INTERNATIONAL MONETARY FUND

Understanding Financial Interconnectedness
Supplementary Information

Prepared by the Strategy, Policy, and Review Department and the Monetary and Capital Markets Department, in collaboration with the Statistics Department and in consultation with other Departments

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October 5, 2010

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I. Global Financial Architecture: Markets, Institutions, and Instruments[1]

This section provides background on some of the key markets, nonbank institutions, and instruments that have come to play a key role in the global financial system. Box 1 describes factors underlying some of these developments.

A. Markets

1. ***Global syndicated loan market***. Operated mainly by the LCFIs, this market is the largest source of corporate funds in the world. It increased from $0.4 trillion in 1990 to $2.2 trillion in 2000 and $3.5 trillion in 2006.

2. ***OTC derivatives markets***. OTC derivatives are used to manage and transfer risks, and to engage in speculation, with respect to currency rates, equity stocks, debt obligations, commodities, and other assets, indices rates or events. Supporting LCFI activities, these markets enjoyed spectacular growth after 1990. The aggregate notional value of outstanding OTC derivatives in global markets increased exponentially during the past two decades, rising $7 trillion in 1989 to $88 trillion in 1999 and $595 trillion in 2007.

3. ***Securitization markets***. Securitization grew rapidly after 1990. The total amount of outstanding residential mortgage backed securities (RMBS) issued by the U.S. government sponsored enterprises (GSEs) nearly quadrupled from 1991 to 2007. The success of the GSEs with RMBS encouraged LCFIs and others to pursue their own securitization strategies. Contributing significantly to the lending boom and housing frenzy were two trends: banks moving to an "originate and distribute" model wherein loans were repackaged and sold to investors; and financing based on shorter maturity instruments. The total outstanding amount of private-label RMBS and consumer asset-backed securities (ABS) increased more than 10-fold during 1991–2007, rising from $0.3 trillion to $3.2 trillion.

B. NonBank Institutions

4. ***Structured investment vehicles (SIVs)***. An SIV may be thought of as a very simple high quality, virtual bank.[2] Instead of gathering deposits from the public, it borrows cash from the money market by selling short maturity (often less than a year) instruments called commercial paper (CP), medium-term notes (MTNs), and public bonds to professional investors. SIVs had the highest ratings of AAA/Aaa enabling them to borrow at interest rates close to LIBOR, the rate at which banks lend to each other. The gathered funds are then invested in a range of long-term instruments, including ABS, RBMS, auto loans, student loans, credit cards securitization, and bank and corporate bonds. Regulatory and ratings

[1] Prepared by R. Basu (SPR).

[2] For a fuller discussion of these markets and SIVs and conduits, see IMF (2008).

arbitrage enhanced the popularity of SIVs. The Basel I Accord required that the banks hold capital of at least 8 percent of loans on their balance sheet, whereas the capital required to be held against contractual credit lines was much lower; there was no capital charge at all for reputational credit lines—like "liquidity backstops" that sponsoring banks provided to SIVs to maintain reputation. Since January 2007, Basel II implemented capital charges based on asset ratings, but banks were able to reduce their capital charges by pooling loans in off-balance-sheet vehicles, which due to the apparent diversification allowed them better ratings.

5. ***Conduits***. Conduits are asset-backed commercial paper (ABCP) programs composed of a bankruptcy-remote special purpose vehicle (SPV), or conduit, that issues commercial paper (CP) and uses the proceeds of such issuance primarily to obtain interests in various types of assets, either through asset purchase or secured lending transactions. An ABCP program includes key parties that perform various services for the conduit, credit enhancement that provides loss protection, and liquidity facilities that assist in the timely repayment of CP. Credit enhancements are unconditional guarantees by sponsoring banks to pay off maturing CP, if the conduit is unable to do so, and is considered in most countries equivalent to on-balance sheet financing and requires regulatory capital charge similar to banks' on-balance sheet assets. Important variation across countries exist in the regulatory treatment of liquidity enhancements, a conditional guarantee by the sponsoring bank to payoff maturing CP if the conduit is unable to do so, conditional on the conduit assets being deemed as performing when the sponsor is called upon to provide liquidity. Conduits usually stipulate assets as performing if the delinquency rate is below a pre-specified level or if assets are rated as investment grade. Under Basel I, liquidity enhancements were considered off-balance sheet and did not require a capital charge; under the standardized approach of Basel II, which was implemented in Europe, there was an 80 percent lower capital charge for assets in conduits relative to assets on balance sheets.

6. ***Money market funds***. These are investment funds that aim to earn interest for shareholders while maintaining a net asset value (NAV) of $1 per share, never to "break the buck" pledge. The pledge is contingent on the sponsor agreeing to buy back the assets so as to maintain the NAV at $1 per share. To achieve this safely, most of the underlying assets are of high quality. Mutual funds, brokerage firms, and banks offer these funds. Portfolios are comprised of short-term (less than one year) securities representing high-quality, liquid debt, and monetary instruments. A money market fund's purpose is to provide investors with a safe place to invest easily accessible cash-equivalent assets characterized as a low-risk, low-return investment. Securitization allowed some money market funds and pension funds—where their prospectuses allowed them to invest in AAA fixed income securities only—to hold these assets (indirectly).

7. ***Monoline insurers***. Originally, these insurers insured only one product against default, municipal bonds, in order to guarantee a AAA-rating. More recently, however, they extended guarantees to mortgage backed securities (MBS) and other structured finance products, despite being thinly capitalized. Losses in mortgage markets led to downgrades of

the insured securities, leading to a potential loss in monolines' AAA rating, making it difficult to sell insurance for municipal bonds, corporate bonds and other structured products. In fact, losses on mortgages led to sweeping rating downgrades across a number of financial instruments, and the threat of a loss in the insurance protection led to fears of "breaking the buck" for money market mutual fund pledges. In January 2008, the downgrade of one monoline, Ambac, led to worldwide tremors in financial markets.

8. ***Counterparties*** are persons or institutions entering the contract on the opposite sides of a transaction. Credit default swaps (CDSs)—contracts that insure investors against losing principal in fixed income securities or structured credit products—that AIG, for instance, wrote on super-senior tranches of collateralized debt obligations (CDOs) were backed by mortgage securities. When AIG suffered rating downgrades, the resulting collateral calls from their counterparties on the CDSs proved ultimately to be much more than AIG could handle and became the main reason the company was bailed out with government commitments. Some of the counterparties to these swaps were 25 financial institutions, LCFIs, spread across the world. Many of them would have been vulnerable to a domino effect if they had not received, first, the collateral that AIG paid them and, later, the bailout from the U.S. government that made the counterparties whole.

9. ***Broker-dealers*** or intermediaries are companies or organizations that trade securities for their own accounts or on behalf of their customers. Although many broker-dealers are "independent" firms solely involved in broker-dealer services, many others are business units or subsidiaries of commercial banks, investment banks, or investment companies. When executing trade orders on behalf of a customer, the institution is said to be acting as a broker. When executing trades for its own account, the institution is said to be acting as a dealer. In 2004, there was a change to the net capital rule applied to U.S. broker-dealers, allowing those with "tentative net capital" of more than $5 billion to increase their leverage ratios. This rule change, which many have attributed as an important cause of the financial crisis that, remains in effect, although subject to modifications.

10. ***Rating agencies***. For mortgage-backed structured credit products, the statistical models used by credit rating agencies were backward looking and based on historically low mortgage default and delinquency rates, which proved to be overly optimistic. It has been argued that structured products may have received more favorable ratings compared to corporate bonds because rating agencies collected higher fees for structured products.

C. Instruments

11. ***CDOs***. Collaterized debt obligations (CDOs) are structured products created to provide payouts from a diversified portfolio of mortgages and other loans, corporate bonds, and other assets such as credit card receivables. These portfolios are then tranched and sold to investor groups with different demands for the riskiness of the payouts. The safest tranche—the super senior tranche—offers investors a relatively low interest rate as it is the

first to be paid out of the cash flows of the portfolio. Mezzanine and junior tranches—the latter referred to as "equity tranche or toxic waste"—are paid out in successive order. The cut-offs between tranches are chosen to ensure a specific rating, with the top tranche constructed to receive a AAA rating. The issuing bank often kept various tranches, sometimes the equity tranche, but more frequently the AAA tranche since the capital needed to be held against it was quite low. More recently, rules have been promulgated to require originators to hold 5 percent of each tranche to ensure that the underlying loans are adequately monitored.

12. ***ABS***. An asset-backed security (ABS) is a financial security backed by a loan, lease, or receivables against assets other than real estate and mortgage-backed securities. For investors, ABSs can be an alternative to investing in corporate debt. An ABS is essentially like a mortgage-backed security, except that the securities backing it are assets such as loans, credit card debt, a company's receivables, and royalties, not mortgage-based securities.

13. ***CDS***. Credit default swaps (CDSs) protect buyers of structured products against default of a particular tranche of a structured credit product or a bond. A fixed fee is paid periodically in exchange for a contingent payment in the event of credit default. For instance, a AAA tranche of CDO backed by a CDS was considered a safe asset with low probability of counterparty default for the purchased CDS. At the peak, the gross notional amounts of outstanding CDS contracts ranged from $45 trillion to $62 trillion in 2007. Indices comprising of portfolios of CDSs, such as CDX in the United States or ITraxx in Europe are also traded.

14. ***ABCP***. Asset-backed commercial papers (ABCP) are generic short-term instruments, but in the run up to the crisis were sold by SIVs and conduits primarily to money market funds to raise short-term funds with an average maturity of 90 days and MTNs with maturities just over a year. The short-term CP were "asset backed," i.e., backed by mortgages or other types of securities as collateral, which the owners of ABCPs had the power to seize and sell at the time of default.

15. ***Repos***. Repurchase agreements (repos) allowed investment banks to raise short term and mostly overnight funding, by selling a collateral asset today with a promise to repurchase it, say, a day later. The fraction of total investment bank assets financed by overnight repos roughly doubled from 2000 to 2007, with term repos (with those up to three month maturity) remaining roughly constant as a share of their assets. Maturity mismatch and funding risks increased as a consequence of this growing reliance on overnight repos.

16. ***Liquidity enhancements***. Liquidity enhancements or "liquidity backstops" interconnect sponsoring commercial banks to their SIVs and conduits as a means to ensure a high rating. The strategy of the off-balance sheet vehicles to invest in long-term assets, such as ABSs, funded by short-term ABCP translates into funding risk. Ultimately, this exposes the sponsoring bank to liquidity risk through the extension of credit lines to these vehicles to

ensure smooth functioning of their funding liquidity. Consequently, the banking system still bears the liquidity risk from holding long-term assets and making short-term loans even though it does not appear on the banks' balance sheets.

Box 1. Competition, Deregulation, and Innovation in Financial Services

During the past two decades, competition, deregulation, and financial innovation encouraged massive consolidation and conglomeration within the financial services industry.

Competition. In response to growing competitive pressures in the financial markets, the Federal Reserve Board (FRB) altered the Glass-Steagall Act (GSA) and allowed bank holding companies (BHCs) to underwrite debt and securities to a limited extent by establishing section 20 subsidiaries in the 1980s.[3] The FRB continued to relax the restrictions through the 1990s facilitating the establishment of Section 20 subsidiaries in many large domestic and foreign banks, often by acquiring small and mid-sized securities firms. These subsidiaries could effectively compete with securities firms to underwrite stocks and bonds. Meanwhile, large security firms made their own acquisitions of industrial loan companies and thrift institutions enabling them to offer FDIC-insured deposits, a low cost source of funding for lending and investment activities, making them de facto universal banks.

Deregulation. In 1999, the enactment of the Gramm-Leach-Bliley Act (GLBA) ratified the merger of the Citicorp-Travelers to form Citigroup and authorized universal banking. GLBA repealed the anti-affiliation provisions of GSA and also amended the BHC Act so that commercial banks could affiliate with securities firms and insurance companies. Following deregulation of the U.K. securities industry in the mid-80s, U.S. and European banks aggressively acquired most of the U.K.'s top investment banks. Similarly, U.S. and European banks took advantage of progressive dismantling of GSA.

Financial innovation. Innovation allowed financial institutions to maintain high margins and remain competitive. On the funding side, the conglomerates established sweep account programs that moved cash balances from customer accounts at their broker dealer subsidiaries into lower cost FDIC-insured deposit accounts—a business offered by many offshore centers. FDIC-insured deposits typically paid much lower interest and earned higher spreads than rates and spreads offered by uninsured money-market mutual funds (MMMFs) at brokerage firms. Additionally, MMMFs could only invest in short-term, highly rated, and low-yielding debt securities, and not in higher yielding loans. Financial innovations and securitization helped, in part, to mitigate these perceived impediments. It facilitated the switch toward fee-based activities, enabling large universal banks to optimize their fee-based revenue by pursuing an "originate to distribute" business strategy—originating and servicing loans, underwriting asset-backed securities (ABS) and collaterized debt obligations (CDOs) based on these loans, creating additional instruments linked to these loans, and distributing the resulting cash flows to other financial instruments.

Consolidation. These changes have led to large scale domestic and international mergers among commercial and investment banks producing a dominant group of LCFIs. By 2007, seventeen such LCFIs effectively controlled domestic and global markets for debt and equity underwriting, syndicated lending, ABS, over the counter (OTC) derivatives, and CDOs. These LCFIs are concentrated across a few geographic nodes interlinked by global strategies across institutions, markets and instruments. While the core nodes have been largely preserved, new nodes have evolved in their search for efficiency and yield. LCFI activities have expanded to cover nonbanks and shadow banks, marking a deep transformation in banking activity away from core deposit taking and loan making activities and toward marketable instruments.

[3] In the United States, the GSA, (also the Banking Act of 1933), had previously built a firewall that separated commercial banks activities from investment banking activities.

II. Cross-Border Interconnectedness: Common Lenders and Borrowers[4]

This section complements the information in the main paper, providing further analysis of BIS data on cross-border banking and CPIS data on cross-border portfolio holdings to discern the countries that are international common lenders and common borrowers. These countries play a key role in intermediating cross-border financial flows.

A. BIS's International Banking Statistics

17. ***Data***. The foreign exposure data from the BIS's international banking statistics are reported on an *immediate borrower basis* (IBB).[5] The IBB dataset reflects the total exposures of the reporting banks on banks, nonbank private sector, and public sector in other countries, net of inter-office accounts (Table 9B from the BIS's *Consolidated Banking Statistics*). The detailed, vis-à-vis individual countries data are available for 24 out of 30 countries that report their aggregate national consolidated data to the BIS.[6] Any on-balance sheet derivatives exposures are not included.

18. ***Common lenders***. As mentioned in section II of the main paper, common lenders are defined as countries whose banking systems provide over 5 percent of the funding for a number of countries. Using the methodology for determining common lenders developed by Sbracia and Zaghini (2001) and extended by Árvai, Driessen, and Ötker-Robe (2009), eight global common lenders are identified—France, Germany, Japan, the Netherlands, Spain, Switzerland, the U.K., and the United States.[7] In addition, a few other countries are identified as common lenders to specific regions.

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[4] Prepared by S. Nowak (MCM) and S. Maziad and T. Oni (SPR).

[5] BIS consolidated banking statistics on *immediate borrower basis* are based on the nationality of the reporting bank and net out intra-group positions. In other words, the consolidated statistics are based on the country where the reporting bank's head office is located and look through inter-office positions to capture exposures to unaffiliated counterparties. They are intended to facilitate the monitoring and management of banks' risk exposures and complement the locational statistics, which were originally intended to complement monetary and credit aggregates and are compiled in a way that is consistent with balance of payments statistics and the system of national accounts.

[6] These countries are: Australia, Austria, Belgium, Brazil, Canada, Chile, Chinese Taipei, Denmark, France, Germany, Greece, Ireland, Italy, Japan, Mexico, Netherlands, Panama, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. Foreign claims of domestically owned banks in Finland, Hong Kong SAR, India, Luxembourg, Norway, and Singapore are not shown separately but included in the grand totals.

[7] The same countries are determined to be the global and regional common lenders if the BIS's international banking statistics reported on an *ultimate risk basis* (URB, Table 9D from the BIS's *Consolidated Banking Statistics*). Common lenders analyzed on the URB basis actually own more assets: 80 percent of assets in the advanced economies (only 65 percent on the IBB basis) and 84 percent of assets in emerging markets (77 percent on the IBB). For the offshore centers, the proportion increases from 81 to 85 percent.

19. ***Importance of common lenders***. The relative dependence on the common lenders' funding is significant. Relative dependence is defined as a ratio between the amounts owed by a country/region to a common lender and the total liabilities of this country/region. Table 1 shows that advanced economies receive 65 percent of their banking funding from the common lenders, emerging and developing economies—77 percent, and offshore centers—81 percent. France, Germany, the United Kingdom, and the United States are the biggest global common lenders. Regionally, Austria and Italy are the key lenders to central and eastern Europe, Sweden—to the Baltics, Spain—to the Western hemisphere, and Japan—to the developing Asia.

20. ***Exposures***. The global common lenders are highly exposed to advanced economies, reflecting the high degree of interconnectedness among developed financial systems. The relative exposure of each common lender is calculated as a ratio between the common lender's assets vis-à-vis the economies of each area and the common lender's total claims vis-à-vis all countries. Table 2 shows that the average relative exposure of the global common lenders to the advanced economies was about 80 percent compared with the 14 percent exposure to emerging and developing economies. Austria, Italy, and Spain were the common lenders with the largest relative exposure to the emerging economies.

21. ***Common borrowers***. Although based only on a small set of data where detailed vis-à-vis individual countries data are available (see ¶17 and footnote 6), the common lenders are also the common borrowers. Table 3 shows that, on average, the common lenders receive 60 percent of their cross-border banking funding from other common lenders and their cross-border exposure to common lenders is also close to 60 percent. Australia, Austria, and the United States are most dependent on the funding from the common lenders. France, Netherlands, and Switzerland are most exposed to the common lenders.

22. ***Stability***. Examining the data from 2002 to 2009, the group of the global and regional common lenders is broadly constant over time. Spain is the only country that rose from being a regional common lender (to Western Hemisphere) to serving as a global common lender. In addition:

- In 2002, Australia, Greece, Ireland, and Mexico did not report their banking statistics to the BIS, so it is not possible to judge their importance.
- The role of Austria, Italy, and Sweden as regional common lenders increased over time.
- Belgium used to be an important source of funds for the euro area, Central and Eastern Europe, and the offshore centers, but is no longer.

Table 1. Measure of Relative Dependence--Ratio between the Amount Owed to the Common Lender and Total Liabilities of the Region in December 2009

(Foreign claims owed to global and regional common lenders as a share of each region's total liabilities, in percent) 1/

	Australia	Austria	Belgium	Canada	France	Germany	Greece	Italy	Japan	Netherlands	Spain	Sweden	Switzerland	United Kingdom	United States	Total dependance on the CLs
All countries					12.4	10.8			8.0	5.2	4.5		5.4	12.0	8.2	66.5
Advanced Economies					13.0	11.2			7.7	5.5	3.7		5.5	11.4	7.3	65.3
Advanced G20					12.1	9.5			9.2	5.7	4.6		7.0	11.6	8.0	67.7
Advanced Asia-Pacific Economies	8.5				10.9	5.7			7.0	4.8	0.3		4.8	21.0	16.4	79.5
Advanced North-American Economies				7.7	10.1	9.6			15.5	5.2	3.4		11.6	19.4	1.7	84.2
Euro Area					16.8	12.6		5.3	4.9	6.3	2.8		2.9	9.3	5.9	66.9
Other Advanced European Economies					9.6	13.0			4.9	4.5	8.1	5.9	4.5	1.3	11.3	63.1
European Union					14.4	12.9			4.8	5.9	4.5		3.5	6.5	7.5	60.2
Emerging and Developing Economies		5.0			9.7	8.1		5.1	5.8	4.7	10.7		2.9	12.5	12.4	76.9
Emerging G20					7.6	6.7			6.3	5.2	16.0		3.1	16.1	18.2	79.3
Central and Eastern Europe		15.9			10.0	12.5	8.8	14.0	1.1	7.0	0.7	7.9	0.6	0.1	3.6	82.1
Baltics					0.8	7.7			0.1	0.1	0.1	72.9	0.4	0.1	0.2	82.4
Other Central and Eastern European Countries		17.4			10.9	13.0	9.7	15.2	1.3	7.7	0.8		0.6	0.1	3.9	80.6
CEE incl. AE CEE		22.3	7.7		11.9	11.5	7.3	14.8	1.1	6.3	0.7		0.5	0.3	3.3	87.5
Commonwealth of Independent States		10.1			17.9	15.2		13.3	4.4	7.6	1.2	5.1	5.1	3.5	6.8	90.1
Developing Asia					5.7	6.9			11.6	5.2	0.5		3.6	20.6	17.7	71.7
Middle East and North Africa					26.9	7.2			5.1	2.9	1.4		3.2	24.0	10.3	81.0
Sub-Saharan Africa					11.8	9.0			3.1	1.4	0.8		3.1	49.0	7.2	85.3
Western Hemisphere					4.3	3.8			6.5	2.9	34.4		3.7	8.0	19.2	82.8
Offshore Centers					11.6	15.0			19.1	2.5	1.6		9.2	11.7	10.4	81.2

1/ Relative dependence of country *i* (in rows) on country *j* (in column) = rd (i; j). Only regional lenders relevant for each region are included. CL refers to common lenders; not only those with more than 5 percent of the global exposures are included.

Source: BIS Quarterly Review: December 2009, Table 9B: Consolidated foreign claims of reporting banks - immediate borrower basis on individual countries by nationality of reporting banks.

Table 2. Measure of Relative Exposure--Ratio between Common Lender's Assets vis-à-vis a Region and the Common Lender's Total Lending in December 2009

(Foreign claims of common lenders on regions as a ratio to the common lender's total lending, in percent) 1/

	Australia	Austria	Belgium	Canada	France	Germany	Greece	Italy	Japan	Netherlands	Spain	Sweden	Switzerland	United Kingdom	United States
All countries	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Advanced Economies					86.8	85.3			79.8	86.7	68.5		85.3	79.0	73.9
Advanced G20					53.5	47.9			63.5	59.8	55.4		72.1	53.4	53.7
Advanced Asia-Pacific Economies	51.5				8.8	5.3			8.8	9.2	0.7		9.0	17.6	20.1
Advanced North-American Economies				60.3	16.0	17.4			38.1	19.5	14.5		42.0	31.7	4.0
Euro Area					48.5	41.8		60.2	22.1	43.1	22.2		19.5	27.8	25.7
Other Advanced European Economies					13.5	21.0			10.8	14.9	31.1	43.8	14.8	1.9	24.1
European Union					61.2	62.8			31.7	59.5	52.8		33.8	28.7	48.4
Emerging and Developing Economies		36.3			10.0	9.5		20.4	9.2	11.4	30.0		6.8	13.3	19.3
Emerging G20					3.8	3.7			4.8	6.1	21.6		3.6	8.2	13.6
Central and Eastern Europe		29.3			2.6	3.7	51.9	14.4	0.5	4.3	0.5	10.9	0.4	0.0	1.4
Baltics					0.0	0.2			0.0	0.0	0.0	9.5	0.0	0.0	0.0
Other Central and Eastern European Countries		29.1			2.6	3.5	51.9	14.2	0.5	4.3	0.5		0.3	0.0	1.4
CEE incl. AE CEE		49.5	21.4		3.7	4.1	51.9	18.4	0.5	4.7	0.6		0.4	0.1	1.6
Commonwealth of Independent States		4.7			1.2	1.2		3.5	0.5	1.2	0.2	1.8	0.8	0.2	0.7
Developing Asia					1.3	1.8			4.1	2.8	0.3		1.9	4.9	6.1
Middle East and North Africa					2.9	0.9			0.9	0.7	0.4		0.8	2.7	1.7
Sub-Saharan Africa					0.7	0.6			0.3	0.2	0.1		0.4	3.0	0.6
Western Hemisphere					1.3	1.3			3.0	2.1	28.4		2.6	2.5	8.8
Offshore Centers					6.2	9.2			16.0	3.2	2.4		11.4	6.5	8.4

1/ Relative exposure of country *j* (in columns) to country *j* (in rows) = re (j, i). Only regional lenders relevant for each region are included.

Source: BIS Quarterly Review: December 2009, Table 9B: Consolidated foreign claims of reporting banks - immediate borrower basis on individual countries by nationality of reporting banks. CL refers to common lenders; not only those with more than 5 percent of the global exposures are included.

Table 3. Common Lenders are Common Borrowers in December 2009

(Foreign claims owed to and by global and regional common lenders as a share of each borrower's liabilities, in percent) 1/

	Australia	Austria	Belgium	Canada	France	Germany	Greece	Italy	Japan	Netherlands	Spain	Sweden	Switzerland	United Kingdom	United States	Total dependance on the CLs
Australia					8.3	8.5			14.1	13.4				15.9	12.5	72.8
Austria					8.3	31.7		36.0								76.0
Belgium					44.6	6.0				19.5						70.2
Canada					5.3	7.1			8.8	8.1				15.3	17.7	62.3
France						11.3			5.6	5.4				13.8	7.8	43.9
Germany					13.9			13.1	7.1	8.4				8.2	7.0	57.7
Greece					31.8	19.1				5.0				6.4	7.0	69.3
Italy					36.2	13.4								5.4		55.0
Japan					18.9	5.1							7.9	11.9	23.6	67.3
Netherlands					14.0	14.4								9.0	8.5	45.8
Spain					19.1	20.7				10.4				9.9		60.1
Sweden					5.5	11.9			5.1					5.1	7.4	35.0
Switzerland					12.0	10.5								5.3	6.1	34.0
United Kingdom					9.6	14.0			5.6	5.3	11.5		5.8		13.9	65.6
United States				8.5	10.6	9.9			16.2				12.3	19.8		77.5
Total exposure to CLs 2/	**38.7**	**34.9**	**54.5**	**70.7**	**75.4**	**67.8**	**23.5**	**64.5**	**68.4**	**77.6**	**58.9**	**26.5**	**76.4**	**59.5**	**60.1**	**-**

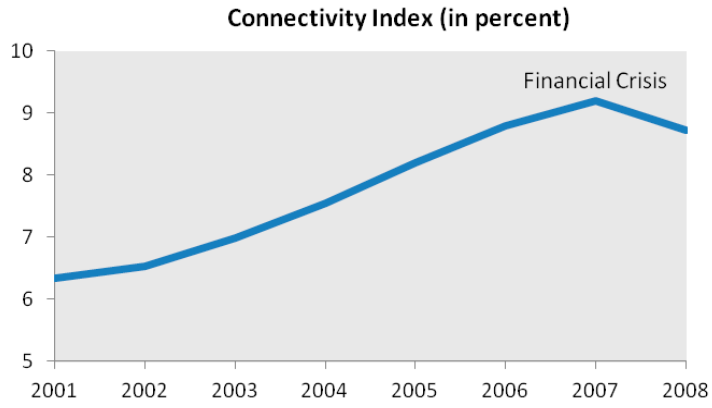
1/ Relative dependence of country *i* (in rows) on country *j* (in columns) = rd (i; j). Only lenders that provide 5 percent of more of funding to each country are included. CL refers to common lenders; not only those with more than 5 percent of the global exposures are included.

2/ Relative exposure of country *j* (in columns) to country i (in rows) = re (j, i).

Source: BIS Quarterly Review: December 2009, Table 9B: Consolidated foreign claims of reporting banks - immediate borrower basis on individual countries by nationality of reporting banks.

B. IMF's Coordinated Portfolio Investment Survey

23. ***Increased interconnectedness***. The analysis of CPIS data shows a significant increase in cross-border portfolio investments and a trend toward asset diversification among global common lenders. The total value of portfolio investment assets tripled between 2001 and 2007 from $12.7 trillion to $39.2 trillion, before contracting sharply in 2008 as a result of the crisis to $30.8 trillion. This pattern reflects both the increase in global liquidity and financial deepening in the mid-2000s and the subsequent retrenchment during the crisis. The data also show increased interconnectedness in the form of the creation of new linkages through regional diversification of holdings (see below) and increased network connectivity. Network connectivity is measured as the ratio *m/n(n-1)*, where *m* is the number of links in the network (nonzero holdings among countries) and *n* is the number of countries in the network, including 73 reporting countries and their reported partner countries amounting to a total of 240 countries, territories, and money centers.[8]



24. ***Global investors or global common lenders***. Global common investors (or asset holders) are defined as those holding 5 percent or more of global portfolio holdings (similar to BIS analysis).[9] The same criterion was used to identify common investors at the regional level. This cut-off point provides a similar set of global investors as provided by the analysis of BIS banking data—France, Germany, Japan, Luxembourg, the U.K., and the United States emerge as the largest holders of global securities in 2001.[10] By the 2008, the concentration of global holdings decreased somewhat with the combined share of the U.S. and the U.K. dropping from 28.4 percent of global portfolio holdings to 22.1 percent against an increase in the shares of France and Ireland (see Table 4.a).

25. ***Regional investors or regional common lenders***. In addition to the global investors, a number of countries appear as critical regional nodes holding a significant portion of regional portfolio liabilities. For instance, the following regional nodes became important investors

[8] See Hattori and Suda (2007) for detailed methodology.

[9] We could use 'common lenders' for ease of comparison with BIS analysis. However, it is probably more accurate to refer to the results of the CPIS as common investors or asset holders.

[10] Note that Luxembourg does not publish complete data in the BIS banking statistics and thus was not identified in that analysis as a common lender.

over time (the number in brackets is the node's share in the region's total liabilities,[11] see Table 4.b):

- Austria is an important investor in Central and Eastern Europe with an increase in share from 8 percent of regional liabilities in 2001 to over 18 percent in 2008;
- Switzerland is the main holder of portfolio assets in the Baltic countries (22.6 percent);
- Hong Kong is invested in emerging and developing countries in 2008 (6.9 percent), particularly developing Asian countries (18.5 percent);
- Kuwait is invested in MENA countries holding over 26 percent of regional liabilities in 2008;
- Mauritius (identified here as an offshore center) became an important node for emerging G20 countries (10.7 percent) and developing Asia (18.1 percent).

In addition, global investors are also important regional investors, particularly:

- Japan has maintained a large share of investment in Western Hemisphere countries (18.9 percent);
- France, the U.K., and the United States are the main investors in MENA, Sub-Saharan Africa, and Western Hemisphere countries.

26. ***Global/regional investors' asset allocation***. The asset allocation of global and regional investors shows some shifting pattern among partner countries/regions, and some diversification away from advanced economies toward emerging markets and off-shore centers, which mirrors the growth in the shadow banking system and could be related to an ability to take advantage of differential regulations (see Tables 4.b and 4.c). For instance:

- The United States, the U.K., and Luxembourg data show a decline of holdings of liabilities issued by advanced economies, particularly advanced G20 countries, in favor of increasing the share of emerging market countries and off-shore centers, particularly Cayman Islands;
- Japan and Hong Kong significantly increase their portfolio investments in off-shore centers at the expense of investments in the United States, pointing to regulatory arbitrage;

[11] Regional liabilities are imputed liabilities derived from the total portfolio investment of reporting countries.

- Western Hemisphere countries attracted a larger share of investments from Hong Kong, Japan and the United States, which reflects the increased allocations to off-shore centers.

27. ***Asset composition***. Except for the United States, debt holdings dominate portfolio investments of global and regional investors (Tables 5a-c and 6a-c). The data also indicate an increase in debt holdings relative to equity investments in 2008, when compared to 2001. Short-term debt as a share of total debt holdings remains modest for most global investors except Luxembourg (23 percent of total debt holdings) and the United States (18.6 percent) (Table 7), notably:

- Debt holdings increased for most global and regional investors, particularly Australia, Germany, Switzerland, the U.K., and the United States. The United States remains the largest holder of equity investment, although it declined from 70 percent to 64 percent of total portfolio investments of the United States. This supports the observation that the United States invests as a 'venture capitalist' with a growing share of investments in emerging markets (discussed above);

- The share of short-term debt increased since 2001 for a number of regional investors, particularly Ireland, Hong Kong, and Switzerland, where the increase is concentrated in advanced economies;

- Regional debt and equity holdings mirror the general trend of increased investments in emerging markets, particularly by the United States, the U.K., and Japan (see Tables 5.c and 6.c).

28. ***Surplus and emerging market countries***. Portfolio assets of large emerging markets, namely Brazil, India, and Russia, has shifted significantly over between 2001 and 2008 (the latest year of data available) toward higher concentration of debt assets (from 49.6 to 78 percent for total portfolio investments) invested in advanced economies and off-shore centers and away from asset issued by global common lenders. Emerging market equity holdings are largely concentrated in the U.S. Surplus countries (MENA countries) asset holdings are concentrated in the United States, the U.K., and off-shore centers with significant decline in the share of investments in Luxembourg (from 10 to 1 percent of the region's holdings).

Table 4.a Share of Holdings in Each Region, in percent of Global Portfolio Investment

	Grand Total	Australia	Austria	Belgium	Canada	France	Germany	Hong Kong SAR	Ireland	Italy	Japan	Kuwait	Luxembourg	Mauritius	Netherlands	Spain	Sweden	Switzerland	United Kingdom	United States
2001																				
All countries	100.0					5.6	6.2				10.1		6.5						10.3	18.1
Advanced Economies	86.8					5.1	5.8				8.3		5.9						8.8	14.9
Advanced G20	63.1										6.7								6.3	10.5
Advanced Asia-Pacific Economies	7.8																			
Advanced North-American Economies	26.9																			
Euro Area	37.6																			5.1
Other Advanced European Economies	14.5																			5.3
European Union	39.8																			5.5
Emerging and Developing Economies	9.4																			
Emerging G20																				
Central and Eastern Europe																				
Baltics																				
CEE incl. AE CEE																				
Commonwealth of Independent States																				
Developing Asia																				
Middle East and North Africa																				
Sub-Saharan Africa																				
Western Hemisphere	7.2																			
Offshore Centers	6.5																			
2008																				
All countries	100.0					8.2	7.0		5.3		7.7		6.9						8.3	13.8
Advanced Economies	84.0					7.5	6.5				5.8		6.0						6.8	10.5
Advanced G20	57.1																			7.2
Advanced Asia-Pacific Economies	7.2																			
Advanced North-American Economies	22.6																			
Euro Area	41.1					5.2														
Other Advanced European Economies	13.1																			
European Union						5.4	5.2													
Emerging and Developing Economies	11.5																			
Emerging G20																				
Central and Eastern Europe																				
Baltics																				
CEE incl. AE CEE																				
Commonwealth of Independent States																				
Developing Asia																				
Middle East and North Africa																				
Sub-Saharan Africa																				
Western Hemisphere	7.1																			
Offshore Centers	7.3																			

Sources: CPIS; and Fund staff calculations.

Table 4.b Share of Holdings in Each Region, in percent of Total Regional Liabilities

	Australia	Austria	Belgium	Canada	France	Germany	Hong Kong SAR	Ireland	Italy	Japan	Kuwait	Luxembourg	Mauritius	Netherlands	Spain	Sweden	Switzerland	United Kingdom	United States
2001																			
All countries																			
Advanced Economies					5.8	6.7				9.6		6.8						10.1	17.2
Advanced G20										10.7		6.8						10.0	16.7
Advanced Asia-Pacific Economies												5.1						17.2	36.8
Advanced North-American Economies																			9.5
Euro Area					8.4	10.4			6.5	7.6		8.4					5.0	11.4	13.4
Other Advanced European Economies					5.1	6.4		5.2		7.9		6.0							36.7
European Union					8.1	10.3			6.3	7.7		8.6						11.7	13.8
Emerging and Developing Economies									5.0	14.7								9.6	33.2
Emerging G20									8.8			5.1						11.2	40.7
Central and Eastern Europe						21.5			6.9	6.6		10.0						15.8	19.7
Baltics										10.5									21.5
CEE incl. AE CEE		8.0				22.2				15.9		7.0						9.2	21.0
Commonwealth of Independent States						8.7			9.6			6.3						14.5	37.6
Developing Asia							14.2			7.8		5.6						14.3	25.4
Middle East and North Africa					9.9					8.3		7.9						23.2	13.8
Sub-Saharan Africa												8.5						16.7	39.3
Western Hemisphere									5.3	17.7								8.0	36.1
Offshore Centers						5.1													9.8
2008																			
All countries																			
Advanced Economies					8.9	7.8		5.4		7.0		7.2						8.1	12.4
Advanced G20					7.1			6.3		8.1		7.4						7.9	12.5
Advanced Asia-Pacific Economies					8.1							6.5						12.6	33.4
Advanced North-American Economies																			10.4
Euro Area					12.7	12.0			5.4	5.1		8.2						7.8	8.4
Other Advanced European Economies					7.2	6.4		8.9		6.1		7.0							25.7
European Union					12.4	12.0			5.1	5.2		8.4						7.8	8.8
Emerging and Developing Economies					5.5		6.9			13.2		6.9						9.6	28.5
Emerging G20							10.4					8.6	10.7					11.1	31.6
Central and Eastern Europe		8.8				17.4						11.0						10.1	15.1
Baltics																	22.6		
CEE incl. AE CEE		18.4				25.1						12.7		6.3				7.2	
Commonwealth of Independent States												11.7						20.8	29.4
Developing Asia							18.5					7.0	18.1					11.4	21.2
Middle East and North Africa					5.1						26.2	5.8						18.3	7.7
Sub-Saharan Africa												10.4						13.2	44.8
Western Hemisphere					6.7		5.6			18.9		6.0						7.2	33.6
Offshore Centers						7.2													9.0

Sources: CPIS; and Fund staff calculations.

Table 4.c Share of Holdings in Each Region, in percent of Country's Total Holdings

	Australia	Austria	Belgium	Canada	France	Germany	Hong Kong SAR	Ireland	Italy	Japan	Kuwait	Luxembourg	Mauritius	Netherlands	Spain	Sweden	Switzerland	United Kingdom	United States
2001																			
All countries																			
Advanced Economies	95.6	87.6	96.6	93.4	90.8	93.8	85.0	88.1	81.9	82.1		91.7	21.3	95.9	87.2	98.4	78.0	85.7	82.3
Advanced G20	81.5	60.1	53.9	82.6	53.2	45.0	67.8	74.4	41.7	66.5		66.4	14.3	74.1	65.1	69.1	46.3	61.6	58.1
Advanced Asia-Pacific Economies	11.3			9.6			4.2					6.1		6.1		6.0		13.1	15.9
Advanced North-American Economies	75.8	57.1		71.6	13.8	17.9	25.5	34.9	76.3	13.9	47.4	36.6	13.0		14.9	10.0	35.6	7.3	24.9
Euro Area	14.5	60.1	76.9	12.9	56.1	62.5	27.4	27.3	56.1	28.3		49.1	6.0	47.2	62.9	36.3	48.9	41.8	27.9
Other Advanced European Economies	12.6	10.7	6.9	12.4	13.2	14.9	27.9	22.1	8.5	11.3		13.4	13.8	12.7	11.9	20.5	7.4	5.9	29.3
European Union	15.4	63.9	78.4	13.9	57.8	65.7	29.5	28.7	57.5	30.1		52.9	6.0	49.3	64.1	38.7	50.7	45.4	30.3
Emerging and Developing Economies		10.2			7.0	5.3	14.4		10.9	13.6		7.0	75.6		6.8		10.1	8.8	17.1
Emerging G20													74.3						5.3
Central and Eastern Europe																			
Baltics																			
CEE incl. AE CEE																			
Commonwealth of Independent States																			
Developing Asia							0.8						71.9						
Middle East and North Africa																			
Sub-Saharan Africa																			
Western Hemisphere		5.7			6.2		10.8		8.7	12.5					6.6		5.0	5.6	14.4
Offshore Centers						6.0	8.6	20.2		5.4	11.6	6.7			6.7	5.2			6.2
2008																			
All countries																			
Advanced Economies	89.5	86.9	94.3	91.0	91.0	93.8	74.8	86.0	91.1	75.8	26.2	87.7	8.4	92.1	76.3	93.8	70.1	82.1	75.6
Advanced G20	74.7	53.0	41.9	78.8	49.3	36.1	53.8	67.9	42.5	59.8	24.6	61.3		67.0	49.3	54.4	42.8	53.9	51.8
Advanced Asia-Pacific Economies	10.3			10.4	7.1		2.6					6.8				5.8		10.9	17.3
Advanced North-American Economies	78.1	49.3	63.7		6.6	8.5	18.0	13.2	66.3	11.4	35.4	32.8	6.0	47.5	19.3	7.4	23.1		28.1
Euro Area	17.5	66.9	76.3	15.8	63.9	70.8	31.7	35.1	71.3	27.1		49.0		51.8	58.2	41.5	44.4	38.6	25.0
Other Advanced European Economies	12.3	10.8	8.8	12.7	11.5	12.1	22.5	22.3	7.4	10.4	8.2	13.4		10.9	9.5	23.4	7.4		24.4
European Union	18.4	74.5	78.9	16.9	65.4	74.6	36.0	36.7	72.1	29.1		53.0		53.5	59.0	46.6	46.0	40.6	27.5
Emerging and Developing Economies		12.3		8.1	7.6	5.5	24.5			19.7	70.2	11.5	91.6	6.3	7.4	5.6	8.1	13.3	23.6
Emerging G20							3.0				14.8		85.5						7.8
Central and Eastern Europe		5.3																	
Baltics																			
CEE incl. AE CEE																			
Commonwealth of Independent States																			
Developing Asia							1.2						86.3						
Middle East and North Africa											58.8								
Sub-Saharan Africa																			
Western Hemisphere				5.6	5.7		19.8			17.3	5.5	6.1			5.3		5.3	6.1	17.2
Offshore Centers					6.3	6.4	18.4	14.0			16.5	8.6			11.6	5.7			7.9

Sources: CPIS; and Fund staff calculations.

Table 5.a Share of Holdings in Each Region, in percent of Total Debt

	Grand Total	Australia	Austria	Belgium	Canada	France	Germany	Hong Kong SAR	Ireland	Italy	Japan	Kuwait	Luxembourg	Mauritius	Netherlands	Spain	Sweden	Switzerland	United Kingdom	United States
2001																				
All countries	100.0					6.8	5.5				14.2		6.7						9.8	9.2
Advanced Economies	85.6					6.0					11.3		6.1						8.2	7.4
Advanced G20	66.0										9.0								6.2	5.9
Advanced Asia-Pacific Economies	5.2																			
Advanced North-American Economies	30.6																			
Euro Area	39.2																			
Other Advanced European Economies	10.7																			
European Union	41.6																			
Emerging and Developing Economies	9.1																			
Emerging G20																				
Central and Eastern Europe																				
Baltics																				
CEE incl. AE CEE																				
Commonwealth of Independent States																				
Developing Asia																				
Middle East and North Africa																				
Sub-Saharan Africa																				
Western Hemisphere	7.0																			
Offshore Centers	5.9																			
2008																				
All countries	100.0					9.8	7.4		5.7		9.4		6.5						8.3	7.2
Advanced Economies	86.1					9.1	6.8		5.1		7.0		6.0						6.9	5.3
Advanced G20	61.0										5.5									
Advanced Asia-Pacific Economies																				
Advanced North-American Economies	24.9																			
Euro Area	44.5					6.5	5.0													
Other Advanced European Economies	11.9																			
European Union	47.1					6.7	5.4													
Emerging and Developing Economies	8.2																			
Emerging G20																				
Central and Eastern Europe																				
Baltics																				
CEE incl. AE CEE																				
Commonwealth of Independent States																				
Developing Asia																				
Middle East and North Africa																				
Sub-Saharan Africa																				
Western Hemisphere	5.6																			
Offshore Centers	5.7																			

Sources: CPIS; and Fund staff calculations.

Table 5.b Share of Debt Holdings in Each Region, in percent of Total Regional Debt Liabilities

	Australia	Austria	Belgium	Canada	France	Germany	Hong Kong SAR	Ireland	Italy	Japan	Kuwait	Luxembourg	Mauritius	Netherlands	Spain	Sweden	Switzerland	United Kingdom	United States
2001																			
All countries																			
Advanced Economies					7.0	5.7				13.2		7.1						9.6	8.6
Advanced G20					5.5					13.7		6.6						9.4	8.9
Advanced Asia-Pacific Economies							8.0			6.9								19.3	14.4
Advanced North-American Economies																			8.8
Euro Area					10.1	9.1			5.3	11.1		9.7		5.7				10.7	6.1
Other Advanced European Economies					6.9	6.0		7.3		13.4		7.0							24.5
European Union					9.8	9.3			5.2	11.1		9.8		5.6				10.7	6.5
Emerging and Developing Economies					6.2	5.3			7.8	23.6								11.4	18.1
Emerging G20						6.6			13.9	8.1								10.6	29.8
Central and Eastern Europe						29.5			8.8	9.3		7.4						9.5	14.5
Baltics										11.8									23.6
CEE incl. AE CEE		9.0				25.9				18.7		5.2		5.1				8.5	17.0
Commonwealth of Independent States						9.2			14.5									15.2	35.2
Developing Asia							18.7			15.5								11.6	18.7
Middle East and North Africa					6.2					11.3								29.9	12.1
Sub-Saharan Africa						9.6				11.2							6.0	28.3	22.5
Western Hemisphere					7.2				8.2	28.3								10.7	18.8
Offshore Centers						8.3				5.9									13.5
2008																			
All countries																			
Advanced Economies					10.6	8.0		5.9		8.2		7.0						8.0	6.1
Advanced G20					8.2			7.0		9.1		6.7						7.6	6.0
Advanced Asia-Pacific Economies					15.5		7.7			7.4		5.1						11.8	15.3
Advanced North-American Economies																			10.0
Euro Area					14.7	11.3				6.2		8.4		5.0				8.0	
Other Advanced European Economies					9.1	8.2		11.7		7.8		7.1							14.2
European Union					14.3	11.5				6.3		8.7						7.9	
Emerging and Developing Economies					6.9	6.0				22.9								12.3	22.2
Emerging G20							6.3			5.8		8.3						15.7	22.3
Central and Eastern Europe		11.0				21.4				5.4		10.2						10.7	8.0
Baltics																	21.3		
CEE incl. AE CEE		18.6				27.6						13.5		6.9				7.8	
Commonwealth of Independent States												6.2		6.8				36.7	18.9
Developing Asia							19.6			5.3		8.5						12.9	16.0
Middle East and North Africa						5.6				5.0	5.0	7.1						28.1	7.1
Sub-Saharan Africa						6.6				8.6		7.2	6.1					31.1	17.0
Western Hemisphere					7.9					30.3								9.5	26.7
Offshore Centers						8.7													11.5

Sources: CPIS; and Fund staff calculations.

Table 5.c Share of Debt Holdings in Each Region, in percent of Country's Total Debt Holdings

	Australia	Austria	Belgium	Canada	France	Germany	Hong Kong SAR	Ireland	Italy	Japan	Kuwait	Luxembourg	Mauritius	Netherlands	Spain	Sweden	Switzerland	United Kingdom
2001																		
All countries																		
Advanced Economies	93.4	84.7	95.2	78.9	88.6	89.4	94.6	87.3	70.5	79.6		91.4	11.7	95.2	82.3	98.0	74.3	83.6
Advanced G20	77.6	60.2	64.5	74.7	53.4	42.5	78.0	73.4	42.6	63.8		64.9	5.2	72.7	61.8	73.1	48.5	63.0
Advanced Asia-Pacific Economies	18.5						2.9											10.1
Advanced North-American Economies	56.8	48.3		71.7	10.0	16.5	26.8	35.7	70.9	12.1	49.5	29.2	12.9		37.9	7.5	29.9	
Euro Area	11.4	62.6	75.6	10.0	58.2	65.2	32.3	31.2	49.9	30.7		56.7	5.1	66.7	67.4	44.7	46.6	42.5
Other Advanced European Economies	15.2	9.1	6.1	5.7	10.9	11.8	32.6	19.5	7.4	10.1		11.2	5.1	7.3	7.0	18.9	8.1	
European Union	12.3	66.9	77.7	10.5	60.1	70.5	34.7	32.8	51.8	32.8		61.1	5.1	69.4	68.9	50.4	48.9	45.4
Emerging and Developing Economies	1.0	12.3	4.0	16.3	8.3	8.9	4.7	2.1	16.9	15.1		6.5	88.3	3.7	8.7	2.0	13.0	10.5
Emerging G20				8.0					7.2				86.7					
Central and Eastern Europe																		
Baltics																		
CEE incl. AE CEE																		
Commonwealth of Independent States																		
Developing Asia							0.5						76.7					
Middle East and North Africa																		
Sub-Saharan Africa													6.9					
Western Hemisphere		7.1		15.1	7.4		2.8		13.8	14.1					8.5			7.7
Offshore Centers	7.6	6.1				7.2		19.1		8.3	9.4	16.7			14.8	7.5		
2008																		
All countries																		
Advanced Economies	63.8	87.0	93.5	91.8	92.7	92.3	91.9	89.8	88.5	74.7	57.1	92.5	33.8	92.7	74.0	96.0	68.3	83.3
Advanced G20	60.1	54.8	46.4	80.3	50.7	40.9	72.6	74.6	52.0	58.7	52.9	63.0	7.8	68.6	50.8	61.8	47.2	56.2
Advanced Asia-Pacific Economies					7.5		2.0						23.9					6.8
Advanced North-American Economies	86.8	42.6	63.3			7.5	20.0	14.8	66.6	14.5	50.1	23.8	6.2	43.1	31.7	7.4	22.3	
Euro Area	9.1	67.7	74.9	17.4	66.6	67.9	41.6	34.6	64.2	29.2	7.4	57.9		64.1	55.8	41.4	42.4	42.9
Other Advanced European Economies	11.1	11.0	9.1	8.6	11.0	13.2	28.4	24.3	9.2	9.8	13.0	13.0		8.8	10.0	28.6	8.7	
European Union	9.4	76.5	78.3	18.6	68.3	72.8	46.2	36.5	65.1	31.3	7.4	63.1		66.1	56.7	51.4	44.6	45.0
Emerging and Developing Economies	0.4	12.1	4.5	5.2	5.7	6.7	7.1	2.1	3.6	19.9	35.1	6.2	66.2	5.2	6.9	2.8	1.4	12.2
Emerging G20							2.7						56.6					
Central and Eastern Europe		6.1																
Baltics																		
CEE incl. AE CEE																		
Commonwealth of Independent States																		
Developing Asia							1.2						47.4					
Middle East and North Africa											28.2							
Sub-Saharan Africa													13.9					
Western Hemisphere							3.7			17.9	5.8							6.4
Offshore Centers						5.1	2.9	15.6			10.6	14.0	5.2			5.8		

Sources: CPIS; and Fund staff calculations.

Table 6.a Share of Holdings in Each Region, in percent of Global Equity

	Grand Total	Australia	Austria	Belgium	Canada	France	Germany	Hong Kong SAR	Ireland	Italy	Japan	Kuwait	Luxembourg	Mauritius	Netherlands	Spain	Sweden	Switzerland	United Kingdom	United States
2001																				
All countries	100.0						7.3						6.1						10.7	31.0
Advanced Economies	88.7						7.2						5.6						9.6	25.8
Advanced G20	59.1																			17.2
Advanced Asia-Pacific Economies	11.7																			6.0
Advanced North-American Economies	21.6																			
Euro Area	35.3																			8.9
Other Advanced European Economies	20.0																			9.2
European Union	37.3																			9.6
Emerging and Developing Economies	9.6																			5.2
Emerging G20																				
Central and Eastern Europe													21.2						9.6	42.0
Baltics																				
CEE incl. AE CEE							7.2						5.6						9.6	25.8
Commonwealth of Independent States																				
Developing Asia																				
Middle East and North Africa																				
Sub-Saharan Africa																				
Western Hemisphere	7.4																			
Offshore Centers	7.4																			
2008																				
All countries	100.0						6.0						7.7						8.4	27.9
Advanced Economies	79.2						5.8						6.1						6.7	21.5
Advanced G20	48.6																			14.6
Advanced Asia-Pacific Economies	12.2																			6.0
Advanced North-American Economies	17.5																			
Euro Area	33.6																			6.8
Other Advanced European Economies	15.8																			7.0
European Union	35.3																			7.4
Emerging and Developing Economies	18.3																			6.3
Emerging G20	7.7																			
Central and Eastern Europe													13.6						8.4	38.0
Baltics																				
CEE incl. AE CEE							5.8						6.1						6.7	21.5
Commonwealth of Independent States																				
Developing Asia	5.2																			
Middle East and North Africa																				
Sub-Saharan Africa																				
Western Hemisphere	10.2																			
Offshore Centers	10.4																			

Sources: CPIS; and Fund staff calculations.

Table 6.b Share of Holdings in Each Region, in percent of Total Regional Equity Liabilities

	Australia	Austria	Belgium	Canada	France	Germany	Hong Kong SAR	Ireland	Italy	Japan	Kuwait	Luxembourg	Mauritius	Netherlands	Spain	Sweden	Switzerland	United Kingdom	United States
2001																			
All countries																			
Advanced Economies						8.1			5.0			6.4						10.9	29.1
Advanced G20				6.3		5.9				5.8		7.1		5.8				11.0	29.1
Advanced Asia-Pacific Economies												5.6						15.8	51.0
Advanced North-American Economies																			10.9
Euro Area					5.6	12.4			8.4			6.5					6.9	12.6	25.2
Other Advanced European Economies						6.7						5.2							46.0
European Union					5.4	11.9			8.0			6.6					6.7	13.0	25.6
Emerging and Developing Economies							8.8											5.8	54.3
Emerging G20												6.9						11.7	53.7
Central and Eastern Europe												21.2						9.6	42.0
Baltics							12.0										9.3		
CEE incl. AE CEE									11.6			17.0						13.1	43.6
Commonwealth of Independent States						7.9						9.3						13.1	41.4
Developing Asia							11.5					7.0						15.9	29.5
Middle East and North Africa					20.8							19.2							19.4
Sub-Saharan Africa												10.9						8.9	49.7
Western Hemisphere							9.8												60.0
Offshore Centers																			
2008																			
All countries																			
Advanced Economies						7.4						7.7						8.5	27.2
Advanced G20				6.0						5.4		9.2		5.4				8.5	29.9
Advanced Asia-Pacific Economies												7.7						13.3	48.7
Advanced North-American Economies																			11.5
Euro Area					7.2	14.0			8.0			7.5						7.4	20.1
Other Advanced European Economies												6.9							44.2
European Union					7.0	13.5			7.6			7.6						7.5	20.9
Emerging and Developing Economies							10.8					8.8	6.3					7.1	34.7
Emerging G20							12.0					8.7	14.0					9.4	35.1
Central and Eastern Europe												13.6						8.4	38.0
Baltics					10.9												29.8		
CEE incl. AE CEE		16.5										5.4				10.3			7.7
Commonwealth of Independent States												14.9						11.6	35.5
Developing Asia							18.3					6.7	21.3					11.1	22.5
Middle East and North Africa					9.3						49.7							7.5	8.4
Sub-Saharan Africa												11.7						6.3	55.6
Western Hemisphere					5.2		10.1			5.7		9.2							41.9
Offshore Centers						5.5													6.1

Sources: CPIS; and Fund staff calculations.

Table 6.c Share of Holdings in Each Region, in percent of Country's Total Equity Holdings

	Australia	Austria	Belgium	Canada	France	Germany	Hong Kong SAR	Ireland	Italy	Japan	Kuwait	Luxembourg	Mauritius	Netherlands	Spain	Sweden	Switzerland	United Kingdom	United States
2001																			
All countries																			
Advanced Economies	96.0	95.1	98.8	95.3	96.1	98.6	51.3	89.7	96.8	93.6		92.0	24.3	96.6	96.6	98.6	81.5	89.9	83.1
Advanced G20	82.4	59.9	36.5	83.6	52.7	47.6	42.5	76.6	40.5	78.8		68.7	17.2	75.6	71.7	67.5	44.2	60.6	55.5
Advanced Asia-Pacific Economies	9.6			10.4			7.3	8.8	6.3			10.6		10.8	6.0	6.6		17.3	19.3
Advanced North-American Economies	88.7	59.2		53.1	20.6	21.3	23.2		91.3	16.3	36.2	40.6	36.1		13.8	14.8	37.8	10.1	21.9
Euro Area	15.2	53.6	78.9	13.3	51.1	59.7	6.5	18.5	64.3	16.8		37.1	6.3	26.5	54.2	33.1	51.1	41.6	28.6
Other Advanced European Economies	11.9	14.7	8.3	13.3	19.1	18.4	24.0	28.0	9.9	17.0		16.9	16.5	18.4	21.6	21.1	6.8	9.1	29.7
European Union	16.0	55.9	79.6	14.3	52.1	60.6	6.5	19.7	64.9	17.8		40.0	6.3	27.9	54.8	34.2	52.5	45.2	30.8
Emerging and Developing Economies							46.7			6.2		7.8	71.7				7.3	5.2	16.8
Emerging G20							5.8						70.4						
Central and Eastern Europe																			
Baltics																			
CEE incl. AE CEE																			
Commonwealth of Independent States																			
Developing Asia							7.0						70.4						
Middle East and North Africa																			
Sub-Saharan Africa																			
Western Hemisphere							39.8			5.4							5.6		14.4
Offshore Centers							19.1	67.9			22.9				6.3				
2008																			
All countries																			
Advanced Economies	91.3	86.5	96.5	90.7	83.6	97.7	28.5	75.4	96.7	81.3	17.9	79.0	6.3	90.9	89.2	92.1	73.2	79.6	77.2
Advanced G20	77.1	44.4	30.2	78.2	43.4	23.3	21.1	49.4	22.2	65.4	17.0	58.1		64.0	41.3	48.7	35.1	48.9	52.2
Advanced Asia-Pacific Economies	13.2			12.6			5.2			7.8		12.2		8.7		7.4		19.3	21.3
Advanced North-American Economies	64.5	52.2	68.8		12.6	12.9	16.0		65.7		27.1	43.7		72.8	18.2	7.7	23.8		23.8
Euro Area	14.0	63.3	79.9	15.2	51.9	78.6	6.0	36.3	86.7	17.0		32.9		29.2	71.6	41.6	47.8	29.6	24.2
Other Advanced European Economies	11.9	10.3	7.9	14.4	13.9	9.2	11.9	16.7		13.4	6.9	14.3		14.7	6.7	19.4	5.1	6.9	25.1
European Union	14.9	64.8	80.6	16.2	52.8	79.5	6.1	37.3	86.9	18.0		34.8		30.5	71.9	42.9	48.3	31.3	26.5
Emerging and Developing Economies		13.3		9.2	16.2		71.5			18.7	79.5	20.9	93.7	8.5	10.0	7.8	19.9	15.5	22.7
Emerging G20							33.4				17.9	8.7	87.8		5.6			8.6	9.7
Central and Eastern Europe																			
Baltics																			
CEE incl. AE CEE																			
Commonwealth of Independent States																			
Developing Asia							34.1						89.5					6.8	
Middle East and North Africa											67.0								
Sub-Saharan Africa																			
Western Hemisphere		6.8		6.2	11.4		37.3			14.4	5.4	12.2			7.2		13.3	5.4	15.3
Offshore Centers	7.5		21.3		15.3	12.1	35.1				19.9				12.3	5.3			7.6

Sources: CPIS; and Fund staff calculations.

Table 7. Share of Holdings in Each Region, in percent of Country's Total Equity Holdings

	2001			2008		
	Debt (Percent of Total)	Equities (Percent of Total)	ST-Debt (Percent of Total Debt)	Debt (Percent of Total)	Equities (Percent of Total)	ST-Debt (Percent of Total Debt)
Australia	19.1	80.9	5.2	38.8	61.2	3.5
Austria	72.3	27.7	1.2	83.0	17.0	1.6
Belgium	62.1	37.9	5.2	72.2	27.8	3.8
Canada	11.7	88.3	16.9	28.4	71.6	2.0
France	71.6	28.4	9.1	81.7	18.3	11.5
Germany	51.8	48.2	2.2	72.6	27.4	3.2
Hong Kong SAR	54.0	46.0	22.6	50.9	49.1	30.0
Ireland	69.1	30.9	38.5	73.5	26.5	25.1
Italy	56.6	43.4	1.6	68.1	31.9	1.2
Japan	82.4	17.6	5.4	83.4	16.6	1.5
Kuwait	na	na	na	21.0	79.0	14.4
Luxembourg	61.1	38.9	17.4	64.3	35.7	23.1
Mauritius	23.6	76.4	1.7	7.6	92.4	17.1
Netherlands	51.6	48.4	2.4	64.7	35.3	1.2
Spain	66.1	33.9	9.7	84.8	15.2	3.7
Sweden	27.8	72.2	3.8	43.4	56.6	3.6
Switzerland	49.4	50.6	5.8	63.7	36.3	14.4
United Kingdom	56.6	42.8	10.6	67.7	32.3	5.9
United States	30.0	70.0	19.6	35.6	64.4	18.6

Sources: CPIS; and Fund staff calculations.

III. FUNDS INDUSTRY EXPOSURES: A SUMMARY FROM THE LIPPER DATA[12]

This section presents a summary of the intermediation role played by the funds industry in 11 key countries, drawing on data available from Lipper (Thomson Reuters). These countries are the United States, the United Kingdom, Switzerland, Austria, France, Germany, Italy, Japan, Netherlands, Spain, and Luxembourg.

29. ***A simplified view***. The main paper presented a simplified view of the intermediation role played by the funds industry in Switzerland (see Box 1 and Figure 6 in the main paper). For 10 other countries that play a key role in funds intermediation globally, Table 8 below presents a similar summary view. For each of these countries, the following information is provided: (i) basic data such as the total assets under management (AUM), the amount of AUM for which detailed asset allocation data are available, the total amount of assets invested abroad (a subset of available data), and assets invested in the core country by other countries; (ii) the main countries in which funds from the core country are registered for sale to the public—in other words, countries whose investors have access to funds in the core country and, therefore, countries where funds are raised; (iii) the main managers of the funds industry; (iv) the main custodians of the funds; and (v) the destination countries and currencies (including the home country and currency) for the assets for which detailed data are available. In the dataset, (ii), (iii), and (iv) cover all assets under management, i.e., the entire funds industry in the country, whereas (v) covers only the subset of data for which detailed asset information are available.

30. ***Key messages***. Some of the key takeaways from Table 8 are as follows:

- The U.S. funds industry dominates the global funds industry, managing about one-half of total assets under management. It is followed by the U.K. and Luxembourg funds industries.

- The main LCFIs play a central role in managing the funds industry globally.

- Similarly, the custodians are heavily concentrated among the core LCFIs. Note that the custodians play a unique and important role in the financial sector, arranging settlement of and for security transactions, gathering information on securities cash-flows, and managing any associated cash and foreign exchange transactions when required (i.e., collecting and transmitting cash-flows arising from securities).

- Luxembourg funds are available for investment to the widest range of investors, followed by German and U.K. funds.

[12] Prepared by K. Youssef, R. Basu, O. Korbut, and T. Oni (SPR).

- Japanese funds are registered for sale only to Japanese investors.

- Italian and Spanish funds are also very limited in their availability compared to their European peers.

- Detailed asset allocation data for the total asset under management vary widely. While limited data are available for the United States, significantly more data on asset allocation are available for other countries such as Japan and the Netherlands.

- From the available detailed asset allocation data, it is clear that all countries invest heavily in the United States.

- All countries also display a significant dependence on U.S. dollar investments. This confirms the view that U.S. dollar markets play a critical role in the asset and liability management strategies of core LCFIs. The lowest dependence on the U.S. dollar is in the case of the United Kingdom, where dollar dependence is only 8 percent. For the remainder of the countries excluding the United States, the observed investment portfolio in dollars averages roughly 15 percent.

- The fact that the core LCFIs manage a large part of the funds industry, as well as transact heavily in U.S. dollar markets, confirms the cross-border currency discussion in the main paper (section III.B).

- This close affiliation between banks and funds shows that looking exclusively at banking data are likely to miss important exposures that drive asset allocation and corresponding risk factors. In some cases, these fund investments use leverage, such as money market mutual funds and hedge funds.

Table 8. Funds Industry by Country: A Simplified View

	Total Funds Complex	Total Investment for which Details Exist	Total Invested in other countries	Total Invested by other countries	Main Countries in which Funds are Registered for Sale to the Public	Main Fund Managers	Main Funds' Custodians	Main Destinations for Funds' Investment	
	in USD billions		in USD billions					by country	by currency
United States	12,601	1%	65	450	· United States · Chile · Peru	· Fidelity · Vanguard · Capital Research · BlackRock · T Rowe Price · PIMCO · Franklin Templeton · JP Morgan Chase	· State Street · JP Morgan Chase · BNY Mellon · Brown Brothers Harriman	· United States · Unknown · United Kingdom · Japan	· US Dollar · Unknown · Euro · British Pound
United Kingdom	2,035	52%	618	140	· United Kingdom · Germany · France · Switzerland · Austria · Luxembourg · Italy	· Saracen · St. James's Place · Aviva · Invesco · First Trust	· Unknown · HSBC · JP Morgan Chase · State Street · Citigroup	· United Kingdom · Unknown · United States · Netherlands	· British Pound · Unknown · US Dollar · Euro
Switzerland	358	36%	77	71	· Switzerland · Lichtenstein · Singapore	· Credit Suisse · UBS	· Credit Suisse · UBS · Zuercher · RBC Dexia	· Switzerland · United States	· Swiss Franc · US Dollar · Euro · Japanese Yen
Austria	86	49%	34	19	· Austria · Germany · Czech Republic · Slovakia · Italy	· Erste · Pioneer · Raiffeisen · Allianz · Volksbank Invest	· Erste · Unicredit · Raiffeisen · Semper · Allianz	· Austria · Germany · United States · Unknown · France	· Euro · US Dollar · Unknown · British Pound
France	1,086	26%	207	174	· France · Germany · Spain · Italy · Switzerland · Netherlands	· Amundi · Natixis · BNP Paribas · Lyxor · CM-CIC · Carmignac · Societe Generale	· CACEIS · Societe Generale · BNP Paribas · Banque Federative	· France · Unknown · United States · Germany	· Euro · Unknown · US Dollar · British Pound
Germany	370	62%	151	200	· Germany · Austria · Luxembourg · Switzerland · France · Netherlands · Singapore · Italy · Spain · Peru	· DWS · Union Investment · Allianz · Deka Gmbh · BlackRock	· State Street · Commerzbank · Deka · DZ Bank · Bayerische Hypo	Germany United States France United Kingdom Unknown Netherlands	· Euro · US Dollar · British Pound · Unknown

Table 8. Funds Industry by Country: A Simplified View (concluded)

	Total Funds Complex	Total Investment for which Details	Total Invested in other countries	Total Invested by other countries	Main Countries in which Funds are Registered for Sale to the Public	Main Fund Managers	Main Funds' Custodians	Main Destinations for Funds' Investment	
	in USD billions		in USD billions					by country	by currency
Italy	261	34%	54	113	· Italy · France	· Eurizon Capital · UBI · Arca · Anima · BNP Paribas	· State Street · Banca Populare · Unione di Banche · SGSS · Intesa Sanpaolo	· Italy · France · Germany · Unknown · United States	· Euro · US Dollar
Japan	567	74%	340	89	· Japan	· Nomura · Daiwa · Nikko · Kokusai · Mitsubishi UFJ	· Mitsubishi UFJ · Sumitomo Trust · Resona Trust · Nomura · Chuo	· Unknown · Japan · United States · Australia · Brazil	· Unknown · Japanese Yen · US Dollar · Australian Dollar · Euro · Brazilian Real
Netherlands	94	81%	66	123	· The Netherlands · Switzerland · Belgium · United Kingdom · Germany	· AEGEON · Fortis · Robeco · Delta Lloyds · ING · Transtrend · Allianz	· AEGEON · ING · Delta Lloyds · Citigroup · BNP Paribas	· United States · The Netherlands · France · Germany · Unknown · United Kingdom	· Euro · US Dollar · British Pound · Unknown
Spain	252	53%	80	53	· Spain · Italy · Portugal	· BBVA · Santander	· Santander · BBVA · La Caixa	· Unknown · Japan · United States · Australia · Brazil	· Unknown · Japanese Yen · US Dollar · Australian Dollar · Euro · Brazilian Real
Luxembourg	2,016	47%	933	33	· Luxembourg · Germany · Austria · Switzerland · Italy · Spain · Netherlands · France · Sweden · United Kingdom · Singapore · Finland · Belgium · Portugal · Chile · Norway · Hong Kong · Taiwan · Bahrain · Ireland	· UBS · Deutsche Bank · BlackRock · Union Investment · Franklin Templeton · Credit Suisse	· State Street · RBC Dexia · JP Morgan Chase · Brown Brothers Harriman · UBS · BNY Mellon	· United States · Germany · Unknown · France · United Kingdom · Italy	· Euro · US Dollars · British Pound · Unknown

Sources: Lipper (Thomson Reuters); and Fund staff calculations.

IV. METHODOLOGY FOR IDENTIFYING PRINCIPAL NODES[13]

To identify the"core" or principal economies in the global financial system, this paper has applied a uniform 5 percent threshold to the cross-border exposures in the BIS and CPIS data. A similar 5 percent threshold is applied to Lipper's funds industry data, together with a focus on economies with the strongest (or the top 50 percent of the most "central") connections.

31. ***Two-step process***. The two-step process is used to arrive at the "core" of the global financial system: (i) finding the largest financial nodes; and (ii) distilling the the most relevant, interconnected nodes.

32. ***Nodes***. Figure 1 identifies the economies that meet the 5 percent threshold of cross-border exposures for the BIS data (see also Section II) or of the domiciled assets under management for the Lipper funds data. (As discussed in section II, the CPIS data provides a similar set of countries.)

Figure 1. Global Financial Architecture Map: Principal Nodes
(as percent of world share)

	Domiciled Funds December-2009	BIS Lenders December-2009	BIS Borrowers December-2009
France	5.0	12.0	6.0
Germany	1.6	11.0	7.0
Italy 1/	1.2	3.0	5.0
Japan	2.1	8.0	3.0
Luxembourg 2/	8.0	-	2.0
Netherlands	0.4	5.0	4.0
Spain	1.2	5.0	4.0
Switzerland	1.3	5.0	2.0
United Kingdom	7.3	12.0	12.0
United States	49.4	8.0	18.0

1/ Italy is classified as a regional common lender. See Section II.

2/ Disaggregated data for Luxembourg are not reported by the BIS.

33. ***Interconnections using the Lipper data***. The portfolio allocations of the funds domiciled in the key nodes are used to determine the strength of the relationships amongst them and with respect to other countries. First, the reported cross-holdings between any two principal nodes are netted to determine the value of the link. The resulting value is treated as a directed investment relationship between the two nodes (with one being the country of origin of positive net flows and the other being the destination country). Other reported holdings (i.e., where there are no reported cross investments between the two) are taken as is. This produces an assymetric adjacency matrix (2 x 146 in this case), wherein the first and second vectors are the countries of origin and destination respectively of fund portfolio

[13] Prepared by Karim Youssef and Ritu Basu (SPR).

allocation, while the rows are the number of relationships arising between any one country and all the others with which it is connected via some fund portfolio allocations. Each of the unique sets of pairwise elements in the adjacency matrix form two connected points, and the connection between them is weighted by the value of the funds directed from any one point to another. Using this formulation for each unique point with links to other points, and utilizing methodologies discussed in Ahuja et al. (1993), Wasserman and Faust (1994), and Newman (2004 and 2005), we arrive at the financial systems displayed in Figures 7, 8, and 9 in the main paper. In doing so, we also calculate:

- *Degree*: measure which quantifies the number of connections any given point has to all other points in the network;

- *Closeness centrality*: measure which is the mean of the shortest path in terms of the number of paths, between one point and all other points;

- *Random walk, betweeness centrality*: measure which quantifies the importance of each point in relaying funds amongst all other points. This can be approximated by the expected number of times that a random walk (or in this case portfolio allocation) between any starting and ending point will pass through an intermediate point averaged over all starting and ending points;[14]

- *Eigenvector centrality*: measure, using closeness and random walk betweeness measure. The eigenvector centrality defines both the number and the quality of the connections any given point has within the network. Points with a large number of connections with lower connection weights may be receive a lower eigenvector centrality value relative to points with fewer connections but with higher connection weights. For example, France appears with a lower eigenvector centrality than that of Germany, despite having more connections and a greater aggregate value of funds sent to other countries. This is explained by the fact that Germany has stronger or more direct connections with core points (such as Luxembourg and the United Kingdom) within the network than does France;

- *Modularity (or best fit cluster)*: this is a measure which allows us to discover a "good" division of a network into sub-networks. A high modularity occurs when the density of intra-group connections amongst a subset of points is high relative to all other inter-group connections.

34. ***Applications***. Figure 7 of the main paper shows the countries for which the eigenvector centrality lies within the top quartile compared to all other nodes. The width of

[14] This is a refinement of the betweeness centrality measure designed to take into account an asymmetric adjacency matrix, unequally weighted links between points, and the lack of information regarding portfolio reallocation and ultimate risk exposure throughout the network.

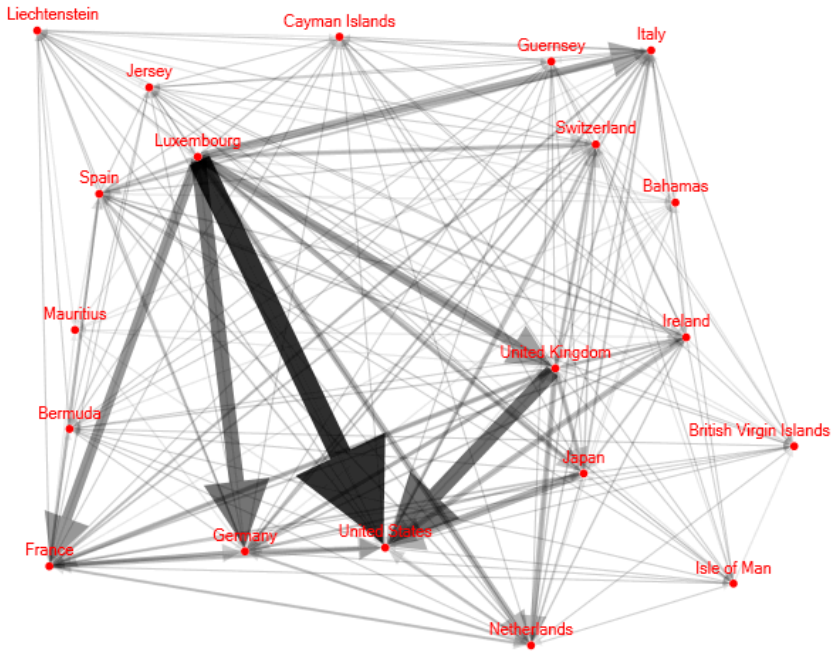
the connection between countries is based upon the weight of the connection as explained above. In Figure 8, the threshold for eigenvector centrality is extended to the top two quartiles, while showing both the direction and weight of each link. Moreover, and in the next section, we display modularity, which forms distinct clusters (in blue and red).

V. Mapping Funds Industry Exposures: Using the Lipper Data[15]

This section presents maps of cross-border exposures derived from the Lipper data. These maps complement the ones provided in the main paper (section II) and illustrate the types of information that can be extracted on financial interconnectedness based on the funds industry data.

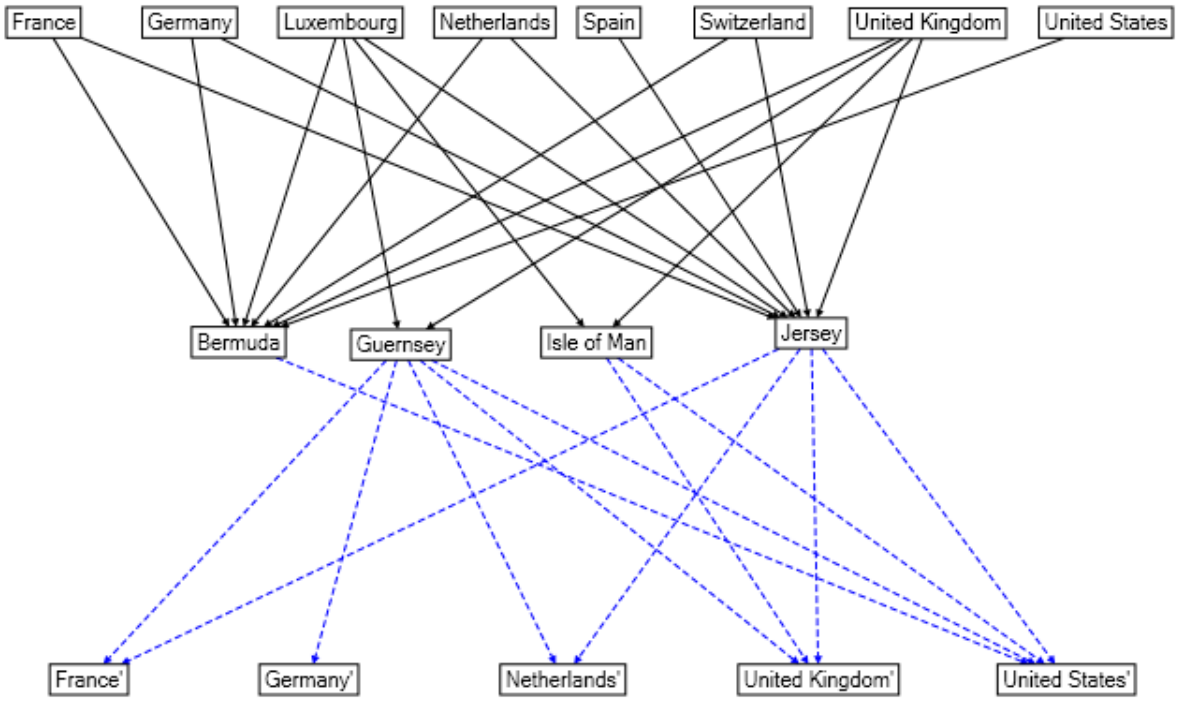
35. ***Offshore centers as satellites***. Despite experiencing rapid growth in recent years and contributing to the impression of a dispersed cross-border funding architecture, offshore centers (OFCs) are generally clustered around a set of core financial intermediaries. The "pass-through" or intermediating role of OFCs is illustrated in the series of maps below, which provide new insights into their role. Data to permit a systematic analysis of their role has thus far been lacking.

- First, as noted in the main paper and illustrated below, Luxembourg plays a focal role in the distribution of funds to the main centers, i.e., the United States, Germany, France, Italy, the United Kingdom, Switzerland, and Spain. Offshore centers such as the Cayman Islands, Liechtenstein, Jersey, Guernsey, the Bahamas, Isle of Man, and Bermuda facilitate the intermediation. In the figure, blue and red color nodes signify clusters, namely, subsets of nodes among which connections are particularly dense relative to other nodes (see section IV and the previous section of this supplement). The thickness of arrows signifies the magnitude of funds delivered from one node to another.



[15] Prepared by K. Youssef (SPR).

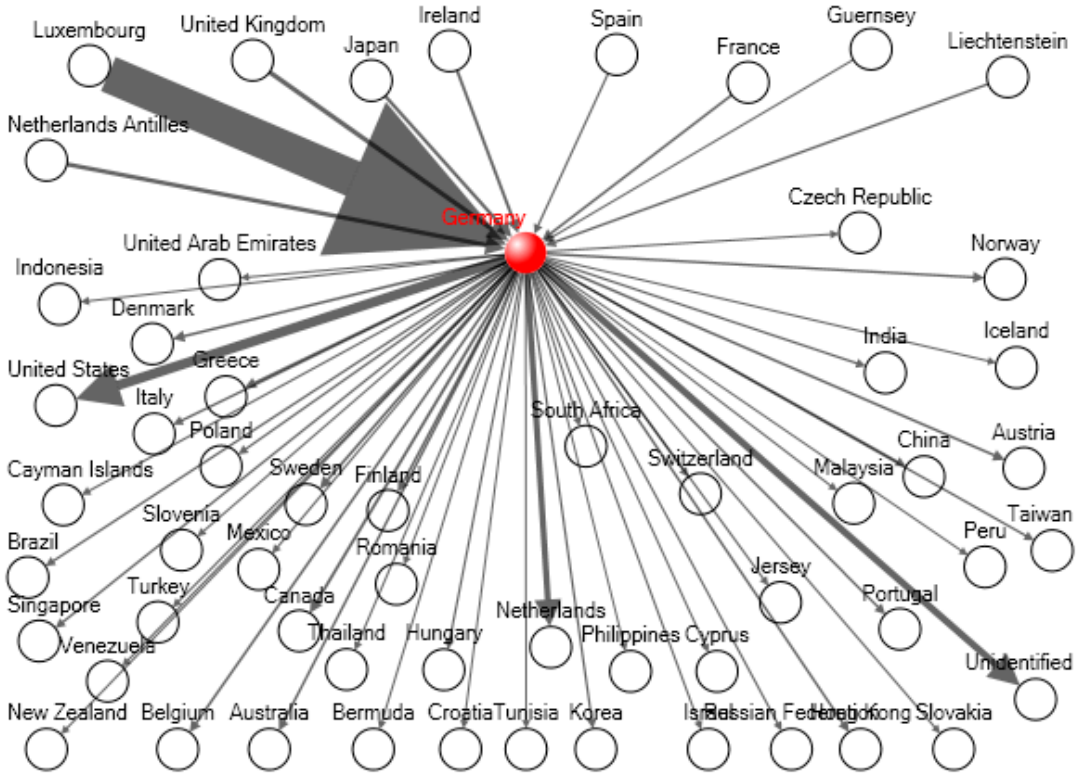
- The paper also notes the role played by OFCs in relation to common lenders. The figure below illustrates the source and destination of funds through select OFCs. Bermuda mobilizes funds across common lenders but has its greatest exposure to the United States. Guernsey mobilizes funds from the United Kingdom and Luxembourg, and intermediates to other common lenders, while Jersey is a pure intermediary to all common lenders (except the United States).



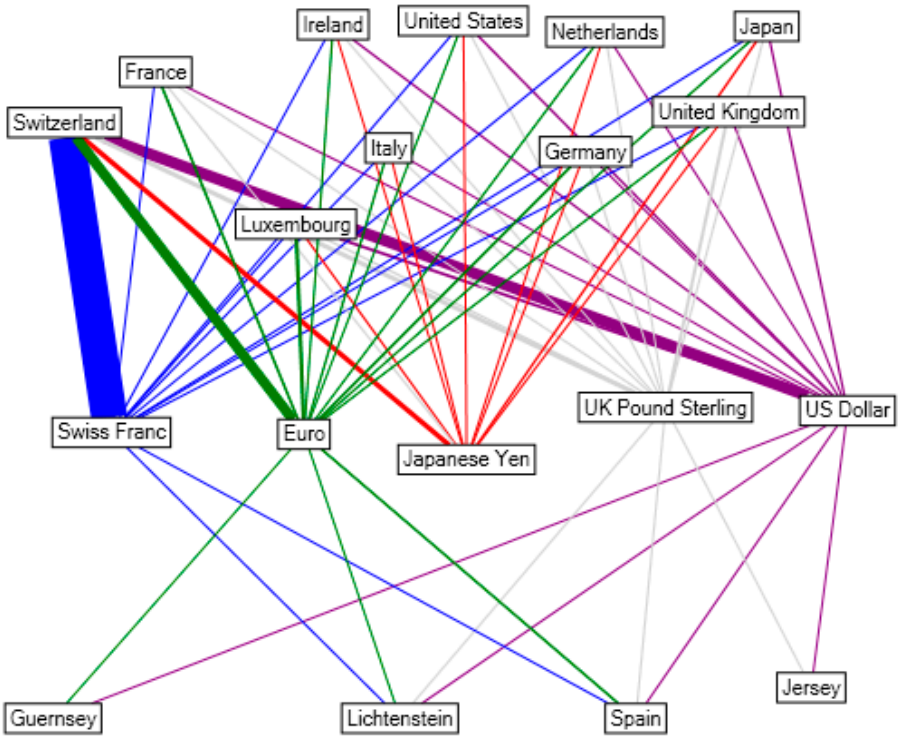
36. ***Major centers and offshore centers***. The maps illustrated above also show that the United States and the United Kingdom receive funds from everyone. Both internalize large fractions of the funds coming in (more than half), and distribute the rest of the funds, partly to the Bahamas, Bermuda, and the British Virgin Islands. The United Kingdom sends funds to a much wider network than the United States, which could also reflect data gaps (Table 8 in Section III). Thus, the OFCs play an important role in the connections among the major money centers, and likely reflect their role in regulatory arbitrage. Similarly, Switzerland—another major center—receives funds from the Isle of Man, British Virgin Islands, the Cayman Islands, Liechtenstein, and Ireland, besides Germany, France, the United Kingdom, and Spain. Although internalizing about one-half of these funds, it sends the rest to the Bahamas, Jersey, Guernsey, and Bermuda, besides Italy, the United States, France, the Netherlands, and Japan.

37. ***Mapping the major centers***. As an example of a map of a major money center, the figure below illustrates exposures to Germany. On net, Germany is an exporter of funds. It is an investment destination for the funds at the top of the figure, with Luxembourg playing an especially important role. German funds seek investments in the lower part of the chart. Out

of roughly $290 billion worth of funds captured flowing in to and out of Germany via the global funds' complex, $77 billion are internalized for investment within Germany and the remainder are redistributed, importantly to the United States and the Netherlands.



38. ***Mapping currency connections***. Based on the asset allocation data, currency connections may also be mapped. The illustration below captures the close connection through Switzerland of the Swiss franc with the U.S. dollar and the euro. By comparison, the connection with the Japanese yen is not very strong (shown by the thickness of the line). The countries at the top of the figure have a strong connection with all the major currencies. By contrast, the countries at the bottom have no connection with the Japanese yen. For example, Liechtenstein and Spain funds are not available to Japanese yen investors. On the other hand, Guernsey is U.S. dollar and euro connected, while Jersey is U.K. pound and U.S. dollar connected.



39. ***A flavor***. This section has provided a flavor of the kind of cross-border and cross-currency connections that may be derived from the funds data, which together with data on banking statistics from the BIS can provide a more comprehensive picture of financial interconnectedness. The connections above help to discern direct and indirect linkages and can be used to trace transmission of shocks. For instance, stresses in the foreign currency swap markets discerned from both the BIS banking and the funds data (see also Table 8), can help identify the countries likely to be affected. From the above interconnections, it is clear why very large central bank swap lines were provided during the crisis in these major currencies. Should such stresses re-emerge in the future, a similar scale of official sector support may be needed as part of the global financial safety net.

VI. LCFI INTERCONNECTIONS: CONSIDERATIONS[16]

As background material to the main paper, this section elaborates on aspects of LCFI activities and interconnections, including repo transactions for funding and off-balance sheet operations to lower costs. The section also provides an analytical annex underlying the simulation of LCFI contagion in section III.C. of the main paper.

40. ***Inter-LCFI connectedness***. The recent crisis has exemplified how interconnections among LCFIs can play a catalyzing role in the propagation of financial shocks across countries. These interconnections can take various forms such as holdings of each other's assets (including bank and nonbank interconnections), liquidity provision, and counterparties in derivative transactions. In addition, indirect exposures occur when two (or more) institutions hold similar types of assets and, thus, are vulnerable to swings in the value of the common assets.

41. ***Complex connections***. Intermediation naturally gives rise to interconnectedness. Beyond traditional lending and borrowing business-lines, the role LCFIs play in the global economy gives rise to connections between the various entities that seek to issue securities and the investors that choose to purchase or otherwise take part in the markets for such securities. These connections are naturally made via the LCFIs that undertake the creation, registration, custody, sale, and market making activities for these securities. A more granular perspective of financial markets reveals additional layers of interconnections amongst LCFIs as they fulfill various functions within these markets (Figure 2). It is worth emphasizing that LCFIs are ideally positioned with respect to the global financial information and transaction infrastructure, which allows them to derive advantages with respect to information, interpretation, and transaction costs.[17] These advantages allow them to play a pivotal role in originating and distributing financial products, thereby helping to transform risk, and such a role increases the interdependence of other bank and nonbank intermediaries (such as fund managers) on LCFIs (Figure 3).

42. ***Profits and balance sheets***. LCFIs' day-to-day activities—focused around deriving profits from interactions with clients and markets—give rise to a dynamic relationship between these revenue-generating activities and balance sheet composition. This dynamic relationship could also perpetuate interconnectedness. The relationship between profit margins and balance sheet composition arises in part from the chosen risk profile—profit is earned via several intermediation functions that carry risks; the challenge of appropriately

[16] Prepared by Karim Youssef (SPR).

[17] LCFIs have an informational advantage via their role as real-time receivers and providers of market data, producers of research, and counterparties to ratings process; whereas they maintain a transactions infrastructure advantage via direct access to or ownership of payments, clearance, settlement and, or custody facilities. See Walter (1999).

choosing the mixture of risks gives rise to both the level of profit margin and the composition of the balance sheet. Any analysis of profitability and returns must, therefore, be understood in the context of an analysis of balance sheets.

Figure 2. LCFIs fulfill various functions in global financial intermediation

(Multiple degrees of interconnections)

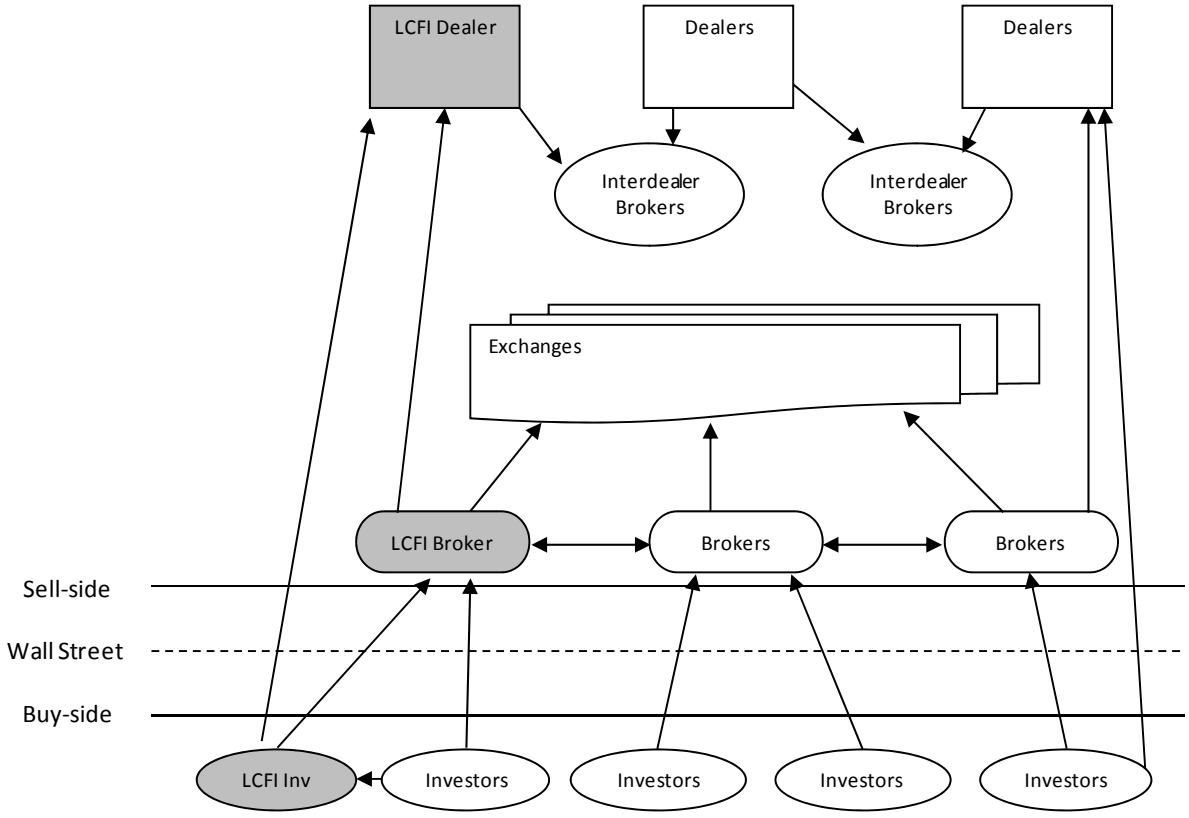
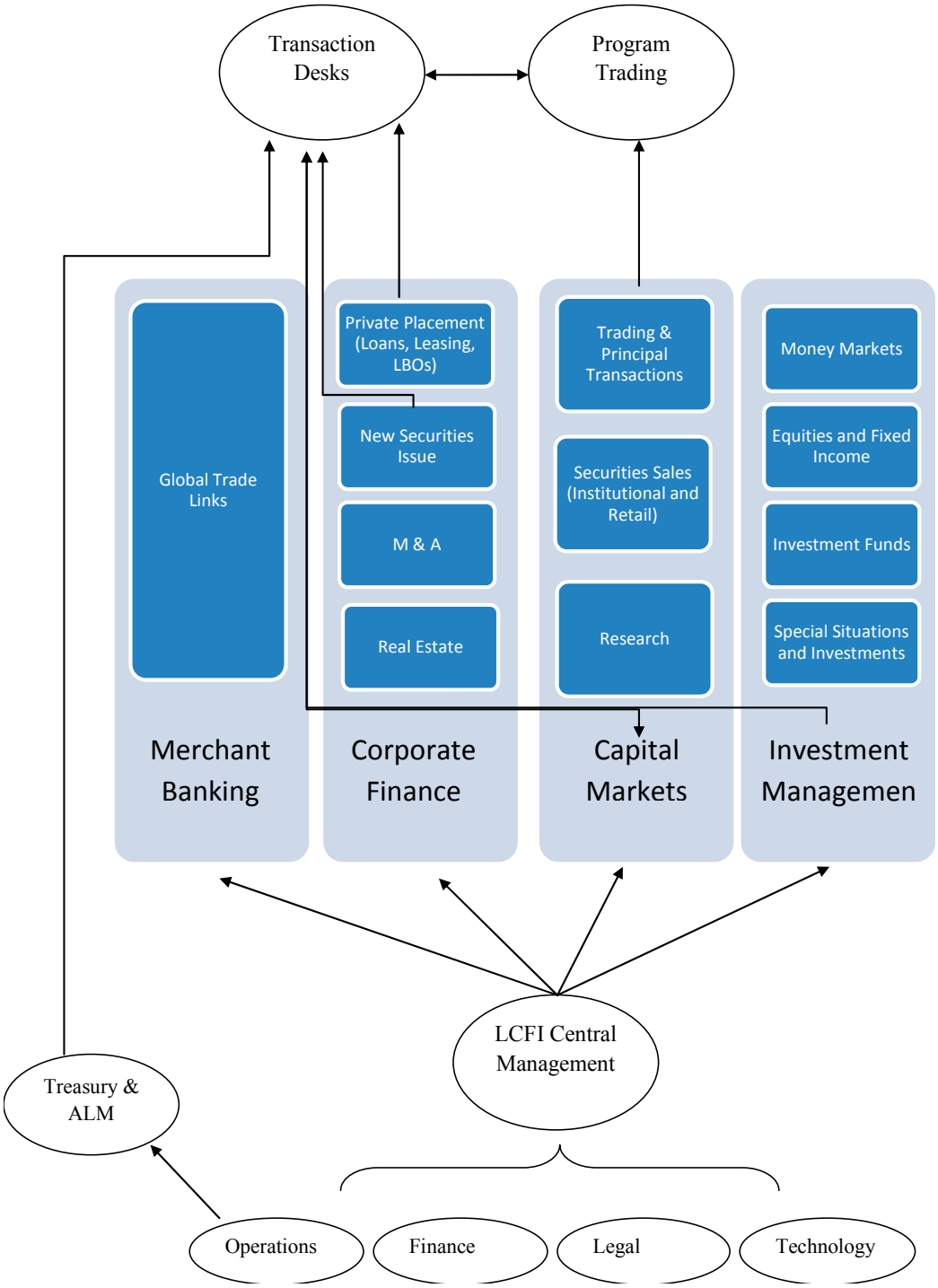


Figure 3. LCFI Operations and Interconnections: A Stylized Model

(An illustration of the heterogeneous and interdependent roles of an LCFI, the internal linkages among business lines, and the central role of the transaction desks.)



43. ***Profits***. Net interest income is central to revenue creation, and maximizing income and managing variability is key for any financial firm. The ability of financial firms to derive interest income has traditionally been linked to the behavior of their corporate and household borrowers. On the expense side, there is also a link to how well a financial firm can mitigate variability in interest related expenses, which underscores the importance of managing both the liabilities that carry interest. Increased competition in lending and deposit-taking in recent years has increased the role of fee income relative to interest income. Securities firms, commercial paper issuers, finance companies, and broker dealers have increasingly operated in the same space as banks, all concurrently seeking investor's cash. A disintermediation effect has thus taken place, forcing traditional lending and deposit-taking to become relatively less profitable. In response, most financial firms have prioritized fee income growth.

44. ***Fee income***. A unique attribute of fee income is that it can be the result of a diversity of activities and products. Financial firms can tailor products to meet specific characteristics demanded by their clients. In fact, financial firms have offered a greater number of products some of which are highly sophisticated, which also contributed to greater interconnectedness. As circumstances evolved, so did the product mix on offer, resulting in considerable heterogeneity. The more flexibility a financial firm can offer to clients, the more integrated (and interconnected) is its product line.

45. ***Asset-Liability Management (ALM)***. To manage risk and uncertainty, financial firms have more actively managed their assets and liabilities. Financial firms have long established a framework for senior management to review and actively decide upon the level of risk assumed by their firm. Typically, the ALM team is tasked with presenting a set of decisions to the firm's senior management. As a function of the multiple factors affecting the level of risk to which the firm is exposed, at any given point in time, the set of choices available to the ALM teams are varied and have concrete effects on the balance sheet profile. For example, if the firm is faced with increasing demand for higher-yielding consumer loans, margins are boosted organically, but credit risk increases. In contrast, lower loan demand can push ALM decisions in favor of investment securities, where market, liquidity and counterparty risks need to be managed.[18]

46. ***Understanding ALM.*** What ALM teams do and how do they do it is crucial to understand. ALM managers seek to dynamically match or rebalance assets and liabilities that are subject to continuous re-pricing as per the direction from their senior management. The greater access an ALM team has to liquidity, the more flexibility they have to provide an

[18] An important point is that the advent of securitization has resulted in both increased loan origination as well as a preference by ALM teams for securities holdings. Securitization allows the three principal income sources of traditional loans (net interest income, loan loss provisions and operating costs) to be combined into servicing fees, thereby transferring credit risk benefits and costs to noninterest income in the firm's income statement.

appropriate set of choices to their management, and by extension the more options they have to transform the profile of the balance sheet. As a result, a securities portfolio is a cornerstone of ALM's toolkit. Diversity across such a portfolio, along with the capacity of ALM to tailor synthetic (or unavailable) cash flow characteristics in order to better match asset or liability re-pricing increases ALM's effectiveness and potentially boosts the pool of available liquidity.

47. ***Securities portfolio.*** How do ALM teams use the securities portfolio, and what types of securities do they need? For a financial firm, a securities portfolio serves three primary functions. First, certain securities provide balance sheet liquidity. In particular, short-term unpledged securities with deep and liquid markets are usually easily convertible into cash that may be needed to meet near-term obligations. Second, securities—and their associated liquidity—facilitate management and mitigation of market risk. Third, financial firms, like all market participants, can boost earnings via purchase and sale of securities. Generally speaking, eligible securities that banks are permitted to hold have included sovereign and quasi-sovereign debt and highly-rated corporate debt. Additionally, financial firms have sought to hold securities with high liquidity.

48. ***Growing complexity.*** The growing complexity of ALM practices is self-reinforcing as it gives rise to further asset complexity and balance sheet interconnectedness. The need to address balance sheet complexity leads to equally complex ALM practices, which may lead to further complexity, interconnectedness or both. For example, in the event that the internal balance sheet fails to provide the necessary components to meet the rebalancing needs of ALM, other firms' balance sheets may need to be accessed. The willingness of firms to respond to one another's ALM needs implies either a corresponding set of available securities and cash to buy these securities—for example, via repo funding (Box 2) or the capacity of one or more firm to synthetically produce the desired cash-flow characteristics required by other firms (Box 3). In either case, interconnectedness begins to materialize between ALM needs and the various business units within a financial firm, and by extension among firms.

Box 2. What is a Repo Transaction?

A repo transaction is an agreement that involves two counterparties. One party lends cash to the other against collateral for a pre-defined period of time. The transaction agreement details a "repo-rate," i.e., a borrowing rate that is traditionally the difference between the cash provided initially and the price agreed upon for repurchase. The transaction involves the full transfer of the ownership of the asset between parties at inception and conclusion of the transaction.

A repo transaction allows the borrowing firm temporary access to money that can be invested in other assets by temporarily selling assets they already own for a defined period of time. From the lender's point of view, they are allowed exposure to a security on a temporary and discounted basis.

Despite the fact that the liability to deliver securities under repo transactions is not recorded on balance sheets as liabilities, they give rise to liability-like dynamics as counterparty risk does exist. This is particularly important as the volume and prevalence of repo transactions have led to additional counterparty relationships and, hence, additional interconnectedness (see GFSR, October 2010) for more information about repo transactions and markets. (Figure 4).

Figure 4. Repos, balance sheet growth and inter-period (unrecorded) financial imbalances

		Regulated Subsidiary 1 of A		Unregulated Subsidiary 2 of A		LCFI A		LCFI B		Global Balance Sheet	
		A	L	A	L	A	L	A	L	A	L
. Reporting Period	T_0	7.00	-7.00	3.00	-3.00	10.00	-10.00	10.00	-10.00	20.00	-20.00
. Asset of S1 A increases		8.00	-7.00	3.00	-3.00	11.00	-10.00	10.00	-10.00	21.00	-20.00
. S1 A transfers 1 asset to S2 A (hedge fund arm)		7.00	-7.00	4.00	-3.00	11.00	-10.00	10.00	-10.00	21.00	-20.00
. S2 A Repos out asset to LCFI B at 2 percent repo rate (i.e. receiving 98 percent of asset value in cash upfront)	T_0 to T_1	7.00	-7.00	3.98	-3.00	10.98	-10.00	10.02	-10.00	21.00	-20.00
. S2 B invests 98 cents in uncorrolated risk and upon achieving return equivalent of 2 percent, repo transaction is terminated (holding margin constant).		7.00	-7.00	4.00	-3.00	11.00	-10.00	10.02	-10.00	21.02	-20.00
· At T_1 (next reporting period) LCFI A consolidated balance sheet has grown to 11 assets while LCFI B now has 10.2 assets. Both firms now have the choice to either repeat repo loop or flat out borrow and increase liability.	T_1	7.00	-7.00	4.00	-3.00	11.00	-10.00	10.02	-10.00	21.02	-20.00

Box 3. Synthetically Tailoring Cash-Flow Characteristics: An Example of Intra-Firm and Inter-Firm Interconnectedness

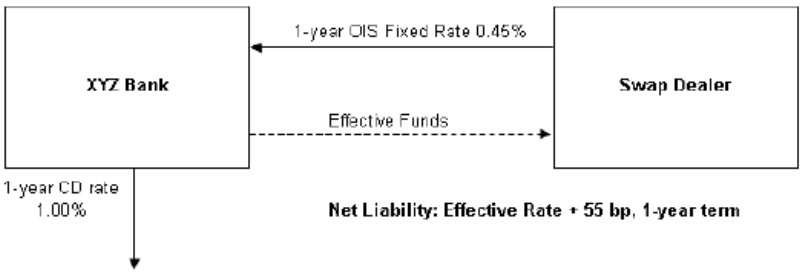
Consider a scenario where a U.S.-based deposit taking financial firm in an effort to be competitive offers retail deposit vehicles with a maturity of one year at a fixed rate of 1 percent (i.e., 75 basis points above the policy rate) that meets with unexpected high demand. The ALM team approaches its management and informs them that they need to reduce the 1 percent interest cost or the mismatch in duration between assets and liabilities will force a compression of profit margins. The management agrees with the ALM team, but instructs them to maintain the liquidity of the funds to mitigate the risk of early withdrawal by clients.

To ensure access to liquidity, the ALM team suggests the following solution:

Enter into an OIS/Fed Funds Effective swap contract with a firm which has the capacity to access interbank funding markets.

The terms of the swap contract are such that the swap is a 1-year long contract, wherein each day the bank receives the 1-year OIS spread rate quoted at the inception of the swap contract (i.e., 0.45 percent fixed), while it pays the swap dealer the variable quoted Fed Funds Effective rate—which at current has been roughly around 0.19 percent (Figure 5).

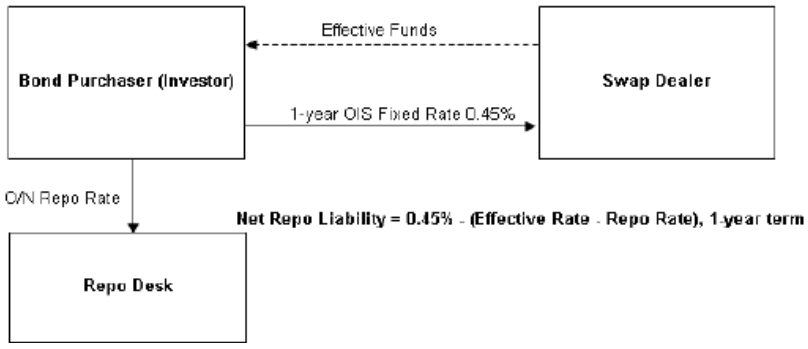
Figure 5. Synthetic Deposit Liability



The result is that the bank is able to reduce the rate it pays on the deposit vehicle it offers by 0.26 percent (-1 percent paid on vehicle + 0.45 percent received from Swap dealer – 0.19 percent paid to swap dealer) *without sacrificing the liquidity of the funds raised via the deposit vehicle,* although the bank is exposed to rising effective Fed Funds rates (above the 0.19 percent) which will decrease the cost savings of the swap.

As displayed in Figure 6 below, the swap dealer utilizes a similar—though in reverse—type of transaction with an investor holding a bond purchased via repo funding. In this case, the bond investor may be the firm itself or a client wishing to fund the bond purchase via a repo transaction. If they do not wish to remain locked into a 1-year funding rate, they could employ a rolling overnight repo contract that equalizes as much as possible the re-pricing on their asset (i.e., the bond) and their liability (repo transaction).

Figure 6. Synthetic 1-Year Term Repo



Clearly, the bank in Figure 5 and the swap dealer are linked, while the hedge undertaken by swap dealer links them to the bond investor. In turn, the repo desk at a peripheral firm is interconnected with the bank via the swap dealer and the bond investor.

As a result, an internal interconnectedness begins to materialize between ALM needs and various arms within a financial firm. Moreover, in the event that the internal balance sheet fails to provide the necessary components to meet the rebalancing needs of ALM, other firms' balance sheets may need to be accessed—giving rise to inter-firm connectedness.

Technical Annex. Modeling Contagion among LCFIs

This technical annex provides background on the simulation of LCFI contagion in section III.C of the main paper.

Assume each institution (i) holds an amount of capital given by the sum of Core Equity (CE), retained earnings (RE), Reserves (R), less the losses which must be paid out of capital (k).

$$k_i = CE + \mathrm{RE} + \mathrm{R} - \mathrm{L}$$

Retained earnings at period (t) are the sum of retained earnings in the previous period and Net Income (NI) less dividends (D) paid out to shareholders during the current period.

$$\mathrm{Re}tained\ Earnings_t = RE_{t-1} + NI_t - D_t$$

Net Income for each institution is the sum of Net Income before taxes (NBIT), the taxes paid out (T), along with minority interest (MinInt), with any residual defined as extraordinary items (e).

$$\text{Net Income} = NIBT - T - MinInt + e$$

Decomposing the income stream further, we define net income before taxes (NIBT) as the sum of Net Interest Income (NII), Net Non Interest Income (NNonII), total Provisions expense (P), and gains or losses on securities (SecPnL).

$$NIBT = NII + NNonII + \mathrm{P} + SecPnL$$

The first two components of NIBT allow us to uncover a quarterly decomposition of profitability via margins on interest and non interest components of the balance sheet. As the following two equations spell out, NII is the result of applying a variable yield on average earning assets (AEA), and a variable cost on average interest bearing liabilities (AiBL). Similarly, NNonII is the result of the application of a variable yield along with the sum of a variable and fixed cost on non interest earning assets (i.e., the residual of Average Total Assets and AiBL).

$$NII = \left((AEA * yield^{\text{variable}}) - (AiBL * \text{cost}^{\text{variable}}) \right)$$

$$NNonII = \left(((ATA - AEA) * yield^{\text{variable}}) - ((ATL - AiBL) * (\text{cost}^{\text{variable}} + \text{cost}^{fixed})) \right)$$

Assuming away the variability in the asset and liability base by setting them all equal to unity, we can use the decompositions in the equations above to arrive at an internal rate of

return on each type of asset and liability within the LCFI balance sheet, which we will call the sum of margins (SoM).

$$SoM = \left(yield^{\text{variable}} - (\text{cost}^{\text{variable}} + \text{cost}^{fixed}) \right)$$

Moreover, defining the cost of funds as a cash flow identity we are able to isolates the price of raising money in the market for each LCFI. We arrive at the cost of funds (CoF) by dividing the sum of the variable cost components of NII and NNonII by the sum of non interest bearing deposits (NIBD) and interest bearing liabilities.

$$CoF = \left((AiBL * \cos t^{\text{variable}}) + ((ATL - AiBL) * (\text{cost}^{\text{variable}})) \right) / (Avg.NIBD + AiBL)$$

Finally, the spread between SoM and CoF allows us to uncover the impact of changes in the market wide price of funding (via changes in Libor-OIS) on the profitability of the firm.

$$M = \left(yield^{\text{variable}} - (\text{cost}^{\text{variable}} + \text{cost}^{fixed}) \right) - (CoF)$$

Using this formulation, a calibrated shock is applied to the margin of LCFIs and the results of this shock simulated, as described in paragraph 34 of the main paper.

VII. A Draft Template for Systemically Important Global Financial Institutions[19]

A. Background

49. In early 2010, the FSB created a Working Group on Data Gaps and Systemic Linkages to address recommendations 8 and 9 in the report by FSB Secretariat and IMF staff, "*The Financial Crisis and Information Gaps*." Recommendation 8 concerns the possibility of improved collection and sharing of information on individual institutions, while recommendation 9 calls for the development by end-2010 of a common draft template for systemically important global financial institutions (SIGFIs) for the purpose of better understanding the interconnections and exposures of these institutions to different financial sectors and national markets. This section focuses on the work to develop a common draft template.[20]

50. Through subgroups covering micro, macro, and crisis needs, the Working Group has identified a set of data needs. The IMF, which leads the work stream on data availability and collection of new statistics, has turned these data needs, and a few others identified within the IMF, into a draft template that was initially presented to the Working Group in July. The latest draft version, still under discussion, is attached (Table 9), and will be one of the inputs considered by the Working Group in the design of a common template for systemically important institutions.

B. Purpose, Underlying Philosophy, and Key Attributes

Purpose

51. Consistent with recommendation 9, the purpose of the template is to both (1) identify the interconnections (both actual and contingent) among SIGFIs, between SIGFIs and other financial corporations, and other sectors, and (2) provide information on SIGFIs exposures to markets, both asset and funding markets. In meeting this purpose, the template provides information on contingent exposures.

Underlying principles

52. In developing the template, five underlying "principles" were adopted:

- *Comprehensiveness:* it is not known how the next crisis might emerge, so the intention is to allow the user to take a holistic view of SIGFI activities;

[19] Prepared by R. Heath and A. Harutyunyan (STA).

[20] The Working Group is led by The Netherlands central bank, and involves supervisors, statisticians, and financial stability experts, primarily from G20 economies. Two IMF staff are members. To date, three meetings have been held.

- *Adaptability:* in the sense that the template could be used to scale up from a single SIGFI's relations with a specific country to an aggregate picture for the whole SIGFI population;

- *Broader coverage than banks:* SIGFIs cover a wider group of financial institutions than banks. In designing the draft template, Fund staff drew on their experience with the standardized report forms (SRFs) for monetary and financial statistics that cover both banks and nonbank financial institutions;

- *Suitability to the global environment:* individual supervisors and macro financial analysts do not presently see the whole global picture, not least for SIGFIs operating in their markets but headquartered in another economy; and

- *Potentially wide use:* it can be used by macro financial analysts, supervisors of individual institutions, and others.

Structure

53. The structure of the draft template is modeled on the reserves template,[21] which was drawn up in cooperation between the IMF and the BIS, with the active involvement of central bank officials.

- Section 1 covers assets, split between liquid assets and other assets. This structure reflects the importance the global crisis demonstrated to monitor liquidity and the growth of illiquid assets, not least in relation to the funding structure. A sectoral distribution of assets is provided. Section 1 includes a "balance sheet total of assets," as a "benchmark" that can be cross-checked with other data sources, similar in intent to the "reserve asset total" in the reserves template. Data on Tier 1 capital is provided as a second "benchmark," and with total assets, allows a basic measure of leverage to be calculated—an indicator whose importance has been highlighted by the global crisis.

- Section 2 sets out the funding structure and its maturity. It is not presented as the liability side of the balance sheet but rather identifies short-term market and other funding, and when this funding falls due. The use of interest swaps is identified to illustrate how SIGFIs are using these instruments to hedge interest rate risks. More information on these data and, more specifically, on the currency forwards data, are contemplated in the separate currency templates.

[21] International Reserves and Foreign Currency Liquidity: Guidelines for a Data Template (http://dsbb.imf.org/Pages/SDDS/SDDSGuide.aspx).

- Section 3 sets out contingencies, or potential drains/additions, on resources. These drains/additions are either off-balance sheet items like credit lines or potential drains/additions, such as from credit default swaps and forex options. The global crisis demonstrated the extra pressures on an institution that can arise from these off-balance sheet items, and the chain reaction consequences.

- Section 4 provides memorandum items that either shed more light on earlier sections, such as sectoral information on derivative counterparts, or additional and relevant details that do not fit the framework of the previous three sections, such as information on debt securities eligible to access the central bank liquidity facility.

Reporting

54. The template is intended to be reported on a consolidated basis, both for total business, and separately for each major currency. The template can also be separately reported to capture the geographic allocation of business on a vis-à-vis basis. It is intended to complement the BIS International Banking Statistics and, to a lesser extent, the IMF's Coordinated Portfolio Investment Survey, which provide such geographic detail. Indeed, a comparison has been made with other related datasets to avoid overlap—an important consideration for the Working Group.

55. The template attempts to strike a balance between providing sufficient information to understand the structure, exposures, and interconnections, of SIGFI activities, and raise flags for further investigation, while not overburdening SIGFIs with requests for too detailed data.

Table 9. Reporting Template for Systemically Important Global Financial Institutions

(in thousands of US dollars)

Section I. Balance Sheet Assets

		Total	Other SIGFIs		Other financial corporations	Nonfinancial corporations	Other
				of which foreign-controlled			
ASSETS							
A.	**LIQUID FINANCIAL ASSETS**						
1.	CURRENCY						
2.	DEPOSITS WITH CENTRAL BANKS						
3.	INTERBANK DEPOSITS/LOANS						
	Secured						
	Unsecured						
4.	REPOs						
5.	SHORT-TERM SECURITIES						
	CDs						
	CPs						
	Government Securities						
	Other short-term securities						
6.	OTHER DEBT SECURITIES						
	Fixed-rate						
	of which government						
	Variable-rate						
	of which government						
7.	OTHER LOANS						
	Secured						
	Fixed-rate						
	Variable-rate						
	Unsecured						
	Fixed-rate						
	Variable-rate						
8.	OTHER LIQUID ASSETS						
	of which equity shares						
B.	**OTHER FINANCIAL ASSETS**						
1.	DEPOSITS						
	Fixed-rate						
	Variable-rate						
2.	DEBT SECURITIES						
	Fixed-rate						
	of which government						
	Variable-rate						
	of which government						
3.	REPOs						
4.	OTHER LOANS						
	Fixed-rate						
	of which real estate						
	Variable-rate						
	of which real estate						
5.	SHARES AND OTHER EQUITY						
6.	FINANCIAL DERIVATIVES (Net Assets)						
7.	OTHER FINANCIAL ASSETS						
	of which insurance technical reserves						
C.	**NONFINANCIAL ASSETS**						
	TOTAL BALANCE SHEET ASSETS						
TIER 1 CAPITAL							

Table 9. Reporting Template for Systemically Important Global Financial Institutions (continued)

Section II. Funding

		Maturity breakdown (residual maturity)				
		Overnight	Up to one month	More than 1 and up to 3 months	More than 3 months and up to 1 year	More than 1 year
A.	**SHORT TERM FUNDING, MARKETS**					
1.	BORROWING FROM CENTRAL BANKS					
2.	INTERBANK DEPOSITS/LOANS					
	Secured					
	of which SIGFIs					
	of which foreign-controlled					
	Unsecured					
	of which SIGFIs					
	of which foreign-controlled					
3.	REPOs					
	of which SIGFIs					
	of which foreign-controlled					
4.	SHORT-TERM SECURITIES					
	CDs					
	CPs					
	Other short-term securities					
5.	OTHER LOANS					
	Secured					
	Fixed-rate					
	Variable-rate					
	of which SIGFIs					
	of which foreign-controlled					
	Unsecured					
	Fixed-rate					
	Variable-rate					
	of which SIGFIs					
	of which foreign-controlled					
6.	OTHER SHORT-TERM (MARKET) FUNDING					
	of which SIGFIs					
	of which foreign-controlled					

Table 9. Reporting Template for Systemically Important Global Financial Institutions (continued)

		Maturity breakdown (residual maturity)				
		Overnight	Up to one month	More than 1 and up to 3 months	More than 3 months and up to 1 year	More than 1 year
B.	**OTHER FUNDING**					
1.	CUSTOMER (RETAIL) DEPOSITS					
	Fixed-rate					
	Variable-rate					
	of which insured (for currency template only)					
2.	PREPAYMENT OF INSURANCE PREMIUMS AND RESERVES AGAINST OUTSTANDING CLAIMS					
3.	OTHER DEPOSITS					
	Fixed-rate					
	Variable-rate					
	of which SIGFIs					
	of which foreign-controlled					
4.	REPOs					
	of which SIGFIs					
	of which foreign-controlled					
5.	DEBT SECURITIES					
	Fixed-rate					
	Variable-rate					
6.	OTHER LOANS					
	Secured					
	Fixed-rate					
	Variable-rate					
	of which SIGFIs					
	of which foreign-controlled					
	Unsecured					
	Fixed-rate					
	Variable-rate					
	of which SIGFIs					
	of which foreign-controlled					
7.	NET EQUITY OF HOUSEHOLDS IN LIFE INSURANCE RESERVES/PENSION FUNDS					
8.	OTHER FUNDING					
	Fixed-rate					
	Variable-rate					
	of which SIGFIs					
	of which foreign-controlled					
C.	**SHARES AND OTHER EQUITY**					
D.	**DERIVATIVES**					
1.	INTEREST RATE SWAPS (NET)					
	Pay leg (-)					
	Fixed-rate					
	Variable-rate					
	Receive leg (+)					
	Fixed-rate					
	Variable-rate					
2.	POSITIONS IN FX FORWARDS, INCLUDING SWAPS (FOR CURRENCY TEMPLATE ONLY)					
	Short positions (-)					
	Long position (+)					

Table 9. Reporting Template for Systemically Important Global Financial Institutions (continued)

Section III. Contingencies

	Maturity breakdown (residual maturity)					
		Overnight	Up to one month	More than 1 and up to 3 months	More than 3 months and up to 1 year	More than 1 year
A.	**GUARANTEES PROVIDED**					
	- Collateral guarantees					
	of which SIGFIs					
	of which foreign-controlled					
	- Letters of credit					
	- Other guarantees					
	of which SIGFIs					
	of which foreign-controlled					
B.	**GUARANTEES RECEIVED**					
	- Collateral guarantees					
	of which SIGFIs					
	of which foreign-controlled					
	- Other guarantees					
	of which SIGFIs					
	of which foreign-controlled					
C.	**UNDRAWN, UNCONDITIONAL CREDIT LINES, PROVIDED TO**					
	- Other SIGFIs					
	of which foreign-controlled					
	- Other financial corporations					
	- Other					
	UNDRAWN, UNCONDITIONAL CREDIT LINES, PROVIDED BY					
	- Central Banks					
	- Other SIGFIs					
	of which foreign-controlled					
	- Other financial corporations					
D.	**BONDS ISSUED WITH EMBEDDED OPTIONS (PUTTABLE BONDS)**					

Table 9. Reporting Template for Systemically Important Global Financial Institutions (continued)

		Maturity breakdown (residual maturity)				
		Overnight	Up to one month	More than 1 and up to 3 months	More than 3 months and up to 1 year	More than 1 year
E.	**CREDIT DEFAULT SWAPS**					
a)	Protections sold (counterparty)					
	- Other SIGFIs					
	reference entity: controlled by an entity in the currency issuing economy **(for currency template only)**					
	of which foreign-controlled					
	reference entity: controlled by an entity in the currency issuing economy **(for currency template only)**					
	- Other financial corporations					
	reference entity: controlled by an entity in the currency issuing economy **(for currency template only)**					
	- Other OTC					
	reference entity: controlled by an entity in the currency issuing economy **(for currency template only)**					
	- Exchange traded					
	reference entity: controlled by an entity in the currency issuing economy **(for currency template only)**					
b)	Protections bought (counterparty)					
	- Other SIGFIs					
	reference entity: controlled by an entity in the currency issuing economy **(for currency template only)**					
	of which foreign-controlled					
	reference entity: controlled by an entity in the currency issuing economy **(for currency template only)**					
	- Other financial corporations					
	reference entity: controlled by an entity in the currency issuing economy **(for currency template only)**					
	- Other OTC					
	reference entity: controlled by an entity in the currency issuing economy **(for currency template only)**					
	- Exchange traded					
	reference entity: controlled by an entity in the currency issuing economy **(for currency template only)**					
F.	**POSITIONS IN FX OPTIONS (FOR CURRENCY TEMPLATE ONLY)**					
a)	Short positions					
	- Bought puts					
	- Written calls					
b)	Long positions					
	- Bought puts					
	- Written calls					
G.	**COLLATERAL CALLS IN THE EVENT OF**					
a)	a rating downgrade of					
	- one rating notch					
	- two rating notches					
	- three rating notches					
b)	a rating upgarde of					
	- one rating notch (if applicable)					
	- two rating notches (if applicable)					
	- three rating notches (if applicable)					

Table 9. Reporting Template for Systemically Important Global Financial Institutions (continued)

Section IV. Memorandum items

A.	**COLLATERAL RECEIVED**	
	Financial assets	
	of which trading collateral	
	of which third party collateral	
	Nonfinancial assets	
B.	**DEBT SECURITIES ELIGIBLE FOR CENTRAL BANK'S LIQUIDITY FACILITY**	
	- Government securities	
	- Securities issued by financial corporations	
	- Securities issued by nonfinancial corporations	
	- Other securities	
C.	**ASSET BACKED SECURITIES**	
	- Issued - short-term	
	- long-term	
	- Bought - short-term	
	- long-term	
D.	**COLLATERALIZED DEBT OBLIGATIONS**	
	- Issued - short-term	
	- long-term	
	- Bought - short-term	
	- long-term	
E (i).	**FINANCIAL DERIVATIVES, NOTIONAL VALUES**	
	- Interest rate	
	- Other SIGFIs	
	of which foreign-controlled	
	- Other OTC	
	- Exchange traded	
	- Foreign currency	
	- Other SIGFIs	
	of which foreign-controlled	
	- Other OTC	
	- Exchange traded	
	- Commodities	
	- Other SIGFIs	
	of which foreign-controlled	
	- Other OTC	
	- Exchange traded	
	- Equity	
	- Other SIGFIs	
	of which foreign-controlled	
	- Other OTC	
	- Exchange traded	
	- Credit derivatives	
	- Other SIGFIs	
	of which foreign-controlled	
	- Other OTC	
	- Exchange traded	

Table 9. Reporting Template for Systemically Important Global Financial Institutions (concluded)

E (ii).	FINANCIAL DERIVATIVES, MARKET VALUES (NET LIABILITIES)	
	- Interest rate	
	- Other SIGFIs	
	of which foreign-controlled	
	- Other OTC	
	- Exchange traded	
	- Foreign currency	
	- Other SIGFIs	
	of which foreign-controlled	
	- Other OTC	
	- Exchange traded	
	- Commodities	
	- Other SIGFIs	
	of which foreign-controlled	
	- Other OTC	
	- Exchange traded	
	- Equity	
	- Other SIGFIs	
	of which foreign-controlled	
	- Other OTC	
	- Exchange traded	
	- Credit derivatives	
	- Other SIGFIs	
	of which foreign-controlled	
	- Other OTC	
	- Exchange traded	
F.	**SECURITIES LENT AND UNDER REPO**	
	- Lent (provided) and included in Section I	
	- Lent (provided) but not included in Section I	
	- Lent by others (received) and included in Section I	
	- Lent by others (received) but not included in Section I	
	- Sold under REPO and included in Section I	
	- Sold under REPO but not included in Section I	
	- Purchased under REPO and included in Section I	
	- Purchased under REPO but included in Section I	
G.	**PLEDGED/ENCUMBERED ASSETS**	
	- DEPOSITS	
	of which included under liquid assets in Section I	
	- CDs	
	of which included under liquid assets in Section I	
	- Government securities	
	of which included under liquid assets in Section I	
	- Other securities	
	of which included under liquid assets in Section I	
	- Other pledged/encumbered assets	
	of which included under liquid assets in Section I	
H.	**TOTAL CLAIMS ON GOVERNMENTS**	
	Debt securities	
	Loans	
	Deposits	
	Other claims	
I.	**NOTIONAL VALUE OF INSURANCE CONTRACTS**	
	Notional value of outstanding contracts for life insurance contracts	
	Notional value of outstanding contracts for non-life insurance contracts	

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