INTERNATIONAL MONETARY FUND

The Multilateral Aspects of Policies Affecting Capital Flows—Background Paper

Prepared by the Monetary and Capital Markets Department and the Strategy, Policy, and Review Department in consultation with the Research Department

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Contents Page

Figures

I. CASE STUDIES[1]

1. **The case studies document the regulatory and supervisory dimension of episodes during the recent crisis involving capital flows that generated systemic stress.** Source country regulation and supervision is the main focus, although recipient country policies also were important in some cases and are thus covered as well.

2. **Three of the case studies are motivated by systemic stress that arose from flows between advanced economies.** Strong demand by foreign investors for U.S. financial products helped drive gross flows between the United States and other countries, especially Europe, and induced the U.S. financial sector to develop products that transformed their risky assets into highly-rated securities.[2] In turn, large European banks came to depend on short-term liquidity provided from the U.S. These two-way capital flows created a complex web among markets and institutions, some regulated and some not (Figure 1.1). Against this background, case studies were prepared for European banks and U.S. money market mutual funds (MMMFs) and for German banks and U.S. mortgage-backed securities (MBSs). Another important case is that of the near failure of the American International Group (AIG), which turned out to have complex and systemically cross-border linkages with other global institutions and markets.

3. **Flows from advanced economy source countries to EMEs are covered in three more case studies.**[3] Increased competition between European banks from the formation of a single European financial market drove an aggressive search for profits. This led banks in smaller advanced economies with limited opportunities at home to expand across borders. In the cases of Sweden and the Baltic countries, and Austria and selected central and eastern European countries, this expansion resulted in systemic stress. Capital flows for financing credit expansion that were designed to circumvent bank regulations are the subject of another case study.

4. **The cases studies—in particular the policy recommendations regarding regulation and supervision—are based almost entirely on official Fund documents.** Thus,

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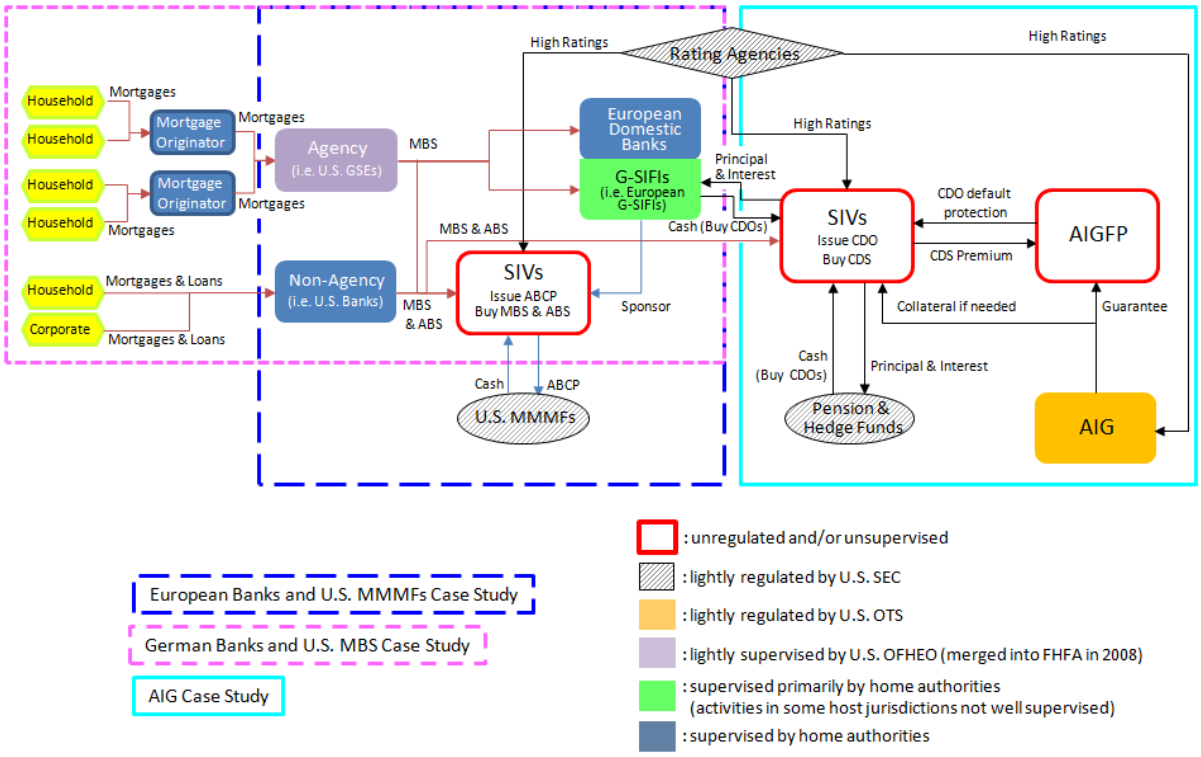
[1] Prepared by Heedon Kang, Roberto Piazza, Tahsin Saadi Sedik, Manmohan Singh, and Mark Stone (IMF).

[2] See Ben S. Bernanke, Carol Bertaut, Laurie Pounder DeMarco, and Steven Kamin, 2011, "*International Capital Flows and the Returns to Safe Assets in the United States, 2003–2007,"* Board of Governors of the Federal Reserve System International Finance Discussion Papers Number 1014; and Tamim Bayoumi and Trung Bui, 2011, "Apocalypse Then: The Evolution of the North Atlantic Economy and the Global Crisis," IMF Working Paper 11/212 (Washington: International Monetary Fund)

[3] EME case studies are discussed in more depth in the companion background forthcoming paper "Cross-Cutting Themes in Advanced Economies with Emerging Market Banking Links." Conclusions from that paper, which examines the linkages between home and host countries, and draws lessons for mitigating the transmission of macro-financial turbulence, are also reflected in this paper.

they are not meant to serve as comprehensive accounts of each episode (these can be found in the underlying documents).

Figure 1.1. Cross-Border Capital Flows Among Advanced Economies



A. European Banks and United States Money Market Mutual Funds[4]

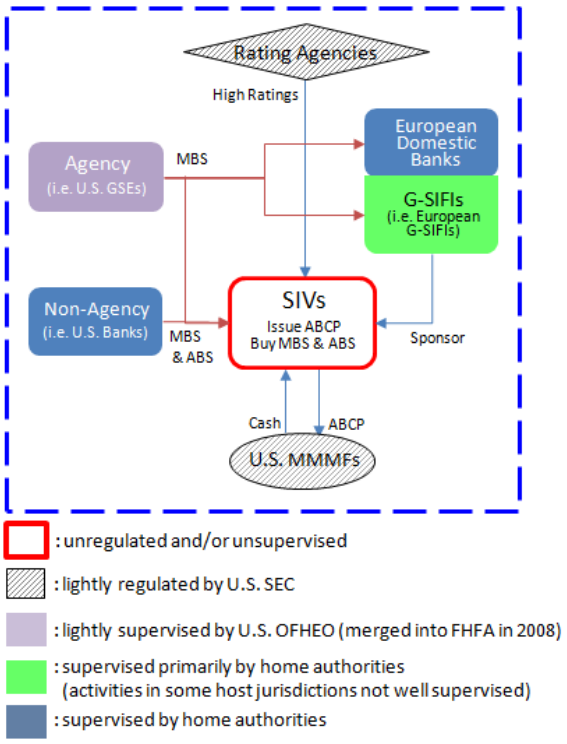
The run on U.S. MMMFs triggered by the Lehman failure squeezed the European banks who had come to rely on them for short-term financing. A downward spiral of cross-border contagion was exacerbated by asset price declines. In response, a number of policy changes regarding MMMFs have been proposed and implemented that enhance their resilience to short-term market turbulence, better protect investors, and mitigate cross-border risks.

5. **The U.S. MMMFs were (and continue to be) a key provider of short-term funding to global financial firms.** *Prime* funds invest in high-quality short-term credit

[4] This case study draws on the U.S. Financial Stability Assessments Program (FSAP), various Global Financial Stability Reports; Report of the President's Working Group on Financial Markets Money Market Fund Reform Options, October 2010; Bank for International Settlements (BIS) Quarterly Review, March 2009; various Fitch Ratings reports; and other published Fund documents.

instruments (primarily ABCP, CDs, repo, commercial paper (CP), short-term corporate notes, and other money funds) and accounted for about 45 percent share of the market in late 2008. *Government and tax-free money* funds invest mainly in treasuries, agency debt, and municipal bonds. The Securities and Exchange Commission (SEC) regulates the credit quality, issuer concentration and maturity of assets that U.S. MMMFs can hold in their portfolios under Rule 2a-7.[5]

Figure 1.2. European Banks and United States Money Market Mutual Funds: Linkages and Regulatory Oversight



6. **European MMMFs play a smaller role than their U.S. counterparts.** This is largely because the European financial system is bank-dominated and retail investors manage their liquidity using bank deposits. Further, some of the regulations that give U.S. household savers lower rates of return on bank deposits vis-à-vis MMMF investments (such as no interest demand deposits) do not hold in Europe. Consequently, MMMFs in Europe are equivalent to only about 8 percent of bank deposits.

7. **The cross-border linkages between U.S. MMMFs and European banks are sizable complex with varying degrees of regulatory oversight (Figure 1.2).** Before the crisis, about half of prime U.S. MMMF exposure was to Europe, and around one third to the

[5] Under this rule, MMMFs are not permitted to hold more than 5 percent of investments in second tier paper, or to hold more than a 5 percent exposure to any single issuer (other than the government and agencies).

euro area (Table 1). Much of the pre-crisis U.S. MMMF funding was for structured investment vehicles (SIVs) set up by European banks to purchase asset-back securities (ABS), mainly mortgage-back securities (MBS). This maturity transformation was largely unregulated and exposed the European banks to foreign exchange liquidity risk.

Table 1.1. United States Money Market Mutual Funds—Holdings of European Bank Paper

(2006–2011)

		MMMF Exposure to Bank CDs, CP, Repos, and Other (percent of Prime MMF Assets)		
		Euro area	**Other Europe**	**Total Europe**
2006	Dec-06	29.1	19.6	48.7
2007	Jun-07	29.8	20.7	50.5
2007	Dec-07	28.8	21.7	50.5
2008	Jun-08	31.1	18.2	49.3
2008	Dec-08	28.3	17.1	45.4
2009	Jun-09	34.2	18.1	52.3
2009	Dec-09	37.1	18.1	55.2
2010	Jun-10	31.2	17.3	48.5
2010	Dec-10	31.6	18	49.6
2011	Jun-11	28.4	20.4	48.8
2011	Aug-11	22.3	19.8	42.1

Note: Based on top 10 prime MMMFs; represents roughly 45 percent of the approximately $1.49 trillion in total U.S. prime MMMF assets under management.

Source: Fitch Ratings.

8. **In mid-September 2008, expected losses on their Lehman holdings led to a run on U.S. MMMFs.**[6] Thereafter, MMMFs, in general, quickly retreated from purchasing and rolling over commercial paper, ABCP, repos, and CDs issued by financial firms, including the European banks. To the extent possible, they also significantly shortened tenors of any lending agreements with financial institutions. This funding "run" squeezed the SIVs of their European bank counterparties.

9. **Contributing to this downward spiral were the MMMFs' concerns about counterparty and market risks.** The counterparties financed by MMMF repos held longer-maturity assets that the MMMFs themselves could not hold because of tenor restrictions. In the event of a counterparty default, these assets would then have to be sold into a poorly

[6] The run started with the Reserve Primary Fund which "broke the buck"—the value of the assets of an MMMF drops to below the value of its liabilities, or the net asset value (NAV) turns negative—due to the decline in the value of its Lehman holdings. This exacerbated redemptions, which totaled more than $40 billion (approximately 67 percent of the Reserve Primary Fund's net assets) in the following days.

performing secondary market. As a result of the loss in confidence in U.S. MMMFs, their total assets declined from a peak of $3.9 trillion in 2009 to about $2.7 trillion in the first half of 2011.

10. **The MMMFs were seen as posing important systemic risks.** The run on MMMFs threatened a run first on the U.S. CP market and then on the CD market and thereby on non-U.S. mainly European banks. A run on the money market funds destabilized already strained global bank funding markets.[7]

11. **A number of official actions were taken to stabilize the MMMFs and restore confidence.** These included a temporary guarantee program for MMMFs and the creation of Fed liquidity facilities aimed at supporting a private-sector initiative to provide liquidity to U.S. money market investors, thereby improving liquidity in short-term debt markets and addressing a credit crunch. Under the Money Market Investor Funding Facility (MMIFF), the New York Fed provided senior secured funding to a series of SIVs to facilitate an industry-supported private-sector initiative to finance the purchase of targeted assets from eligible investors.

Policy implications

12. **A number of policy changes have been proposed and implemented to enhance U.S. MMMF resiliency to short-term market turbulence and to protect investors.** These changes would require MMMFs to maintain a portion of their portfolios in instruments that can be readily converted into cash, to reduce exposure to long-term debt, and to limit investments to the highest quality securities. The modifications under consideration would also permit funds that have "broke the buck" to suspend redemptions to allow for the orderly liquidation of fund assets.

- SEC regulations have been changed to tighten the 2a-7 liquidity requirements and credit and interest rate exposure.

- In 2010, the President's Working Group issued a series of proposals for industry comment. The options included: (i) convert to a floating NAV structure; (ii) establish private emergency liquidity facilities; (iii) require in-kind redemptions; (iv) require insurance; (v) provide differential treatment for stable- and floating-NAV funds; (vi) regulate MMMFs as special purpose banks; and (vii) impose constraints on unregulated MMMF substitutes.

- Further, the Fund has recommended that money market funds be required to make real-time disclosures of their actual (as opposed to "stabilized") net values.

[7] See Baba, Naohiko, Robert N. McCauley, and Ramaswamy Srichander, 2009, "U.S. Dollar Money Market Funds and Non-U.S. Banks," BIS Quarterly Review.

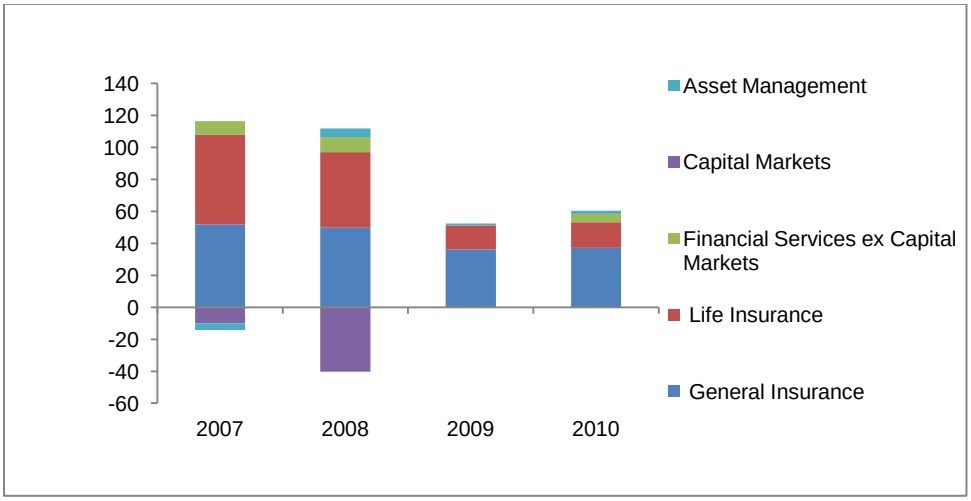
B. The American International Group[8]

The inability of a subsidiary of AIG to meet its mortgage default protection obligations posed significant counterparty risk to global systemically important financial institutions (G-SIFI). This prompted large-scale government intervention and exposed shortfalls in U.S. and international supervision and regulation. Key policy implications are strengthening the regulation of over-the-counter (OTC) derivative markets, better supervisory coordination, and development of a macroprudential framework.

13. **In 2007, AIG was the largest and most diversified insurance company in the world.** The bulk of its revenues came from domestic and foreign life insurance, diversified property/casualty insurance, and other financial services, including aircraft leasing and consumer finance (Figure 1.3).

Figure 1.3. American International Group: Segment Revenues[1/]

(2007–2010, in billions of U.S. dollars)



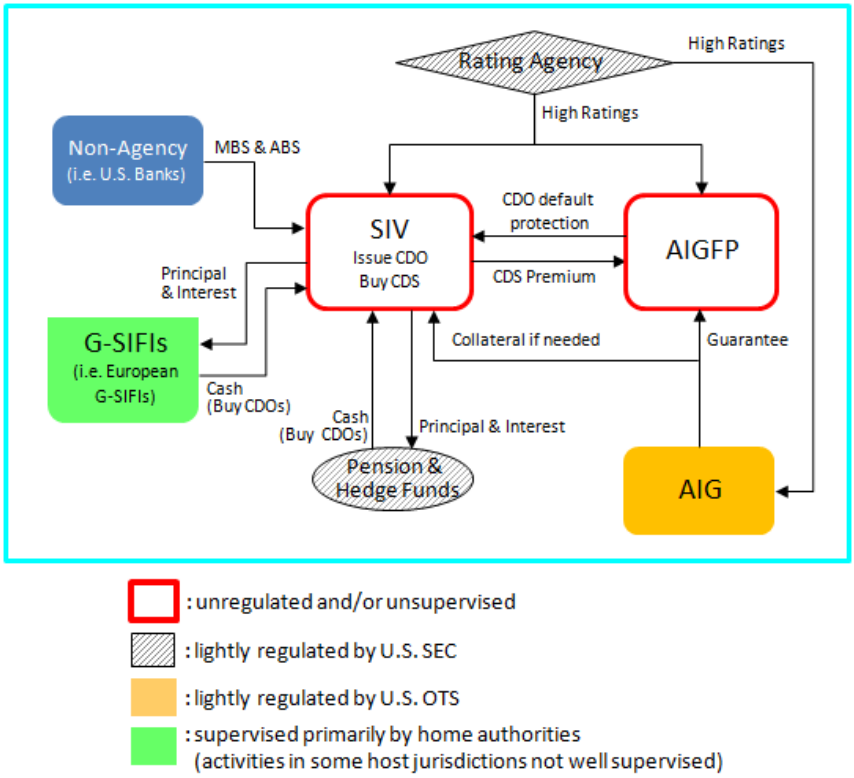
Source: Company reports.
1/ Revenues exclude realized gains/losses.

14. **The AIG group was not subject to a single regulator and key subsidiaries fell outside of the regulatory perimeter** (Figure 1.4). Its more than 70 insurance subsidiaries in the United States were regulated by their state insurance supervisors, and over 175 non-insurance or foreign entities were overseen by various national supervisors. AIG Financial

[8] This case study draws on U.S. FSAP Documents: Financial System Stability Assessment (FSSA); Technical Note on Consolidated Regulation and Supervision; Technical Note on Regulatory Reform: OTC Derivatives; Detailed Assessment of Observance of IAIS Insurance Core Principles; various Global Financial Stability Reports (GFSRs); and other published Fund documents.

Products (AIGFP) was a London branch of a French incorporated subsidiary and, as such, was not effectively regulated at all. This arrangement meant that no single body had an overall view of the risks associated with AIG and AIGFP, nor the power to react when the crisis emerged.

Figure 1.4. American International Group Financial Products: Linkages and Regulatory Oversight



15. **AIGFP posed counterparty risk to G-SIFIs via their purchases of MBS default protection.** The G-SIFIs bought large amounts of credit default swaps (CDSs) on largely subprime mortgage collateralized debt obligations (CDOs) written by AIGFP. The CDSs were guaranteed by AIG, exposing it to mortgage risk. The main G-SIFI counterparties of AIGFP were Société Générale, Deutsche Bank, Goldman Sachs, Merrill Lynch, Calyon, Barclays, and UBS. These institutions were derivatives dealers who needed to hedge client transactions, and AIG was, unusually, willing take a long position on mortgage risk. As the crisis unfolded, the value of the protection soared, and following the ratings downgrade of parent AIG triggered by the drop in value of its own assets, AIGFP was obliged to post large amounts of collateral that it did not have.[9] Furthermore, funding markets refused to roll over

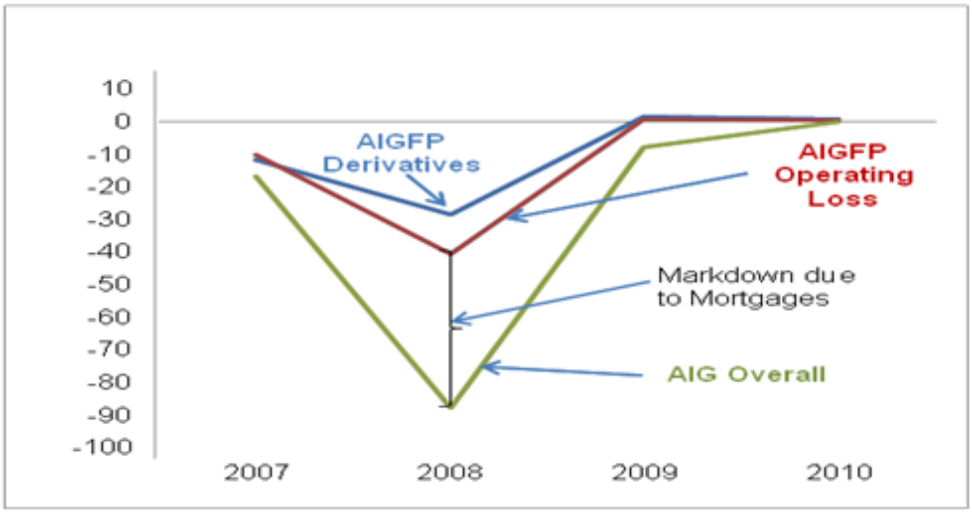
[9] As long as AIG and AIGFP were assigned top ratings by credit rating agencies, the terms and conditions of their contracts did not oblige them to post collateral against their positions. However, after the first downgrade to AA+ in March 2005, they had to start posting collateral. As the crisis unfolded in 2008 and AIG's credit

(continued)

AIG's debts due to the prospect of massive losses. AIGFP accounted for a large share of the losses of the group (Figure 1.5).

Figure 1.5. American International Group: Contribution of Derivatives to Operating Loss

(2007–2010, in billions of U.S. dollars)



Sources: Company reports, and IMF staff calculations.

16. **AIG's failure could have had devastating effects throughout financial markets and the economy.** The main channel for the financial contagion was potential losses to counterparties to the AIGFP derivatives or securities lending transactions. Many of the counterparties to AIGFP were major financial institutions in the U.S. and abroad already in a precarious state. They were only the first links in the chain culminating in either smaller banks or nonbanks. In addition, liquidation of the securities lending collateral under duress could have further depressed prices in the credit markets. Potential losses for policy holders and pension beneficiaries were large.

17. **Substantial official support was provided to AIG.** AIG suffered $121 billion of losses on holdings of derivatives and securities. Of these, $85 billion were covered by earnings, leaving a capital loss of about $36 billion. It received about $198 billion in loans and equity from the Federal Reserve, a sum surpassed only by the costs the official rescue of the Royal Bank of Scotland in the United Kingdom. About $92 billion of the support funds went to major institutions (including $11 billion to Société Générale; $8.5 billion to Barclays;

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rating was downgraded, collateral calls were triggered by the insurer's counterparties, and their mounting collateral posting requirements eventually became unsustainable.

$11.8 to Deutsche Bank; and $7.3 billion to Goldman Sachs). Most of the bailout monies have been repaid.

18. **The AIG crisis exposed shortfalls in United States and international supervision and regulation**:

- Group supervision: The parent holding company was a thrift holding company under the general supervision of the Office of Thrift Supervision (OTS) since 2005. However, the OTS was required to defer to functional regulators for the regulated subsidiaries; it was not responsible for either the securities lending operations or the derivatives dealing. It had been convening annual meetings of relevant regulators and company representatives to coordinate supervision, but did not have authority to resolve the failure of the institution.

- Insurance supervision: The state-based regulatory system lacked a systemic focus and the capacity to exercise group-wide oversight. Federal regulators had limited regulatory responsibility over insurance companies, which extended to only those affiliated with commercial banks or thrifts. The multiplicity of state regulations also imposes inefficiencies.

- Regulatory perimeter: Securities regulation had not kept pace with innovation in financial markets and instruments. Securitization and growth in certain OTC derivative markets, along with the growth of "shadow banking," were key factors contributing to the crisis. Significant gaps existed in the regulation of OTC derivative products and markets. The oversight of these markets, the prudential regulation of firms trading in them, and the market conduct rules governing market participants fell behind, resulting in important regulatory gaps. Derivatives were largely unregulated, and the lack of collateral requirements for certain significant market participants in bilaterally-settled OTC derivatives contributed to the undetected build up of leverage.

- Cross-border regulation and coordination: Foreign regulators had only narrowly defined jurisdiction over subsidiaries and they deferred to home country regulators. The lack of a consolidated regulator with good information about the consolidated picture on mortgage risk was a key problem. European national supervisors could have applied the new supplementary consolidated supervision just implemented in 2005 over the European group, which could have helped to monitor the widespread activities of AIG throughout Europe. However, the European Union (EU) directive provided for an exemption of third country groups from this supplementary regime, and equivalence was granted to the OTS.

- Macroprudential perspective: A single financial authority with a systemic view would likely have better understood the systemic implications of AIGs business model.

Policy implications

19. **The Dodd–Frank Wall Street Reform and Consumer Protection Act of 2010 aims to strengthen the regulation of OTC derivative markets and improve the resiliency of the system.** Key provisions relevant for the AIG case include:[10]

- Registration requirements for OTC derivative dealers and "major swap participants";
- Central clearing of standardized derivatives contracts and powers for the CFTC and SEC to determine which instruments should be subject to clearing and trading on an exchange or swap execution facility;
- Reporting requirements for all derivative transactions and the trading positions of major market participants;
- Enhanced prudential requirements for risk exposures arising from OTC derivative trading for transactions that are not centrally cleared and collateral requirements for OTC derivatives;
- Authority for regulators to safeguard market stability;
- Capital and collateral requirements; and
- Market conduct provisions for OTC derivatives markets.

20. **Insurance regulatory reforms that would help address the issues raised by AIG include:**[11]

- Developing the approach to supervision of groups through consolidated financial condition reporting and analysis of the group as a whole (including unregulated affiliates) and further development of colleges of supervisors.
- Improving the regulation of bond insurance and securities lending, including the reserving and capital treatment of market risks associated with guarantees (as in variable annuities) and the treatment of liquidity risks.

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[10] See International Monetary Fund, 2010, United States: Publication of Financial Sector Assessment Program Documentation—Financial System Stability Assessment, IMF Country Report 10/247 (Washington: International Monetary Fund).

[11] Ibid.

- Modernizing solvency requirements, including through more forward-looking approaches to solvency regulation (e.g., utilizing stress and scenario testing and other forms of dynamic financial analysis).

C. German Banks and United States Mortgage-Backed Securities[12]

Parts of Germany's banking sector were hit hard by their exposure to U.S. mortgage market risk. Several banks had to be rescued after they were unable to meet their liquidity commitments to their off-balance-sheet SIVs at significant costs to the German taxpayer. Key policy lessons for the source country (Germany) are more transparency and widespread use of the International Financial Reporting Standards (IFRS) to better capture off-balance-sheet activity.

21. **Prior to the crisis, several German banks expanded rapidly into less familiar financial markets in a "search for yield" as their traditional business lines stagnated.** In particular, German banks used conduits or SIVs to invest in U.S. ABSs and other structured investment products backed by residential mortgages. Over one-fifth of U.S. ABSs were estimated to have been held abroad in the lead up to the crisis, with German banks, alongside banks in the United Kingdom, Switzerland, France, the Netherlands, and Belgium, having a significant exposure and facing increased cross-border market risk from changes in value of the securities.[13]

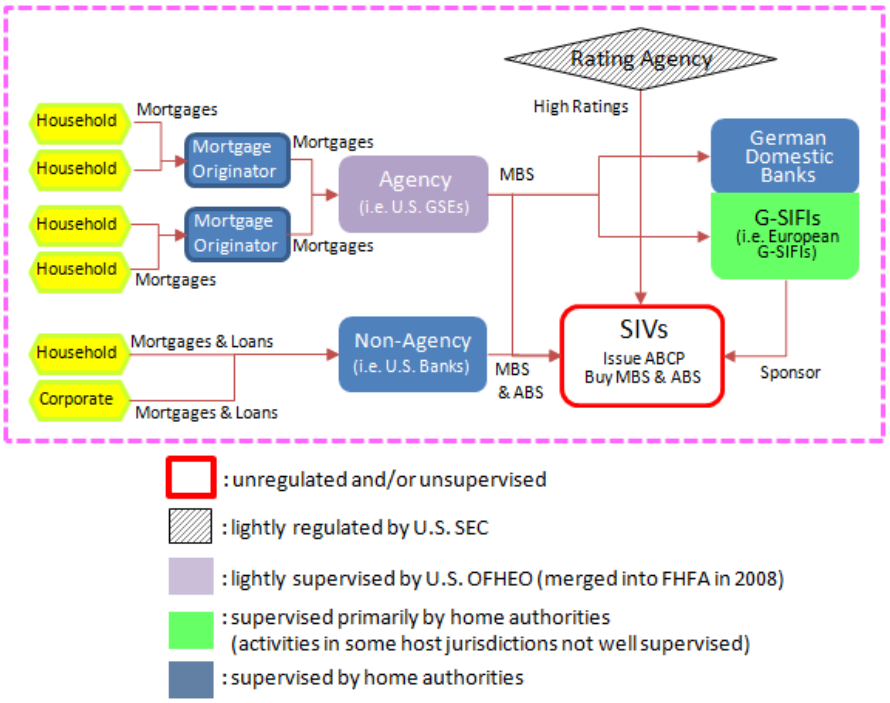
22. **The U.S. subprime mortgage market expanded rapidly and away from prime government-sponsored enterprises (GSEs) before the crisis.** The mortgage market went through a radical shift in market shares and in underwriting standards, with global private-label securitization gross issuance soaring from almost nothing in the early 1990s to peak at almost $5 trillion in 2006. In 2003, the GSEs were the source of 76 percent of the mortgage-backed and asset-backed issuances, with "private label" issues by major Wall Street firms accounting for the balance. By mid-2006, private label issues had risen to a 57 percent share. Whereas the GSEs were almost entirely "prime" mortgage lenders, the private label issues grew in large part through the origination and securitization of high-risk subprime mortgages as well as somewhat less risky "Alt-A" mortgages. This growth was facilitated by the willingness of credit rating agencies (CRAs) to give their highest ratings (AAA or Aaa) to the senior tranches of private label issue. Another factor was the arbitraging of Basel I

[12] This case study draws on the United States and Germany Staff Reports for the 2007–2011 Article IV consultations; the United States FSAP; Germany FSAP Update; various GFSRs; and other published Fund documents.

[13] See Fitch Ratings, 2007, "*European Bank Exposure to Subprime Risk*," Special Report, August 31.

regulatory capital requirements, which had zero capital adequacy risk weights on securitized products held in off-balance-sheet entities.[14]

Figure 1.6. German Banks and United States Mortgage-Backed Securities: Linkages and Regulatory Oversight



23. **The high-yield mortgage securities attracted many non-U.S. buyers.** Many German banks made large investments in the U.S. subprime market (Table 1.2). The linkages between MBBs and German banks were complex and subject to varying degrees of regulatory oversight (Figure 1.6).

24. **The purchase by German banks of U.S. MBSs was largely driven by regulatory differences.**[15] In the United States, banks were required to maintain a simple leverage ratio (as well as a risk weighted one). As a result, they increased leverage by placing assets in securitized pools and then selling them. Such a leverage ratio did not, however, apply to European banks (and U.S. investment banks), which ended up holding large amounts of U.S. ABSs in their trading books, where risk weights on such assets were low. In addition, German and other European banks had incentives to sponsor SIVs since they did not face any capital charge on their contingent exposures to such vehicles. Further, MBSs also served as collateral for dollar wholesale funding in repo markets. Thus, SIVs invested in longer-dated

[14] See GFSR, 2009, Chapter 2, *Restarting Securitization Markets: Policy Proposals and Pitfalls*, October.

[15] See Bayoumi and Bui (op. cit.).

securities and financed these investments by issuing short-dated commercial paper and collateralized repos, making them unregulated maturity transformers.

25. **Parts of Germany's banking sector were hit hard by their exposure to U.S. mortgage market risk during the financial crisis.** Germany felt the force of the first shocks from the subprime mortgage markets in July 2007. As increasing default rates on subprime mortgages raised doubts about the asset quality of their investments, the German bank SIVs faced funding difficulties. The resulting financing squeeze triggered a contractual obligation on the part of German banks to provide financing to their SIVs. Banks, some of systemic importance, suffered large losses and funding problems with those that were perceived to have lower capitalization or lower quality capital were most at risk.

Table 1.2. Exposure of Selected German Banks to Conduit—Special Investment Vehicles

	Ownership	Conduit- and SIV-financed assets (in percent)	
		Over equity t	Over assets
Sachsen-Finanzgruppe	Public	1,126	30.3
West LB	Public	542	12.7
IKB (until July 29, 2007,, i.e., before bailout)	Private	494	20.5
Dresdner Bank (mitigated by integration into Allianz group)	Private	364	9.9
Landesbank Berlin (mitigated by integration into S-Verbund Bayern)	Public	179	2.2
BayernLB (mitigated by integration into S-Verbund Bayern)	Public	170	5.1
HSH Nordbank	Public	126	4.0
Deutsche Bank	Private	114	3.3
HVB (mitigated by integration into UCI group)	Private	105	6.6
NORD LB	Public	89	2.9
Commerzbank	Private	85	2.2
Helaba (mitigated by integration into Cooperative Network)	Public	68	1.1
DZ-BANK (mitigated by integration into Cooperative Network)	Private	61	1.3
LBBW	Public	59	1.7
KfW (mitigated by unlimited sovereign guarantee)	Public	58	2.6

Sources: Germany 2007 Article IV Consultation—Staff Report, and Fitch Ratings.

26. **Several banks—including certain Landesbanken but also a major issuer of covered bonds—had to be intervened, at significant costs to the German taxpayer.** In the summer of 2007, two largely publicly-owned banks had to be rescued after they were not able to meet their liquidity commitments to their SIVs. These were IKB (a private bank, but with a one-third ownership by the government-owned KfW) and Sachsen Landesbank (a state-owned bank). West LB, another prominent public sector bank, also faced severe difficulties that necessitated a rescue package in early 2008. In addition, many other private and public banks reported larger than expected write-downs, including Bayern LB and Deutsche Bank. In the aftermath of the failure of Lehman Brothers in the fall of 2008, confidence in the system was again threatened by the liquidity rollover requirements at Hypo Real Estate (major issuer of covered bonds), which required substantial financial support and led to subsequent nationalization in 2009.[16] These ad hoc measures demonstrated the limitations of the then-existing crisis framework.

27. **A new financial stability framework was introduced in October 2008.** The authorities set up the Special Fund for Financial Market Stabilization (SoFFin) to be administered by the Federal Agency for Financial Market Stabilization (FMSA). Financial stability support measures comprised guarantees, recapitalizations, asset purchases, and subsequently, the establishment of winding-up institutions. The authorities also strengthened the mandate of the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin).

Policy implications

28. **The U.S. mortgage crisis reflected many important weaknesses.** The U.S. economy experienced an unsustainable lending boom, fueled by low interest rates and capital inflows from abroad; a housing bubble; the rapid rise of a "shadow banking system," a decline in underwriting standards; weaknesses in risk management, governance, and compensation structures in the financial sector; and the growing use of complex derivative and structured credit instruments whose risk properties and contribution to systemic fragility were poorly understood. These vulnerabilities were allowed to build as a result of insufficient market discipline but also because of critical shortcomings and gaps in the supervisory and regulatory framework, both at the micro- and macro-prudential levels.[17] Therefore, staff recommended reforms in the following areas:

- Addressing supervisory gaps and the shadow banking sector, given that the crisis was fueled in part by regulatory arbitrage that spurred the rapid growth of leverage and

[16] Hypo Real Estate received liquidity support with a package worth €35 billion from the Federal government, banks, and financial sector firms to prevent collapse. The package was subsequently increased to €50 billion.

[17] International Monetary Fund, 2010, United States: Publication of Financial Sector Assessment Program Documentation—Financial System Stability Assessment, IMF Country Report 11/247 (Washington: International Monetary Fund).

maturity transformation outside the banking sector. Measures were recommended to level the playing field, improve risk management in repo and other funding markets, and ensure that all systemic institutions and markets are inside the regulatory perimeter.

- Increasing transparency in areas such as off-balance sheet vehicles and rating agencies. It will be important that the authorities continue their efforts to improve CRA procedures, including transparency, governance, and mitigation of conflicts of interest that are associated with their "issuer pays" model of charging issuers for their ratings.

29. **In Germany, the crisis revealed important gaps in the regulation and supervision framework**. Weaknesses appeared in the following areas :

- Effective supervision requires reduced reliance on external auditors and stepped-up efforts to attract and retain skilled supervisors. Supervisors should require more frequent financial statements and encourage more widespread use of IFRS reporting to better capture off-balance-sheet activity.

- Need for a bank resolution framework with better incentives for prudent operations. The insolvency framework should recognize the role of banks in the payment system and the macro economy and incorporate greater flexibility to allow for quick resolutions and dilution of the equity claims of all shareholders. [18] The new bank restructuring law, in force since 2011, significantly strengthens the crisis management framework. It grants broad powers and effective instruments to the authorities to facilitate more timely and efficient resolution of problem banks that are deemed systemically relevant. A particularly powerful new instrument is the ability to transfer the banking business to another institution, including to a bridge bank, with an emphasis on protecting deposits and other business parts that are of systemic significance.[19]

- The European Commission is due to publish legislative proposals for a harmonized set of resolution tools across the EU, which are likely to include debt write-down or debt conversion tools.

[18] See International Monetary Fund, 2008, Germany: 2007 Article IV Consultation; Staff Report; Staff Supplement; Public Information Notice; and Statement by the Executive Director for Germany, IMF Country Report 08/80 (Washington: International Monetary Fund).

[19] See Germany FSAP Update—Technical Note on "Crisis Management Arrangements."

D. Austrian Banks in Selected Central Eastern and Southeastern European Countries[20]

Prior to the global financial crisis, the capital inflows of Austrian banks helped drive the rapid credit expansion of the Central Eastern and Southeastern European (CESE) region. This credit posed indirect foreign exchange and mortgage market risks that proved to be important sources of vulnerability for the Austrian banking sector and contributed to macroeconomic instability in the recipient countries. In some instances, the vulnerabilities were successfully addressed through cross-country policy coordination among public regulators and private banks. This experience had a number of implications for regulation and supervision.

30. **Prior to the global financial crisis, Austrian banks played a major role in financing the rapid pace of private credit growth in CESE countries.[21]** Lending from Western Europe to CESE countries significantly increased, with banks being the main intermediaries of these flows. At the end of 2007, 19 percent of the banking flows to the CESE region originated from Austrian banking groups.[22] Other major source countries were Belgium, France, Germany, and Italy.

31. **Subsidiaries in CESE countries accounted for a large share of Austrian banks' activities ahead of the crisis.**[23] The six major banking groups active in the CESE region were UniCredit Bank Austria, Erste Bank, Raiffeisen Zentralbank Österreich, Volksbank, Bank für Arbeit und Wirtschaft und Österreichische Postsparkasse, and Hypo Group Alpe Adria. Almost 50 percent of lending extended by the foreign subsidiaries of these groups was denominated in foreign currency. Also, intra-group liquidity transfers played a major role of financing for subsidiaries, although there was substantial variation across CESE countries.

32. **The large size and concentration of their claims on a relatively small number of recipient CEE countries exposed Austrian banks to cross-border credit risk.[24]** Total

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[20] This case study draws on staff reports for the 2008–2011 Article IV consultations, program reviews, and FSAP Updates for Austria, Czech Republic, Germany, Hungary, Italy, Poland, Romania, and Slovak Republic.

[21] The CESE region comprises the following countries: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovak Republic, Turkey, Ukraine, Albania, Belarus, Bosnia and Herzegovina, Cyprus, Macedonia, Malta, Moldova, Montenegro, and Serbia.

[22] The data are from the BIS foreign claims from consolidated international banking statistics.

[23] The activities of Austrian Banks in the CESE region are documented in Financial Stability Report 21, Oesterreichische Nationalbank, and Focus on European Economic Integration Special Issue 2009, Oesterreichische Nationalbank.

[24] Maechler, Andrea M. and Li Lian Ong, 2009, "Foreign Banks in the CESE Countries: In for a Penny, in for a Pound," IMF Working Paper 09/54 (Washington: International Monetary Fund).

claims of Austrian banks to CESE countries amounted to 70 percent of Austrian GDP. The corresponding figures for Germany and Italy were 5 percent and 18 percent, respectively.

33. **This note focuses on the four main recipients of Austrian banks' credit; the Czech Republic, Romania, Hungary and Croatia.**[25] Although Austrian banks were relatively more diversified compared to banks in other source countries, still 60 percent of their claims on the CESE region was concentrated in these four countries.

34. **Financial vulnerabilities in the major recipient countries stemmed from high credit growth and foreign-currency denominated liabilities.** During 2003–2008, double digit credit growth was experienced in all the main recipients of Austrian banks' credit. Often, but not always, lending was denominated in foreign currencies, mainly the euro and the Swiss franc. Currency mismatches between assets and liabilities were significant in some countries, both in the household and in the corporate sector.[26] The heavy reliance on credit from the banking system of only a few foreign countries implied that funding sources of recipient countries were insufficiently diversified.

35. **However, there were important differences in vulnerability across the recipient countries, with the Czech Republic being in a particularly strong position.** The banking system of the Czech Republic weathered the global financial crisis. On the contrary, Romania, Hungary, and to a lesser extent Croatia, were harder hit, reflecting various factors. In the Czech Republic, foreign banks financed local lending by issuing local deposits, while in Romania and Hungary, subsidiaries of foreign banks were largely financed by their parents. Foreign currency lending was small in the Czech Republic, while it accounted for more than half of total private credit in Romania and Hungary.[27] Finally, the different degrees of reliance on foreign funds—which in Romania and Hungary also took the form of large FDI inflows—translated into significantly smaller net capital inflows to the Czech Republic (a cumulative of 50 percent of GDP during 2003–2008, mostly in the form of FDIs) compared to, for example, Romania (170 percent of GDP).

36. **Domestic financial vulnerabilities were accompanied by external imbalances.**[28] Capital inflows were substantial in all recipient countries, and where credit growth was large,

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[25] For the Czech Republic, the credit is mainly funded by local sources and is included in the BIS data because the Austrian Erste Bank owns one of the biggest banks in the Czech Republic, Ceska Sporitelna.

[26] International Monetary Fund, 2009, *Regional Economic Outlook: Europe*, October 2009, Box 3.

[27] In Croatia, while foreign currency lending was small, a large part was foreign currency indexed.

[28] International Monetary Fund, 2010, *Regional Economic Outlook: Europe*, May 2010, Chapter 2 (Washington); International Monetary Fund, 2010, *Regional Economic Outlook: Europe*, October 2010, Chapter 3 (Washington); and Bakker, Bas B. and Anne-Marie Gulde, 2010, "The Credit Boom in the EU New Member States: Bad Luck or Bad Policies?" IMF Working Paper 10/130 (Washington: International Monetary Fund).

it was coupled with large foreign borrowing by foreign banks' subsidiaries. Sizable external imbalances left recipient countries vulnerable to sudden stops.

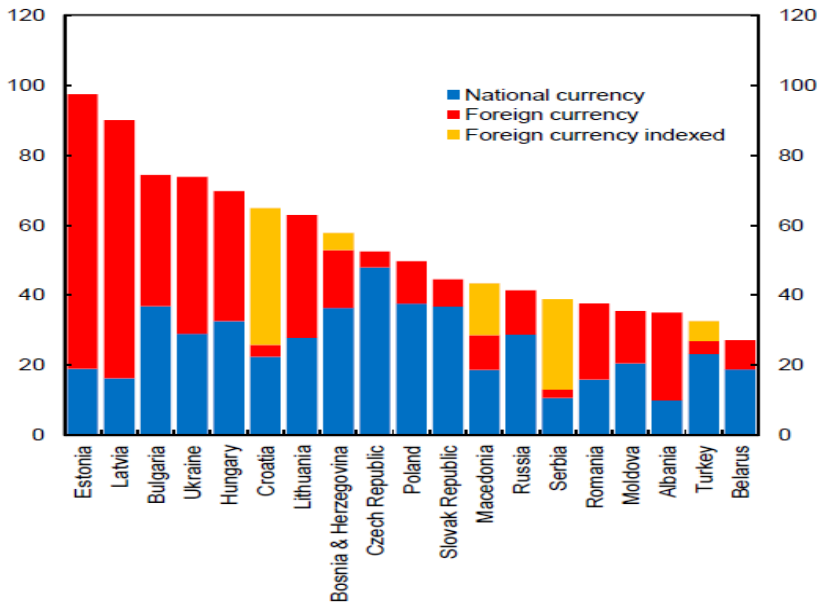
37. **Both demand and supply side effects, fostered by the process of European integration, helped explain the rapid credit expansion of Austrian banks in CESE countries:**

- *Supply side effects*. Foreign banks were eager to enter the highly profitable and relatively underdeveloped credit markets of CESE countries. The presence of foreign banks, established mainly as subsidiaries, was an element potentially contributing to making foreign currency loans readily available in recipient countries.

- *Demand side effects*. In most recipient countries, there was a positive and large spread between borrowing rates in domestic versus foreign currency, while exchange rate volatility was decreasing. Moreover, the prospect of Euro adoption might have further reinforced expectations of stable exchange rates. These factors likely provided incentives to foreign banks to lend to households and corporations in recipient countries in foreign currency, even if the borrowers earned income in local currency, thus exposing the banks to indirect foreign exchange risk. There were country-specific considerations as well. For example, in Hungary, the abolition of a subsidy for forint-denominated household loans made borrowing in foreign currency more attractive.

Figure 1.7. Emerging Europe: Total Private Sector Credit by Currency, 2008

(Stock in percent of GDP)



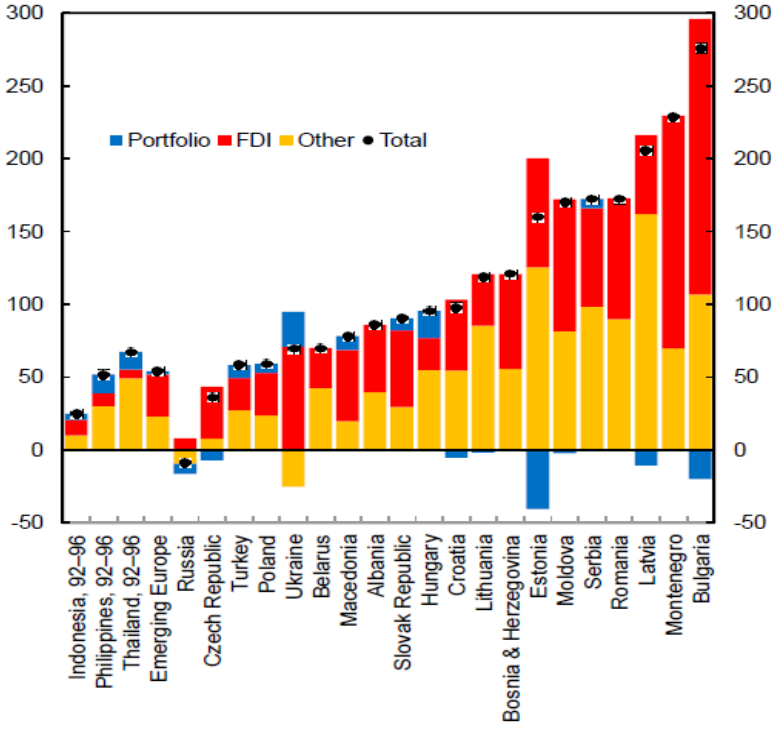
Sources: National authorities; and IMF, International Financial Statistics.

38. **The outbreak of the global financial crisis and deteriorating growth presented recipient countries with the risk of a sudden stop and large currency devaluations.** The risk of devaluation was particularly important for those countries with liabilities largely denominated in foreign currencies. This risk seemed to have materialized when, in the first half of 2009, the currencies of Eastern European countries faced strong pressures to depreciate. However, thanks to the confidence spurred by domestic and international policy initiatives, exchange rates rebounded. Overall, between 2007 and the end of 2010, currencies depreciated only between 3 percent and 15 percent in the selected recipient countries. Nonetheless, during 2008–2009, net capital flows dropped by more than 10 per cent of GDP in Hungary, Romania and Croatia. Consistent with its less vulnerable situation, net capital inflows remained roughly stable in the Czech Republic.

39. **The deterioration in the quality of Austrian bank loans in CESE countries fed back into Austria.** Facing liquidity shortages, two medium-sized Austrian banks—Kommunalkredit and Hypo Group Alpe Adria—were nationalized in 2008–2009, while other banks benefited from large capital injections from the Austrian government. Overall, the difficult situation of the banks led the government to approve a €100 billion rescue package (36 percent of GDP), composed of both capital support measures and guarantees.

Figure 1.8. Emerging Europe: Cumulative Net Capital Inflows1/

(Percent of 2003 GDP, 2003–08)



Source: World Economic Outlook database.

1/ As the boom in the Baltic states ended in 2006, data for the Baltics refer to 2002–2007 in percent of 2002 GDP.

40. **An important policy response to risks in source and recipient countries was the "Vienna initiative."** In some countries, national regulators, international financial institutions, and the largest international private banks were able to agree on a set of measures to prevent sudden stops to Eastern European countries. In bilateral agreements, foreign banks agreed not to reduce their exposures to Romania, Serbia, Bosnia Herzegovina, Hungary, and Latvia. Banks also pledged to maintain adequate capitalization in their foreign subsidiaries. The IMF provided emergency loans to national governments who agreed to policies to avert the crises, and national central banks committed to perform stress tests according to IMF standards and to a continuous information exchange with all the parties involved. Other policy responses by Austrian authorities were moral suasion to stop loans in Swiss francs by Austrian banks in Eastern Europe, and a call for higher capital requirements for Austrian banking groups with large exposures to Eastern Europe.

41. **The "Vienna initiative" is an example of the challenge of dealing with collective action problems.** International banks had individual incentives to withdraw their foreign lending as the global financial crisis deepened. Moreover, financial authorities in recipient countries had incentives to forcefully prevent repatriations from international banks. These individual incentives, if they had remained uncoordinated, would have likely led to banking crises both in Austria and in the main and recipient countries. Certainly, the relatively small number of players—national regulatory bodies and international banks—reduced the severity of the coordination problem. Also, all the players involved had high stakes in the game, including foreign banks, which viewed the Eastern European market as a long-term investment strategy.

Policy implications

42. **The experience of Austria and CEE countries bears useful lessons for regulation and supervision in source countries:**

- To better address cross border risk channels, risk monitoring and analysis should include a special regional focus on exposures to the main recipient regions.

- After improving the effectiveness of domestic measures, authorities in the source country could assist the development of consumer financial education campaigns in the recipient countries.

- Joint supervision and risk assessment by regulators in the source and recipient countries should be strengthened, especially by allowing regulators in the source country to take part in on-site inspections in recipient countries.

- The supervisory authority in the source country should be allowed to object to the creation of financial groups combining banks and nonbanks, as these can undermine effective supervision.

43. **Lessons can also be drawn for regulation and supervision in recipient countries:**

- Given the ability of foreign parent banks to quickly withdraw liquidity from their foreign subsidiaries, the supervisory authority in the recipient country should be able to monitor the liquidity position of the foreign parent bank.

- Risks in the real estate sector should be carefully addressed. In fact, foreign funds are often excessively directed to the domestic real estate sector, giving rise to destabilizing boom-bust cycles.

- Regulations aimed at curbing bank lending can be circumvented, shifting lending to less regulated markets. For instance, after credit ceilings for banks were tightened in 2007, corporate entities in Croatia turned to direct borrowing from parent banks abroad.

44. **More generally, regulatory arbitrage and conflicting interests between different national regulators should be minimized.** New European regulatory bodies were created to coordinate the activities of national regulators and supervisors across the EU. These include the European Systemic Risk Board (ESRB) as well as the new sectoral authorities: the European Securities and Markets Authority, the European Banking Authority, and the European Insurance and Occupational Pensions Authority. In addition, colleges of supervisors are being set up to ensure more effective supervision of cross-border groups.

E. Sweden and Baltic Countries[29]

The Baltic crisis followed asset price bubbles and large current account deficits driven by rapid credit growth financed largely by capital inflows from Swedish banks. Indirect foreign exchange and real estate market risks generated losses for the Swedish banks and had repercussions for the Swedish economy. The experience spurred home and host authorities to take actions to reinforce international coordination and to reform prudential policies.

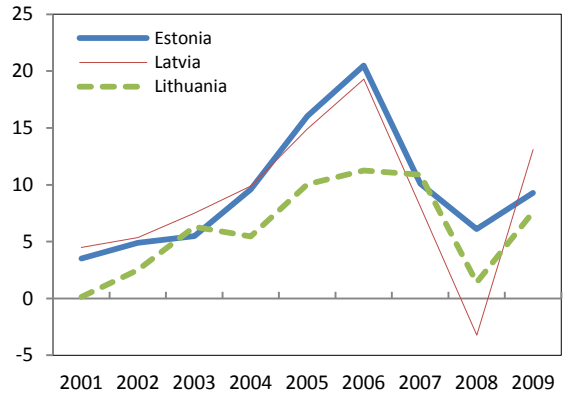
45. **Beginning in the early 2000s, the Baltic countries experienced a bank credit boom, fueled by capital inflows mainly from Sweden (Figure 1.9).** Profitable and stable investment opportunities due to strong growth performance (Figure 1.10) and the prospect of EU accession attracted capital flows to the region (Table 1.3). Credit growth was part and parcel of a domestic demand boom based on expectations of continued growth in real incomes (Figure 1.11), asset price growth, and low real lending rates on foreign currency borrowings, such as euro-denominated loans.

46. **Two Swedish parent banks, Swedbank and SEB, funded a large part of the credit expansion through their subsidiaries supervised by Baltic authorities**. The opening up of Baltic countries' financial markets and limited opportunities for domestic business expansion in small open economies encouraged expansion in the Baltic region, and abundant liquidity and low risk aversion in global financial markets led to easy financing conditions for the Swedish banks. The two Swedish banks raised funding in foreign currencies from global financial markets, mainly in euros, and lent them to private unhedged borrowers with local currency earnings through their subsidiaries. They dominated Baltic bank lending (Figure 1.12).

[29] This case study draws on staff reports for the 2008–2011 Article IV consultations and FSAP updates for Sweden and Baltic countries; Financial Stability Reports of Sveriges Riksbank and Latvijas Banka; Financial Stability Reviews of Eesti Pank and Lietuvos Bankas; several published papers and speeches from IMF and other relevant organizations: IMF, 2010, *Regional Economic Outlook: Europe*, October; Bas B. Bakker and Anne-Marie Gulde, 2010, "*The Credit Boom in the EU New Member States: Bad Luck or Bad Policies? IMF Working Paper 10/130; May 1, 2010*"; "*Adjustment under a Currency Peg: Estonia, Latvia and Lithuania during the Global Financial Crisis 2008–09; IMF Working Paper 10/213; September 1, 2010*"; European Commission, 2010, *Cross-country Study: Economic Policy Challenges in the Baltics*, Occasional Papers No. 58 (Brussels: European Commission, February); Riksrevisionen, 2011, *Maintaining Financial Stability in Sweden: Experiences from the Swedish Banks' Expansion in the Baltics*, RiR 2011:9 (Stockholm: Riksrevisionen); Lars Nyberg, 2009, "The Baltic Region in the Shadow of the Financial Crisis," speech at the Intervalor and Baltic Property Trust (Stockholm: Sveriges Riksbank, September 9); and Stefan Ingves, 2010, "The Crisis in the Baltic—The Riksbank's Measures, Assessments, and Lessons Learned," speech at the Rikdag Committee of Finance, Stockholm (Stockholm: Sveriges Riksbank, February 10).

Figure 1.9. Baltics: Private Debt to GDP

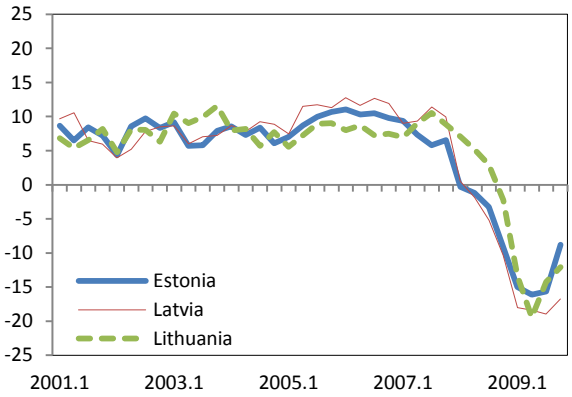
(In percent, annual change)



Source: The Riksbank.

Figure 1.10. Baltics: Economic Growth

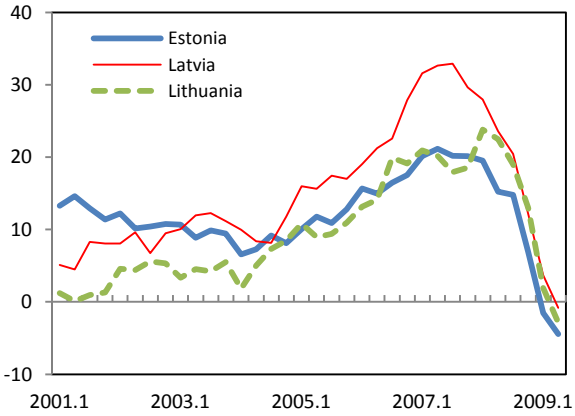
(In percent, annual change)



Source: The Riksbank.

Figure 1.11. Baltics: Nominal Wage

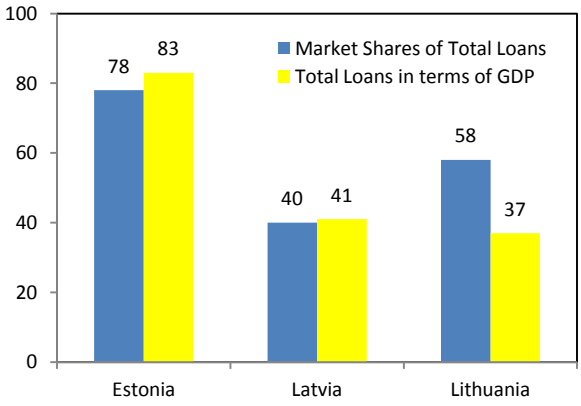
(In percent, annual change)



Source: The Riksbank.

Figure 1.12. Exposures to Baltic Countries by Swedbank and SEB

(In percent)



Source: IMF, Sweden 2009 Article IV Consultation.

Table 1.3. Foreign Capital Inflows into Baltic Countries
(In percent of GDP)

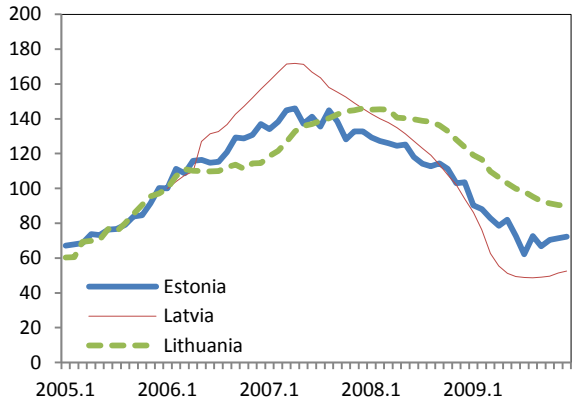
	2004	2005	2006	2007	2008	2009
FDI	3.9	7.3	5.6	5.0	3.3	0.6
Portfolio Investments	2.8	-5.9	-2.9	-1.8	1.3	-2.1
Other Investments	4.6	10.7	18.4	15.5	5.8	-6.3
Total Capital Inflows	**11.4**	**12.2**	**21.2**	**18.7**	**10.4**	**-7.8**

Source: European Central Bank.

47. **By the mid 2000s, the credit boom supported by the extensive capital inflows contributed to growing imbalances and rising vulnerabilities.** Cheap and easily-accessed cross-border bank mortgage lending fueled housing demand and boosted housing prices (Figure 1.13). Capital inflows corresponded to large current account deficits (Figure 1.14). The concomitant vulnerabilities were heavy dependence on foreign parent bank financing and large indirect foreign exchange exposures. Foreign currency loans totaled around 80 percent of GDP in Estonia and Latvia and 40 percent of GDP in Lithuania in 2008, which was 2–4 times higher than levels in 2003.

Figure 1.13. Baltics: Apartment Prices

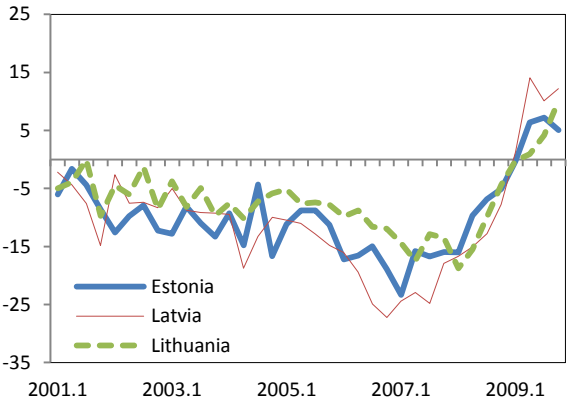
(Index: January 31, 2006 = 100)



Source: The Riksbank.

Figure 1.14. Baltics: Current Account Balances

(Percent of GDP)



Source: The Riksbank.

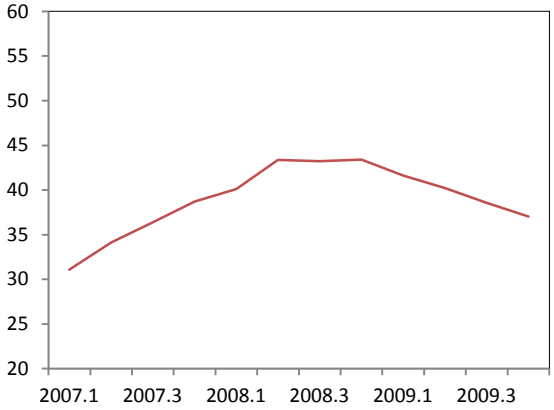
48. **Recognizing risks associated with Baltic exposures, Swedish banks started to slow credit growth in the summer of 2007 and to decrease lending from September 2008** (Figure 1.15). The lending in foreign currency to borrowers with earnings in local currency exposed the banks to indirect foreign exchange rate risk.[30] With 30 percent to 40 percent of total credits in the Baltic region channeled to mortgage lending, the banks became vulnerable to the cross-border credit concentration risk from any shocks in the Baltic housing market. With the substantial reliance on external wholesale financing (40 percent of total funding at end-March 2008), they were also exposed to global liquidity risk.

[30] The experience of the affiliates of Spanish banks in Latin America offers a useful contrast: they rely more on local financing, and thus were relatively immune to the global liquidity shock. See Kamil, Herman and Kulwant Rai, 2010, "The Global Credit Crunch and Foreign Banks' Lending to Emerging Markets: Why Did Latin America Fare Better?" IMF Working Paper 10/102 (Washington: International Monetary Fund); and the background paper to International Monetary Fund, 2011, "Cross-Cutting Themes in Advanced Economies with Emerging Market Banking Links," IMF Policy Paper (Washington).

49. **The Lehman Brothers' bankruptcy accelerated the real and financial sector downturn in the Baltic countries.** Led by a deflating asset price bubble, economic growth in the Baltic countries began to decelerate from the first half of 2008, especially in Estonia and Latvia, and the cumulated output decline in 2008–2009 ranged from 14 percent in Lithuania to almost 25 percent in Latvia.

Figure 1.15. Swedish Banks' Lending in Baltic Countries

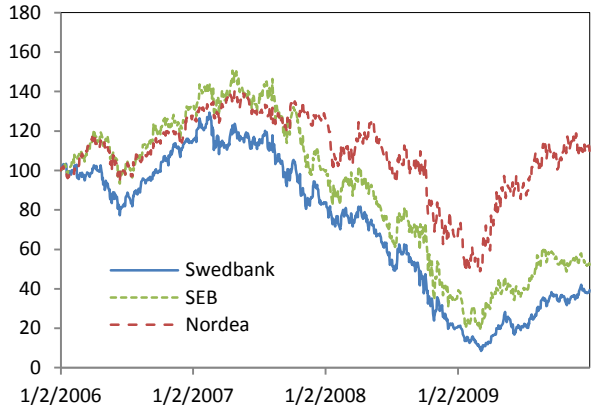
(In billions of euros)



Source: The Riksbank.

Figure 1.16. Equity Prices of Swedish Banks

(Index: January 2, 2006 = 100)



Source: Bloomberg.

50. **Swedish banks were confronted by a liquidity and capital squeeze, reflecting losses from Baltic lending and tight funding conditions in global financial markets.** Sharp increases in banks' loan losses stemmed from the Baltic region in 2008–09. The CDS spreads of Swedish banks increased sharply starting in 2008. Their stock prices bottomed in 2009 at levels well below their pre-crisis levels (Figure 1.16).

51. **To contain the crisis, the Swedish authorities took measures to ease the funding situation of the banks.** The Riksbank provided ample liquidity to Swedish banks at longer maturities and against broader types of collateral, and provided foreign currency liquidity support to Estonia and Latvia via swap arrangements in February 2009. Latvia secured external funding through IMF-supported programs.

52. **Supervisors stepped up cooperation after the onset of crisis.** The 2010 Nordic-Baltic memorandum of understanding (MOU) appears to have been especially effective in facilitating information sharing on the performance of Swedish parent banks and their affiliates among authorities, in conducting joint risk assessments and on-site examinations, and in helping to avoid cross-border regulatory arbitrage.

53. **Swedish parent banks maintained their presence in the Baltic countries despite a large portion of loan losses from the region.** Due to the global liquidity crunch and Latvian sovereign credit rating downgrades, the largest domestic bank in Latvia, Parex bank, which had relied on short-term wholesale funding, faced liquidity and solvency problems that forced a government takeover. In contrast, two large subsidiaries of Swedish banks, Hansabanka and SEB, avoided such problems owing to their parent banks' commitments to maintain their investments in Latvia as a part of the "Vienna Initiative."

54. **Before the crisis, the Baltic authorities did not fully appreciate the impending risks and did not take early and adequately strong policy actions.** The economic and credit boom in the region was thought to be different from other countries' previous boom-bust experiences. Efforts by Baltic authorities, partly due to a belated implementation, were not sufficient to avoid the credit boom-bust cycle.[31] There was no effective mechanism in place in the Baltic countries, and Sweden, to counteract the pro-cyclicality of capital flows: favorable shocks attracted large capital inflows and encouraged consumption and investment that were unsustainable in the longer run, forcing painful adjustments in recipient countries when an adverse shock hit.

55. **The Swedish supervisor lacked both the resources to carry out effective supervision and sufficient knowledge of asset quality in banks' operations in the Baltic countries:** [32]

- Swedish parent banks and the supervisory authority under-appreciated potential risks, such as cross-border credit concentration risk and indirect exchange rate risk posed by banks' activities in Baltic countries. The Estonian supervisory authorities' petition for stricter capital requirements on the Swedish banks' affiliates was turned down by the Swedish supervisor.

- The sustainability of the Swedish parent banks' business model was not examined preemptively. The model of borrowing and lending in foreign currencies exposed the

[31] The Baltic authorities had implemented various measures to contain instability from 2006. The changes in prudential regulation were focused on increasing the capital base of the banks. The risk weight for residential mortgage loans in Estonia was increased from 50 percent to 100 percent in 2006. In Lithuania, restrictions on the capital base calculation limiting the inclusion of the current year profit were introduced. In Estonia, the banks' reserve requirement was raised from 13 percent to 15 percent in 2006. In Latvia, the minimum reserve requirement was increased from 4 percent in 2004 to 8 percent by the end of 2008. In Estonia, the tax deductibility of interest rate payments on mortgages was reduced, and in Lithuania restrictions were adopted to limit tax relief on residents' mortgage loans. In Latvia, the authorities in 2007 required banks to grant loans only on the basis of legally reported income, required a 10 percent minimum down payment, and strengthened loan-to-value and debt-to-income ratio requirements.

[32] See Riksrevisionen, *Maintaining Financial Stability in Sweden: Experiences from the Swedish Banks' Expansion in the Baltics*.

banks and Baltic countries to global liquidity risk. The Swedish supervisor carried out in-depth studies on the Swedish banks' risks in the Baltic region only in the second half of 2007.

Policy implications

56. **Fund documents include a number of recommendations on the riskiness of capital flows from a Swedish regulatory and supervisory perspective:**[33]

- Swedish authorities should have monitored credit concentration to a small group of foreign countries in order to be able to contain credit risks and reduce negative repercussions in Sweden.

- Swedish supervisors needed to monitor the Swedish banks' business model and restrict, if necessary, foreign currency lending to unhedged borrowers to contain foreign exchange risks.

- National financial authorities should have had sufficient overall capacity and more resources to ensure effective supervision of Swedish parent banks.

57. **More consideration could be given to achieving better cooperation on macroprudential policy**. The need for a focus on systemic financial stability as a whole is strong in Sweden, which reflects the diffusion of financial stability responsibilities and instruments across official institutions.

58. **Enhancing cooperation on a regional basis can be an effective way of proceeding, since host countries' policies can only affect the demand side of credit expansion.** For greater efficiency, certain elements of the 2010 Nordic-Baltic MOU remain to be fully developed: the crisis management and burden-sharing arrangements need to be complemented with a more structured assessment framework, templates, and a confidential data warehouse.

[33] In March 2011, the Swedish supervisor announced higher capital requirements, including the conservation capital buffer and the countercyclical capital buffer, for the Swedish banks according to the proposals by the Basel Committee on Banking Supervision. The Swedish supervisor said that the major Swedish banks should prepare for a faster implementation of the regulations in Sweden than what was proposed by the Basel Committee.

F. Capital Flows Bypassing Regulated Financial Institutions[34]

This section looks at the cross-border capital flows that bypassed the host country regulatory perimeter. These flows create a challenge for host countries aiming to limit domestic credit growth. Key policy implications include: improving macroprudential and microprudential policy coordination, and enhancing the cooperation between home and host supervisors. Residency-based CFMs can be an option in specific circumstances.

59. **Foreign-owned banks can evade regulatory measures by having their host country borrowers switch their borrowing from the local affiliate to the home country parent bank.** For example, Bulgaria introduced bank-by-bank credit ceilings in 2005–06, which seemingly reined in credit growth but also accelerated direct cross-border borrowing by firms from foreign bank parents. In Croatia, corporate entities turned to direct borrowing from parent banks abroad, instead of channeling loans through the domestic banking system.

60. **Host country regulations aimed at restricting credit growth can also be circumvented by switching lending from foreign banks to less regulated local nonbanks.** For example, leasing institutions owned by foreign banks and outside of the regulatory perimeter were used to provide financing in Serbia. Nonbank lenders are also less likely to be influenced by domestic monetary policy measures, such as domestic interest rates.

61. **The flows that bypass regulated financial institutions can generate systemically important cross-border risks.** Unregulated—by the host country—providers of capital flows that finance credit do not have the incentive to internalize the systemic risks of their lending. Nonfinancial entities (firms or households) could take on an excessively risky external liability structure that exposes the borrower to exchange rate risk and foreign exchange liquidity risk. The lender is exposed to indirect exchange rate risk, foreign exchange liquidity risk, and credit concentration risk.

Policy implications

62. **The following policies can be used to address the risks arising from capital flows that circumvent host country regulations:**

- **The regulatory perimeter should be widened.** All financial markets and institutions, including banks and nonbanks, that are systemically important in a host country

[34] This section draws on Regional Economic Outlook: Europe (May and October 2010); Baqir, Reza, and others, 2011, "Recent Experiences in Managing Capital Inflows—Cross-Cutting Themes and Possible Policy Framework," IMF Policy Paper (Washington: International Monetary Fund); Ötker-Robe, Inci, "Coping with Capital Inflows: Experiences of Selected European Countries," IMF Working Paper 07/190 (Washington: International Monetary Fund); Ostry, Jonathan D., and others, 2011,"Managing Capital Inflows: What Tools to Use?" IMF SDN/11/06 (Washington: International Monetary Fund).

should be properly regulated in order to close loopholes used to circumvent host country regulation and supervision.

- **Micro- and macro-prudential measures can be designed to address systemic risks.** Some countries were partially able to discourage foreign currency lending in the run-up to the crisis. For example, Belarus, Moldova, and Turkey effectively restricted household borrowing in foreign currencies through long-standing prudential regulations. A more widespread effective discouragement of foreign currency loans, such as currency-specific limits on loan-to-value ratios and payment-to-income ratios (earning), could slow credit growth and prevent the buildup of large currency mismatches in the private sector.

- **Better cooperation between home and host supervisors would likely make prudential measures to control credit growth more successful.** Such cooperation should include adequate mechanisms for effective communication, information sharing, and joint analysis of common concern, and the formulation of effective responses.

- **Residency-based CFMs are more likely to be an option when prudential measures have no traction.**[35] These should be utilized only when appropriate macroeconomic conditions are already in place.[36] Non-prudential CFMs that do not discriminate on a residency basis, if available, may be preferable.

II. Policy Notes

A. Patterns and Drivers of Global Capital Flows, and Policy Implications[37]

63. **As cross-border capital flows have trended upward over the past two decades, they have become more volatile and riskier.** Surges of capital occur sequentially, and are persistent. Further, both surges and sudden stops are becoming increasingly synchronized (Figure 2.1).[38] A number of factors contribute to these trends, including structural changes, the rapid expansion of financial markets, the rise of large cross-border institutions, and the

[35] However, there are a number of practical considerations that may preclude implementing residency-based CFMs, including constraints for OECD members from its Code of Liberalization of Capital Movements and for members of the EU subject to the Treaty on the Functioning of the European Union.

[36] See Baqir, Reza, and others, 2011, "Recent Experiences in Managing Capital Inflows—Cross-Cutting Themes and Possible Policy Framework," IMF Policy Paper (Washington: International Monetary Fund).

[37] Prepared by Alvaro Piris, Narayanan Raman, and Sarah Oludamilola Sanya (IMF).

[38] See Baqir, Reza, and others, 2011, "Recent Experiences in Managing Capital Inflows—Cross-Cutting Themes and Possible Policy Framework," IMF Policy Paper (Washington: International Monetary Fund).

acceleration of financial interconnections among countries.[39] While the crisis showed that both advanced economies and EMEs could face risks from capital flows, the differing pattern of flows among these two groups determined the types of risks that manifested themselves.

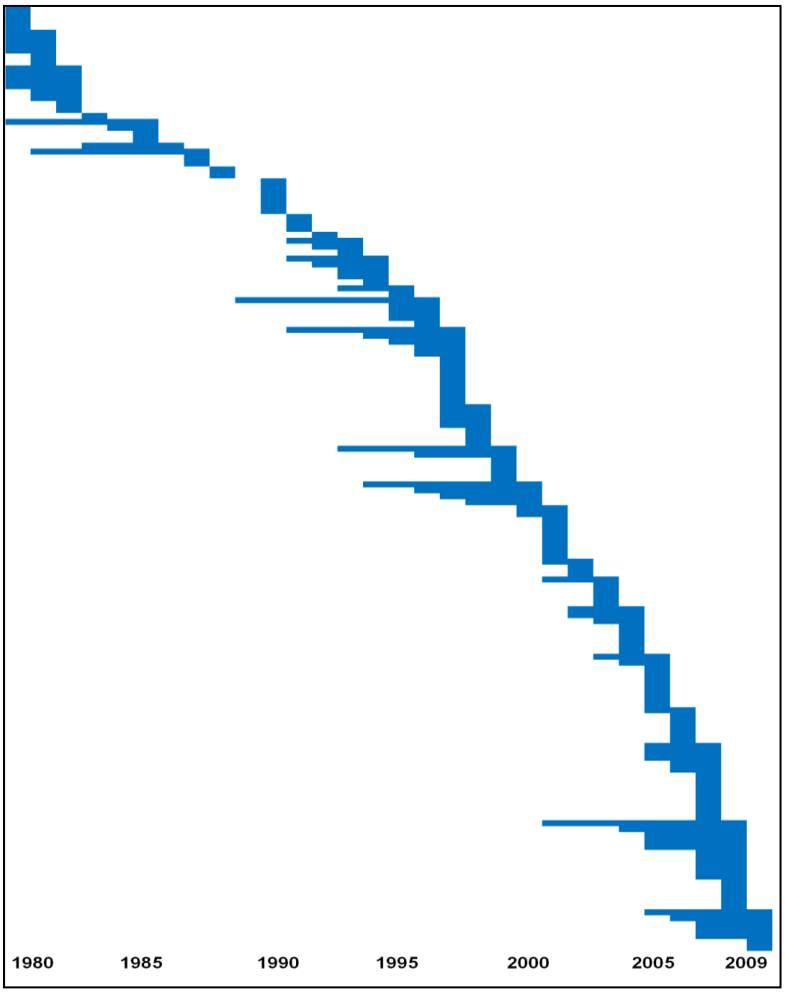
Advanced economies: Hidden risks in gross flows

64. **Transactions among a small set of large advanced economies account for the bulk of gross flows and stocks of external assets, and embed potentially important risks.** As noted in the main paper, while net flows are not large among advanced economies, they account for the bulk of gross capital flows. This trend has been largely driven by the acceleration of portfolio and other investment flows (Figure 2.2). Further, other investment flows, followed by portfolio flows, have proven to be the most volatile in recent years. The other investment segment mainly reflects banking-related flows, mostly driven by European banks (Figure 2.3). Additionally, a handful of advanced economies account for the bulk of gross global capital flows and are also home to SIFIs and global capital markets, which makes them important sources and transmitters of global shocks (Table 2.1 and Understanding Financial Interconnectedness - Supplementary Information).[40]

[39] International Monetary Fund, 2010, Understanding Financial Interconnectedness; IMF Policy Paper (Washington).

[40] Also, see the U.S. and U.K. spillover reports (International Monetary Fund, 2011, The United States: Spillover Report for the 2011 Article IV consultation; IMF Country Report 11/203 (Washington) and International Monetary Fund, 2011, United Kingdom: Spillover Report for the 2011 Article IV Consultation and Supplementary Information, IMF Country Report 11/225 (Washington).

Figure 2.1. Pattern of Surges and Sudden Stops in Capital Flows to Emerging Market Economies[41]

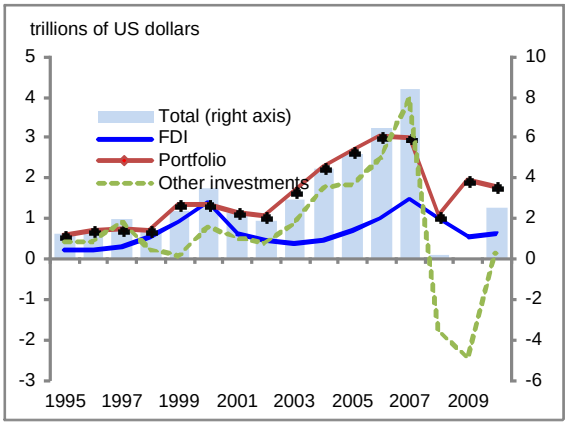


Source: World Economic Outlook and IMF staff calculations.

[41] The shaded areas show surge episodes for EMEs, based on the methodology discussed in Policy Note B. Each horizontal bar represents a surge episode for a country.

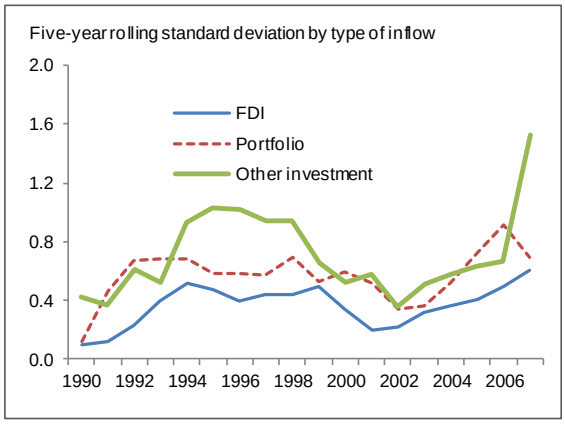
Figure 2.2. Gross Capital Inflows to Advanced Economies

Composition of Capital Flows



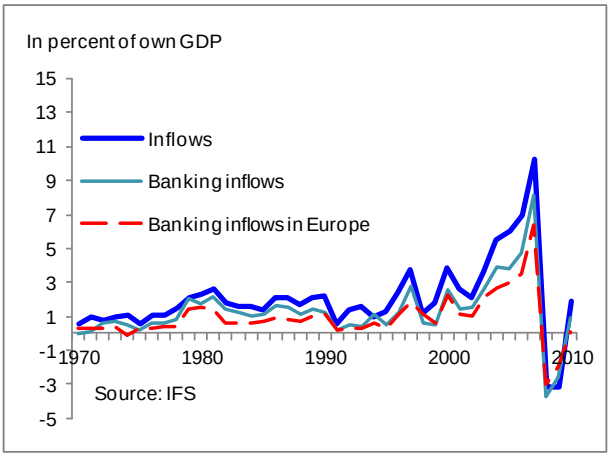
Source: World Economic Outlook

Volatility of Capital Flows



Source: World Economic Outlook

Figure 2.3. Other Investment Inflows: Bank and Nonbank Flows



Source: International Financial Statistics.

Table 2.1. Most Important Systematically Important Financial Institutions[1]

Institution	Country
JPMorgan Chase 2/	United States
Barclays Bank PLC	United Kingdom
Deutsche Bank AG	Germany
Bank of America	United States
HSBC	United Kingdom
Credit Suisse Group	Switzerland
Citigroup 2/	United States
UBS	Switzerland
BNP Paribas	France
RBS	United Kingdom
Goldman Sachs	United States
Morgan Stanley	United States
Credit Agricole SA	France
Lloyds Banking Group	United Kingdom
Rabobank	Netherlands
Wells Fargo	United States
State Street 2/	United States
BNY Mellon 2/	United States

Sources: IFR, May 2010, and staff estimates.

1/ The methodology used to identify key SIFIs is detailed in International Monetary Fund, 2010, Sweden: 2010 Article IV Consultation—Staff Report; Staff Supplement; Public Information Notice on the Executive Board Discussion; and Statement by the Executive Director for Sweden.

2/ Some of the largest holders of custody assets.

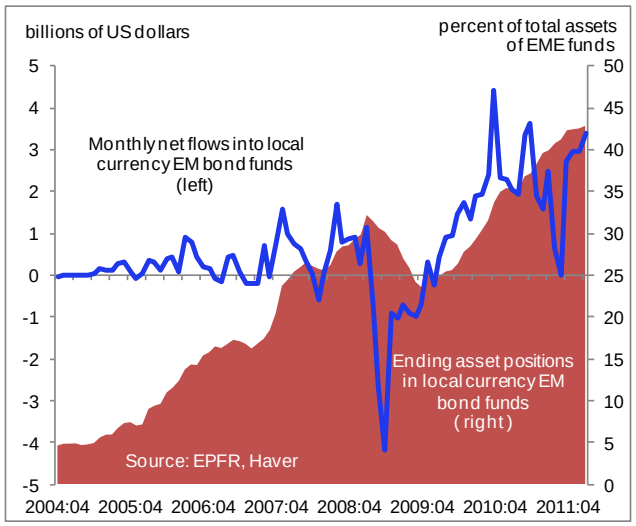
Emerging market economies: Volatile net flows

65. **In contrast to advanced economies, EME capital flows are larger on a net basis, directly affecting macroeconomic stability through the funding channel**. Not only is macroeconomic stability in EMEs vulnerable to even temporary halts in flows, but the risks are compounded by greater volatility in recent years, and, at least in the past, greater recourse to debt financing in foreign currency. For instance, banks domiciled in BIS countries overwhelmingly participated in foreign currency financing in EMEs, but a much smaller group extended loans in domestic currency.[42] Indeed, for EMEs in some regions, these vulnerabilities are especially evident. For example, foreign currency denominated loans accounted for nearly 80 percent of total loans in the Baltic countries on the eve of the crisis, and constituted the majority of loans in Hungary, Bulgaria, and Romania.

[42] Cetorelli, Nicola and Linda S. Goldberg, 2010, *Global Banks and International Shock Transmission: Evidence from the Crisis*, NBER Working Paper No. 15974.

66. **At the same time, though, structural shifts in some EMEs may have reduced vulnerabilities.** First, there has been a gradual reduction in recourse to debt financing over the last decade: gross external debt liabilities of the median EME have declined from 55.5 percent of GDP in 2000 to 42 percent in 2009. Instead, more stable financing, especially foreign direct investment (FDI), has become more prominent. During this same period, FDI liabilities rose from about 20 percent to over 40 percent of GDP.[43] Second, there is some evidence that external liabilities are becoming increasingly denominated in domestic currency as home bias among advanced economy portfolio investors steadily declines. Recent data suggest that funds in advanced economies specializing in local currency EME assets have seen a surge in interest (Figure 2.4). Third, overall macro-fundamentals in EMEs have improved, as evidenced by their relatively strong overall performance through the crisis, which has engendered greater confidence in these economies.[44] Other important factors behind renewed investor interest are the expectations of relatively stronger growth in EMEs compared to advanced economies, and the potential for higher yields.

Figure 2.4. Net Flows into Emerging Market Economies' Local Currency Bond Funds



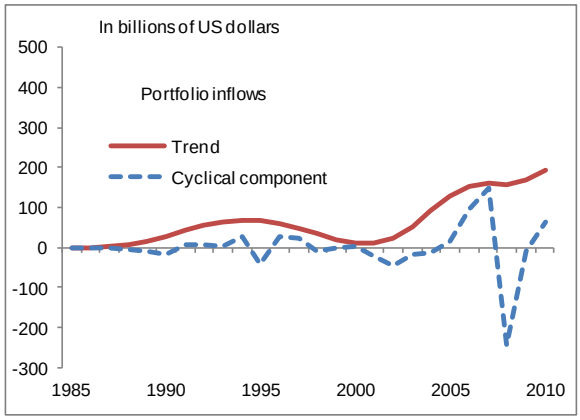
67. **Nevertheless, recent trends also point to a larger role for the more volatile components of capital flows.** Recently, there has been a significant acceleration in inflows of portfolio and other investment, which seem to have been only temporarily moderated by the crisis (Figure 2.5). Inflows remain volatile, as evidenced by the decline in flows to EMEs

[43] Goyal, Rishi, and others, 2011, Financial Deepening and International Monetary Stability, IMF SDN/11/16 (Washington: International Monetary Fund).

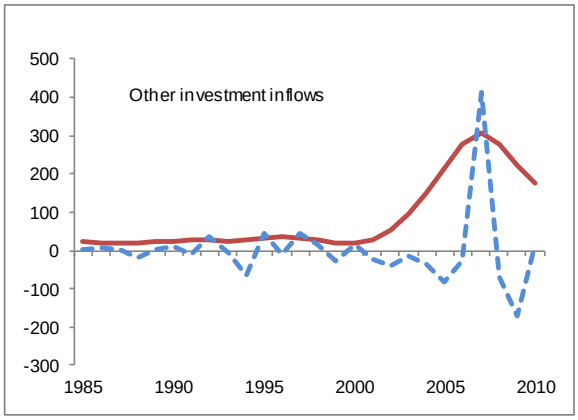
[44] See International Monetary Fund, 2010, "*How Did Emerging Markets Cope in the Crisis?*" IMF Policy Paper (Washington) and Frankel, Jeffrey, Carkis A. Vegh and Guillermo Vuletin, 2011, "*Fiscal Policy in Developing Countries: Escape from Procyclicality*," VoxEU, (available at http://www.voxeu.org/index.php?q=node/6677).

in recent months. The upward trend in gross and net flows to EMEs (Figure 4 in the main paper) and the increasing synchronization of surges and—more importantly—reversals (Figure 2.1),[45] suggests that capital flows will become an even more important issue going forward. Indeed, at current levels, a permanent 10 percent redirection of advanced economy flows to EMEs would double flows to the latter. Authorities in EMEs therefore would need to consider long-term measures to improve the absorptive capacities of their economies to deal with these flows, while using the full range of instruments at their disposal.

Figure 2.5. Trend and Cyclical Components of Gross Capital Inflows to Emerging Market Economies



Source: World Economic Outlook.



Source: World Economic Outlook.

B. Empirical Analysis of Push and Pull Factors and Net Capital Inflow Surges into Emerging Market Economies[46]

68. **This note presents a new empirical analysis of push and pull factors driving net capital inflow surges into EMEs.** The results suggest that global *push* factors play a significant role in explaining the *incidence* of a surge but that the *magnitude* of a surge depends mainly on *pull* conditions.

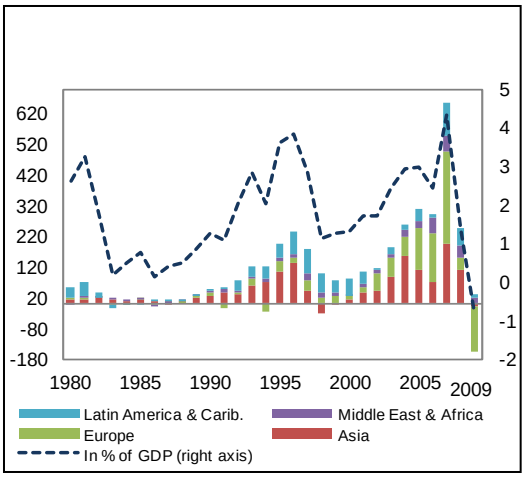
69. **Net capital flows to EMEs exhibit considerable volatility, with sudden surges in capital inflows followed by sharp reversals.** In the past three decades, for example, three periods of large capital inflows to the EMEs can be readily identified—the early 1980s (just before the Latin American debt crisis), the mid-1990s (before the East Asian financial crisis), and the years preceding the recent financial crisis (Figure 2.6).

[45] Also, see Baqir, Reza, and others, 2011, "Recent Experiences in Managing Capital Inflows—Cross-Cutting Themes and Possible Policy Framework," IMF Policy Paper (Washington: International Monetary Fund).

[46] Prepared by Mahvash Saeed Qureshi (IMF).

Figure 2.6. Net Private Capital Flows to Emerging Market Economies, 1980–2009

(In billion of U.S. dollars)



Source: IMF World Economic Outlook.

70. **In these episodes, several EMEs experienced capital inflow surges, but there is considerable cross-country variation in the amount of capital inflows received** (Figure 2.7).[47] For example, in the surge of capital inflows before the recent financial crisis (2005–2007), about one-third of the EMEs in Latin America, and the Middle East and Africa, and about one-half in Europe experienced a surge in capital inflows. However, the magnitude of the average net private capital flow during the surge ranged more widely from about 7 percent of GDP in Latin America to about 15 percent of GDP in Europe.

71. **The synchronized occurrence of surges across countries, together with the variation in their magnitude, suggests that both global push and domestic pull factors may be at play in large capital inflows to EMEs.**[48] Push factors typically include external

[47] To identify capital inflow surges in EMEs, a common threshold of the top 30th percentile of (annual) net private capital flow to GDP is taken for individual countries. However, to ensure that the identified surges are truly global in nature, only those observations are included as surges for which the net private capital flow to GDP ratio falls in the top 30th percentile for the entire EME sample as well (where the sample comprises 52 EMEs). Thus, observations of excessive net inflows that are large by historical standards are marked as surges under this approach.

[48] A large body of literature has investigated the determinants of capital flows to EMEs (for example, E. Fernandez-Arias, 1996, "The New Wave of Private Capital Inflows: Push or Pull?" *Journal of Development Economics*, Vol. 38(2), pp. 389–418; M. Taylor and L. Sarno, 1997, "Capital Flows to Developing Countries: Long- and Short-Term Determinants," *World Bank Economic Review*, Vo. 11(3), pp. 451–470; and IMF, 2011, World Economic Outlook: April 2011 (Washington DC: International Monetary Fund), but the determinants of capital inflow surges remain largely unexplored. C. M. Reinhart, and V. R. Reinhart, 2008, "Capital Flow Bonanzas: An Encompassing View of the Past and Present," NBER Working Paper 14321 (Cambridge, MA:

(continued)

conditions such as global liquidity, interest rates in advanced economies, and investors' perception of global economic risk that affect all EMEs. They could also include regional contagion effects spread through financial and trade linkages among countries. Pull factors are recipient country-specific characteristics that reflect opportunities and risks to investors, and can be grouped into macroeconomic indicators (such as output growth, the return on investment, external vulnerability, fiscal performance, and exchange rate overvaluation), and structural variables (such as integration in international goods and financial markets, financial sector development, and the overall investment climate).

72. **The empirical analysis shows that for the occurrence of a surge global push factors matter strongly.** Specifically, lower real U.S. interest rates and higher world real GDP growth rate are associated with a higher probability of a capital inflow surge in the EMEs, whereas greater uncertainty in international markets (proxied by the volatility of S&P 500 annual returns) significantly reduces the likelihood of an inflow surge (Table 2.2).[49] Among the local factors, external imbalance—proxied by the (lagged) current account balance to GDP—and the real GDP growth differential with advanced economies are the strongest determinants of surge occurrence, which simply reflect that countries with widening current account deficits tend to rely more on external financing, while those with better economic performance are likely to be more attractive investment destinations.

73. **Turning to the magnitude of surges, domestic pull factors appear much more important** (Table 2.3). While the current account imbalance remains an important determinant, trade and financial openness, as well as the exchange rate regime in place influence the magnitude of the surge. Further, the magnitude of the surge is larger for economies that are more integrated in international goods and financial markets, and for those with less flexible exchange rate regimes. Countries with lower external vulnerability (proxied by the stock of foreign exchange reserves to imports) are also estimated to attract more capital inflows. The effect of overall institutional quality, and banking supervision and regulation as measured by the indices used here is, however, statistically insignificant.

National Bureau of Economic Research); and Cardarelli, Roberto, Selim Elekdag, and Ayhan Kose, 2009, "Capital Inflows: Macroeconomic Implications and Policy Responses; IMF Working Paper 09/40; March 1, 2009," (Washington: International Monetary Fund) focus on large net capital inflow episodes, but mostly identify key stylized facts associated with these episodes, while K. Forbes and F. Warnock, 2011, "Capital Flow Waves: Surges, Stops, Flight and Retrenchment," NBER Working Paper 17351 (Cambridge, MA: National Bureau of Economic Research) use data on gross inflows to investigate the causes of the surge episodes but their sample comprises advanced economies as well as EMEs.

[49] Other measures to reflect the global macroeconomic environment such as world oil prices, and the annual percentage change in the S&P 500 index, support this result, where an increase in both variables is estimated to raise the likelihood of a surge occurrence. These measures, however, tend to be correlated with real U.S. interest rates and the world real GDP growth rate, and their statistical significance weakens when included jointly. They are therefore included as alternate proxies for global push factors.

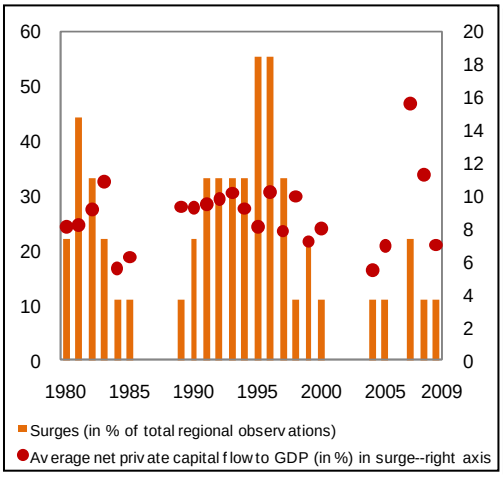
74. **About one-quarter of the surge episodes were followed by sudden reversals (Table 2.4).** One-third were in Latin America—reflecting the crises of the 1980s and 1990s—followed by Europe, reflecting the recent crisis.[50] In general, Asia has the highest percentage of crash endings, with about 50 percent of the regional surge episodes ending in sudden outflows, followed by Europe and Latin America. Preliminary analysis reveals that changes in both the global and domestic policy environment are associated with the likelihood of a surge episode ending in a crash. Specifically, a sharp increase in the real U. S. interest rates marks a higher probability of an abrupt reversal, indicating that foreign investors respond quickly to yield differences. Among the local variables, a deterioration in the current account balance (to GDP), and a rapid expansion of domestic credit (to GDP) over the surge episode, increase the likelihood of a country exiting into a crash. However, countries which experience greater currency appreciation in real terms, and those that have a higher FDI to GDP ratio during the episode are less likely to experience a hard landing.

[50] To identify the post-surge abrupt reversals, we use a three-year window with a negative net flow larger than 1 percent of GDP occurring in the first, second, or third year after the end of the surge episode. Using a window ensures that any post-surge sudden stops are not missed, while the threshold of negative net flow of 1 percent of GDP ensures that we do not include routine outflows. Together, these criteria are intended to ensure that the well-established cases of sudden stops after excessive inflows are included in the sample.

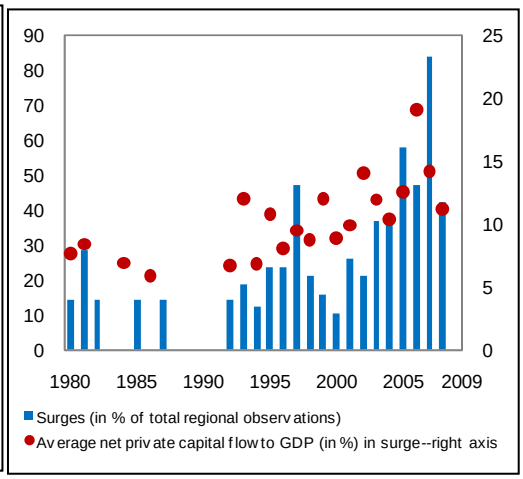
Figure 2.7. Capital Inflow Surges by Region

(1980–2009)

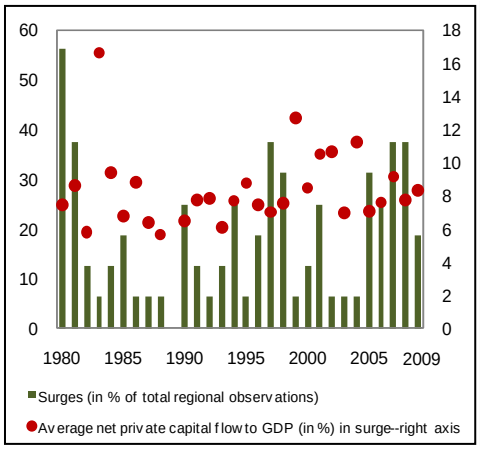
Asia



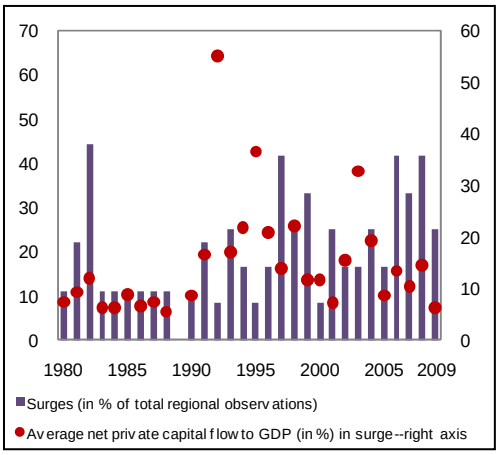
Europe



Latin America and the Caribbean



Middle East & Africa



Source: IMF Staff estimates.

Table 2.2. Estimation Results for the Likelihood of Surges

(1980–2009)

	1	2	3	4	5	6	7	8
Global factors								
Real US interest rate	-0.079***	-0.073*	-0.073**	-0.074***	-0.086*	-0.087***	-0.089*	-0.092**
	(0.025)	(0.039)	(0.033)	(0.028)	(0.045)	(0.033)	(0.046)	(0.041)
World real GDP growth rate	0.106***	0.098**	0.099**	0.094**	0.096	0.114**	0.118	0.160**
	(0.039)	(0.043)	(0.046)	(0.038)	(0.074)	(0.056)	(0.094)	(0.073)
S&P500 volatility	-0.054***	-0.053***	-0.053***	-0.051***	-0.055***	-0.056***	-0.057**	-0.063***
	(0.013)	(0.017)	(0.018)	(0.018)	(0.015)	(0.017)	(0.024)	(0.021)
Regional contagion	0.006*	0.005	0.005	0.005	0.005	0.005	0.007	0.005
	(0.003)	(0.004)	(0.004)	(0.003)	(0.005)	(0.003)	(0.008)	(0.005)
Domestic factors								
Current account balance to GDP	-0.081***	-0.080***	-0.083***	-0.082***	-0.105***	-0.100***	-0.143***	-0.123***
	(0.013)	(0.015)	(0.015)	(0.016)	(0.022)	(0.021)	(0.029)	(0.027)
Real GDP growth differential	0.010	0.009	0.009	0.008	0.032**	0.033	0.073***	0.074***
	(0.018)	(0.016)	(0.016)	(0.018)	(0.013)	(0.021)	(0.024)	(0.023)
Trade openness	0.001	0.001	0.001	0.000	-0.002	-0.001	-0.004	-0.005
	(0.002)	(0.002)	(0.001)	(0.002)	(0.004)	(0.003)	(0.004)	(0.004)
REER overvaluation	0.196			0.163	-1.159	-1.168	-2.103	-1.901
	(0.791)			(0.619)	(0.917)	(1.001)	(1.666)	(1.643)
Capital account openness		0.041		0.031	0.055	0.062	0.039	0.040
		(0.060)		(0.066)	(0.071)	(0.065)	(0.080)	(0.109)
Reserves to imports			0.002	0.002	0.003	0.003	0.002	-0.002
			(0.003)	(0.003)	(0.005)	(0.004)	(0.005)	(0.005)
Dejure exchange rate regime				-0.023	-0.040	-0.023	-0.009	-0.000
				(0.038)	(0.049)	(0.047)	(0.051)	(0.064)
Institutional quality index				0.879	0.025	0.283	0.510	0.979
				(0.772)	(0.857)	(0.825)	(1.178)	(0.973)
Private sector credit to GDP					0.001	-0.000		
					(0.006)	(0.005)		
Stock market capitalization							0.269	0.474
							(0.443)	(0.362)
Banking supervision index					0.074		0.040	
					(0.193)		(0.142)	
Credit controls/reserve requireme					-0.164		-0.033	
					(0.109)		(0.162)	
Financial liberalization index						-0.020		0.009
						(0.014)		(0.027)
real GDP per capita (log)				-0.081	0.031	-0.030	-0.125	-0.311*
				(0.151)	(0.207)	(0.180)	(0.240)	(0.167)
Observations	1,230	1,230	1,230	1,230	1,015	1,107	748	824
No. of countries	52	52	52	52	47	47	42	42
Prob. Chi2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: IMF Staff estimates. .

Notes: Dependent variable is a binary variable equal to 1if a surge occurs and 0 otherwise. Real US interest rate is the difference between 3-month US Tbill rate and the US inflation rate; S&P 500 index volatility is the annual average of twelve-month rolling standard deviation of the S&P 500 index annual returns; regional contagion is the percentage of countries in the region experiencing a surge; Real GDP growth differential is the difference in growth rate with advanced economies; REER overvaluation is the difference between actual REER and trend REER; De jure exchange rate regime ranges from 1(hard peg) to 7 (independent float); Institutional quality index is the ICRG index; Stock market capitalization is the value of listed shares to GDP; Banking supervision index ranges from 0 (ineffective supervision) to 4 (effective supervision); Credit controls/reserve requirements index ranges from 0 (strict reserve requirements and credit controls) to 4 (no reserve requirements and credit controls); Financial liberalization index ranges from 0 (fully repressed) to 4 (fully liberalized). All variables except for real US interest rate, world real GDP growth rate, and S&P500 index volatility are lagged one period. Constant and regional dummy variables included in all specifications. Standard errors reported in parentheses are bootstrapped. ***,**,* indicate significance at 1, 5, and 10 percent levels, respectively.

Table 2.3. Estimation Results for the Magnitude of Capital Inflows Surges

(1980–2009)

	1	2	3	4	5	6	7	8
Global factors								
Real US interest rate	-0.047	-0.031	0.027	0.018	-0.420	-0.237	-0.341	-0.169
	(0.206)	(0.204)	(0.210)	(0.210)	(0.268)	(0.177)	(0.278)	(0.180)
World real GDP growth rate	0.514*	0.423	0.414	0.382	0.608*	0.662**	0.305	0.309
	(0.306)	(0.323)	(0.318)	(0.322)	(0.338)	(0.274)	(0.403)	(0.289)
S&P500 volatility	-0.111	-0.094	-0.081	-0.090	-0.086	-0.184	-0.215*	-0.299***
	(0.120)	(0.118)	(0.117)	(0.117)	(0.123)	(0.113)	(0.129)	(0.111)
Regional contagion	-0.012	-0.019	-0.009	-0.010	0.012	0.006	0.027	0.013
	(0.017)	(0.017)	(0.017)	(0.016)	(0.021)	(0.016)	(0.025)	(0.019)
Domestic factors								
Current account balance to GDP	-0.359***	-0.323***	-0.361***	-0.323***	-0.457***	-0.462***	-0.444***	-0.443***
	(0.080)	(0.084)	(0.081)	(0.085)	(0.103)	(0.087)	(0.118)	(0.084)
Real GDP growth differential[a/]	0.108	0.081	0.039	0.021	0.050	0.052	0.107	0.076
	(0.078)	(0.079)	(0.086)	(0.089)	(0.100)	(0.091)	(0.131)	(0.118)
Trade openness	0.064***	0.056***	0.069***	0.069***	0.063***	0.057***	0.075***	0.063***
	(0.013)	(0.012)	(0.014)	(0.015)	(0.017)	(0.015)	(0.020)	(0.017)
REER overvaluation	-3.661			-0.634	-2.921	-6.949*	-6.489	-10.055**
	(4.928)			(5.279)	(4.282)	(4.026)	(4.829)	(4.724)
Capital account openness		0.598**		0.676**	0.301	0.546*	0.314	0.536**
		(0.259)		(0.282)	(0.297)	(0.282)	(0.255)	(0.254)
Reserves to imports			0.046***	0.061***	0.050**	0.051**	0.063**	0.055**
			(0.018)	(0.019)	(0.024)	(0.020)	(0.027)	(0.021)
Dejure exchange rate regime				-0.429**	-0.548***	-0.624***	-0.468**	-0.561***
				(0.190)	(0.184)	(0.170)	(0.189)	(0.193)
Institutional quality index				-5.328	1.444	2.373	-1.252	-1.050
				(3.456)	(2.965)	(2.872)	(4.105)	(3.507)
Private sector credit to GDP					-0.024	-0.021		
					(0.021)	(0.021)		
Stock market capitalization							-1.776	-0.464
							(1.345)	(1.131)
Banking supervision index					-0.529		-0.586	
					(0.660)		(0.723)	
Credit controls/reserve requireme					-0.131		-0.402	
					(0.369)		(0.455)	
Financial liberalization index						-0.173		-0.251
						(0.107)		(0.161)
GDP per capita (log)				-1.085	-1.542*	-1.724**	-1.871	-2.033**
				(0.692)	(0.923)	(0.806)	(1.133)	(0.926)
Observations	253	253	253	253	193	213	152	169
R-squared	0.428	0.441	0.444	0.483	0.498	0.528	0.546	0.581

Source: IMF staff estimates.

Notes: Dependent variable is net private capital flow to GDP (in percent) conditional on surge occurrence. Real US interest rate is the difference between 3-month US Tbill rate and the US inflation rate; S&P500 index volatility is the annual average of twelve-month rolling standard deviation of the S&P 500 index annual returns; regional contagion is the percentage of countries in the region experiencing a surge; Real GDP growth differential is the difference in growth rate with advanced economies; REER overvaluation is the difference between actual REER and trend REER; De jure exchange rate regime ranges from 1(hard peg) to 7 (independent float); Institutional quality index is the ICRG index; Stock market capitalization is the value of listed shares to GDP; Banking supervision index ranges from 0 (ineffective supervision) to 4 (effective supervision); Credit controls/reserve requirements index ranges from 0 (strict reserve requirements and credit controls) to 4 (no reserve requirements and credit controls); Financial liberalization index ranges from 0 (fully repressed) to 4 (fully liberalized). All variables except for real US interest rate, world GDP growth rate, and SP&P500 index volatility are lagged one period. Constant and regional dummy variables included in all specifications. Robust standard errors reported in parentheses. ***,**,* indicate significance at 1, 5, and 10 percent levels, respectively.

Table 2.4. Estimation Results for the Likelihood of Surge Episodes Ending in a Sudden Reversal

(1980–2009)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Real US interest rate [a]	0.111*	0.105*	0.179**	0.109*	0.115*	0.120*	0.189**
	(0.063)	(0.063)	(0.077)	(0.064)	(0.063)	(0.068)	(0.074)
Current account balance/GDP[a]	-0.082***	-0.081***	-0.064**	-0.085***	-0.077***	-0.116***	-0.144***
	(0.027)	(0.028)	(0.030)	(0.026)	(0.027)	(0.035)	(0.042)
Total domestic credit/GDP[a]	0.031***	0.036***	0.056***	0.028**	0.035**	0.047***	0.035*
	(0.012)	(0.014)	(0.020)	(0.014)	(0.015)	(0.016)	(0.020)
REER[a]		-0.008	-0.014	-0.008	-0.017	-0.004	-0.034**
		(0.010)	(0.012)	(0.010)	(0.013)	(0.012)	(0.016)
Primary balance/GDP[a]			-0.209***				-0.289***
			(0.066)				(0.092)
Output gap[b]				0.157**			0.146*
				(0.074)			(0.084)
Exchange rate overvaluation[b]					9.084*		8.303**
					(4.836)		(4.234)
FDI/GDP[b]						-0.116***	-0.100**
						(0.043)	(0.040)
Short term debt/Forex reserves[c]							0.002
							(0.002)
Exchange rate regime[a]							-0.090
							(0.213)
Observations	100	100	100	100	100	100	100
Pseudo R2	0.127	0.133	0.203	0.166	0.184	0.194	0.341

Source: Authors' calculations.

Notes: Dependent variable is equal to one if a surge episode ended in a crash and zero otherwise. To identify crashes (or post-surge abrupt reversals), we use a three-year window with a negative net flow larger than 1 percent of GDP occurring in the first, second or third year after the end of the surge episode. Using a window ensures that any post-surge sudden stops are not missed, while the threshold of negative net flow of 1 percent of GDP ensures that we do not include routine outflows. Constant included in all specifications. Real GDP growth rate, trade openness, and (log of) real GDP per capita in the year before the surge episode included as an initial condition in all specifications. Robust standard errors in parentheses. ***, **, and * indicate significance at 1, 5 and 10 percent levels, respectively.

a/ Change computed over surge episode.

b/ Average over episode.

c/ Value in last surge year.

C. The International Regulatory and Supervisory Architecture[51]

75. **This note summarizes and reviews the ongoing changes to the international architecture pertaining to regulatory and supervisory policies.** The international regulatory and supervisory architecture is complex, not legally binding on its own, and its implementation is up to national authorities. The architecture is today in a state of flux as major reforms prompted by the crisis are being decided.

[51] Prepared by Heedon Kang, Manmohan Singh, and Mark Stone (IMF).

Institutional setup

76. **The Group of Twenty (G-20) and the Financial Stability Board (FSB) play an important coordinating role for national regulation and supervision policies:**

- The G-20 comprises 19 countries and the EU and serves as a forum for discussion of key issues in the global economy. Since the outset of the global crisis, financial regulatory reform has been a major focus of the G-20.

- The FSB comprises high-level officials from central banks, regulators, and treasuries from 24 jurisdictions and the European Central Bank (ECB) and EU, six international standard-setting, regulatory, and central banking bodies, and four international financial institutions—including the IMF. The FSB coordinates the international work of national financial authorities and international standard setters in regulation and supervision. Membership in the FSB also does not impose legal obligations on its members. The FSB has a small secretariat located in Basel.

77. **International financial institutions have broad membership and help develop, coordinate, and implement regulatory policies drawing on their own staffs:**

- The BIS membership comprises 58 central banks and hosts regular meetings of central bank heads and other officials to discuss a variety of issues of interest to the central banking and regulatory community. The BIS also serves as a bank for central banks. Membership in the BIS does not impose legal obligations on its members. The BIS has a permanent staff of 589.

- The IMF has legal oversight over members' exchange rate, reserve and related policies. The bilateral surveillance—especially FSAP assessments—and multilateral surveillance of the Fund encompass regulation and supervision.

- The World Bank assesses certain financial standards and helps conduct FSAP assessments.

78. **Standard setters formulate standards and guidelines, and identify best practices in the expectation that member authorities will implement them in home countries.** Country members take on a de facto commitment to implement the standards and guidelines. The standard setters all have small secretariats. The standard setters most relevant for banking and supervision are:

- The Basel Committee on Banking Supervision (BCBS) has 27 member countries, reports to central bank governors and supervisors, and is hosted by the BIS.

- The International Organization of Securities Commissions (IOSCO) is an association of securities regulators based in Madrid.

- The International Association of Insurance Supervisors (IAIS) represents insurance regulators and supervisors of some 190 jurisdictions and is hosted by the BIS.

- Other relevant standard setters include: the Committee on Payment and Settlement Systems (CPSS), the International Accounting Standards Board (IASB), International Association of Deposit Insurers (IADI), International Organization of Pension Supervisors (IOPS), and International Auditing and Assurance Standards Board (IAASB).

The FSB helps coordinate the work of the standard setting agencies.

79. **Several high-level committees serve as forums for financial authorities to share information and produce reports:**

- The Committee on the Global Financial System (CGFS), which meets under the aegis of the BIS, is made up of senior central bankers and discusses and prepares reports on stability and structural changes in the global financial system.

- The Senior Supervisors Group (SSG) was established in 2007 and comprises nine supervisory agencies from 7 countries; its secretariat is hosted by the New York Federal Reserve Bank. It prepares reports of interest to the supervisory community.

80. **Supervisory colleges are comprised of national financial authorities and aim to enhance effective consolidated supervision of an international banking group on an ongoing basis.** They facilitate cross-border cooperation and information-sharing among home and host supervisors. The G-20 and the EU, which mandates Colleges of Supervisors for SIFIs, have been particularly active in developing these colleges and codifying best practices for their operation.

81. **Finally, a large number of varied working groups and committees contribute to the operational and technical design and implementation of regulatory and supervisory policies.** Some are longstanding and were created under the BIS. Others are more ad hoc, for example, the G-20 has requested working groups to address the international monetary system, ways to manage capital flows, and global liquidity. Many of these groups involve participation of national authorities as well as international entities and the standard setters.

Current reforms

82. **Progress on improving financial sector regulation has been made, in line with the recommendations of the G-20, but important gaps remain.** Coordinated progress by the international community, especially in implementation, is essential to reduce the likelihood and impact of another crisis and alleviate regulatory uncertainty.

- New capital and liquidity standards—The BCBS and FSB have adopted stricter rules for banks on capital and liquidity. Tighter requirements on trading book assets and contingent liabilities were introduced by the BCBS in July 2009. Basel III[52] was approved in July 2010 and the calibration of the new minimum requirements and capital buffers were approved in September 2010.[53] The new capital standards enhance the quality of capital, raise minimum capital standards, promote the buildup of countercyclical capital buffers, and improve risk coverage of capital. Implementation is planned to start on January 1, 2013, with completion by January 1, 2019. The Liquidity Coverage Ratio (LCR), which aims to meet short-term institution specific and systemic stresses of up to 30 days, will be implemented in January 2015 after an observation period, which began in 2011 and was extended until mid-2013. The BCBS will accelerate its review of adjustments in key areas and issue the final technical details and calibration of the LCR in June 2012. The Net Stable Funding Ratio (NSFR), which is designed to promote longer term funding of assets in times of stress, will become a minimum standard by January 2018 after an observation period starting in 2012. However, the timing of implementation may vary considerably across countries.

- Global systemically important banks (G-SIBs[54])—The additional loss absorbency requirement for G-SIBs, so-called capital surcharge, was finalized at the September

[52] Basel III is a new international regulatory standard on bank capital adequacy and liquidity agreed by the members of the BCBS. It was developed in a response to the deficiencies in financial regulation revealed by the global financial crisis in order to strengthen bank capital requirements and introduce new regulatory requirements on bank liquidity and bank leverage. For detailed information, see Basel Committee on Banking Supervision, 2011, *Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems* (Basel: BIS, June).

[53] Basel Committee on Banking Supervision, 2011, *Progress Report on Basel III Implementation* (Basel: BIS, October).

[54] G-SIBs comprise banks whose disorderly failure would cause significant disruption to the global financial system and economic activity due to their size, complexity, and interconnectedness. G-SIFIs encompass global systemically important banks and non-banks.

2011 Basel Committee meeting.[55] The surcharge is to be met with Common Equity Tier 1 (CET1) capital ranging from 1 percent to 2.5 percent, depending on banks' current systemic importance. If G-SIBs would become more systemically important in the future, they could face surcharges of up to 3.5 percent. Implementation will begin in January 2016 becoming fully effective on January 1, 2019. The methodology for identifying G-SIBs, proposed in the BCBS document, will be subject to changes and additional testing by March 2012. Whether to disclose the names of G-SIBs remains unsettled, and more work will need to be done to extend this framework to other sectors, such as insurance companies, and to institutions that are systemically important at a national level. Agreement by the G-20 will be needed for the new rules to take effect.

- The infrastructure of the OTC derivatives markets[56]—To address the weaknesses exposed by the crisis, the G-20 agreed at the Pittsburgh leaders' summit in September 2009 that all standardized OTC derivatives contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties (CCPs) by the end of 2012, and that OTC derivative contracts should be reported to trade repositories. To support implementation, the FSB, along with the IOSCO and the CPSS, formed several working groups to set out policy options, and prepared a report of recommendations to the G-20. Standard setters and regulators are also cooperating in the design and implementation of the new framework to promote greater use of CCPs. In September 2011, the Basel Committee concluded that the most of the agreement would be met by the end of 2012. However, based on concerns pertaining to slow progress, the Committee stressed that it would be necessary to put pressure on national jurisdictions for implementation in as many areas as possible, and to obtain the renewed political support of the G-20 leaders.

- Regulatory perimeter and shadow banking—At its plenary meeting in Paris in July 2011, the FSB approved initial recommendations for strengthening the oversight and regulation of the shadow banking system prepared by its Shadow Banking Task Force. The Task Force identified five areas where more detailed work is warranted: regulation of banks' interactions with shadow banking entities; regulatory reform of MMMFs; regulation of other shadow banking entities; regulation of securitization; and regulation of activities related to securities lending and repos. The FSB set up dedicated workstreams in each area with progress reports to be submitted by July

[55] Basel Committee on Banking Supervision, 2011, *Global Systemically Important Banks: Assessment Methodology and the Additional Loss Absorbency Requirement*, Consultative Document (Basel: Bank for International Settlements, July).

[56] Financial Stability Board, 2011, *OTC Derivatives Market Reforms: Progress Report on Implementation*, (Basel: Bank for International Settlements, April).

2012. Given the heterogeneity of institutions and the wide-ranging differences in their systemic importance in national systems, reaching agreement and moving to implementation could be a drawn out process.

- Supervisory intensiveness and effectiveness—Significant efforts have been made to improve the intrusiveness and effectiveness of prudential supervision, particularly in the context of complex G-SIBs. These efforts have culminated in recommendations for enhanced supervision issued by the FSB in November 2010,[57] addressing, *inter alia*, supervisory mandates, independence and resources, as well as supervisory powers, supervisory techniques, consolidated supervision, supervisory colleges, and macroprudential surveillance. Implementation of these recommendations is ongoing. While national authorities are making progress in strengthening the supervision of G-SIBs, more work is needed to ensure that supervision applied by national authorities is fully commensurate with the potential risk that such firms pose to their own domestic financial systems, as well as to the broader international financial system.

- Effectiveness of supervisory colleges—Core supervisory colleges involving a small number of key jurisdictions appear to work well for both banks and supervisors, but broader colleges with more jurisdictions are working less effectively. In response to host countries' concerns that they were not being sufficiently included in supervisory colleges, a suggestion was made at the September 2010 BCBS meeting to allow host jurisdictions to participate in the supervisory colleges of G-SIBs whose affiliates are systemically important in the host country. An agreement was also reached to continue monitoring the effectiveness of the colleges based on the importance of better information sharing between home and host jurisdictions.

- Adherence to standards—The BCBS and the FSB put in place a rigorous framework to monitor and review members' adherence to International Standards by FSAPs, periodic peer reviews, thematic reviews of key issues, and by establishing a toolbox of measures.[58] Based on this monitoring, the BCBS will publish the status of members' adoption of the standards and will update this report on a regular basis. It will also review the consistency of members' legislation or regulations with the international minimum standard to identify differences that could raise level playing field concerns, especially in terms of risk weighted asset calculations for the banking and trading

[57] Financial Stability Board, 2010, *Intensity and Effectiveness of SIFI Supervision: Recommendations for Enhanced Supervision* (Basel: Bank for International Settlements, November).

[58] As of September 2011, four peer reviews were completed under the FSB's "Framework for Strengthening Adherence to International Standards."

books in G-SIB home jurisdictions. There was also an agreement that the IMF, BCBS, and FBS will need to coordinate to carry out assessments to avoid duplication.

D. Review of the Literature on the International Coordination of Supervisory Policies[59]

83. **The literature suggests that cross-country supervisory coordination can produce an array of outcomes with quite different implications for global stability.** In particular, different assumptions can lead to the opposite results (more coordination is good or more coordination is bad). Policymakers should make every effort to coordinate in a manner supportive of global stability.

84. **Much of the literature deals with regulatory arbitrage involving large financial institutions shifting from strong to weakly supervised jurisdictions.** The problem is that the cross-country linkages between financial institutions and markets can expose all the jurisdictions to the externalities posed by the risk taking of private decision-makers. There is some evidence that banks indeed gravitate to weakly regulated jurisdictions.[60] However, there is also an argument against regulatory coordination, which is that it leads to a loss of national flexibility (if all regulators are compelled to impose common regulations).

85. **Dell'Ariccia and Marquez (2005) employ a three-stage model of bank regulation and lending competition to capture an inherent cross-border externality.**[61] Regulators maximize a weighted average of bank profits and bank stability (probability of failure). The cases of a national or an international regulator are considered. Banking regulation introduces an externality: higher standards in one country improve stability in foreign countries where its banks operate; thus, the foreign regulator imposes lower standards than would be the case under an international regulator. A single regulator will be preferred only if it sets universal standards higher than those of the national regulators. The presence of third countries creates free rider problems. Finally, the results hinge on the nature of financial integration.

86. **Morrison and White (2009)[62] come to the conclusion that multilateral regulatory coordination leads to weak regulations.** Assuming no bank deposit insurance (so that banks want to be regulated tightly) and a limited number of bank licenses per country (so that weaker banks have to migrate to loosely regulated countries), an adverse cherry picking externality is imposed by the better regulator on the worse regulator. Weakly regulated

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[59] Prepared by Roberto Piazza and Mark Stone (IMF).

[60] Joel F. Houston, Chen Lin, and Yue Ma, 2009, *Regulatory Arbitrage and International Bank Flows*.

[61] Giovanni Dell'Ariccia and Robert Marquez, 2005, *Competition Among Regulators and Credit Market Integration*, Journal of Financial Economics 79, 401–430.

[62] Alan D. Morrison and Lucy White, 2009, *Level Playing Fields in International Financial Regulation*, Journal of Finance 64, 1099–1142.

countries could respond by closing their capital accounts. Alternatively, international coordination (a level playing field) could be realized by requiring common deposit rates and capital requirements. However, banks in the weakly regulated countries will only stay there if the common capital requirements are low, which limits the benefits of regulation in better-regulated economies. This approach ties together capital account openness and regulatory coordination, but the assumption of no deposit insurance undermines its realism.

E. Empirical Analysis of Multilateral Effects of Capital Flow Management Measures[63]

This note describes analysis of the multilateral effects of CFMs. The impact of the announcements of recent CFMs in one country on the equity returns and equity fund flows of other countries in the same region are tested using event studies. The results suggest that CFMs can have both positive and negative effects on the equity returns and flows of other countries.

Model specification

87. **The main analysis examined changes in equity prices in U.S. dollar terms—a proxy for equity investment returns for foreign investors—in the countries of interest relative to the country that has implemented CFMs.** The methodology follows Bayoumi and Bui (2011), who examine the impact of U.S. policy announcements on foreign asset prices across G20 countries.[64] The estimated coefficients of the equity returns relationships only capture the correlations between the two markets, controlling for other global and domestic variables, and do not necessarily signify causal relationships. Domestic and global market indicators which could drive both the home and foreign markets were included as control variables to separate out as much as possible the impact of CFMs from those arising from changes in other financial conditions.

88. **Daily data from January 2003 to September 2011 were used for five Latin American countries (Brazil, Chile, Colombia, Mexico, and Peru) and five Asian countries (Indonesia, Korea, Malaysia, the Philippines, and Thailand).** Daily equity returns of other countries in the region (e.g., four Latin American countries excluding Brazil) were regressed on returns in the CFM-implementing country (e.g., Brazil) and daily changes in other global financial conditions in a pooled panel. Responses to events were measured using the single-day response in equity market prices in U.S. dollar terms. A one-day window was chosen over a longer window to focus on the multilateral effects of identified CFM events and to avoid adding noise from a confluence of other unrelated events.

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[63] Varapat Chensavasdijai, Mali Chivakul, and Sarah Oludamilola Sanya (IMF).

[64] Bayoumi, Tamim and Trung Bui, 2011, "*Unforeseen Events Wait Lurking: Estimating Policy Spillovers From U.S. To Foreign Asset Prices*," IMF Working Paper 11/183 (Washington: International Monetary Fund).

Robustness checks indicate that similar results are obtained using somewhat longer windows (2, 5, and 10 days).

89. **The specification used in the analysis is:**

$$\Delta y_{it} = \alpha i + (\beta_i + \gamma_i EVENTS_{it})\Delta x_{it} + \delta \Delta z_t + \varepsilon_{it},$$

where y_{it} is the equity return in U.S. dollar terms in neighboring countries, x_{it} is the equity return in U.S. dollar terms in the CFM-implementing country, $EVENTS_{it}$ is a matrix of dummy variables equal to one on the dates of the CFM announcements, and z_t is a matrix of domestic and global market conditions (control variables). Global market conditions include global risk aversion, oil and non-oil commodity prices, and U.S. asset prices, and domestic conditions include domestic policy rates and sovereign risks (see details in Table 2.8). Hence, the coefficient γ captures the impact of CFM announcements on neighboring countries, scaled by the impact on the CFM-implementing country.

90. **Responses to events were measured using the market response on the day of the CFM announcement.** The same-day responses for Latin American markets and the U.S.-based control variables were used, while for Asia, same-day responses for Asian markets, together with a one-day lag for the U.S.-based control variables, were employed owing to the time difference. Daily data on the basis of five-day weeks were cleaned to remove non-trading days.[65]

91. **Only CFM events that had a noticeable impact on the country itself were selected for the analysis (Table 2.5).** If the introduction of a measure (or set of measures) by a particular country at any one date had a negligible impact on domestic financial markets (e.g., equity prices or exchange rates moved by less than one standard deviation computed over the entire horizon considered), it was considered unlikely to have had spillover effects on the region, and was therefore excluded.

[65] Exchange rate data were all measured at the end of the U.S. trading day.

Table 2.5. List of Key Capital Flow Management Events

Country	Announcement Date	Effective Date	Event 1/
Brazil	*19-Oct-09*	*20-Oct-09*	*Imposed 2 percent IOF tax 1/*
	4-Oct-10	5-Oct-10	Imposed 4 percent IOF tax
	18-Oct-10	*19-Oct-10*	*Imposed 6 percent IOF tax (bonds) 1/*
	6-Jan-11	*14-Apr-11*	*Imposed 60% reserve requirements on bank short USD positions above US$3 billion 1/*
	28-Mar-11	29-Mar-11	Imposed 6 percent IOF tax on ST FX loans with maturities of 360 days or less
	6-Apr-11	7-Apr-11	Imposed IOF tax on ST FX loans with maturities extended from 360 to 720 days
	27-Jul-11	*27-Jul-11*	*Imposed 1 percent IOF tax on increases in banks' net short FX derivatives positions 1/*
Colombia	*6-May-07*	*7-May-07*	*Imposed 40 percent URR on foreign borrowing 1/*
	23-May-07	*24-May-07*	*Extended URR to nonresidents' portfolio investments 1/*
Korea	19-Nov-09	19-Nov-09	Introduced measures on banking sector
	13-Jun-10	*14-Jun-10*	*Introduced measures on banks aiming to reduce their short-term debt 1/*
	18-Nov-10	*1-Jan-11*	*Re-instated withholding tax on foreign investors' earnings from government bonds 1/*
	19-Dec-10	1-Aug-11	Proposed plans to introduce a levy on banks' non-deposit FX liabilities
	19-May-11	1-Jun-11	Reduced banks' FX derivatives ceiling
Thailand	*18-Dec-06*	*19-Dec-06*	*Imposed 30 percent URR on all inflows 1/*
	12-Oct-10	13-Oct-10	Re-instated withholding tax on interest income amd capital gains from public bonds

Source: IMF staff estimates.
1/ CFM events selected for the analysis.

92. **The impact of the announcement of CFMs in Brazil on equity fund flows to other Latin American countries was also estimated.** Specifically, the determinants of daily net flows into dedicated Latin American country equity funds were examined. Flow data from January 2008 to July 2011 were collected from EPFR.[66] Given limited data availability, only the impact of Brazil's CFM events was considered. Each event date dummy for the flow equation specified below is set as unity for the day after the CFM announcement date due to the nature of investors' deposit and withdrawal of funds (i.e., lags between investors' buy/sell orders and when transactions actually take place). Specifically:

[66] High frequency data were obtained from EPFR Global. The assets under management (AUM) by dedicated country equity funds reported to EPFR on a daily basis represent between 2 percent to 5 percent of total equity liabilities (according to IMF's International Investment Position data) of each EME of interest.

$$y_t = \alpha + \sum_1^n \mu_n y_{t-n} + (\beta + \gamma EVENTS_{t-1})x_t + \delta \Delta z_t + \varepsilon_t,$$

where y_t is net flows into equity funds of the neighboring countries, $y_{t-n}$is a structure of lags to capture persistence in flows, x_t is net flows into equity funds of the CFM-implementing countries, $EVENTS_t$ is a matrix of dummy variables equal to one on the dates of the CFM announcements, and z_t is a matrix of market conditions including those identified as push and pull factors in capital flows. The Breusch-Godfrey test was used to test for the presence of serial correlation in the model with lagged dependent variables.

Results

93. **The estimated multilateral effects of CFMs varied considerably (Table 2.5).** The positive estimated coefficients for the equity returns relationships indicated that they are highly correlated across countries within each region. As expected, global factors such as VIX, commodity prices, and U.S. equity index are found to be important determinants of EME equity returns. CFM events, however, had both negative and positive effects on the equity returns of and flows to neighboring countries. CFMs in Brazil were associated with higher equity returns in Chile and Mexico—consistent with a diversion of flows to these countries—and with lower returns in Colombia and Peru, consistent with market perceptions of increased likelihood that these countries could follow suit with similar measures.[67] The estimated effects for Mexico and Peru were statistically significant, while those for Chile and Colombia were not. CFMs in Colombia were associated with higher equity returns in Chile, but also with lower returns in Brazil, Mexico, and Peru. CFMs in Korea were estimated to have increased equity returns in Malaysia and Thailand. Finally, Thailand's CFM was associated with higher equity returns in Indonesia, Korea, Malaysia and the Philippines.

[67] Note that a negative sign means that the effect on the neighboring country is in the opposite direction as in the country implementing the CFM, and hence is consistent with diversion of flows to the neighboring country.

Table 2.6. Impact of Capital Flow Management Measures

Brazil's 2009-11 measures	Percent change in returns in USD terms
Control variables	
CDS	-0.000350***
	(0.0000)
Policy rates	-1.90E-05
	(0.0000)
VIX	-0.000699***
	(0.0002)
Oil price	-0.00232
	(0.0183)
Non-oil commodity price	0.130***
	(0.0214)
U.S. yield	-5.23e-05*
	(0.0000)
U.S. equity index	0.0652**
	(0.0325)
LIBOR	-0.000269***
	(0.0001)
Equity returns relationship	
Chile	0.282***
	(0.0193)
Colombia	0.196***
	(0.0229)
Mexico	0.432***
	(0.0215)
Peru	0.231***
	(0.0227)
Impact of CFM events	
Chile	-0.151
	(0.1180)
Colombia	0.0688
	(0.2900)
Mexico	-0.507***
	(0.1490)
Peru	0.146*
	(0.0804)
Observations	7,468
R-squared	0.453

Colombia's May 2007 URR	Percent change in returns in USD terms
Control variables	
CDS	-0.000492***
	(0.0000)
Policy rates	-1.28E-05
	(0.0000)
VIX	-0.000499**
	(0.0002)
Oil price	0.0541***
	(0.0193)
Non-oil commodity price	0.104***
	(0.0223)
U.S. yield	-1.35E-05
	(0.0000)
U.S. equity index	0.427***
	(0.0362)
LIBOR	-6.41E-05
	(0.0001)
Equity returns relationship	
Chile	0.180***
	(0.0203)
Brazil	0.374***
	(0.0295)
Mexico	0.222***
	(0.0285)
Peru	0.140***
	(0.0231)
Impact of CFM events	
Chile	-0.176***
	(0.0561)
Brazil	0.479***
	(0.0713)
Mexico	0.219***
	(0.0487)
Peru	0.179**
	(0.0852)
Observations	7,430
R-squared	0.504

Korea's 2010 measures	Percent change in returns in USD terms	Thailand's December 2006 URR	Percent change in returns in USD terms
Control variables		**Control variables**	
CDS	-0.000135***	CDS	-0.000443***
	(0.0000)		(0.0001)
Policy rates	-8.90E-06	Policy rates	2.85E-05
	(0.0000)		(0.0000)
VIX	-0.000376***	VIX	-0.000208
	(0.0001)		(0.0002)
Oil price	0.106***	Oil price	0.0676***
	(0.0196)		(0.0201)
Non-oil commodity price	-0.0356	Non-oil commodity price	-0.0049
	(0.0236)		(0.0268)
U.S. yield	-4.22E-05	U.S. yield	5.23e-05*
	(0.0000)		(0.0000)
U.S. equity index	0.236***	U.S. equity index	-0.0513
	(0.0252)		(0.0386)
LIBOR	-0.000163**	LIBOR	-6.86E-05
	(0.0001)		(0.0001)
Equity returns relationship		**Equity returns relationship**	
Indonesia	0.348***	Indonesia	0.453***
	(0.0334)		(0.0426)
Malaysia	0.167***	Korea	0.454***
	(0.0181)		(0.0404)
Philippines	0.224***	Malaysia	0.221***
	(0.0198)		(0.0192)
Thailand	0.276***	Philippines	0.223***
	(0.0281)		(0.0406)
Impact of CFM events		**Impact of CFM events**	
Indonesia	-0.0303	Indonesia	-0.253***
	(0.0346)		(0.0426)
Malaysia	0.143***	Korea	-0.400***
	(0.0205)		(0.0406)
Philippines	-0.0025	Malaysia	-0.0703***
	(0.0083)		(0.0192)
Thailand	0.126***	Philippines	-0.162***
	(0.0303)		(0.0405)
Observations	7,489	Observations	7,397
R-squared	0.315	R-squared	0.315

Source: IMF staff estimates.
Note: Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

94. **The determinants of daily flows to Brazil equity funds, by contrast, seem to be mostly captured by the persistence of flows (Table 2.7) and the correlations between flows to Brazil and other neighbors are mostly not significant.** Only Chile and Peru (and

to a lesser extent Mexico) seem to exhibit significant, albeit different, responses in flows on Brazil's CFM event dates, and in both cases the direction of the estimated impact is different from that obtained in the estimates from equity returns. This could be due to the much shorter sample period or the very limited coverage of the daily equity funds flows data, especially in comparison to the event studies on equity returns.

Table 2.7. Capital Flow Management Measures and Daily Flow to Emerging Market Equity Funds

Variables	Chile	Colombia	Mexico	Peru
Flows to Brazil	0.0283	0.101**	0.0156	0.00472
	(0.0023)	(0.0009)	(0.0299)	(0.0041)
(Flows to Brazil)*Brazil's CFM events	0.0542**	-0.0191	-0.0372*	-0.106***
	(0.0396)	(0.0069)	(0.1840)	(0.0368)
Control variables				
VIX	-0.0359	-0.00168	-0.00862	-0.103**
	(0.0104)	(0.0101)	(0.0639)	(0.0491)
Change in oil prices	-0.0925	0.00327	-0.0178	-0.0227
	(17.8200)	(5.1030)	(50.6300)	(26.1200)
Change in non-oil commodity prices	0.0881	-0.0368	0.0118	0.0262
	(17.6500)	(6.4210)	(62.1300)	(32.3200)
Change in Brazil's CDS spreads	0.0403	-0.00622	-0.022	0.04
	(0.0261)	(0.0104)	(0.0656)	(0.0787)
Change in U.S. equity index	0.0534*	-0.025	0.135***	0.0215
	(9.4110)	(4.1860)	(45.0600)	(27.0500)
Change in U.S. yield	-0.0795	0.0594	0.0467	0.00386
	(0.0519)	(0.0088)	(0.0980)	(0.0421)
Change in LIBOR	0.026	-0.031	0.0457	0.0514*
	(0.1660)	(0.2530)	(0.9480)	(2.2240)
Observations	878	603	883	528
R-squared	0.077	0.155	0.102	0.142
Number of lag dependent variables	4	4	4	4

Source: IMF staff estimates.

Note: Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Table 2.8. Definition and Source of Variables

Variable	Definition	Source
Equity returns in USD	(1+%ΔEquity indices)*(1+%ΔBilateral USD exchange rate) -1	Bloomberg, Datastream
Equity indices	Daily equity indices from each market	Bloomberg
Bilateral USD exchange rate	Daily local currency per U.S. dollar	Datastream
VIX	Daily Chicago Board Options Exchange Market Volatility Index	Datastream
Oil prices	Daily oil prices	Datastream
Non-oil commodity prices	Daily non-oil commodity price indices	Datastream
US yield	Daily U.S. generic 10-year treasury yields	Bloomberg
US equity	Daily S&P 500 indices	Bloomberg
CDS	Daily 5-year CDS spreads	Markit, Datastream
Policy rates	Relevant central bank policy rates (daily)	Datastream, Haver
LIBOR	Daily overnight LIBOR	Haver
Daily flows to equity funds	Daily flows to each EM-dedicated equity funds	EPFR

F. Trade Policies and Capital Flow Management Policies[68]

95. **This note summarizes the trade policy literature with a view to informing consideration of the multilateral implications of capital flow policies.** There is a considerable amount of analysis and policy experience in trade policies that can be tapped to help better understand policies affecting capital flows.

96. **The efficiency of free trade has been for a long time a widespread belief among economists.** Since Ricardo's seminal work on comparative advantage, economists have viewed free international trade as the optimal regime. The general view is that free trade allows a country to produce and export the goods that it is able to produce with relatively greater efficiency, while importing the goods that are more efficiently produced abroad. Every country is better off in a free trade regime.[69]

97. **However, real world trade policies are often interventionist.** The use of interventionist trade policies has helped motivate theoretical attempts to justify them. Economic and political rationales have been proposed.

[68] Roberto Piazza and Mark Stone (IMF).

[69] For an overview on optimal trade policies, see Gene M. Grossman and Kenneth Rogoff, 1995, *Handbook of International Economics, vol. III*, Elsevier Science.

98. **Economic rationales for interventionist policies are usually based on some form of market imperfection.** For instance, international firms transacting in oligopolistic markets are able to gain extra profits. Here, export subsidies can help domestic firms pursue aggressive market penetration strategies and thus "shift" profits from foreign competitors.[70] As another example, import tariffs can increase returns in production from learning by doing, among other economies.[71] Temporary protection of "infant" industries enables domestic firms to grow and progressively become more efficient by fully exploiting increasing returns to scale.

99. **Political economy considerations may also be important in understanding trade policies.** The Stolper-Samuelson theorem on international factor price equalization shows that international trade can have large and asymmetric effects on the incomes of production factors. International trade should lead to a decrease in the price of production factors that are relatively scarce domestically but abundant internationally, and to an increase in the price of factors that are domestically abundant but internationally scarce. This produces gains for some domestic groups and losses for others. Interventionist trade policies are simply the outcome of a political economy game with different groups lobbying the government for supporting interventionist policies.[72]

100. **However, economists remain skeptical about the effectiveness of active trade policies, reflecting their strong informational requirements.** There is no general argument in favor of active ("strategic") trade policies. Rather, the optimality of intervention relies on very specific conditions, which may not only be hard to achieve in practice, but would also require that the government have access to a great deal of information. In the words of Krugman, "theoretical work has shown that the appropriate strategic policy is highly sensitive to details of market structure that governments are unlikely to get right." [73]

101. **In particular, active trade policies can have negative one-way spillover effects on trading partners.** Even if unilaterally optimal, active trade policies often increase domestic welfare at the expense of trading partners. For instance, "profit shifting" policies are explicitly aim to increase profits for domestic firms by reducing production and profitability of foreign competitors. Similarly, policies that shift demand to domestic infant industries

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[70] James Brander and Barbara Spencer, 1985, *Export Subsidies and International Market Rivalry*, Journal of International Economics, 18, pp. 83–100.

[71] Alwyn Young, 1991, *Learning by Doing and the Dynamic Effects of International Trade*, Quarterly Journal of Economics, pp. 369–405.

[72] Gene M. Grossman and Elhanan Helpman (1994), *Protection for Sale*, American Economic Review 84, pp. 833–850.

[73] Paul Krugman, 1993, *The Narrow and Broad Arguments for Free Trade*, American Economic Review 83, pp. 362–366.

reduce production abroad, negatively affecting foreign countries' abilities to exploit their increasing returns to scale in production. Negative trade policy spillovers can pose an externality in that the policymaker lacks incentives to factor into its decision-making the welfare of the trading partners adversely impacted by spillover from its trade interventions.

102. **Negative spillovers from active trade policies can trigger inefficient trade policy "wars."** Countries have the incentive to protect themselves from another country's attempt to employ beggar-thy-neighbor policies. In the context of trade policies, this situation can lead to a trade war, namely to a chain reaction where protectionist barriers keep rising worldwide. This can induce a "prisoner's dilemma" equilibrium, with every country worse off than in the free trade regime.

103. **Trade policies during the 1930s are often cited as a contributing factor in worsening the Great depression.** As the Depression unfolded, trade measures to protect domestic industries caused negative one-way spillovers to similar industries in other countries. Trading partner governments responded with matching protectionist measures. Overall, the Smoot-Hawley Act (1930) of the U.S. and similar laws passed in Europe had the effect of doubling import tariffs in the world's largest economies. Since trade was concentrated in material inputs, the collapse of international trade attributable to the tariff war negatively impacted productivity and investment, thus worsening the recession.[74] [75]

104. **International trade agreements and institutions, such as the WTO, were established to avoid trade policy wars.** International trade agreements can be seen as a response to the possibility of repeated trade policy actions between governments. Repeated interactions allow participants in a trade agreement to punish a partner that deviates from the agreement. A credible trade agreement emerges from a sufficiently strong punishment for a unilateral deviation. This requires credible punishments, or that countries must find it optimal to enact the punishment whenever necessary. As verification of a deviation from a trade agreement can be difficult, international organizations, such as the WTO, assess potential deviations from agreements and coordinate the corresponding punishment in the case of a violation.[76]

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[74] Mario J. Crucini and James Kahn, Tariffs *and Aggregate Economic Activity: Lessons from the Great Depression*, Journal of Monetary Economics 38, 427–467.

[75] Some authors dismiss the importance of the trade war in causing the Great Depression. See for instance Dornsbush, Rudiger, and Stanley Fischer, 1984, *The Open Economy: Implications for Monetary and Fiscal Policies*, NBER Working Paper 1422.

[76] Raymond Riezman, 1991, *Dynamic Tariffs with Asymmetric Information*, Journal of International Economics 30, pp. 267–283.