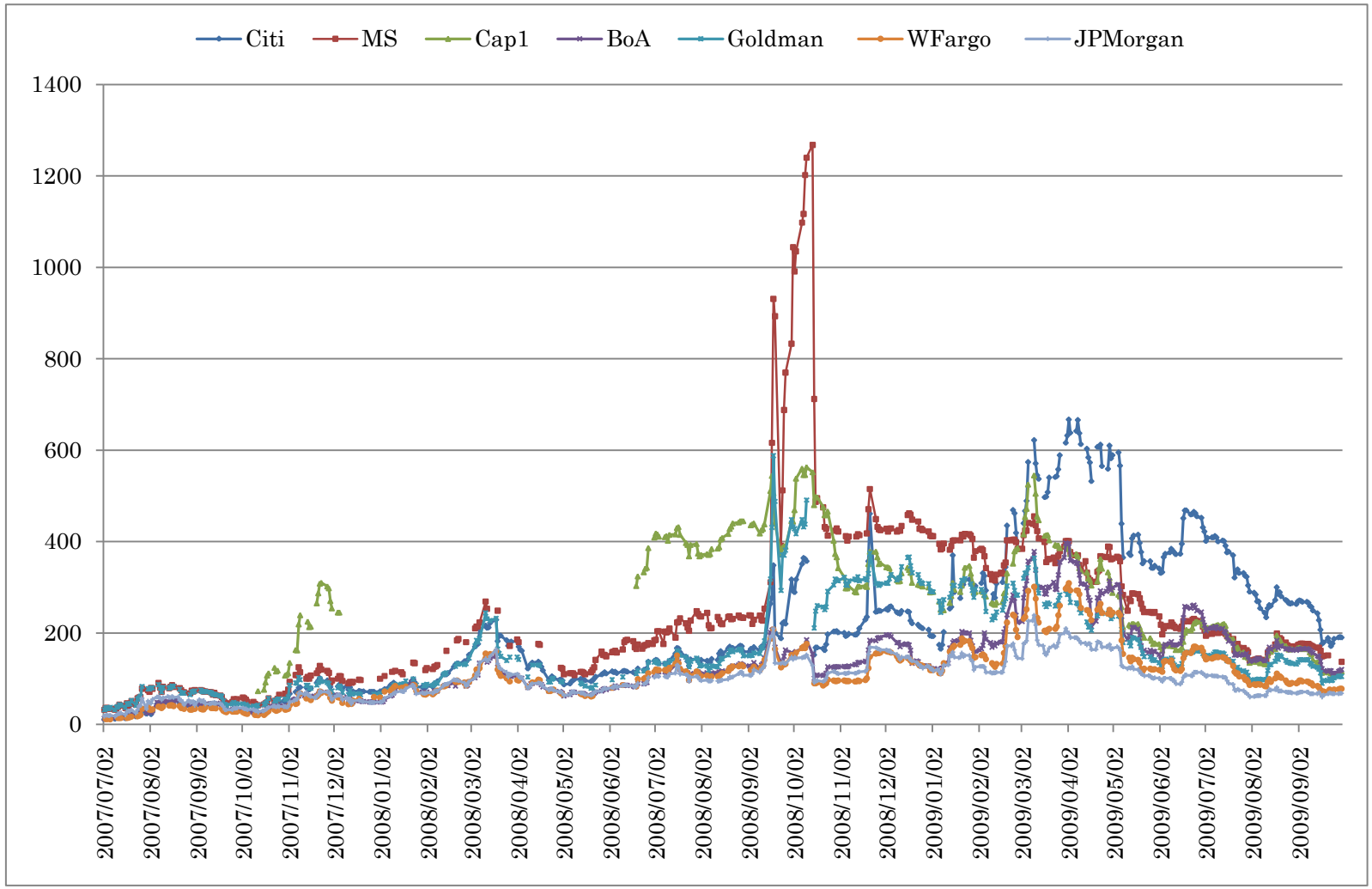


Table 1: Overview of Commitments and Outlays of Rescuing Banks (Panetta (2009, table 1.2)

		Capital Injection Euro billions	**Debt guarantees** Euro billions	**Asset purchases** Euro billions	**Asset guarantees** Euro billions	**Total** Euro billions	% of GDP	% of banking sector assets
Australia	Commitments		Uns			Uns	Uns	Uns
	Outlays		62			62	10.4	4.6
Canada	Commitments		Uns			UNs	Uns	Uns
	Outlays		0					
France	Commitments	43	320		5	368	18.9	4.8
	Outlays	28	72		5	104	5.3	1.4
Germany	Commitments	80	420	Uns	200	700	28.1	8.9
	Outlays	22	129	0	0	151	6.1	1.9
Italy	Commitments	20	Uns			Uns	Uns	Uns
	Outlays	10	0			10	0.6	0.3
Japan	Commitments	105		8		113	2.7	0.9
	Outlays	3		0		3	0.1	0
Netherlands	Commitments	37	200		28	265	44.6	11.9
	Outlays	31	40		28	99	16.6	4.4
Spain	Commitments	Uns	100			Uns	Uns	Uns
	Outlays	0	31			31	2.8	0.9
Switzerland	Commitments	4	Uns	27		Uns	Uns	Uns
	Outlays	4	0	27		31	8.7	1.5
United Kingdom	Commitments	54	269		523	845	54	10.8
	Outlays	54	113		523	690	44.1	8.8
United States	Commitments	335	1760	115	281	2491	22.3	25.5
	Outlays	237	271	36	281	825	7.4	8.4
Total of 11 countries	Commitments	677	3131	150	1036	4994	18.8	8.3
	Outlays	387	719	64	836	2006	7.6	3.3

Source: Panetta et al. (2009: Table 1.2., p. 13)

Figure 3: Policy rates of FRB, ECB, BOJ, and BOE

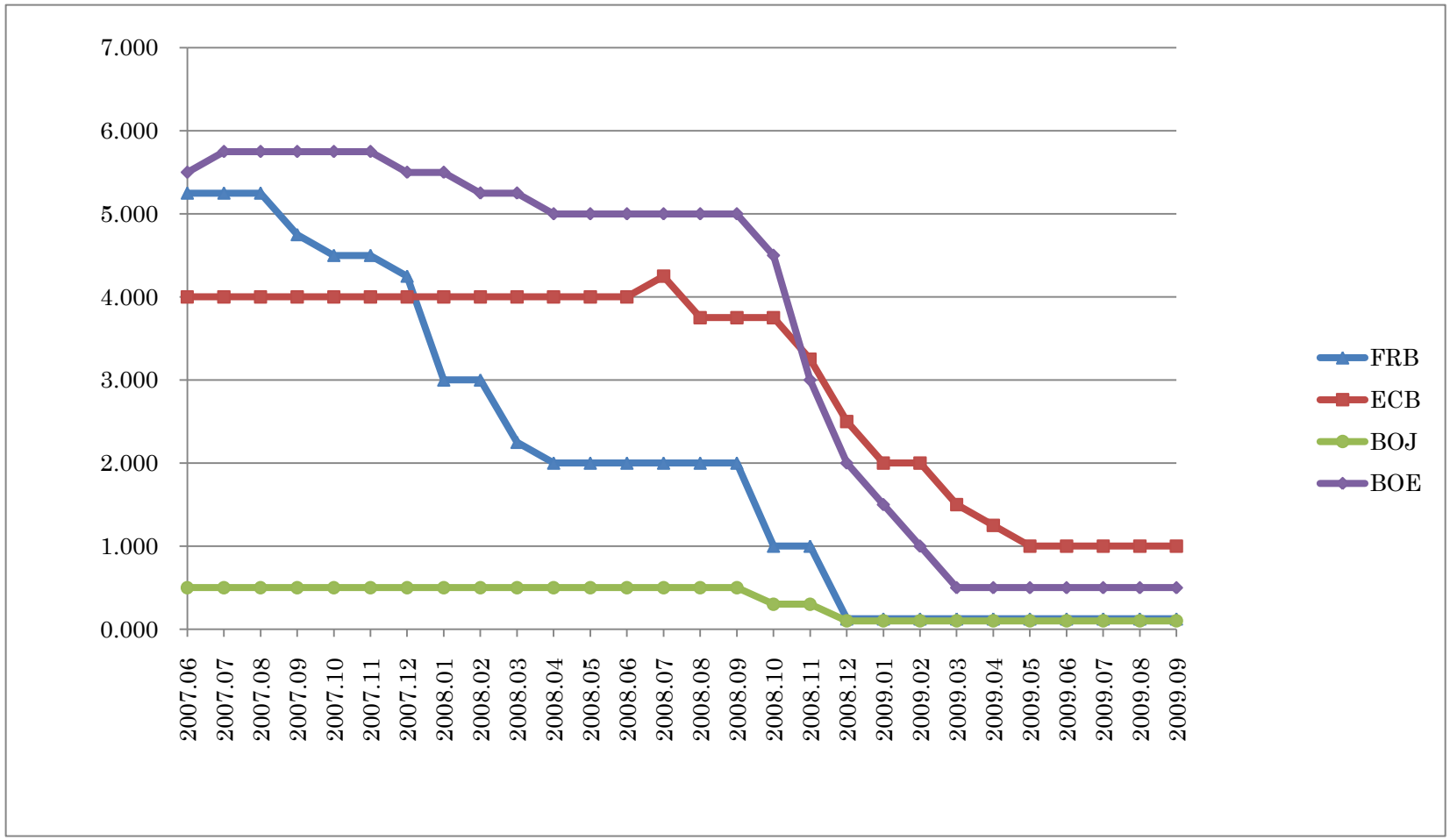
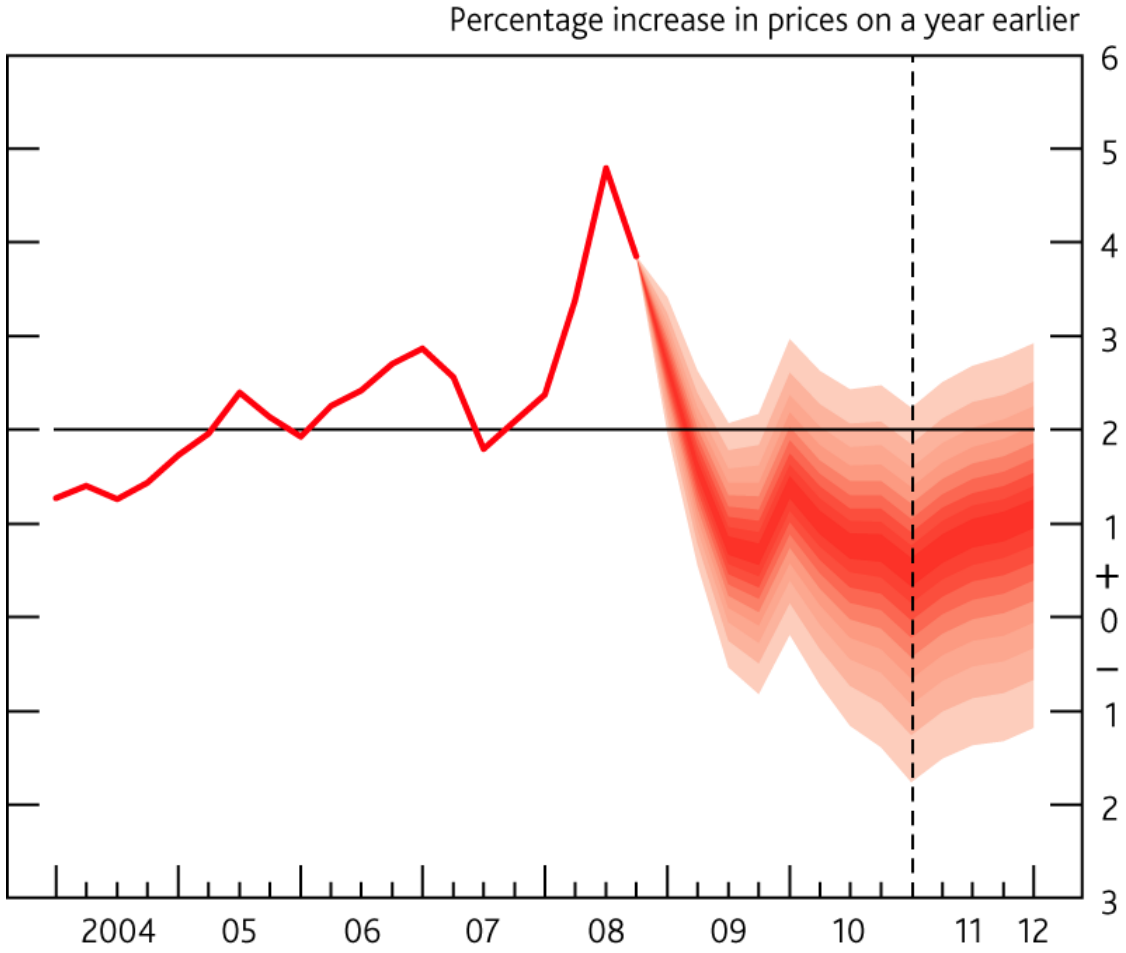


Figure 4A: Bank of England, CPI inflation projection based on market interest rate expectations



Source: The Bank of England, Inflation Report, February 2009.

Figure 4B: CPI inflation projection based on constant nominal interest rates at 0.5% and £175 billion asset purchases, August 2009

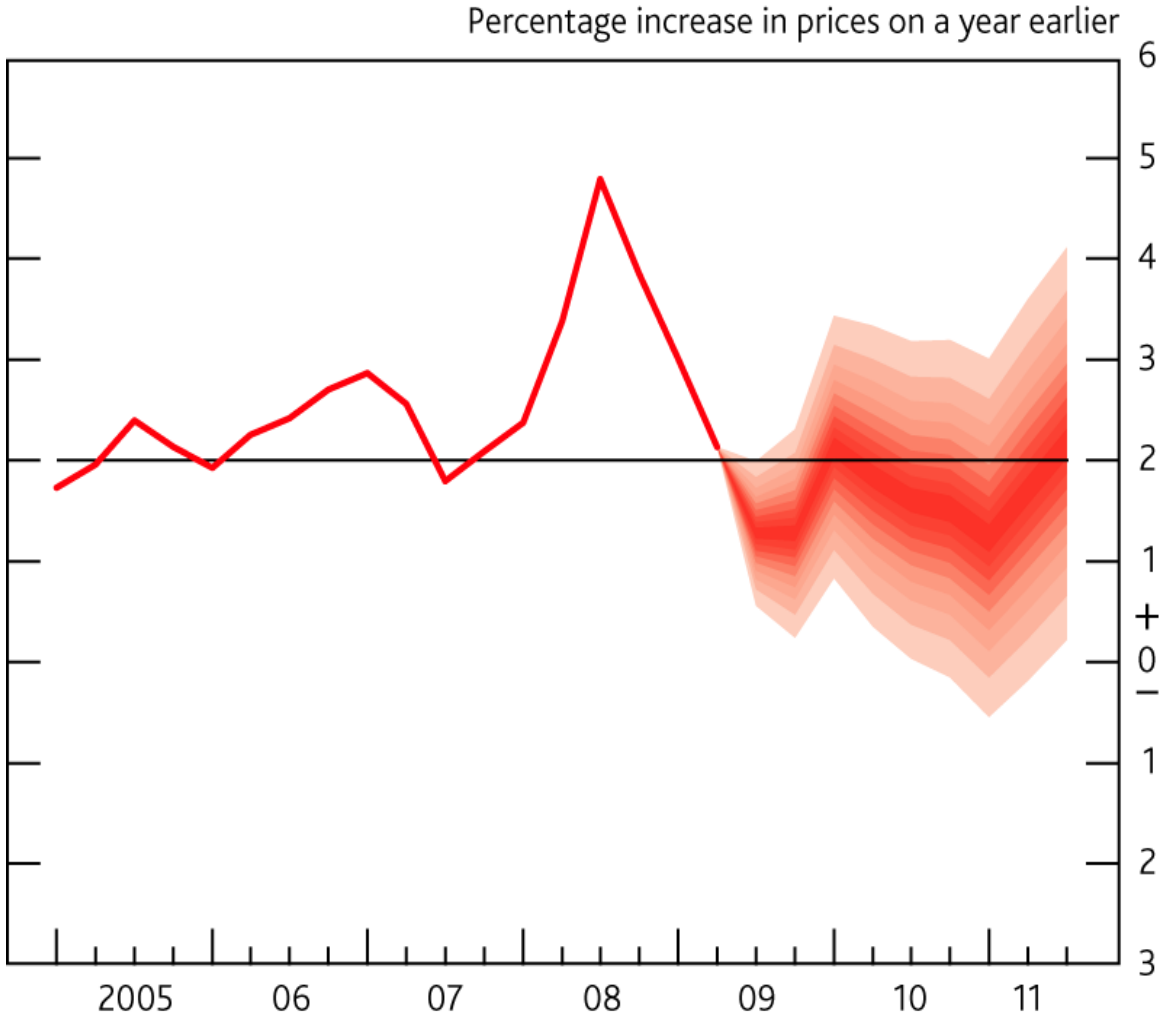


Table 2: Conventional and Unconventional Monetary Policy among FRB, ECB, BOJ, and BOE

	FRB	ECB	BOJ	BOE
Policy rates, June 2007 => Dec 2008	5.25% => [0-0.25]range	4.00 => 1.00	0.50 => 0.10	5.50 => 0.50
Virtual ZIRP	December 2008	May 2009	December 2008	March 2009
QE/CE	CE	QE(?)	QE(?)	QE
Expectation management	FOMC member forecasts; Lengthening horizon	Staff forecasts	MP member forecasts; lengthening horizon	Inflation targeting
Government bonds purchase	yes	no	Yes, expanded	Yes, introduced
Other unconventional	Many facilities	Covered bonds	CP, CB	Asset purchases.
Governance	FOMC for FF rate Board for CE	Governing Council	MPM for both monetary policy and financial stability policy	MPC
Other relevant parties	Treasury; other organizations	National central banks and fiscal authorities	MOF and FSA	Tripartite with HM Treasury and FSA