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Japan: Financial Sector Assessment Program—Technical Note on Financial System Spillovers—An Analysis of Potential Channels

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FINANCIAL SECTOR ASSESSMENT PROGRAM

JAPAN

FINANCIAL SYSTEM SPILLOVERS: AN ANALYSIS OF POTENTIAL CHANNELS

TECHNICAL NOTE

AUGUST 2012

INTERNATIONAL MONETARY FUND
MONETARY AND CAPITAL MARKETS DEPARTMENT

Contents Page

ABSTRACT[1]

Identifying and estimating spillovers has become a key agenda for financial stability oversight. This note lays down some of the potential channels of financial system spillovers in Japan that policy makers should keep in view. The 2011 IMF Spillover Report focused on outward spillovers from Japan using broad macro-level data. This note advances the understanding of those channels in three ways. First, it focuses on inward spillovers to the financial system. Second, it provides a deeper evaluation of cross-border exposures using stress tests and market surveillance. Third, it combines quantitative analyses with qualitative assessments of financial oversight framework both for on-shore and off-shore risks.

The overall finding is that financial system spillovers from overseas exposures appear manageable for the present except in severe distress situations in the U.S. or the core European countries. Funding risks for Japanese institutions also seem limited, at present, except for some nonbank institutions that would need intensive monitoring. There is also some room to deepen coordination with foreign supervisors and financial stability authorities so as preemptive remedial actions can be initiated before stress conditions set in.

[1] The note was prepared by Serkan Arslanalp (MCM), W. Raphael Lam (APD) and Hiroko Oura (MCM), with inputs from the rest of the FSAP team, Bank of Japan (BoJ) and Japan Financial Services Agency (FSA).

I. INTRODUCTION

1. **Spillover analysis within FSAP.** Transmission channels through indirect effects from global spillovers to the real economy are discussed in the context of Article IV consultations and IMF spillover reports. The Financial Sector Assessment Program (FSAP) analysis enhances those by providing more granular and risk-oriented assessments on cross-border exposures of financial institutions, and by identifying key cross-border issues in the institutional, legal and regulatory framework. It aims to facilitate the ongoing public exchange in Japan between regulators, the financial industry, and politicians on the role of the financial sector in supporting long term economic growth in Japan, and in avoiding the build-up of contingent risks. This may also help forge a consensus in favor of further reform and preemptive remedial actions and interventions.

2. **More granularity and risk-oriented assessment.** FSAPs typically focus on more granular analyses than those based solely on aggregate data such as Bank for International Settlements (BIS) data. Cross-border exposures, based in particular on the use (direct or indirect) of supervisory data or internal bank data are critically examined, alongside a fuller understanding of the business models that drive these risks and exposures. An examination is made of the types of assets held by financial institutions (on-and off-balance sheet), their key counterparties, and related funding channels. Potential risks (market, credit, and liquidity risks) are assessed against financial institutions' capital buffers through formal stress tests, qualitative analysis, market surveillance, and a detailed dialogue with supervisory authorities.

3. **Importance of institutional and regulatory framework in managing spillover channels.** Managing spillover risks requires a proper institutional and regulatory and oversight framework. It becomes important that national regulators have the legal authority and capacity to identify and monitor emerging risks as well as to collaborate with other countries' supervisory authorities in addressing risks that could have spillovers. Adherence to internationally accepted practices while tailoring them to the structural and local market realities becomes a key factor in mitigating spillover risks.

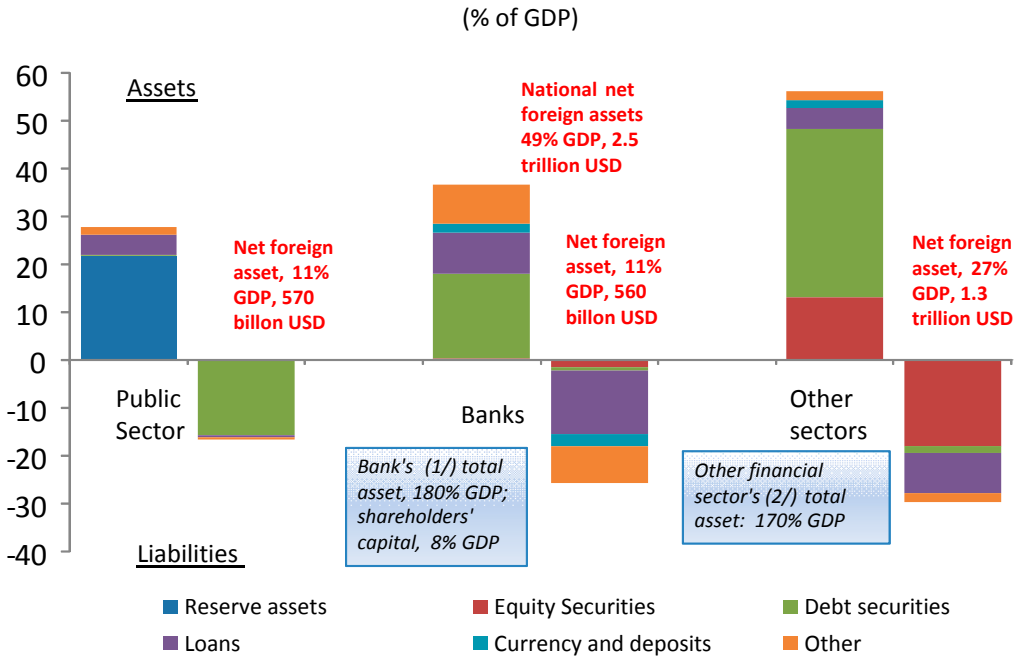
II. OVERSEAS EXPOSURE OF THE JAPANESE FINANCIAL SYSTEM

4. **Cross-border exposures of the Japanese financial firms are the key channels of global spillovers to the Japanese financial systems.** A snapshot of Japan's international investment position (IIP) is shown in Figure 1. The data are from Bank of Japan (BOJ) and show Japan's external assets and liabilities for three sectors: public sector, banks, and "other sectors." Most of the assets held by the "other sectors" category are attributed to nonbank financial institutions (insurance companies, pension funds).[2]

[2] More specifically, the public sector includes the general government, monetary authorities, and governmental financial institutions; banks include commercial banks and other deposit-taking corporations such as

(continued)

Figure 1. Japan: Foreign Assets and Liabilities (excluding direct investment), end-2010



Source: Bank of Japan.

1/ Deposit-taking institutions, excluding Japan Post Bank. Japan Post Bank's assets are mostly domestic, in particular Japanese government bonds.

2/ The definitions of "other financial sector" and "other sectors" do not match exactly. The former is based on the BOJ's flow of funds data and do not include nonfinancial corporations and individuals.

3/ The IIP data are on a residency basis, and hence, the figures reported also include assets and liabilities of Japanese branches of foreign financial institutions.

5. **Several observations can be drawn from Japans' IIP data.** First, foreign assets of the banking sector (37 percent of GDP) are four times their shareholders' capital (8 percent of GDP). This suggests that sizeable changes in the (yen-based) valuation of external assets could have a significant impact on the shareholders' capital of the banking system. Second, banks' cross-border liabilities are primarily in the form of loans (i.e., wholesale funding), while the share of currency and deposit is small. This implies that banks may potentially face funding risk from overseas when there is severe turbulence in global asset and funding markets. Third, insurance and pension funds may face potentially large valuation losses with their overseas portfolio, although they are less likely to face liquidity risks since their

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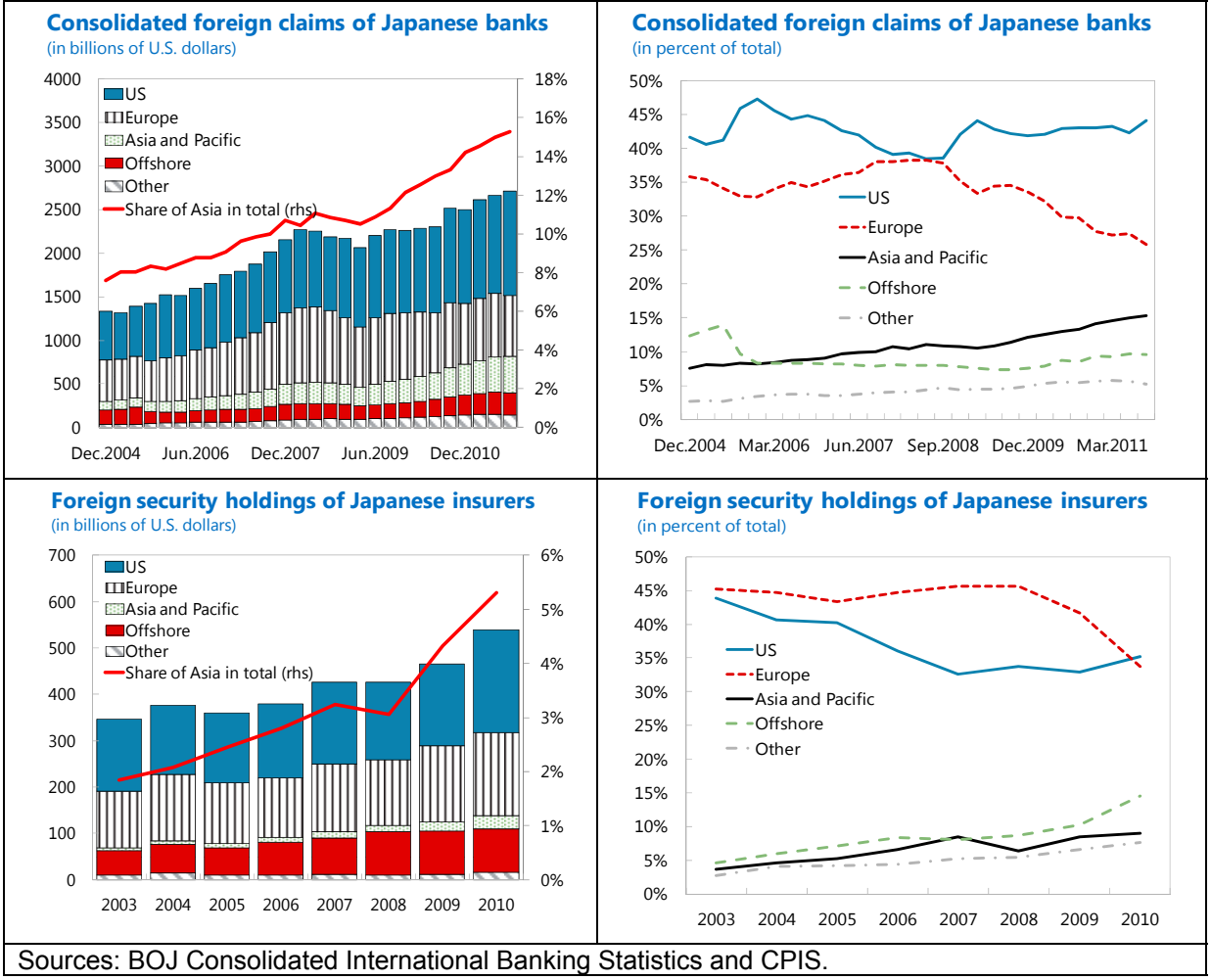
cooperative-type financial institutions; and other sectors include trust accounts of trust banks, life and nonlife insurance companies, investment trusts, securities companies, nonfinancial corporations, and individuals.

liabilities are longer term. Finally, Japanese financial institutions holds substantial amounts of cross-border assets, and liabilities which bring them connected to international payment systems and cross-border oversight and resolution frameworks.

6. **Cross-border exposures of Japanese banks and insurance companies are rising, although they are still relatively low compared to U.S. and European counterparts.** The consolidated foreign claims of Japanese banks have roughly doubled over the last few years from US$1.3 trillion at end-2004 to US$2.7 trillion dollars as of September 2011, according to BIS banking statistics (on ultimate risk basis).[3] The overseas expansion has been funded mainly through excess domestic savings with currency swaps, local deposits, and overseas borrowing mainly in U.S. and U.K. markets. The geographical distribution of cross-border claims is shifting from Europe since mid-2008 to Asian region (account for 15 percent of total foreign claims), while exposures to the United States still accounts for nearly half of overseas exposures (Figure 2). Foreign securities investments of insurance companies have also risen over the past years, reaching close to US$600 billion in 2010 (around 15 percent of total assets) and exceeding the pre-Lehman level.

[3] The consolidated BIS statistics for Japan cover "internationally active banks" of Japan (no securities firms). The FSA determines a deposit-taking financial institution as an internationally active bank if that deposit-taking financial institution operates a branch or subsidiary in a foreign jurisdiction, regardless of its size and systemic importance. As of end-March 2011, there were six major banks and 10 regional banks classified as internationally active by the FSA. Major banks account for the bulk of this group by asset size (more than 80 percent). Moreover, while BIS statistics for Japan mainly cover mainly banking accounts of banks, they also include trust accounts for a number of banks. On these accounts, overseas risk exposure belongs ultimately to banks' clients.

Figure 2. Japan: Overseas Exposures of Japanese Banks and Insurers



Sources: BOJ Consolidated International Banking Statistics and CPIS.

7. **Majority of Japanese banks' and insurers' cross-border holdings are claims on the nonfinancial private sector and foreign government securities** (Table 1)**.** According to the BIS banking statistics, Japanese banks' consolidated claims on nonbank corporate entities account for nearly 60 percent of their cross-border claims (US$1.5 trillion), mainly in the form of syndicated loans and project finance related to infrastructure and manufacturing sectors. BIS statistics also show that a sizeable share of banks' overseas holdings is sovereign securities (US$850 billion, or about 30 percent of total cross-border claims).[4] The main sovereign holdings of Japanese banks are U.S. Treasuries, German bunds and U.K. gilts.

[4] In BIS statistics, public sector refers to all debt obligation of the general government. U.S. agency bonds are not included under public sector and hence Japan's sovereign exposure may be higher, inclusive of U.S. agency bond. U.S. agency bonds are categorized under the nonbank private sector in BIS statistics.

Table 1. Japan: Consolidated Foreign Claims of Japanese Banks, end-September 2011

(in billions of USD)

	Banks	Non-bank private sector	Public sector	Total	Other potential exposures 1/
Total	336	1,528	851	2,715	374
US	87	668	443	1,198	177
Cayman Islands	1	214	0	216	4
United Kingdom	44	87	46	177	31
Germany	30	32	77	139	16
Australia	30	40	39	110	11
France	23	37	35	95	23
China	16	26	12	55	6
Hong Kong SAR	8	40	5	54	14
Canada	8	29	17	53	7
Netherlands	12	27	11	50	6
Rest of the world	75	328	165	568	78

Source: BIS consolidated banking statistics (on ultimate risk basis), Table 9E

1/ Other potential exposures include derivatives contracts, guarantees extendend and credit commitments.

8. **Exposure to peripheral European countries is negligible. The remaining claims on foreign banks are relatively small at about US$300 billion, or 13 percent of total cross-border claims.** In addition, Japanese banks have "potential exposures" to foreign institutions, in the amount of nearly US$400 billion, through derivative contracts and contingent liabilities (i.e. guarantees extended and credit commitments). For insurance companies, overseas assets are mostly in the form of foreign security holdings, which nearly 90 percent in bonds (most are sovereign bonds and investment grade corporate bonds) and the rest in equities. Over 70 percent of foreign securities holdings are in the U.S. or Europe (exposure to peripheral Europe is also negligible for insurance companies).

III. Channels of Spillovers

9. **The following channels of spillovers are examined.** These can be broadly categorized as into three groups: direct spillovers, funding market spillovers, and institutional spillovers (Table 2).

Table 2. Japan: Spillover Channels Examined Through the FSAP

Spillover Channels	Analysis	Implemented By
Direct spillovers		
Losses from overseas exposures (loans and securities)	Top-down and bottom up stress tests	BOJ/Financial Services Agency (FSA), banks, insurance companies, and IMF
Counterparty risks	Network analysis and EDF correlations	IMF
Funding market spillovers		
Yen money market spillovers	Capital market surveillance	IMF
Foreign exchange (FX) funding risks	Liquidity stress tests Capital market surveillance	BOJ/FSA, banks, IMF
Institutional spillovers		
Regulatory framework for cross-border resolution	Standard and codes assessments for the banking sector, insurance sector and securities markets	IMF Assessors
Financial market infrastructures (FMIs)	Assessments of the oversight for FMIs	IMF Assessors

A. Direct Spillovers

10. **Losses from overseas exposures.** A sharp global slowdown, or a regional slowdown in Asia, may have direct financial spillovers to Japanese financial institutions (i.e., banks and insurance companies) through their overseas loan and security holdings.[5] This could be triggered by rising credit costs on loans overseas or a fall in the price of securities held by these institutions. In addition, spillovers can be caused purely by cross-correlations in capital markets, in particular among G7 countries. A global slowdown can translate into a drop in Japanese equities, causing valuation losses for financial institutions with large equity holdings (banks and insurers). These issues are examined through the top-down and bottom up stress tests for banks and insurers, drawing on the parameters of the global double-dip scenario.[6]

[5] Overseas lending accounts for 13–20 percent of total lending of mega banking groups, with 70 percent of this lending estimated to go towards non-Japanese firms. In addition, Japanese banks and insurance companies hold about US$900 and US$600 billion of foreign securities, with 40 percent of these holdings in U.S. securities and 30 percent in European securities based on CPIS data.

[6] In bottom up stress tests for banks, all types of overseas exposures are stressed, including loans, fixed income securities and equities, broadly separated by region (United States, Asia, Europe, and rest of the world). As for securities, valuation losses are estimated for securities in all types of accounts, including held-to-maturity account. In one scenario, losses from European sovereigns are estimated separately for GIIPs, France, Germany and United Kingdom.

11. **The bank stress test shows that potential solvency impact from these channels is, at this moment, limited.** The contribution from overseas loans to credit costs is relatively small owing to small share and historically higher quality of these loans. Valuation losses from foreign bonds and equities are also limited, especially compared to those from Japanese government bonds (JGBs) and domestic equities. Within foreign securities, major sources of losses in the global double-dip scenario is U.S. debt securities (mainly U.S. Treasuries), followed by debt securities of United Kingdom and Italy. Losses from other European sovereigns, including Greece, Spain, Ireland, Portugal, France, and Germany, and foreign equity exposures are negligible.

12. **Regarding the insurance sector, potential losses from overseas exposures could be sizeable**, **as foreign securities account for around one-fifth and one-sixth of total assets in life and nonlife insurance companies, respectively.** The insurance stress test results suggest that, under the severe double-dip scenario, solvency margins of life insurance and nonlife insurance companies would be reduced by about 17 and 13 percent, respectively, over two years. Although the life insurance companies hold significant JGBs and domestic equities, this is in part driven by losses on foreign securities in that scenario, especially for life insurance companies (Annex I).

13. **Counterparty risks.** BIS data indicate that Japanese banks have large foreign claims on U.S. and U.K. banks. Hence, a distress scenario in a large United States and United Kingdom counterparty may lead to distress for Japanese banks. The interconnectedness between the Japanese and foreign banking systems is examined through network analysis and distress dependence approaches.

14. **The network analysis suggests that the U.S. and core European banking systems are the key systemic risks for the Japanese banking system.** In particular, financial spillovers to Japan can be substantial if there is a system-wide distress in the United States or United Kingdom. banking systems, or a distress in German or French banking systems that spreads to their corporate/sovereign sectors. Spillover risks from other banking systems, including Asian financial centers, are currently modest, even under severe assumptions including deleveraging effects. However, these risks may grow as Japanese banks continue to expand into Asia. Complementary to the network analysis, market distress correlation measures indicate moderate spillover risks between individual Japanese and United States./European global systemically important financial institutions (G-SIFIs), except during crisis episodes
(Annexes II and III).

B. Funding Market Spillovers

15. **Spillovers to yen money markets.** Overall, yen funding conditions, especially those for Japanese financial institutions, remained relatively stable upon the global financial crisis. While yen markets did not completely avoid the rise in funding costs, the increase was much

lower than those with U.S. dollar or euro funding markets. There was no major turbulence in repo markets as was the case in the U.S., as almost all repos in Japan use liquid JGBs as collateral, limiting the scope for negative feedback effects between declining market liquidity of collateral assets and funding liquidity for financial institutions. Those who experienced funding strains were mainly foreign banks, and their balance sheet in Japan has contracted noticeably in the past few years due to high yen funding costs and low profit opportunities.

16. **Going forward, there could be renewed surge in funding costs in the yen money market originating from overseas turbulences as risks with foreign banks, especially European banks with distressed sovereigns, could remain elevated for some time.** At the same time, there are multiple risk-mitigating factors limiting funding risk for Japanese institutions. Japanese financial institutions have abundant yen liquidity with a large and expanding deposit base. Japanese banks are also relying little on wholesale funding, and bank liquidity stress test shows they are resilient against major closure of wholesale funding markets for three months. Securities firms rely more on yen funding, hence needing more prudent internal liquidity risk management than banks, but their funding are mainly for inventory financing and less for proprietary trading (Annex IV).

17. **FX funding risks.** Large international Japanese banks raise funding in overseas markets to match the currency composition of their overseas assets, primarily though local deposits (including CDs), interbank borrowing, repos and cross-currency funding using FX swaps. Hence, stress in overseas funding markets, including FX swap markets, especially in the dollar funding market, could influence FX funding conditions for Japanese financial institutions. These issues are examined through the bottom-up bank liquidity stress tests and capital market surveillance.

18. **Overall, Japanese financial institutions appear to be well prepared for disturbances in global FX funding markets.** Liquidity stress test for three mega banks shows that banks can sustain major disruptions to their access to U.S. dollar funding sources, including difficulty to rollover FX swap contracts for one week and one month, using their liquidity buffers (mainly excess reserve deposit at Federal Reserve System and borrowing though the system's discount window). Also, banks have been extending the maturity of swap contracts. On the other hand, securities firms might need to be prudent in their day-to-day liquidity management, as they do not have access to central bank's standing liquidity facilities outside of Japan. In money markets, U.S. dollar funding costs for Japanese financial institutions rose in the second half of 2011, including those using FX swaps. However, their access to funding (e.g., rollover of swaps) remained open. Market surveillance shows that the rise in cross-currency dollar funding costs seems to reflect generalized reduction in the liquidity of this market rather than Japanese institutions' funding distress (Annex V).

C. Institutional Spillovers

19. **Cross-border resolution risks:** The failure of Lehman Brothers highlighted the challenges of resolving a globally active firm given that resolution frameworks are essentially governed by local laws. As a result, efforts need to be strengthened to ensure adequate cross-border supervision of such firms. A key mechanism to achieve such a goal is supervisory colleges. In this context, the FSAP assessed the extent of Japanese authorities' participation in the supervisory colleges for globally active financial institutions as well as other arrangements for similar purposes, such as Memoranda of Understanding (MoUs) for cooperation and exchange of information.

20. **Overall, the standard and codes assessments found strong cooperation and information sharing between Japanese authorities and foreign supervisors, including through supervisory colleges for major banks, insurance, and securities companies.** There is also interaction within the central banking community with members of various Basel-based committees. However, to strengthen their ability to anticipate and deal with crisis situations, Japanese supervisors can enhance home/host cooperation by (i) having more proactive engagement and coordinated, effective and timely sharing of relevant information with foreign bank supervisors; (ii) developing comprehensive plans to deal with insurance companies in a crisis situation and ensure that plans are internationally-coordinated by working with foreign supervisors, for example, through supervisory colleges; and (iii) documenting a contingency plan to be followed in the event of a securities market intermediary's failure (Annex VI).

21. **Financial Market Infrastructures (FMI) Interdependencies.** Tighter interdependencies have contributed to strengthen global financial market infrastructures by reducing settlement costs.[7] At the same time, interdependencies have increased the potential for disruptions to spread quickly and widely across multiple systems. Central banks and other authorities are expected adjust their policies as needed in light of the challenges posed by FMI interdependencies. Through the assessment of the oversight of FMIs, the FSAP analyzed FMI interdependencies that could create spillover risks to Japan and examine how the main stakeholders, in particular BOJ, can manage them.

22. **Overall, spillover risk from FMI interdependencies is currently limited.** However, FMI interdependencies are rising and the authorities should continue to monitor them closely. Main interdependencies for Japan come from the use of Continuous Linked Settlement (CLS) for yen FX transactions; the offshore clearing of yen denominated over-

[7] This is for example the case for the Continuous Linked Settlement (CLS) system, the main FOREX transactions settlement system worldwide, which clears 68 percent of global currency trades daily in 17 major currencies, including the yen.

the-counter (OTC) derivatives transactions; and the offshore settlement of JGBs in the two largest international central securities depositories (Annex VII).

IV. CONCLUSIONS

23. **This analysis identifies some of the potential challenges from overseas exposures of Japanese financial institutions and how to manage these risks.** Risks from overseas exposures are usually not monitored as intensively as those from domestic exposures. This is partly because, for Japan, overseas exposures still represent a small portion of financial sector balance sheets. At the same time, cross-border exposures could involve inherently difficult-to-monitor instruments such as off-balance sheet derivatives contracts or credit lines, capital and money market financing in foreign currency, and transactions with hard-to-assess counterparties. Monitoring these positions often require strong collaboration with various authorities in the host country, which may not be straightforward to obtain. Moreover, ensuring good collaboration framework with host country's authorities regarding cross-border crisis management and resolution—an area that generally requires significant improvement around the world—will be a key factor limiting the negative spillover effects at the time of distress.

ANNEX I: LOSSES FROM OVERSEAS EXPOSURES (LOANS AND SECURITIES)

A. Banking Sector Solvency Tests

24. **Solvency impact from overseas exposures is examined in both top-down (TD) and bottom-up (BU) tests.** In both approaches, the risks from overseas exposures are highlighted the most in double-dip scenario (especially severe case). Each of them has different approaches and coverage of overseas exposures. The TD approach stress tests the credit quality of overseas loans, but not securities, and does not differentiate across countries or regions. BU tests stress the credit quality of overseas loans and securities by major countries/regions. Loan and equity portfolio are stressed by applying differentiated assumptions to the U.S., Europe, China, and the rest of the world, and by using each banks' internal models. As for bonds, additional breakdown is applied, assuming different sovereign bond yield assumptions for United Kingdom, France, Germany, Italy, Spain, Greece, Ireland, and Portugal. Only the securities in trading and AFS accounts are subject to stress.

25. **For all countries/regions outside Japan, macro assumptions are calibrated using IMF's GIMF model as well as expert judgment.** European sovereign bond yields for mild (severe) double-dip scenario are simulated using the largest 10 (1) percentile of quarterly yield change between January 2009 and January 2012. Corresponding discount factor assumptions using weighted average duration calculated with supply side data are also provided to banks, but all banks chose to take yield change assumptions and apply to them to their own portfolio which has different duration from market average (Table 3).

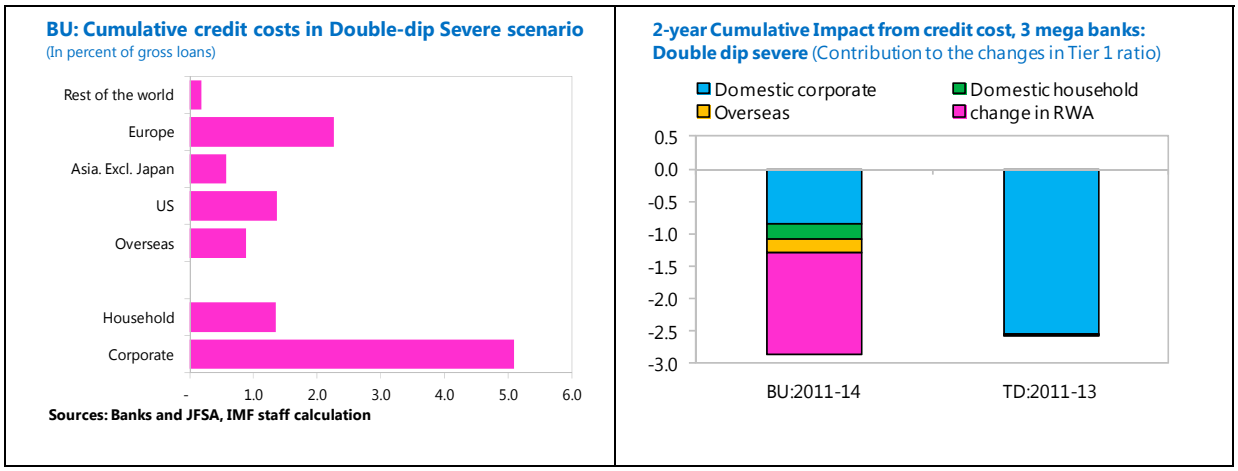
Table 3. Japan: List of Variables Used in Bottom-up Stress Tests

Japan	Real and nominal GDP growth rate; TOPIX level; 10-year JGB yields; short-term rates; corporate spreads (A rated); unemployment rate.
United States	Real and nominal GDP growth rate; Dow Jones index; 10-year U.S. Treasury yields; short-term rates; corporate spreads (A rated); yen/U.S. dollar nominal exchange rate.
Europe	Real and nominal GDP growth rate; DAX; 10-year German bunds yields; short-term rate; corporate spread (A rated); yen/euro nominal exchange rate; two year, five year, and 10 year bond yields for U.K., France, Belgium, Italy, Spain, Portugal and Ireland; sovereign bond haircut for Greece.
Rest of the world	China real and nominal GDP growth rate, Asia excluding Japan and China real and nominal GDP growth rate.

	Haircut, using supply side duration and 5y yields in percent		Sovereign yields in basis points					
			Mild double dip			Severe double dip		
	Mild double dip	Severe double dip	2y	5y	10y	2y	5y	10y
UK	4	9	48	48	48	98	98	98
France	7	10	57	89	110	94	126	147
Belgium	7	10	150	121	136	204	175	190
Italy	10	20	169	169	187	330	330	347
Spain	6	11	128	118	130	218	208	220
Portugal	28	40	395	626	579	670	901	854
Ireland	11	33	159	228	209	603	672	653
Greece	50	75	...	...	...	...	...	...

26. **Both types of test indicate direct spillover risks from overseas exposures are limited.** In particular:

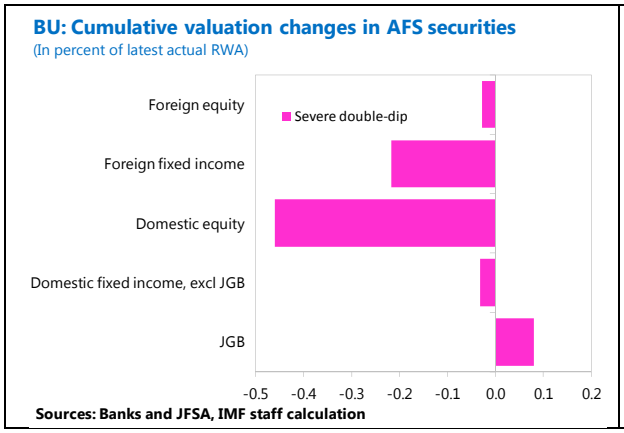
- **Loans.** Credit risk from overseas loan portfolio is much smaller than those for domestic loans, especially corporate loans, even in the severe double-dip scenario where stresses on other economies are largest.[8] Across different regions of the world, European exposures are more vulnerable in line with the recent deterioration of their credit quality as well as the larger shock envisaged for Europe in the global double-dip scenario. Asian exposure fares better than the U.S. or Europe exposures.

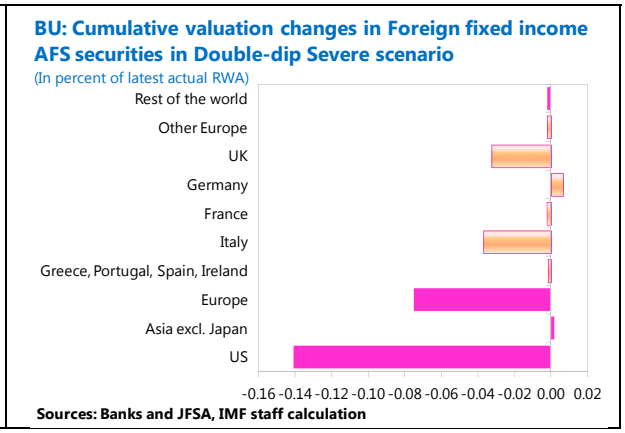


- **Securities.** Valuation losses from foreign securities are also small. In the severe global double-dip scenario, there are losses from foreign fixed income assets, but their impact on capital ratio is small (reducing capital ratios by about 0.2 percentage points) and smaller than those from domestic equities. Losses from foreign equities are negligible. Within foreign fixed income losses, losses from United States debt

[8] Overseas loans have historically incurred lower credit costs than domestic loans and nonperforming loan (NPL) ratios for overseas loans have been lower than those for domestic loans, even during the global crisis (BOJ FSR October 2011).

securities are the largest owing to much larger exposures to United States securities, especially U.S. Treasuries. Within Europe, potential losses could stem from Italian and U.K. debt securities, but losses from other distressed European countries, or Germany, are negligible despite substantial haircut assumptions.

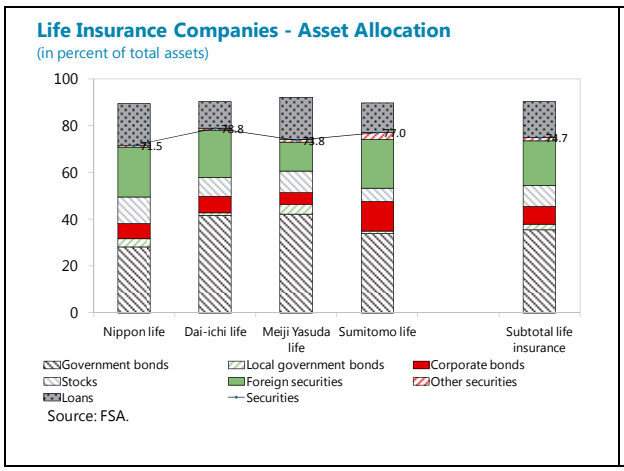


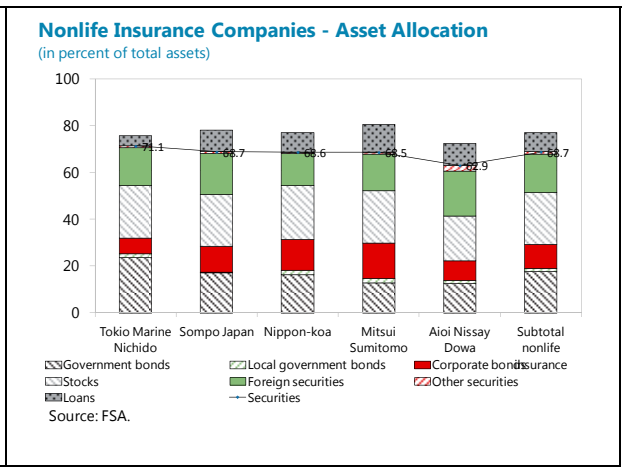


Insurance sector solvency tests

27. **The solvency impact from overseas exposures for insurers is examined through bottom-up (BU) tests.** The BU stress tests examined several parameters, including foreign exposures of life and nonlife companies, without differentiating across countries or regions. Unlike banks, foreign securities were more significant than foreign loans.

28. **Foreign securities account for nearly 20 and 17 percent of total assets in life and nonlife insurance companies**, **respectively.** As such, potential losses from overseas exposures could be sizeable. In particular, stress test results suggest that large losses could arise in the severe double-dip scenario, reducing the solvency margin by 17 percent for life insurance companies and by about 13 percent for nonlife insurance companies over two years. Although the life insurance companies hold significant JGBs and domestic equities, this is in part driven by higher losses on foreign securities in that scenario.





ANNEX II: NETWORK ANALYSIS

29. **A network analysis is conducted to identify key systemically important financial centers for Japanese banks.** The methodology is based on Espinosa-Vega and Sole (2010), which simulates the failure of the banking system in a country and tracks its spillover effects to other countries.[9] Wider spillovers would suggest higher importance of potential linkages among banking sectors. This approach does not only consider spillovers through direct linkages through exposures, but also through third parties by considering the "domino effect" of banking failures (Figure 3). The approach also tracks the spillover effects on affected counterparties from both asset and liability sides. More specifically, it considers two separate shocks: (i) the impact of a banking system defaulting on its liabilities to foreign banks (credit shock), and (ii) the impact of a banking system deleveraging by withdrawing funding from foreign banks, forcing the latter to deleverage as well by selling assets at a discount (funding shock).[10] These shocks/assumptions may be considered tail risks (in particular the failure of the entire banking system of a country), but are helpful to illustrate relative importance of systemic linkages among countries through the global banking network.

30. **The analysis is based on bilateral exposures of banking systems among 30 countries.**[11] All bilateral exposure data come from the BIS consolidated banking statistics and are available as of end-September 2011 (Table 9D of BIS statistics) except for three countries—China, New Zealand, and South Korea. Those countries do not report consolidated banking statistics to the BIS, and their exposures are inferred from the foreign claims and liabilities of other countries. The sectoral breakdowns of bilateral exposures are available from Tables 9E and 9C of BIS statistics, but data on exposures maturity are not available. Data on banking sector capital are obtained mainly from IMF's *Financial Soundness Indicators* database (www.fsi.org). A consistent definition of capital (Tier I) is used for all countries. The capital level data are as of end-September 2011 or latest available.

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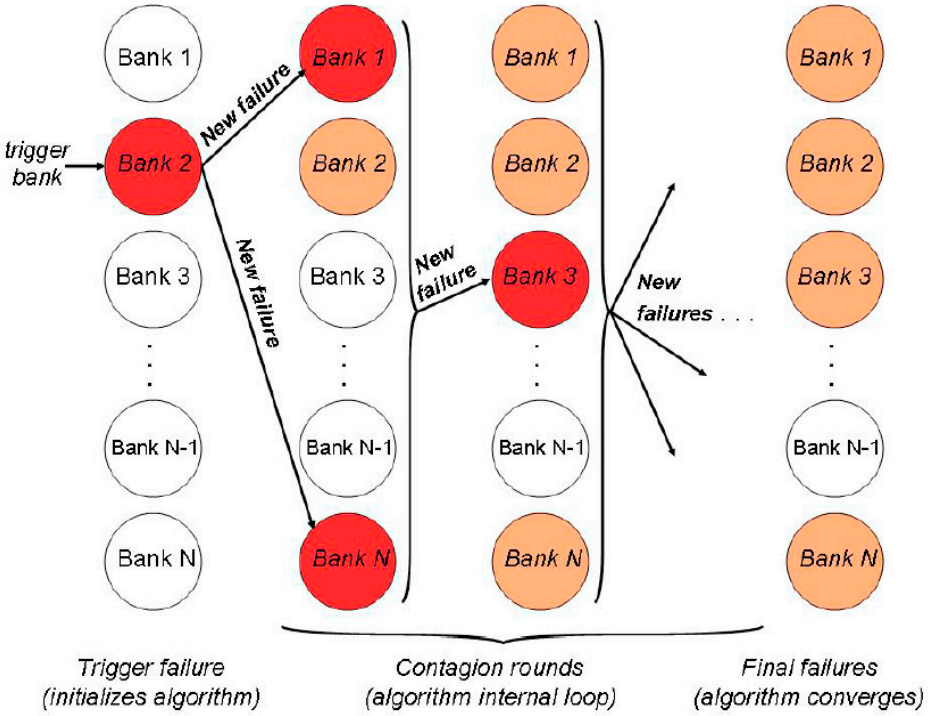
[9] Marco Espinosa-Vega and Juan Solé, 2010, Cross-border Financial Surveillance: A Network Perspective, IMF Working Paper /10/105.

[10] For these shocks, we use the same assumptions as Espinosa-Vega and Sole (2010). In particular, under the credit shock, a loss given default of 100 percent is assumed on interbank exposures based on the difficulty of recovering assets at the time of bank failures. Under the funding shock, a withdrawal of 35 percent is assumed on interbank funding and a discount of 50 percent is assumed on forced asset sales. The final numerical results are sensitive to these assumptions; however the relative importance of systemic countries remains the same.

[11] These countries are Australia, Austria, Belgium, Brazil, Canada, China, Chinese Taipei, Denmark, Finland, France, Germany, Greece, Hong Kong SAR, India, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, South Korea, Sweden, Switzerland, Turkey, U.K, and U.S.

Figure 3. Japan: Network Analysis based on Interbank Exposures



Source: Espinosa-Vega and Sole (2010).

31. **Three simulations are explored in the analysis.** The first simulation focuses only on interbank exposures (Simulation 1). This is the simulation used in the 2009 Selected Issues Paper and 2011 Spillover Report for Japan.[12] The simulation, however, does not capture potential exposures at default, i.e. outstanding derivative contracts or contingent liabilities (guarantees, credit commitments) vis-à-vis the defaulting banking system. To get a more comprehensive measure of exposure at default, a second simulation is conducted that takes into account these potential exposures (Simulation 2).[13] This allows us to better capture the spillover risks from countries that have a large presence in the derivatives or off-balance sheet markets such as the U.S. Finally, a third simulation is conducted to capture the potential knock-on effects of banking sector distress on the *nonbank* and *sovereign sectors* of each

[12] Mr. Marco Espinosa-Vega, Mr. Juan Solé, and Mr. Murtaza Syed, 2009, Japan and the Global Financial System: Spillovers and Systemic Linkages, IMF Staff Country Report 09/211; and Mitra, Srobona, 2011, Global and Regional Bank Linkages, IMF Staff Country Report 11/183.

[13] This is done by adding to the assets of each banking sector the market value of outstanding derivatives with the rest of the world and adding to the liabilities of each banking sector the notional value of their contingent liabilities. The relevant data come from Table 9C-E of BIS banking statistics.

country (Simulation 3). This allows us to capture spillover effects of banking problems within countries, as recently witnessed in several Euro zone countries.[14]

32. **The simulations show that the U.S., U.K, Germany, and France are the key sources of systemic risk for the Japanese banking system.** Japanese banks' exposures to banks in these four countries are substantial, amounting to US$184 billion, or US$1609 billion if including nonbank and sovereign exposures, nearly 60 percent of Japanese banks' total foreign claims. In all simulations under the credit shock, these countries inflict more losses on Japanese banks than others. Adding the funding shock to the simulations does not change the ranking of systemically important countries (Figures 4–5). Spillover risks from the U.S. and U.K. are especially large given their larger share of exposures. Spillover risks from Germany and France could be substantial if they face banking problems that spill over to their sovereign and nonbank private sectors, incurring losses to other banking systems.

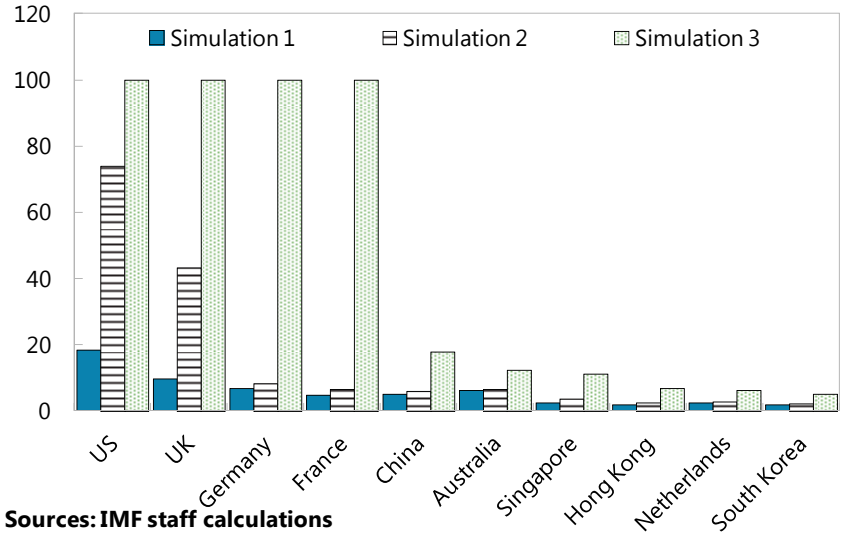
33. **At the same time, the Japanese banking sector seems to be able to withstand a wide range of shocks outside these four countries.** None of the countries other than the four systemically important ones can generate impairment more than 25 percent of Tier I capital for Japan (Figures 4–5, Table 4). Among Asian countries, Japan is most at risk from China, Australia and Singapore, although the spillovers risk from those banking systems are much more benign. Given the current Tier I capital ratio for internationally active Japanese banks is about 13 percent; losses incurred from banking failures in these Asian countries would not put Japanese banks' capital below the regulatory standard.

34. **Spillover risks to Japan from direct cross-border exposures seem manageable, in all but severe scenarios.** Overall, spillover risks to Japanese banks from foreign banking systems continue to be limited given the still large domestic orientation of Japanese banks. Under various simulations, impairment of Japanese banks capital is manageable in all cases except if there is (i) a system-wide distress in the U.S. or U.K. banking systems; or (ii) a distress in German or French banking systems that spreads to their corporate/sovereign sectors; or (iii) if there are widespread strains in global funding markets that lead to more foreign bank failures, resulting in larger credit losses for Japanese banks. Indeed, Japanese banks were affected when United States and United Kingdom banking system experience distress in 2008, and, to a lesser extent, when French banks and sovereign faced stress in 2011Q4. Spillover risks from other banking systems, including Asian financial centers, are

[14] This is done by expanding the definition of exposure at default to include not only bank exposures but also potential losses from a likely impairment of related nonbank and sovereign exposures. A loss of 50 percent and 20 percent are assumed for nonbank and public sector exposures, respectively. The relevant data on sectoral exposures come from Table 9C-E of BIS banking statistics.

currently modest. However, these risks may increase as Japanese banks continue to expand into Asia.

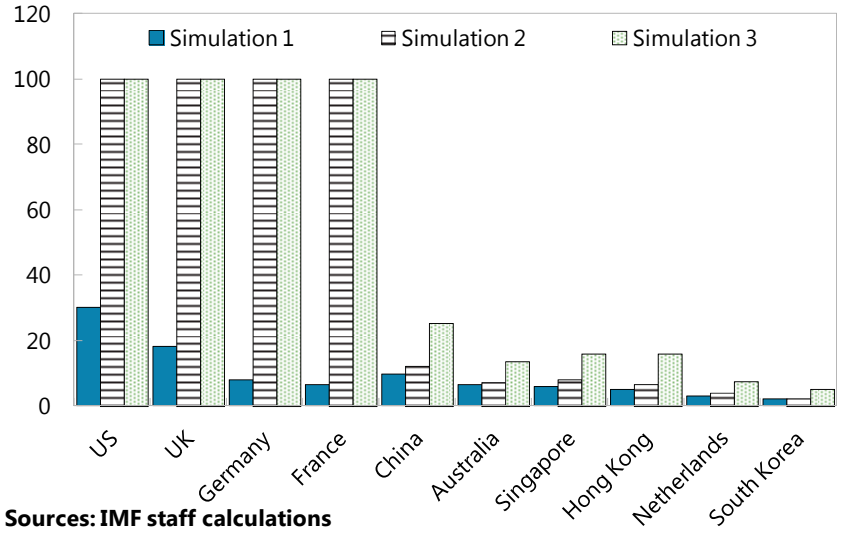
Figure 4. Japan: Spillovers to Japanese Banking System: Credit Shock
(impairment as percent of Tier I capital)



Sources: IMF staff calculations

Note: The chart presents the top ten countries with the highest impact on the Japanese banking system. A 100 percent loss of capital denotes failure of the banking sector.

Figure 5. Japan: Spillovers to Japanese Banking System: Credit and Funding Shock
(impairment as percent of Tier I capital)



Sources: IMF staff calculations

Note: The chart presents the top ten countries with the highest impact on the Japanese banking system. A 100 percent loss of capital denotes failure of the banking sector.

Table 4. Japan: Network Analysis: Impact of Foreign Bank Failures on Japanese Banks

Capital Impairment of Japanese Bank (in percent of pre-shock capital)

	Credit Shock			Credit and Funding Shock		
Trigger Country	Simulation 1	Simulation 2	Simulation 3	Simulation 1	Simulation 2	Simulation 3
Australia	-6.1	-6.6	-12.4	-6.4	-7.2	-13.7
Austria	-0.3	-0.3	-0.6	-0.3	-0.3	-0.7
Belgium	-0.5	-0.6	-1.4	-0.5	-0.6	-1.4
Brazil	-1.0	-1.1	-3.3	-1.0	-1.1	-3.3
Canada	-1.6	-2.0	-5.6	-1.8	-2.4	-6.2
China	-5.0	-5.9	-17.9	-9.6	-12.0	-25.2
Chinese Taipei	-0.5	-0.6	-1.9	-0.6	-0.7	-2.0
Denmark	-0.9	-1.0	-2.5	-0.9	-1.2	-4.2
Finland	-0.7	-0.8	-2.9	-0.7	-1.2	-4.2
France	-4.7	-6.5	Fail	-6.5	Fail	Fail
Germany	-6.8	-8.2	Fail	-7.9	Fail	Fail
Greece	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2
Hong Kong SAR	-1.7	-2.4	-6.7	-5.0	-6.5	-16.0
India	-1.1	-1.2	-3.0	-1.2	-1.2	-3.0
Ireland	-0.3	-0.5	-2.3	-0.4	-0.5	-2.3
Italy	-0.5	-0.7	-2.7	-0.5	-0.7	-2.7
Luxembourg	-0.5	-0.6	-4.7	-0.5	-0.6	-4.7
Netherlands	-2.5	-2.9	-6.1	-3.1	-3.8	-7.4
New Zealand	-0.1	-0.1	-12.8	-0.2	-0.2	-13.7
Norway	-1.1	-1.3	-3.6	-1.2	-1.8	-4.2
Portugal	0.0	-0.1	-0.2	0.0	-0.1	-0.2
Singapore	-2.5	-3.7	-11.2	-5.9	-8.0	-16.0
Spain	-0.9	-1.0	-2.5	-0.9	-1.1	-2.6
South Korea	-1.9	-2.1	-5.0	-2.0	-2.2	-5.2
Sweden	-0.6	-0.7	-1.7	-0.7	-1.2	-4.2
Switzerland	-1.3	-2.1	-4.2	-2.1	-5.0	-8.3
Turkey	-0.3	-0.3	-0.5	-0.3	-0.4	-0.5
United Kingdom	-9.7	-43.2	Fail	-18.2	Fail	Fail
United States	-18.5	-73.8	Fail	-30.1	Fail	Fail

Source: IMF staff calculations.

Note: Three simulations are conducted with increasing severity. Simulation 1 examines spillovers only through direct interbank exposures. Simulation 2 includes additional channels through potential exposures at default, i.e. outstanding derivative contracts, guarantees, credit commitments. Simulation 3 allows for spillovers from knock-on effects of banking sector problems in the trigger country on its own corporate and sovereign sector assets.

35. **These findings expand on the previous studies that applied network analysis to the Japanese banking system.** Increasing the coverage of countries in the sample to 30 countries only supports the findings of previous studies (2009 Selected Issues Paper and 2011 Spillover Report for Japan)—i.e., that United States and United Kingdom banking sectors are key systemic risks for the Japanese banking system. At the same time, including *potential exposures* in the analysis can substantially increase the systemic importance of United States and United Kingdom banking systems. In addition, we find that Japan could

also be vulnerable to Germany and France, if they face banking problems that spill over to their sovereign and nonbank private sectors.

36. **Several policy-related implications can be drawn from this analysis.** Specifically:

- **Cross-border collaboration, especially with United States and United Kingdom supervisors, is important.** Due to large exposures and potential spillover risks as shown in our analysis, continued close collaboration with U.S. and U.K. supervisors would be especially useful, especially the cross-border exposures involving off-balance sheet derivatives contracts and credit lines that are inherently difficult to monitor. Meanwhile, collaboration with German and French supervisors is important, especially if they face banking problems that spill over to their sovereign sectors (or vice versa).
- **Ensuring financial stability in Japan will require continued careful surveillance of potential vulnerabilities overseas, including in Asia.** Although financial spillover risks from Asian banks are currently modest, these risks are likely to increase as Japanese banks expand in this region. Japan also has strong trade relations with Asia.
- **Strengthening data availability for cross-border exposures.** Network analysis illustrates financial linkages and spillovers based on foreign claims of banking system and their sectoral breakdown. Data on the maturity and funding bases of such foreign claims are not available from the BIS consolidated data. Strengthening data collection and application would be key in macro-prudential oversight. In that regard, recent efforts by the authorities and financial institutions to disclose the nature and size of cross-border exposures to peripheral European countries have contained speculations on potential impact of European debt crisis on Japanese financial institutions.

ANNEX III: EXPECTED DEFAULT FREQUENCY CORRELATIONS WITH G-SIFIS

37. **Market perceptions of interconnectedness among Japanese and foreign SIFIs are analyzed using correlations of expected default frequencies (EDFs).** EDFs provide a market-price based forward-looking measure of the probability of distress in a firm, based on equity market and balance sheet information. Two firms with highly correlated EDFs are likely to be in distress at the same time, either because of direct linkages or driven by a common factor. This type of analysis does not identify the source of contagion (unlike network analysis) but helps illustrate which financial institutions are more likely to be in distress at the same time, regardless of the way spillovers are propagated.

38. **EDF measures for G-SIFIs are gathered from Moody's KMV.** Our measure of distress is the one year EDF provided by Moody's KMV for 29 G-SIFIs identified by FSB in November 2011 (Table 5). These institutions include the three Japanese megabanks, eight U.S. banks, four United Kingdom banks, five French banks, eight other European banks, and a Chinese bank. For the sake of comprehensiveness, we also include Nomura in the sample. The data covers September 2008 to December 2011 (post-crisis period). One-year rolling windows of cross-correlation are calculated between each financial institution. We examine the average of these correlations in the post-crisis period and further identify specific crisis episodes: (i) Lehman shock (September–December 2008); (ii) Greece downgrade (April–June 2010); and (iii) recent Eurozone turmoil (September–November 2011) as measures of interconnectedness between each institution.

Table 5. Japan: List of G-SIFIs (as of November 2011)

G-SIFIs	Names of Banks
Japanese SIFIs	Mitsubishi UFJ FG (MUFG); Mizuho FG (MZFG); Sumitomo Mitsui FG (SMFG)
US SIFIs	Bank of America (BOA); Bank of New York Mellon (BONY); Citigroup (CITI); Goldman Sachs (GS); JP Morgan Chase (JPM); Morgan Stanley (MS); State Street (SST); Wells Fargo (WF)
UK SIFIs	Barclays (BARC); HSBC; Lloyds Banking Group (LLOY); Royal Bank of Scotland (RBS)
French SIFIs	Banque Populaire (BCP); BNP Paribas (BNP); Dexia (DEX); Group Crédit Agricole (CAG), Societe Generale (SG)
Other European SIFIs	Commerzbank (COM); Credit Suisse (CS); Deutsche Bank (DB); ING Bank (ING); Nordea (NOR); Santander (SAN); UBS; Unicredit Group (UNI)
Chinese SIFIs	Bank of China (BOC)

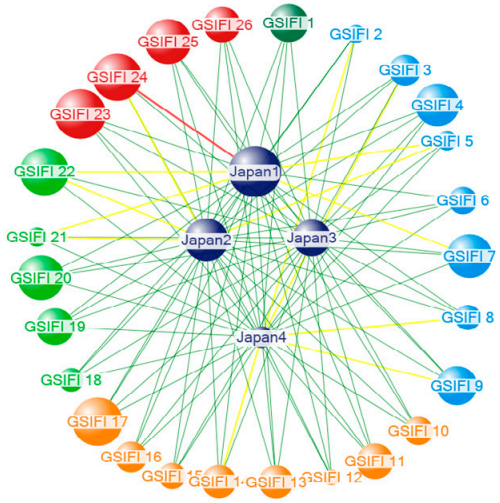
Source: FSB.

39. **The cross-correlations of EDFs between Japanese institutions and foreign G-SIFIs are presented in network charts.** In these charts, each G-SIFI is represented by a bubble. The volume of the bubble represents the financial institutions' asset size. The line between the bubbles represents the average correlation of EDFs in the post-crisis period between two institutions. Different levels of correlation are identified with different colors. A green line indicates a correlation that is either statistically insignificant or low (defined as less than 0.5). A yellow line indicates moderate correlation (more than 0.5 but less than 0.8), while a red line indicates high correlation (more than 0.8).

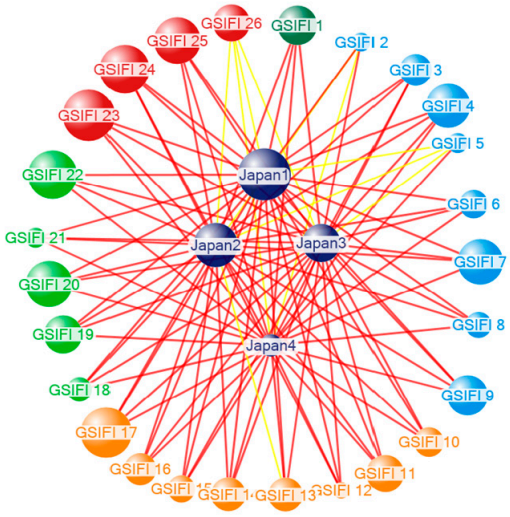
40. **EDF correlations suggest that Japanese banks' linkages with G-SIFIs are modest, except in crisis periods** (Figure 6)**.** According to average EDF correlations since September 2008, Japanese banks do not seem highly connected to other global G-SIFIs, except for a large Japanese bank, which has high correlation with a U.K. bank. But, overall, the network charts show that Japanese financial institutions have only moderate EDF correlations with other G-SIFIs. On the other hand, these correlations have turned higher during crisis episodes. This is consistent with the network analysis finding that severe distress in U.S. or Europe would affect Japanese banks but, in other episodes, spillover risks to Japan remain limited.

Figure 6. Japan: EDF Correlations Between Major Japanese Financial Institutions and G-SIFIs

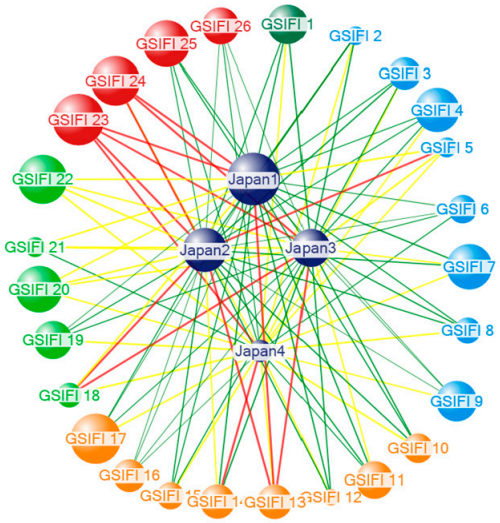
Post-Crisis Average: September 2008–December 2011



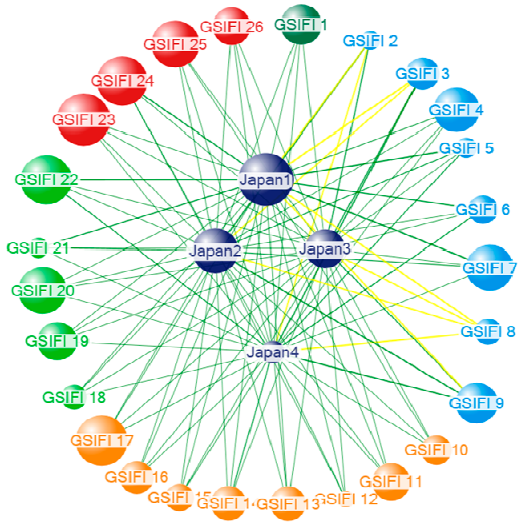
Lehman Shock: September–December 2008



Greece Downgrade: April–June 2010



Euro Area Turmoil: September–November 2011

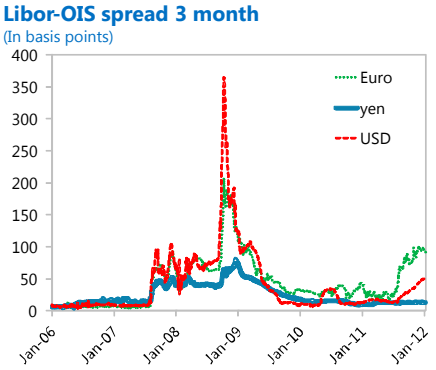


ANNEX IV—SPILLOVERS TO YEN MONEY MARKETS

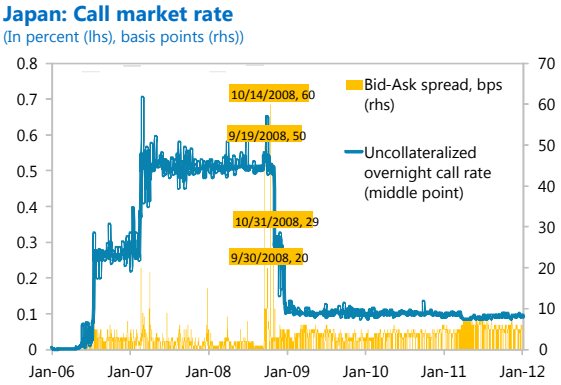
Development at the onset of the global financial crisis

41. **Yen money market remained broadly stable at the heights of the global financial crisis.** The Libor-OIS spreads (a common measure of unsecure funding market distress), for yen rose appreciably in late 2008, but remained at much lower levels than U.S. dollar or euro funding stresses. Domestic call markets experienced some spikes, but these spikes were associated with lower market liquidity (as indicated by larger bid ask spreads), rather than generalized funding distress (due to counterparty risks and other solvency concerns). In particular, the yen funding conditions in Tokyo were much more troublesome for foreign banks, and funding cost increases for Japanese banks were fairly limited.

Japan: Money Market Developments During Global Financial Crisis

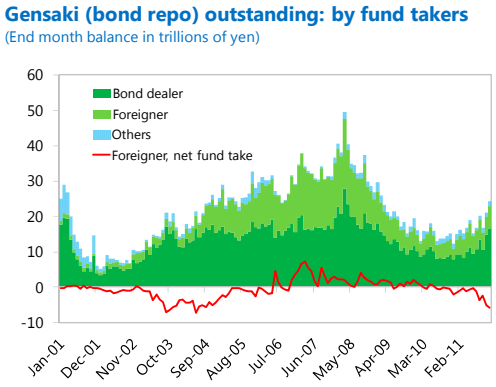


Source: Bloomberg.



Source: Bloomberg.

42. **Secured funding market has generally functioned well. Almost all Japanese bond repos are contracted using liquid JGBs as collateral, which have shown very limited volatility throughout the crisis.** Therefore, Japan did not experience the negative feedback effects multiplied through the interaction between market liquidity of collateral assets and funding liquidity of financial institutions that rely substantially on repos using those collateral assets, as was the case in the United States. Rehypothecation practice was also limited. More fundamentally, the core part of the financial sector, the banking sector, did not need to rely on market funding during the run-up of the crisis. Banks have been receiving strong deposit inflows in the context of weak credit growth, limiting the need to fund them in market. Indeed, major fund takers in Japanese bond repo market are foreigners and brokers.

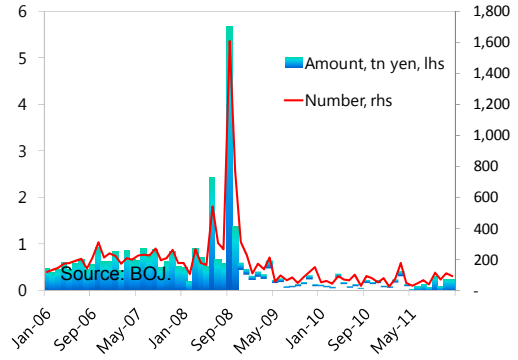


Source: Japan Securities Dealers Association.

43. **Overall, JGB clearing and settlement systems remained well-functioning, despite a short-lived surge of settlement "fails".** Lehman did not settle existing repo transactions the firm had on that day, causing numerous fails of JGB settlements between third parties. The use of Japan Government Bond Clearing Corporation (JGBCC), the central counterparty for JGBs, helped mitigate market confusion. Various ongoing and completed efforts, including the review of market practice on settlement fails, shortening of the JGB settlement cycle, enhancements to risk management of JGBCC, and expansion of the use of JGBCC, are expected to further strengthen the JGB market infrastructure.

Japan: Instances of JGB settlement fails

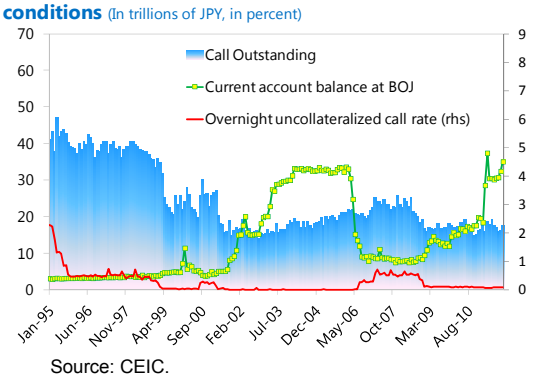
(In trillions of JPY, number)



New trends since 2008

44. **The system has abundant yen liquidity, especially for Japanese institutions, in the context of renewed accommodative monetary policy**. Financial institutions have been accumulating excess reserves at the BOJ, reaching the levels observed during the past quantitative easing periods. At the same time, volume in call market has decline, the similar trend as in the previous quantitative easing periods.

Japan: Call market outstanding and monetary conditions (In trillions of JPY, in percent)



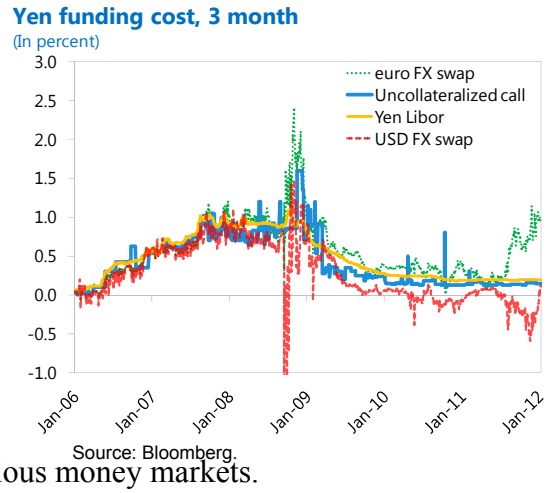
45. **A large share of the reductions in call market relates to the substantial declines of foreign banks' borrowings due to lower funding needs and their higher counterparty risks**. Call market is the most important source of yen funding for foreign banks, followed by FX-swap funding. Foreign banks used to actively raise funds in call markets during the run-up for the crisis, in conjunction with the popularity of yen-carry trades and partly to provide funding for overseas hedge funds to take positions in JGB markets. Since the collapse of Lehman Brothers, these trading opportunities shrunk and correspondingly funding needs subsided. Furthermore, Japanese financial institutions became more cautious about counterparty risks of U.S. and European banks, limiting credit lines, setting low credit limits, asking for additional premiums, and in some cases completely shutting down transactions vis-à-vis foreign banks.

46. **The funding strains with foreign banks in Tokyo seem to be linked to reduced market liquidity in various segments of money markets, in particular FX swap markets**. Reduced activities by foreign banks means smaller number of market makers providing

market liquidity in money markets. FX swap market is one such area where foreign banks play key roles as market makers. The covered interest parity between U.S. dollar and yen has been often violated since end 2008 and the gap occasionally has pushed cross-currency yen funding costs using U.S. dollar-yen swap into negative territory. This implies that there were not enough market makers who exploit these obvious arbitrage opportunities.

Outlook going forward

47. **Going forward, there could be renewed surge in funding costs in the yen money market originating from overseas turbulences as risks with foreign banks, especially European banks with distressed sovereigns, could remain elevated for some time**. These global conditions are likely to keep foreign banks' counterparty risks at high levels, which could then results to reduced market liquidity, especially at the time of generalized market pressures, in various money markets.



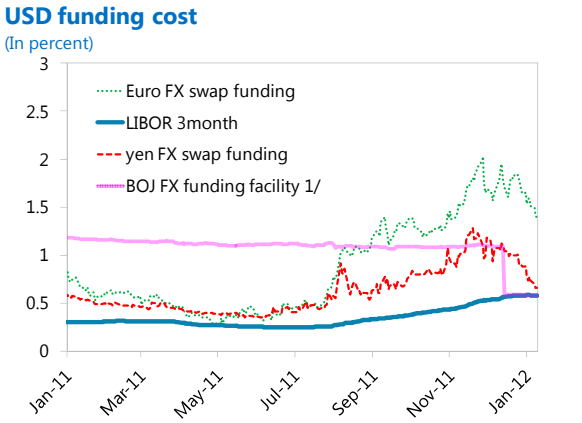
48. **Nonetheless, most of the Japanese financial institutions seem well prepared for potential volatilities in yen money markets**. The banking sector, which is the core of the Japanese financial systems, relies little on wholesale funding. The banking sector liquidity stress tests indicates banks have enough liquidity buffer (mostly deposit at BOJ, cash and JGBs) to withstand freeze of wholesale markets for three months that stop the rollover of maturing market funding. If any, securities firms are those relying on market funding, including repos, which requires them to closely manage their liquidity positions more cautiously than banks. However, their funding is mainly for inventory financing and little for proprietary trading.

ANNEX V. FX FUNDING RISKS

Trends in U.S. dollar funding costs

49. **Turbulence in global capital markets can affect FX funding costs of internationally active Japanese institutions**. Internationally active Japanese institutions typically use local repos, interbank loans and CDs (including U.S. MMF deposits in branches and subsidiaries of Japanese banks), or cross-currency funding to obtain FX (mostly USD). Turbulences in global funding markets raise their direct FX funding costs in local or offshore markets, and could potentially limit their access to FX funding. Moreover, market turbulences often distress FX swaps market, which add to cross-currency funding costs for Japanese institutions, as discussed in Annex IV.

50. **As of January 2012, the stress in USD funding using yen has subsided.** The U.S. dollar-yen CIP deviation has been closed, reducing the U.S. dollar funding costs for Japanese financial institutions to U.S. dollar Libor levels (although U.S. dollar Libor itself is edging up due to the counterparty risks in this market and U.S. dollar Libor-OIS spread is rising). This is in contrast with European banks, which still face substantially higher U.S. dollar funding costs (and yen funding costs) than Japanese peers.



Sources: Bloomberg

1/ BOJ's USD lending facility charged OIS+ 100 bps up to mid December 2011 and then cut to + 50 bps. 3 month OIS is used for calculation

51. **This could be due to the entry of some new players to pick up the arbitrage gains.** A few market sources explicitly mentioned a sovereign asset holder as increasing yen bond holdings, and raising the implied yield by swapping into dollars. Other sovereign asset holders, particularly in Asia, may also be engaging in this trade, which could help explain the reported increase in foreign flows to JGBs and shorter-term financing bills.

USD funding risks going forward

52. **The Japanese banking sector is relatively well positioned to secure FX funding, compared to European peers**. Japanese banks typically have very conservative overseas securities investment (e.g., U.S. Treasury bonds), which has high liquidity in both outright as well as in repo markets. This is in contrast to European banks which tend to have exposures in less liquid securities in the United States. United States MMFs are also shifting their deposits to Japanese banks from European banks. U.S. dollar funding costs using U.S. dollar-

yen FX swaps are much more stable than those using euros and banks are extending their swap maturities in order to prevent facing high rollover costs.

53. **The FX liquidity stress tests for the three largest Japanese banks show that Japanese banks would be resilient to a shock to FX market funding.** A contraction of interbank funding, disruption in U.S. dollar-yen swap markets, deposit withdrawals, or realization of contingent liabilities, could be met by a combination of access to various FX credit lines and foreign asset sales. In particular, Japanese banks' excess reserve deposits at the U.S. Federal Reserve System could be mobilized to generate substantial FX liquidity. In addition, they have large amounts of collateral that would allow them to borrow in U.S. dollars through the Fed's discount window.

54. **These benign results largely owe to accommodative monetary policy in the U.S. as well as banks' FX liquidity risk management strategies.** As is the case with yen liquidity, monetary policy stance, especially those of quantitative nature, tend to be linked to higher excess reserve holdings, especially when they receive some interest earnings with them. This excess reserve buffer together with Japanese banks' investment pattern concentrated in U.S. treasuries seems to be providing strong U.S. liquidity buffer. Furthermore, banks have been extending the terms of FX swaps and issuing USD bonds. Therefore, only a part of the FX swap contracts are maturing in the stress test horizons considered in the test (one week and month). The results could change if the access to all the funding markets remain closed to Japanese banks for over three months, but such extent of distress did not happen even at the time of post-Lehman shock period.

55. **Having said that, continued rise in the cost of U.S. dollar funding could weigh on profitability of financial institutions**. Even if Japanese financial institutions maintain access to the U.S. dollar funding markets, they could face higher costs as strains in global funding market continue.

ANNEX VI. CROSS-BORDER RESOLUTION RISKS

56. **This annex summarizes the findings and recommendations** of the standard and codes assessments for the banking sector, insurance sector, and securities markets regarding Japan's cooperation with foreign supervisors on information sharing and crisis management.

Banking sector—BCP Assessment

57. **Findings.** Some progress in the cooperation and information sharing between the FSA and other home and host supervisors has been observed through various channels, such as the Exchange of Letters with overseas supervisors and the holding of annual supervisory colleges for the major bank groups. Frequency of supervisory colleges held and quality of information shared during these colleges appear to be sufficient although there is room to continue enhancing coordination and cooperation with regards to cross border crisis and resolution situations. The assessors were also informed that Japan has decided to sign institution specific formal arrangements on information sharing for the G-SIFIs by the end of 2012, following the discussion at Financial Stability Board (FSB). Since 2007, the FSA has undertaken a "Better Regulation" program, in which one of the goals is strengthening cooperation with foreign supervisors.

58. **Recommendations.** Based on feedback from banks as well as other host and home supervisors, there is a room for the FSA continue enhancing it home/host relationships with foreign supervisors in terms of more proactive sharing of information on an ongoing basis. This could take place through the sharing of information with foreign supervisors on issues which may have a material effect on the subsidiaries or branches in the host country and timely sharing of other relevant information on a regular basis (and not only on a needs to basis). This will strengthen the FSA's ability to anticipate and deal with crisis situations and potentially any bank resolution situations through gaining timely insights into head office, branches and subsidiaries profiles and crisis management/resolution plans. In addition, the FSA should continue in its efforts to sign more formalized arrangements including bilateral or multilateral MOUs with more foreign supervisors.

Insurance sector—ICP Assessment

59. **Findings.** The FSA is a signatory to the IAIS Multilateral Memorandum of Understanding. It also has bilateral agreements with the supervisors in foreign jurisdictions where Japanese insurers have material operations. Moreover, FSA participates in colleges of supervisors for foreign insurers that operate in Japan and is considering the establishment of supervisory colleges for those insurance companies with material foreign operations. At the same time, the FSA has not yet developed comprehensive plans for dealing with Japanese insurers in crisis, although it has participated in the development of such plans for some foreign insurers that operate in Japan. Insurers are encouraged to prepare business continuity plans, which are reviewed by the FSA, but this not currently required.

60. **Recommendations.** The FSA should develop comprehensive plans for dealing with insurers in crisis situation and ensure that it has the tools needed to carry out such plans. It should ensure that the plans are internationally coordinated by working with foreign supervisors, for example, through supervisory colleges. In addition, insurers should be required to prepare contingency plans, including specific procedures for use in a gone-concern situation.

Securities Markets—IOSCO Assessment

61. **Findings.** The Financial Instruments Exchange Act provides the FSA with the power to enter into information arrangements with other foreign authorities. In fact, the FSA is a signatory to the IOSCO MMoU (signed in 2008). As the FSA is a MMoU signatory it does not consider it is necessary to enter into specific bilateral MOU information sharing arrangements with foreign regulators.[15] A supervisory college and a crisis management group were created in 2010 for a large complex firm, with the objective of fostering a comprehensive analysis of its operations. Both the FSA and the BOJ participate in the college, along with the regulators from the jurisdictions where the firm has major operations. The FSA and the BOJ share a set of information with the other supervisors, meetings take place on an annual basis and there are also calls on a semiannual basis. In the context of the crisis management group, the regulators have discussed possible measures to deal with crisis situations. In addition the FSA and the BOJ are members of the supervisory colleges for large investment banks with operations in Japan. The foreign regulator shares information with all the members of the college. The colleges meet once a year and have conference calls on a semiannual basis.

62. **Recommendations.** The authorities should document a contingency plan to be followed in the event of an intermediary's failure. The plan should include the type of regulatory actions necessary to protect investors from loss and manage the situation. The authorities should continue discussing with other domestic authorities, such as the BOJ, how to cooperate in the case of financial crisis management, including the management of weak financial institutions. In such context the authorities could consider to elaborate contingency plans further. In addition, the authorities are encouraged to develop a resolution plan for large complex securities firms.[16]

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[15] It has, however, entered into arrangements with a number of countries, by way of exchange of letters, as evidence of supervisory cooperation. These include Australia, Brazil, China, France, Germany, Hong Kong SAR, Korea, New Zealand, Singapore, Switzerland, UAE, U.K., U.S., and Vietnam.

[16] The FSA has documented actions taken during past large failures (domestic and international), providing a substantial corporate memory available to current FSA management.

Annex VII. Spillover Risks from FMI Interdependencies[17]

63. **The spillover risks stemming from interdependencies with overseas FMIs have increased in the past decade but remain relatively limited in Japan**. Main interdependencies come from the use of CLS for yen FX transactions, the offshore central clearing of yen denominated OTC derivatives transactions, the participation of foreign financial institutions in Japanese FMIs, the offshore settlement of JGBs in the two largest International Central Securities Depositories (ICSDs), and the use of SWIFT as a financial messages network provider. However, the net settlement of CLS in BOJ-NET FTS amounts to less than one percent of the value of BOJ-NET FTS total settlement even though yen is the third largest currency settled in CLS, following the U.S. dollar and the euro.

64. **For the offshore central clearing of yen denominated OTC derivatives transactions—according to SwapClear website as of December 14, 2011—the outstanding notional of yen denominated Interest Rate Swap (IRS) at the London-based CCP amounted to US$38.4 trillion.** This makes the yen the third currency cleared in SwapClear far behind the euro (US$113.4 trillion) and US$102.9 trillion. ICSDs participate in BOJ's JGB Book-Entry System as Foreign Indirect Participants, and the part of JGB settlement in the ICSDs seems limited. Finally, none of the Japanese FMIs currently rely on the SWIFT network, which, in Japan, is rather used for bilateral transactions between financial institutions.

65. **It is important that the authorities continue monitoring the spillover risk stemming from interdependencies with overseas FMIs.** Determining whether an offshore FMI has the potential to have a significant impact depends on a combination of factors including the value and volume of yen transactions processed by the FMI and the degree of interdependency between the offshore and domestic FMIs. The FSA has signed the IOSCO Multilateral Memorandum of Understanding on consultation, cooperation and information exchange among securities supervisory authorities, which enables, in particular, the FSA to exchange information on FMIs with securities supervisory authorities all over the world. Nevertheless, there is currently no concrete example of such information exchanges.

66. **Neither the FSA, nor BOJ currently gets sufficient information on offshore yen central clearing, but both authorities are participating in the discussions that are taking place in the OTC Derivatives Regulator Forum to develop information sharing agreements on individual FMIs, including London Clearing House (LCH) Clearnet limited.** In addition, authorities explained that they monitored JGB offshore settlement and foreign FMIs participants. At a time when some other parts of the world are facing financial difficulties, it is strongly recommended to continue and even enhance such a monitoring to

[17] See Technical Note on Oversight and Supervision of Financial Market Infrastructures (FMIS) for more details. Available at: http://www.imf.org/external/pubs/cat/longres.aspx?sk=26161.0

measure if the risk factors are changing and be prepared for a default of one of the relevant overseas FMIs or foreign financial institutions.