



The Financial Crisis in Japan: Causes and Policy Reactions by the Bank of Japan

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Abstract:

This paper describes the transmission of the recent financial crisis to Japan and compares the monetary policy reactions by the Bank of Japan (BoJ) with those during the 1990s, and with reactions by other major central banks. The paper first reviews the recent literature on the origins and transmission mechanisms of financial crises. We then consider how the financial crisis was transmitted to Japan and describe the responses by BoJ. The paper then proceeds and analyses the lessons that have been learnt by the BoJ and other central banks from the financial crisis of the 1990s.

JEL Classification: G21, E42, E52

Keywords: Financial crisis, Constructive ambiguity, Counterparty/liquidity risk, Quantitative/qualitative easing, Japan, Zero interest rate policy

1. Introduction

Japan is currently experiencing its second major financial crisis of the last two decades. While the first crisis of the 1990s was entirely home-made and had effects that were largely confined to Japan, the recent crisis originated outside Japan – mainly in the US and UK – and was transmitted not only to Japan, but to all other major economies worldwide.³ The Bank of Japan (BoJ) and other Japanese government agencies, such as the Financial Services Agency (FSA), started to react to the financial crisis in September 2008, taking into account the experiences of the first financial crisis. Compared to measures undertaken in other countries, especially in the USA, but also in Europe, monetary policy reaction in Japan was quantitatively rather modest and only temporary.⁴ This modest reaction may be due not only to the fact that Japan was hit less hard by the recent crisis, but also because the authorities had learnt from experiences acquired during the 1990s financial crisis.

In this paper, we describe the propagation of the recent financial crisis to Japan, analyze the reactions of the BoJ and compare them with those in the European Monetary Union (EMU), the UK, and the US. Although the recent financial crisis was a global phenomenon, the Japanese case is of particular interest for the following three reasons. Firstly, during the 1990s financial crisis, the BoJ already had to act as a lender

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³ While the World's real GDP growth declined by 0.6 percent in 2009, the World economy experienced positive growth during the 1990s, even including the Asian crisis. See Kamezaki (2009).

⁴ This is true for monetary policy, but the fiscal policy reactions were even more pronounced. The estimated change in the structural budget deficit was more significant in Japan than in the Eurozone and in the US. See IMF (2010a). We are grateful to a referee for providing this information.

of last resort and provided financial assistance to individual financial institutions and to financial markets, so as to prevent a meltdown of the financial system. Differences between policy reactions then and now help us to understand what form of financial assistance is appropriate during a financial crisis in order to regain financial stability.⁵ Secondly, all major central banks have significantly reduced interest rates and almost shifted towards a zero interest rate policy (ZIRP) and one of quantitative/qualitative easing (QEP). While this is new territory for most central banks, the Bank of Japan had already pursued such a policy until 2006. Hence, the monetary policy measures undertaken by the BoJ in the late 1990s may serve as a blueprint for ZIRP and QEP in other countries during a financial crisis. Finally, as with some other major central banks, the BoJ has augmented its monetary policy framework and, for example, introduced a deposit facility which did not exist in Japan during the first financial crisis. Thus, the Japanese case enables us to understand the functions of such a deposit facility and why some central banks started to adjust their monetary policy toolkits.

To date, the literature offers only a few analyses of the impact of the recent world financial crisis on Japan and of the actions taken by BoJ. Kamezaki (2009) is a notable exception, providing a short chronological overview of reactions by the BoJ after the collapse of Lehman Brothers in September 2008, but without comparing them with reactions in other countries. Another is Sato (2009), who describes the current state of Japan's financial system and analyses FSA's recent responses. Borio and Nelson (2008), Chailloux et al. (2008), Committee on the Global Financial System Report (2008), Bank of Japan (2009a, 2009b), and Bank for International Settlements (2009a, 2009b) analyze rescue programs that were adopted in several countries, after the Lehman Brothers default, in order to support banks and other financial institutions. None of these papers, however, relates the recent policy measures in Japan since 2008 to the experiences of the first financial crisis, but rather treat the recent financial crisis as a historically unique event.⁶ They fail to explain the lessons that were learnt in Japan from the financial crisis during the 1990s. Therefore, these studies do not enable policymakers to determine appropriate reactions to a financial crisis.

In this paper, we bridge this gap and compare the policy reactions in Japan during the recent crisis with those in Japan during the 1990s, and with recent actions in the member countries of the EMU, the UK, and the US. Our objective is to determine how severely Japan was affected by the recent financial crisis and whether the Japanese authorities reacted differently to the recent crisis, than during the 1990s or to the actions of authorities in other countries. We consider the extent to which the recent reactions by the Japanese authorities can be traced back to experiences during the first financial crisis and what lessons have been learnt. Our research reveals that Japanese banks were barely involved in the production and distribution of subprime-related products and

⁵ In doing so, one has to bear in mind that Japan has, in the meantime, improved its regulatory framework and adopted a financial safety net which is widely regarded as being state of the arts (Tamaki, 2008; Tanaka, 2008). Hence, differences in policy reactions during the 1990s and the current financial crisis may also be due to an improved regulatory framework.

⁶ An exception, however, is Shiratsuka (2009) who examines Japan's experience of QEP until 2006 in the light of current reactions. Another exception is Hoshi and Kashyap (2010), who analyze the tools used by the US government to rehabilitate the US banking industry and compare them with measures in Japan during the 1990s.

explains how the financial crisis was transmitted to Japan through capital outflows. We argue that the Japanese authorities reacted differently to the recent financial crisis than other central banks, not because Japan was hit less severely by the current crisis, but because Japan had indeed learned from its experiences during the first crisis.

Since the purpose of this paper is to analyze and compare monetary policy reactions to financial crises, we concentrate on the time period between 2008 and 2010 and do not address in detail the reactions to the great earthquake and tsunami in East Japan on March 11, 2011. The Bank of Japan reacted immediately to this catastrophe and injected 15 trillion Yen into the interbank market (far more than after the collapse of Lehman Brothers). In consequence, the financial markets remained resilient and there was no serious interruption to the payments system after the Earthquake.⁷

The paper is organized as follows: Section 2 reviews the theoretical and empirical literature on the origins and propagation of a financial crisis in general. In Section 3, we turn to the Japanese case and analyse the origins of the recent crisis, as well as the reactions by the BoJ. In Section 4, we compare these policy measures with the crisis of the 1990s and with recent policy reactions in other countries. Section 5 provides some concluding remarks.

2. Origins and propagation of a financial crisis: Recent literature

The recent literature on financial crises attempts to address three interrelated questions. Firstly, what causes a financial crisis? Secondly, what makes it spread throughout a national banking industry, across borders and into the real economy? Thirdly, what are the appropriate policy responses to a financial crisis?

With respect to the first question, there is general consensus that a financial crisis is characterized by a crisis of the national banking industry.⁸ Banks are fragile institutions that simultaneously grant loans and issue demandable deposits. Thus, they create liquidity but are simultaneously exposed to the risk of a bank run, i.e. a situation in which all depositors, even without actually facing liquidity needs, wish to withdraw their deposits. Such a run may result from a coordination failure among depositors, i.e., depositors withdraw deposits because they believe that other depositors will also do so (Diamond and Dybvig, 1983). Alternatively, a bank run may be triggered by changing fundamentals and by expectations that a bank's capital cushion will be depleted when assets devalue (Jacklin and Bhattacharya, 1988; Diamond and Rajan, 2000).

Regarding the devaluation of assets, especially with regard to real estate and securitized financial products, the literature offers three major strands of explanation. One argues that swings in asset prices are due to monetary policy changes and that bank failures stem mainly from a less accommodative monetary policy, resulting in a collapse of the housing market and of the securitization market. (Taylor, 2007: 8-10).⁹ A second

⁷ While monetary policy, therefore, contributes to cushioning the short-term consequences of the disaster, the long-term consequences are likely become evident in Japan's fiscal balance (IMF, 2011a: 40).

⁸ Banking crises are sometimes accompanied by currency crises and/or state defaults.

⁹ Measured by the S&P/Case-Shiller-Index, US housing price inflation reached 20 percent during parts of the period 2000-2004. See Taylor (2007: 3). Since the peak in 2006, residential and industrial real estate prices dropped by more than 30 percent.

strand blames the increased diffusion of the ‘originate-and-distribute-business’ in banking and the massive increase in the size of markets for credit risks, as causing the banking crisis. ‘Originate-and-distribute-business’ refers to a bank not holding a loan on its balance sheet but, either selling it directly or buying a synthetic product – such as a credit default swap (CDS) – that effectively insures the bank against non-performance.¹⁰ Both direct loan sales and the use of CDS allow a separation of credit risks from loans. This strengthens bank ability to manage risk, because credit risks can be valued more accurately and more easily be diversified (Deutsche Bundesbank, 2004: 36). On the other hand, however, asymmetric information may cause efficiency problems, due to adverse selection and moral hazard (Parlour and Winton, 2008; Heyde and Neyer, 2010).

Finally, the third strand accuses the decrease in asset prices of bursting an asset bubble, i.e., to the sudden reversal of a speculative price increase (see, e.g., Kindleberger, 1978). An asset bubble is a situation in which market participants buy assets in expectation of a further increase in asset prices. This increase in asset demand is financed by loans which are expected to be repaid by gains from asset price increases. In such a case, the expectation of rising asset prices can be self-fulfilling. However, if asset prices reach a certain ceiling, the process reverses and asset prices start to fall. According to this explanation, housing prices in the US increased merely because market participants expected further future price increases, and started to fall in 2004, when housing prices reached unsustainable levels relative to borrowers’ income.

The literature quoted above offers explanations as to why banks with large exposures in the housing and subprime markets may get into trouble and ultimately originate a financial crisis. We now explore the literature explaining how the financial crisis is propagated i.e. why other banks, with no housing and subprime market exposure, also got into difficulties. Such financial contagion may be caused by imperfections in the interbank markets which channel liquidity from banks with excess liquidity to banks with liquidity needs. Normally, the interbank market operates smoothly, with interest rates for unsecured interbank loans being only marginally higher than interest rates on secured interbank loans or on central bank loans. Furthermore, interbank markets tend to be very liquid, with a large number of participants and high turnover. During a financial crisis, however, the funding of interbank markets becomes severely impaired, with rising interest rates and increased liquidity hoarding by banks.¹¹ Instead of lending at the unsecured interbank market, banks start to use central bank deposit and lending facilities excessively. Therefore, banks take refuge at central banks, which are forced to simulate the functioning of the interbank markets.

Such a breakdown in the functioning of the interbank markets may be caused either by increases in aggregate credit risk or by increases in aggregate liquidity risk. The first cause, an increase in aggregate credit risk, is relevant only for the unsecured segment of the interbank markets. It refers to a situation in which participants perceive

¹⁰ For more details on the functioning of the ‘originate-and-distribute-business’ see European Central Bank (2008a).

¹¹ Liquidity hoarding and interbank market spreads are reported, e.g., for US interbank markets and interbank markets in the Euro area. A standard measure of tensions in the unsecured interbank market is the spread between three months loan borrowing costs (measured by e.g. Euribor or LIBOR) and the overnight index swap (OIS) in three months’ time, which measures the difference between unsecured and secured interbank loans. See Heider et al. (2009: 2); Eisenschmidt and Tapking (2009).

a decline in the repayment probability of an interbank loan, i.e. an increase in counterparty risk. This increase in risk causes an increase in interbank interest rates. As long as the overall level of counterparty risk is low, interest rates are also low and there is full participation in the interbank market. However, once counterparty risk raises interest rates in the interbank markets rise beyond a certain threshold level and safer banks drop out of the interbank markets, this adverse selection causes a further rise in interest rates. In this situation, an increase in the dispersion of counterparty risk alone, without an increase in the level of risk, can lead to a breakdown of the interbank market, either because lenders hoard liquidity (i.e. supply dries up) or borrowers drop out, because of excessively high interest rates (i.e. demand dries up; Heider, Hoerova and Holthausen, 2009).¹²

The second cause of an interbank market breakdown is an increase in aggregate liquidity risk which, in contrast to increases in aggregate credit risk, is relevant to both secured and unsecured segments of the interbank market. This scenario refers to a situation in which participants in the interbank markets perceive either a decline in the quality of available collateral or an increase of the probability of a liquidity outflow in the near future. Consequently, with an increased liquidity risk, term money markets become illiquid, while overnight money markets become more liquid, and the interest rate spread between term money markets and overnight money markets increase. Increased liquidity hoarding hence leads to a rising liquidity interest rate premium and to a significant decline in unsecured term money market volumes (Eisenschmidt and Tapking, 2009: 6-7). Moreover, it may result in a drying-out of interbank markets, if central banks offer a deposit facility and banks prefer to hold excess liquidity reserves at central banks, instead of lending to the interbank markets.¹³

If interbank markets fail, bank leverage problems and liquidity problems spread to other banks, and this may exert a substantial impact on real activity and cause macroeconomic phenomena, such as credit crunches and liquidity shortages. A credit crunch is a situation in which bank equity has fallen substantially and where banks are capital constrained and are unable to offer loans to investors (Tirole, 2007: 478-9).¹⁴ A credit crunch may occur in a situation where information is distributed asymmetrically between a loan applicant (investor) and a large number of financiers (Holmstrom and Tirole, 1997). Capital regulations, such as minimum capital adequacy ratios set by the Basel committee and enforced by national regulatory authorities, can prevent excessive risk taking by banks. However, such regulations may also influence bank lending behaviour procyclically, i.e., they have a relatively more severe impact on bank lending during a recession than during a boom. This “procyclicality” effect results from the fact that under Basel II, regulations minimum capital adequacy ratios depend on the internal or external rating of the bank’s assets, which often varies pro-cyclically, because ratings

¹² For another paper that models the influence of credit risk on bank lending, see Longstaff (2010).

¹³ For other models of a liquidity risk, based on Diamond and Dybvig (1983), see Allen and Gale (2000); Allen, Carletti and Gale (2009).

¹⁴ This situation is sometimes also referred to as the “lending channel” and focuses on the influence of bank balance sheets on economic activity. A related situation is called the “balance sheet channel”, which focuses on the influence of firms’ balance sheet on their economic activity. This refers to a situation in which firms’ cash flows and collateral values have fallen substantially and their increased leverage reduces investment. See Tirole (2007: 471).

are often downgraded during recessions and upgraded during booms (Amato and Furfine, 2004). This results in a similar procyclicality of risk weights, which are larger during recessions than in a boom. Banks therefore have more leeway during a boom to leverage their capital than during a recession.

Policy makers may react to bank leverage and liquidity problems by (i.) bank recapitalizations and by (ii.) supplying liquidity assistance to banks. In addition, they may (iii.) conduct a policy of credit easing and quantitative or qualitative easing, so as to facilitate corporate financing. Bank recapitalizations may, in principle, be conducted in two ways; either (via the asset side of the banks' balance sheet) by buying toxic assets and transferring them to a 'bad bank', or (via the liability side of the balance sheet) by injecting fresh equity capital (or junior debt) into the bank (Aghion, Bolton and Fries, 1999; Osano, 2002). While recapitalizations ensure the solvency of insolvent banks, emergency liquidity assistance by a lender of last resort (LLR) aims at restoring the liquidity of either a single bank or the entire banking industry. Emergency liquidity assistance may be necessary when there is an increased liquidity preference in the economy, which results in a run on a single bank, as in the event of banking panic (Allen and Gale, 2000). The provision of emergency liquidity by a LLR (the central bank or the deposit insurance corporation) may protect banks against such incidents. Financial assistance may either take the form of lending to the entire market or the provision of liquidity on special terms to a single institution. Liquidity provision to the market as a whole is inefficient, as long as the interbank market does not work smoothly and the transfer of liquidity from one bank to another is impaired. In this case, the central bank or deposit insurance must ensure that individual, solvent banks with a liquidity shortage will receive the liquidity needed against collateral (Flannery, 1996).

Although a LLR may shield the banking sector from financial crises, the drawback is that it creates moral hazard on the part of banks that are in effect insured against mismanagement of all types of risks.¹⁵ In order to limit these adverse effects, the literature already suggests providing LLR liquidity to the market only at a penalty rate, i.e. exceeding the market rate. Demanding a penalty rate, however, may aggravate a bank's solvency problem and also send signals to market participants that the bank is in trouble. Moreover, it may even provide an incentive to managers to 'gamble for resurrection', i.e. to invest in projects with higher risks and higher returns in the hope of surviving, if the gamble pays off.

'Constructive ambiguity' may be another mechanism for constraining moral hazard. It can be defined as a situation in which the central bank retains discretion as to whether, when and under what conditions financial support will be provided to an individual financial institution. If the central bank does not disclose whether or not financial support will be granted, banks will not know individually whether they will be rescued or not, which might have the advantage of avoiding imitation effects. If the central bank is ambiguous about the conditions of financial assistance, it keeps bank shareholders and management uncertain about the costs they will have to bear in the event of financial assistance (Freixas, 1999; Cordella and Levy-Yeyati, 2003).¹⁶

¹⁵ For a survey of the lender-of-last-resort-literature, see Freixas et al. (2004).

¹⁶ A central bank may also practice 'constructive ambiguity', not because it wants to constrain moral hazard, but rather because it receives a random and non-verifiable signal about bank's solvency and

While a central bank, as the LLR, targets the financial industry, intending to cushion the consequences of a banking crisis for the real economy, it may alternatively reduce interest rates by increasing liquidity in the interbank markets. The Zero Interest Rate Policy (ZIRP), however, comes to a halt after interest rates have reached zero. When this occurs, ZIRP is sometimes accompanied by a policy of quantitative and qualitative easing (QEP). Under ‘quantitative easing’, the central bank expands the size of its balance sheet through an increase in its monetary liabilities, i.e., base money. In contrast to conventional monetary policy instruments which address short-term money markets, under QEP, central banks have to take unconventional monetary measures, such as outright open market operations or direct lending to companies, none of which are part of the regular monetary policy tool kit during normal times. This usually means either that gross bank reserves expand beyond the threshold necessary to achieve the interest rate target, or that the central bank is providing liquidity directly to borrowers and investors to credit markets. The aim of both these measures is to reduce long-term interest rates which are decisive both for investment and long-term consumption decisions.

Since central banks do not control long-term interest rates directly, they attempt to influence expected short-term interest rates. If market participants expect a fall in short-term interest rates in the future as a result of quantitative easing, then long-term interest rates will also fall, which might have an expansionary impact on the real economic activity (Benford et al., 2009; Bini-Smaghi, 2009). In order to exert such an influence on market participants’ expectations of future short-term interest rates and hence on long-term interest rates, the continuation of QEP must be credible and its termination linked to the occurrence of a verifiable event, such as the end of consumer price deflation and an increase in the rate of consumer price inflation above zero percent.

This indirect influence of quantitative easing might be supplemented by ‘qualitative’ or ‘credit easing’, where the central bank changes the composition of the assets on its balance sheet towards less liquid and more risky assets. Normally, the provision of liquidity to financial institutions via interbank markets exposes central banks only to a low level of risk, as loans are usually short-term, over-collateralized and collateralized with high quality assets. Under qualitative easing, however, the central bank takes more term risk and credit risk into its portfolio, provides loans for the longer term and accepts lower-quality assets as collateral. Quantitative easing may reduce expected short-term interest rates as well as long-term interest rates (Bank for International Settlements, 2009a: 66; Bernanke, 2009).

3. The recent financial crisis and policy reactions in Japan

The recent financial crisis started in Autumn 2006 when – after a lengthy boom in the housing markets – real estate prices in the US finally began to fall.¹⁷

makes financial assistance dependent on the outcome of the signal which cannot be observed by outsiders. See Repullo (2000).

¹⁷ Acharya et al. (2009), Rajan (2009) and Dewatripont et al. (2010) give a short chronology of the recent financial crisis between April 2007 and March 2009, and an overview of the causes of the crisis.

Financial instruments that were issued in order to finance real estate investments subsequently lost value and endangered the financial stability of mortgage banks. In April 2007, 'New Century Financial', the largest US mortgage bank in the subprime segment, went into bankruptcy. In July 2007, rating agencies started to downgrade a large number of securities that were collateralized with mortgage loans, which as a result, declined substantially in value. As a consequence, financial firms which were dependent on financial funds borrowed on international money markets and which had used asset backed securities as collateral, encountered serious liquidity problems. In the US, two hedge funds belonging to 'Bear Sterns' failed and large European banks suffered from liquidity shortages. In August 2007, the US Fed and the European Central Bank expanded the liquidity supply and the Fed started to reduce interest rates. In September 2007, the British mortgage bank 'Northern Rock' suffered from a liquidity shortage which resulted in a bank run; the bank was nationalized in February 2008. In September 2008, the US Government assumed 'Fannie Mae' and 'Freddie Mac', the largest US home loan banks, under public conservatorship. On September 15, 2008, the US investment bank 'Merrill Lynch' was taken over by 'Bank of America', and 'Lehman Brothers' collapsed.

Unlike banks in Europe or the US, Japanese banks were only marginally affected by the financial crisis, that is, until the failure of Lehman Brothers, because they neither invested directly in subprime-related products nor conducted the 'originate-and-distribute'-business with structured financial products, such as credit default swaps, on a large scale.¹⁸ This low engagement in the markets for subprime-related and structured financial products followed from experiences acquired during the first financial crisis, which resulted in more conservative business policies. Additionally, Japanese banks focus more on traditional banking services and are less involved in the production and distribution of securitized financial products. Consequently, Japanese banks suffered only small subprime-related losses amounting to 1,038 billion Yen by September 2010 (Table 1). These losses represented less than 2.2 percent of Japanese bank Tier-1-capital and were largely absorbed by capital buffers which exceeded mandatory requirements even before the outbreak of the financial crisis (IMF, 2008: 4; Bank of Japan, 2008a: 12; Shirakawa, 2008: 9).

¹⁸ Japan shares this feature also with other Asian economies where financial institution losses and public capital injections were also small. Estimated total bank write-downs on toxic loans and securities between 2007 and 2010 are: USD 156 bn. for Asia (Japan, Hong Kong, Singapore, New Zealand and Australia); USD 885 bn. for the US; USD 665 bn. for Euro Area; and USD 455 bn. for the UK. See Bank of Japan (2009a: 9) and IMF (2010a: 12). Obviously, holdings of toxic assets were smaller in Asia than in other World regions.

Table 1: Exposure of Japanese deposit-taking institutions¹⁾ to subprime-related products (in Billion Yen)

Date ²⁾	Tier-1-Capital	Direct Investments		,Originate-and-Distribute'-Business	
		Book value	Realized Losses ⁷⁾	Book value	Realized Losses ⁶⁾
09/2007	49,408 ³⁾	1,407	141	138	19
12/2007	49,408 ³⁾	1,519	442	202	85
03/2008	50,071 ⁴⁾	1,019	725	107	288
06/2008	50,071 ⁴⁾	958	754	64	305
09/2008	50,071 ⁴⁾	797	803	26	316
12/2008	50,071 ⁴⁾	565	919	21	317
03/2009	47,920 ⁵⁾	449	1,001	17	324
06/2009	47,920 ⁵⁾	407	1,040	17	323
09/2009	47,920 ⁵⁾	341	1,046	18	322
12/2009	47,920 ⁵⁾	320	1,034	23	322
03/2010	56,733 ⁶⁾	355	1,029	6	320
06/2010	56,733 ⁶⁾	327	1,046	/	/
09/2010	56,733 ⁶⁾	305	1,038	/	/

1) Major banks, regional banks, co-operative financial institutions

2) End of month.

3) End-March 2007.

4) End-March 2008

5) End-March 2009

6) End-March 2010

7) Accumulated since April 1, 2007.

Source Financial Services Agency; <http://www.fsa.go.jp/en/news/2009/20090911-10.html>

Due to this limited subprime involvement of Japanese banks, funding costs on unsecured interbank markets increased much less and were considerably less volatile than in Europe and the US. Between June 2007 and January 2009, the three month LIBOR-OIS spread for Japanese Yen increased to around 50 basis points, much less than the spreads for European Euros, for British Pounds and for US Dollars, which increased to around 200 basis points (Euro), 300 basis points (GBP) and 350 basis points (USD) (Bank of Japan 2011b: 31). Furthermore, the Tokyo interbank market rate (TIBOR), the reference interbank rate for prime Japanese domestic banks, also remained stable. In addition to the low subprime involvement, this was attributed to a stable deposit base of Japanese banks, which finance only 10 percent of their liabilities in the interbank market.¹⁹ Finally, corporate bonds spreads over government bond yields

¹⁹ Unlike interest spreads inside Japan, spreads between three month (Japanese Yen) TIBOR and (Japanese Yen) LIBOR started to rise in September 2007. While TIBOR features mainly Japanese banks

rose in Japan far less than in Europe and in the US (International Monetary Fund, 2008: 6; Bank of Japan, 2008a: 9; Bank of Japan, 2009a: 7). Hence, there are barely any signs that the current financial crisis originated inside Japan or is a result of an excessively high risk appetite on the part of Japanese financial institutions.

This contrasts completely with the financial crisis of the 1990s in the run-up to which interest rates were regulated and banks were implicitly protected under the “convoy system”. Under this system, banking supervision and regulation were conducted “in such a way as not to undermine the viability of the weakest banks” (Nakaso, 2001: 2). Instead, financial firm survival was guaranteed implicitly, as long as all guidance by the BoJ or Ministry of Finance was observed. Disclosure rules were lax and takeover bids difficult to implement. Accordingly, market discipline was lacking and banks did not behave as profit-maximizers, but increased their loans volume far beyond the profit-maximizing level (Revankar and Yoshino, 2008). The increased loan supply by banks fueled housing prices that had started to fall after 1989 (Nakaso, 2001; Baba et al., 2005; Yoshino, 2010).

Financial liberalization started in the early 1970s, but proceeded only gradually until the end of the decade, when interest rate liberalization began. Large-scale manufacturing firms, as the banks’ main clients, raised funds increasingly from capital markets, and banks reacted by lending to the construction sector, where the additional loan supply fueled housing prices. When the financial liberalization process was completed, market participants began to shift their investments away from the real estate sector, where prices then started to fall after 1989. The resulting sharp decline in asset prices caused substantial losses for firms, which could not pay the interest on borrowed funds, and banks remained stuck with nonperforming loans on their portfolios (Bebenroth et al., 2009). The result was financial turmoil which, however, remained limited to Japan, because of the minimal use of securitization and ‘originate-to-distribute’ business models, even during the 1980s.

The failure of Lehman Brothers in September 2008 marks the start of the current financial crisis spreading to Japan, the international capital movements being a major transmission channel (Table 2).²⁰ While the capital and financial account was always negative between 2005 and 2010, the deficit increased to ¥22,538 billion in 2007 and remained high in 2008. Short-term portfolio investments contributed significantly to the deficit in the capital and financial account. While negative outward portfolio investments have increased since 2007 in absolute terms, inward portfolio investment also turned negative in 2008 and 2009, meaning that (foreign) investors decreased their short-term investments in Japan.

in the Tokyo market, Yen-LIBOR is dominated by offshore European and US banks. Hence, a rising spread reflected Japanese bank concerns of a perceived credit risk with respect to foreign banks. See IMF (2008: 6) and Iwada (2009).

²⁰ The sum of current account, capital and financial account, change in reserve assets and errors and omissions is by definition always equal to zero.

Table 2: Japan's Balance of Payments: 2005-2010 (in Billion Yen)

Position	2005	2006	2007	2008	2009	2010¹⁾
Current account	18,259	19,839	24,794	16,380	13,287	17,080
Capital and financial account	-14,007	-12,296	-22,538	-18,390	-12,645	-12,859
of which:						
outward portfolio investments	-23,567	-9,689	-12,930	-13,978	-16,304	-25,797
inward portfolio investments	20,346	22,199	24,923	-10,344	-4,951	9,608
Change in reserve assets	-2,456	-3,720	-4,297	-3,200	-2,527	-3,793
Errors and omissions	-1,796	-3,663	2,042	5,210	1,884	-429

1) Preliminary data

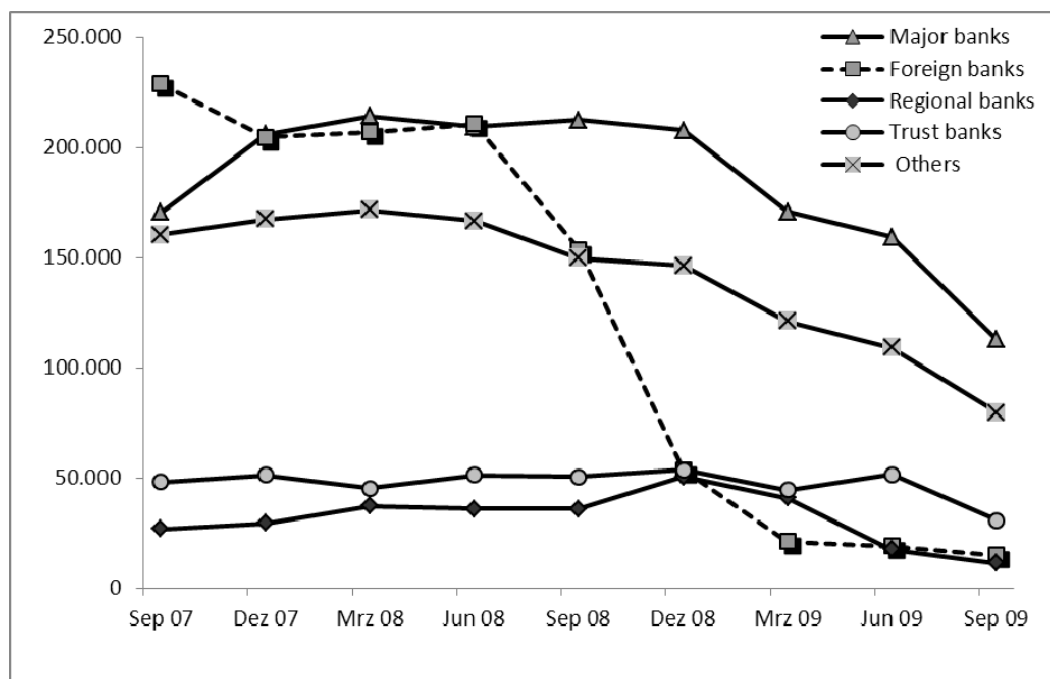
Source: Bank of Japan; http://www.boj.or.jp/en/research/brp/ron_2011/ron110707a.htm/

The impact of international capital movements on Japanese financial markets can also be observed in Japan's interbank markets. Despite the fact that interest spreads did not increase significantly, Japan's interbank markets shrunk considerably, as banks began to limit their provision of funds (Figure 1). Total amounts outstanding in the Call Money Market fell from more than ¥659,000 trillion in December 2007 to around ¥250,000 trillion in September 2009.²¹ Especially foreign banks in Japan substantially reduced their supply of funds to the Japanese interbank markets while regional banks became more reluctant to invest under the complementary deposit facility introduced by BoJ (Bank of Japan, 2009a: 43).²² In addition to this short-term liquidity outflow, foreign investors became net sellers on Japanese stock markets and net foreign purchases of Japanese equities became negative. Especially hedge funds that faced liquidity constraints in funding and increased risk exposure, sold stocks (Bank of Japan, 2009a: 56). This was crucial, since foreign holdings of Japanese stocks account for a quarter of market capitalization and foreigners for nearly two thirds of market turnover.

²¹ Data from BoJ website.

²² Because of this outflow of short-term liquidity, it seems that Japanese financial markets helped to stabilize financial markets abroad. See also Kumakura (2008).

Figure 1: Japanese Call Money Market: Amounts Outstanding (2007-2009, in Billion Yen)



Source: Bank of Japan: Time-series data. http://www.stat-search.boj.or.jp/index_en.html.

As a consequence of capital outflows, the Nikkei stock index fell from 18,000 JPY in July 2007 to 7,000 JPY in March 2009. It subsequently climbed to around 9,000 JPY, before the great earthquake in March 2011. This major net fall in stock prices depressed the asset value of Japanese banks which hold around one third of their Tier-1-capital in stocks. It heavily impaired their capital basis and especially those of major banks. Although banks' stock holdings are valued at acquisition prices and included considerable unrealized gains (from which, under Basel rules, 45% may be included in Tier-2-capital), the fall in equity not only eliminated these unrealized gains, but also affected Tier-1-capital (IMF, 2008: 8).

As a result of the increased liquidity preference worldwide, interest rate spreads on commercial papers (CPs) and on commercial bonds (CBs) over government bonds increased sharply, in particular for companies with lower ratings (Juhara, 2009).²³ At the same time, the volume of outstanding CPs and CBs decreased considerably (Bank of Japan, 2009a: 44), and particularly companies with lower or medium credit ratings had difficulty selling such papers. This credit crunch occurred mainly because of rising concerns about the funding availability of firms and decreased risk appetite by investors who preferred to increase precautionary liquidity demand, instead of holding corporate bonds (Nichikin Tankan, 2009). Large companies were able to compensate for this decreased turnover in CPs and CBs, by increasing their bank borrowing. For small and medium-sized companies, however, bank borrowings fell below the 2007 level (Shirakawa, 2008: 9; Bank of Japan, 2008c).

²³ Besides, the ratings of a large number of firms were downgraded. See Bank of Japan (2009a: 60).

Although the recent financial turmoil did not originate in Japan, the impact of the crisis on the country was severe, because of Japan's integration into the world economy. Japan's real GDP growth rate fell to -1.2 percent in 2008 and to -6.3 percent in 2009, constituting one of the largest fall in real output among major OECD countries. In 2010, output growth returned to 3.9 percent, but the projected growth rate for 2011 is 1.4 percent, still far below the estimated average growth rate (2.4 percent) of all advanced economies (IMF, 2010b: 2; 2011b: 2).²⁴

The Bank of Japan started to react to developments in financial markets in September 2008. BoJ implemented two reductions in interest rates and made several adjustments to their monetary policy framework. The objectives underlying these measures were, firstly, to ensure stability in financial markets and, secondly, to facilitate corporate finance.²⁵ In order to ensure financial market stability, immediately after the failure of Lehman Brothers, Bank of Japan had signed a bilateral currency liquidity agreement or swap facility with the US Fed, which allows BoJ to acquire US Dollars from the Federal Reserve and lend them to domestic financial institutions (Bernanke, 2009).²⁶ This was the first time BoJ used domestic assets as collateral for USD credits. The purpose of these measures was to satisfy the increased worldwide liquidity demand for US-Dollars and to alleviate pressure from US short-term money markets.²⁷

To ease financing, especially for small and medium-sized companies and to prevent a Yen appreciation, the Bank of Japan decided to lower the target rate for the uncollateralized overnight call rate twice by 20 basis points. The new target rate was lowered from (around) 0.5 percent to (around) 0.3 percent on October 31st, 2008 and to (around) 0.1 percent on December 19, 2008.²⁸ On the same dates, the basic loan rate and the basic discount rate were reduced to 0.3 percent and 0.1 percent, respectively. Moreover, BoJ introduced a 'complementary deposit facility' allowing banks to receive interest payments on excess balances with the central bank; the interest rate paid by BoJ was fixed at 0.1 percent.²⁹ This facility allows BoJ to attract liquidity and prevents the uncollateralized overnight call rate from falling significantly below the target rate.

²⁴ The world economic outlook projections for 2012 are 2.1 percent for Japan and 2.4 percent for advanced economies. See IMF (2011b: 2).

²⁵ Appendix 1 offers a chronological compilation of the policy measures taken by BoJ. The information presented in this section refers to Kamezaki (2009: 6-9) and Bank of Japan (2011a). For further information, also refer to the website of Bank of Japan.

²⁶ On September 18th, 2008, BoJ also started to conduct USD funds-supplying operations against pooled collateral, as a coordinated measure with five other central banks (Bank of Canada, Bank of England, Federal Reserve, ECB, and Swiss National Bank).

²⁷ The first two operations were conducted through market-rate competitive auctions; from October 31 on, funds were provided at a fixed interest rate for an unlimited amount, against pooled collateral. See Kamezaki (2009: 6).

²⁸ Since the end of quantitative easing policy, the uncollateralized overnight call rate is the main policy target of BoJ. Through the use of its policy instruments, BoJ encourages this call rate at the target level.

²⁹ The "complementary lending facility" is equivalent to the Eurosystem's "deposit facility" which has existed since 1999. The US Fed., like BoJ, also introduced a deposit facility during the recent financial crisis in October 2008. See Borio and Nelson (2008); European Central Bank (2009a).

Beginning on October 14th, 2008, Bank of Japan introduced several measures to secure the stability of the financial system. In order to enhance the stability of the stock market and to gauge market developments, BoJ decided to suspend the sale of stocks purchased from financial institutions on the stock exchange. Furthermore, on February 3rd, 2009, BoJ decided to resume its purchases of stocks held by financial institutions. Both measures were announced as temporary and served a twofold purpose: to stabilize stock market prices and to reduce market risk associated with stockholdings. Moreover, on March 17th, 2009, BoJ announced its readiness to provide subordinated loans to financial institutions up to a total amount of one trillion Yen; a limit of 350 billion Yen per financial institution was set by BoJ. Eligible are banks subject to international capital standards and those deemed creditworthy. As an additional measure to ensure stability of the financial markets, on October 18th, 2008, BoJ expanded its securities lending facility, which allows BoJ to sell Japanese Government Bonds (JGBs) with repurchase agreements; the minimum fee rate applied for this facility was lowered from 1.0 percent to 0.5 percent. Furthermore, BoJ announced that it will add floating-rate JGBs, inflation-indexed JGBs and 30-years Government Bonds to the list of eligible JGBs for its repo operations.

Two months later, on December 19th, 2008, BoJ started a policy of “credit easing” which had already been followed during the first financial crisis. Since the target rate for the uncollateralized overnight call rate had already been lowered to 0.1 percent, with further cuts therefore being almost impossible, BoJ decided to increase the amount of outright purchases of JGBs. Also on December 19th, the range of JGBs accepted in these outright purchases was expanded (floating-rate JGBs, inflation-indexed JGBs and 30-years Government bonds were added to the list of eligible JGBs). Subsequently, debt instruments (bonds, dematerialized commercial papers, bills, commercial papers and loans on deed) issued by real estate investment corporations, government guaranteed dematerialized CBs and loans on deeds to the government and to municipal governments were all accepted as eligible. The same applied to bonds issued by foreign governments (US, UK, France and Germany).

To facilitate corporate financing, Bank of Japan announced on October 14th, 2008, that it would increase the frequency and size of its commercial paper (CP) repo operations, which were generally conducted quarterly. On December 2nd, the range of corporate debt that was accepted as eligible collateral in repo operations was expanded. The BoJ also introduced a new credit facility called “Special Funds-Supplying Operations to Facilitate Corporate Financing”, which utilizes corporate debt as eligible collateral. Through this facility, financial institutions may borrow unlimited amounts of (three months) funds from BoJ at an interest rate equal to the target rate for the uncollateralized overnight call rate. These operations were initially conducted twice a month, but from February 2009 onwards, even once a week (Bank of Japan, 2008b).

On December 19th, 2008, the BoJ announced the introduction of outright purchases of commercial papers (CPs) as a temporary measure.³⁰ This meant a much higher degree of credit-risk taking, than if commercial papers are taken as collateral for providing credit to financial institutions; it also meant a deeper involvement of BoJ in microeconomic resource allocation. For these reasons, BoJ decided not to buy these

³⁰ On January 22nd, 2009, BoJ also announced outright purchases of corporate bonds.

instruments directly from the issuer, but only from financial institutions that were counterparties of the Bank and to buy them using competitive auctions. The total amount of purchases was limited to three trillion Yen; the outstanding amount if a single issuer's CP purchased by BoJ is not to exceed 100 billion Yen.

As a consequence of BoJ's operations, tightness in money market conditions eased and interest rate spreads declined. BoJ evaluated the impact of its measures on the spreads between issuing rates on CP's with credit ratings a-1+, a-1, and a-2 and three months OIS rates. The spreads reveal risk premiums on corporate credit risk and on CP market liquidity risk. These dependent variables were regressed against three independent variables, such as the implied volatility of stock prices (as a proxy variable for changes in uncertainty over corporate financing), spreads between TIBOR and OIS rates (as a measure of the cost of unsecured bank lending) and the share of funds obtained through operations by BoJ in the amount outstanding in CPs (as a proxy for Bank of Japan's measures to facilitate corporate financing). The results reveal significant downward effects of the corporate financing measures taken by BoJ on CP issuance rates. Hence, these measures were effective in lowering CP issuance rates (without going through the conventional transmission channels of interest rate cuts; Bank of Japan, 2009a: 48-50).³¹

In March and April 2010, Bank of Japan decided to retire some of the temporary measures ("provision of subordinated loans to banks"; "special funds-supplying operations to facilitate corporate financing", and "stock purchases held by financial institutions") introduced in Autumn 2008/Spring 2009.

4. Lessons learnt from the 1990s - Japan and other major economies

Table 3 provides synopses of monetary policy measures applied during the recent financial crisis and compares reactions by BoJ with those of Eurosystem (ECB), Bank of England (BoE), and US Fed. All four central banks have considerably expanded their monetary policy toolkits, although some of the measures taken have been phased out in the meantime. The measures aim at guaranteeing consistency of short-term market interest rates with policy rates, to provide financial stability, and to support firm access to non-bank credit markets. While the number of 'new policy instruments' introduced by BoJ is large, they differ from both the policy measures adopted by Japanese authorities during the 1990s and from reactions of other central banks during the recent crisis.

During the first financial crisis, the Japanese interbank market almost collapsed when in early November 1997, 'Sanyo Securities' failed, a securities house which acted as a borrower in the interbank market. Although the amount of the default was relatively small, lender banks preferred placing their money with the Bank of Japan, to lending in the interbank market, for fear of being caught by another default. The consequence was that major financial institutions failed on an almost weekly basis, until BoJ stepped in and injected massive liquidity into the market in late November 1997 (Nakaso, 2001).

³¹ In fact, the effects on CP issuance rates varied considerably by credit rating and were most powerful with respect to a-1 ratings. See Bank of Japan (2009a: 50).

Table 3: Policy Reactions by Major Central Banks after the Collapse of Lehman Brothers

Objective	Policy measure	BoJ	ECB	BoE	Fed
Reduction in funding costs	Policy interest rate cuts ^{a)}	From 0.50% to 0.10%	From 4.25% to 1.00 %	From 5.00% to 0.50 %	From 2.00% to 0.00-0.25%
Consistency of market rates with policy rates	Interest rates on excess reserves	+	+ ^{b)}	+	+
	Exceptional fine-tuning operations	+	+	+	+
	Introduction of fixed-rate tenders with full allotment	+ ^{c)}	+ ^{d)}	-	-
	Narrower corridor on overnight rates	-	+	+	+
	Change in reserve requirements	-	-	+ ^{f)}	-
Financial system stability	US Dollar repos/inter central-bank swap lines	+	+	+	+
	Expansion of eligible collateral	+	+	+	+
	Provision of subordinated debt	+	+	+	+
	Exceptional long-term operations	+	-	-	-
	Purchases of stocks held by financial institutions	+	-	-	-
	Supporting measures of individual financial institutions	-	+ ^{e)}	-	+
Supporting non-bank credit markets	CP funding/ purchase/ collateral eligibility	+	-	+	+
	CB funding/ purchase/ collateral eligibility	+	-	+	-
	Outright purchases of Government Bonds	+	-	+	+
	ABS funding/ purchase/ collateral eligibility	-	+	+	+

a) Bank of Japan (BoJ): Target rate for the uncollateralized overnight call rate; Eurosystem (ECB): Main refinancing operations (fixed rate); Bank of England (BoE): Bank rate paid on commercial bank reserves; US Federal Reserve (Fed): Target federal funds rate.

b) Temporary increase in interest rate on excess reserves.

c) Special fund-supplying operations to facilitate corporate financing.

d) Fixed-rate tenders in main refinancing operations.

e) By single NCBs.

f) Expanded range over which reserves are remunerated.

Source: Bank for International Settlements (2009b: 97); Bank of Japan (2009a: 15); Central Bank's Websites.

In contrast to this episode, after the collapse of Lehman Brothers, all central banks reacted immediately by injecting liquidity into the market, knowing that a collapse of the interbank markets might result in a domino effect and systemic financial instability. Providing immediate financial assistance to banks was the first major lesson learnt by the Japanese authorities from the financial crisis of the 1990s.

The second lesson concerns the introduction of accommodative policy measures and the switch to a more expansionary monetary policy. While during the 1990s, BoJ reduced its policy rate only gradually, from six percent in 1992 to zero percent in 1999, almost the same interest rate reduction was implemented during the current crisis within only 16 months (Shirakawa, 2009). After the Lehman collapse, the sharpest cut was implemented by BoE (450 basis points), followed by the ECB (325 basis points) and the Fed (175 basis points), which had already lowered interest rates from 5.25 percent in June 2006 to 2.0 percent in April 2008. Since interest rates were already very low in Japan, interest cuts by BoJ were less pronounced (Bank of Japan, 2009a: 16). While monetary policy in Japan during the 1990s was often criticized as doing ‘too little, too late’, the current policy reaction by central banks was faster and much more aggressive.

The third lesson concerns financial assistance through a LLR. Even though constructive ambiguity may limit moral hazard, the drawback of this policy is that the central bank loses transparency and accountability. Ambiguity could also force illiquid, but solvent banks (that still have a positive net present value) into bankruptcy. Moral hazard may also be constrained through other means – such as firing the senior management of a failed bank or using shareholder capital as a senior source for covering losses. During the recent financial crisis, authorities did not make their LLR policies transparent, bailing out some investment banks but not others, e.g., in the case of Lehman Brothers. This policy differs from LLR policies by BoJ, which had learnt during the 1990s that maintaining ‘ambiguity’ about a central bank’s policy as a LLR is not necessarily constructive, especially if the stability not only of a single bank, but of the whole banking sector is in danger. Rather, during the first crisis, BoJ decided not to maintain constructive ambiguity in pursuing its role as a LLR, but to base its policy on a set of predetermined principles (Nakaso, 2001). Since Japanese banks did not take excessive risks before the recent turmoil, the Japanese case suggests that a renouncement of constructive ambiguity may not necessarily imply adverse incentives for banks.

Because market participants might lose incentives to trade at a market rate slightly above zero (if margins no longer cover transaction costs), all central banks started to pay interest on excess reserve balances and offered a ‘complementary deposit facility’.³² Such a facility did not exist in Japan during the 1990s and authorities in Japan and other countries learnt that the functioning of the money market is impeded, if the key interest rate is lowered to zero (Mizuno, 2009; Shiratsuka, 2009: 9).³³ The purpose of an interest-

³² In the case of the Eurosystem, such a facility already existed and ECB raised interest rates paid on excess reserve balances; this increase was recalled later, but partially reintroduced in May 2009.

³³ See also Baba et al. (2005: 16), who report from the 1990s, the situation that when the interbank rate was 0.001 percent, the return of an investment of 10 billion Yen in the interbank market was only 273 Yen which did not even cover trading costs.

bearing deposit facility is to prevent just such a situation.³⁴ Its drawback, however, is that it drains off liquidity from the interbank markets (Furfine, 2003). Banks with excess liquidity deposit funds at accounts with the central bank instead of lending it to the market. Banks with a liquidity shortage become dependent on fund-supplying operations by the central bank. Consequently, central banks must recycle liquidity and play the role of money market brokers. They thus have to practice ‘quantitative’ or ‘qualitative easing’.

Quantitative easing occurred during the recent financial crisis in the UK, the US, and in the EMU, where bank accounts with the central bank rose alarmingly and central bank balance sheets rose dramatically in scale. This expansion was especially pronounced in the case of BoE and the US Fed, followed by the Eurosystem. BoJ’s balance sheet, however, remained almost constant between 2007 and 2009 (Mizuno, 2009; European Central Bank, 2009a; Deutsche Bundesbank, 2011; Table 4). Prior to the financial turmoil, the US Fed had the smallest balance sheet, both relative to banknotes outstanding and to GDP. Its size almost doubled between June 2007 and August 2009 and made the Fed’s balance sheet the largest, at least in proportion to banknotes. The increase in size of the balance sheet (in terms of banknotes) was smaller for the Eurosystem (35 %) and for BoJ (25 %). BoJ had the largest balance sheet before the financial crisis, but the smallest relative to banknotes outstanding in August 2009 (European Central Bank, 2009a).³⁵ The Bank, therefore, resisted acting as a money market broker, despite the fact that amounts outstanding on the call money market decreased significantly (Bank for International Settlements, 2009a: 98; Bank of Japan, 2009a: 20). Consequently, nominal and real short-term interest rates fell in Japan, but to a much lesser extent than in the US and in the Euro area (IMF, 2010b).

³⁴ Another objective is to prevent central banks from taking on too much counterparty risk in intraday real time gross settlement systems. See Ennis and Weinberg (2007).

³⁵ Between August 2008 and April 2009, real central bank assets rose 250 percent (US Fed and BoE) and around 150 percent (ECB), but remained almost constant in the case of BoJ. See IMF (2009).

Table 4: Relative Size of Central Banks: Bank of Japan, Eurosystem, US Federal Reserve

	Total assets on the simplified balance sheet ¹⁾ relative to GDP (in %)			Total assets on the simplified balance sheet ¹⁾ relative to banknotes in circulation (in %)		
	June 2007	Peak (Date)	August 2009	June 2007	Peak (Date)	August 2009
BoJ	16	23 (31/03/2009)	22	111	144 (31/03/2009)	139
Eurosystem	10	19 (02/01/2009)	16	144	231 (02/01/2009)	194
US Fed	6	15 (17/12/2008)	14	109	266 (17/12/2008)	232

1) Partly aggregated and netted financial statements of central banks.

Source: European Central Bank (2009a: 96).

Quantitative easing was accompanied by qualitative easing, i.e., a change in central bank assets structure towards more risky and towards long-term assets. The Fed began to buy risky assets in February 2009, when it decided to start outright purchases of Mortgage Backed Securities (MBS) and of long-term Agency Bonds. In the meantime, the volume of MBSs held by the Fed exceeds more than one trillion USD (Deutsche Bundesbank, 2011). Eurosystem lowered the minimum rating of assets eligible as collateral to “BBB” and even accepted asset backed securities with a minimum rating of “A-” as eligible collateral. In Spring 2010, it also started outright purchases of sovereign government bonds under the newly created Securities Markets Program (European Central Bank, 2010). In addition, the ECB substantially increased the duration of its money-supplying operations during the crisis. Eurosystem normally provides liquidity to the markets by granting loans to commercial banks against collateral. Before the start of the financial turmoil, about 75 percent of all liquidity-providing operations were short-term, in the form of main refinancing operations with a duration of 7 days; the rest were long-term operations with a duration of 90 days. Since 2007, Eurosystem increased the share of long-term operations significantly to 60 percent and extended the term of these loans to 180 days and to more than one year in June 2009 (European Central Bank, 2008b; Neumann, 2009).

In contrast, Bank of Japan pursued qualitative easing to a lesser degree than other central banks (Mizuno, 2009). The Bank accepted debt instruments with credit ratings of “B- or higher” as collateral. The Bank temporarily purchased commercial papers (CP) and corporate bonds (CB) with credit ratings of “a-1” (in the case of CPs) and “A or higher” (in case of CBs; Bank of Japan, 2011a). Moreover, BoJ generated excess reserves after the Lehman collapse, mainly by providing short-term funds in the form of its ‘special fund-supplying operations to facilitate corporate financing’, with a duration of three months. In addition, it had set ceilings for the amounts outstanding of government bonds it purchased, for outright purchases of CPs and CBs and for the provision of subordinated loans to banks. BoJ has also set a time limit for the various special measures.

Exiting from quantitative and qualitative easing can be difficult and tedious, yet another lesson learnt from the 1990s. During the first financial crisis, BoJ needed more than a decade to abandon ZIRP and QEP and return to normal policy measures. BoJ had committed itself to continuing ZIRP and QEP, as long as it was needed to eradicate price deflation. It decided to terminate both measures only if the year-on-year rate of change in the consumer price index reached or exceeded zero percent for four consecutive months. This was the case only in Spring 2006. For the US Fed and the Eurosystem, an early exit from quantitative and qualitative easing, as well as from ZIRP may also not be possible, because rising bank reserves were financed by issuing or collateralizing long-term and risky assets. Exiting from these non-standard monetary policy measures will become difficult for central banks, if upside risks to price stability emerge before problems in interbank markets disappear and market participants perceive a reduction in counterparty and liquidity risks (Stark, 2009).

By the time of writing this paper, US Fed and Eurosystem have both begun exiting from non-standard monetary policy measures. In December 2009, the US Fed established a term deposit facility and announced paying higher interest on reserve balances or undertaking various actions that reduce the stock of reserves. However, it has not yet been decided when the move toward such normalization will begin (Board of Governors at the Federal Reserve System, 2011). Also in December 2009, ECB decided to embark on a gradual phasing-out of some of the non-standard policy measures, terminated 12-month and six-month operations and decided to return to variable rate tender procedures in their regular three month operations (European Central Bank, 2009b; Stark, 2010). The phasing-out had to be postponed, however, due to the emerging sovereign debt crisis.³⁶ Due to emerging upside risks on inflation, Eurosystem raised its main policy rate by 25 basis points in April 2011 and June 2011, respectively.

Observers cast doubt on whether these exit strategies are likely to succeed (Mizuno, 2009). Critics argue that neither the Fed nor the Eurosystem have yet made clear when and under what conditions they will finally terminate their QEP or use the tools mentioned above. While BoJ had announced in October 2003 that it will maintain QEP until core CPI inflation becomes stable at zero (or above), a similar announcement would not be credible in the current situation. If exiting from this rescue operation is not credible, banks will not use their extra-profits to recapitalize their balance sheets and central banks will be forced to extend QEP. Hence, a credible exit strategy will be of considerable importance.

The final lesson learnt from the financial crisis in the 1990s – but one that is beyond the realm of monetary policy – should finally be mentioned. In the event of bank failures, a resolution or restructuring mechanism is needed that regulates how to dissolve or restructure a failed bank. Normal bankruptcy procedures applied to non-financial firms are often insufficient and, hence, special restructuring laws for financial institutions are needed. The Japanese authorities enacted such a law in 1998 and founded a ‘bridge bank’ that acquired bad loans from failing banks (Nakaso, 2001; Bebenroth et al., 2009). Other countries did not possess such a legal mechanism before

³⁶ In December 2011, ECB decided to continue the policy of ‘quantitative’ and ‘qualitative easing’. See European Central Bank (2011).

the failure of Lehman Brothers and therefore had to enact resolution and restructuring procedures during the recent financial crisis. Since these laws also regulate the management of a failed institution, they create incentives for management *ex ante* not to take excessive risks. Possibly, the fact that Japan did have such legislation at the outset of the recent crisis, was another reason why Japanese banks were not heavily engaged in the markets for subprime-related and structured financial products before the recent financial turmoil.

5. Conclusions

In this paper, we describe the reactions by the Bank of Japan during the current financial crisis and compare them with measures taken during the 1990s and with current reactions by other central banks. We show that after the failure of Lehman Brothers, central banks immediately offered financial assistance to the financial sector, enlarged the range of eligible collateral and increased the number of counterparties. In addition, they rapidly reduced interest rates and started to pay interest on excess bank reserves, so as to prevent interbank markets from collapsing. With these measures, current monetary policy reactions differ from the reactions in Japan during the 1990s, when BoJ waited several weeks before acting as a lender of last resort, only gradually reduced policy rates and did not pay interest on excess balances. Immediate financial assistance, rapid transition to a more accommodative monetary policy and the introduction of a deposit facility are the major lessons learnt by central banks from the Japanese financial crisis of the 1990s.

While all major central banks have in the meantime joined the ‘ZIRP-club’, the Bank of Japan has been much more resistant than the US Fed or the Eurosystem during the recent crisis, to switching to QEP. Although the amounts outstanding on Japanese interbank markets shrunk considerably between September 2008 and April 2009, BoJ did not significantly enlarge its balance sheet. It neither engaged in credit easing (because it mainly increased its short-term lending to banks), nor did it accept asset backed securities with low ratings as eligible collateral. Bank of Japan hence did not take such a large “swig from the bottle of quantitative/qualitative easing” which makes it easier to exit from QEP. In this respect, recent monetary policy responses by BoJ differ from both policy reactions during the 1990s and from recent reactions in the US and Euro area.

The Japanese experience from the 1990s suggests that a return to standard monetary policy measures is a long-lasting and difficult process. How to exit easily from QEP remains an unanswered question. Three problems have to be considered. One is the tools that should be used and another is the circumstances that trigger the use of these tools. Finally, central banks have to establish credibility that they will start exiting when certain desirable changes in circumstances occur. The proper answers to these questions have still to be found.

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Appendix: Time Line of Policy Measures taken by the Bank of Japan (2008-2010)

Date	Measure
2008	
Sep. 18, 2008	Introduction of US Dollar fund-supplying operations;
Sep. 29, 2008	Expansion of US Dollar fund-supplying operations;
Oct. 14, 2008	Expansion of securities lending facility; Expansion of purchase of JGBs with Repo agreements; Expansion of US Dollar fund-supplying operations; Provision of sufficient funds over the year-end (40 trillion Y); Increase in frequency and size of CP repo operations; Expansion in the range of ABCP as eligible collateral; Suspension of selling stocks held by the Bank of Japan;
Oct. 31, 2008	Reductions in policy interest rates: <ul style="list-style-type: none"> • New target for the uncollateralized overnight call rate: around 0.3%; • New basic loan rate: 0.5 %; Introduction of complementary deposit facility (rate applied: 0.1 %);
Dec. 02, 2008	Introduction of “special fund-supplying operations to facilitate corporate financing”; Expansion of range of corporate debt as eligible collateral;
Dec. 19, 2008	Reductions in policy interest rates: <ul style="list-style-type: none"> • New target for uncollateralized overnight call rate: around 0.1%; • New basic loan rate: 0.3 %; Expansion in range of JGBs accepted in outright purchases; Outright purchases of JGBs (16.8 trillion Yen per year); Inclusion of Development Bank of Japan as counterparty in operations such as CP Repo op.; Expansion of “special fund-supplying operations to facilitate corporate financing”; Introduction of outright purchases of CPs;
2009	
Jan. 22, 2009	Acceptance of debt instruments issued by real estate investment corp. as eligible collateral; Expansion in range of JGBs accepted in outright purchases;

	Expansion of outright purchases of CPs; Introduction of outright purchases of Government bonds;
Feb. 3, 2009	Resumption of stock purchases held by financial institutions (rating BBB- or better);
Feb. 19, 2009	Inclusion of government-guaranteed dematerialized CP in eligible collateral; Expansion of “special fund-supplying operations to facilitate corporate financing”; Expansion of outright purchases of Government bonds; Expansion of securities lending facility;
Mar. 17, 2009	Provision of subordinated loans to banks;
Mar. 18, 2009	Outright purchases of JGBs (21.6 trillion Y);
Apr. 7, 2009	Expansion in range of eligible collateral for loans on deeds to public sector;
Apr. 10, 2009	Provision of subordinated loans to banks;
May 22, 2009	Acceptance of US, UK, German, French Government Bonds as eligible collateral;
Jul. 15, 2009	Prolongation;
Oct. 30, 2009	Expiration of temporary measures announced;
2010	
Jan. 28, 2010	Expansion of US Dollar fund-supplying operations;
Mar. 31, 2010	Expiration of “special funds-supplying operations to facilitate corporate financing”; Expiration of provision of subordinated loans to banks;
April 30, 2010	Expiration of “stock purchases held by financial institutions”;
May 10, 2010	Reestablishment of US Dollar fund-supplying operations.

Source: Bank of Japan (2011a)