"Financial Risk and Crisis Management after
the Global Financial Crisis" Series　No.1　(10/2015)

The Global Financial Crisis and Management of the Eurozone Crisis[1]

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[1] This document is an English translation of the original Japanese, which appears in the Oct. 2015 edition of The Japan Economic Research Institute Monthly Report, published by The Japan Economic Research Institute.

1. Introduction

Although the global financial crisis began with the meltdown of the US subprime mortgage market, defaults on collateralized subprime mortgage securities held in the investment portfolios of European financial institutions significantly influenced not only credit risk in the securities and lending markets but also counterparty risk in the interbank markets from which financial institutions use to procure short-term funding. The manifestation of this new financial risk following the global financial crisis has heightened the need for financial risk management both before and after a crisis. To address these needs, individual institutions (financial institutions as well as corporations) are developing financial risk and crisis management plans while governmental and international bodies are exploring financial regulations and regional financial cooperation with regard to cross-border financial transactions.

The US subprime mortgage problem also significantly impacted the European financial institutions that played the role of international financial intermediaries between balance-of-payments surplus nations, such as oil exporters, and balance-of-payments deficit nations, such as the US, during the time of global payment imbalances (Ogawa, 2013b). Simultaneously, as the global recession deepened and nations ran larger fiscal deficits, Greece fell into a fiscal crisis that subsequently spread to some other Eurozone nations (Ogawa, 2015). To cope with this Eurozone crisis, the European Commission (EC), the European Central Bank (ECB), and the International Monetary Fund (IMF) established a Troika to offer financial assistance.

This paper first reviews the phenomenon of US dollar liquidity shortages and ensuing policy responses during the global financial crisis and subsequently considers optimal ways to manage a financial crisis stemming from the dollar liquidity shortages. Furthermore, it reviews the government policies used to combat the Eurozone crisis and considers best practices to manage financial risk pertaining to the IMF and financial cooperation in the region.

2. US Dollar liquidity shortages during the Global Financial Crisis

2.1 The Global Financial Crisis and European Financial Institutions

The global financial crisis of 2007-2008 originated in the US wherein the collapse of a housing price bubble led to defaults of subprime mortgages. The housing price bubble began when home prices rose due to home purchases that were based on the expectation that prices would rise. When those expectations reversed from housing price increases to declines, homes flooded the market, and housing prices stopped increasing and instead began to decline. This sort of self-fulfilling expectation both expanded the bubble and collapsed it.

In this US housing price bubble fed by self-fulfilling expectations, expectations for rising home prices led to mortgages being issued to low-income households who would normally find it difficult to secure such loans due to their extremely high credit risk. Simultaneously, US investment banks were at the forefront in designing securitized products (RMBS, etc.) backed by subprime mortgages, which shifted that credit risk to other parties. They then combined credit default swap (CDS) backed by those initial securitizations and sold them off to financial institutions in the US and Europe.

European financial institutions' investment into these securitizations served to help savings-starved US economy procure funds. This flow of funding into the US came not only from Europe but also from the Middle East, Russia, and other oil-exporting creditor nations that invested in these securitizations through intermediaries, i.e., European financial institutions. In this sense, European financial institutions assumed the role of international financial intermediaries between the oil-exporting creditor nations and the US, with its negative balance of payments. These international financial transactions were entered into not only by the UK with London as a center of international finance but also by Iceland and other nations. Moreover, these international transactions caused capital to flow from these creditor nations into Europe, fueling purchases of land and other assets in Europe and adding to the land bubble (Ogawa, 2013a).

However, once the housing bubble burst in the US, declining prices, the subprime mortgages' high credit risk, once concealed by the expectation of rising home prices, was exposed. As the housing bubble burst, subprime mortgages defaulted, and the securitizations backed by subprime mortgages became more likely to be uncollectible. This had the same degree of impact

on the European financial institutions that held many of these subprime mortgage securitizations as it had on the US financial institutions.

Thus, European financial institutions directly felt the impact of the US subprime meltdown; coupled with the effects of the bursting of their own land bubble, their own balance sheets were damaged. Moreover, European financial institutions also faced counterparty risk due to lack of clarity regarding the degree of subprime mortgage-backed products in their overall holdings of securitizations.

2.2 US Dollar liquidity shortages in Europe

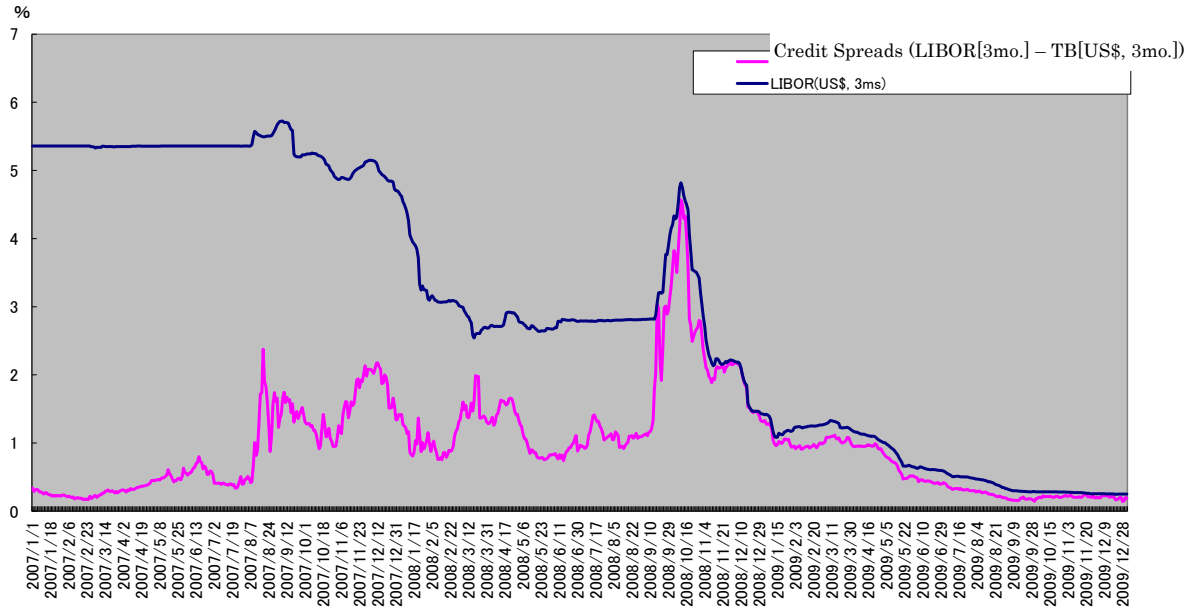
As mentioned before, European financial institutions' balance sheets were damaged as a direct result of the subprime crisis. Simultaneously, a land bubble burst in some EU nations, leading mortgages issued by the European financial institutions themselves to default. Further exacerbating and complicating the problem was the lack of clarity regarding the degree of subprime mortgage-backed products in general securitizations, making it impossible for the financial institutions involved to determine the extent to which their balance sheets were damaged. Consequently, financial institutions began to regard their trading counterparties with mistrust, and consequently counterparty risk increased.

Although the ECB, Bank of England (BOE), and other European countries' central banks can normally supply the market with Euros and British pounds, they cannot supply US dollars without being subject to foreign exchange reserve restrictions. The ECB and BOE cannot provide an unlimited supply of US dollar funding as a "lender of last resort." Europe's financial institutions therefore faced serious counterparty risk in obtaining dollar-denominated liquidity. In the period immediately following the bankruptcy of Lehman Brothers, financial institutions found it difficult to raise dollar-denominated funding in London and other European interbank lending markets.

Counterparty risk among European financial institutions was clearly manifested in the London Interbank Offered Rate (LIBOR). Figure 1 illustrates the movement of LIBOR (three month, US dollar denominated) minus the equivalent US Treasury Bill (TB) rate, indicating the degree to which financial institutions' credit risk incurred an additional risk premium (credit spread) vis-a-vis TBs—a risk-free asset. The risk premium for the

European financial institutions that comprise the primary users of the London interbank lending market is visible from the movement of the credit spread.

Figure 1. LIBOR (US$, 3 mo.) and Credit Spreads (LIBOR－TB rate, US$, 3 mo.)

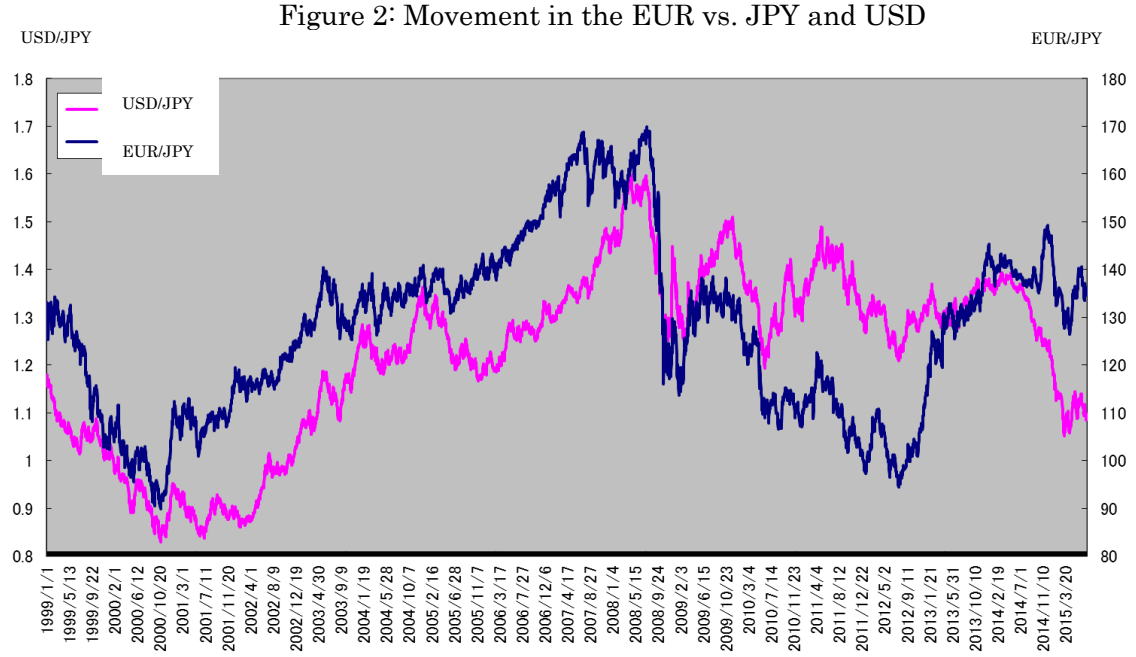


Data : Datastream

As illustrated in Figure 1, the credit spread was less than 0.5% before the summer of 2007, when the subprime mortgage crisis emerged, but the credit spread rose above 1% by August, increasing above 2% by month end. With the Lehman bankruptcy on September 15, 2008, the credit spread rose again, increasing to 2% on the following day and skyrocketing to 4.5% by the middle of October 2008. The LIBOR level also rose from 2.8% before the Lehman bankruptcy to nearly 4.8% by mid-October, an increase of 2% in one month. Figure 2 indicates that the Euro peaked vis-a-vis the US dollar and the Japanese yen before the global financial crisis, but it dramatically declined against both currencies during the crisis. Furthermore, it indicates that this dramatic decline in the Euro was greater than that experienced during the subsequent Eurozone crisis.

This major increase in the dollar-denominated LIBOR credit spread indicates that European financial institutions were subject to an extremely high risk premium when attempting to raise dollar-denominated funds in

Figure 2: Movement in the EUR vs. JPY and USD



Data : Datastream

London's interbank market. Notably, this risk premium was imposed on financial institutions that had not suffered much damage to their balance sheets. Those institutions that were deemed likely to have damaged balance sheets were unable to procure dollar funding in the interbank market. The increase in counterparty risk thus made it difficult for European financial institutions to procure dollar funding; thus, dollar liquidity suffered.

2.3 The European Response to Dollar liquidity shortages

The Federal Reserve Board (FRB) initiated quantitative easing by reducing the federal funds rate (a policy interest rate) to zero percent to eliminate US dollar liquidity shortages. As presented in Table 1, it also successively entered into currency swap agreements with central banks of numerous major foreign countries, thereby providing an unlimited supply of US dollars. Central banks, including the European Central Bank (ECB), also provided unlimited liquidity to European financial institutions based on the US dollar liquidity supplied by FRB swap lines.

Considering the shortage of dollar funds in the euro area and surrounding

Table 1. Initiation and Expansion of Dollar Supply Operations

12 Dec 2007	The US Federal Reserve Bank enters into new currency swap agreements with the European Central Bank (ECB) and Swiss National Bank (SNB). Other central banks implement dollar supply operations using currency swap agreements as funding sources.
11 Mar 2008	FRB expands currency swap agreements with ECB and SNB.
2 May 2008	FRB expands currency swap agreements with ECB and SNB. Other central banks expand dollar supply operations using currency swap agreements as funding sources.
30 Jul 2008	FRB expands currency swap agreement with ECB. ECB and SNB expand dollar supply operations using currency swap agreements as funding sources.
18 Sept 2008	FRB expands currency swap agreements with ECB and SNB and enters into new currency swap agreements with the Bank of Japan (BOJ), Bank of England (BOE), and Bank of Canada. Other central banks initiate or expand dollar supply operations using currency swap agreements as funding sources.
24 Sept 2008	FRB enters into currency swap agreements with the Reserve Bank of Australia, Sveriges Riksbank, Danmarks Nationalbank, and Norges Bank.
26 Sept 2008	FRB expands currency swap agreements with ECB and SNB. ECB, SNB, and BOE expand dollar supply operations using currency swap agreements as funding sources.
29 Sept 2008	FRB greatly expands currency swap agreements with various central banks, extends term of currency swap agreements from the end of Jan 2009 to the end of Apr 2009.
13 Oct 2008	ECB, SNB, and BOE initiate unlimited dollar supply operations as long as the currency swaps are fully collateralized and have fixed interest rates. FRB follows by abolishing the currency swap agreement limit with these central banks. BOJ announces it is considering initiating similar measures.
14 Oct 2008	BOJ implements unlimited dollar supply operations as long as the currency swaps are fully collateralized and have fixed interest rates. FRB follows by abolishing the limit on its swap agreement with the BOJ.
28 Oct 2008	FRB enters into a new currency swap agreement with the Reserve Bank of New Zealand.
29 Oct 2008	FRB enters into new currency swap agreements with the Banco do Brasil, Banco de Mexico, Bank of Korea, and the Monetary Authority of Singapore.

Source：Bank of Japan

countries, it became apparent that providing dollar funds to the European interbank market by only utilizing the foreign currency reserves held by the ECB and other central banks would be inadequate to overcome this shortage. Therefore, the FRB entered into central bank liquidity swaps with the ECB and Swiss National Bank on December 12, 2007, supplying dollars to these parties. Following the Lehman bankruptcy, the Federal Reserve (FRB) entered into a currency swap agreement with the BOE on September 18, 2008. This was followed on September 24 by similar agreements with the Swedish, Danish, and Norwegian central banks. On October 13, the FRB removed the value limitation on its swap agreements with the ECB, Swiss National Bank, and BOE, initiating unlimited secured dollar-supply operations. On October 14, the Bank of Japan also announced that it would conduct similar operations in the Tokyo market in preparation for the potential inability of Japanese banks to raise dollar funds in European interbank markets. This dollar liquidity supply system found its footing in mid-October 2008, rapidly shrinking the credit spread from 4.5% to below 2% by November 2008, with the said spread declining below 1% by January 2009. By June 2009, the credit spread declined below 0.5%, returning to pre-global financial crisis levels. However, a troublesome pattern continued in the interbank markets wherein commercial financial institutions were all borrowers and the central banks were the sole lenders.

Considering this, it became clear that the ECB and European countries' central banks could not handle the supply of dollar liquidity to the European interbank markets during the time of heightened counterparty risk. They were only able to lower interest rates for European currencies, which limited the provision of dollar funding to the European financial institutions that needed it. Furthermore, it clarified that the IMF, which provides monetary support to help mitigate balance-of-payments crises, was also unable to function as a "lender of last resort" in providing unlimited dollar funds. In the end, the European financial market was forced to depend on the US domestic "lender of last resort" for the dollar—the FRB.

The situation of dollar liquidity shortages in Europe during the global financial crisis indicated that the dollar still serves as a crucial function in the Eurozone and the EU, where the euro is the single and common currency. Particularly, it became apparent that dollar liquidity is crucial to financial transactions and that the dollar remains the basic currency as it was under

the Bretton Woods system. On the other hand, the FRB's currency swap agreements that resolved the credit spread issue that arose from dollar illiquidity in Europe revealed that the FRB was the only "lender of last resort" for dollar liquidity. Moreover, although this revealed a deficiency in the market whereby central banks were the only lenders, the elimination of the credit spread through currency swaps with the FRB and an influx of unlimited dollar liquidity from Europe's central banks suggested that the drying up of dollar liquidity was an outcome of increasing counterparty risk at European financial institutions. Although the potential for insolvency from bad debt at these European financial institutions was not apparent during the time, the ECB's (2014) stress test results and subsequent trends should be examined.

3. Responses to the Eurozone Crisis

3.1 The Three-Part Policy for Combating the European Debt Crisis

The dollar liquidity shortages caused by the global financial crisis appeared to have been resolved by mid-2009 as credit spreads were reduced by the unlimited supply of dollar liquidity from European central banks and their currency swap agreements with the FRB. However, the injection of capital into ailing financial institutions and international fiscal stimulus policy coordination by the G20 to combat the global recession following the global financial crisis worsened fiscal budgets in many nations. Then, the discovery in October 2009, when Greece's administration turned over, that the nation had falsified its budget figures triggered a crisis of confidence in Greece's financial authorities. In particular, rolling over Greek government debt became difficult. Furthermore, since banks in France, Germany, and other countries also held Greek government debt, the potential for an international balance-of-payments crisis in the capital account emerged. Therefore, the European Commission (EC), ECB, and IMF jointly established a Troika to combat the Greek fiscal crisis.

The following three items are generally required to resolve a fiscal crisis (Ogawa, 2013a).

The first essential factor is to restore fiscal discipline, the erosion of which played a major role in causing the Greek fiscal crisis and ripple effects in some other Eurozone nations. Restoring and strengthening fiscal discipline

is imperative. To achieve this, the country suffering from the fiscal crisis must undergo fiscal reform—a process that requires visible planning and steady implementation. It is also necessary to reduce sovereign risk as well as the potential for a fiscal crisis by establishing strict fiscal discipline and preventing moral hazard.

The second prerequisite is to extinguish some of the massive government debt through private sector involvement to facilitate crisis management. Extinguishing debt of the country in fiscal crisis (Greece) is necessary to soften the burden borne by that nation's economy during fiscal reconstruction. Debt relief thus provides the afflicted nation's government with an incentive to advance with austerity measures for its rehabilitation. Considering the essential role of private financial institutions as lenders in a debt crisis, both lenders and borrowers must share a portion of the burden to prevent moral hazard.

The third factor is the need to provide a safety net for the private sector financial institutions participating in debt relief. To minimize the impact of debt relief from the fiscal crisis on private sector financial institutions and limit the secondary impact on other Eurozone nations, the European Stability Mechanism (ESM, the successor to the European Financial Stability Facility [EFSF[2]] that was formed as an interim organization before the Treaty of Lisbon revision) was established in October 2012 to act as a safety net (European Commission, 2011). In its capacity as a safety net, the ESM was expected to purchase the sovereign debt of countries facing a fiscal crisis.

Before its revision, the Lisbon Treaty prohibited financial assistance to member states. The EFSF was established insofar as the treaty's Article 122.2 broadly interprets financial crises as being in the same category as natural disasters, that is, as "exceptional occurrences beyond its control." After the Lisbon Treaty was revised, the EFSF became a permanent entity as the ESM, and financial transfers among Eurozone nations during crises became possible. These financial transfers are extremely limited, but they could potentially integrate fiscal sovereignty.

[2] The EFSF was created as a temporary entity because of the need to revise the Lisbon Treaty, which prohibited fiscal transfers except in the event of a natural disaster. From this, came the establishment of the ESM, which is intended to guard against the contagion of fiscal crises, or more precisely, "exceptional occurrences beyond its control," in the same class as natural disasters, as defined by Article 122.2 of the Lisbon Treaty.

3.2 Actions to Combat the Greek Fiscal Crisis

When the Eurozone nations in crisis (Greece, Ireland, Portugal, and Cyprus) requested the IMF's financial assistance, experience with EC and IMF joint programs in central and eastern Europe proved to be useful. The ECB was added to the mix as a third partner, and the three constituted a Troika for providing monetary assistance in cooperation with one another.

The measures to the Greek crisis, which triggered the Eurozone crisis, is worth noting. Under the Troika system, the first line of financial support for the Greek fiscal crisis was to be a bailout facility granted by the Eurozone nations and the IMF (worth EUR 110Bn, of which 80Bn was from Eurozone nations and 30Bn from the IMF), as decided in May 2010. Here, under the Troika, the European nations shouldered two-thirds of the monetary burden of rescuing Greece while the IMF provided the remaining one-third. Therefore, although the IMF typically plays a key role in crisis management, it was a minority lender in its financial support for Greece. Therefore, the IMF found it difficult to manage the Troika.

Since the initial stages of the Greek financial rescue program, the following three points have stood out: (i) restoring fiscal sustainability, (ii) improving external competitiveness, and (iii) creating safeguards for financial sector stability. The first bolstered confidence and restored market access such that the ratio of public debt outstanding to GDP has been declining since 2013. The second comprised shifting Greece's economy to an investment- and export-driven growth model through structural reforms such as lowering nominal wages, cutting costs, and boosting price competitiveness. Moreover, it improved the government's economic transparency and reduced the government's role in the economy. The third established a financial stabilization fund to guard against deflation and expand the safety net for managing bank solvency issues. It also expanded the government's existing bank liquidity assistance facility to mitigate liquidity issues resulting from increasing sovereign risk. These constituted the conditions for financial support from the IMF or the IMF's conditionality. Eurozone nations, working in tandem with the IMF to provide such support, imposed this conditionality on the Greek government.

The second line of financial support was to be a new loan facility totaling EUR 130Bn (EUR 102Bn from Eurozone nations, EUR 28Bn from the IMF), to be granted in March 2012. This was to reduce the amount of Greek

sovereign debt in the private sector, which was not done by the first bailout facility. Since neither the EFSF nor the ESM existed when the first facility was provided, there had been no private sector participation in Greek sovereign debt relief. The first line of support, therefore, had merely imposed a major burden on the Greek government and made no progress in actually resolving the Greek fiscal crisis. Therefore, debt relief with private sector participation was discussed, and private sector debtholders agreed to take a 53.5% write down. Avoiding a unilateral "disorderly default," the agreement instead resulted in an "orderly default" with the private sector.

However, the hard-line left-wing Syriza party, led by Alexis Tsipras, won a landslide victory in the January 25, 2015, general election on a platform of opposing austerity measures, and Greece's internal political upheaval continued as the new government put its anti-austerity commitment to a national referendum as the June 2015 repayment to the IMF approached. This delayed the repayment to the IMF, and the government won the anti-austerity referendum on July 5, 2015. However, Prime Minister Tsipras later changed his position toward austerity, and the Greek parliament passed a fiscal reform bill on July 16, 2015.

Tsipras's abandonment of his anti-austerity pledge in favor of austerity measures allowed Greece to receive a third bailout package. However, a deepening distrust of Greek domestic politics in other Eurozone nations, especially in Germany, delayed discussions of debt relief. Opinions on debt reduction were split between those arguing that it would provide a positive incentive for fiscal reform and debt balance sustainability and those arguing that it would negatively impact fiscal discipline and increase moral hazard.

3.3 Measures Restoring Trust in the Financial Authorities

If we consider that a loss of confidence in Greece's financial authorities triggered a shift in the equilibrium by which one incident (the bubble) set off another (the post-bubble sovereign crisis), restoring trust in the financial authorities is necessary to resolve the sovereign crisis and escape this scenario. This requires the fixing of the fiscal deficit as well as maintenance of fiscal discipline by the government.

At the December 2011 EU summit, all parties, except the UK and the Czech Republic, fundamentally agreed on a fiscal compact to strengthen fiscal discipline by forming a "Fiscal Stability Union" that would end the sovereign

crises in Greece and other Eurozone countries (European Council, 2011). Although this aimed to strengthen the EU's economic alliance, for the time being, it was merely a "Fiscal Stability Union" and not a "Fiscal Union" that would consolidate financial sovereignty. In addition, this accord sought to legislate fiscal rules that would apply under each nation's constitution or equivalent legal construct to limit each nation's structural deficit to 0.5% of its GDP, except in cases of deficits resulting from changes in the business cycle. Furthermore, a self-correcting mechanism to apply excessive deficit procedures would be established automatically once a nation's deficit was confirmed by the EC as exceeding that limit, providing that there was no opposition from the EU members.

The Eurozone nations fundamentally agreed on creating such a fiscal compact with new rules to strengthen fiscal discipline in this way. These fiscal rules decreed that government's overall budgets must balance. However, this was not the convergence criterion specified by the Maastricht Treaty wherein the ratio of a government's annual deficit to GDP must not exceed 3%; instead, it limited structural deficits to 0.5% of GDP, excluding cyclical factors, to consider the damage to fiscal revenue and expenses caused by economic downturns and the resultant shrinkage of tax revenue and increased unemployment benefits. The condition that these rules be legislated as part of each nation's constitution or equivalent legal construct was also included.

In the EU, the "Stability and Growth Pact" was already established to ensure fiscal discipline. In emphasizing fiscal discipline, the EU demanded via the "Stability and Growth Pact" that each nation practice fiscal discipline by implementing a sound fiscal management even after adopting the Euro as its unit of currency. The European Commission and Council of Ministers mandate that Eurozone nations institute "stability programs" as a method for mutually monitoring each other's fiscal status. Based on these "stability programs," the European Commission and Council of Ministers can investigate each nation's fiscal status and apply excessive deficit procedures if a nation is deemed to be running too large a deficit.

These procedures include recommending corrective actions to those countries found to be running excess deficits by the European Commission and the Council of Ministers. If a nation does not comply with these recommendations, then sanctions amounting to 0.2%–0.5% of GDP will be

applied if the country's deficit exceeds 3% of GDP. This would initially take the form of a zero-interest deposit, but more than two years of excessive deficits without correction would result in the deposit being confiscated as a fine. These punitive and strict rules were therefore created in quest for fiscal discipline among member nations. Due to the discretionary nature of these rules, they were not actually applied in some cases wherein they should have been applied. Consequently, the Greek government triggered moral hazard because they assumed that these procedures would not be applied to them due to such discretion. Greece came to be consistently incapable of complying with the GDP rule of 3% for its fiscal deficit.

Although these procedures could actually have been applied to numerous nations, including Greece, the discretionary leeway that existed resulted in such actions not being taken even once. Because of this track record of inaction, the EU agreed on new rules for establishing a self-regulating mechanism that, barring any opposition by the Eurozone nations, automatically triggers excess deficit procedures when the EC determines that a country's deficit has exceeded a given limit. They therefore sought a practical strengthening of fiscal discipline. This "Fiscal Stability Union" is merely a basic agreement on a policy accord among Eurozone nations to strengthen fiscal responsibility and promote fiscal reform. In other words, this agreement stops short of being a "Fiscal Union" in the sense of a consolidation of fiscal authority.

4. Conclusion

The response to the global financial crisis and the Eurozone crisis hold several lessons that may be applied to Asia.

First, as a general theory, crisis management plans should be set up ahead of time during a period of economic stability. However, discussions and conclusions about establishing crisis management plans may not occur until an actual crisis has flared up. Considering this, establishing a crisis management plan during the crisis itself may delay a response and allow the crisis-ridden country's problems to deepen. In addition, those problems will have a greater chance of spreading to other nations. A classic example is the Treaty of Lisbon's restriction on financial transfers, which prevented the Eurozone from establishing the ESM until after the Eurozone crisis. This

also happened in East Asia with the 1997 Asian currency crisis as regional financial cooperation was nonexistent and discussions to set up the Asian Monetary Fund (AMF) had not yet come to fruition. East Asia had to wait until 2000 before the first financial crisis management system, the Chiang Mai Initiative, was finally established as a regional financial cooperation program.

The second lesson from the global financial crisis is that the FRB's provision of dollar liquidity at a time of insufficient liquidity or a liquidity crisis was at least able to rapidly shrink credit spreads. In such a situation, the FRB was able to respond to the crisis because it was in the US, the epicenter of the crisis, simultaneously experiencing liquidity problems. If the US economy had been under inflationary pressure and the FRB had sought to tighten monetary policy, then it is not entirely certain that the FRB would have had the same type of policy response toward other countries. Preparing for such a scenario would need to be complemented by actions from the IMF and regional financial cooperation programs. In East Asia, to make this type of response possible, the ASEAN+3 entered into a currency swap agreement under the Chiang Mai Initiative. In addition, bilateral agreements were expanded into multilateral agreements to improve their maneuverability. The ASEAN+3 Macroeconomic Research Office (AMRO) has also been set up as an oversight body for both crisis management and crisis prevention.

The third lesson is found in the Eurozone crisis management handled by the EC, ECB, and IMF's Troika system. In this, the IMF partnered with regional financial cooperation efforts to work on crisis management. A balance-of-payments crisis or a currency crisis would normally be managed by the IMF alone. However, although the Asian currency crisis was also handled mainly by the IMF, most of the actual monetary support provided during the crisis was contributed by the East Asian countries. In the Chiang Mai Initiative's currency swap agreement, the IMF link is weakened because the swaps would be executed only after the IMF support was received to promote maneuverability. While the swap agreement bills itself as complementary to the IMF, it is also viewed as partially distancing itself from the IMF.

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