



IMF MULTILATERAL POLICY ISSUES REPORT

2013 SPILLOVER REPORT—ANALYTICAL UNDERPINNINGS AND OTHER BACKGROUND

August 1, 2013

IMF staff regularly produces papers covering multilateral issues and cross-country analyses. The following documents have been released and are included in this package:

- The **Staff Report** on the 2013 Spillover Report—Analytical Underpinnings and Other Background, prepared by IMF staff and completed on July 3, 2013 for the Executive Board's consideration on July 15, 2013.

The Executive Board met in an informal session, and no decisions were taken at this meeting.

The policy of publication of staff reports and other documents allows for the deletion of market-sensitive information.

Copies of this report are available to the public from

International Monetary Fund • Publication Services
700 19th Street, N.W. • Washington, D.C. 20431
Telephone: (202) 623-7430 • Telefax: (202) 623-7201
E-mail: publications@imf.org Internet: <http://www.imf.org>

**International Monetary Fund
Washington, D.C.**



2013 SPILLOVER REPORT—ANALYTICAL UNDERPINNINGS AND OTHER BACKGROUND

July 3, 2013

Approved By
**Isabelle Mateos y
Lago**

Inputs were coordinated by Costas Christou (EUR) and Bikas Joshi (SPR) from contributors comprising: Steve Barnett, Dennis Botman, Stephan Danninger, Joong Shik Kang, Raphael Lam, Papa N'Diaye, Jack Ree (APD), S. Ali Abbas, Petya Koeva Brooks, Alasdair Scott, and Thierry Tressel (EUR), Julian Chow, Yingyuan Chen, Sanjay Hazarika, Anna Ilyina, William Kerry, Mohamed Norat, and Miguel Segoviano (MCM), Jongsoon Shin (OAP), Abdul Abiad, Irineu de Carvalho Filho, Dirk Muir, Benjamin Hunt, Rene Lalonde, and Susanna Mursula (RES), Mali Chivakul, Sean Craig, Manju Ismael, Franziska Ohnsorge, Roberto Perrelli, Silvia Sgherri, Chad Steinberg, Andrew Tiffin, and Francis Vitek (SPR), Roberto Cardarelli, Deniz Igan, Lusine Lusinyan, and Martin Sommer (WHD), and the Brazil, Canada, Hong Kong SAR, India, Korea, New Zealand, Russia, and South Africa country teams.

CONTENTS

CROSS-COUNTRY STUDIES	6
I. STABILIZATION DIVIDENDS	6
1. Spillovers from Policy Uncertainty in the United States and Europe	6
2. Effects of Stabilizing Policies in the Euro Area and the US	17
3. Market-Based Indicators of Systemic Risks	22
II. UNCONVENTIONAL MONETARY POLICIES	26
4. Impact of Unconventional Monetary Policies on International Asset Prices	26
5. Effects of Unconventional Monetary Policies by the Systemic Advanced Economies Using the G-35 Model	33
6. Effects of Quantitative Easing in Systemic Advanced Economies Using GIMF	42
III. GLOBAL CAPITAL FLOWS	46
7. Global Capital Flows in the QE Era	46
8. Case Studies	63
A. Brazil	63
B. Canada	65
C. Hong Kong SAR	68
D. India	73
E. Korea	75
F. New Zealand	79
G. Russia	80
H. South Africa	81
9. ANNEX: Changes in the Cross-border Banking Landscape	83
IV. MULTI-COUNTRY SCENARIOS	93
10. Effects of Sovereign Stress in Japan or the United States	93
11. Combined Rebalancing Scenario	97
12. Effects of a Protracted Slowdown in the Systemic Economies	101
COUNTRY-SPECIFIC STUDIES	105
V. SPILLOVERS FROM CHINA	105
13. China Rebalancing Scenario	105
14. Capital Account Liberalization in China	109
VI. SPILLOVERS FROM THE EURO AREA	116
15. Dividends of Euro Area Stabilization	116

16. Effects of a Protracted Slowdown in the Euro Area _____	124
17. Euro Area Rebalancing Scenario _____	125
VII. SPILLOVERS FROM JAPAN _____	128
18. Spillovers of the New Policy Framework: A Model-Based Evaluation _____	129
19. Will Abenomics in Japan Generate Sizeable Spillovers on Capital Flows? _____	131
20. The Curious Case of the Yen: A Safe Haven Currency without Inflows _____	141
21. The Impact of Yen Depreciation on Exports Prices in Asian Economies _____	146
22. Revitalization of the Japanese Economy and the Asia Supply Chain _____	150
VIII. SPILLOVERS FROM THE UNITED KINGDOM _____	154
23. Spillovers from United Kingdom Macroeconomic Policies _____	154
24. Financial Spillovers _____	157
IX. SPILLOVERS FROM THE UNITED STATES _____	161
25. Effects of Accelerated Monetary Normalization in the United States Using G-35 _____	161
26. Effects of Accelerated Monetary Normalization in the United States Using GIMF _____	166
27. Estimating Output Loss from the Fiscal Cliff Relation to the 2012 Spillover Report _____	168
28. United States Rebalancing Scenario _____	168

TABLES

Table 4.2 Impact of Surprises—10-Year Bond Yields Responses _____	30
Table 4.1 Surprise Effect of UMP Announcements _____	30
Table 4.4 Impact of Surprises—Foreign Exchange Rate Responses _____	31
Table 4.3 Impact of Surprises—Stock Price Responses _____	31
Table 7.1 Baseline Regressions _____	50
Table 7.2 Robustness Regressions _____	53
Table 14.1 FGLS Regression: Share of Bilateral Portfolio Assets in Total Portfolio, 2005–10 _____	114

FIGURES

Figure 1.1 Policy Uncertainty in the United States and Europe _____	7
Figure 1.2. General Uncertainty and Confidence in the United States and Europe _____	9
Figure 1.3 Growth Impact of U.S. and European Policy-Uncertainty Shocks _____	11
Figure 1.4 Effect of a U.S. or European Policy-Uncertainty Shock on Real GDP in Other Regions _____	11
Figure 1.5 Effect of a U.S. or European Policy-Uncertainty Shock on Real Investment in Other Regions _____	12
Figure 1.6 Peak Effect of a U.S. or European Policy-Uncertainty Shock on Real GDP, Consumption, and Investment in Other Regions _____	13
Figure 1.7 The “Growth Dividend” from a Decline in U.S. and European Policy Uncertainty _____	14
Figure 2.1 Simulation Results, Euro Area Policies _____	20
Figure 2.2 Simulation Results, United States Policies _____	21
Figure 3.1 Asset Market Based Systemic/“Tail” Risk Indicators _____	24

Figure 5.1 Simulation Results, Unconventional Monetary Easing by the Euro Area	38
Figure 5.2 Simulation Results, Unconventional Monetary Easing by Japan	39
Figure 5.3 Simulation Results, Unconventional Monetary Easing by the United Kingdom	40
Figure 5.4 Simulation Results, Unconventional Monetary Easing by the United States	41
Figure 6.1 Effect of Quantitative Easing in Advanced Economies	44
Figure 7.1 Capital Flows and EMP Indices	60
Figure 8.1 Canada: Net and Gross Capital Inflows, 2000Q1–2012Q2	67
Figure 8.2 Impact of First Three Rounds of Tightening of Macro-Prudential Measures	68
Figure 8.3 Spillovers from U.S. Quantitative Easing	71
Figure 8.4 Composition of Capital Flows	72
Figure 9.1 Bank Leverage and Wholesale Funding Ratios 2008Q4–2012Q3	89
Figure 9.2 Consolidated Foreign Claims	89
Figure 9.3 Total Foreign Claims	89
Figure 9.4 Change in Foreign Claims	89
Figure 9.5 Change in European Bank Foreign Claims, by Sector 2010Q4–2012Q4	90
Figure 9.6 U.S. Prime Money Market Fund Exposures to Banks	90
Figure 9.7 One-Year Cross Currency Swap Spreads	90
Figure 9.8 Trade, Project, and Corporate Finance	90
Figure 9.9 Global Project Finance	91
Figure 9.10 Asian Project Finance, by Region of the Lending Bank	91
Figure 9.11 Project Finance in Asia, by Industry	91
Figure 9.12 Change in Bank Cross-Border Intra-Group Exposures	91
Figure 9.13 Bank Net Foreign Asset Position	92
Figure 9.14 Net Foreign Asset Position of Asian and Pacific Banks	92
Figure 9.15 Long-Term International Claims to Developing Asia and Pacific	92
Figure 9.16 External Liabilities: Dependence on Wholesale Funding	92
Figure 10.1 Simulation Results, Sovereign Stress in Japan	95
Figure 10.2 Simulation Results, Sovereign Stress in the United States	96
Figure 12.1 Simulated Output Growth Paths, Systemic Economies	104
Figure 14.1 Change in Net Financial Flows and Business Cycle at Time of Capital Account Liberalization	113
Figure 15.1 Sovereign Funding Costs and Links to Domestic Banks	117
Figure 15.2 Fragmentation of the Euro Area Banking System	117
Figure 15.3 Normalization of Capital Flows in Other European Countries	119
Figure 15.4 Exchange Rate Adjusted Changes of EA4 Banks' International Positions	122
Figure 19.1 Real GDP (% difference)	132
Figure 19.2 Current Account (%pt GDP difference)	133
Figure 19.3 Real Effective Exchange Rate (% difference)	134
Figure 19.4 Inflation (% pt difference)	135
Figure 19.5 Net Public Debt (%pt GDP difference)	136
Figure 20.1 Cumulative IRFs to a Risk-Off Shock, Non-Commercial Derivative Positions	145
Figure 23.1 United Kingdom: Real Spillovers	156

Figure 24.1 Percentage Decline in Domestic Credit Due to 2.5 ppt. Higher Capital Requirement Imposed by U.K. Regulator on Banks Headquartered in the United Kingdom. _____	159
Figure 25.1 Simulation Results, Endogenous Tightening _____	164
Figure 25.2 Simulation Results, Endogenous Tightening _____	164

ANNEX TABLES

Annex Table 15.1 Distribution of Directional Spillovers from Sovereign Yields and Stock Market Indices Forecast Error Variance _____	123
--	-----

CROSS-COUNTRY STUDIES

I. STABILIZATION DIVIDENDS

1. Spillovers from Policy Uncertainty in the United States and Europe¹

1. **A common view is that high uncertainty in general, and high policy uncertainty more specifically, has held back global investment and output growth in the past two years.** Much of the policy uncertainty emanated from the United States, with the debt ceiling dispute in August 2011 and negotiations about the “fiscal cliff” in December 2012. Policy uncertainty has also been elevated in Europe, especially in the aftermath of Greek Prime Minister George Papandreu’s call for a referendum on the Greek bailout plan (and his subsequent resignation) in November 2011, and during the negotiations about a pan-European crisis response through much of 2012. Policymakers and business leaders across the globe worry about the implications of such uncertainty in the United States and Europe—the world’s two largest economies.

2. **Spillovers from policy uncertainty can occur through several channels.** Trade can be affected if increased policy uncertainty adversely affects economic activity and import demand in the United States and Europe. Policy uncertainty could also raise global risk aversion, resulting in sharp corrections in financial markets and capital outflows from emerging markets.

3. **This background note attempts to quantify the impact of U.S. and European policy uncertainty on other regions.**² Specifically, it addresses the following questions: What do we mean by policy uncertainty? How well can we measure it? How has policy uncertainty in the United States and Europe evolved during the past several decades? And how large are the spillovers to economic activity in other regions?

4. **The analysis suggests that sharp increases in U.S. and European policy uncertainty in the past have temporarily lowered investment and output in other regions to varying degrees.** It also suggests that a marked decrease in policy uncertainty in the United States and Europe in the near term could help boost global investment and output.

Uncertainty and economic activity

¹ Prepared by Abdul Abiad, Nadia Lepeshko, and Katherine Pan.

² A number of empirical studies have analyzed the effects of uncertainty on domestic economic activity, not on activity elsewhere. These include Bloom, Bond, and van Reenen (2007); Bloom (2009); Bekaert, Hodrick, and Zhang (2010); Baker, Bloom, and Davis (2012); and Box 1.3 of the October 2012 *World Economic Outlook*. One exception is Carrière-Swallow and Céspedes (2011), who look at the effects of uncertainty (as measured by implied volatility in the U.S. stock market) on economic activity in a handful of emerging market economies. The analysis in this feature is similar in spirit to that in Carrière-Swallow and Céspedes (2011), but it looks specifically at policy uncertainty and investigates its impact on all the regions of the world.

5. **The idea that uncertainty can adversely affect economic activity dates back to John Maynard Keynes (1936), who argued that investment is the most volatile component of aggregate activity because it is dependent on views about the future, which are most uncertain.** The idea was formalized in a number of theoretical models, ranging from Bernanke (1983) to Bloom (2009). Temporary increases in uncertainty make it worthwhile to delay investment, because investment is impossible or costly to undo or change. Investment tends to recover once uncertainty dissipates, and can overshoot as a result of pent-up demand. The same holds true for consumption of durables, which is subject to the same forces.

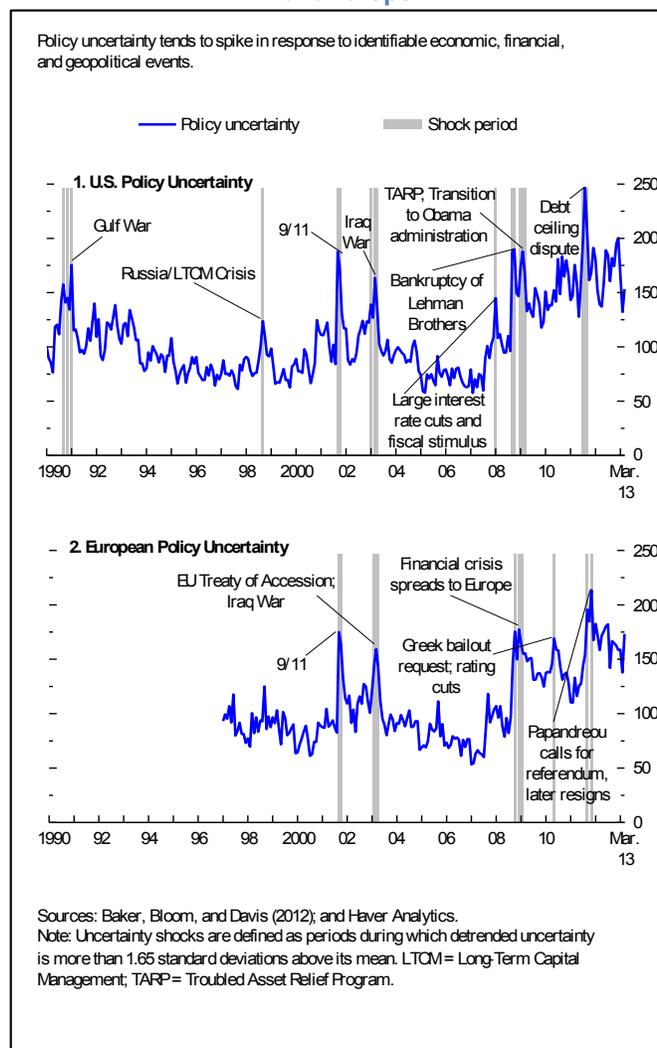
6. **Two critical challenges arise in trying to estimate the spillover effects of policy uncertainty.** First, it is necessary to ensure that causality is not running in the opposite direction—that policy uncertainty in the United States and Europe is not being driven by developments in economic activity elsewhere. For the most part, this is a plausible assumption—spikes in policy uncertainty are often associated with domestic economic and political events, or with global geopolitical events that can be considered exogenous to most individual countries (Figure 1.1). To the extent that specific events could result in reverse causality (for example, the Russian and Long-Term Capital Management crises in 1998 resulted in a spike in policy uncertainty), the analysis verifies that the results hold even when these events are excluded.

7. **The second challenge is to avoid attributing to policy uncertainty the effects of other factors, such as more general economic uncertainty, shifts in consumer or business confidence, or fluctuations in economic activity.** This challenge is addressed by controlling for such variables, which is important because these variables tend to move together—uncertainty tends to rise and confidence tends to fall during downturns in economic activity. This means that various measures of uncertainty could be picking up actual changes in economic prospects, not just the uncertainty surrounding economic prospects.

Measuring economic policy uncertainty

8. **The analysis starts with the measures of U.S. and European economic policy uncertainty constructed by Baker, Bloom, and Davis (2012).** These measures use news-based indicators of policy-related

Figure 1. Policy Uncertainty in the United States and Europe
Figure 1.1 Policy Uncertainty in the United States and Europe



economic uncertainty (the relative frequency of newspaper articles that refer to “uncertainty,” “economy,” and “policy”), the number of expiring tax provisions, and the dispersion in economists’ forecasts about government spending and inflation levels.³ These measures are combined to construct monthly indices of policy uncertainty dating back to 1985 for the United States and to 1997 for Europe.

9. **This measure of economic policy uncertainty is not without issues.** First, the news-based component is an indirect measure, and ascertaining whether it is measuring policy uncertainty properly is hard. Second, many expiring tax code provisions are regularly renewed and are unlikely to be a major source of uncertainty. Finally, the forecast dispersion components might rise because of other factors—inflation forecasts could become more dispersed because of uncertainty about oil or food prices, for example, and not because of uncertainty about monetary policy.

10. **To address the first concern, Baker, Bloom, and Davis (2012) offer several “proof of concept” tests.** For example, they construct a similar news-based measure for financial uncertainty by searching for news articles containing “uncertainty,” “economy,” and “stock market” and show that the constructed index tracks the Chicago Board Options Exchange Market Volatility Index (VIX) closely. They also note that their measure of policy uncertainty is highly correlated with other policy-uncertainty measures, such as those of Fernández-Villaverde and others (2011) and Born and Pfeifer (2011), which are constructed using very different methodologies.⁴ With regard to the second and third issues, the results reported below are robust to excluding the tax-expiration and forecast-dispersion components of the policy-uncertainty measure and relying solely on the news-based measure of policy uncertainty.

The evolution of U.S. and European policy uncertainty

11. **Policy uncertainty tends to spike in response to identifiable economic, financial, and geopolitical events (Figure 1.1).** Uncertainty shocks, identified by vertical lines in Figure 1.1, are defined as periods during which the Hodrick-Prescott detrended value of the index exceeds its mean by more than 1.65 standard deviations, following Carrière-Swallow and Céspedes (2011). As noted by Baker, Bloom, and Davis (2012), many of the spikes in policy uncertainty are associated with identifiable events. For example, U.S. policy uncertainty spiked after the start of the Gulf War in August 1990, the September 11, 2001, terrorist attacks, and the run-up to the Iraq War in early 2003. More recent spikes in U.S. policy uncertainty have been associated with economic and financial events, including the recession-induced monetary and fiscal easing in January 2008, the bankruptcy of Lehman Brothers in September 2008, the debt ceiling dispute in August 2011, and the fiscal cliff negotiations in late 2012.

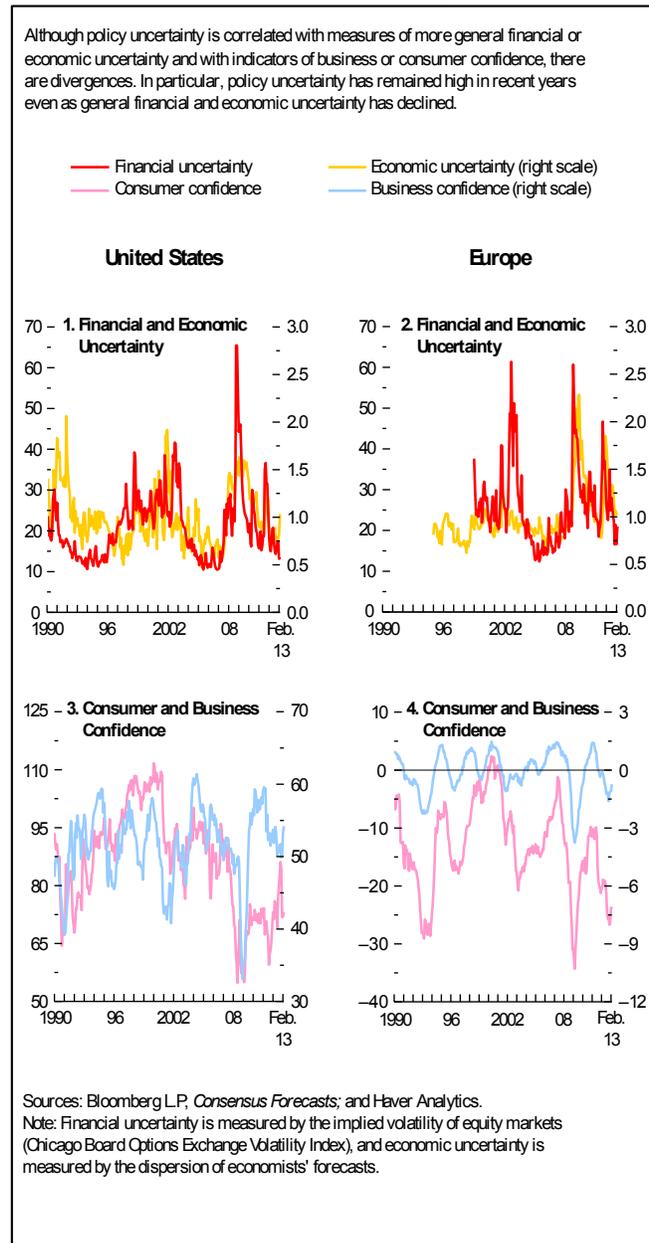
³ The European measure relies only on a news-based indicator of policy-related economic uncertainty and the dispersion in economists’ forecasts because data on expiring European tax provisions are not available.

⁴ Fernández-Villaverde and others (2011) and Born and Pfeifer (2011) use time series methods to estimate the time-varying volatility of taxes and government spending.

12. **European policy uncertainty also spiked following the September 11 attacks and again in early 2003 with the signing of the EU Treaty of Accession (the single largest expansion of the European Union), which compounded the uncertainties from the Iraq War.** Other events associated with high European policy uncertainty include the Greek bailout request in May 2010, the call in November 2011 for a Greek referendum on the terms of the bailout, and discussions on the EU-wide policy response to the expanding crisis in 2012.

13. **These events raised uncertainty about economic policies, but they also raised general financial and economic uncertainty and caused a drop in confidence—making it critical to control for these other correlates.** Policy uncertainty tends to move with general economic uncertainty—whether measured by indicators of financial uncertainty (such as implied stock market volatilities) or of economic uncertainty (such as the dispersion of economists' GDP forecasts; Figure 1.2, panels 1 and 2). There are divergences, however. Most notably, general economic uncertainty has retreated from its 2008 highs, whereas policy uncertainty has remained high and has even increased. The correlation between confidence indicators (Figure 1.2, panels 3 and 4) and policy uncertainty is also evident but imperfect, making it possible to include them as control variables in the analysis.

Figure 2. General Uncertainty and Confidence in the United States and Europe



Spillovers from policy uncertainty

14. **The policy-uncertainty shocks in the United States and Europe are regressed on output and investment behavior in other regions.** The methodology resembles those of Cerra and Saxena (2008) and Romer and Romer (2010), among others. Specifically, real GDP growth and real investment growth (both measured in log differences) are regressed on their lagged values to capture the normal dynamics of the growth process, as well as on contemporaneous and lagged

values of a dummy variable that is equal to 1 during the policy-uncertainty shocks described above and zero otherwise.^{5,6} Including lags allows for the possibility that policy-uncertainty spillovers affect other economies with a delay. The specification also includes a full set of country dummies to account for differences in normal growth rates, but the inclusion of time dummies is precluded by the fact that the variable of interest is a global variable common across all countries.

15. **The model is estimated by region, using seasonally adjusted quarterly data for 43 economies from 1990 to 2012, although the wide variation in the availability of quarterly GDP data means the sample is highly unbalanced.**⁷ The effects of U.S. and European policy-uncertainty shocks are estimated separately, given their high correlation; the estimated impacts should thus be considered an upper bound because each is likely picking up the effects of the other.

16. **Figure 1.3 shows the estimated impact of a large but temporary policy-uncertainty shock—similar in magnitude to the shocks highlighted in Figure 1.1—on real GDP of economies in various regions.** The impulse responses are shown for an eight-quarter horizon, with the 90 percent confidence bands around the estimates shaded in gray. The impact on annual growth is significant. U.S. policy-uncertainty shocks temporarily reduce GDP growth in other regions by up to ½ percentage point in the year of the shock (Figure 1.4, panel 1). European policy-uncertainty shocks temporarily reduce GDP growth in other regions by a smaller amount (Figure 1.4, panel 2).⁸

⁵ Using the level of the policy uncertainty variable, or of a hybrid that interacts the 0–1 dummy with the level, produces similar results. Excluding policy uncertainty shocks whose origins are outside the United States or Europe also does not materially change the findings.

⁶ The regression is estimated in changes (that is, growth rates) because of nonstationarity in the log levels of real GDP and real investment. The estimated responses from the regression are cumulated to recover the response of the level of output or investment to a policy-uncertainty shock. The standard errors of the impulse responses are calculated using the delta method.

⁷ The regional definitions follow those used in Chapter 2 of the *World Economic Outlook*. No spillover estimates are provided for the Middle East and North Africa because of a lack of quarterly GDP data. Because the quarterly data for sub-Saharan Africa include only Botswana and South Africa, the estimates should be considered to reflect spillover effects only on the region's open middle-income economies.

⁸ We do not estimate the impact on domestic activity in the United States and Europe because they are much more subject to the endogeneity problem—policy uncertainty is affected by domestic activity. But for purposes of comparison, Baker, Bloom, and Davis (2012) use a vector-autoregression-based approach and find that an increase in U.S. policy uncertainty of the size that occurred between 2006 and 2011 would reduce U.S. output by up to 3.2 percent, and private investment by 16 percent.

Figure 1.4 Effect of a U.S. or European Policy-Uncertainty Shock on Real GDP in Other Regions
(Quarters on x-axis, percent change in real GDP on y-axis)

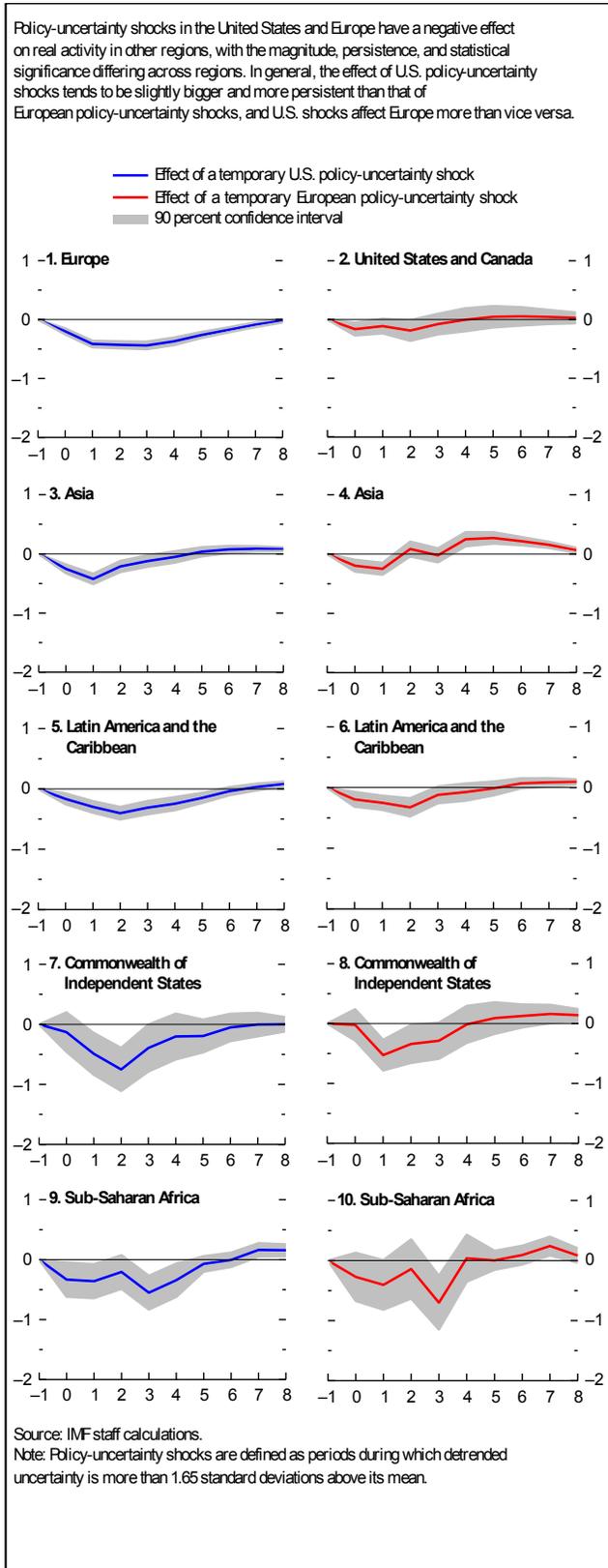
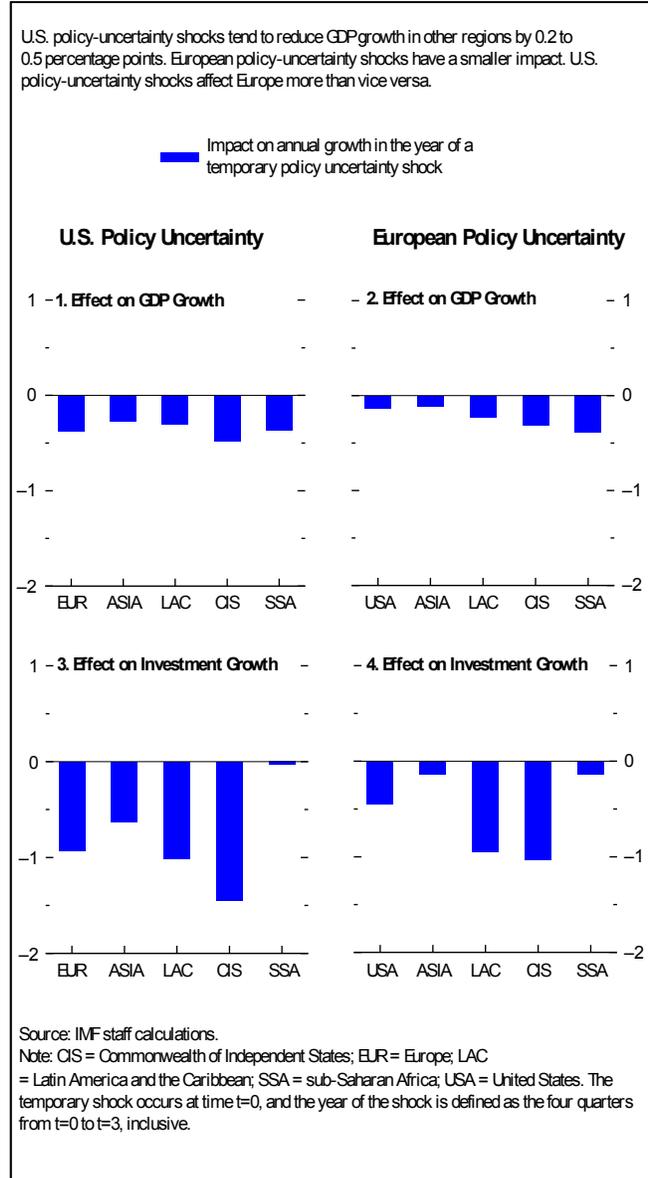


Figure 1.3 Growth Impact of U.S. and European Policy-Uncertainty Shocks
(Percentage points)



17. **One of the ways that policy uncertainty affects economic activity in other regions is by reducing investment.** Figure 1.5

shows the results of a similar exercise in which real investment is the dependent variable. Significant declines in investment result in all regions, except sub-Saharan Africa, with the biggest decline in the Commonwealth of Independent States (CIS).⁹ With regard to output, the effect of European policy-uncertainty shocks tends to be similar or slightly smaller than that of U.S. shocks (Figure 1.4, panels 3 and 4). In addition, European shocks tend to have a smaller effect on the United States than vice versa.

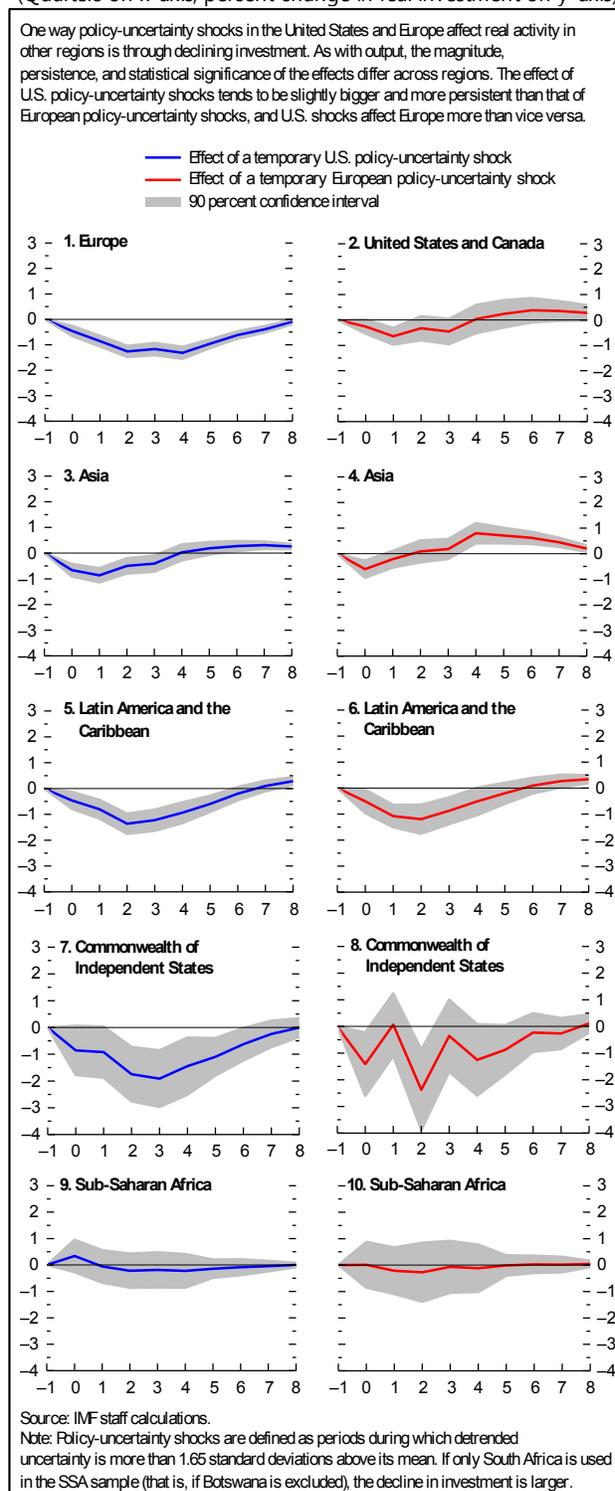
The mechanics of policy uncertainty spillovers

18. **The analysis addresses the possibility that the policy-uncertainty measure is picking up the effects of other variables by controlling for general uncertainty, declining confidence, or a decline in U.S. or European economic activity.** Note that the results can be interpreted in two ways:

- One possibility is that the additional control variable—for example, general economic uncertainty—affects U.S. or European policy uncertainty as well as economic activity in other countries. In this case, adding the control variable improves the estimate of the spillover effects from policy uncertainty.

Figure 1.5 Effect of a U.S. or European Policy-Uncertainty Shock on Real Investment in Other Regions

(Quarters on x-axis, percent change in real investment on y-axis)



⁹ If only South Africa is used in the SSA sample (that is, if Botswana is excluded), the decline in investment is larger.

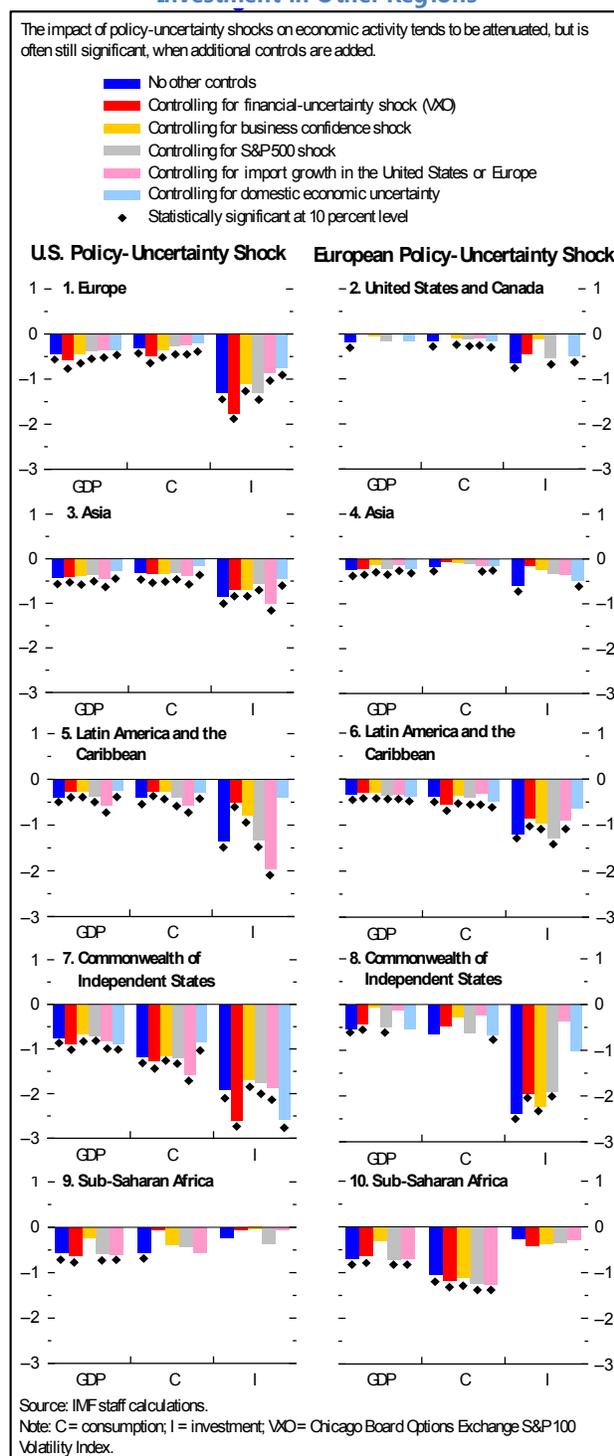
- A second possibility is that the control variable is a mediating variable through

which policy uncertainty is actually conveyed—for example, higher policy uncertainty increases general uncertainty, which, in turn, affects activity elsewhere. In this case, adding the control variable nets out any effect of policy uncertainty that was conveyed through this mediating variable, resulting in an underestimation of the overall spillover effects.

19. **The likeliest scenario is that both interpretations are valid—that is, policy uncertainty affects and is affected by the control variables (general uncertainty, confidence, and activity).** As a result, the true magnitude of spillover effects from policy uncertainty is most likely somewhere between the baseline effect reported in Figures 1.3 and 1.5 and the effects estimated when using the control variables shown in Figure 1.6.

20. **In addition to showing the peak effect on real GDP and real investment, Figure 1.6 shows the peak effect on real consumption.** The dark-blue bars show the peak effect when there are no control variables other than policy uncertainty: these are the minimum values of the impulse response functions shown in Figures 1.3 and 1.5. The red bars show the peak effect of policy uncertainty when financial-uncertainty shocks—as measured by the VXO—are added as a control in the regression.¹⁰ For the most part, the magnitude of the policy-uncertainty effect is broadly similar to the baseline. The same holds true for controls for business confidence or the

Figure 1.6 Peak Effect of a U.S. or European Policy-Uncertainty Shock on Real GDP, Consumption, and Investment in Other Regions



¹⁰ The Chicago Board Options Exchange S&P 100 Volatility Index (VXO) is a measure of implied stock market volatility similar to (and very highly correlated with) the more widely recognized VIX, but it has longer time coverage, going back to 1985.

level of the stock market (Figure 1.6, yellow and gray bars).

21. **The pink bars in Figure 1.6 show that controlling for import growth in the United States or Europe reduces the estimated effect of policy uncertainty in many, but not all, regions.**¹¹ One interpretation is that U.S. or European policy uncertainty could negatively affect domestic activity in these economies, which affects activity elsewhere via lower import demand. The reduction in the impact of policy uncertainty would then indicate the strength of this particular transmission channel. For the CIS, for example, the effects of European policy uncertainty are diminished, but the effects of U.S. policy uncertainty are not. Under this interpretation, European policy uncertainty affects the CIS primarily via trade channels, but U.S. policy uncertainty is transmitted through other channels.

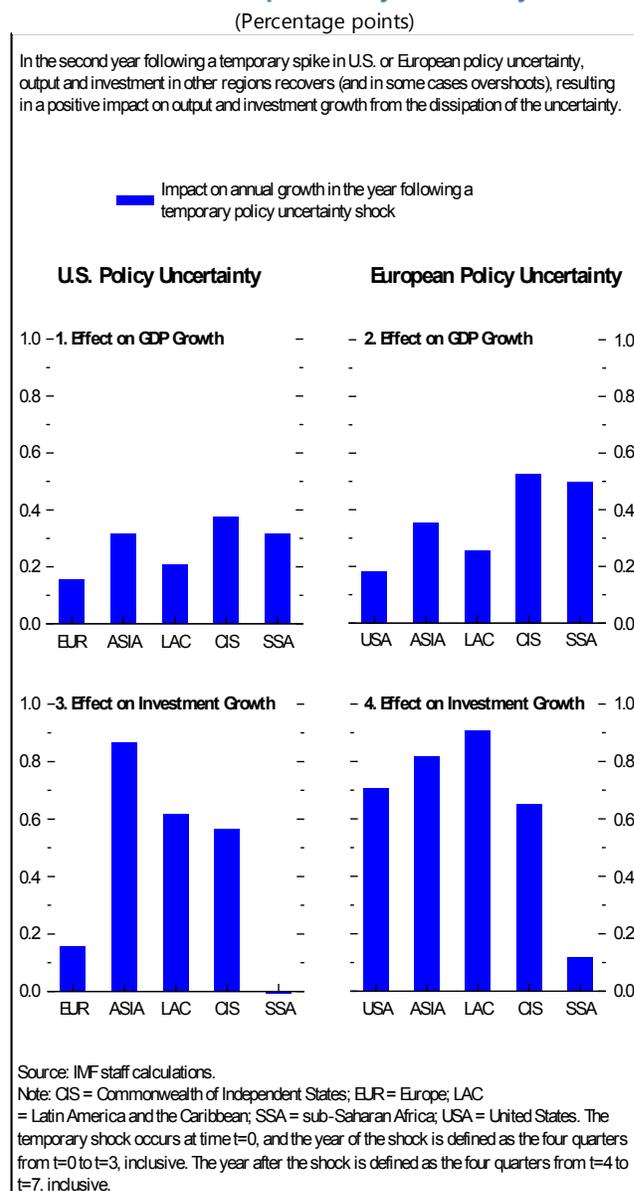
22. **A similar exercise can measure the extent to which the spillover effects of U.S. and European policy uncertainty are transmitted by raising uncertainty in other economies (measured by forecast dispersion).**

The spillover effects of policy uncertainty are reduced in some cases, but not in others (Figure 1.6, light-blue bars), suggesting that increased uncertainty can be another channel of transmission. In most regions, policy uncertainty seems to reduce investment through its effect on higher domestic uncertainty.

What happens when policy uncertainty subsides?

23. **The impulse responses in Figures 1.3 and 1.5 can also provide an indication of the benefits one might expect once policy uncertainty in the U.S. and Europe starts to subside to more normal levels.** The negative impact of a temporary spike in policy uncertainty lasts from between two to four quarters. Beyond that, its spillover effects start to dissipate, and output and investment in other regions begin to recover to normal levels. Figure 1.7 shows that lower U.S. and European policy uncertainty on

Figure 7 The “Growth Dividend” from a Decline in U.S. and European Policy Uncertainty



¹¹ Controlling for U.S. and European GDP growth instead of import growth produces similar results.

growth is associated with a “growth dividend” of between $\frac{1}{4}$ and $\frac{1}{2}$ percentage point in the year after policy uncertainty has subsided, with the impact again varying by region.

Conclusion

24. **This analysis documents significant spillover effects from policy uncertainty in the United States and Europe to other regions.** It finds that sharp spikes in U.S. policy uncertainty—of the magnitude observed during the U.S. debt ceiling dispute in August 2011, for example—can temporarily lower investment and output in other regions. The spillover effects from European policy uncertainty tend to be slightly smaller and less persistent and tend to have smaller effects on U.S. activity than vice versa.

25. **Policy uncertainty has remained high in the United States and Europe since the Great Recession—even as more general uncertainty has receded and various measures of consumer and business confidence have recovered.** The evidence presented here hints at the possibility that elevated policy uncertainty may have contributed to the serial disappointments and downward revisions in investment and output growth observed throughout the same period. The evidence also suggests that a reduction in policy uncertainty in the United States and Europe in the near term may give an added fillip to global investment and output.

References

- Baker, Scott, Nicholas Bloom, and Steven J. Davis, 2012, “Measuring Economic Policy Uncertainty” (unpublished). Paper and indices are available at www.policyuncertainty.com.
- Bekaert, Geert, Robert Hodrick, and Xiaoyan Zhang, 2010, “Aggregate Idiosyncratic Uncertainty,” NBER Working Paper No. 16058 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Bernanke, Ben, 1983, “Irreversibility, Uncertainty, and Cyclical Investment,” *Quarterly Journal of Economics*, Vol. 98, No. 1, pp. 85–106.
- Bloom, Nicholas, 2009, “The Impact of Uncertainty Shocks,” *Econometrica*, Vol. 77, No. 3, pp. 623–85.
- , Stephen Bond, and John van Reenen, 2007, “Uncertainty and Investment Dynamics,” *Review of Economic Studies*, Vol. 74, No. 2, pp. 391–415.
- Born, Benjamin, and Johannes Pfeifer, 2011, “Policy Risk and the Business Cycle,” Bonn Econ Discussion Paper No. 06/2011 (Bonn: University of Bonn).
- Carrière-Swallow, Yan, and Luis Felipe Céspedes, forthcoming, “The Impact of Uncertainty Shocks in Emerging Economies,” *Journal of International Economics*.
- Cerra, Valerie, and Sweta Saxena, 2008, “Growth Dynamics: The Myth of Economic Recovery,” *American Economic Review*, Vol. 98, No. 1, pp. 439–57.

Fernández-Villaverde, Jesús, Pablo Guerrón-Quintana, Keith Kuester, and Juan Rubio-Ramírez, 2011, "Fiscal Volatility Shocks and Economic Activity," Working Paper No. 11–32 (Philadelphia: University of Pennsylvania Press).

International Monetary Fund (IMF), 2012, *2012 Spillover Report* (Washington).
www.imf.org/external/np/pp/eng/2012/070912.pdf.

Keynes, John Maynard, 1936, *The General Theory of Employment, Interest, and Money* (London: MacMillan).

Romer, Christina D., and David H. Romer, 2010, "The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks," *American Economic Review*, Vol. 100, No. 3, pp. 763–801.

2. Effects of Stabilizing Policies in the Euro Area and the US¹²

1. **This note analyzes the global macroeconomic effects of policy measures taken to alleviate the sovereign debt crisis in the euro area and avert the fiscal cliff in the United States.**

This analysis is based on scenarios simulated with the structural macroeconomic model of the world economy, disaggregated into thirty five national economies, documented in Vitek (2013).¹³ Within this framework, each economy is represented by interconnected real, external, monetary, fiscal, and financial sectors. Spillovers are transmitted across economies via trade, financial, and commodity price linkages. Financial linkages are both direct, through cross-border debt and equity portfolio holdings, and indirect via international comovement in asset risk premia.

2. **The stabilizing policy measures under consideration were taken by the euro area in the second half of 2012 and by the United States at the beginning of 2013.**

For the euro area, we consider: the creation of the Single Supervisory Mechanism, agreed to by the European Council on June 29; the establishment of the Outright Monetary Transactions program, foreshadowed by the European Central Bank on July 26, announced on August 2, and clarified on September 6; the backing for the European Stability Mechanism, approved by the German Constitutional Court on September 12; the provision of additional debt relief for Greece, agreed to by the European Council on November 26; and the regulation of the Single Supervisory Mechanism, agreed to by the European Council on December 13. For the United States, we consider the American Taxpayer Relief Act, passed by Congress on January 1.

3. **Our scenario for the euro area represents the stabilizing policy measures taken to alleviate the sovereign debt crisis with global bond and stock market adjustments.**

In particular, we calibrate changes in long-term nominal market interest rates and equity prices to match their estimated responses to the stabilizing policy announcements under consideration, in the absence of conventional monetary policy reactions and automatic fiscal stabilizers worldwide. These estimated global financial market responses are based on an event study analysis using the data set documented in Sgherri (2013).¹⁴ They are phased out gradually according to a first order autoregressive process having a coefficient of 0.85, and are generated with sequences of temporary but persistent duration and equity risk premium shocks. We allow for feasible conventional monetary policy reactions to these inferred sequences of risk premium shocks, as well as the full operation of automatic fiscal stabilizers. We assume that conventional monetary policy reactions are constrained by the zero lower bound on the nominal policy interest rate through 2015Q2 in the Czech Republic, Denmark, the euro area, Japan, Saudi Arabia, Switzerland, the United Kingdom, and the United States.

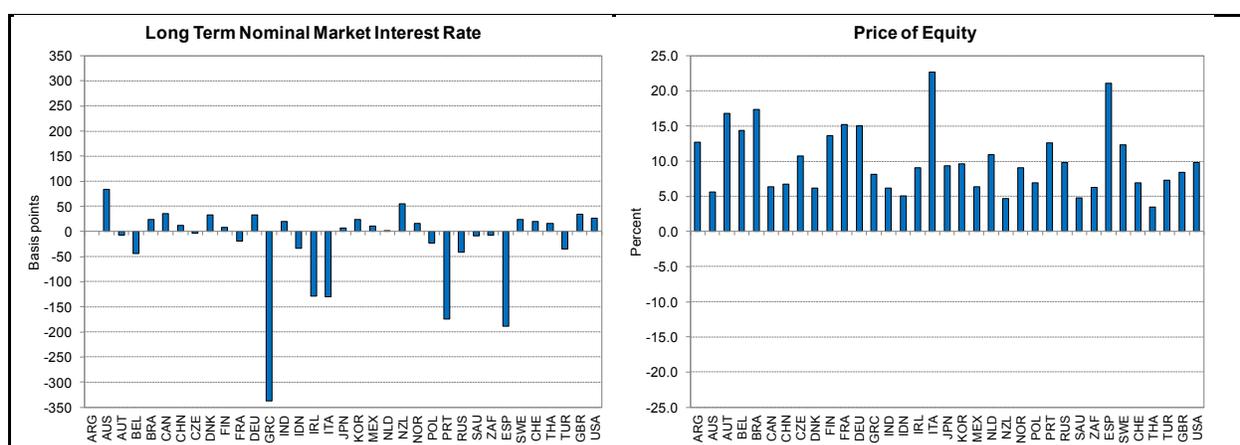
¹² Prepared by Francis Vitek.

¹³ Vitek, F. (2013), Policy analysis and forecasting in the world economy: A panel dynamic stochastic general equilibrium approach, *International Monetary Fund Working Paper*, forthcoming.

¹⁴ Sgherri, S. (2013), Spillovers from unconventional monetary policies: Impact on international asset prices, *Unpublished Manuscript*.

4. **We estimate the global financial market responses to the stabilizing policy measures taken to alleviate the sovereign debt crisis with a traditional event study analysis.** This event study analysis entails the measurement of absolute changes in long-term government bond yields and proportional changes in equity prices over two day windows centered around event dates. Summing these measured changes across event dates reveals that the policy measures taken to alleviate the sovereign debt crisis in the euro area were very effective at reducing financial stress in the periphery. Indeed, long-term government bond yields in Greece, Ireland, Italy, Portugal and Spain fell by 192 basis points, while equity prices rose by 14.7 percent, on average. Meanwhile, long-term government bond yields rose in safe havens, by 43 basis points on average across Australia, Canada, Denmark, Germany, New Zealand, the United Kingdom, and the United States.

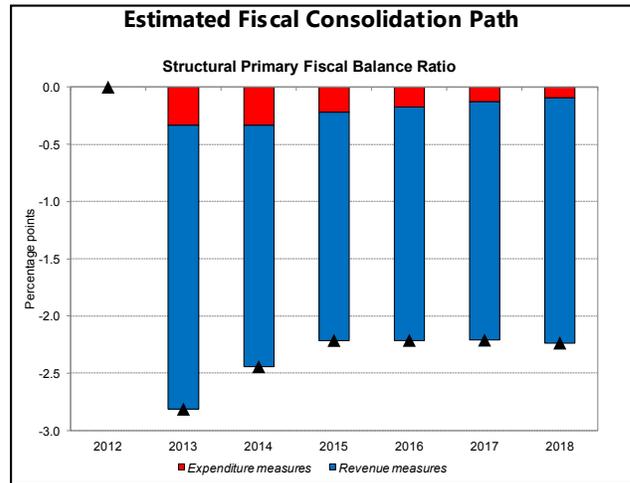
Estimated Cumulative Global Financial Market Impacts



5. **Our scenario for the United States represents the stabilizing policy measures taken to avert the fiscal cliff with less fiscal consolidation, as measured by the change in the structural primary fiscal balance ratio.** The corresponding fiscal consolidation path is generated with sequences of temporary but persistent fiscal expenditure and revenue shocks, mixed commensurate with its composition. Our scenario also features a sustained improvement in financial market confidence from not raising concerns over the effectiveness of the political process in the United States, manifested through global stock market adjustments. In particular, we assume an increase in equity prices in the United States of 10.0 percent, in other advanced economies of 5.0 percent, in emerging economies with open capital accounts of 7.5 percent, and in emerging economies with closed capital accounts of 2.5 percent, in the absence of conventional monetary policy reactions and automatic fiscal stabilizers worldwide. These global stock market responses are phased out gradually according to a first order autoregressive process having a coefficient of 0.75, and are generated with sequences of temporary but persistent equity risk premium shocks. We allow for feasible conventional monetary policy reactions to these inferred sequences of risk premium shocks, as well as the full operation of automatic fiscal stabilizers outside of the United States. We assume that conventional monetary policy reactions are constrained by the zero lower bound on the nominal

policy interest rate through 2015Q2 in the Czech Republic, Denmark, the euro area, Japan, Saudi Arabia, Switzerland, the United Kingdom, and the United States.

6. **The stabilizing policy measures taken to avert the fiscal cliff are estimated to imply substantially less fiscal consolidation.** Indeed, the structural primary fiscal balance ratio of the general government is estimated to increase by 2.8 percentage points less in 2013 due to averting the fiscal cliff, of which 88 percent is accounted for by revenue measures. Moreover, 79 percent of this change in the structural primary fiscal balance ratio is estimated to persist over the medium term.



7. **We estimate that the stabilizing policy measures taken by the euro area, and to a lesser extent the United States, are generating large output gains there, with spillovers concentrated among geographically close trading partners.** Indeed, our scenario simulation results indicate that the stabilizing policy measures taken by the euro area will raise output there by 5.3 percent in 2013, by 0.8 to 3.9 percent in other advanced economies, and by 1.5 to 4.5 percent in emerging economies, reflecting their transmission primarily via financial linkages. Within the euro area, the largest output gains are realized in the periphery, at 9.8 percent for Greece, 3.6 percent for Ireland, 6.6 percent for Italy, 7.3 percent for Portugal, and 8.2 percent for Spain. By comparison, the stabilizing policy measures taken by the United States will raise output there by 3.6 percent in 2013, by 0.9 to 1.8 percent in other advanced economies, and by 0.8 to 2.1 percent in emerging economies, commensurate with their transmission via trade linkages to a greater degree. Aggregating these simulated output gains implies a world output gain of 3.0 percent from stabilizing policies in the euro area, and of 1.7 percent from those in the United States. The associated increases in the prices of energy and nonenergy commodities are 31.0 and 20.1 percent for the euro area, versus 14.7 and 8.0 percent for the United States.

Simulated Initial Output Effects

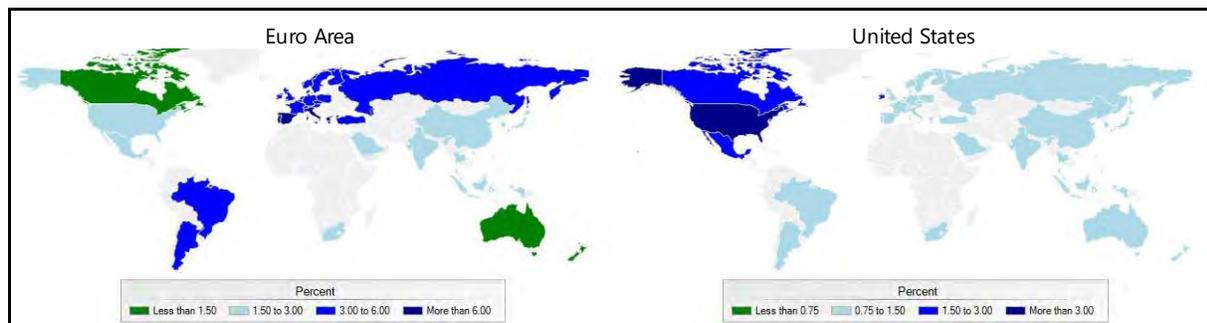
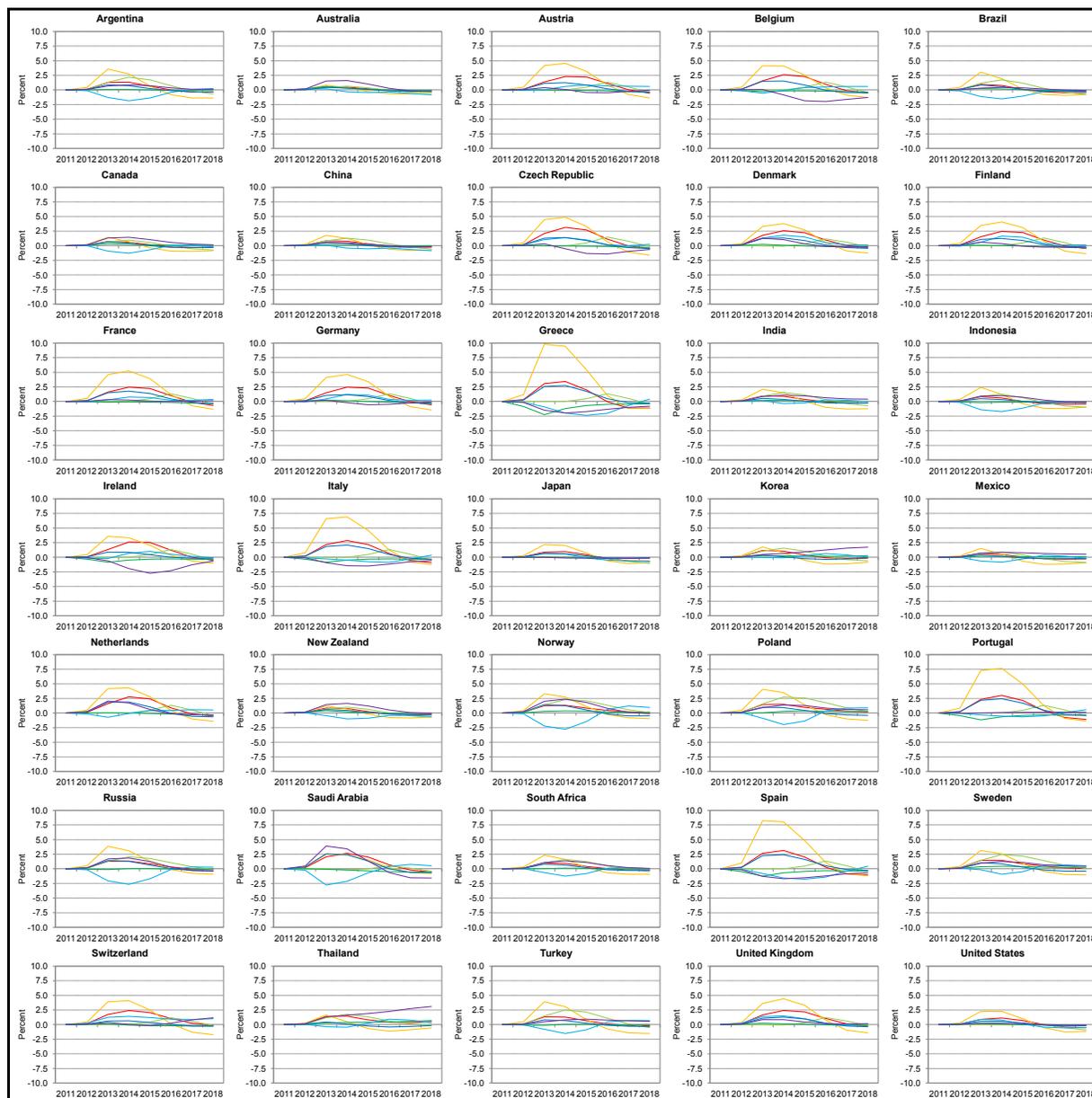


Figure 2.1 Simulation Results, Euro Area Policies



Note: Depicts the simulated paths of consumption price inflation ■, output ■, the short-term nominal market interest rate ■, the long-term nominal market interest rate ■, the real effective exchange rate ■, the fiscal balance ratio ■, and the current account balance ratio ■, expressed as deviations from baseline in percent or percentage points.

Figure 2.2 Simulation Results, United States Policies



Note: Depicts the simulated paths of consumption price inflation ■, output ■, the short-term nominal market interest rate ■, the long-term nominal market interest rate ■, the real effective exchange rate ■, the fiscal balance ratio ■, and the current account balance ratio ■, expressed as deviations from baseline in percent or percentage points.

3. Market-Based Indicators of Systemic Risks¹⁵

Market-based indicators that are commonly used to gauge systemic (“tail”) risks suggest that the euro area tail risks declined markedly since mid-2012 and remain below the previous peak (spring 2012) despite some revival of concerns amid Italian elections and Cyprus bail-out in early 2013. In contrast, markets now seem to be more concerned about extreme outcomes in Japan as well as the effects of potential QE tapering in the United States. Compared to European G-SIBs, U.S. G-SIBs appear less vulnerable to contagion from other G-SIBs, reflecting a combination of greater progress in balance-sheet repair and lower exposure to the euro area risks.

Funding stress

1. **LIBOR-OIS spreads provide insight into market perceptions of credit risk in funding markets, with higher spreads associated with higher risk.** Funding stress peaked during the Lehman bankruptcy and remained elevated during the subsequent months (Figure 13). At present, spreads have returned to their pre-crisis levels as markets have normalized. However, worries over the European debt crisis prompted an increase in stress levels in 2011–early 2012 that declined following the LTROs and the OMT announcement. In contrast, Japanese funding markets were much more stable even at the height of the crisis.

Equity and bond market volatility

2. **Equity VIX indexes (also known as “fear indexes”) are based on the relative price of put options on equity indexes.** Global equity stress levels peaked during the Lehman crisis and have subsequently come down to near-record lows, in part suppressed by the QE (Figure 13). However, volatility spiked again during periods of tensions in Europe (see Figure 1). More recently, the Japanese implied volatility index (VXJ) has moved higher following the change of government and the announcement of the QE program by the Bank of Japan, as well as the bouts of volatility in the JGB market. During the recent month, investor worries about Fed tapering of QE (notably after the Chairman Bernanke’s statement on May 22 – dashed line on the current charts in Figure 13) have come to the forefront and led to a spike in the U.S. Treasury yields and implied volatility in the UST market (as reflected in the MOVE index).¹⁶

Swap market volatility

3. **Swaptions are options to enter into interest rate swaps with a specified strike rate and maturity.** Ten year maturity swaptions on ten year swaps are widely used as a benchmark for stress in the fixed income market, as swaptions prices typically spike in times of market stress. Swaption

¹⁵ Prepared by J. Chow, Y. Chen, S. Hazarika, A. Ilyina (all MCMGA) and M. Segoviano (MCMCM)

¹⁶ Merrill Lynch Option Volatility Estimate (MOVE) Index is a yield curve weighted index of the normalized implied volatility on 1-month Treasury options which are weighted on the 2, 5, 10, and 30 year contracts.

volatility also peaked during the Lehman crisis and declined subsequently but has not returned to pre-crisis levels due to lingering uncertainty regarding monetary policy and the effects of QE policies instituted by several major global central banks (Figure 13). In Japan, swaptions volatility has risen significantly following the QE announcement by the Bank of Japan due to disruptions in the JGB market. Although conditions are slowly returning to normal, the JGB market saw several weeks of poor liquidity and fluctuating prices as investors and banks sought to position for large scale central bank purchases. Frequent shutdowns of the JGB futures market due to tripping of volatility triggers exacerbated swaptions volatility.

Currency volatility

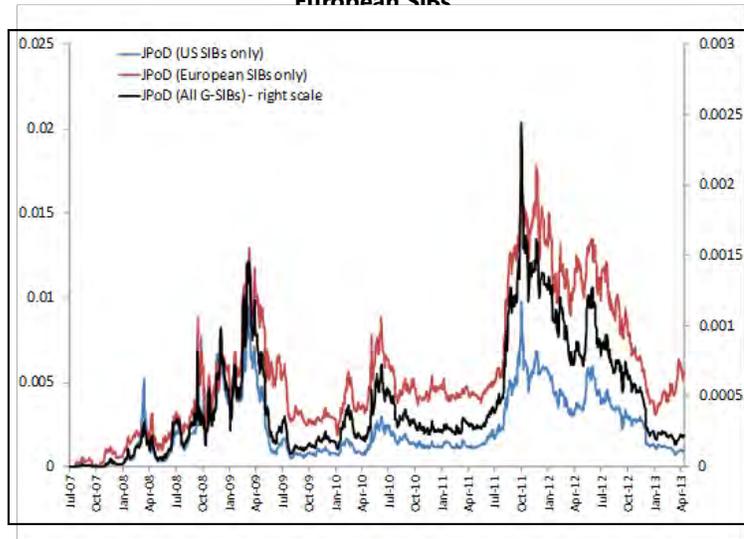
4. **In the FX market, risk reversals or the difference in price between call and put options are widely used as a gauge of risk aversion.** The dollar and the yen are viewed as safe havens in crisis situations, while the euro and high yielding emerging market currencies tend to suffer. At the height of the financial crisis, euro-dollar risk reversals spiked as investors favored euro puts (dollar calls) over euro call options. At present, risk-reversals are close to pre-crisis levels again.

Likelihood of distress and value-at-risk of G-SIBs

5. **Since the collapse of Lehman in September 2008, the market-implied probability of all G-SIBs falling in distress (as measured by the joint probability of distress (JPoDs)¹⁷) has continued to be driven by poor growth outlook as well as by the developments in the euro area.** While JPoDs have generally tapered-off since 2009, concerns about the Greek bailout plan and spillover implications to other periphery economies precipitated a significant spike during the last quarter of 2011 (see figure below). The spike was largely driven by European banks.

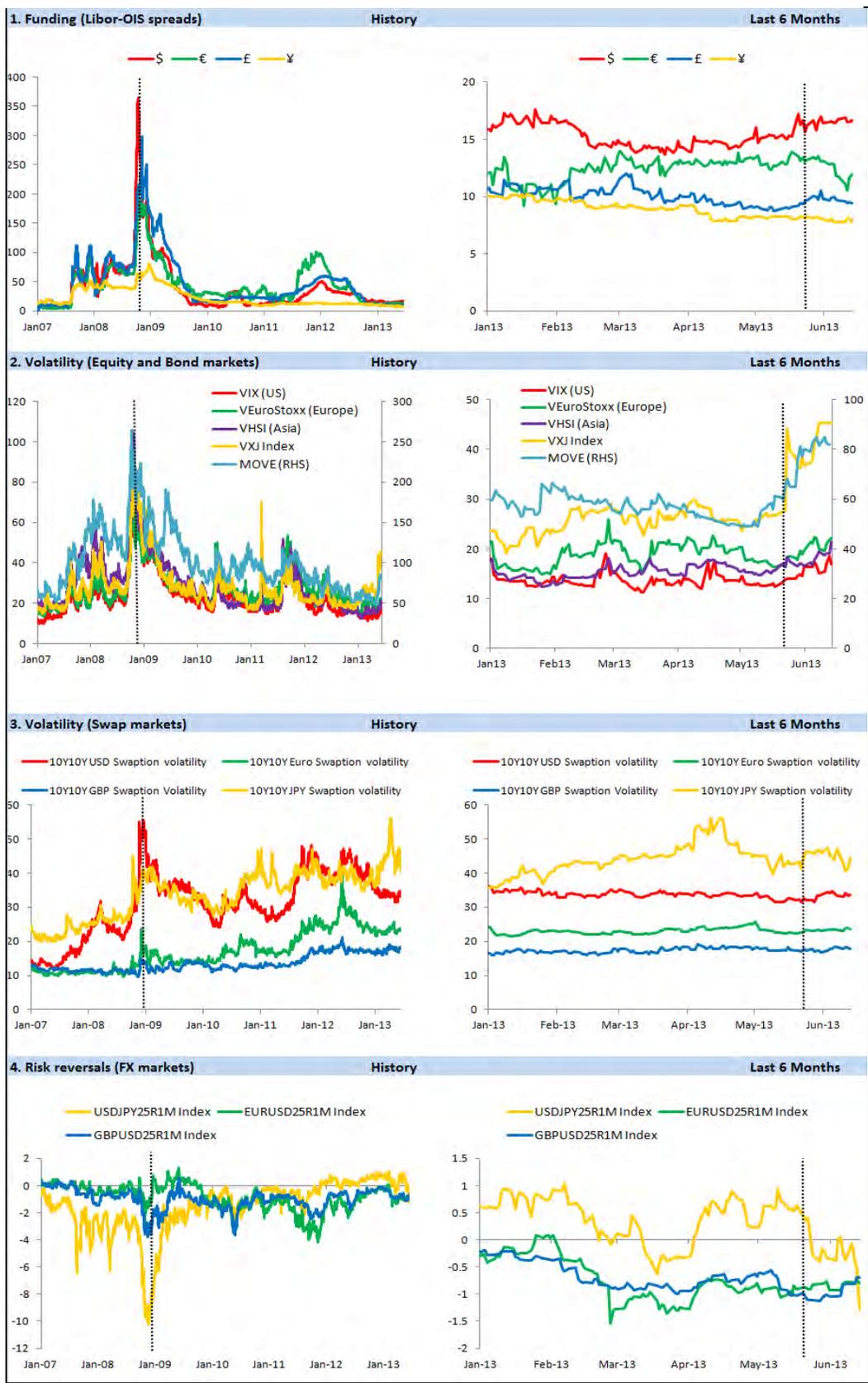
6. **The events early this year (Italian elections, Cyprus bail-out) have led to another increase in the JPoD of the European SIBs.** In contrast, the JPoD of the U.S. SIBs has continued to steadily decline, reflecting improvement in the perceived resilience of their balance sheets.

Probability of distress of all G-SIBs and for the United States and European SIBs¹

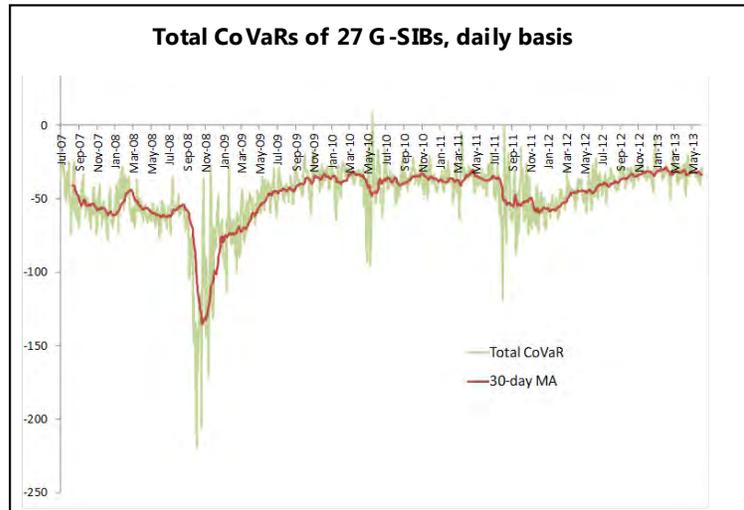


¹⁷ Based on Segoviano M., Goodhart, C. (2009) "Banking Stability Measures", IMF WP/09/04; derived from CDS-implied probabilities of default and equity prices.

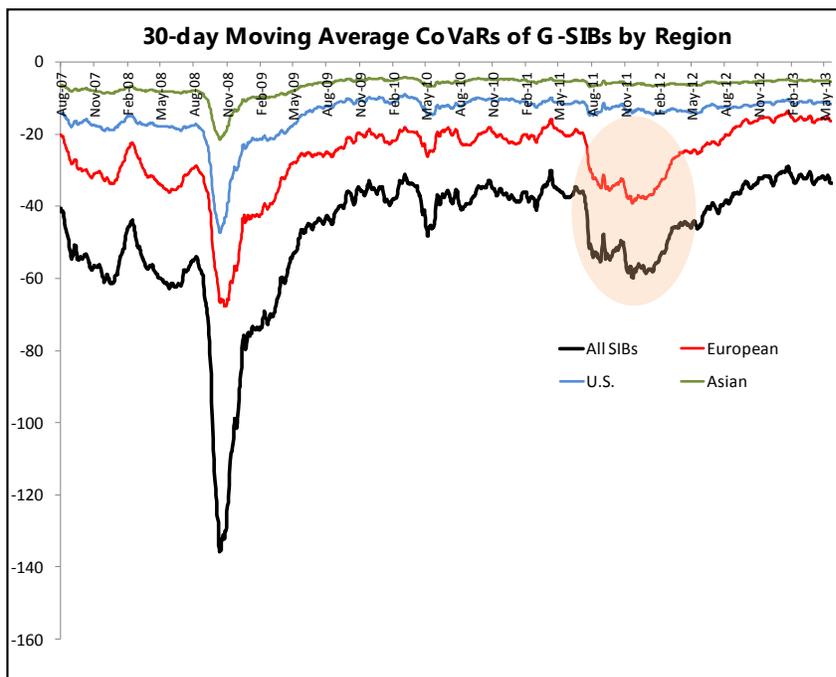
Figure 3.1 Asset Market Based Systemic/“Tail” Risk Indicators



7. The total value-at-risk of the system comprising 27 G-SIBs, conditional on one failure on average (total CoVaR¹⁸), has declined markedly since its peak in October 2008 following Lehman’s collapse, in line with the balance sheet repair and recapitalization efforts, though the total CoVaR has increased in the second half of 2011 (see figure below).



8. A noteworthy point is that the increase in overall CoVaRs has largely been driven by European SIBs, while U.S. and Asian SIBs remain relatively flat since 2011 (see figure below).



¹⁸ Based on Adrian and Brunnermeier (2008)

II. UNCONVENTIONAL MONETARY POLICIES

4. Impact of Unconventional Monetary Policies on International Asset Prices¹⁹

Unconventional policies are often launched precisely because market conditions are unsettled, and it is in these circumstances that international financial spillovers tend to be the largest. Looking ahead, the larger impact coming from unconventional monetary policies is likely to be through forward guidance, managing market expectations of future policies.

1. **The focus of this study is on the impact on foreign asset prices of conventional and unconventional monetary policies in systemic advanced economies.** By examining the impact across a number of major asset prices the analysis aims at providing a relatively comprehensive picture of the likely impact on recipients. Bond yields and equity prices are important drivers of domestic demand through wealth effects and changes in the value of collateral. Exchange rates help determine competitiveness and hence the level of foreign demand.
2. **Financial market spillovers from unconventional monetary policy are gauged using event studies.** The impact of unconventional monetary policies is estimated on two-daily returns over a 10-year period of 2003–2013 for three asset markets (bond, equity and foreign exchange market) in a wide range of countries—23 advanced economies (AEs) and 11 emerging markets (EMs)—and reported for selected subgroups of advanced and EMs having similar characteristics.²⁰ Spillovers from pre-crisis easing, post-crisis policy announcements not involving unconventional monetary policy, and unconventional monetary announcements are examined by looking at the change in asset price for a given monetary surprise—as it is the surprise, after all, that moves asset prices.²¹
3. **The analysis is adapted to take account of ‘typical’ international and domestic financial linkages as well as differing time zones.** High correlations in asset prices both across and within countries imply complex dynamics, even at daily frequencies. A two-stage approach is used to

¹⁹ Prepared by Silvia Sgherri (SPR).

²⁰ The advanced markets included in the analysis are Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, adopted Germany, Greece, Ireland, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States. The emerging markets are Brazil, China, India, Indonesia, Malaysia, Mexico, Poland, Russia, South Africa, Thailand, and Turkey. In the context of the event study, country-specific estimates have been pooled across selected country subgroups using Generalized Least Squares with robust standard errors for panel regressions with cross-sectional dependence. The country grouping is specified at the bottom of the relevant tables and figures.

²¹ This analysis—first elaborated in the context of IMF (2013a, 2013b)—measures monetary surprises by changes in 1-year-ahead futures on short-term interest rates, as the change in futures on a policy announcement day reflects the surprise associated with the announcement. For each asset purchase program considered in the analysis, the measured surprise effect is pictured in Table 4.1, cumulating the effects of all corresponding announcements.

account for this “typical” behavior. First, the transmission of shocks between bond yields, equity prices, exchange rates and money market rates within and between the four major financial markets (Germany, Japan, the United Kingdom, and the United States) is examined in a simultaneous manner.²² Next, the corresponding underlying shocks are used as inputs into a similar system for each other small open economy in turn, to account for linkages across domestic assets within each of these smaller economies. Hence, for example, the model for Brazil takes account of financial markets shocks from the four major markets as well as interactions across Brazilian asset prices. Finally, a two-day window is used to study events given differing time zones—in particular, Asian markets in any given day are closed before the same day session in the United States starts.²³

4. **The limitations of the event study approach need to be recognized. Examining short-term responses of financial markets to announcements of unconventional monetary policy helps avoid concerns that responses are being contaminated by non-policy-related news.** Also, spillover effects are expected to rapidly transmit between liquid and highly integrated financial markets through portfolio rebalancing and expectation channels. However, event studies only reveal the immediate market reaction to such policies. To the extent that views on the impact of unconventional policies evolve over time, these revisions will not be captured by these event studies. In addition, as will be discussed further below, interpreting the response of financial markets to unconventional monetary policy announcements is complicated as the announcement reveals both a policy decision and an assessment of current economic conditions. If markets conclude that current conditions are worse than they had earlier perceived, the impact of a policy loosening on (say) equity prices becomes ambiguous.

5. **Previous studies have shown that early announcements of asset purchases in AEs have buoyed asset prices globally by decreasing the tail risk of a severe recession, but their effects diminished once markets normalized.** Previous evidence focusing on quantitative easing policy in the United States found significant spillover impact on bond yields and currency in EMs, with larger estimated effects from QE1 than from QE2.²⁴ Evidence of spillovers from unconventional monetary

²² The approach is similar to that taken in Ehrmann, Fratzscher, and Rigobon (2011), although extended and modified to analyze spillovers between bond, equity, exchange rate, and money markets within and between the four systemic economies. Details of the underlying study are provided in Sgherri (2013, forthcoming).

²³ The fit of these equations is relatively high—with R-squares ranging between 75 and 90 percent.

²⁴ There is relatively little research on the international spillovers of central bank balance sheet policies, especially the impact on emerging markets. Exceptions are Chen, Filardo, He and Zhu (2012), Glick and Leduc (2011), Neely (2012), Bauer and Neely (2012), Fratzscher, Lo Duca, and Straub (2012), Bayoumi and Bui (2011), IMF (2011, 2012). To give a sense of the order of magnitude, Neely (2012) finds that U.S. quantitative easing lowered bond rates in the other AEs by 20-80 basis points and the value of U.S. dollar by 4-11 percentage points. Glick and Leduc (2011) showed that commodity prices fell on average on days of the Fed LSAP announcement, associated with declines in long-term interest rates and dollar depreciation.

policy in non-U.S. AEs appears rather muted. Shocks to bond and equity markets in the United Kingdom and euro area generated mild spillovers to other AEs.²⁵

6. **Divergence in the estimated spillover effects can reflect the context in which quantitative easing was implemented, country-specific factors in EMs, and endogenous policy responses.** Findings of opposite spillovers on foreign asset prices of QE1 and QE2 could be due to different policy objectives and market environment.²⁶ Indeed, QE1 was intended to repair markets and provide liquidity to financial institutions, which effectively induced investors to relocate investments to the United States. As a result, QE1 announcements tend to be positively associated with a short-term improvement in global financial conditions measured by global risk appetite and global equity prices, while QE2 announcements do not. On the other hand, QE2 was implemented when many EMs were on an upward growth trend, making it difficult to distinguish the impact of the QE in creating capital outflows from the impact of better growth prospects in EMs in attracting capital flows. Finally, opposite responses of foreign exchange rates from QE2 could reflect policy reactions of EMs to intervene to stabilize exchange rates.

7. **Controlling for monetary surprises and asset price endogeneity across borders and across markets broadly confirms these findings.** Tables 4.2–4.4 summarize the estimated cumulative effect of the surprise for each type of announcement and each group of countries. For example, in Table 4.2, the “Latin America” bar corresponding to the U.S. “LSAP1a” entry shows that the surprise associated with the U.S. purchase of MBS and Agency bonds during the first phase of LSAP1 lowered long-term bond rates in Brazil and Mexico by over 9 basis points.

8. **Evidence points to the effectiveness of conditional forward guidance in managing market expectations of future policy and the importance of a clear central bank communication on exit strategy from highly accommodative monetary policies.** At the zero boundary, forward guidance can be used to convince markets that the central bank will keep rates low for longer (allow inflation to go higher) than consistent with its usual policy rule. Results show, for example, that the surprise effect of Fed’s conditional forward guidance lowered expectations of future short-term interest rates, as measured by the 1-year ahead 3-month Libor, and boosted asset prices both domestically and internationally. Most recently, though, market expectations about a faster unwinding of monetary stimulus in the United States have led to a generalized repricing of risks, rising domestic interest rates and weakening equity prices in most emerging markets, among higher foreign exchange rate volatility.

9. **The results suggest that the financial market spillovers of unconventional monetary policies vary by market conditions as well as the nature of the intervention.** Such policies

²⁵ Joyce and others (2011) show that QE announcements in the United Kingdom depreciated its currency by 4 percent. Event studies of asset purchases by Japan did not find significant impact on exchange rates, although Japan’s QE announcements in earlier 2000s appear to have a sizable impact on emerging Asian countries.

²⁶ See, on this point, Fratzscher, Lo Duca, and Straub (2012).

appear to have been particularly effective in supporting global financial market conditions at times when financial conditions in the major country or region and, likely as a result, globally are particularly volatile. In these situations, unconventional monetary announcements have often led to outsized improvements in global market conditions. This includes the early announcements by the United States and more recent announcements in the euro area. As markets normalize, however, the impacts of policies have been smaller and more ambiguous. However, the results also reflect shifts in the surprise content of the announcements, as shown in Table 4.1. However, evidence mostly relates to the extension of similar bond purchase programs. A substantially different program—either in size or in scope—could still have strong effects, as suggested by the latest BoJ’s QQME announcement.

10. **Assessing the overall impact from unconventional policy announcements on a particular asset price in a particular country or region is complicated by the simultaneous response of asset prices in other markets and in other countries.** The international transmission of financial shocks (such as a monetary policy surprise) is highly complex, as shocks tend to generate co-movements across asset prices around the world. Results show that the direct impact of a monetary surprise on an asset price in a given country is often magnified through indirect spillovers via third countries (especially other systemic markets) as well as via the response of other domestic assets. Analogously, the direct effect of early U.S. unconventional policy announcements on EM bond yields appears to be almost doubled by indirect spillovers through simultaneous asset price movements in other S4 economies.

11. **The impact of unconventional policy announcements on global financial conditions is further complicated by the fact that they often occur when financial volatility is high.** Unconventional policies are often launched precisely because market conditions are unsettled, and it is in these circumstances that the financial spillovers tend to be the largest. Whether the spillovers are helpful or not depends not only on the spillovers themselves, but also on the cyclical conditions in recipients. A boost to domestic demand from lower bond yields, higher equity prices, and a reduction in tail risks to the global economy can be helpful if an economy is operating below capacity. However, it may complicate policy making if an economy is overheating, a relevant factor given large differences in cyclical conditions during this recovery. In addition, because decisions on unconventional monetary policies tend to be less easy to predict, they tend to be associated with times when it is more difficult to anticipate the future path of global monetary and financial conditions.

12. **Over time, however, the larger impact coming from unconventional monetary policies is likely to be through their effectiveness in guiding market expectations and their impact on underlying market conditions.** To the extent that unconventional monetary policies help lower uncertainty and tail risks, they can reduce underlying volatility. If, however, they are simply used as a salve to avoid more fundamental reforms, then they are likely to prolong an environment with high levels of uncertainty that will ultimately put more pressure on other financially open economies. Unconventional policies are a bridge to a solution, not the solution itself.

Table 4.1 Surprise Effect of UMP Announcements

	Forward Libor Responses to UMP announcements <i>bps, cumulative</i>															
	United States							United Kingdom			EA			Japan		
	LSAP1A	LSAP1B	LSAP2	TWIST	LSAP3	Tapering	Forward Guidance	APP1	APP2	FLS	OMT	Speech	Rate Cut	Forward Guidance	LSAP	QQME
United States	<u>-5.5</u>	<u>-9.9</u>	-2.4	1.9	5.1	0.5	<u>-16.1</u>	0.5	-1.3	-1.8	1.5	-0.5	-0.5	-0.8	-1.0	-1.5
Japan	0.8	-0.3	0.3	0.5	1.2	-0.5	-1.4	-0.3	-0.5	-0.3	0.0	0.5	-0.5	-0.5	-0.5	3.0
United Kingdom	<u>-7.7</u>	<u>-2.6</u>	-0.5	0.3	-3.0	<u>-3.1</u>	1.8	2.6	<u>-5.1</u>	<u>-5.4</u>	1.9	2.9	<u>-3.1</u>	2.9	-0.7	-1.1
Euro Area	<u>-4.8</u>	-0.9	<u>-1.1</u>	0.5	-1.0	<u>-2.5</u>	0.4	3.8	-2.2	-1.4	0.5	0.5	<u>-4.0</u>	0.3	-1.5	2.0

Figures in italicized underlined font indicate significance at 5%.

Note: For a detailed list of announcement dates, see IMF (2013a, 2013b).

Table 4.2 Impact of Surprises—10-Year Bond Yields Responses

	1-year Bond Yields Response to UMP Announcements <i>bps, 2-day cumulative</i>															
	United States							United Kingdom			EA			Japan		
	LSAP1A	LSAP1B	LSAP2	TWIST	LSAP3	Tapering	Forward Guidance	APP1	APP2	FLS	OMT	Speech	Rate Cut	Forward Guidance	LSAP	QQME
Advanced Economies																
United States	-8.7	-11.6	-4.4	-14.2		8.3		4.4		-1.3		13.7	11.6	2.0		
United Kingdom	-15.7															
Japan	-4.2				21.7			11.4								
Germany	-6.3	-5.7	-2.7	-6.8	-7.4		3.8	3.5		-2.3	0.5	8.7				-2.4
Euro Area																
Core	-4.8	-4.7	-2.2	-3.8	-7.0	3.3		1.9								-0.5
Periphery	-3.8	-3.8	-1.6	-3.3	-13.9	6.9		-1.4	3.7		-2.9	-15.2				-0.5
EUR Safe Havens	-4.2	-3.2	-1.9	-5.4	-6.4	6.1		2.6		-0.8		9.2	3.2			-0.4
Inflation Targeters	-1.8	-2.6	-2.4	-3.2				2.2		-3.0		5.0				
Emerging Market																
China and India	-2.9	-1.9	-0.7			3.1					0.4					-0.3
China and India										-2.6						-3.7
Emerging Asia	-2.2		-1.4							-0.6						
Emerging Asia																
Emerging Europe	-2.5					7.9	7.6		-8.2		1.6					-0.6
Latin America	-9.3	-9.6		5.8			9.7					14.7				
Other	-6.0	-5.6	-2.2	6.0		8.1				2.2						-4.3
Other																

Notes: Core EA comprises: Austria, Belgium, Finland, France, and Netherlands; Periphery EA comprises: Greece, Ireland, Italy, Spain, and Portugal; European Safe Havens comprise Denmark and Switzerland; Inflation Targeters comprise Australia, Canada, New Zealand, Norway, and Sweden; Latin America comprises Brazil and Mexico; Asia comprises Indonesia, Malaysia, South Korea, and Thailand; Europe comprises Czech Republic and Poland; Other EMs comprise Russia, South Africa, and Turkey. Only significant responses are reported.

Table 4.3 Impact of Surprises—Stock Price Responses

	Stock Prices Response to UMP Announcements <i>percentage points, 2-day cumulative</i>															
	United States							United Kingdom			EA			Japan		
	LSAP1A	LSAP1B	LSAP2	TWIST	LSAP3	Tapering	Forward Guidance	APP1	APP2	FLS	OMT	Speech	Rate Cut	Forward Guidance	LSAP	QQME
Advanced Economies																
United States	-1.5	-2.2					5.1		1.4			3.3	1.8		-0.6	-0.6
United Kingdom																
Japan	-1.1		-0.5	-3.4	-3.2	-2.6	3.1	0.8		-0.6		5.1				
Germany	-1.3	-1.0	-0.4	-4.5			3.8	0.7	2.3	-0.4		3.5	2.4	-0.9	-1.3	
Euro Area																
Core	-0.7		-0.3	-3.2	-2.2	-1.4	1.6			-0.4		2.6		1.2	-0.3	
Periphery	-0.7			-3.5	-2.6	-1.6	1.4			-0.3		2.2		0.9	-0.1	
EUR Safe Havens	-1.4	-1.5	-0.3	-2.5			3.9	0.5		-0.2		1.7		0.9	-0.2	
Inflation Targeters	-1.2	-1.3	-0.4	-2.2			2.9					2.6		1.8	-0.3	
Emerging Market	-0.7	-0.6		-1.7		-1.3	2.4			-0.4		1.7		0.6	-0.2	
China and India				-2.8						-0.5	0.2					
Emerging Asia	-0.8	-1.0		-2.5		-3.2	2.6		1.4	-0.4		1.6		1.3	-0.4	
Emerging Europe	-0.8						1.5	0.5		-0.3					-0.1	
Latin America	-1.4	-1.9		-3.3			4.5			-0.6		5.4				
Other	-0.9			-2.6	-1.8	-2.2	3.6			-0.5		1.4		0.9	-0.3	

Notes: Core EA comprises: Austria, Belgium, Finland, France, and Netherlands; Periphery EA comprises: Greece, Ireland, Italy, Spain, and Portugal; European Safe Havens comprise Denmark and Switzerland; Inflation Targeters comprise Australia, Canada, New Zealand, Norway, and Sweden; Latin America comprises Brazil and Mexico; Asia comprises Indonesia, Malaysia, South Korea, and Thailand; Europe comprises Czech Republic and Poland; Other EMs comprise Russia, South Africa, and Turkey. Only significant responses are reported.

Table 4.4 Impact of Surprises—Foreign Exchange Rate Responses

	Cross FX Rates Response to Surprises of UMP Announcements <i>percentage points, 2-day cumulative</i>															
	United States							United Kingdom			EA			Japan		
	LSAP1A	LSAP1B	LSAP2	TWIST	LSAP3	Tapering	Forward Guidance	APP1	APP2	FLS	OMT	Speech	Rate Cut	Forward Guidance	LSAP	QQME
Advanced Economies																
United States								0.3		-0.7	1.0	1.7				-1.5
United Kingdom	0.9	0.4	-0.1	1.4	0.8		-2.9						-0.6			-1.5
Japan	-0.4	-0.8	-0.3			-1.3	-0.9	0.3		-0.6		2.5	1.1			
Germany			-0.3	1.1	1.7		-2.6			-0.2						-2.0
Euro Area																
Core			-0.3	1.1	1.7		-2.6			-0.2						
Periphery			-0.3	1.1	1.7		-2.6			-0.2						
EUR Safe Havens	0.2			2.3	0.8		-2.2			-0.3				0.4		-1.5
Inflation Targeters			-0.3	1.2	1.5		-2.8			-0.2						-1.9
Emerging Market	0.2		-0.8	1.1	1.2		-1.2			-0.4				0.2		-1.7
China and India	0.9	0.9		0.2	0.4		-0.3	0.3		-0.6		1.2				-1.4
Emerging Asia				0.6	0.9	0.4	-0.5			-0.5		1.2		0.2		-1.7
Emerging Europe	0.6		-0.4	1.8	1.9		-3.5			-0.7				0.4	0.2	-2.2
Latin America	0.6	0.7		2.7	2.1	0.9	-2.1	-0.5		-0.5	0.2				0.3	-2.2
Other		-0.9		1.8	2.5					-0.6			-0.9	0.4	0.3	-2.4

Notes: Core EA comprises: Austria, Belgium, Finland, France, and Netherlands; Periphery EA comprises: Greece, Ireland, Italy, Spain, and Portugal; European Safe Havens comprise Denmark and Switzerland; Inflation Targeters comprise Australia, Canada, New Zealand, Norway, and Sweden; Latin America comprises Brazil and Mexico; Asia comprises Indonesia, Malaysia, South Korea, and Thailand; Europe comprises Czech Republic and Poland; Other EMs comprise Russia, South Africa, and Turkey. Only significant responses are reported.

References

- Bauer and Neely (2012) "International Channels of the Fed's Unconventional Monetary Policy," Working Paper Series 2012-12, Federal Reserve Bank of San Francisco.
- Bayoumi and Bui (2011) "Unforeseen Events Wait Lurking: Estimating Policy Spillovers from U.S. To Foreign Asset Prices," IMF Working Papers 11/183, International Monetary Fund.
- Chen, Filardo, He and Zhu (2012), "International Spillovers of Central Bank Balance Sheet Policies," BIS Paper No. 66p.
- Ehrmann, Fratzscher, and Rigobon (2011) "Stocks, Bonds, Money Markets and Exchange Rates: Measuring International Financial Transmission," *Journal of Applied Econometrics*, Vol. 26, No. 6, pp. 948—974.
- Fratzscher, Lo Duca, and Straub (2012) "A Global Monetary Tsunami? On the Spillovers of U.S. Quantitative Easing," CEPR Discussion Papers No. 9195.
- Glick and Leduc (2011) "Are Large-Scale Asset Purchases Fueling the Rise in Commodity Prices?" Economic Letters 2011-10, Federal Reserve Bank of San Francisco.
- IMF (2011) *United States – Spillover Report for the 2011 Article IV Consultation*, IMF Country Report No. 11/203, July.
- IMF (2012) *2012 Spillover Report*, IMF Policy Papers, July.
- IMF (2013) *Global Financial Stability Report*, April, International Monetary Fund.
- Joyce, Lasaosa, Stevens, Tong (2011) "The Financial Market Impact of Quantitative Easing," *International Journal of Central Banking*, Vol. 6, pp. 113-161.
- Moore, Nam, Suh, and Tepper (2013) "Estimating the Impacts of U.S. LSAPs on Emerging Market Economies' Local Currency Bond Markets," Federal Reserve Bank of New York, Staff Report No. 595.
- Neely (2012) "The Large-Scale Asset Purchases Had Large International Effects," Federal Reserve Bank of St. Louis, Working Paper 2010-018D.
- Sgherri (2013) "(Unconventional) Financial Transmission Across Systemic Advanced Economies," forthcoming IMF Working Paper.

5. Effects of Unconventional Monetary Policies by the Systemic Advanced Economies Using the G-35 Model²⁷

1. **This note analyzes the global macroeconomic effects of unconventional monetary easing measures recently taken by the euro area, Japan, the United Kingdom, and the United States.** This analysis is based on scenarios simulated with the structural macroeconomic model of the world economy, disaggregated into thirty five national economies, documented in Vitek (2013). Within this framework, each economy is represented by interconnected real, external, monetary, fiscal, and financial sectors. Spillovers are transmitted across economies via trade, financial, and commodity price linkages. Financial linkages are both direct, through cross-border debt and equity portfolio holdings, and indirect via international comovement in asset risk premia.

2. **The unconventional monetary easing measures under consideration vary considerably in design across the systemic advanced economies.** For the euro area, we consider the Outright Monetary Transactions program foreshadowed by the European Central Bank on July 26 of 2012, announced on August 2 of 2012, and clarified on September 6 of 2012. For Japan, we examine the asset purchase program announced by the Bank of Japan on October 5 of 2010 and subsequently revised many times, in particular on April 3 of 2013. For the United Kingdom, we consider the two asset purchase programs announced by the Bank of England on January 19 of 2009 and October 6 of 2011 together with their numerous expansions, as well as the Funding for Lending Scheme announced on July 12 of 2012. For the United States, we examine the three asset purchase programs announced by the Federal Reserve on November 25 of 2008, August 10 of 2010 and August 31 of 2012 together with their revisions, as well as Operation Twist announced on September 21 of 2011. Most of these unconventional monetary easing measures involved an expansion of the monetary base, with notable exceptions being the Outright Monetary Transactions program and Operation Twist.

3. **Our scenarios represent these unconventional monetary easing measures with global money, bond, stock, and foreign exchange market adjustments.** In particular, we calibrate changes in short-term nominal market interest rates, long-term nominal market interest rates, equity prices and nominal bilateral exchange rates to match their estimated responses to unconventional monetary easing announcements, in the absence of conventional monetary policy reactions and automatic fiscal stabilizers worldwide. These estimated global financial market responses are based on an event study analysis using the data set documented in Sgherri (2013). They are phased out gradually according to a first order autoregressive process having a coefficient of 0.75, and are generated with sequences of temporary but persistent credit, duration, equity and currency risk premium shocks. We allow for feasible conventional monetary policy reactions to these inferred sequences of risk premium shocks, as well as the full operation of automatic fiscal stabilizers. We assume that conventional monetary policy reactions are constrained by the zero lower bound on the

²⁷ Prepared by Francis Vitek.

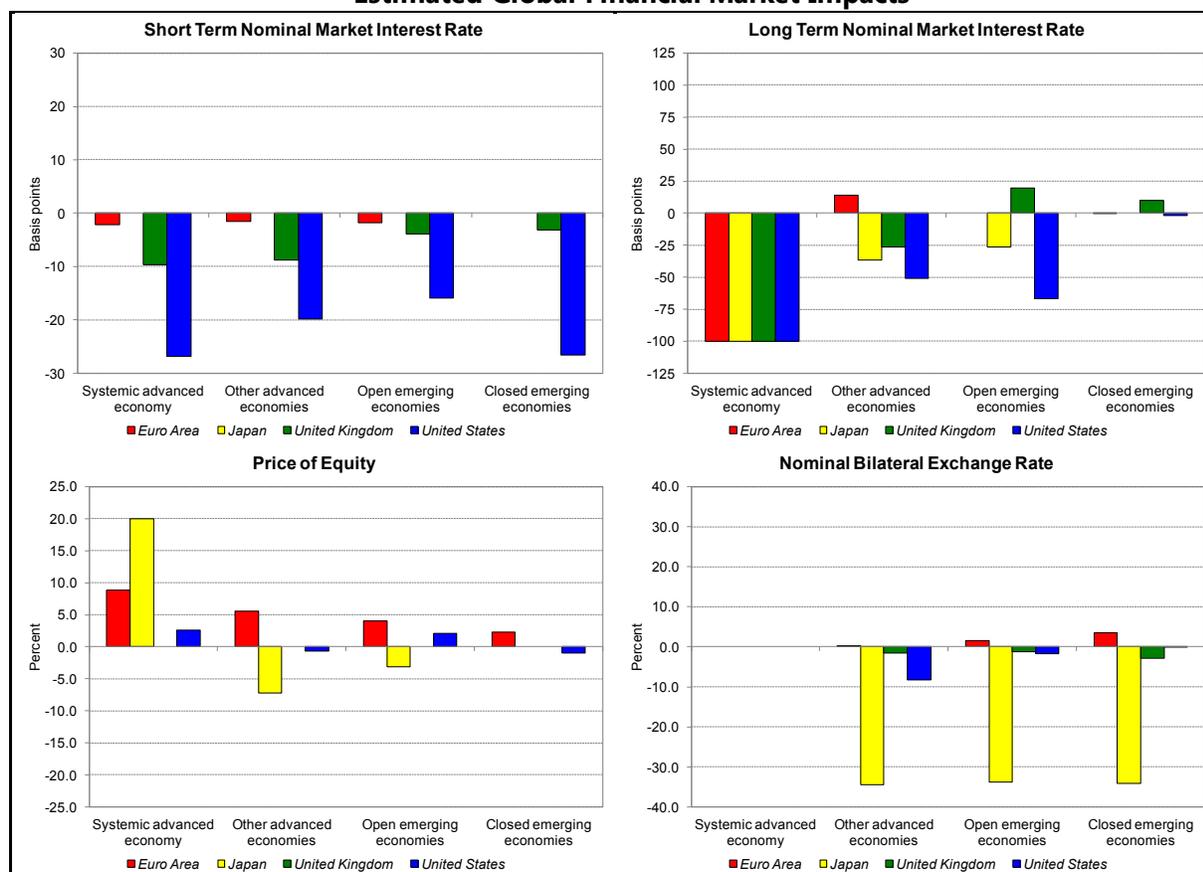
nominal policy interest rate in the Czech Republic, Denmark, the euro area, Japan, Saudi Arabia, Switzerland, the United Kingdom, and the United States.

4. **We estimate the global financial market responses to the unconventional monetary easing announcements under consideration with a traditional event study analysis.** This event study analysis entails the measurement of absolute or proportional changes in money market interest rates, long-term government bond yields, equity prices and bilateral exchange rates over those windows centered around event dates on which the unconditional probability of observing a larger reduction in the long-term government bond yield in the systemic advanced economy under consideration, or Italy in the case of the euro area, is less than 0.005. This extreme threshold criterion ensures that these measured global financial market adjustments are predominantly reactions to the unconventional monetary easing announcement under consideration, thereby solving an otherwise difficult identification problem. A two day event window is used except for Japan, where a one day window is used to abstract from a major unrelated event. We sum these measured changes across event dates, and normalize them such that the long-term government bond yield in the systemic advanced economy under consideration, or Italy in the case of the euro area, declines by 100 basis points. These relative measures are adopted instead of absolute measures because our event study analysis only captures responses to the unanticipated components of announcements, and misses more gradual adjustments to their anticipated components. Finally, we pool these estimated relative cumulative global financial market impacts across structurally similar economies by calculating group medians. In particular, we group together other advanced economies, emerging economies with open capital accounts, and emerging economies with closed capital accounts. In the case of the euro area, we also group together the members of the periphery. This pooling may be expected to yield mean squared error reductions while achieving robustness to outliers, which are prevalent.

5. **Our event study analysis indicates that unconventional monetary easing by the United States, and to a lesser extent the euro area, loosens global financial conditions substantially.** In the case of the United States, the unconventional monetary easing measures under consideration reduced money market interest rates and long-term government bond yields substantially worldwide, loosening financial conditions in emerging economies with open capital accounts in particular, while depreciating the dollar moderately with respect to the currencies of other advanced economies. For the euro area, the unconventional monetary easing measure under consideration reduced long-term government bond yields substantially in the periphery and raised them slightly in other advanced economies, while increasing equity prices substantially worldwide and appreciating the euro moderately with respect to the currencies of emerging economies. By comparison, our event study analysis suggests that financial market spillovers from unconventional monetary easing by Japan, and in particular the United Kingdom, are small. In the case of Japan, the unconventional monetary easing measures under consideration reduced long-term government bond yields moderately worldwide, while increasing equity prices enormously domestically and reducing them moderately in the rest of the world, consistent with an enormous improvement in external price competitiveness derived from a depreciation of the yen with respect to other currencies. For the United Kingdom, the unconventional monetary easing measures under consideration reduced money market interest rates moderately worldwide, reduced long-term government bond yields

moderately in other advanced economies while raising them moderately in emerging economies, and depreciated the pound slightly with respect to other currencies.

Estimated Global Financial Market Impacts

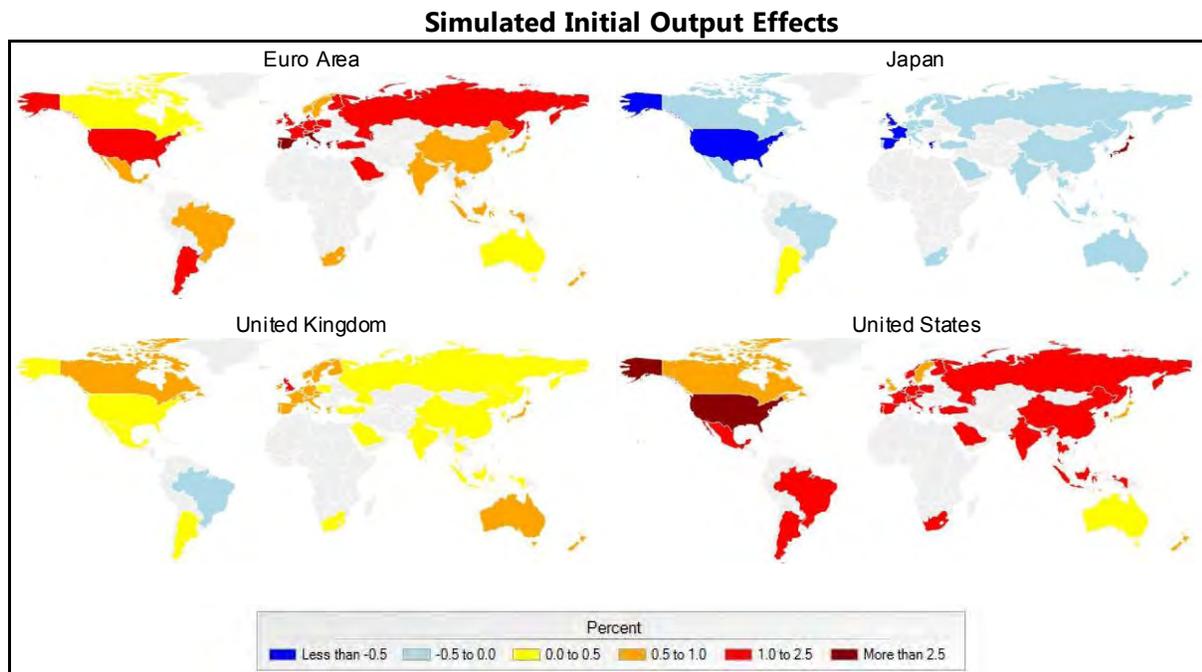


Note: Depicts estimated pooled relative cumulative global financial market impacts of recent unconventional monetary policy easing measures. The nominal bilateral exchange rate measures the price of the currency of the systemic advanced economy under consideration in terms of the domestic currency.

6. Our scenario simulation results indicate that unconventional monetary easing by the United States, and to a lesser extent the euro area, generates large output gains worldwide.

Indeed, unconventional monetary easing by the United States raises output growth there by 3.4 percentage points during the first year, by 0.4 to 1.3 percentage points in other advanced economies, by 1.2 to 2.2 percentage points in emerging economies with open capital accounts, and by 1.1 to 1.4 percentage points in emerging economies with closed capital accounts. By comparison, unconventional monetary easing by the euro area raises output growth there by 1.7 percentage points, by 0.3 to 1.4 percentage points in other advanced economies, by 0.5 to 1.5 percentage points in emerging economies with open capital accounts, and by 0.8 to 1.0 percentage points in emerging economies with closed capital accounts. In contrast, unconventional monetary easing by Japan and the United Kingdom tends to generate small negative and positive output spillovers, respectively. To put them into perspective, unconventional monetary easing by the United States and the euro area raises world output growth by 1.7 and 1.1 percentage points, whereas unconventional monetary

easing by Japan and the United Kingdom raises world output growth by 0.4 and 0.5 percentage points, respectively. The associated increases in the prices of energy and nonenergy commodities are 20.6 and 13.7 percent for the United States, 13.1 and 8.6 percent for the euro area, 1.8 and 0.2 percent for Japan, and 4.2 and 2.4 percent for the United Kingdom, respectively.



7. **These unconventional monetary easing scenarios imply moderate net capital inflows into each systemic advanced economy to finance the deterioration in its current account balance, as well as into some emerging economies with open capital accounts.** In particular, unconventional monetary easing by the United States decreases its current account balance ratio by 0.3 percentage points during the first year, while also reducing that of the Czech Republic by 0.7 percentage points, of Korea by 0.4 percentage points, of Turkey by 0.2 percentage points, and of Poland and Thailand by 0.1 percentage points. These current account balance deteriorations are generally financed by net capital outflows from commodity exporters and emerging economies with closed capital accounts. In response to unconventional monetary easing by the United States, the largest increases in current account balance ratios are for Saudi Arabia at 2.2 percentage points and for Norway at 0.7 percentage points.

Simulated Initial Current Account Balance Ratio Effects

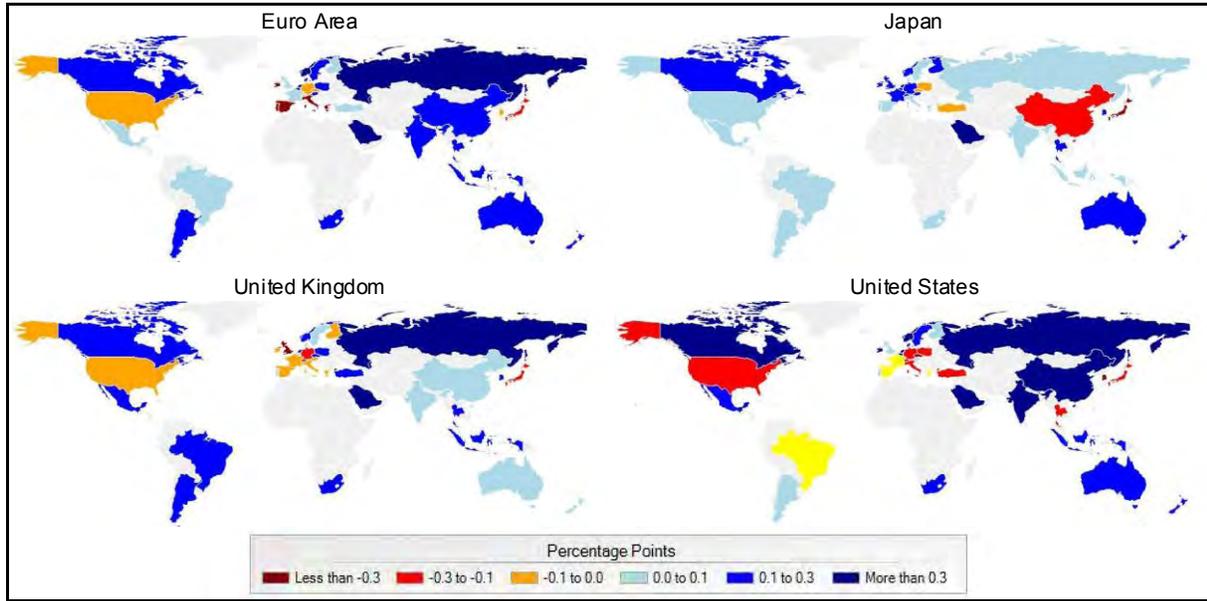
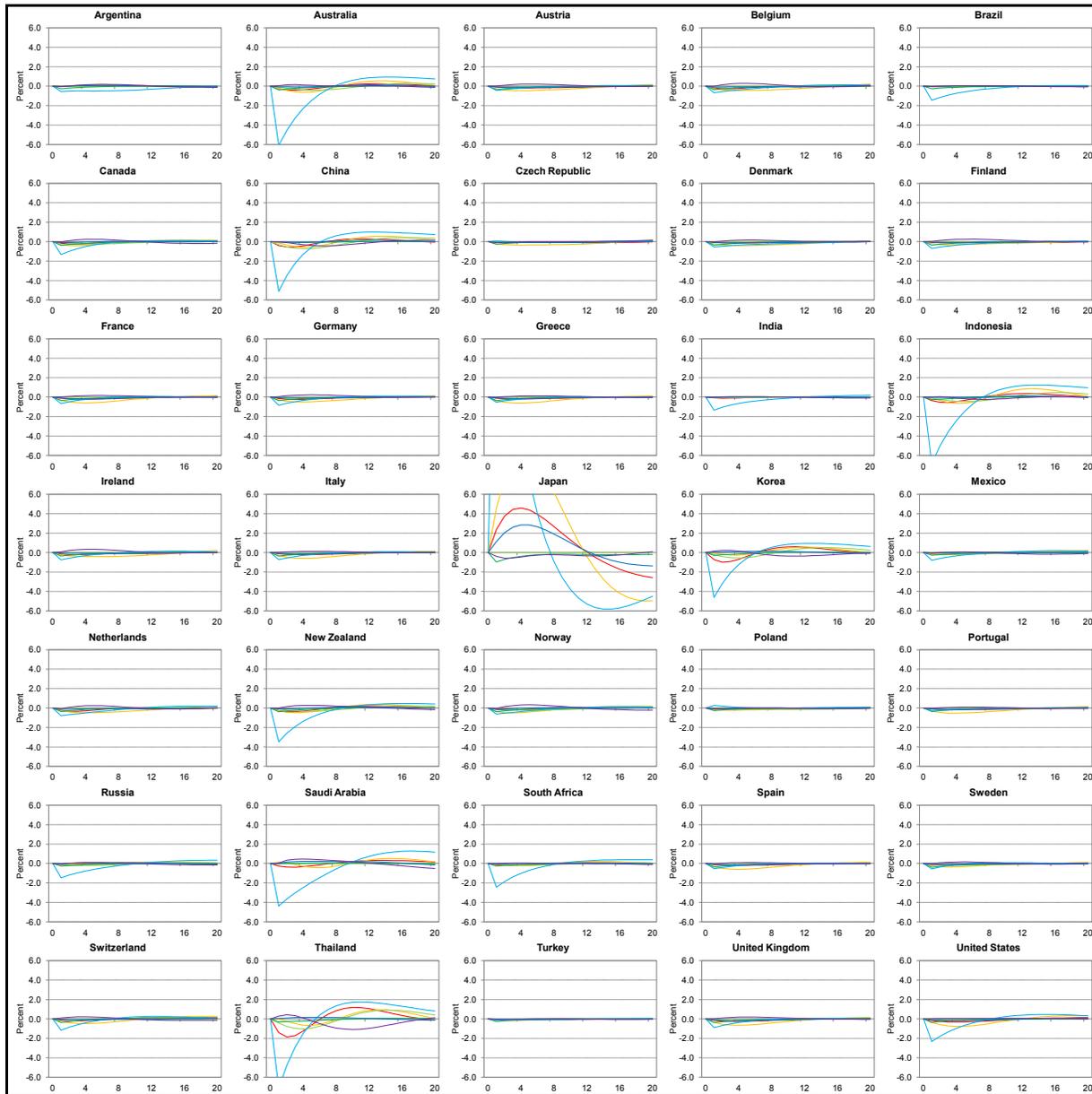


Figure 5.1 Simulation Results, Unconventional Monetary Easing by the Euro Area



Note: Depicts the simulated paths of consumption price inflation ■, output ■, the short-term nominal market interest rate ■, the long-term nominal market interest rate ■, the real effective exchange rate ■, the fiscal balance ratio ■, and the current account balance ratio ■, expressed as deviations from baseline in percent or percentage points.

Figure 5.2 Simulation Results, Unconventional Monetary Easing by Japan



Note: Depicts the simulated paths of consumption price inflation ■, output ■, the short-term nominal market interest rate ■, the long-term nominal market interest rate ■, the real effective exchange rate ■, the fiscal balance ratio ■, and the current account balance ratio ■, expressed as deviations from baseline in percent or percentage points.

Figure 5.3 Simulation Results, Unconventional Monetary Easing by the United Kingdom



Note: Depicts the simulated paths of consumption price inflation ■, output ■, the short-term nominal market interest rate ■, the long-term nominal market interest rate ■, the real effective exchange rate ■, the fiscal balance ratio ■, and the current account balance ratio ■, expressed as deviations from baseline in percent or percentage points.

Figure 5.4 Simulation Results, Unconventional Monetary Easing by the United States



Note: Depicts the simulated paths of consumption price inflation ■, output ■, the short-term nominal market interest rate ■, the long-term nominal market interest rate ■, the real effective exchange rate ■, the fiscal balance ratio ■, and the current account balance ratio ■, expressed as deviations from baseline in percent or percentage points.

6. Effects of Quantitative Easing in Systemic Advanced Economies Using GIMF²⁸

The analysis presented here uses the Global Integrated Monetary and Fiscal Model (GIMF) to illustrate the potential spillovers to emerging economies of quantitative easing in advanced economies.

1. **GIMF is a multicountry dynamic structural general equilibrium model with optimizing behavior by households and firms, and full intertemporal stock-flow accounting.** Frictions in the form of sticky prices and wages, real adjustment costs, liquidity constrained households, along with finite planning horizons of households, mean that there is an important role for monetary and fiscal policy in economic stabilization. GIMF is multi-region, encompassing the entire world economy, explicitly modeling all the bilateral trade flows and their relative prices for each region, including exchange rates. The international linkages in the model allow the analysis of policy spillovers at the regional and global level.²⁹ The standard production version comprises 6 regions: the United States; the euro area; Japan; emerging Asia; Latin America and, as a single entity, the rest of the world. For presentation here, the model's outputs have been aggregated into two regions, advanced economies (United States, the euro area, and Japan) and emerging economies (emerging Asia and Latin America).
2. **The scenarios presented are stylized and are not designed to proxy for any specific episodes of quantitative easing in advanced countries, but rather are designed to illustrate the potential transmission channels and the implications of various policy responses in emerging economies.** Four scenarios are presented. In the first scenario, advanced economies experience sharp reductions in private consumption and investment expenditures and it is assumed that monetary policy is unable to respond for a period of two years because the nominal policy interest rate is constrained by the zero interest rate floor (ZIF). In the second scenario, advanced economies pursue quantitative easing. The third scenario builds on the second and in addition to the impact on emerging market exchange rates from advanced economy quantitative easing, it is assumed that capital inflows to emerging markets also reduce their corporate risk premiums. The final scenario assume that emerging market economies prevent the appreciation of their currencies when advanced countries implement quantitative easing and are able to prevent the capital inflows that reduce corporate risk premium.
3. **Under the first scenario, the reduction in domestic demand in advanced economies (G3) leads to a reduction in imports from emerging economies (blue solid line in figure).**

²⁸ Prepared by Ben Hunt and Dirk Muir.

²⁹ For a description of GIMF's theoretical structure see Kumhof and others, 2010, "The Global Integrated Monetary and Fiscal Model (GIMF)—Theoretical Structure", IMF Working Paper Series WP/10/34 and for an understanding of the GIMF's macroeconomic properties see Anderson and others, 2012, "Getting to Know GIMF: The Simulation Properties of the Global Integrated Monetary and Fiscal Model", IMF Working Paper Series WP/13/55.

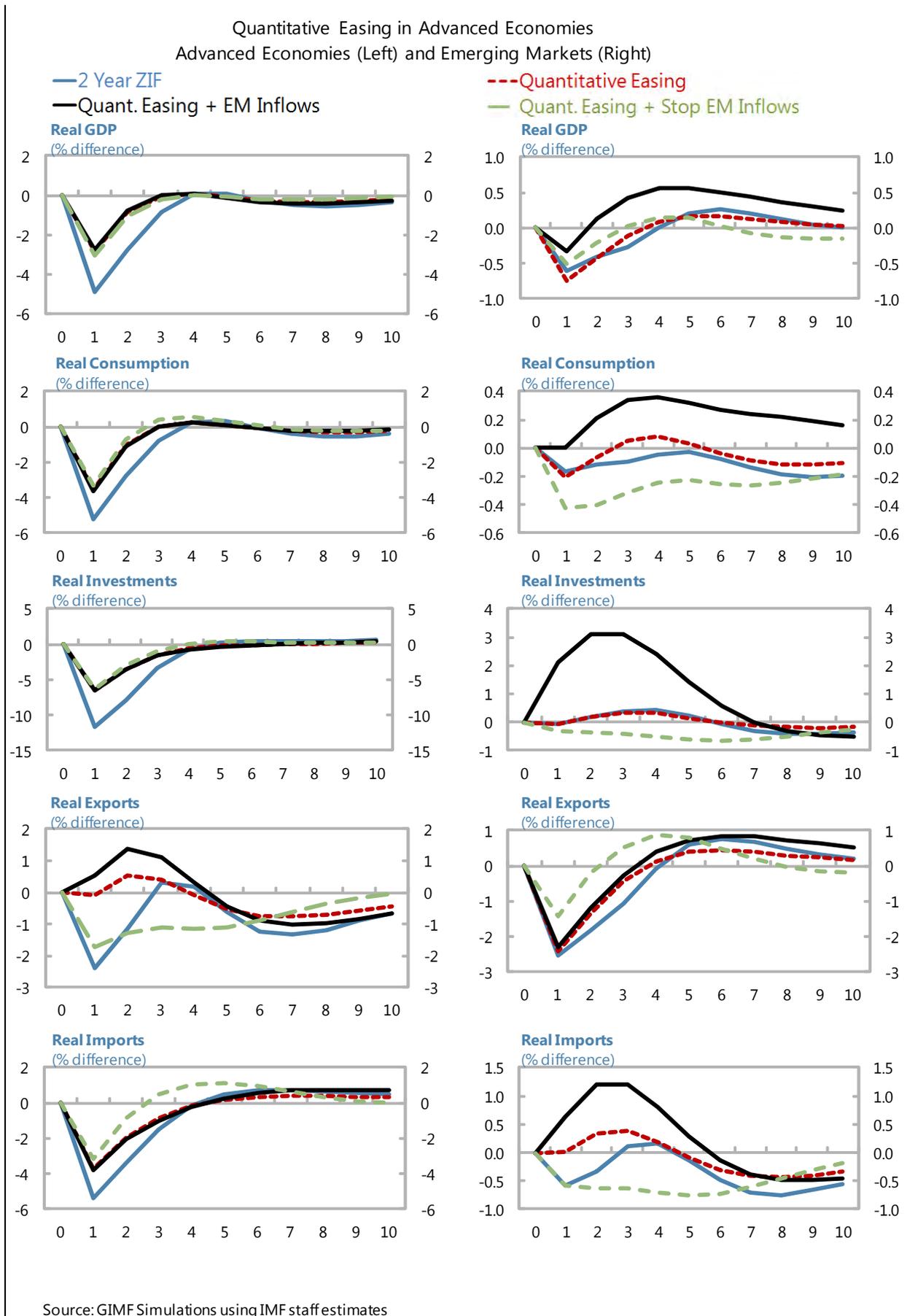
However, with policy rates unchanged in the G3 and inflation declining owing to weak aggregate demand, real G3 real interest rates rise. In addition, emerging economies reduce policy interest rates, further widening the real interest rate differential with G3 economies and G3 currencies appreciate relative to those of emerging markets. Emerging market currency depreciation helps increase the competitiveness of their exports and mitigates the impact of declining aggregate demand in the G3. However, real GDP still falls below baseline in emerging economies.

4. **Under the second scenario, the G3 engage in quantitative easing (red dashed line in the figure).** The easing in policy significantly reduces the reduction in G3 aggregate demand. However, the impact on demand for emerging market exports is partially offset by relative appreciation in emerging market currency as the real interest rate differential versus the G3 reverses relative to the case of no quantitative easing. However, emerging market exports still recover faster when the G3 engage in quantitative easing. Aside from a slightly larger negative impact in the first year, GDP in emerging markets returns to baseline faster when the G3 pursue quantitative easing.

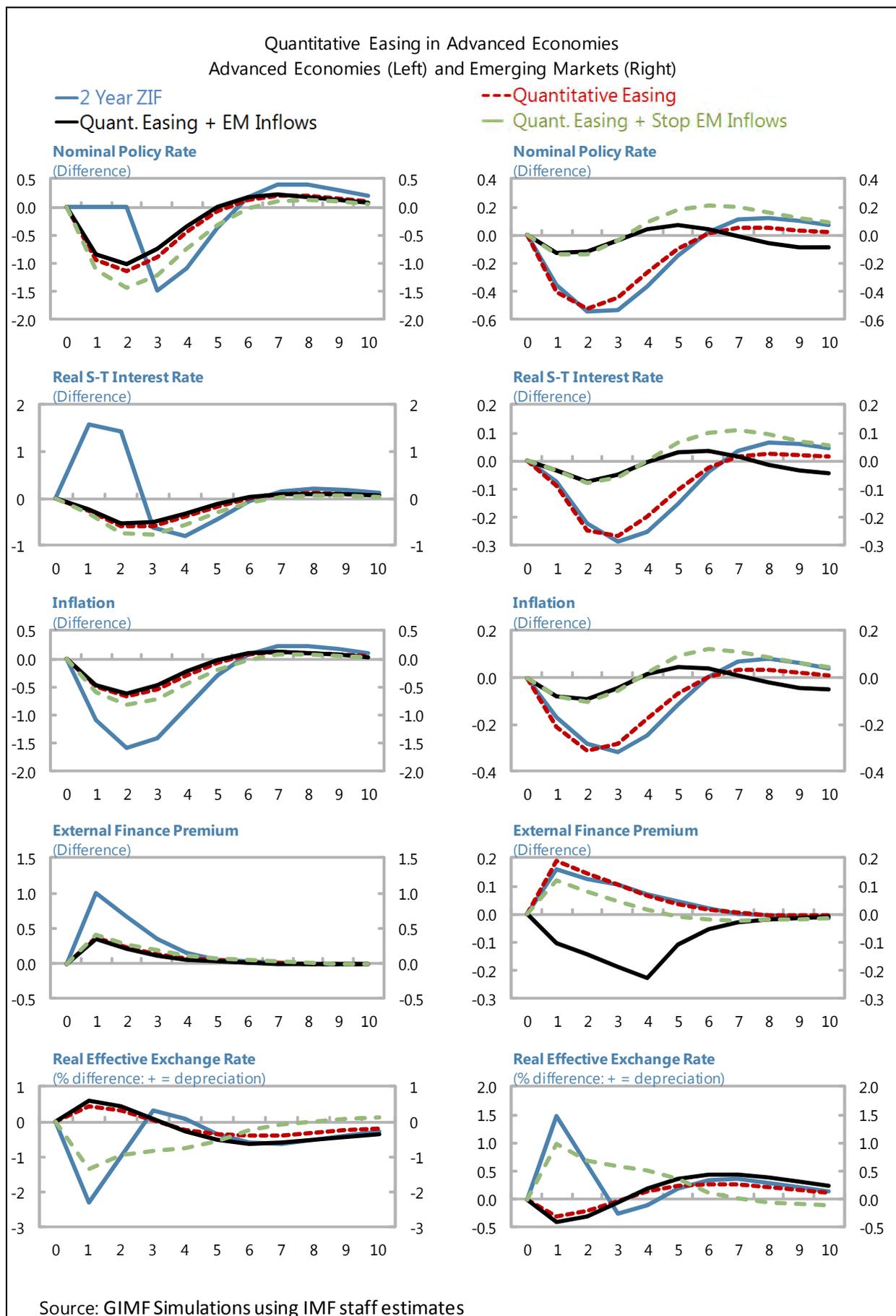
5. **Under the third scenario (green dotted line in figure), capital inflows to emerging markets resulting from quantitative easing are assumed to reduce corporate risk premium lowering the cost of capital for emerging market firms.** Consequently, real investment rises notably and the larger capital stock leads firms to demand more labor. The resulting increase in household income raises private consumption expenditure and real GDP in emerging economies rises above baseline prompting a tightening in monetary policy to constrain domestic demand and re-anchor inflation at the target. The policy tightening leads to further currency appreciation, which slows the recovery in exports.

6. **Under the final scenario (yellow line in the figure), where emerging economies prevent currency appreciation and capital inflows, the recovery in GDP in emerging economies closely matched that in the second scenario.** However, the composition of GDP is quite different. Preventing the currency appreciation helps support emerging economies exports and they fall less initially and recover back to baseline more quickly. Domestic demand, however, declines by more than in all other three scenarios reflecting the fact that monetary policy needs to ease very little as it is assumed that other policy tools are relied on to prevent currency appreciation and capital inflows.

Figure 6.1 Effect of Quantitative Easing in Advanced Economies



Source: GIMF Simulations using IMF staff estimates



Source: GIMF Simulations using IMF staff estimates

III. GLOBAL CAPITAL FLOWS

Capital flows are experiencing a resurgence in the post-crisis period. Our analysis suggests that both push and pull factors continue to be important for explaining the recent surge; but, that risk in particular has grown in importance, reflecting a dramatic drop in the VIX over the post-crisis period. One interpretation of the results is that the impact of UMP has mostly been felt through its impact on risk perceptions. Factor analysis tends to support this view, with the findings suggesting that a common global factor explains up to one-half of the recent flows to key emerging markets. Case studies, meanwhile, suggest that country authorities have tended to respond with both a mix of foreign exchange intervention and macro-prudential measures.

7. Global Capital Flows in the QE Era³⁰

Recent trends

1. Capital flows to emerging markets (EMs) have increased significantly in the last two decades.

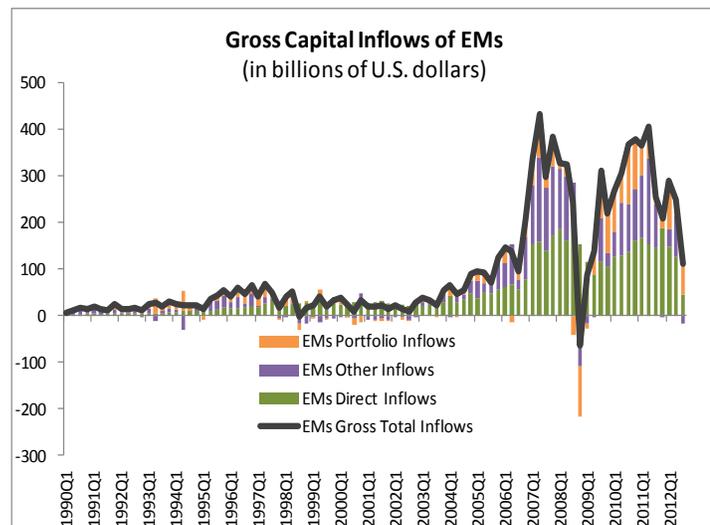
As documented elsewhere (IMF (2012) for example), although capital flows into EMs remain small compared to flows into advanced markets (AMs), the size of gross flows has grown dramatically, with substantial increase in portfolio and other investment in the last decade.

2. In the more recent post-crisis period, flows have rebounded strongly, but remain volatile.

Following a dramatic slowdown in late 2008/early 2009, capital inflows to most EMs recovered sharply over 2009–10 as market fears ebbed. Indeed, by mid 2011 flows had reached the high levels seen just prior to the crisis. At that point however, increased uncertainty associated with the euro area crisis prompted another decline in inflows lasting until late 2012. Flows have since resumed with an easing of euro area tensions. The volatility of flows has increased since the early years of the great moderation although it is hard to link this with UMP measures per se.

3. The composition of outflows from AMs, especially for the QE countries, have also altered post crisis.

As is well documented,³¹ flows into fixed income securities have increased as local debt markets expanded. Gross portfolio investment outflows from QE countries actually declined in recent years, especially from the euro area and the United States, while outflows were on a rise in Japan until 2011. Direction of flows, however, points to a change in QE portfolio investment



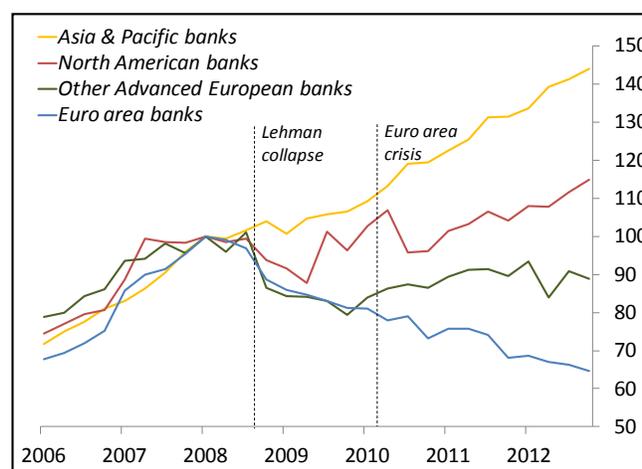
³⁰ Prepared by Mali Chivakul and Chad Steinberg, with inputs by other contributors as noted.

³¹ See: "Global Capital Flows in/from the QE Area," prepared by Lusine Lusinyan and Andrew Tiffin.

pattern from QE to non-QE countries. The group of other advanced economies has been the main recipient of QE bond flows. In particular, the U.S. and Japan's holdings of other non-European advanced economies' (Australia, Canada, Israel, and New Zealand) bonds almost doubled between 2007 and 2011. Latin American countries were the second largest beneficiaries of the QE bond portfolio reallocations, followed by advanced European countries outside the euro area and the Asian economies. Changes in regional reallocations of equity portfolios varied among QE countries, but generally favored the U.S. equities and, to some extent, equities of other advanced countries. These small compositional changes may have a large impact on flows to EMs.

4. **Deleveraging in Europe's core, meanwhile, has created an opportunity for Asian banks to increase their cross-border claims.**³²

Banking systems have significantly cut back their cross-border exposures since the start of the GFC. This happened in two phases: (i) a reduction in cross-border activity by many banking systems in the wake of the Lehman Brothers collapse; and (ii) a continued cutback in cross-border claims by euro area banks from the start of the euro area crisis in 2010. Meanwhile, Asian banks have relatively stronger balance sheets and were less affected by the GFC. As a result, these banks have continued to increase their cross-border claims and have helped to offset partially the cutback by euro area banks in Asia, particularly in syndicated lending and project finance areas. But these banks face new vulnerabilities, emerging from a wider use of short-term capital markets to fund the expansion in U.S. dollar exposures.



5. **Against this background, we update and extend the Fund's past empirical work on the determinants of capital flows.** In section B, the main results are presented confirming the continued importance of both push and pull factors. Section C complements this analysis with further analytical work that looks at the relative importance of push and pull factors and the initial impacts of UMP through event study analysis. Section D reviews relevant case studies.

Main Drivers of Push and Pull

6. **Previous studies have identified that both push and pull factors play important roles in capital flows to emerging markets.** Empirical studies, including those from the Fund, have concluded that both push and pull factors are important drivers of capital flows to EMs.³³ In these studies, push factors mostly include U.S. interest rates and risk aversion measures while pull factors generally include EM GDP growth and other EM macroeconomic performance variables.

³² See: Annex.

³³ See for example IMF (2011), *Recent Experiences in Managing Capital Inflows—Cross Cutting Themes and Possible Policy Framework* and Ghosh and others (2012).

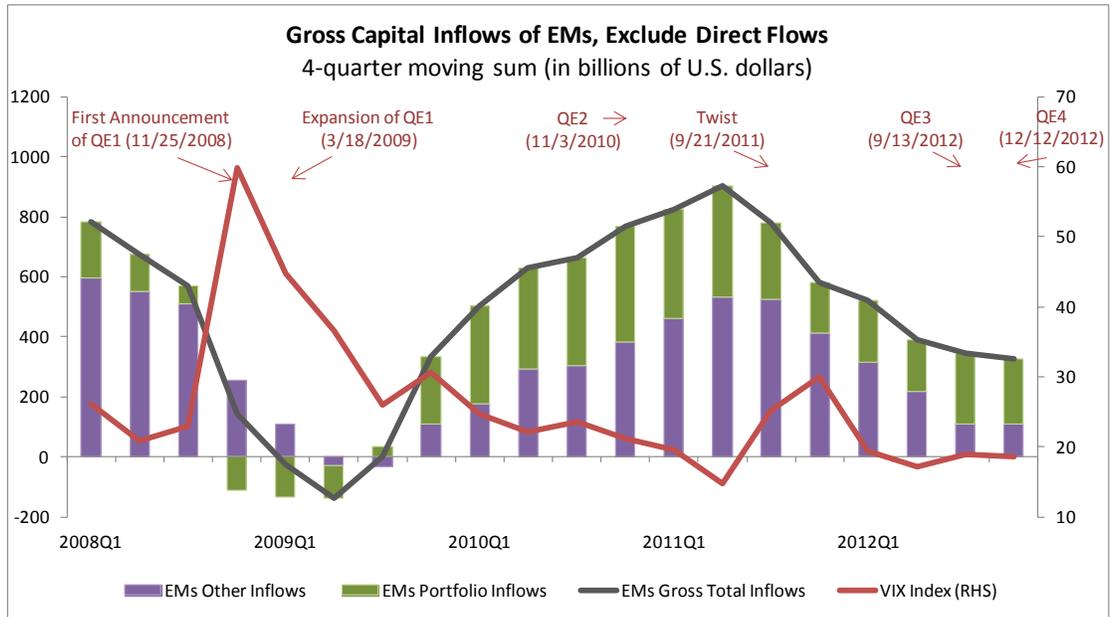
7. **There is only a handful studies that focus on the effect of UMP on capital flows to EMs.** Fratzscher, Lo Duca and Straub (2012), which look at global portfolio allocation and the effects of the U.S. UMP, conclude that the effects of U.S. QE measures on capital flows to EMEs have been relatively small compared to other factors, but they have exacerbated the pro-cyclicality of EME capital flows. In late 2008–09, Fed measures contributed significantly to net capital outflows from EMEs—in a period when EMs experienced sudden stops and massive capital flight overall—and then since mid-2009 induced a gradual reversal of these outflows, contributing to the surge in capital inflows to EMs during that period. Hence one key message of the empirical findings of the paper is that U.S. UMP measures have not so much affected the overall magnitude of capital flows to EMs, but have magnified the variability and procyclicality of capital flows.

Baseline push pull regressions

8. **Capital flow regressions with push and pull factors are employed in this exercise.** The main push factors considered include U.S. interest rates and VIX (a measure of global risk aversion). As UMP lowers the cost of funds along the yield curve when short-term rates already hit zero bound, 10 year yields are used as the primary measure of interest rates. (See below robust check on alternative measures.) Pull factors include GDP growth, inflation and economy size in the capital recipient countries.

9. **Panel fixed effect regressions are run with quarterly data from 1990 to 2012 Q3 of 42 EMs.** The dependent variable is the log of gross capital flows, adjusted with a constant for all countries to keep the value positive. To minimize endogeneity, both GDP growth and inflation are entered with one quarter lag.

10. **The results suggest that the effects of push factors have changed over time with increasing importance of risk aversion in the post-crisis period (Table 7.1).** As expected, both U.S. interest rate and VIX have strong and significant effects on capital flows to EMs. In the post crisis period, the strength of the relationship between interest rates and capital flows has significantly weakened and has turned positive. This could be interpreted that the signaling effects of future growth of the yield could be dominant in the post-crisis period. The effect of VIX on capital flows to EMs has however increased over the post-crisis period. This is consistent with our priors, where we have seen VIX, in particular, as driving market sentiment (see below).



11. **The size of the coefficients, however, is not very large.** A one standard deviation decline in the VIX index—corresponding to a 30 percent change—is associated with an increase in capital flows of just over 2 percent. The results for interest rates are equally small (see chart). This suggests that other country-specific factors are quite influential.

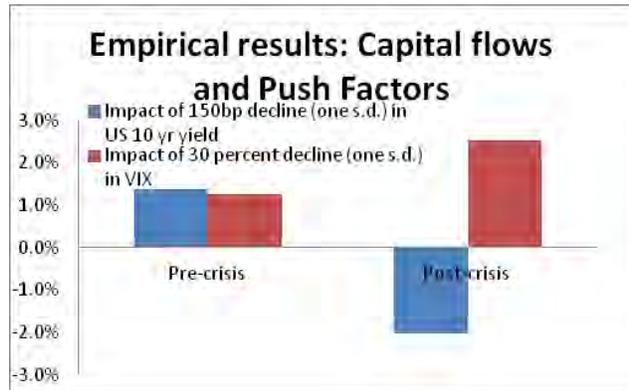
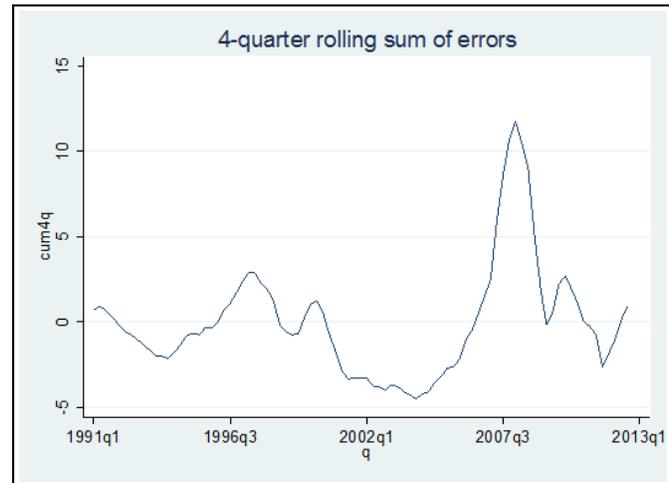


Table 7.1 Baseline Regressions

VARIABLES	(1)	(2)	(3)	(4)
	Full sample	Full sample with post crisis dummy on both sides	Pre crisis sample	Post crisis sample
PUSH				
US 10 year yield	-0.0146*** (0.0038)	-0.0112*** (0.004)	-0.00914*** (0.0032)	0.0136** (0.0061)
Log VIX	-0.0472*** (0.0102)	-0.0423*** (0.010)	-0.0422*** (0.0102)	-0.0844*** (0.0233)
Post crisis dummy 1/		0.0546 (0.085)		
Post crisis * US 10 yr yield		0.0288*** (0.009)		
Post crisis * Log VIX		-0.0403* (0.021)		
PULL				
Recipients' GDP Growth (t-1)	0.000231*** (0.0001)	0.000200*** (0.000)	0.000212*** (0.0001)	0.00288** (0.0012)
Recipients' log average nominal GDP 2/	0.0168** (0.0066)	0.00468*** (0.001)	0.0220*** (0.0057)	
Recipients' inflation (t-1)	-1.91E-05 (0.0000)	0.0161** (0.006)	-1.26E-05 (0.0000)	0.000239 (0.0006)
Post crisis * Recipients' GDP Growth (t-1)		-1.92e-05* (0.000)		
Constant	4.123*** (0.0475)	4.089*** (0.042)	4.058*** (0.0362)	4.226*** (0.0781)
Observations	2,892	2,892	2,300	592
R-squared	0.11	0.138	0.098	0.136
Number of IFS	42	42	42	42
1/ Post crisis dummy is equal from one from 2008q4				
2/ Average for 1990s and post 2000				

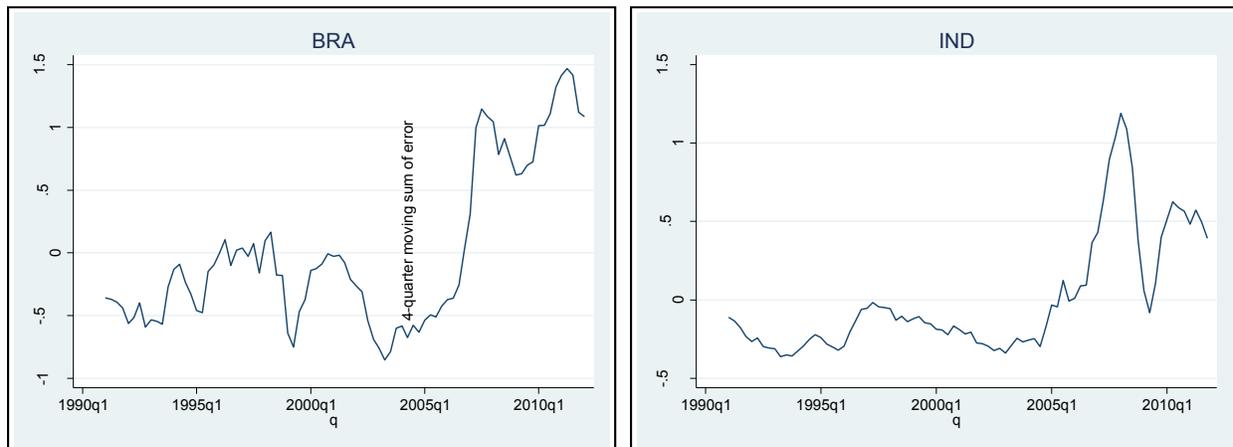
How well do the regressions explain the post crisis period?**12. The regression explains the surge in capital flows in the post-crisis period better than it does in the pre-crisis period.**

To investigate the explanatory power of the regression, forecast errors are computed for the full sample period, with error terms aggregated across countries for each time period (see text chart).³⁴ A positive error term indicates that countries are receiving higher capital flows than predicted by the regression coefficients. The chart shows that in the pre-crisis period, aggregate capital flows were significantly higher than predicted.



In contrast, the surge in the post-crisis period is better explained by the regression as the surge was accompanied by both a declining 10-year yield and a reduction in risk aversion (the VIX).

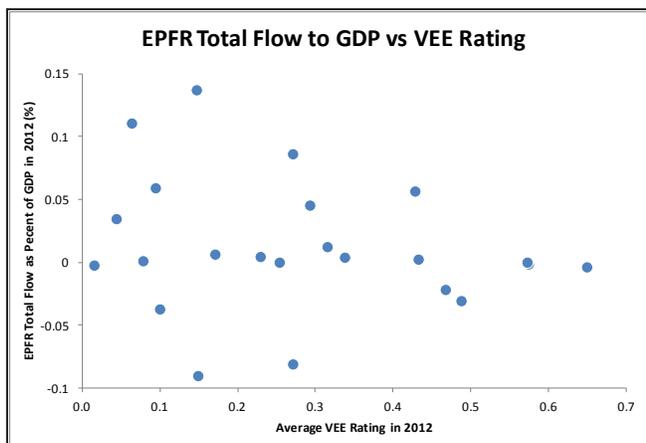
13. Still, there are many differences across countries, with the regression substantially underestimating flows for several high profile cases. For both Brazil and India, the regression under predicts flows in both the pre-crisis and post-crisis period. One interpretation is that the regression is missing an important pull factor that may have changed recently; alternatively, the current inflows received by these countries is excessive. Looking at the fuller sample, the results are more balanced with several countries also reporting lower flows than predicted, especially in EM Europe and the Middle East.



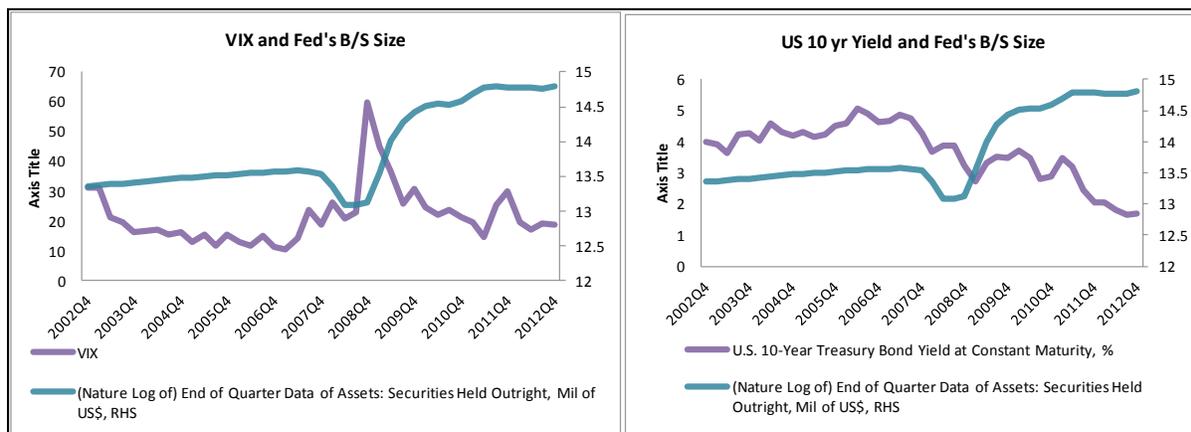
³⁴ By construction, the forecast errors should sum to zero for each country over time.

Do vulnerabilities measure track recent trends in capital flows?

14. **Capital flows do not seem to differentiate between countries in terms of their vulnerabilities.** Although it appears intuitive that investors should keep in mind countries' vulnerabilities as one part of the pull factors in deciding how attractive an investment destination is. In reality, capital flows seem to be more indiscriminate. A formal test of adding VEE rating into the baseline regression confirms this—VEE rating has no statistical significance in explaining capital flows (Table 7.2).

**Alternative measures of UMP and interest rates**

15. **Although the effect of UMP is captured mainly through the U.S. yields, quantity variables are also considered.** One variable generally used to measure the size of the UMP in the United States is the securities holding at the Federal Reserve. The amount of securities holdings has been stable from 2002 until 2007 when it dropped as the crisis in the United States started to unfold. It then shot up significantly since 2009Q1 as the LSAP1 formally started. The Fed's balance sheet size is however highly correlated with VIX in the post-crisis period (correlation of -0.9) as the UMP operation has had an important role in lowering global risk aversion.



16. **The additional effect of Fed's balance sheet seems to be positive to capital flows to EMs.** In the post crisis period, the Fed's balance sheet size variable shows a positive and significant coefficient. However, due to high correlation with VIX, adding the quantity variable has also dampens the effect of VIX.

17. **Other ways of measuring U.S. interest rates give different results.** Using short-term U.S. interest rates (fed funds rate (FFR) for example) gives a positive impact of these rates to capital flows to EMs while short-term rate differentials show a significant and negative impact on capital flows. This may be due to the fact that short-term rates are also strong indicator of growth prospects. The

results are the same if the shadow FFR is used in place of FFR. The shadow FFR is computed to capture the effect of the UMP if there would be no interest rate floor at zero.

Table 7.2 Robustness Regressions

	Baseline	Baseline with VEE rating	Baseline with OMO stock	FFR instead of US 10Y yield	FFR shadow	Money market differentials
Push						
US 10 year yield	-0.0112*** (0.004)	-0.0102 (0.014)	0.0481*** (0.008)			
Fed funds rate				0.00415*** (0.001)		
Fed funds rate shadow					0.00414*** (0.001)	
Money market differential						-1.18e-05*** (0.000)
Log stock of OMO			-0.0553*** (0.011)			
Log VIX	-0.0423*** (0.010)	-0.0211 (0.014)	-0.0160* (0.008)	-0.0389*** (0.010)	-0.0389*** (0.010)	-0.0435*** (0.013)
Post crisis dummy 1/	0.0546 (0.085)	0.0406 (0.131)	-0.371** (0.172)	0.124* (0.068)	0.190** (0.073)	0.246*** (0.083)
Post crisis * US 10 yr yield	0.0288*** (0.009)	0.0307* (0.016)	-0.0329*** (0.008)			
Post crisis * Log VIX	-0.0403* (0.021)	-0.0569** (0.026)	-0.0629*** (0.020)	-0.0232 (0.018)	-0.0441** (0.019)	-0.0674** (0.027)
Post crisis * log stock of OMO			0.0621*** (0.015)			
Post crisis * FFR				-0.0453** (0.021)		
Post crisis * FFR shadow					-0.00101 (0.009)	
Post crisis * Money market diff						0.0025 (0.003)
PULL						
Recipients' GDP Growth (t-1)	0.000200*** (0.000)	-0.000908 (0.006)	-0.000317 (0.002)	0.000172 (0.000)	0.000172 (0.000)	0.000192** (0.000)
Recipients' log average nominal GDP 2/	0.00468*** (0.001)			0.00477*** (0.001)	0.00433*** (0.001)	0.00284*** (0.001)
Recipients' inflation (t-1)	0.0161** (0.006)	(0.000) (0.001)	(0.000) (0.001)	0.0398*** (0.009)	0.0397*** (0.009)	0.0376*** (0.012)
Post crisis * Recipients' GDP Growth (t-1)	-1.92e-05* (0.000)	0.0062 (0.007)	0.00546* (0.003)	-2.03e-05** (0.000)	-2.04e-05** (0.000)	-2.40e-05*** (0.000)
VEE rating		-0.0301 (0.036)				
Constant	4.089*** (0.042)	4.154*** (0.082)	4.480*** (0.120)	3.931*** (0.029)	3.931*** (0.029)	3.961*** (0.042)
Observations	2,892	921	1,436	2,892	2,892	2,263
R-squared	0.138	0.118	0.114	0.131	0.13	0.154
Number of IFS	42	41	42	42	42	35

Role of global, regional and country-specific factors

18. This section investigates two complementary questions concerning capital flows using alternative analytical techniques. First, to what extent can we attribute recent capital flows to

global versus regional and country-specific factors? To investigate, this study employs a Bayesian dynamic latent factor model to estimate common dynamic components associated with capital flows to both emerging and advanced economy markets. Second, to what extent can we tie global bond and equity flows to specific UMP announcements? An event study analysis on weekly equity and bond flows is employed to investigate.

Bond and equity flows: world, region, and country-specific factors³⁵

19. **The objective of this study is to analyze the role of different drivers of global capital flows during the crisis and the subsequent recovery.** The focus is on two related questions: first, how important have been common, global shocks for capital flows in EME and AE countries? Second, how heterogeneous are capital flows across countries and are these differential patterns accounted for by market-specific, country-specific, or region-specific characteristics? Answers to these questions allow us to shed important light on the relevance of push versus pull factors in shaping capital allocations across countries/assets and identify where risks lie moving ahead.

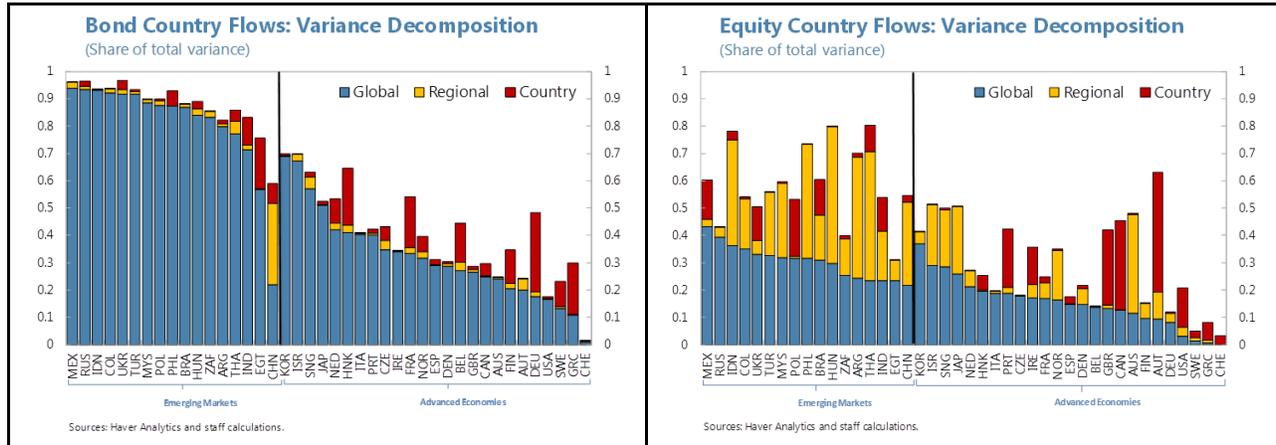
20. **The study uses the EPFR Global dataset, which contains weekly portfolio investment (net) flows by more than 14,000 (mutual and ETF) equity funds and more than 7,000 (mutual and ETF) bond funds, with USD 8 trillion of capital under management.** Although this represents only 5-20 percent of the market capitalization in equity and in bonds for most countries, EPFR data can be deemed as a fairly representative sample of global flows, closely matching portfolio flows stemming from BOP data (Jotikasthira and others, 2009).

21. **The study employs a Bayesian dynamic latent factor model to estimate common dynamic components in two different kinds of portfolio flows (bonds and equities) in our 42- country sample covering nine regions of the world.** In particular, we simultaneously estimate (i) a dynamic factor common to all aggregates, regions, and countries (the world factor); (ii) a set of nine regional dynamic factors common across aggregates within a region; (iii) 42 country factors to capture dynamic comovement across the net flows of the 2 asset markets within each country; and (iv) a component for each asset market that captures idiosyncratic dynamics. By design, the dynamic factors capture all intertemporal cross-correlation among the observable variables.

22. **The results suggest changes in bond flows are primarily determined by global push factors.** To measure the relative contributions of the world, region, and country factors to variations in portfolio flows in each country, we estimate the share of the variance of net flows in each asset market that is due to each of the three factors (world, region, country-specific). What is left represents the share of the variance due to the idiosyncratic component characterizing each country-specific bond and equity flow, respectively. As shown in the below figure for bond country flows, results indicate that common shocks—such as specific crisis events, changes to global liquidity and risk conditions—have been a predominant source of volatility for bond flows in emerging markets over the crisis, providing evidence for a strong role of push factors in EMEs bond flows. In AE bond markets, such a world component is found to be about half as important as in EME bond markets.

³⁵ Prepared by Silvia Sgherri

23. **Such a global component is found to be a less important source of volatility for equity flows in general.** Region-specific factors are found to play a large role in explaining fluctuations in EMEs equity flows, while equity flows in advanced economies tend to be largely dominated by idiosyncratic or—in a few cases—country-specific factors. In Asian EME markets such as Indonesia, Philippines, Malaysia, and Thailand—as well as in Hungary, Turkey, and Argentina—the sum of the global and the regional component accounts for more than half of the volatility of equity flows.



An event study: How UMP has affected global bond and equity flows³⁶

24. **The objective of this study is to analyze the impact of specific UMP announcement on bond and equity flows.** The impact of U.S. unconventional monetary policy operations is estimated over three periods related to specific large-scale asset purchase (LSAP) programs by the Federal Reserve. LSAP1 spanning January 9th 2008 to July 28th 2010; LSAP2 spanning August 4th 2010 to September 2011; and Operation Twist and LSAP3 spanning September 21st, 2011 to May 1st 2013. The study focuses on the flow of bonds and equities into exchange traded funds and mutual funds across sixty-seven countries, forty-five emerging markets (EMs) and twenty-two advanced economics (AEs). Impacts on capital flows are assessed through the Federal Reserves purchase of treasuries and debt securities while controlling for relevant FOMC announcements as well as market activity specifically volatility (VIX), oil price movements (an average of Dubai, Brent, and WTI), and fluctuations in non-energy commodity prices. The study builds off existing work done by Bayoumi and Bui (2011) and Fratzscher, Duca, and Straub (2011).

Diverse regional significance

25. **UMP had a significant impact on the movement of capital across the globe though the nature of the spillover varied based on the region, program, and asset purchased.** The largest impact came from activities focused on purchasing treasuries as opposed to debt and more so on bond flows than equity flows. LSAP1 had highly significant results for bond flows across all regions in both EMs and AEs when asset purchases were limited to treasuries but solely EMs when it came to debt purchases. LSAP2 significantly impacted bond flows in the euro area and North America when

³⁶ Prepared by Manju Ismael

the Fed purchased debt securities and to a lesser extent equity flows in Asia, Europe, and North America when the Fed purchased treasuries. Operation Twist and LSAP3 activity related to the purchase of treasuries had a significant impact on bond flows across the EM world and equity flows in AEs notably Asia and to a lesser extent Europe.

Regional Significance

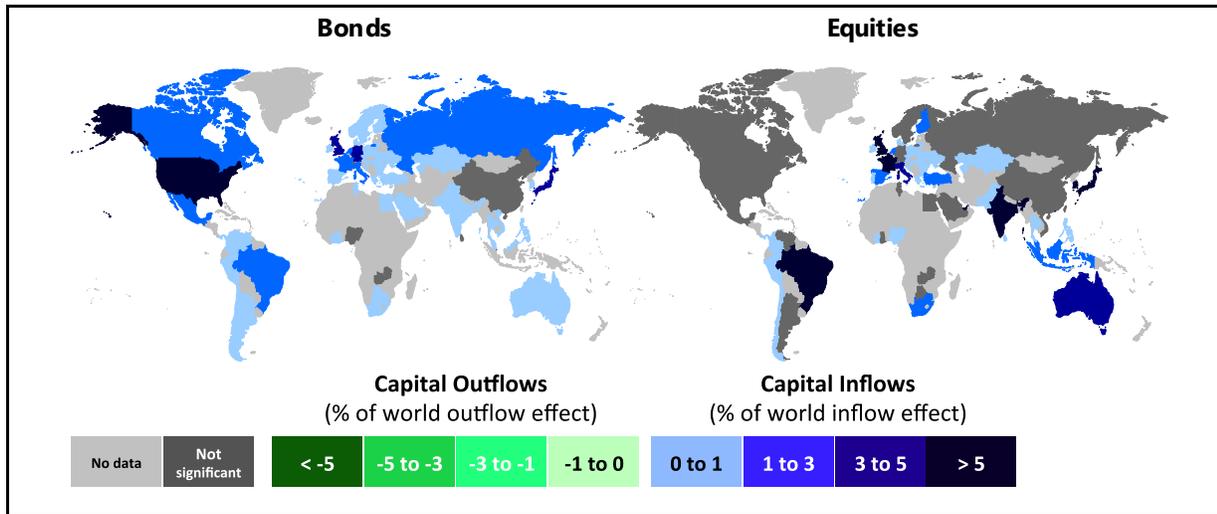
	Federal Reserve Purchase of Treasuries						Federal Reserve Purchase of Agency Debt					
	Impact on Bond Flows			Impact on Equity Flows			Impact on Bond Flows			Impact on Equity Flows		
	LSAP1	LSAP2	Twist & LSAP3	LSAP1	LSAP2	Twist & LSAP3	LSAP1	LSAP2	Twist & LSAP3	LSAP1	LSAP2	Twist & LSAP3
Emerging Markets	High	None	High	Low	None	None	None	None	None	None	None	None
Africa	High	None	High	None	None	None	None	None	None	None	None	None
Asia	High	High	High	None	None	None	High	None	None	None	None	None
Europe	High	None	High	None	None	None	None	None	None	None	None	None
Latin America	High	None	High	None	Low	None	None	None	None	None	None	None
Middle East	High	None	High	None	High	None	None	None	None	None	None	None
BRICS	High	None	High	None	High	None	Low	None	None	None	None	None
Advanced Economies	High	None	High	High	High	Low	None	High	None	None	None	None
Asia	High	None	High	High	High	Low	None	High	None	None	None	None
Europe	High	None	High	None	High	None	None	None	None	None	None	None
Euro Area	High	None	High	None	High	None	None	None	None	None	None	None
North America	High	None	High	None	High	None	None	High	None	None	None	None
Level of significance:	High (1%)			Medium (5%)			Low (10%)			None		

Sources: EPFR, Bloomberg, and staff estimates

Global picture

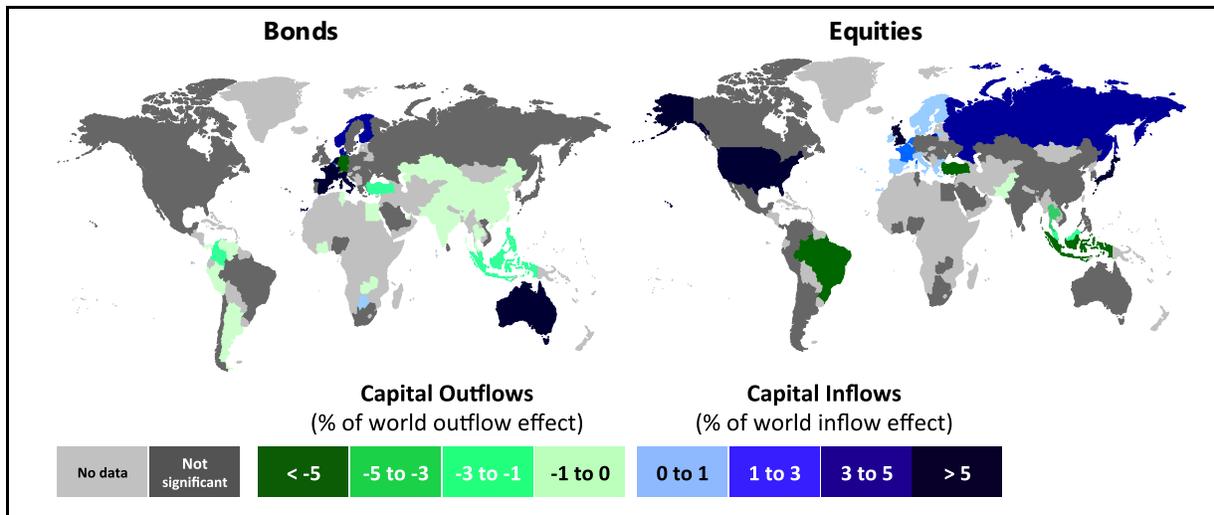
26. **LSAP1 activities limited to the purchase of treasuries by the Federal Reserve had a positive impact on both debt and equity flows.** The largest increase in bond inflows occurred in key advanced economies, the United States, the United Kingdom, Germany, and Japan. Equity inflows were the largest in the United Kingdom and Japan though a large percent of the money was directed to Brazil and India as well as France and Italy. Secondary options for bond inflows were neighboring countries of the United States, the large EMs Brazil and Russia, along with France and Italy. In the case of equity inflows, Spain, South Africa, Turkey, Malaysia and Finland were the secondary recipients of capital. LSAP1 had no effect on China for both bonds and equities.

Global Impact of LSAP1



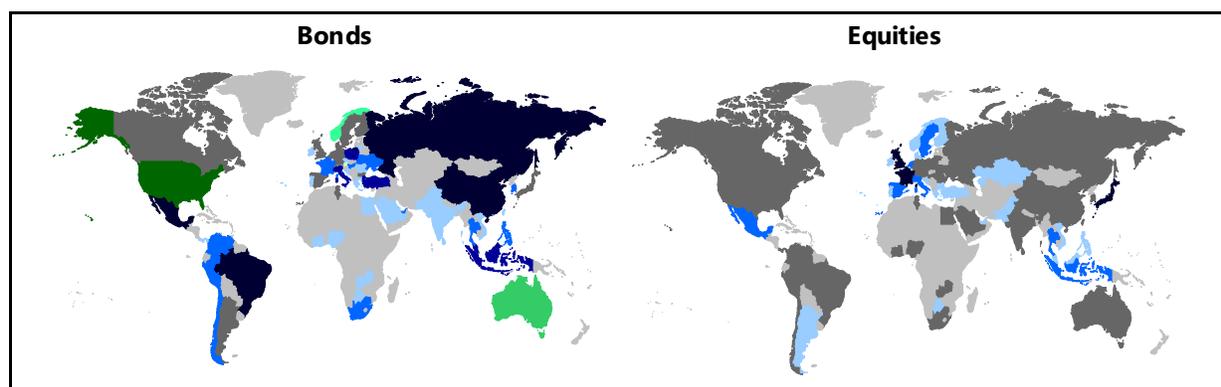
27. **While LSAP1 was a global story of capital inflows LSAP2 had a much smaller range of influence the majority of which was an outflow of capital.** The largest bond inflows occurred in Spain, France, Italy, and Australia. The largest outflows occurred in Germany and to a lesser extent Turkey, Malaysia, and Indonesia. Much of the European activity can likely be explained by ECB actions, which are not controlled for in this study. In the case of equities, the majority of the inflows occurred in the United States, the United Kingdom, and Japan and to a lesser degree Turkey while the largest outflows occurred in Brazil, Turkey, and Indonesia.

Global Impact of LSAP2



28. **LSAP3 witnessed a global shift in the movement of bond flows away from advanced economies and into emerging markets specifically Brazil, Russia, China, Mexico and to a lesser degree Malaysia, Indonesia, Turkey.** The largest bond outflow occurred in the United States. In contrast, the largest equity inflows occurred in key advanced economies outside of the United States—the United Kingdom, France, and Japan with the majority of countries showing no significant impact.

Global Impact of Operation Twist and LSAP3



Case studies: key messages

29. Key finding from the case studies:

- For most countries, the peak size of capital flows in the post-crisis period was not as high as in the pre-crisis period (see Figure 10.1).³⁷ Two exceptions are Canada and Korea where quarterly gross inflows peak in the post-crisis period surpassed ones in the pre-crisis period. Peak gross inflows happened mostly in 2009 when there was a resumption of flows as investors' confidence returned. Brazil, however, is an exception; its post-crisis peak flows were in 2010.
- Brazil, Canada, Hong Kong SAR and Korea experienced stronger average quarterly gross inflows in percent of GDP in the post-2008Q4 period. Average flows to New Zealand and Russia were much lower during the same period.
- In all countries, exchange market pressure (EMP) indices indicate very strong appreciation pressure in 2009 after an even larger depreciation pressure in 2008. However, excluding the rebound, the EMP indices for most countries are contained within one standard deviation movement, except for Hong Kong (2010Q3) and New Zealand (2011Q2).
- Most of the countries that experienced stronger average flows also show stronger appreciation pressure than in the 3 years prior the crisis. Hong Kong, Canada and Korea belong to this group. On average, however, the appreciation pressure in most countries was not as strong as the pressure in the pre-crisis boom years (2005-07) and for some countries, depreciation pressure dominated on average in the post-crisis period (BRA, NZL and ZAF experienced a smaller average appreciation while IND and RUS had depreciation pressure).

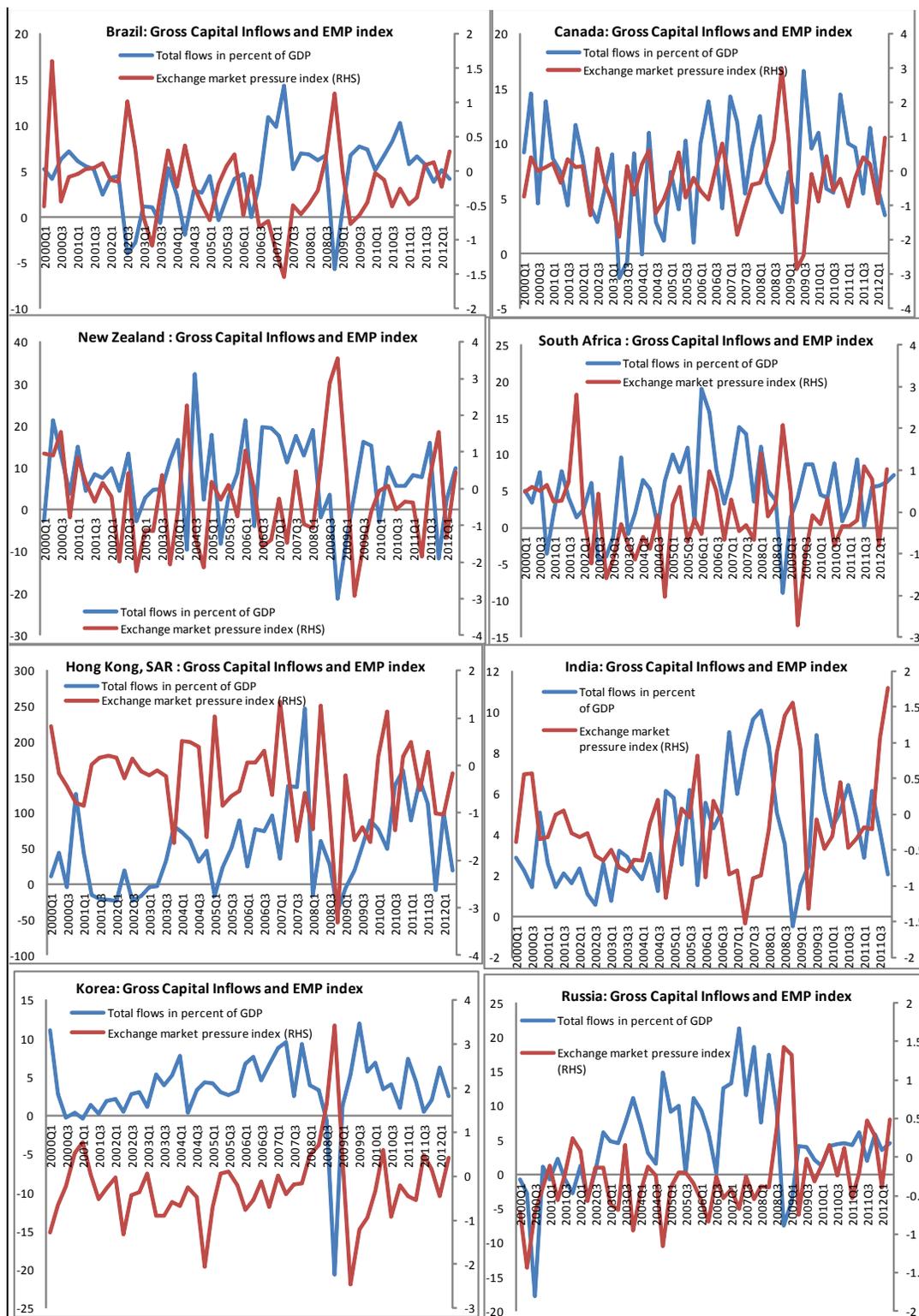
³⁷ Pre-crisis period is from 2000Q1 to 2008Q3 and post-crisis period is from 2008Q4 to 2012Q2.

- Global push factors explain almost half of the portfolio flows at the country level (see panel charts 2 and 3). However, much of the variation remains unexplained. For example, capital flows to Canada are largely unexplained reflecting possibly its role as a safe haven country.
- The policy response was largely uniform, with the authorities using a combination of both foreign exchange intervention and macro-prudential measures. The use of foreign exchange intervention was quite novel for certain countries such as New Zealand. CFMs were only used in Brazil.

Country	Pre-crisis peak CF/GDP	Post-crisis peak CF/GDP	Global push component in bond and equity flows	Policy response 1: FX Intervention	Policy response 2: CFMs	Policy response 3: Macro prudential policies
Brazil	Red	Yellow	49%	yes	yes	yes
Canada	Yellow	Red	10%	no	no	yes
Hong Kong	Red	Yellow	46%	yes	no	yes
India	Red	Yellow	55%	yes	no	no
Korea	Yellow	Yellow	38%	yes	no	yes
New Zealand	Red	Green	n.a.	yes	no	proposed
Russia	Red	Green	48%	yes	no	no
South Africa	Red	Green	38%	yes	yes	no

Red: >2sd; Yellow: >1sd & <2sd; Green: <1sd. Mean and standard deviations for both capital flows and exchange market pressure index are calculated on a sample from 2000Q1-2012Q2.

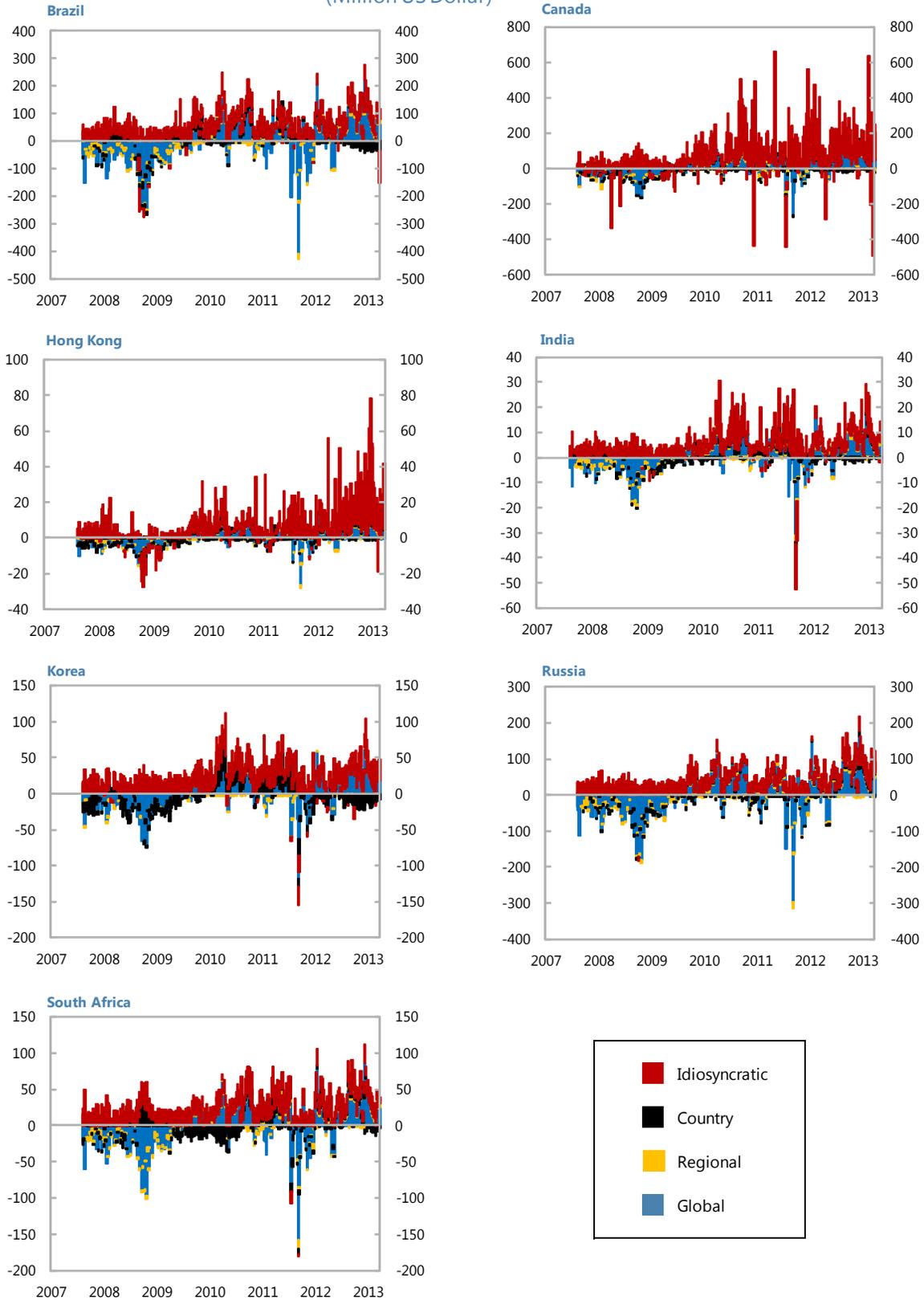
Figure 7.1 Capital Flows and EMP Indices



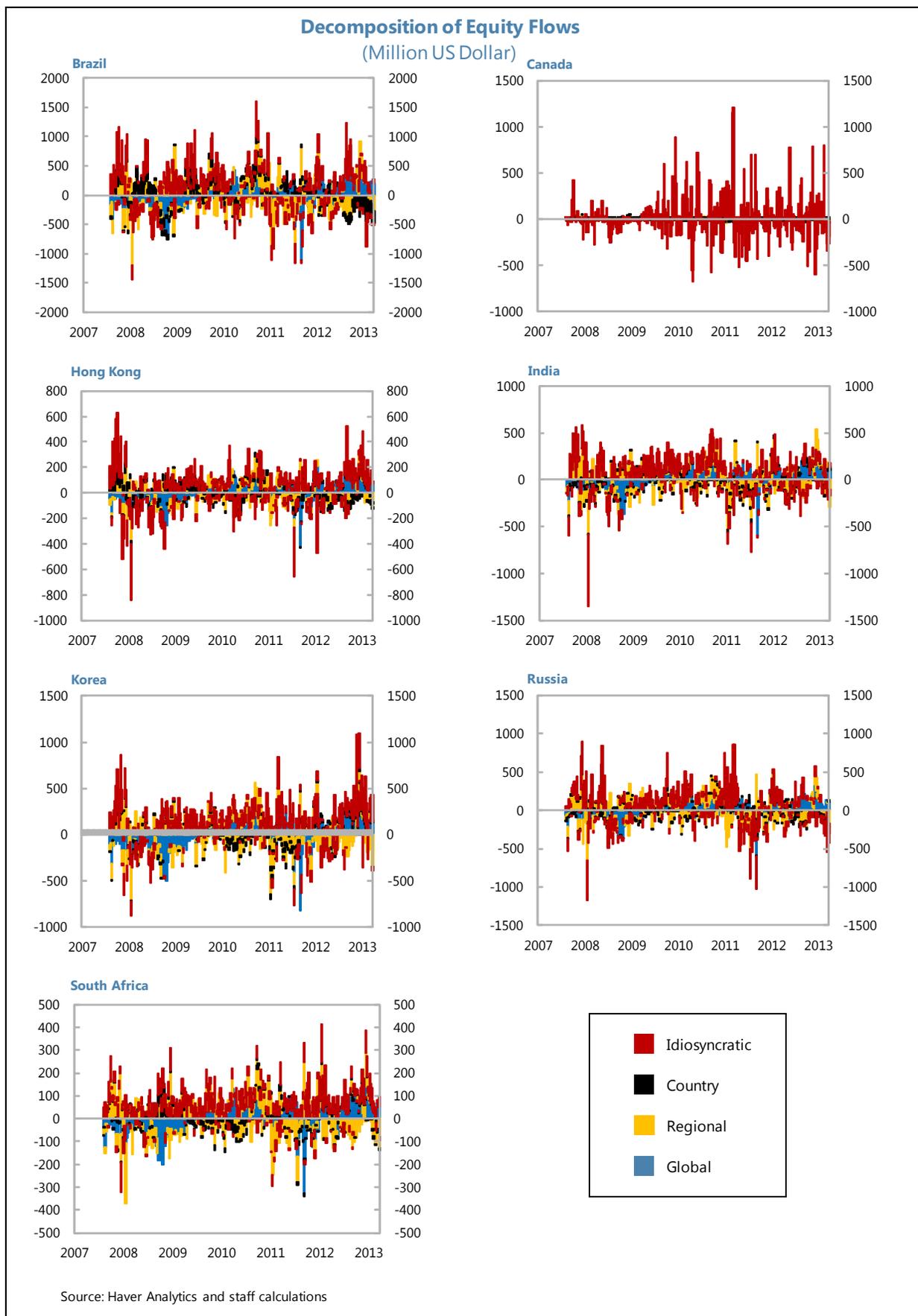
Sources: IFS, WEO and staff estimates.

Note: The EMP indices are calculated on a monthly basis. Quarterly averages are used here. The index is a weighted average of exchange rate changes and reserve changes following Eichengreen, Rose and Wyplosz (1997). Gross capital flows is a sum of gross liabilities (direct investment, portfolio investment and other investments) and is standardized against quarterly GDP.

Decomposition of Bond Flows (Million US Dollar)



Source: Haver Analytics and staff calculations



8. Case Studies

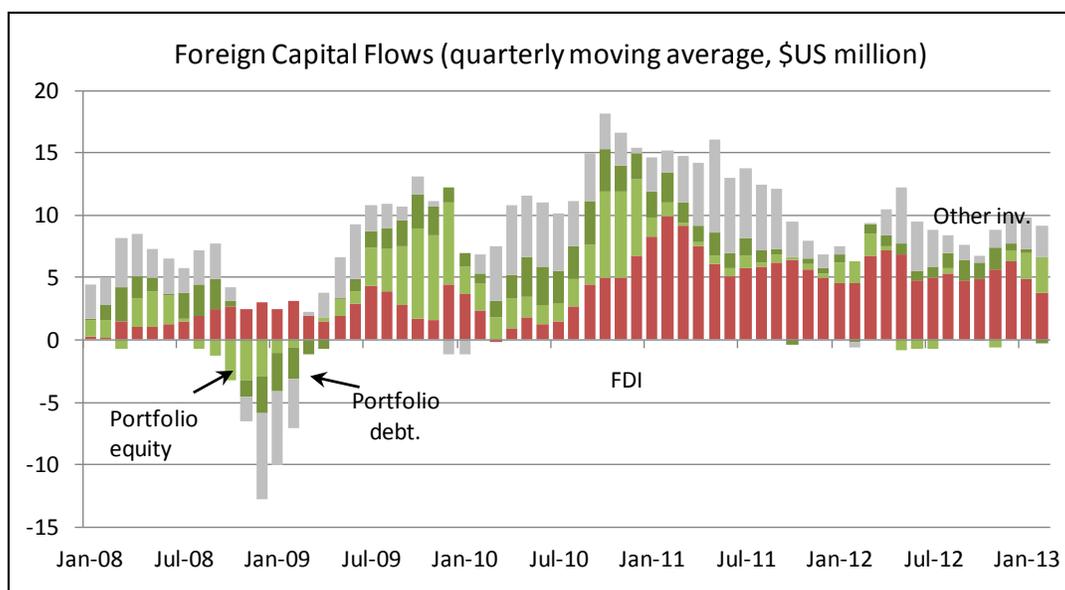
A. Brazil³⁸

Trends in capital flows

1. **In the aftermath of the global crisis Brazil experienced large capital inflows—amid robust economic growth and high interest rate differentials.** Foreign capital inflows reached 5.3 and 7.4 percent of GDP in 2009 and 2010, respectively, with portfolio flows contributing about half of total inflows.

Empirical analysis by the BCB confirms that QE has had a statistically significant impact on inflows.³⁹

2. **Since mid-2011 capital inflows moderated, particularly portfolio flows. Net capital inflows diminished to US\$104 billion (4.4 percent of GDP) in 2012, with the share of portfolio flows declining to about 15 percent.** A number of global and domestic reasons contributed to the moderation, including global uncertainty, tightening of capital flow measures (CFMs), a substantial slowdown in growth and reduction in interest rate differentials (driven by the cumulative cut in the policy rate of 500 bps).



Impact on the economy and asset prices

3. **Strong capital inflows resulted in a significant appreciation of the exchange rates, which contributed in part to the relatively weak performance of the manufacturing sector,**

³⁸ Prepared by the Brazil team (WHD).

³⁹ See Barroso, João Barata, Luiz Pereira da Silva and Adriana Soares Sales (2013). *Quantitative Easing and Related Capital Flows into Brazil: Measuring its effects and transmission channels through a rigorous counterfactual evaluation*. Banco Central do Brasil Working Paper Series 313.

including manufacturing exports. The evidence about the impact on other asset prices appears more mixed.

- The *real effective exchange rate* appreciated by almost 50 percent between end-2008 and mid-2011, despite sizable interventions. During that period international reserves increased by more than US\$150 billion. With the moderation of inflows since 2011, the real exchange rate has depreciated, recovering about half of the initial appreciation, and reserves have remained broadly constant at US\$370 billion (16 percent of 2012 GDP).
- Following the recovery after the global crisis, *stock market prices* remained broadly flat through early 2011. More recently the stock market declined—reflecting in part weak economic growth—with Brazil underperforming relative to other EMs.
- Foreign funding contributed to *credit growth* in 2010-11; it has subsided since then and the share of foreign liabilities in the banking system remains relatively low.
- While there has been a significant increase in *property prices* in certain urban areas, the direct link to capital inflows is unclear (market valuation of REITs for instance have underperformed).
- Long-term local currency *bond yields* have declined steadily after the crisis, in line with other EMs.

Policy responses and their effectiveness

4. **Brazil has deployed a wide range of policy tools to manage net capital flow pressures, including exchange rate appreciation, reserves accumulation, and the use of macroprudential tools and priced-based CFMs.** The tax on inflows (*Imposto de Operações Financeiras*, IOF) has played an important role in the response to capital inflows during the post-crisis period. The IOF was re-imposed in 2009, initially for portfolio equity and fixed income flows, but subsequently the rate and the coverage have been adjusted several times to account for changes in the composition of capital flows (including imposing the tax on derivatives transactions and adjusting the exempt duration limits on foreign borrowing). The IOF has been complemented by macroprudential measures (e.g., reserve requirements on banks' short FX positions). Implementation of the framework has responded to the intensity of pressures, reducing FX intervention and CFMs when inflow pressures subsided (for instance, in September 2011 the IOF on equity transactions was lowered from 2 to 0 percent).

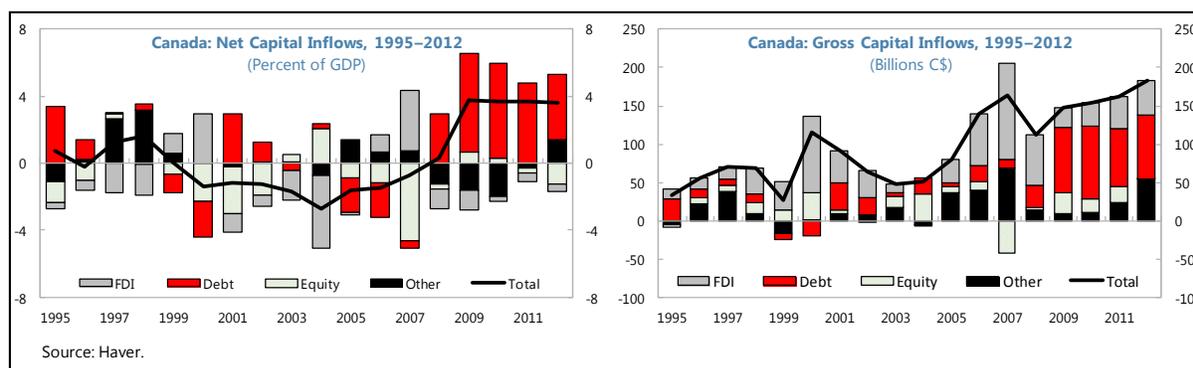
5. **The use of this wide-ranging policy toolkit has helped to manage the challenges posed by capital inflows.** There is some evidence that CFMs have been successful in helping to reduce portfolio inflows although the evidence for persistent effects on the exchange rate is unclear. Macroprudential measures have been somewhat effective in containing rapid domestic credit growth.

6. **Several factors would help mitigate the risks posed by capital flow pressures on Brazil of a faster exit from QE in the United States and other advanced economies:** portfolio inflows have declined substantially since 2011, reducing the share of portfolio liabilities; the exit from QE would coincide with the expected tightening of monetary policy in Brazil, limiting the impact on interest rate differentials; and Brazil's flexible exchange rate and sizable FX reserves would be key buffers in the event of disorderly global financial conditions.

B. Canada⁴⁰

1. Canada benefited from strong capital inflows since 2009 owing to its perceived safe-haven nature.

- Total net portfolio (debt and equity) inflows amounted to 5 percent of GDP per year on average over 2009–12 against net outflows of 2 percent of GDP per year in 2000–07 (see Figure 8.1 for quarterly data). Gross foreign portfolio investment in Canada, which since mid-1990s fluctuated around C\$20 billion per year, surged to C\$110 billion in 2009–10 and was still high at over C\$80 billion in 2012. Net FDI and other investment inflows have been negative since 2008 although other investment turned positive more recently.



- Capital flows have been concentrated in debt securities, with the initial surge reflecting, to a large extent, foreign purchases of new bond issues as Canadian corporations and provincial governments stepped up borrowing.
- The U.S. investors, in particular, increased purchases of Canadian long-term bonds from US\$[30] billion in 2005–07 to US\$[55] billion in 2008–11 and more than doubled their purchases of Canadian stocks over the same period. Also, IMF's CPIS data show that the share of Canadian securities in the U.S. investors' debt portfolio increased from 11 percent in 2007 to 16 percent in 2011.⁴¹
- To the extent that a large share of capital flows has been directed to government bonds, this could be an indication of a safe-haven nature of the flows given Canada's relatively strong fiscal position.

2. At the same time, Canada's economy has been undergoing notable changes, some however reflecting longer-term trends. In particular:

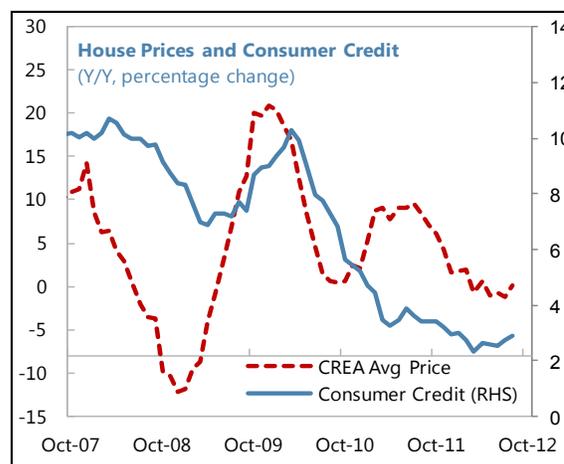
- First time in a decade, Canada's current account turned negative in 2009, as external demand contracted and commodity prices plunged. With the subsequent recovery in commodity prices,

⁴⁰ Prepared by the Canada team (WHD).

⁴¹ This share declined for other QE countries; however, all QE countries slightly increased the share of Canadian equities in their portfolios between 2007 and 2011.

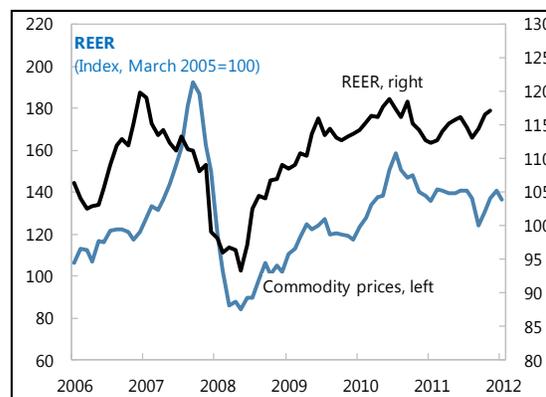
strengthening of the Canadian dollar, and subdued exports to the United States, the current account deficit widened further, largely financed by foreign purchases of Canadian debt.

- Financial liberalization in early 2000s, low interest rates, strong immigration flows, and terms of trade gains all contributed to the accumulation of household leverage and strong housing market over the last decade. While interrupted in 2008–09, this trend resumed swiftly thanks to strong monetary and fiscal stimulus, helping also the economy to rebound. Household debt-to-income ratio reached 165 percent in 2012 (a historic high), while real house prices and residential investment are estimated to be way above levels consistent with economic fundamentals. More recently, however, housing sector and credit growth have been slowing down, in part reflecting a series of macro-prudential measures adopted over the last years (Figure 8.2).



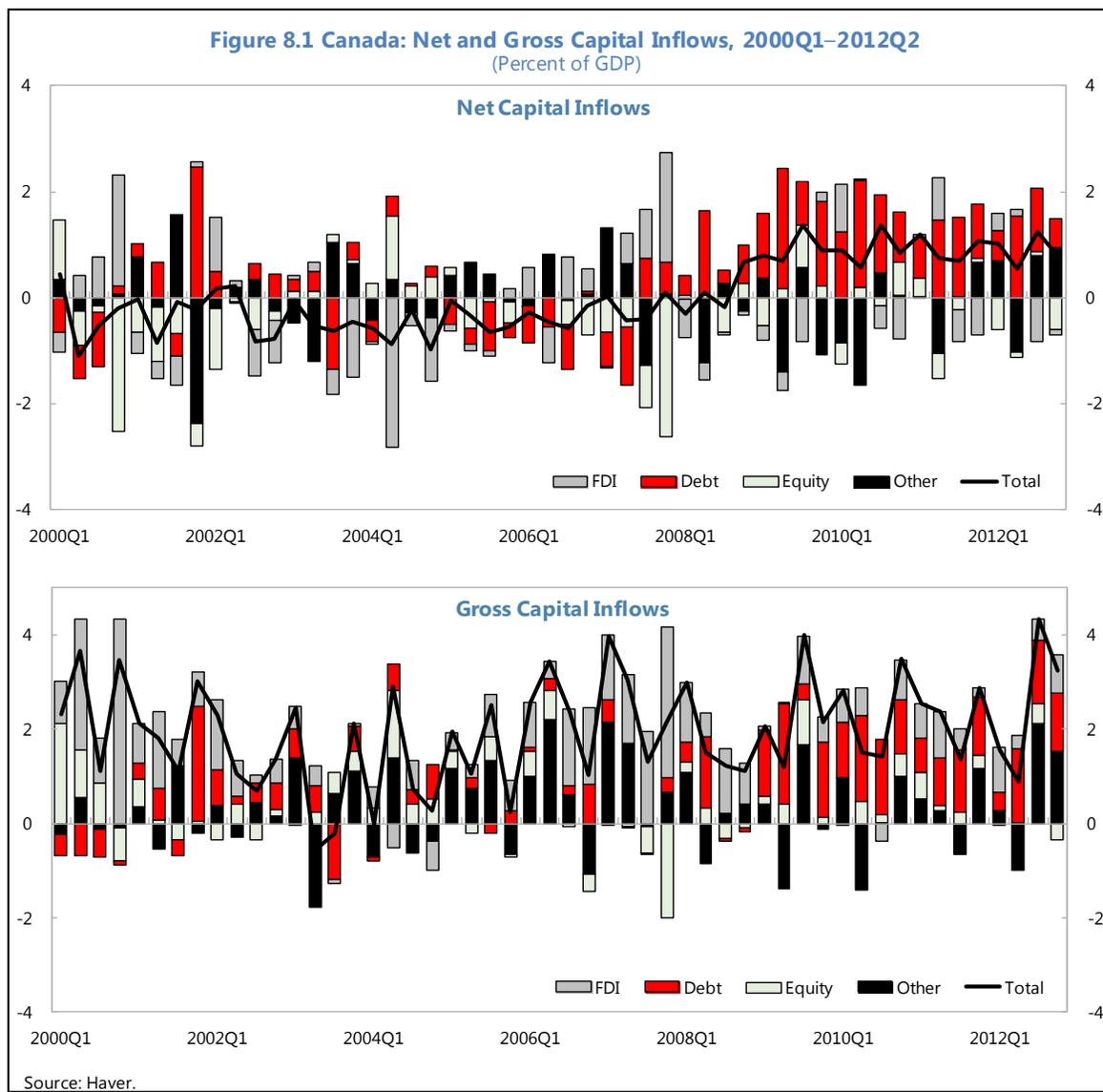
3. **Establishing a strict link (and causality) between capital flows to Canada and recent economic developments is not straightforward, but some observations are warranted.**

- Safe-haven flows have likely been contributing to the persistent strength of the Canadian dollar. However, over the last decade Canada's exchange rate has become increasingly correlated with commodity prices, while the latter appear to be little affected by global liquidity (2012 Spillover Report).
- Capital inflows particularly into government bonds have helped lower sovereign bond yields (also as a large fiscal stimulus was being implemented), keeping the spread vis-à-vis U.S. bonds close to zero.
- A relatively easy access of the Canadian banks to global liquidity and funding would have encouraged bank lending and contributed to continuing favorable domestic financial conditions.

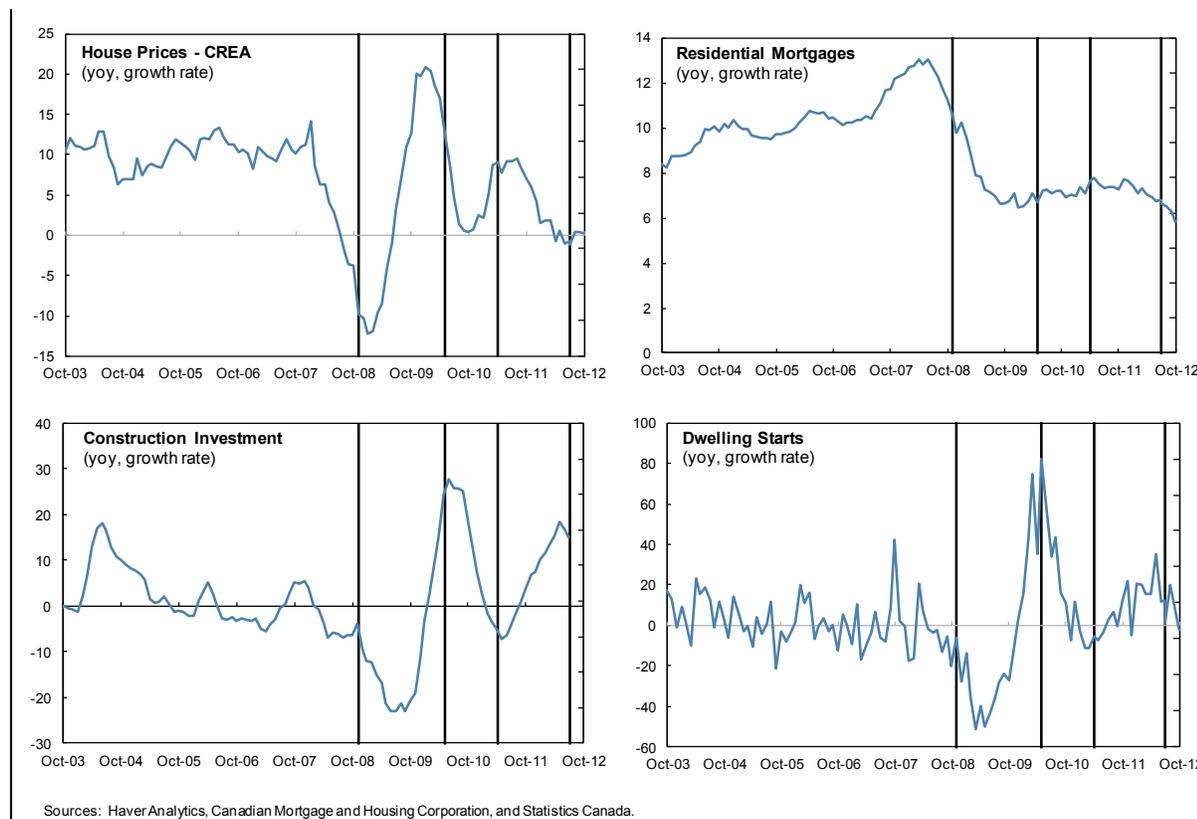


- ### 4. **There have been no specific policy responses to capital inflows per se.** Canadian authorities have taken a number of major policy actions since the financial crisis, which appear to have been effective in addressing the underlying demand conditions and imbalances (e.g., fiscal and monetary stimulus followed by gradual withdrawal, and macro-prudential regulations to moderate credit growth and housing).

5. **The large share of debt raised abroad by Canada’s non-financial private sector and the increased exposure of Canadian banks to non-residents present a potential vulnerability.** The share of Canada’s non-financial private sector credit financed by external sources is estimates at about 30 percent (mostly bonds). Around 30 percent and 25 percent of Canadian banks assets and liabilities, respectively, are vis-à-vis nonresidents, and banks’ reliance on wholesale funding in foreign currency is non-negligible. As the U.S. debt market has become a more important source of Canada’s bank and firm funding, sudden tightening of financial conditions in the United States could have a significant negative impact on Canada’s economy.⁴² However, if the monetary policy tightening (or risk premium increase) in the United States is accompanied with a recovery in the United States, the impact on Canada’s growth could still be positive on net: strong trade links with the United States would dominate the negative impact of lower domestic demand from tighter financial conditions in Canada.



⁴² See Annex I of the 2012 Canada Article IV Staff Report for estimates of such impact.

Figure 8.2 Impact of First Three Rounds of Tightening of Macro-Prudential Measures

C. Hong Kong SAR⁴³

1. **Hong Kong SAR's Linked Exchange Rate System (LERS) requires both the stock and flow of the monetary base to be fully backed by foreign reserves.** Capital flows that push the Hong Kong dollar exchange rate to the limits of its narrow trading band (7.75-7.85) have to be absorbed by the currency board, leading to an adjustment in the monetary base. As a result, Hong Kong SAR imports U.S. monetary policy.

Capital flows since QE1

2. **QE1.** There have been strong capital inflows into the Hong Kong dollar following QE1, with Other Investment being the main contributor. Net FDI flows were relatively stable, and portfolio investment registered large net outflows due to repatriation of funds out of Hong Kong SAR. The strong-side of the Convertibility Undertaking has been triggered repeatedly, which meant that the Hong Kong Monetary Authority (HKMA) had to passively inject liquidity into the banking system. The inflows were evidenced by the sharp rise in the Hong Kong dollar monetary base after QE1, with the

⁴³ Prepared by the Hong Kong team (APD).

aggregate balance reaching a peak of HK\$320.0 billion on 24 November 2009 before declining to HK\$264.6 billion on 31 December as more Exchange Fund Bills were issued to absorb the inflows and limit the resulting increase in the monetary base.

3. **QE2.** Following the announcement of QE2, Other Investment inflows picked up again strongly, but the total non-reserve flows were quite balanced, leaving the monetary base little changed. With limited capital inflows, the convertibility undertaking was not triggered during QE2.

4. **QE3.** After the QE3 announcement, the strong-side Convertibility Undertaking was triggered repeatedly in the fourth quarter of 2012, which led to the purchase of U.S. dollars of \$13.8 billion by the HKMA.

Impact on the economy

5. **Real Economy.** After a sharp downturn in the first quarter of 2009, the economy recovered quickly in the second quarter of 2009, owing to the government fiscal stimulus and positive spillovers from China. Underlying inflation remained broadly subdued throughout QE1, but picked up later as a result of higher food inflation and the pass-through of higher rental costs. Inflation pressures kept building up before easing in late 2011.

6. **Money and Credit.** Domestic monetary conditions have stayed expansionary, due to near-zero interest rates. The low global cost of U.S. dollar credit induces local corporates to raise dollar funding, notably in the fast-growing corporate bond market. Hong Kong SAR banks have also grown their dollar loan book at double-digit rates for the past few years. There is no sign that this has created problematic open foreign exchange positions among corporates, but overall leverage has been rising. Domestic credit generally picked up since 2009 H2, reflecting the increasing credit demand and buoyant asset markets, particularly the property market. It then started to decline sharply when the European's debt crisis escalated in 2011, and registered a slow improvement after QE3.

7. **Asset Market.** Local asset markets rebounded strongly in the second half of 2009, on the back of ample liquidity and rapid credit growth in Mainland China. Equity prices have risen by 70 percent in 2009 since mid-March. After a small correction following the end of QE1, equity prices stabilized during QE2, and picked up again after the announcement of QE3.

8. **Property market.** Property prices have surged since QE1, driven by the combination of extraordinarily low interest rates of mortgage programs offered by banks, limited supply of new housing, and strong demand from Mainlanders.

Policy responses and effectiveness

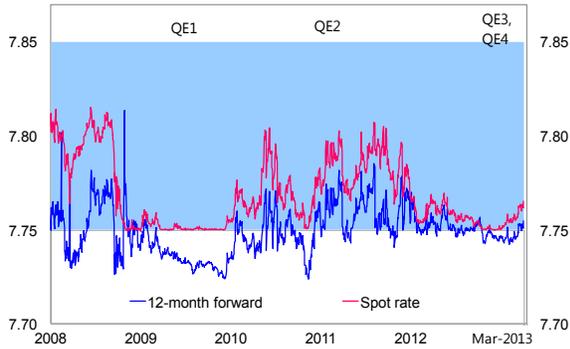
9. **Fiscal.** The government raised the special stamp duty from 15 percent to 20 percent for properties resold within 6 months of purchase; and a 5 percent rate was introduced for properties resold within 2-3 years. A flat rate of 15 percent of Buyer's Stamp Duty introduced for home buyers who are not Hong Kong SAR permanent residents. Staff analysis shows that such measures have statistically significant impact on house prices and transaction volume over time.

10. **Macprudential.** The authorities also used to macro-prudential policies to cool down the housing market. Caps on loan-to-value and debt-service-to-income ratios have been tightened progressively since 2009. In 2012, HKMA imposed a maximum of 30-year tenor on all mortgage loans and, in 2013, introduced a minimum capital risk weight of 15 percent for new residential mortgages to ensure lenders' capital cushions are deep enough. Staff analysis of the effectiveness of countercyclical macro-prudential policies shows that changes in loan-to-value ratios tend to reduce transaction volumes after around one year, and lower property price inflation after 2 years.

Figure 8.3 Spillovers from U.S. Quantitative Easing

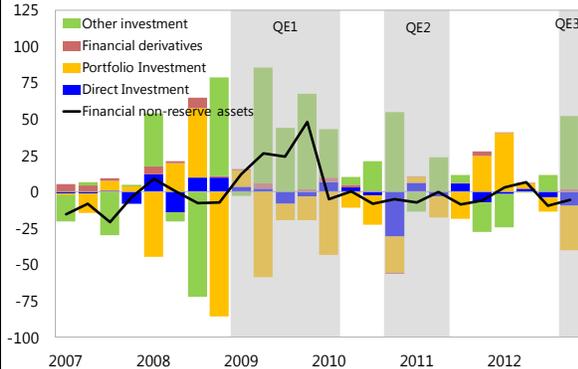
With the Linked Exchange Rate System, the strong-side Convertibility Undertaking has been triggered repeatedly since QE1 ...

Bilateral Exchange Rate
(In USD/HKD)



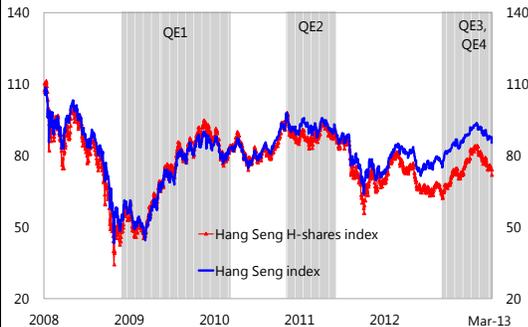
...capital inflow surged after QE1, but remains more balanced throughout QE2 and QE3...

Contributions to Net Capital Flows
(In percent of GDP)



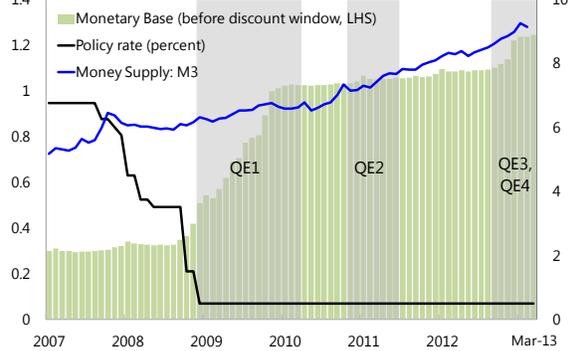
...Asset Markets rebounded quickly in QE1, stabilized in QE2, and picked up again in QE3...

Stock Price Index
(Index, January 2008=100)



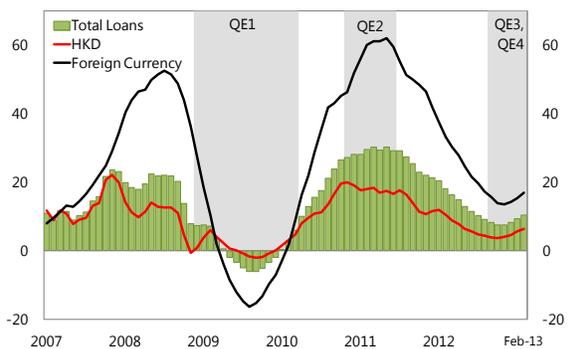
The easy U.S. liquidity conditions have been imported into Hong Kong SAR...

Monetary Base and Policy Rate
(In HKD Trillion)



...and fueled credit growth, both foreign currency denominated loans (mostly USD) and loans for domestic use...

Credit Growth
(In percent, year-on-year, 3mma)



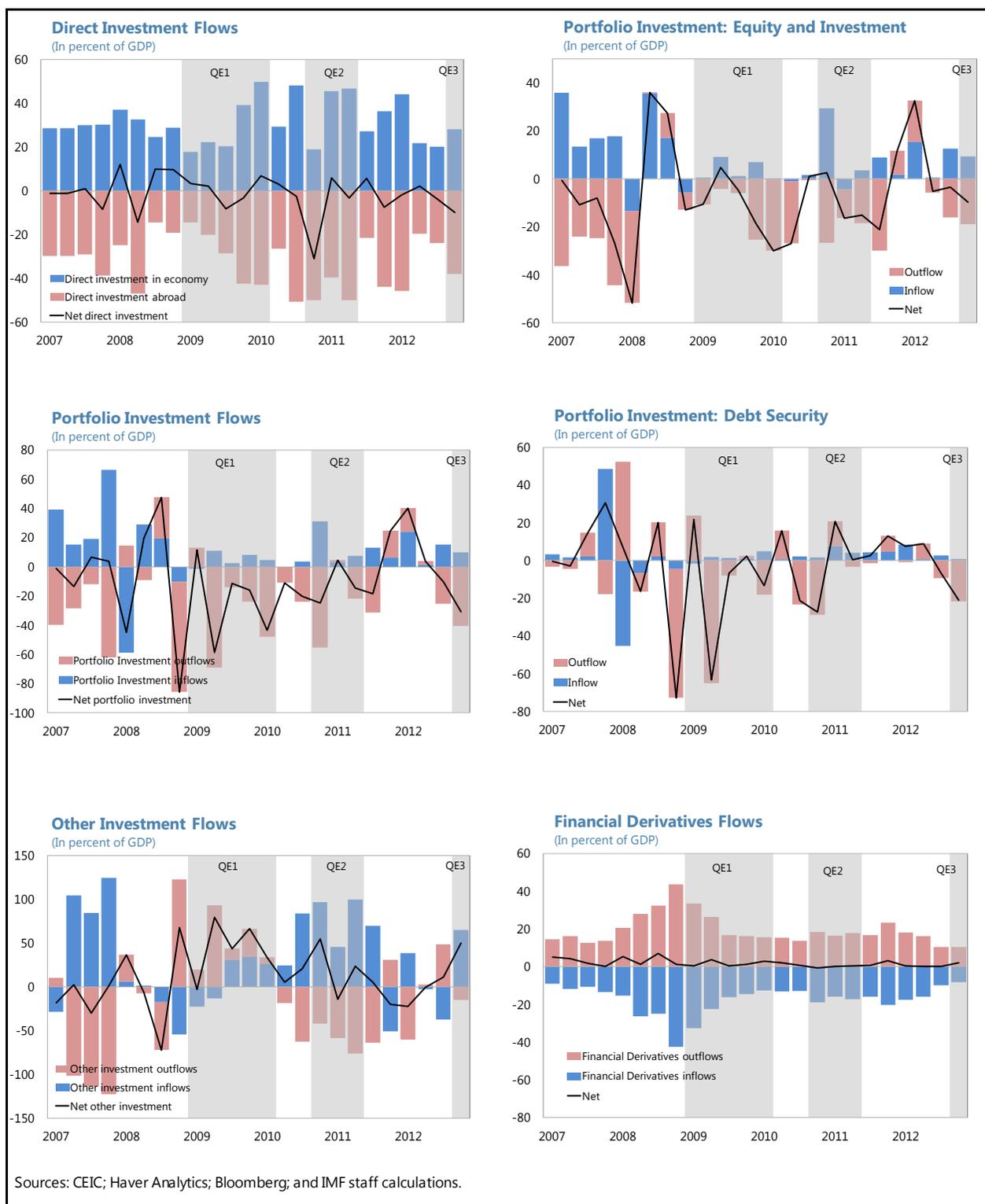
A broad-based residential property boom started in 2004 and continued into 2012, with a moderate correction before QE1.

Property Price
(Index 1999=100)



Sources: CEIC; Haver Analytics; Bloomberg; and IMF staff calculations.

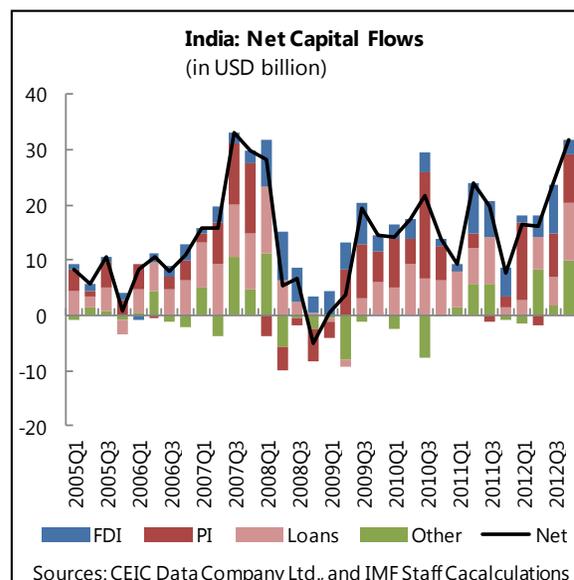
Figure 8.4 Composition of Capital Flows



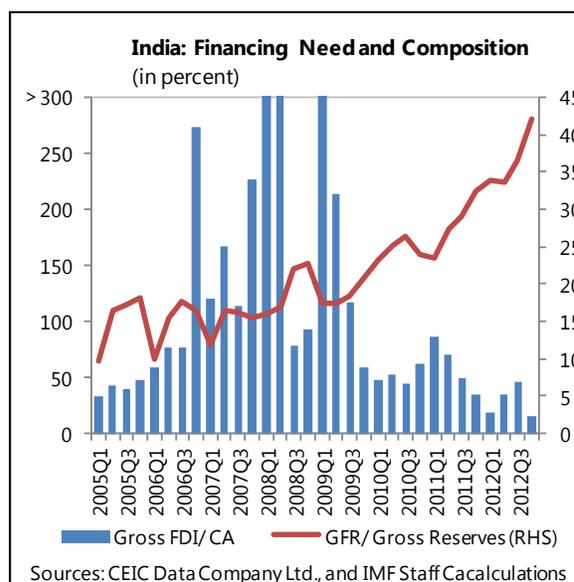
D. India⁴⁴

Trends in capital flows since U.S. QE1

1. **Net capital inflows increased to US\$ 19.3 billion (6.2 percent of GDP) in 2009Q3, up from around US\$ 0.4 billion in 2009Q1.** Capital flows recovered quickly in response to a decline in global risk aversion, low interest rates and abundant liquidity in advanced economies, and a sharp growth rebound in India (with growth going back to 8½ percent in 2009/10). However, inflows have remained below pre-Global Financial Crisis (GFC) levels (in percent of GDP terms). Ongoing growth concerns—coupled with policy and regulatory uncertainties—dampened capital inflows during 2011/12. Since the announcement of reform measures in September 2012, capital inflows (particularly portfolio flows) have surged, with net inflows in 2012Q4 almost reaching pre-GFC levels.



2. **Capital inflows financed India's widening current account deficit (CAD), which reached a record level of -6.7 percent of GDP in 2012Q4.** However, the financing mix has changed with FDI inflows financing only a quarter of the CAD in 2012, when they generally exceeded the CAD prior to the GFC. Instead, debt flows, particularly short-term and in the form of non-resident Indian (NRI) deposits, have increased. Similarly, external commercial borrowings (by Indian corporates) have increased by more than 60 percent since 2008.

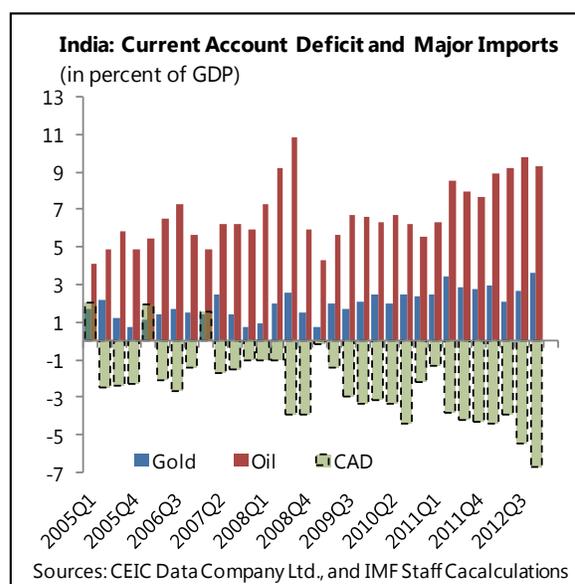
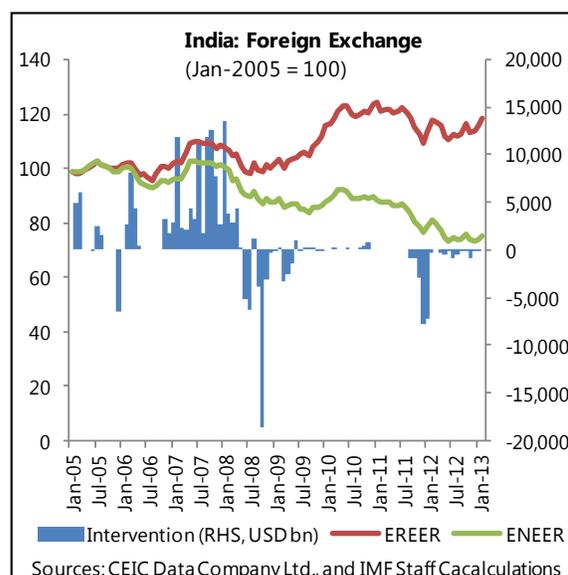


⁴⁴ Prepared by the India team (APD).

Impact on the economy, asset prices etc.

3. **The impact of capital inflows on asset prices has remained limited thus far.** During 2012/13, Indian equities performed well (in line with diminished global risk aversion), but have also responded to key domestic developments. Despite high inflows, the widening current account deficit led to a sharp depreciation of the rupee in 2011 and early 2012. As a result, despite the RBI's intervention in the FX market, the NEER depreciated by 9 percent in 2011/12, partly reversing a 21 percent real appreciation over the previous two years.

4. **Increased reliance on short-term debt flows to finance the growing CAD has increased India's medium-term vulnerabilities to foreign interest and liquidity shocks, as well as to sudden stops.** Any sudden reversal in capital flows when the United States and other advanced economies exit from QE, particularly if this exit occurs faster than anticipated, would be expected to have a serious impact on India. This was the case during the GFC, though there the sudden stop lasted only a few quarters. This time, however, potential stresses would be aggravated by India's large current account deficit and the reliance of its corporates on foreign borrowing for about a quarter of their funding. However, low external debt compared to other EMs, adequate reserves, and a flexible exchange rate, continue to help India manage its external vulnerabilities.

**Policy responses and their effectiveness**

5. **India's financial account has been gradually liberalized in the past decade, but restrictions on capital flows continue.** In view of the widening current account deficit and consequent need for increased financing, the authorities have taken several steps to further liberalize capital inflows: the FDI regime has been further liberalized; external commercial borrowing norms have been relaxed, including for sectors without a natural FX hedge; the Foreign Institutional Investors (FII) debt quota has been raised; and withholding tax on rupee corporate bonds has been

lowered. These measures have increased FII equity (portfolio inflows) and debt flows, while FDI inflows have remained tepid.

E. Korea⁴⁵

Vulnerability before the GFC

1. **During the 2000s, Korea liberalized its capital account transactions.** The liberalization of capital flows, despite significant benefits they brought for economic growth and financial deepening has also introduced new sort of vulnerability. For one, relative to GDP, capital flows grew sharply in size. On the net terms they, too, became far more volatile; with short-term debt and portfolio flows increasingly driving the cycles. Capital flows—in particular debt flows—also became progressively more intertwined with the expectation on exchange rate movement, and decoupling from the trends of current account.

2. **This new vulnerability was not fully appreciated before the 2008–09 global financial crisis (GFC).** In the run up to GFC, expectation of trend appreciation in the won exchange rate created a large demand for hedging by exporters. This in conjunction with the lack of commensurate demand for hedging by the importers (particularly refineries) led to a large build-up of liquidity mismatch in the banking system: banks (particularly foreign bank branches) relied heavily on short-term external borrowing in order to offset currency risks arising from relatively long-term forward contracts.⁴⁶

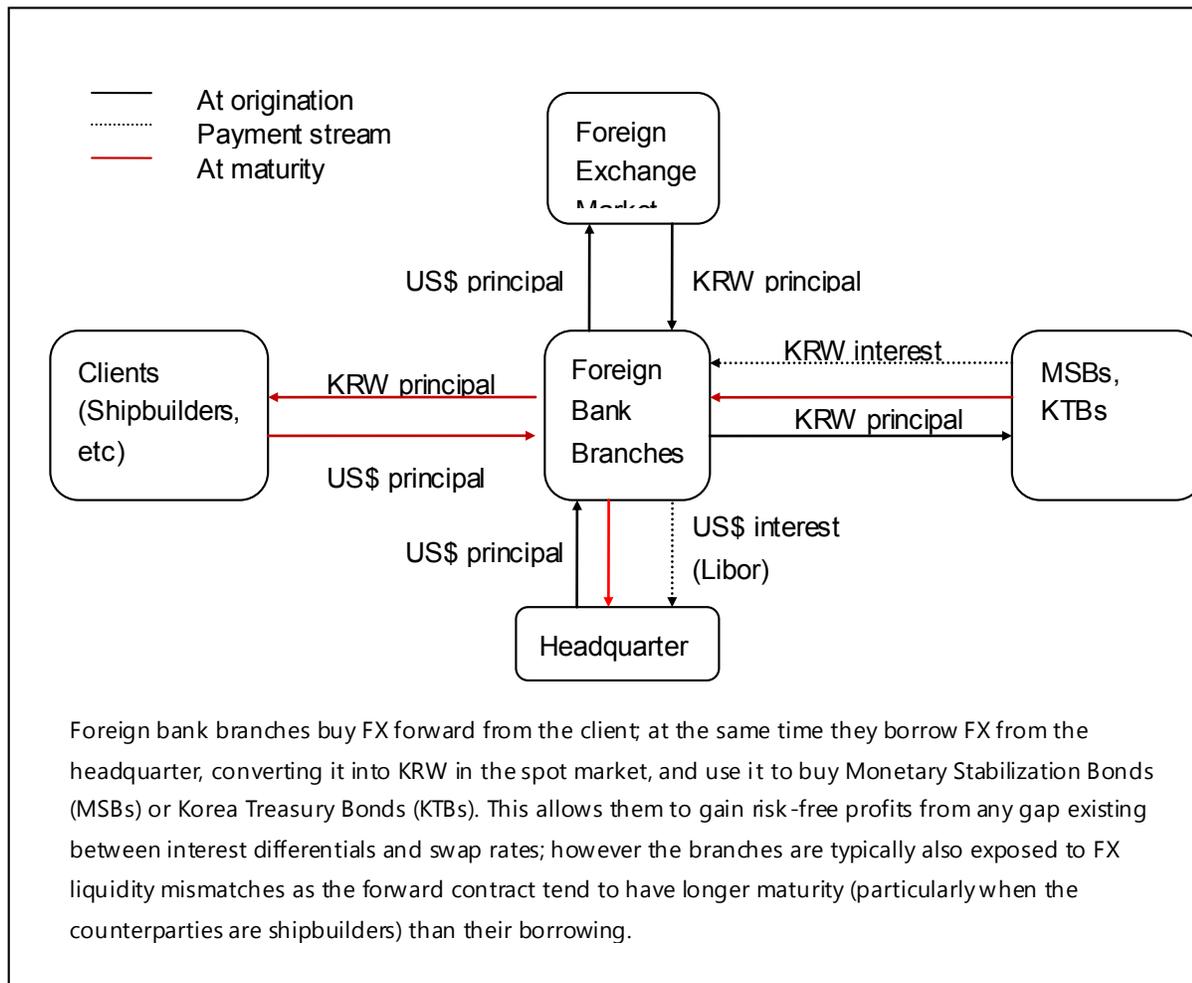
Sudden stop of capital during the GFC

3. **In 2008Q4, global liquidity dry-ups caused a sudden outflow of about 33 billion dollars (14 percent of Korea's gross international reserves) of banking capital from Korea.** Stemming mainly from unexpected repayment of short-term interbank FX loans—bulk of which were interoffice loans—by the foreign bank branches, these outflows entailed liquidation of local bond positions and conversion of the won proceeds to dollars, to the extent that they were not readily covered by FX cash flows arising from banks' maturing long FX forward positions. These flows, thus, caused a sharp depreciation of won (to a maximum of 36 percent during the GFC), prompting 11 and 7 billion dollars of gross outflows in portfolio bond and equity respectively.⁴⁷ They also caused Korea's gross international reserves to decrease by 38 billion dollars that quarter (i.e., a decline by 16 percent; the maximum decline during the GFC amounted to 65 billion dollars or a peak to trough fall by 24 percent).

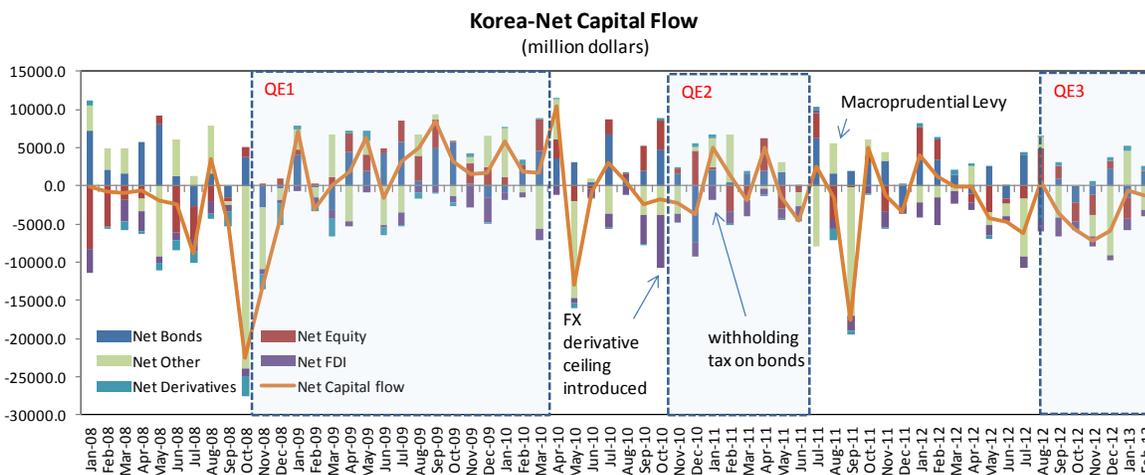
⁴⁵ Prepared by Jack Ree (APD)

⁴⁶ Model estimation suggests that a one percentage point increase in net forward position (scaled by the total asset size) of a foreign bank branch is associated with a 0.3 percentage point increase in short-term external debt (scaled the same way) in the same quarter, and 0.2 percentage point increases them in the subsequent quarters (see Jack Joo K. Ree, Kyoungsoo Yoon, Hail Park, "FX Funding Risks and Exchange Rate Volatility—Korea's Case", IMF Working Paper, WP/12/268, November 2012).

⁴⁷ These flows were however largely offset by inflows caused by unwinding of Korean residents' foreign portfolio investment, mainly through offshore mutual funds



Foreign Bank Branches' Typical Positioning



Source: CEIC

4. **In response to the stress, Korean authorities promptly put together a package of measures, comprising aggressive monetary easing, fiscal stimulus, FX liquidity injection to banks through the Bank of Korea's FX swap. In addition, they also established bilateral currency swap facilities with United States, as well as Japan.**

Post GFC capital flows and the effect of QE

5. **Given the extensive combination of Korea's crisis responses, it is difficult to quantitatively isolate the spillover effect of quantitative easing by advanced countries, which also worked in conjunction with other important global policy responses to thaw liquidity and stimulate growth.** In case of Korea, the authorities' continued efforts, after the crisis, to reduce banks' short-term external debt complicates the analysis further, to the extent that they have affected capital flows.

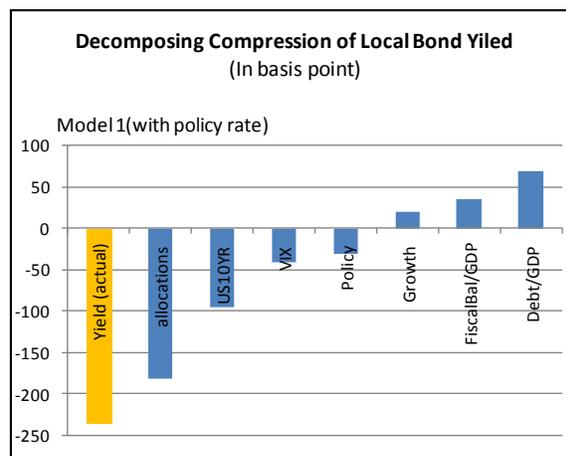
6. **Despite the complications, a few stylized observations come out from the post-GFC trends of capital flows, shedding some lights to our question (the subsequent analysis is focused on quantitative easing of the United States).**

- Some push factor effect of the quantitative easing seems to have existed for Korea during QE1 (November 2008 to March 2010), but not so much during QE2 (November 2010 to June 2011) and QE3 (September 2012 to now) periods. During QE1, the monthly capital flows to Korea was 1.5 billion dollar net inflows on average (the average net flow was negative during the QE2 and QE3), with strong bond and equity flows (3.5 billion dollars) more than offsetting outflows in FDI, banking flows and settlement payments related to derivative liabilities (i.e., valuation losses). The strong portfolio capital flows during the QE1 period should be, of course, gauged against significant pull factors—e.g., aggressive rate cuts (attracting equity flows), enhanced safeguards such as the bilateral swap lines, and strong export-led rebound of growth during the QE1 period. Considering this, the pure impact of the quantitative easing (of the United States) for Korea seems to have been, at best, modest, as is also suggested by little apparent responses of asset prices to the ending of the quantitative easing.

Korea - Net capital flows during US quantitative easing (In billions of dollars, monthly average)			
	QE1	QE2	QE3
Net Bonds	1.7	0.2	0.0
Net Equity	1.8	0.1	-0.9
Net Other	-0.5	0.7	-2.4
Net FDI	-1.1	-1.6	-1.3
Net Derivatives	-0.4	0.2	0.5
Net Capital flow	1.5	-0.3	-4.1
1/ QE1 (2008.11-2010.3); QE2 (2010.11-2011.6); QE3 (2012.9 - 2013. 2)			
Source: CEIC			

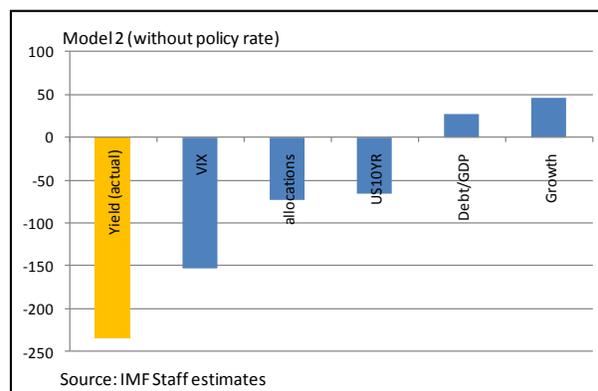
EMs -EPFR flows during US quantitative easing (In billions of dollars, monthly average)			
	QE1	QE2	QE3
Bonds	0.0	0.5	3.3
Equity	4.5	3.7	10.5
Total	4.5	4.1	13.8
1/ QE1 (2008,11-2010.3); QE2 (2010.11-2011.6); QE3 (2012.9 - 2013. 2)			
Source: Haver			

- The impact of quantitative easing on bond and equity flows appear to be significantly milder for Korea than emerging market countries in general. The EPFR bond and equity flows to emerging market countries rose to average 14 billion dollars per month during QE3 from of 4-5 billion dollars per month during QE1 and QE2. In case of Korea, monthly gross bond and equity flows rose from 2.1 billion dollars during QE1 to 2.4 billion dollars during QE2, but they fell back to 2.1 billion dollars during QE3. This suggests that the strength of QE factor, relative to Korea-specific factors may have been weaker than the case of emerging market countries.
- There are some evidences that the impact of push factors (VIX, changes in allocation of investor base to foreigners, and U.S. interest rate) could have played a stronger role in driving post-GFC asset prices relative to pull factors, for example by compressing the local currency bond yields in Korea. This suggests that asset prices may face substantial moderation with the exit from the QE.⁴⁸



Policy responses to QE

7. **Korea has put in place an array of macroprudential measures mainly aimed to prevent FX liquidity mismatches from re-growing in the banking system.** Combined with more rigorous checks on banks' FX liquidity management through supervisory guidance, these measures helped reducing Korea's short-term debt. Korea also significantly improved reserve buffer, increasing reserve coverage to 186 percent in 2012 from 111 percent in 2008.



8. **With looming concerns on Japan's 'Abenomics' the authorities studied various options, since late 2012, to strengthen their macroprudential toolkits.** Their consideration involved, not only options to strengthening existing tools, but also ones for new instruments; ranging from Tobin tax to financial transactions tax similar to the one being adopted by many European countries. The focus was put on ways to strengthen toolkits to place safety valves on portfolio bond flows.

9. **However Korea's new government has publicly indicated that it will first strengthen existing measures, should upside risks to capital flows materialize, led including by the**

⁴⁸ See IMF's 2013 Spring Global Financial Stability Report, Chapter 1, Figure 1.70.

quantitative easing. There are also growing public pressures on the Bank of Korea to cut policy rate to contain further appreciation of won/yen cross rate. However, the BOK has so far not made any action along this line.

F. New Zealand⁴⁹

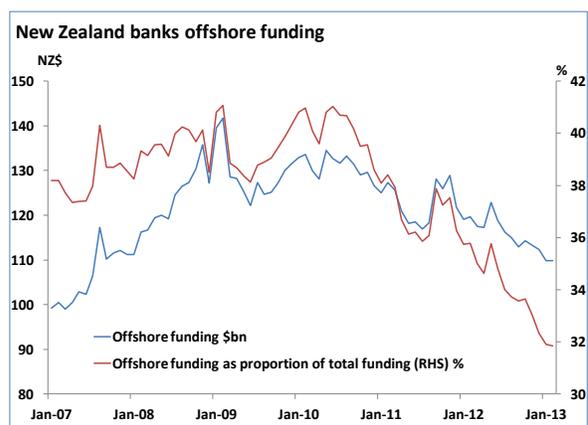
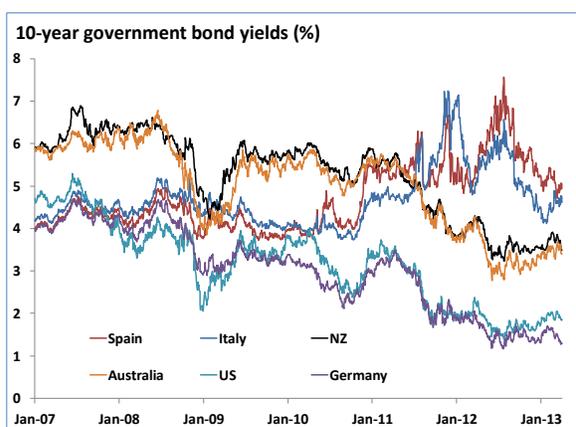
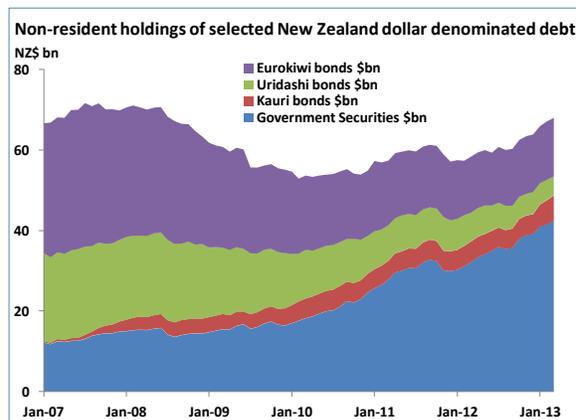
Trends in capital flows since U.S. QE1

1. **New Zealand experienced some increase in capital inflows as a result of the post-crisis easing of global monetary conditions and a recovery in risk appetite.**

Financial account transactions showed net inflows of NZD 6.3 billion in 2012 (3 percent of GDP), driven mostly by the increase in non-resident holdings of government debt. The New Zealand government bond yields remain near historic lows. More recently there is also a pick up in the issuance of New Zealand dollar denominated bonds by offshore issuers (Eurokiwi, ridashi and Kauri), indicating stronger demand for New Zealand dollar investments.

2. With respect to compositions, flows into the finance and insurance industry have been declining since 2009, reflecting overseas investors shifting toward purchases of government debt securities instead of banking sector debt. New Zealand banks' reliance on offshore funding has been declining steadily.

3. **On sources of capital flows, total investments from the United States in New Zealand continued to decline from the peak in 2009, while Australia remains the largest investor in New Zealand, holding one-third of the total foreign investment.** There has not yet been evidence of a material reallocation of funds from Japan to New Zealand since QQME.



⁴⁹ Prepared by the New Zealand team (APD).

Impact on the economy, asset prices etc.

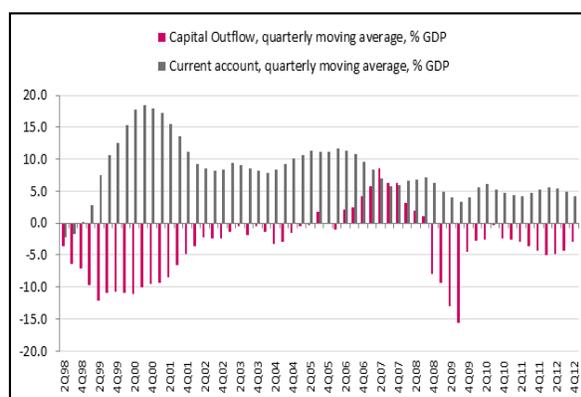
4. **The impact of capital inflows on the economy is mainly through an appreciation of the exchange rate.** Despite recent declines in export commodity prices, the New Zealand dollar remains elevated, which has helped contain inflation pressure, but at the same time the strong dollar continues to weigh on tradable sector competitiveness and limit demand for net exports. Although there is no clear evidence that capital inflows have had direct impact on asset prices, there is a risk that buoyant global risk appetite could add upward pressure on already elevated house prices.

Policy responses and their effectiveness

5. **The authorities are committed to the floating exchange rate regime.** The Reserve Bank of New Zealand remains ready to intervene in the exchange rate market subject to certain criteria being met to smooth the exchange rate, but do not consider it effective nor advisable at this stage to intervene to target a particular level for the exchange rate. Over the last several years interventions have been rare and modest.

G. Russia⁵⁰**Trends in capital flows and correlation with U.S. QE1**

- **Bottom line:** Russia has experienced large net capital outflows since the beginning of the global financial crisis. 2012 net outflows amounted to USD57bn (2.7 percent of GDP), down from USD81bn in 2011. Capital flows from/to Russia do not appear to be correlated to U.S. QE1 or subsequent waves of QE in the United States and elsewhere.
- **Background:** Historically, and compared to other large emerging markets, Russia's net capital flows have been relatively small and often negative. With the exception of net inflows during the years 2006–07, Russia experienced a tendency toward net outflows overall. The global financial crisis also triggered large outflows. Current capital outflows do not differ significantly from their historical levels, but their structure has changed since capital account liberalization in late 2006: (1) public-sector outflows have been replaced by private-sector outflows; and (2) foreign inflows have essentially dried up (with the exception of some FDI). The rebound of relatively high net capital outflows in 2011/12 has raised some concern among policymakers and public. However, there appears to be broad-based consensus that—with increased exchange rate flexibility and a diminished role of CBR FX intervention—persistent



⁵⁰ Prepared by the Russia team (EUR).

capital outflows merely mirror the large current account surplus in combination with Russia’s poor investment climate, with the intensification of capital outflows in late 2011 and early 2012 explained by (1) a global flight to safety against the backdrop of a worsening euro crisis and (2) possibly also domestic political uncertainty related to parliamentary and presidential elections.

Impact on the economy, asset prices etc.

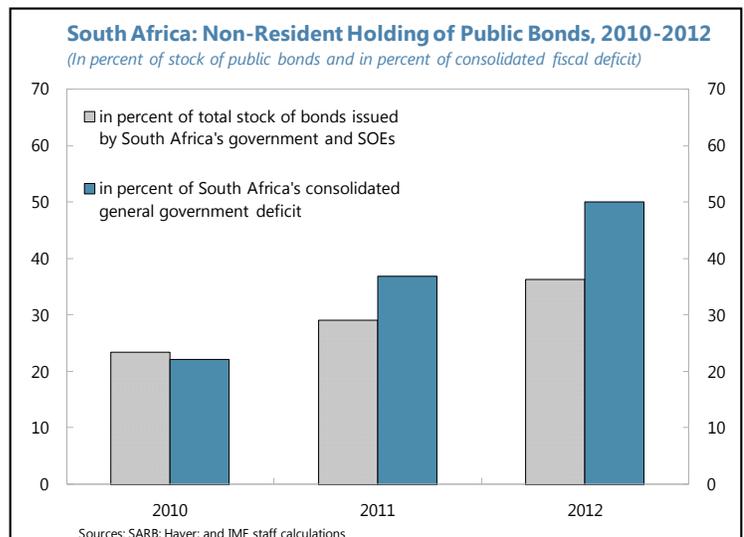
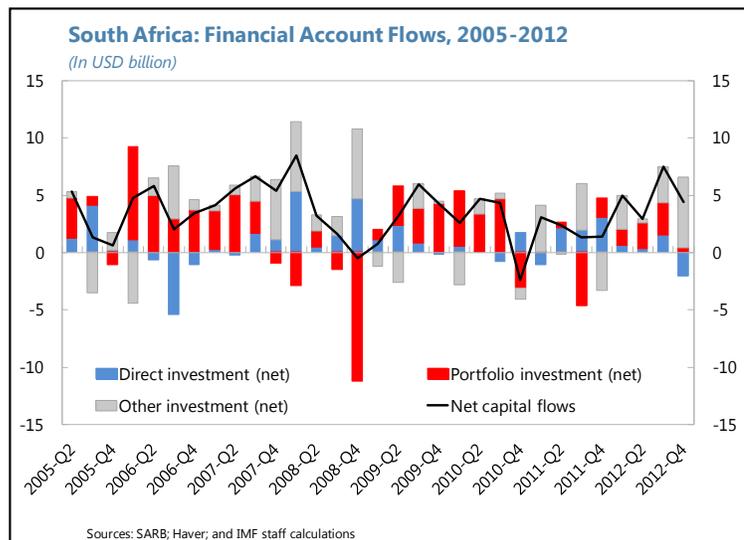
- We estimate that the impact of capital outflows on the economy, asset prices, etc. has been limited thus far. Outflows may have had mild negative bearing on private investment, asset prices, and exchange rate; however, we think that other—mostly domestic—factors are more important drivers of these variables. While Russia is exposed to risks of accelerated capital outflows (global flight to safety; poor domestic investment climate), the more flexible exchange rate, large international reserves, and reduced balance sheet mismatches would help Russia to better absorb such shocks.

Policy responses and their effectiveness

- None.

H. South Africa⁵¹

1. **Through end 2012, South Africa continued to benefit from strong capital inflows, carried by a global search for high-yield assets and its inclusion in the World Government Bond index.** Net capital flows into SA printed US\$4.4 billion (4.7 percent of GDP) in 2012Q4, following a post-Lehman peak of US\$7.5 billion in the previous quarter. The upward trend has been broadly supported by a sturdier global search for high-yield EM assets following subsequent waves of quantitative easing in AMs, coupled with SA’s pull factors, including the depth of its financial market, the flexibility of the Rand, its heavy weight in the Global Emerging Markets Local Currency Bond index, and its recent inclusion in the WGBI. The volumes observed in



⁵¹ Prepared by Roberto Perrelli (SPR).

late 2012 have approached pre-crisis levels. Sizable nonresident participation in the domestic bond market, mostly at the longer end of the maturity spectrum, has led to a substantial decline in long-term bond yields, lowering the cost of financing for the government and reducing the cost of capital for corporations.

2. **Nevertheless, the recent rise in domestic risks has affected investors' sentiment and elevated SA's vulnerability to capital flow reversals.** Nonresidents' participation in SA's domestic bond market reached near 40 percent in 2012—one of the highest among EMs, covering about half of that year's sizeable fiscal deficit. Foreign participation in the domestic bond market has also been boosted by the fact that SA's debt issuance abroad continues relatively limited. But investors' sentiment has changed after labor unrests in the mining sector last fall, which, coupled with subdued growth and weaker fiscal position, triggered sovereign credit ratings downgrades by three major agencies. These moves are reflected in the Q4 net FDI drop (-2.2 percent of GDP), the strong depreciation of the Rand, and the widening in SA's CDS spreads. The country now appears to be in a much weaker position than a year ago. And the predominance of non-FDI flows on the financing of soaring external deficits makes SA highly vulnerable to potential capital flow reversals.

3. **So far price and credit developments remain contained, and the authorities have not announced changes to CFM measures on fears that additional controls may chase off capital flows.** South Africa's financial account remains fairly open to nonresidents, but with restrictions to residents' FX transactions.⁵² Corporate foreign exchange transactions are subject to exchange control regulations that limit corporate offshore borrowing and FX exposure. Similarly, banks largely rely on wholesale deposits from resident institutional investors as a major source of funding. Ample liquidity in the corporate and banking sectors, along with subdued private investment, have reduced corporate borrowing needs. At the household level, unfavorable labor market conditions have kept balance sheets weak (with one of the highest debt service-to-income ratios among EMs) but relatively insulated from capital flows surges. Equity holders, nevertheless, are more susceptible to "unpleasant surprises" related to capital flows reversals as P/E ratios continue to grow faster than supported by fundamentals, and boosted by domestic investors' exposure limits.⁵³ Against this background, the authorities have kept monetary policy loose, bringing policy rates to all time lows, with limited FX intervention. The authorities are carefully monitoring the CFM measures introduced by several countries, but at this juncture they have not signaled to any changes to the current policies as they are concerned that controls on inflows may permanently drive away capital flows.

⁵² Such restrictions are aimed to avoid driving offshore the liquidity provided by resident institutional investors, which is essential to support domestic banks' funding and balance sheets.

⁵³ Being "maxed out" on offshore assets, and unsatisfied with bonds' low real returns, domestic investors have opted to reallocate resources towards equities, which are more liquid and offer some positive rent.

9. ANNEX: Changes in the Cross-border Banking Landscape⁵⁴

The Global Financial Crisis (GFC) triggered a transformation of the cross-border banking landscape that has altered the systemic risks facing banking systems. Banking systems have significantly cut back their cross-border exposures since the start of the GFC. This happened in two phases: (i) a reduction in cross-border activity by many banking systems in the wake of the Lehman Brothers collapse; and (ii) a continued cutback in cross-border claims by euro area banks from the start of the euro area crisis in 2010.

While many banking systems have taken steps to strengthen their balance sheets, five years after the start of the GFC banking systems are still in different stages of repair. Old risks remain, with some European banks still highly leveraged and reliant on wholesale funding. This leaves these banking systems vulnerable to further shocks, which could lead to a further round of cross-border deleveraging.

Asian banks have relatively stronger balance sheets and were less affected by the GFC. These banks have continued to increase their cross-border claims and have helped to offset partially the cutback by euro-area banks in Asia, particularly in syndicated lending and project finance areas. But these banks face new vulnerabilities, emerging from a wider use of short-term capital markets to fund the expansion in U.S. dollar exposures. This exposes some Asian banks to the risk of disruption to foreign currency funding markets. This could create deleveraging pressures, in much the same way as a drying-up in euro area bank U.S. dollar funding sources in 2011 triggered a pullback in cross-border claims by euro area banks.

Global Patterns of Deleveraging After the GFC

Bank deleveraging drivers

1. **Advanced economy banking systems have been under pressure—from both markets and regulators—to reduce leverage since the outbreak of the GFC.** Many institutions entered the crisis with thin capital cushions and with a heavy reliance on wholesale funding. Since then, banks have been actively engaged in strengthening their balance sheets through deleveraging—either by raising capital levels or cutting back balance sheets—and reducing use of short-term and cross-border wholesale funding.
2. **This is in response to:** (i) the wholesale funding runs experienced during the crisis; (ii) the higher cost of wholesale funding, particularly in the euro area where sovereign risks have spilled over to bank funding costs; (iii) Basel III liquidity requirements, which favor more stable funding sources; and (iv) the increased incidence of regulatory ring-fencing of bank liquidity and capital along

⁵⁴ Prepared by Sean Craig, William Kerry, Raphael Lam and Jongsoo Shin. We are grateful to Anna Ilyina for her comments. The annex draws on analysis carried-out for the *Global Financial Stability Report*.

national lines (in part because of the slow progress in establishing robust cross-border resolution frameworks).

3. **However, progress has been uneven and banks are at different stages of the balance sheet repair process.**⁵⁵ Leverage and wholesale funding remain relatively high for core euro area banks, in particular, leaving these institutions more vulnerable to shocks (Figure 9.1.).
4. **As part of this deleveraging process, banking systems have significantly reduced their cross-border exposures.** Two phases of cross-border deleveraging can be distinguished (Figure 9.2). *The first phase* is characterized by a widespread cutback in cross-border claims by a number of banking systems in the wake of the Lehman Brothers collapse. This reflecting concerns about capital adequacy, counterparty credit risk and the drying-up of a number of key wholesale funding markets. This led to the failure of a number of banks, restructuring of some institutions, recapitalization of banking systems and a drive to change business models to reduce leverage and curtail use of short-term wholesale funding.
5. **In 2010, the second phase of cross-border deleveraging began with the start of the euro area financial crisis.** Euro area banks—which were both at the epicenter of the crisis and had more vulnerable balance sheets (as discussed above)—were most affected. These banks continued to cutback foreign claims due to pressures on bank balance sheets following an increase in sovereign risk, pressures funding markets, problems in accessing dollar funding, and a fragmentation of capital markets within the euro area. Banking systems outside the euro area were much less affected and were even able to expand foreign claims during this phase.

Changes in cross-border bank lending patterns

6. **Bank foreign claims peaked at almost \$28 trillion in 2008 Q1, but have since fallen by more than \$4 trillion to stand at just over \$23 trillion in 2012 Q4 (Figure 9.3).** Most of this cutback has been by European banks, which reduced their foreign claims by almost \$6 trillion over the same period. European banks largely cut back claims on Europe and North America (Figure 9.4). Analysis in the April 2013 *Global Financial Stability Report* shows that most of the deleveraging has been by banks with publicly announced plans to scale back the size of their balance sheets, including institutions under EU state aid rules. The majority of the asset reductions have been in assets other than loans, particularly legacy assets that turned sour with the onset of the GFC.
7. **Within Europe, cutbacks by local institutions have mainly been to advanced countries—reductions in foreign claims to emerging Europe amounted to only \$0.1 trillion from 2008 Q1 to 2012 Q4.** While parent banks have cut back funding to their subsidiaries in Central and South-Eastern Europe⁵⁶, this has been offset by an increase in local deposits, leaving foreign claims essentially flat. During the *second phase* of cross-border deleveraging, European banks concentrated on reducing their interbank exposures, which have declined by around 20 percent in the two years to

⁵⁵ This is discussed in more detail in Chapter 1 of the April 2013 *Global Financial Stability Report*.

⁵⁶ See the discussion on the subsidiarization of funding models in Section IV of this note.

2012 Q4 (Figure 9.5). Banks also sought safety, cutting back their exposures to the higher risk euro area periphery sovereigns, while increasing exposures to governments in the core euro area and other Advanced European countries. Claims on the non-bank private sector were cut back in the euro area periphery, as expected, as well as other Advanced Europe (mainly the United Kingdom).

8. **In addition, some European banks, particularly French institutions, have concentrated on reducing U.S. dollar denominated assets, following a curtailment in dollar funding, for example from money market funds (Figure 9.6) and disruption to dollar-euro cross-currency swap markets (Figure 9.7) during the *second phase of cross-border deleveraging*.** Many of these assets involved specialized lending activities (e.g. structured commodity finance, project finance, and shipping or aircraft leasing). It is likely that this was behind the pullback by euro area banks in North America and Asia in the *second phase*. In contrast, Spanish banks increased their exposures to Latin America. This likely to reflect growth in local deposits in the region.

Increasing Role of Asian Banks in International Credit

9. **Trade, project and corporate finance lending in foreign currency is large and volatile.** It peaked at \$820 billion in the second quarter of 2011 and then collapsed by one third over the next three quarters. The role of this credit is often overlooked, as it is not separately identified in national credit and balance of payments statistics and must instead be constructed by aggregating private sector data on individual loan contracts. Large, global, euro area and U.S. banks have traditionally dominated this lending but—as is discussed above—as euro area banks came under pressure in the *second phase* of cross-border deleveraging, room was created for local banks to step in (Figure 9.8).

10. **This shift to local banks has been strongest in Asia, where institutions—which were less affected by the GFC and had relatively strong balance sheets (e.g. with relatively low loan-to-deposit ratios and high liquidity)—were in a strong position to fill the gap left by European banks.** Importantly, Asian banks did not suffer from a pullback in U.S. money market funding in the same way as European banks (Figure 9.6). In fact, prime U.S. money market fund exposures to Asian banks have increased since the start of the global financial crisis. Asian banking systems were able to increase their foreign claims throughout the two crisis phases (Figure 9.2). While this expansion has not been sufficient to offset the cutbacks by European banks in many regions (particularly Europe and North America), Asia is the only region where cutbacks by euro area banks have been outpaced by an expansion by other (in this case, predominantly Asian) banks (Figure 9.4).

11. **Asian banks have been playing an increasing role in regional syndicated loans and project finance, with such lending in the continent reaching US\$352 and US\$88 billion, respectively in 2012 (Figures 9.9 and 9.10).** Asian project finance represented over 40 percent of the flow of global project finance in 2012, with the next most important region—Advanced Europe—representing around 20 percent of global project finance flows.⁵⁷ Within Asia, most project finance lending goes towards the oil, transportation and telecommunications industries (Figure 9.11). Japanese and Indian banks have been increasing their market share in regional project finance, in

⁵⁷ Data are from Thompson One.

particular. However, Asian banks from a number of countries—not only Japanese and Indian banks, but also institutions from Australia, China, and the ASEAN economies—have been increasing their market share in syndicated lending.

12. **The expansion of foreign lending within Asia follows, in part, the resilience of local economies as well as expansionary fiscal measures that centered on public infrastructure investments, particularly in India and China.** This business is attractive to banks as it not only provides interest income over a long period, but also includes additional fee revenue from arranging the deals in the first place.

Old Risks and New Vulnerabilities

13. **As banking systems are still in different stages of the repair process, a number of old risks remain.** Core euro area banks, in particular, are still highly leveraged and reliant on wholesale sources of funding. This makes these systems vulnerable to shocks, which could in turn induce a further round of cross-border deleveraging.

14. **Another old risk that has come to the fore is the strength of global banks' funding structures.** A number of banks in Europe and the United States are also increasingly matching their assets and liabilities on a country-by-country basis in a move to make their subsidiaries self-funded over time. In some cases, the development of subsidiarized funding models is being encouraged by regulators. For example, there is increased scrutiny over cross-border intra-group transfers, as well as new regulations being put in place that require banks to hold more liquidity locally (e.g. the Federal Reserve has proposed that operations of foreign banks in the United States should establish a holding company structure with the same capital and liquidity requirements as domestic banks). This trend, however, has also been playing out in the euro area, in part due to concerns about redenomination risk. Figure 9.12 shows that cross-border assets and liabilities with related offices (e.g. subsidiaries) have fallen in a number of banking systems, reflecting this trend towards subsidiarized funding models. While such models help to insulate individual parts of a banking group from pressures in other countries—and hence limit spillovers—they also reduce the flexibility which centrally-funded groups have to use excess funding in one region to cope with pressures in another region—worsening vulnerabilities to local crises.

15. **At the same time, new vulnerabilities are also emerging as Asian banks expand their regional syndicated and project finance lending.** Much of this activity in Asia is denominated in U.S. dollars. This means that U.S. dollar assets are often financed by local currency funds, such as corporate and household deposits, and swapped into dollars through the foreign exchange swap market.

16. **First, this has given rise to a large net foreign asset position—the difference between a banking system's foreign assets and liabilities.** For Asian banks, net foreign assets amount to almost 25 percent of total foreign assets (Figure 9.13). This contrasts to European banks (excluding the United Kingdom) which reduced their net asset position from around 10 percent of assets to near zero, and with U.S. and U.K. banks, which have a negative foreign asset position. Figure 9.14 shows that much of the net foreign asset position comes from Japanese banks—where the net

position amounts to \$1.6 trillion, just under 50 percent of foreign assets—with Australian and other Asian banks actually running a negative, or small, net foreign asset position.

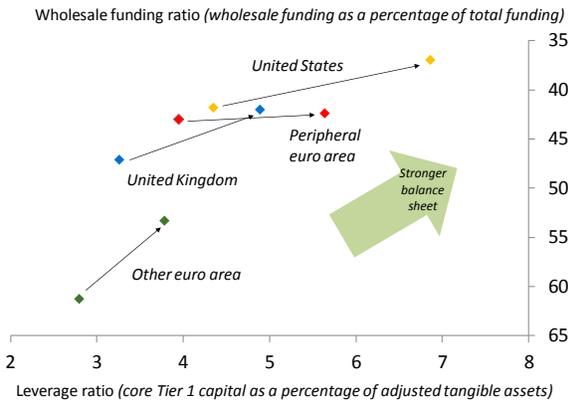
17. **A second vulnerability comes from a wider asset-liability mismatch on balance sheets.** Around half of these claims of Japanese banks have a long maturity, similar to the position of U.K. banks, but different to that of U.S. banks where exposures are more short-term (Figure 9.15). However, as discussed above, banks rely on shorter-term swap markets to fund these positions. This means that Japanese banks are also running maturity mismatches, as well as market liquidity risks. However, it should be noted that not all of the net foreign asset position of Japanese banks relates to foreign lending. Japanese banks hold substantial portfolios of foreign securities, which tend to be more liquid than loans and so could be more easily sold in the event that these banks face liquidity shocks.
18. **Nevertheless, if cross-currency swap markets were to become severely disrupted, banks may need to scale back their exposures to these cross-border dollar assets.** Indeed, this is one of the problems that French banks faced at the start of the euro area crisis. Furthermore, Figure 9.16 shows that Asian banks place a similar reliance on wholesale funding of their external liabilities as euro area banks, again revealing similar vulnerabilities. However, Japanese banks have recently reduced their reliance on wholesale markets by increasing the proportion of non-bank deposit funding. This contrasts with some other banking systems—such as Australia—where reliance on wholesale sources remains at a very high level.
19. **Asian banks' foreign lending expansion also brings another new vulnerability.** There is always a risk that institutions that are gaining market share are doing so by lending to less creditworthy borrowers and that this has not been adequately recognized in a bank's risk management. While it is difficult to show that this risk is increasing, past experience demonstrates that these risks need to be managed carefully. This is particularly the case for specialized areas of lending, such as project finance.
20. **In addition, overseas activity also adds to challenges on the cross-border supervision of banks.** Banks in Asia with large cross-border banking activity, as well as the local supervisors of those banks have established relationships with foreign supervisors in other advanced countries on risk monitoring and information exchanges. As banks are expanding in emerging Asia, institutions and supervisors may face the challenges of a lack of common regional supervisory framework to effectively monitor risks arising from increasing international activity in the region.

Conclusions

21. **The GFC, as well as market and regulatory pressures on banks, have substantially transformed global banks' cross-border lending patterns.** As the crisis hit, all banks scaled back their cross-border activities in the *first phase* of cross-border deleveraging. But the *second phase* was centered on Europe, where local banks were still highly leveraged and reliant on wholesale funding and so were vulnerable to the shocks that hit them. European banks continued to cut-back cross-border exposures as they continued to face old risks of weak balance sheets.

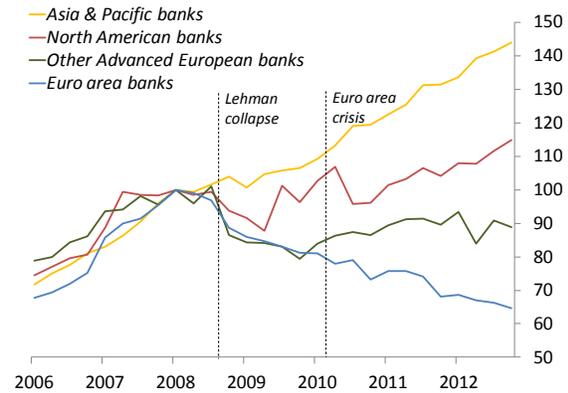
22. **This provided an opportunity for Asian and North American banks, in particular, to take an increasing share of cross-border exposures.** These banks were well poised to seize international lending business: U.S. banks had strengthened their balance sheets in the aftermath of the GFC; and Japanese banks were looking to move away from domestic markets, where loan demand was weak, and to seek more profitable overseas lending opportunities. But, for Asian banks, this has led to the emergence of new vulnerabilities in their use of cross-currency swap markets to use local funding to back U.S. dollar exposures.

Figure 9.1 Bank Leverage and Wholesale Funding Ratios 2008Q4–2012Q3



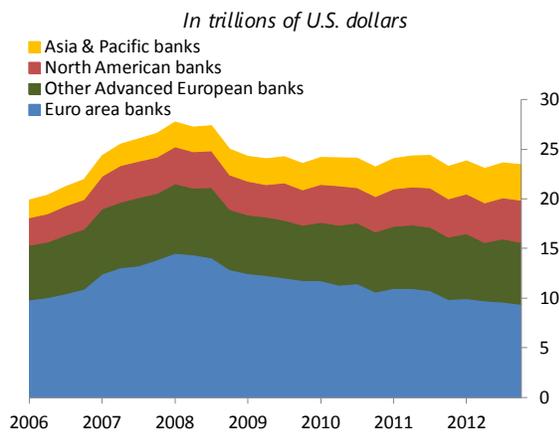
Sources: SNL Financial; and IMF staff estimates.
 Note: For European banks, tangible assets are adjusted by subtracting derivative liabilities. However, some differences in accounting definition may remain. Wholesale funding is debt, repo and interbank deposits. Total funding is wholesale funding plus customer deposits.

Figure 9.2 Consolidated Foreign Claims
 Index: 2008 Q1 = 100



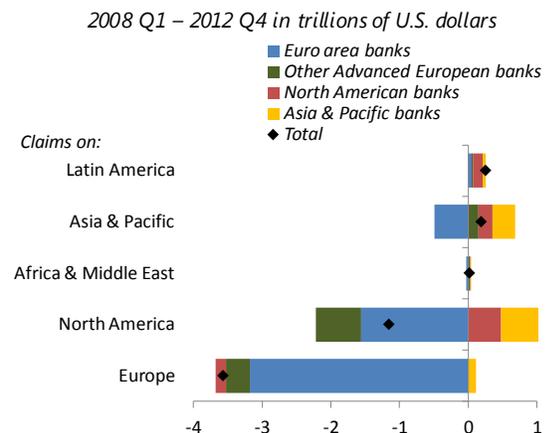
Sources: BIS; Bloomberg; and IMF staff calculations.
 Note: Data for advanced countries have been partially adjusted for changes in local exchange rates and a break in the U.S. banks series. Euro area banks = Austria, Belgium, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal and Spain. Other Advanced European banks = Sweden, Switzerland and United Kingdom. North American banks = United States and Canada. Advanced Asia & Pacific banks = Japan and Australia.

Figure 9.3 Total Foreign Claims



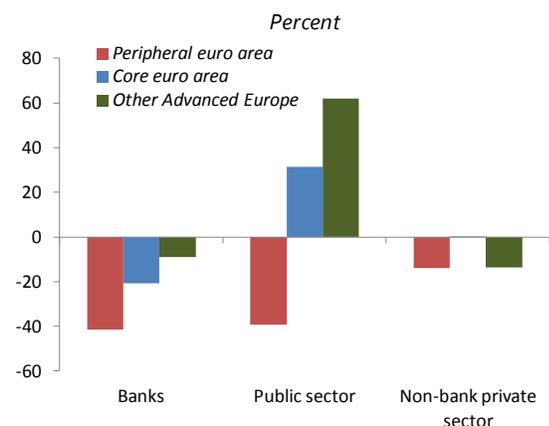
Sources: BIS; Bloomberg; and IMF staff calculations.
 Note: See notes to Chart 2.

Figure 9.4 Change in Foreign Claims



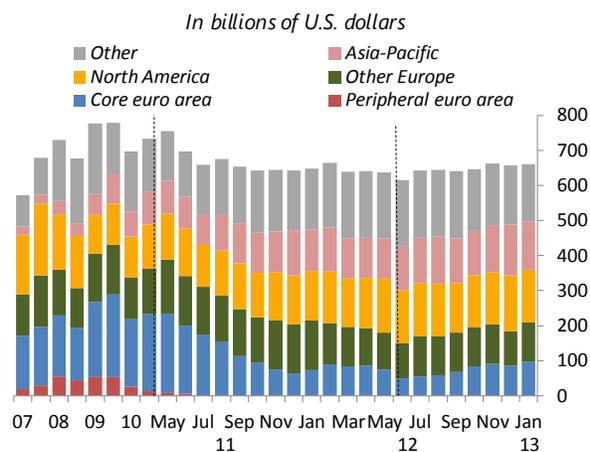
Sources: BIS; Bloomberg; and IMF staff calculations.
 Note: See notes to Chart 2. Offshore financial centers have been reclassified to their respective geographical regions.

Figure 9.5 Change in European Bank Foreign Claims, by Sector 2010Q4–2012Q4



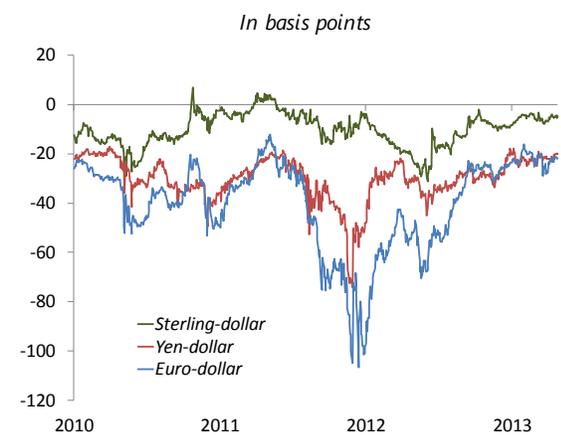
Sources: BIS; Bloomberg; and IMF staff calculations.
 Note: Data for advanced countries have been partially adjusted for changes in local exchange rates.

Figure 9.6 U.S. Prime Money Market Fund Exposures to Banks



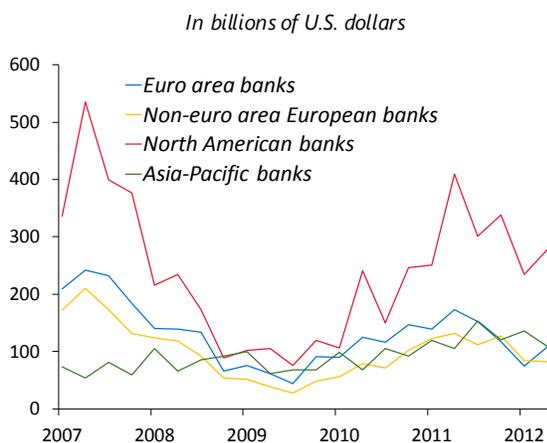
Sources: Fitch; and staff calculations.
 Note: Data are semi-annual to 2010H2, monthly from May 2011 onwards and include some estimates from July 2012 onwards.
 Peripheral euro area = Ireland, Italy, Portugal and Spain. Core euro area = Austria, Belgium, France, Germany and Netherlands.

Figure 9.7 One-Year Cross Currency Swap Spreads



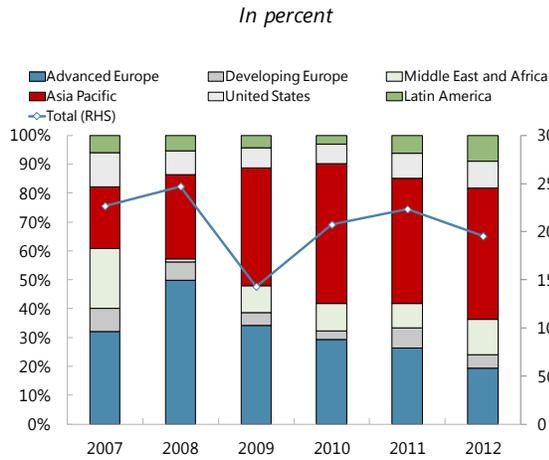
Source: Bloomberg LP.

Figure 9.8 Trade, Project, and Corporate Finance



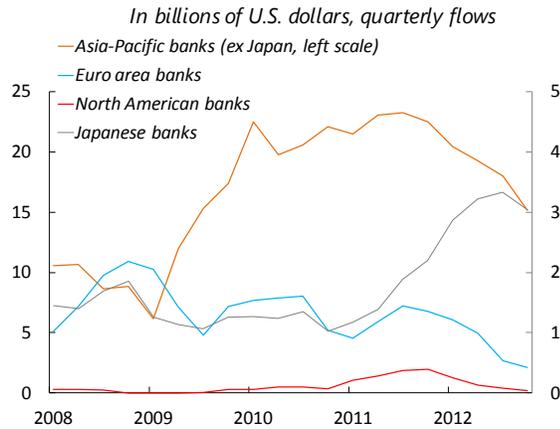
Sources: Dealogic; and IMF staff estimates.
 Note: Based on top 50 mandated lead arrangers' reports on their trade finance, project finance, and general corporate finance, among others. For deals with more than one lead arranger, equal amount of loans are assumed for each bank.

Figure 9.9 Global Project Finance



Sources: Dealogic; and Thompson One.

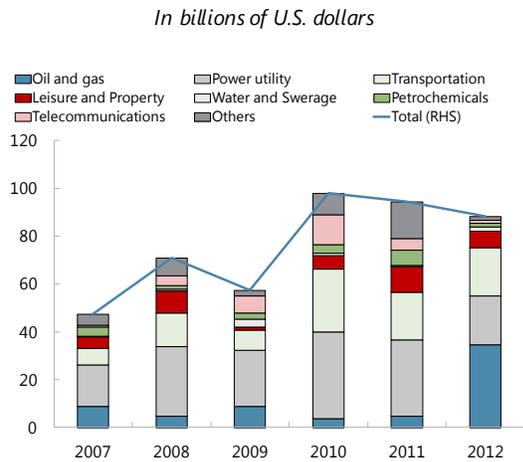
Figure 9.10 Asian Project Finance, by Region of the Lending Bank



Sources: Dealogic; and IMF staff estimates.

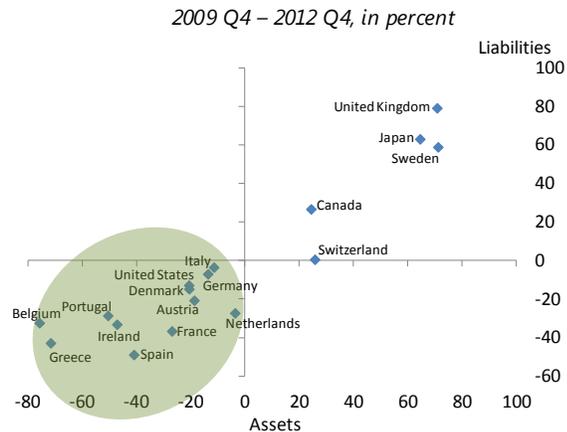
Note: Chart shows a four-quarter moving average. Based on the top 50 mandated lead arrangers' reports of trade finance, project finance and general corporate finance, among others. Loan amounts are distributed equally among participating banks. HSBC and Standard Chartered are classified as Asia-Pacific banks.

Figure 9.11 Project Finance in Asia, by Industry



Sources: Dealogic; and Thompson One.

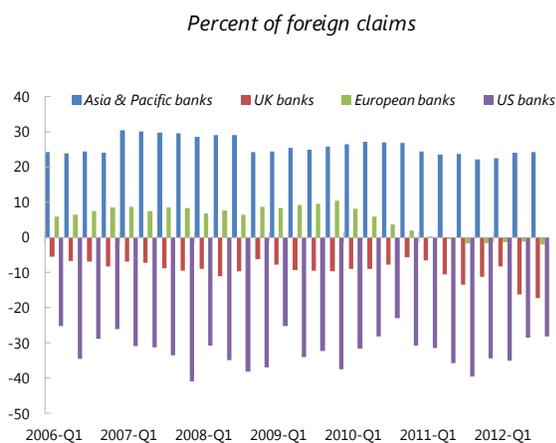
Figure 9.12 Change in Bank Cross-Border Intra-Group Exposures



Sources: Bank for International Settlements; and IMF staff estimates.

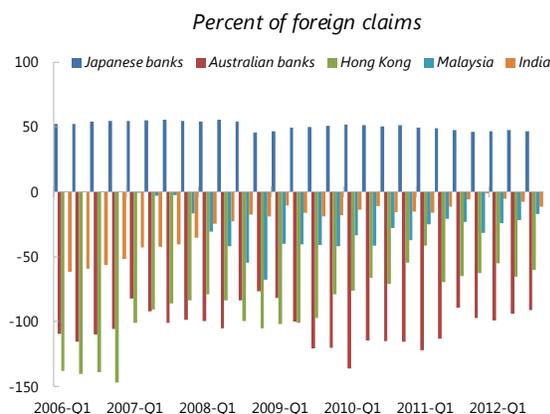
Note: The country is that of the parent bank. The chart shows exchange rate adjusted changes.

Figure 9.13 Bank Net Foreign Asset Position



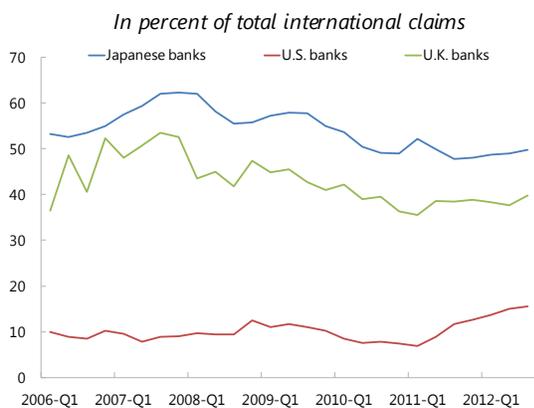
Sources: Bank for International Settlements; and IMF staff estimates.
 Note: Foreign claims minus foreign liabilities, excluding positions with related offices. European banks excludes U.K. banks.

Figure 9.14 Net Foreign Asset Position of Asian and Pacific Banks



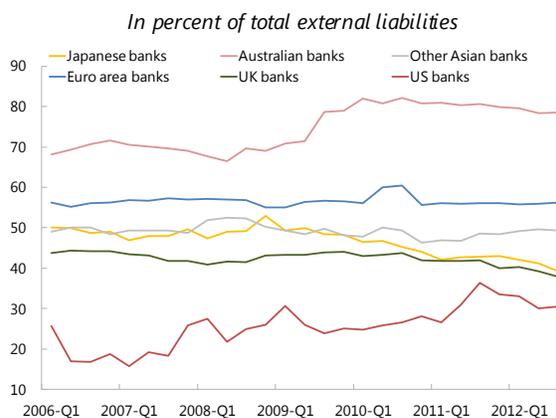
Sources: Bank for International Settlements; and IMF staff estimates.
 Note: Foreign claims minus foreign liabilities, excluding positions with related offices.

Figure 9.15 Long-Term International Claims to Developing Asia and Pacific



Sources: Bank for International Settlements (Table 9A)
 Note: Long-term international claims include international claims with maturities over 1 year. Developing Asia and Pacific excludes Hong Kong and Singapore

Figure 9.16 External Liabilities: Dependence on Wholesale Funding



Sources: Bank for International Settlements (Table 8B)
 Note: Wholesale funding includes CDs & other securities and liabilities to other banks. Liabilities to related foreign offices are excluded.

IV. MULTI-COUNTRY SCENARIOS

10. Effects of Sovereign Stress in Japan or the United States⁵⁸

1. **This note analyzes the global macroeconomic effects of sovereign debt market stress in Japan or the United States.** This analysis is based on scenarios simulated with the structural macroeconometric model of the world economy, disaggregated into thirty five national economies, documented in Vitek (2013).⁵⁹ Within this framework, each economy is represented by interconnected real, external, monetary, fiscal, and financial sectors. Spillovers are transmitted across economies via trade, financial, and commodity price linkages. Financial linkages are both direct, through cross-border debt and equity portfolio holdings, and indirect via international comovement in asset risk premia.

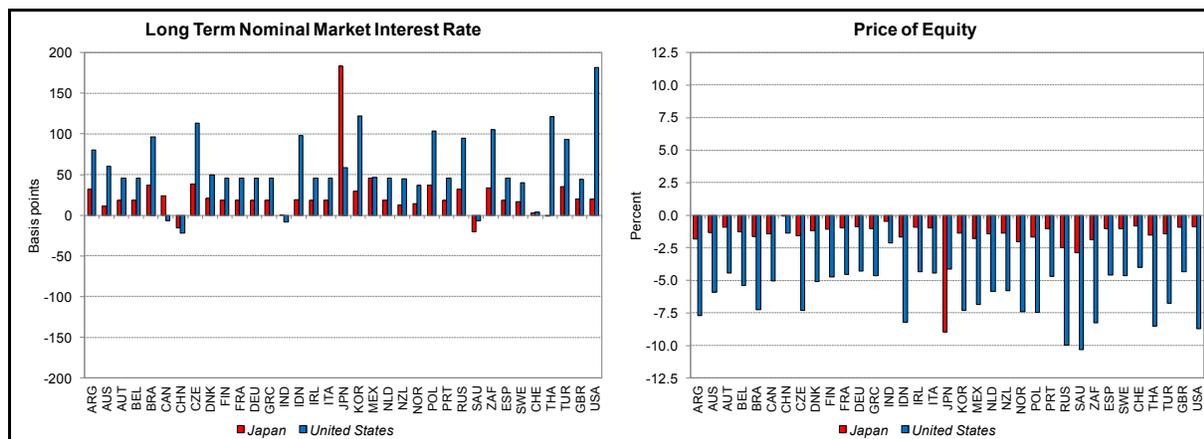
2. **Our scenarios posit a sudden loss of market confidence in sovereign debt sustainability in Japan or the United States in the medium term.** They represent this loss of confidence with an increase in the short-term government bond yield of 100 basis points, a rise in the long-term government bond yield of 200 basis points, and a fall in the price of equity of 10 percent, in the absence of conventional monetary policy responses and automatic fiscal stabilizers worldwide. These domestic financial market adjustments are phased out gradually according to a first order autoregressive process having a coefficient of 0.95, and are generated with internationally correlated sequences of temporary but persistent domestic credit, duration and equity risk premium shocks. We allow for conventional monetary policy responses worldwide to these inferred sequences of risk premium shocks. We also allow for the full operation of automatic fiscal stabilizers outside of Japan or the United States, where we assume a procyclical fiscal consolidation reaction which raises the primary fiscal balance ratio by 1.0 percentage point. This fiscal consolidation reaction is frontloaded and is 75 percent expenditure based. It is also phased out gradually according to a first order autoregressive process having a coefficient of 0.95, and is generated with sequences of temporary but persistent fiscal expenditure and revenue shocks.

3. **Under these scenarios, sovereign stress in the United States tightens global financial conditions substantially, while financial market spillovers from sovereign stress in Japan are moderate.** Financial conditions generally tighten the most in emerging economies with open capital accounts, followed by other advanced economies, and finally emerging economies with closed capital accounts, abstracting from policy responses. However, economies with high exposures and flexible exchange rate regimes significantly mitigate this tightening of financial conditions with policy responses, in particular contemporaneous and expected future nominal policy interest rate reductions.

⁵⁸ Prepared by Francis Vitek.

⁵⁹ Vitek, F. (2013), Policy analysis and forecasting in the world economy: A panel dynamic stochastic general equilibrium approach, *International Monetary Fund Working Paper*, forthcoming.

Simulated Global Financial Market Impacts



Note: Depicts simulated global financial market impacts allowing for feasible conventional monetary policy responses and automatic fiscal stabilizers.

23. **Our scenario simulation results indicate that sovereign stress in the United States generates very large output losses worldwide, whereas output spillovers from sovereign stress in Japan are moderate.** Indeed, sovereign stress in the United States reduces output growth there by 8.6 percentage points during the first year, by 3.3 to 5.8 percentage points in other advanced economies, by 3.5 to 6.8 percentage points in emerging economies with open capital accounts, and by 2.8 to 3.4 percentage points in emerging economies with closed capital accounts. In contrast, sovereign stress in Japan reduces output growth there by 6.4 percentage points, by 0.9 to 1.6 percentage points in other advanced economies, by 1.1 to 2.3 percentage points in emerging economies with open capital accounts, and by 0.9 to 2.1 percentage points in emerging economies with closed capital accounts. Aggregating these simulated output growth losses implies a world output growth loss of 5.0 percentage points for the United States and of 1.7 percentage points for Japan. The associated declines in the prices of energy and nonenergy commodities are 46.7 and 26.2 percent for the United States, versus 17.1 and 10.0 percent for Japan, respectively.

Simulated Initial Output Effects

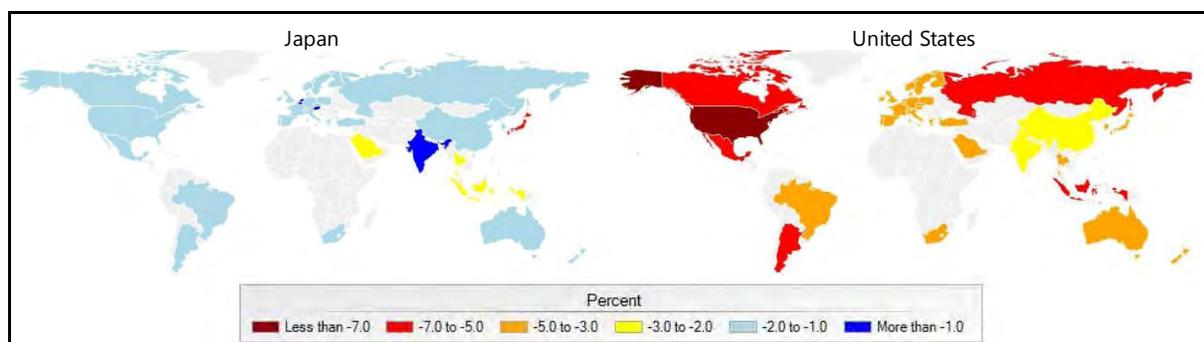
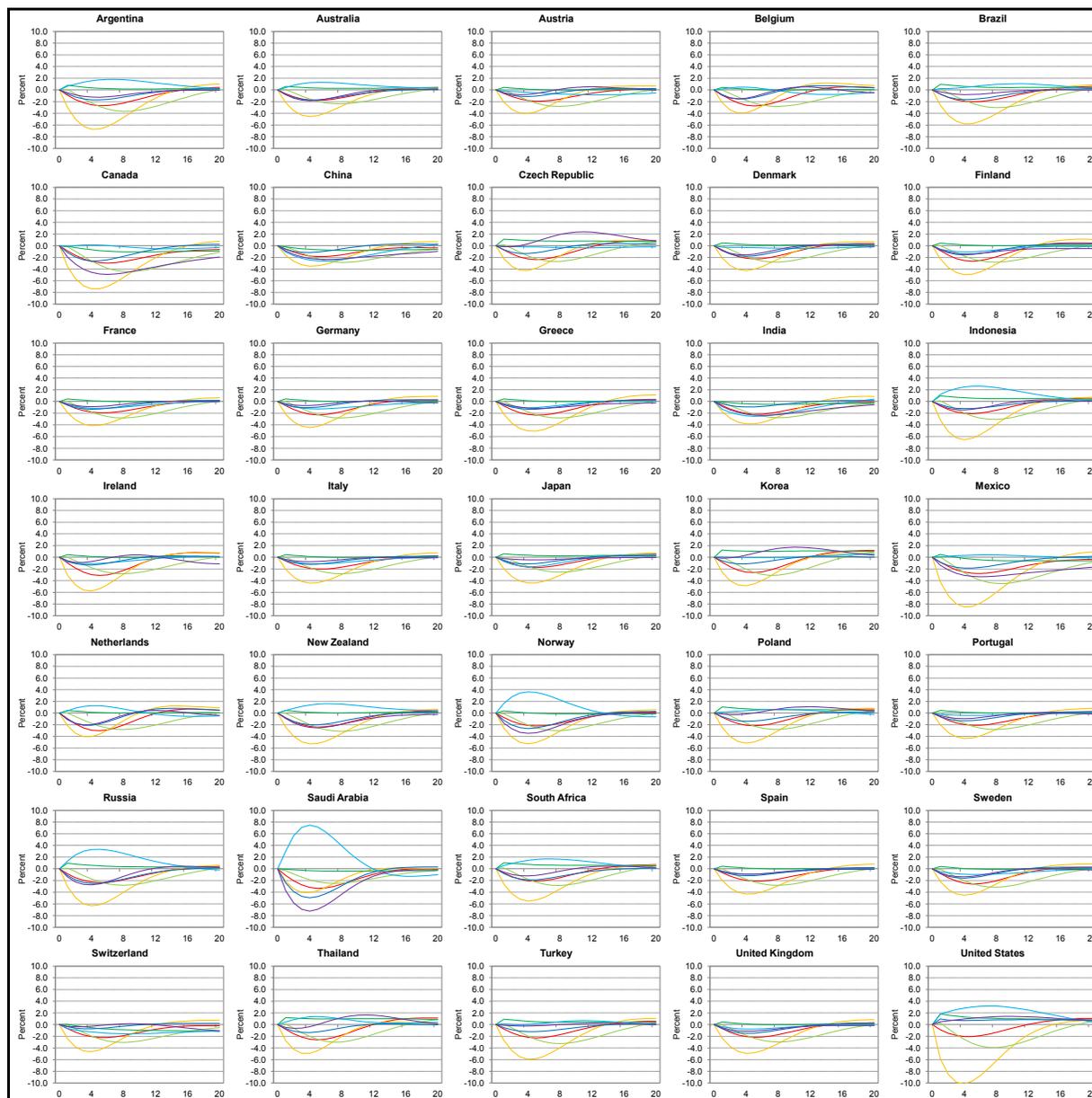


Figure 10.1 Simulation Results, Sovereign Stress in Japan



Note: Depicts the simulated paths of consumption price inflation ■, output ■, the short-term nominal market interest rate ■, the long-term nominal market interest rate ■, the real effective exchange rate ■, the fiscal balance ratio ■, and the current account balance ratio ■, expressed as deviations from baseline in percent or percentage points.

Figure 10.2 Simulation Results, Sovereign Stress in the United States



Note: Depicts the simulated paths of consumption price inflation ■, output ■, the short-term nominal market interest rate ■, the long-term nominal market interest rate ■, the real effective exchange rate ■, the fiscal balance ratio ■, and the current account balance ratio ■, expressed as deviations from baseline in percent or percentage points.

11. Combined Rebalancing Scenario⁶⁰

This scenario combines the rebalancing scenarios for the United States, the United Kingdom, the euro area, Japan, and China. For all scenarios except Japan, the rebalancing scenarios are identical to the individual ones done for each country/region. However, for Japan, because the rebalancing scenario had some components that were in the Japan WEO baseline, only those layers of the scenario not in the baseline are included here.

The United States

- The scenario consists of near-term fiscal expansion followed by medium-term consolidation and a temporary increase in private savings to capture the transitory impact from entitlement reform.

The United Kingdom

- The scenario consists of some near-term unconventional monetary easing and temporary fiscal stimulus via public investment along with reforms to immigration that increase labor supply and reforms to education that raise productivity.

The Euro Area

- The scenario embodies a reduction in sovereign and corporate risk premium owing to a reduction in financial fragmentation following ECB policy action and progress on banking union. Product market reforms are implemented in core countries that raise productivity alongside product and labor market reforms that raise productivity in the periphery. In addition, the fiscal dividend from the resulting higher growth in the periphery allows for a temporarily easier fiscal stance. Further reforms in Germany raise private investment and the Netherlands implements some temporary fiscal stimulus.

Japan

- The scenario consists of fiscal consolidation and structural reforms.

China

- The scenario consists of fiscal reforms that reduce both public and private savings, financial sector reforms that remove subsidies and distortions in the cost of capital, structural reforms that raise productivity beyond the WEO horizon, and reductions in risk premium as the reforms put China on a sustainable growth path and thus avoid a crisis beyond the WEO horizon.

⁶⁰ Prepared by Ben Hunt, Rene Lalonde, and Susanna Mursula (all RES), and the S5 country teams. Based on simulations with the Flexible System of Global Models (FSGM): G20MOD and EUROMOD.

The Impact

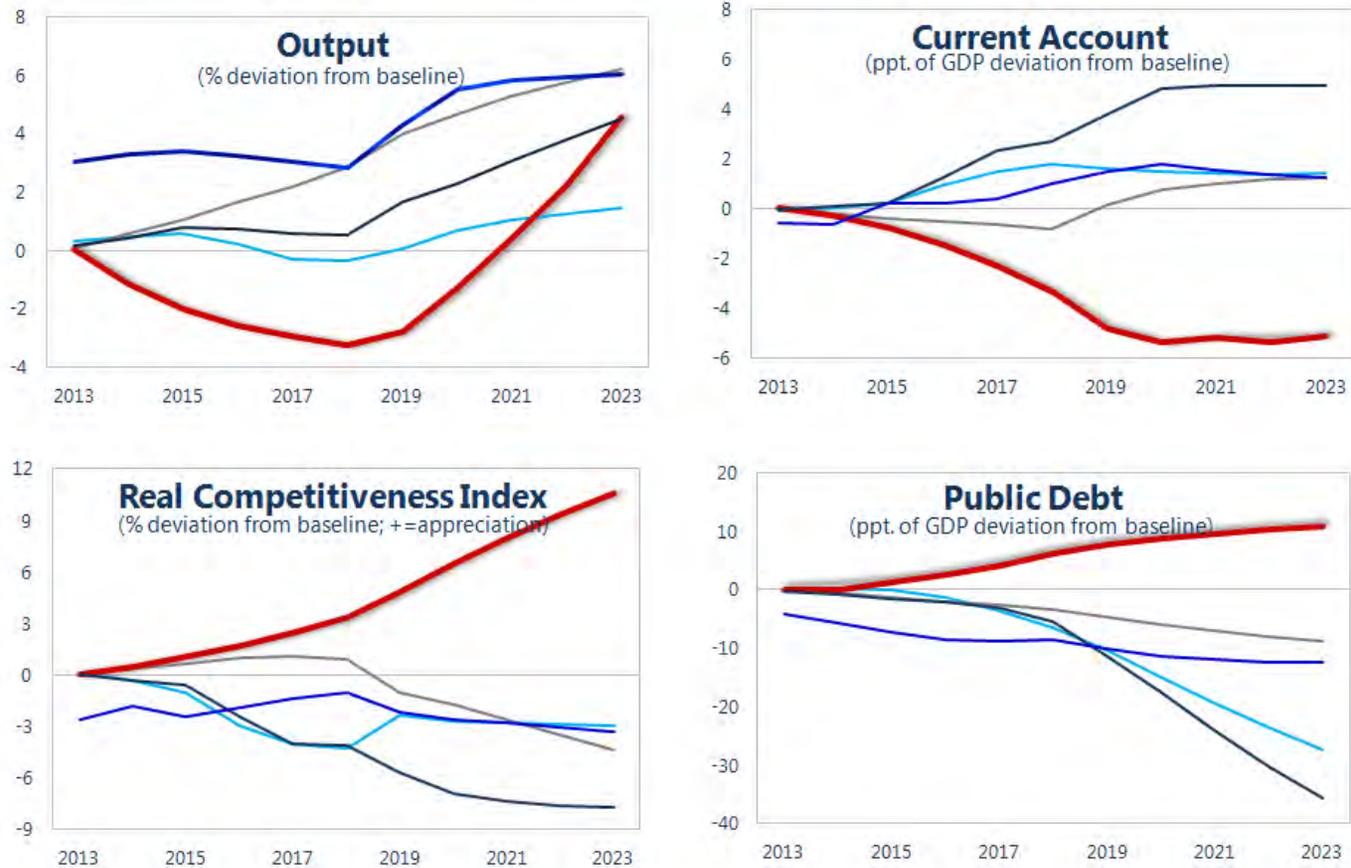
- For all countries implementing reforms except China, GDP rises modestly in the near-term owing to increased productivity, declines in real interest rates, and temporary fiscal stimulus. In China the reforms are designed to achieve but higher-quality, but lower growth which the positive spillovers from reforms in other regions are not sufficient to offset. The spillovers over the WEO horizon for countries not implementing reforms, are modest, but positive. Higher exports to reforming countries and stronger investment owing to declines in the cost of capital (real corporate interest rates) are the key drivers.⁶¹ Beyond the WEO horizon the benefits from reform grow larger in both reforming and non-reforming countries. This reflects continued adjustment to higher productivity and reductions in real corporate interest rates. In part the decline in real interest rates arises from the decline in demand for savings in the United States and Japan more than offsetting the effect of the increased demand for savings owing to higher productivity growth and the decline in public and private savings China. In addition, real interest rates decline because of the crisis that is avoided by the reforms that put China on a sustainable growth path.

Combined Spillover Scenarios: Contributions to World Growth							
<i>(percentage point deviation from baseline)</i>							
	Total World growth	Contribution to world growth					Rest of the World
		USA	Euro Area	China	Japan	United Kingdom	
2013	0.18	0.06	0.01	0.01	0.01	0.08	0.01
2014	0.01	0.03	0.07	-0.21	0.02	0.01	0.09
2015	0.01	0.02	0.06	-0.15	0.02	0.00	0.07
2016	-0.12	-0.07	0.08	-0.10	0.00	0.00	-0.02
2017	-0.11	-0.10	0.06	-0.07	-0.01	-0.01	0.02
2018	0.04	-0.01	0.08	-0.06	0.00	0.00	0.04
2019	0.66	0.08	0.13	0.09	0.05	0.03	0.27
2020	0.75	0.11	0.08	0.30	0.03	0.03	0.21
2021	0.60	0.07	0.07	0.34	0.04	0.01	0.09
2022	0.49	0.03	0.05	0.36	0.03	0.00	0.00
2023	0.58	0.04	0.05	0.45	0.03	0.00	-0.01
Total	3.1	0.3	0.7	1.0	0.2	0.1	0.8

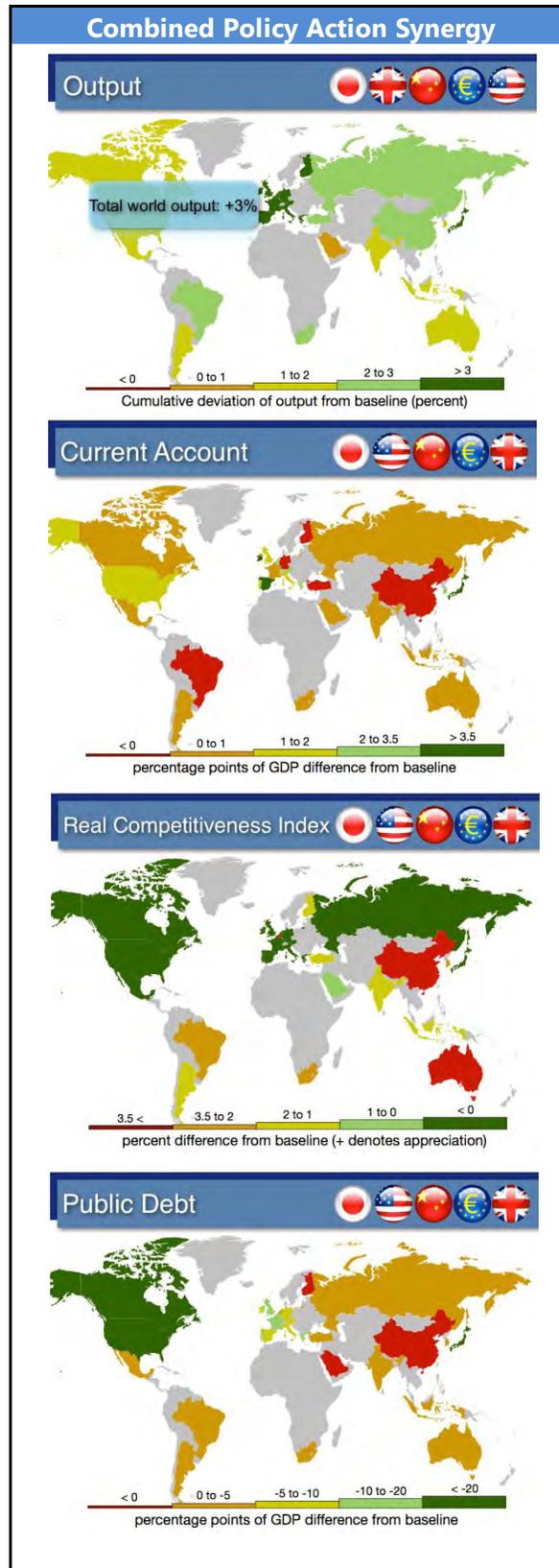
⁶¹ The exceptions are Sweden and Switzerland where the real corporate interest rate initially rises which suppresses investment.

Total: Rebalancing Scenario¹

China **Japan** **Euro Area** **United States** **United Kingdom**



¹ Assuming the implementation of policy actions by the S5.

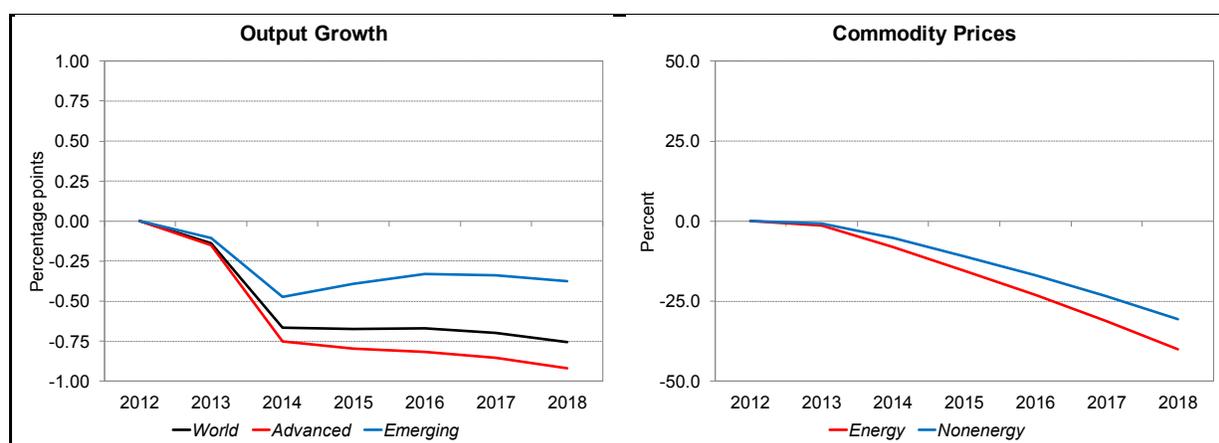


12. Effects of a Protracted Slowdown in the Systemic Economies⁶²

This note analyzes the global macroeconomic effects of protracted slowdowns in the systemic economies. This analysis is based on scenarios simulated with the structural macroeconomic model of the world economy, disaggregated into thirty five national economies, documented in Vitek (2013).⁶³ Within this framework, each economy is represented by interconnected real, external, monetary, fiscal, and financial sectors. Spillovers are transmitted across economies via trade, financial, and commodity price linkages. Financial linkages are both direct, through cross-border debt and equity portfolio holdings, and indirect via international comovement in asset risk premia.

1. **Our scenario generates protracted slowdowns in the systemic economies with reductions in private domestic demand growth.** In particular, we subject these economies to sequences of temporary but persistent negative intertemporal substitution shocks which reduce domestic demand growth by x percentage points over the period 2013Q3 through 2018Q4, respectively. These negative intertemporal substitution shocks delay private consumption and investment expenditures, and may be motivated by balance sheet deleveraging. The value of x is calibrated to reduce the price of energy commodities by 30.0 percent by 2018. In addition, we subject these economies to sequences of temporary but persistent positive equity risk premium shocks which reduce domestic demand growth by y percentage points over the period under consideration. These positive equity risk premium shocks raise the cost of financing private consumption and investment expenditures, and may be motivated by uncertainty induced stock market overshooting. The value of y is calibrated to reduce the price of energy commodities by 10.0 percent by 2018. We assume that monetary policy responses are constrained by the zero lower bound on the nominal policy interest rate in the Czech Republic, Denmark, the euro area, Japan, Saudi Arabia, Switzerland, the United Kingdom, and the United States.

Simulation Results

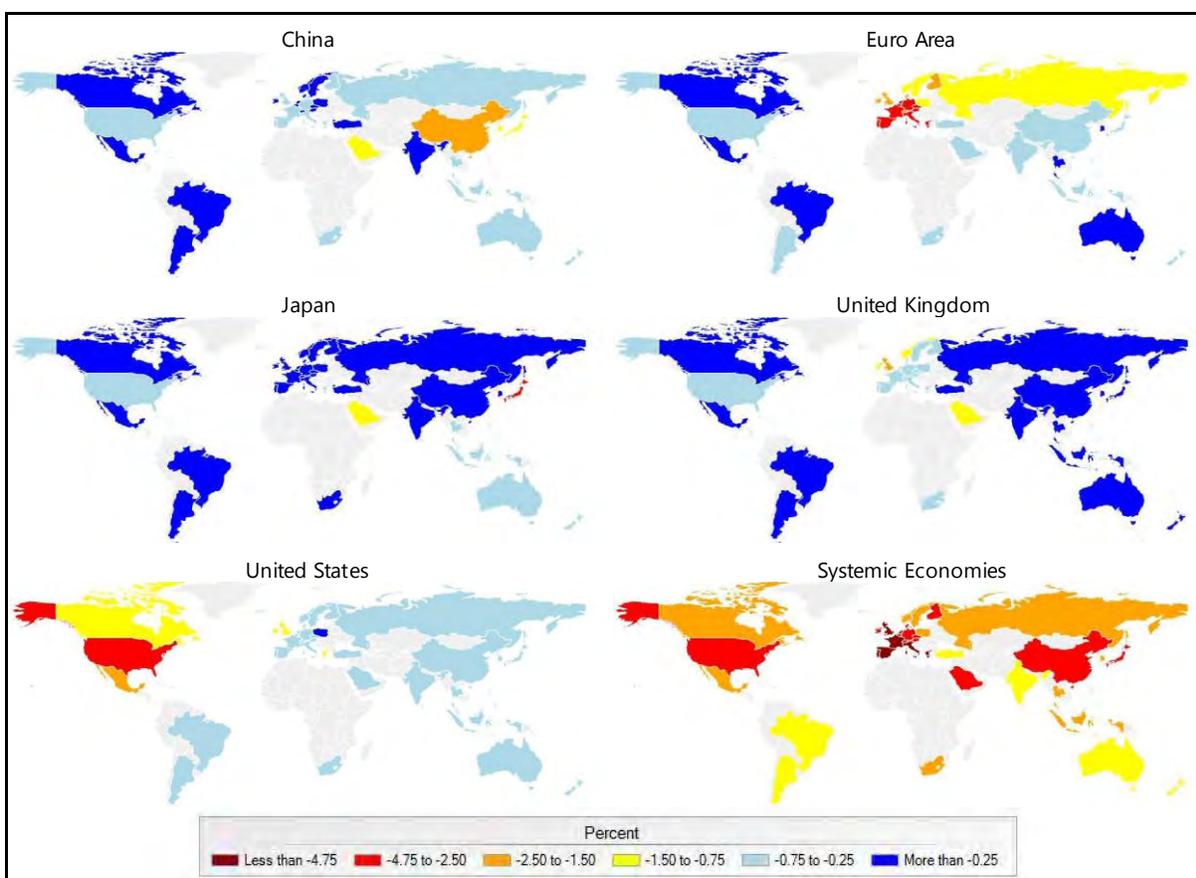


⁶² Prepared by Francis Vitek (SPR).

⁶³ Vitek, F. (2013), Policy analysis and forecasting in the world economy: A panel dynamic stochastic general equilibrium approach, *International Monetary Fund Working Paper*, forthcoming.

2. **Under this scenario, large output losses in the systemic economies, concentrated in relatively closed economies, are accompanied by moderate output losses in the rest of the world, concentrated in economies with high export exposures.** Simulated cumulative output losses are 2.7 percent for China, 4.6 percent for the euro area, 4.6 percent for Japan, 5.1 percent for the United Kingdom, and 4.5 percent for the United States by 2018. In the rest of the world, simulated cumulative output losses range from 1.3 to 3.7 percent in other advanced economies, and from 1.0 to 4.0 percent in emerging economies. Aggregating these simulated cumulative output losses implies a cumulative world output loss of 3.7 percent. The associated decline in the price of energy commodities is 40.0 percent, while that for the price of nonenergy commodities is 30.6 percent.

Simulated Cumulative output effects



3. **This scenario also results in significant increases in government debt ratios. Simulated cumulative government debt ratio increases are 3.0 percentage points for China, 5.1 percentage points for the euro area, 7.3 percentage points for Japan, 5.3 percentage points for the United Kingdom, and 4.5 percentage points for the United States by 2018.** In the rest of the world, simulated cumulative government debt ratio increases range from 1.7 to 4.0 percentage points in other advanced economies, and from 1.1 to 8.3 percentage points in emerging economies.

Simulated Cumulative Net Government Debt Ratio Effects

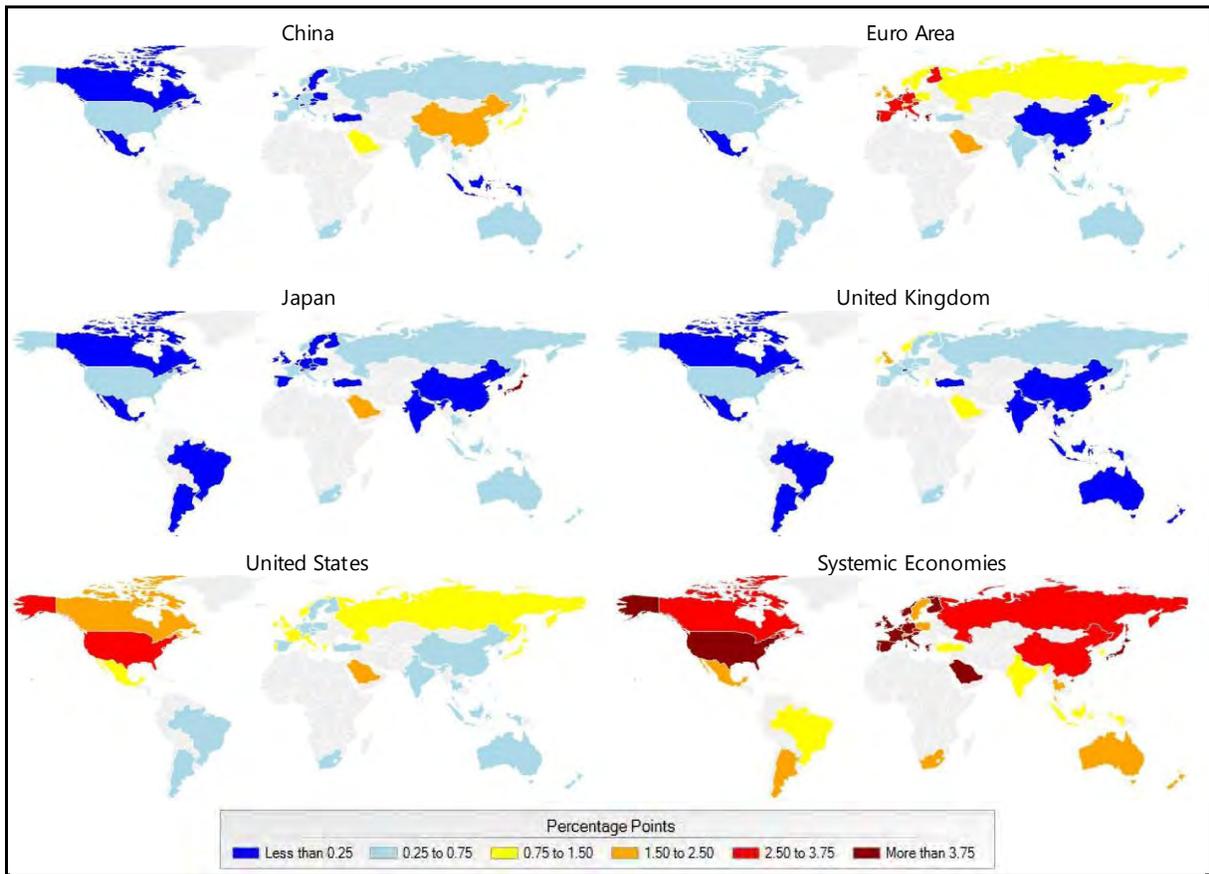
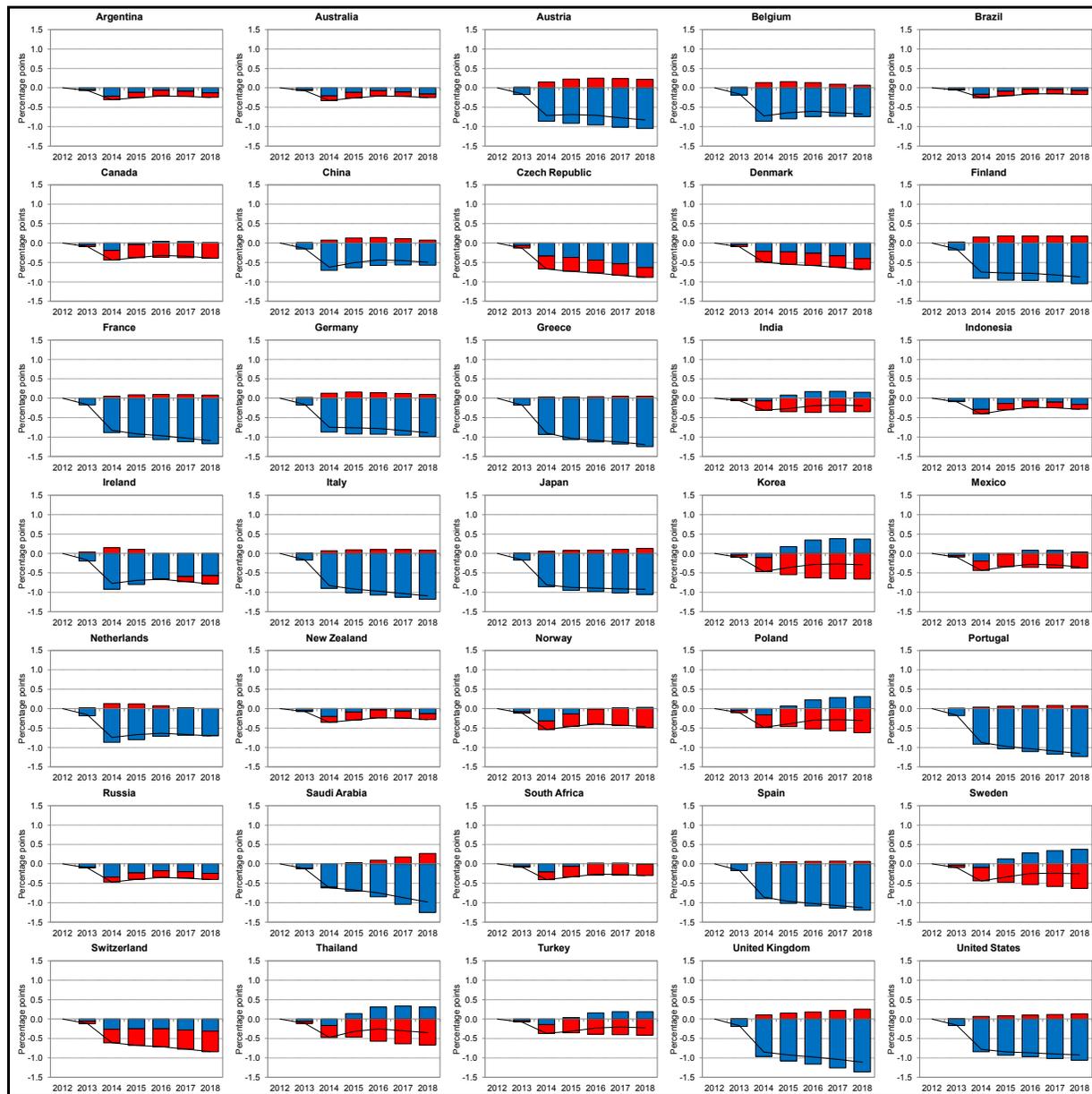


Figure 12.1 Simulated Output Growth Paths, Systemic Economies



Note: Decomposes the simulated path of output growth into contributions from domestic demand ■ and net exports ■.

COUNTRY-SPECIFIC STUDIES

V. SPILLOVERS FROM CHINA

13. China Rebalancing Scenario⁶⁴

The simulations compare a baseline scenario where China hangs onto to the investment-driven growth for too long versus a reform scenario where the authorities implement a package of reforms to rebalance growth in China. The package of reform includes financial sector reform, deregulation of the service sector, further improving social insurance, reforms to the fiscal framework, raising factor pricing, continuing SOE reform, and greater exchange rate flexibility. Overall, the simulation results show that accelerating reforms to rebalance growth in China toward private consumption and away from investment and net exports will entail longer-term benefits for China, but slower growth in the short-term. For the rest of the world, slower growth in China in the short run will have negative spillovers, but as payoffs from reforms in China take hold they will also benefit the rest of the world.

Rebalancing growth in China

1. **A package of reforms is needed to shift China's economy decisively toward a more service-oriented, consumer-based economy.** This will not be easy as the reforms, elaborated below, may have short-run adjustment costs and entail moving to a slower but more sustainable growth path. However, delay is not a viable option as it would just lead to increasing crisis risks and higher costs down the road. This risk is likely to materialize in the baseline, sometime beyond the WEO horizon.

The package of reforms includes:

- **Financial sector reform** will yield significant economic benefits by improving the allocation of financing, especially to the more dynamic private sector; supporting domestic rebalancing by boosting household capital income while discouraging investment in low-yielding projects; and facilitating progress in other areas, such as capital account liberalization and reforms to the state-owned enterprise sector. In the rapidly changing financial environment, these reforms have become increasingly urgent to contain financial sector risks and help safeguard macroeconomic stability.
- **Service sector deregulation.** Widening labor market opportunities and raising household disposable income will require dismantling barriers to entry across many sectors. Encouraging

⁶⁴ Prepared by the China team.

the entry of new firms and improving contestability will substantially raise overall productivity and incomes.⁶⁵

- **Social security.** Reductions in precautionary saving will require further action on multiple fronts. On pensions, the complexity of rules and regulations covering the multiple national, provincial, private and public pension programs can be simplified to encourage greater participation in pension schemes covering all categories of worker – urban, rural, and migrant. Regarding health care, further reductions in out-of-pocket expenses can be achieved through lower co-pays on medical procedures and drugs and more comprehensive insurance coverage for catastrophic and chronic conditions.
- **Social contributions.** Social contribution rates often exceed 40 percent of wages, which lowers household disposable income and raises the cost of labor. The high marginal contribution rates should be lowered, with the lost revenue replaced by budget transfers and thus using more efficient revenue sources, such as less regressive income taxes, SOE dividends, or VAT. General budget resources and asset transfers (such as SOE shares) are better means than payroll contributions to cover the substantial legacy costs resulting from the change in the pension regime.
- **Factor price reform.** Raising input costs closer to levels in comparator economies and aligning the cost of capital with its high return would reduce the excess rents earned by firms, limit investment, and move it toward domestically oriented sectors.
- **Exchange rate policy.** Allowing exchange rate flexibility should lead to appreciation over the medium term and will facilitate resource relocation into domestically-oriented sectors.

2. **While progress has been made on many of these fronts, the reform process needs to be accelerated, especially as implementation will take time.** Looming demographic changes and the build-up of risks in the financial sector, local governments, and real estate market all point to the urgency of rapid progress in transforming the growth model.

Nature of the Exercise

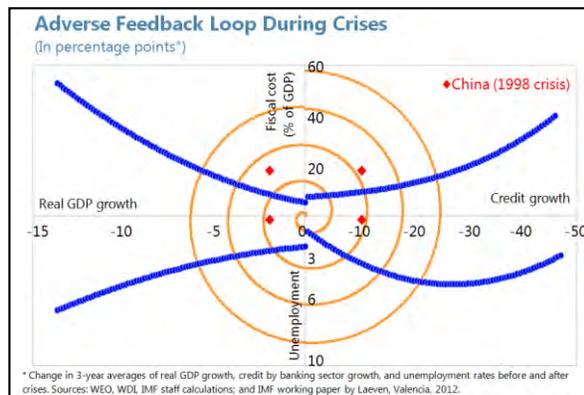
In the model, the **reform scenario** contains the following elements:

- The first element consists of fiscal reforms that lead to a reduction in public as well as private savings. The reform consists of an increase in public spending on healthcare of 1.7 percent of GDP, pension reforms that imply an increase in transfers to households of roughly 3 percent of GDP. The increase in public expenditure is assumed to be financed 50 percent from debt and 50 percent from an increase in corporate taxes. The combined impact is a reduction in private savings of about 4 percent of GDP after 5 years.

⁶⁵ Ahuja, A., 2012, "De-monopolization Toward Long-Term Prosperity in China," IMF Working Paper No. 12/75 (Washington: International Monetary Fund).

- The second element consists of reforms that remove subsidies and distortions that are implicitly lowering the cost of capital and contributing currently to overinvestment. These reforms are proxied by raising the corporate risk premium by 50 basis points and temporarily raising the depreciation rate on the capital stock to capture the exit of firms that would no longer be profitable.
- The third element consists of product market reforms and relies on OECD estimates of the impact on productivity in the tradable and non-tradable sectors of moving toward best practice. It is assumed that the product market reforms implemented here close roughly 100 percent of the best-practice gap but the benefits don't start to materialize until 2019.
- The fourth element consists of a reduction of 200 basis points in China's sovereign risk premium, 150 basis point in China's corporate risk premium, 100 basis point reduction in sovereign risk premium elsewhere, and 50 basis point in corporate risk premium elsewhere. These risk premium reductions are relative to the crisis scenario that would materialize should China not shift to a sustainable growth path.

- The **baseline scenario** assumes incomplete rebalancing or failure to successfully rebalance China's growth. Over the first 5 years, the baseline scenario is the WEO. Beyond the WEO horizon, the baseline scenario assumes investment continues to outstrip both external and domestic demand, leading to a further build-up of excess capacity and increased misallocation of resources. With demographics trends implying a decline in the labor force after



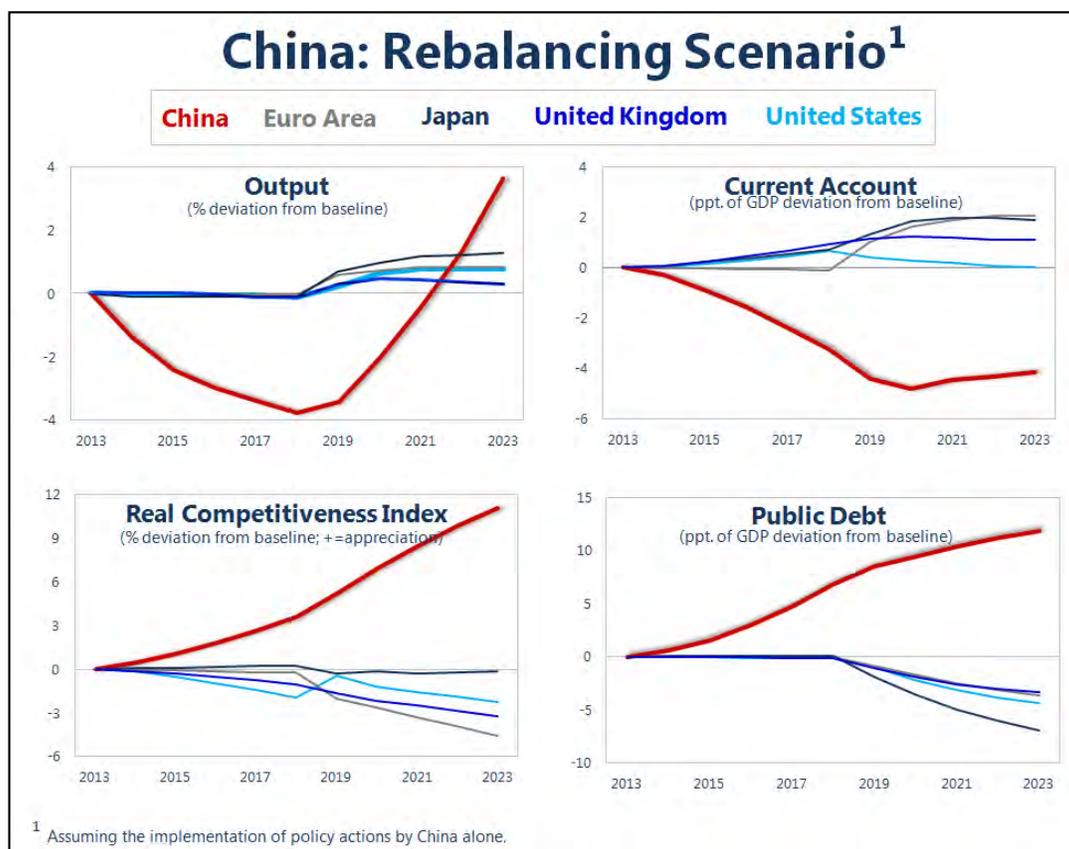
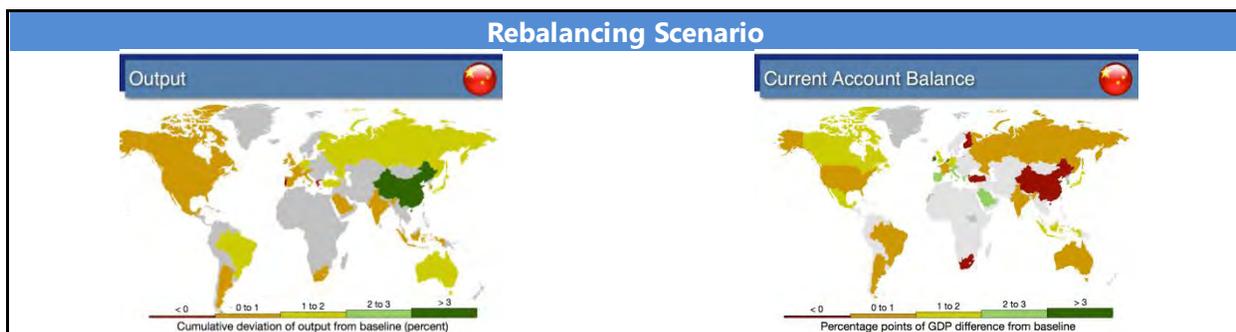
2015 and exhaustion of the surplus labor around 2020, the returns on investment would be much lower than envisaged, which would cause bankruptcies and large financial losses. Such financial losses would in turn hamper employment and growth. China's own and other countries' experience with financial crisis have shown that the costs to the real and financial sectors could be large (see text chart). The economy could be stuck in the middle income trap.

Simulation results

3. **Simulation results indicate that accelerating reform in China would lower China's growth by about ½ to 1 percentage point lower than the WEO baseline over the short- to medium-term (3-5 years), but improve the composition of growth with stronger private consumption growth (and as a share of GDP) and weaker growth in investment and exports.** China's current account surplus would fall by about 3 percent of GDP in the medium term. Over the longer term, reforms will help maintain annual growth roughly 2 percentage points higher than it would be in the baseline (which is unsustainable and ends in a crisis). Growth in investment and exports rebound sharply while consumption continues to grow relative to the baseline. After ten

years, the current account as a share of GDP stabilizes roughly 4 percentage points below baseline and the exchange rate has appreciated by roughly 10 percent.

4. **In the short to medium term, the spillovers to most countries are generally negative, but small.** The negative spillovers materialize primarily through higher global real interest rates as a result of lower public and private savings in China. In most countries, the decline in private investment that results from a higher cost of capital more than offsets the strengthening in exports caused by improved competitiveness relative to China. However, large creditor countries benefit from the small increase in global real interest rates. Once the benefits of the reform start to flow through in China, the impact becomes positive for all countries as increased Chinese demand further stimulates exports and declines in risk premium spur investment.



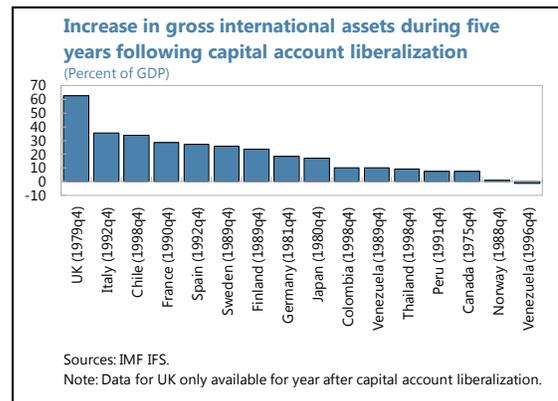
14. Capital Account Liberalization in China⁶⁶

China's 12th Five-Year Plan pledges to make the renminbi fully convertible. This renews a similar pledge—for full convertibility by 2000—that was made in 1993 but whose implementation had to be delayed after the Asian financial crisis. This note investigates how capital flows might respond were China to liberalize its capital account. It looks into historical episodes of capital account liberalization in advanced and large emerging markets since the 1970s and empirically estimates a portfolio allocation model. Historical episodes of liberalization were generally followed by large gross flows but the direction of net flows depended on country-specific and global factors. The portfolio allocation model suggests that the domestic savings that currently support large domestic financial markets could generate substantial net outflows as Chinese investors diversify their portfolios.

Historical episodes of capital account liberalization

1. **Kaminsky and Schmukler (2003) have compiled a database that dates full or partial capital account and financial sector liberalization.** These dates are used to compare changes in portfolio and other investment capital flows (in percent of GDP) before and after liberalization.

2. **Following liberalization, gross capital flows generally increased substantially.** For example, capital account liberalization was followed by a buildup of gross international assets over the subsequent five years of some 60 percent of GDP in the United Kingdom (1979) and about half that amount in Chile (1992) and Italy (1992).



3. **The direction of net capital flows after liberalization, however, depended on many factors.** For example, capital account liberalization was initially followed by net portfolio and other investment outflows in Sweden, Finland, and Spain, but inflows in Denmark, Chile, and Colombia. Prasad and Rajan (2008) point to a series of nonlinearities and threshold effects that make predictions about the eventual impact of capital account liberalization difficult.

4. **Four factors are among those that could determine net flows: the domestic and global business cycle, financial sector reform, and growth prospects.**^{67,68} Since data on both business

⁶⁶ Prepared by Franziska Ohnsorge (SPR).

⁶⁷ For each country a bilateral trade-weighted average real GDP growth of 12 of the largest economies (the United States, Japan, the United Kingdom, Germany, France, Italy, Canada, Norway, Sweden, Finland, Spain, Korea, and Argentina—countries for which a continuous times series is available since the 1970s) is defined as “world” growth.

⁶⁸ Business cycle peaks and troughs at least four quarters apart are identified as in Harding and Pagan (2002). A positive business cycle variable indicates the share of quarters since the last business cycle *trough* in the total number

(continued)

cycles and capital flows is only available for some 16-21 countries, regression estimation is of doubtful value. However, Figure 1 suggests a few correlations with the change in capital flows (in percent of GDP) between the last year before and the first year after liberalization.

- **Domestic business cycle:** Typically, the more advanced a domestic upswing, the greater the net outflows⁶⁹. This may have reflected residents seeking to diversify their domestic financial assets in upswings and borrowing in downswings.
- **Growth prospects:** Net inflows increased more in countries with higher growth prospects.
- **World business cycle:** A more advanced upswing in the *world* business cycle typically increased net portfolio inflows. This may reflect inflows from nonresidents seeking to diversify their securities exposures when the global business growth is buoyant and investor sentiment sanguine.
- **Financial sector liberalization:** In general, the more recent the elimination of financial repression, the greater net outflows in portfolio investment tended to be. In contrast, in Japan and the United States, where capital account liberalization preceded financial sector liberalization, net inflows were negligible after capital account liberalization.

Empirical estimates of portfolio allocation model

24. **The baseline regression equation is a multi-country version of that used in Forbes (2010) for the United States alone.** It regresses the share of country A's total portfolio investment invested in country B on several measure of cost of cross-border investment. The dependent variable is defined as the bilateral portfolio asset exposure (equity and debt separately) as reported in the IMF's CPIS database as a share of the source country's total securities portfolio.⁷⁰ The total securities portfolio consists of domestic stock market capitalization or outstanding domestic debt securities as reported in the World Bank's Global Financial Development Database (GFDD) plus the source country's net international equity or bond assets. An FGLS estimation is used to account for persistence in the dependent variable that is defined as a stock variable—and hence likely autocorrelation in the error term—and heteroskedasticity in the variance across country pairs. Data availability constrains the sample period to 2005-10.

25. **The cost of investing in any country depend on the depth and size of financial markets, on capital controls, on information asymmetries, and return differentials and correlations:**

of quarters between the last trough and next peak. A negative business cycle variable indicates the share of quarters since the last business cycle *peak* in the total number of quarters between the last peak and next trough.

⁶⁹ In contrast, the relationship between net inflows and the domestic business cycle seems to be nonlinear. There have been net outflows both when the domestic business cycle emerged from a trough and when it had reached a peak.

⁷⁰ Unfortunately, China does not report CPIS data.

- **Financial market size:** A larger financial market is likely to be a more liquid one and hence reduce the cost of investing. For regressions on equity assets, stock market capitalization and, for regressions on bond assets, outstanding domestic public and private debt securities are used, both in percent of GDP and from the GFDD database.
- **Capital controls:** Capital controls (measured as in Schindler, 2009) can raise the cost of investing cross-border both for residents and nonresidents.
- **Information asymmetries:** Already existing trade or other non-financial ties and greater proximity are likely to reduce information asymmetries and the cost of investment between any country pair. Existing nonfinancial ties are proxied by bilateral trade (exports and imports) in percent of GDP using data from the IMF's DOTS database and geodesic distances (Mayer and Zignano, 2011).
- **Return differentials:** A greater relative return in the host market makes portfolio investment in the host country more attractive. The annual average of monthly stock market returns for the stock market index with the broadest coverage in 59 countries in the sample and the annual average 5-year sovereign bond yield for 37 countries are used, both based on Bloomberg data.
- **Return correlations:** Risk diversification is a key motivation for cross-border investment. Hence the bilateral correlation coefficient in monthly stock market returns or sovereign bond yields over the past three years is added as a control.
- **Governance:** Better governance increases the transparency of investment and thus may reduce investment cost. Governance is proxied by the first standardized principle component of indicators of control of corruption, rule of law, and regulatory quality, all available from the World Bank's World Governance Indicators database.

26. **Table 14.1. shows the baseline FGLS regression results for equities in columns I-II and for bonds in column III-IV.**⁷¹ Capital controls, both in the source and the destination country, significantly reduce cross-border portfolio exposures. In general, equity exposures appear less sensitive to capital controls than bond exposures and less sensitive to destination country controls than source country controls.

27. **As expected, the results confirm that international investors seek exposure to deeper financial markets and higher returns.** First, for both asset classes, larger domestic financial markets discourage domestic investors from investing abroad.⁷² Second, higher returns in the destination

⁷¹ A standard goodness of fit measure is not readily available for an FGLS regression. As a proxy, the correlation between the predicted and the actual values of the dependent variable is 17 percent for the regression in column I of Table 14.1. and 14 percent for the regression in column III of Table 14.1.

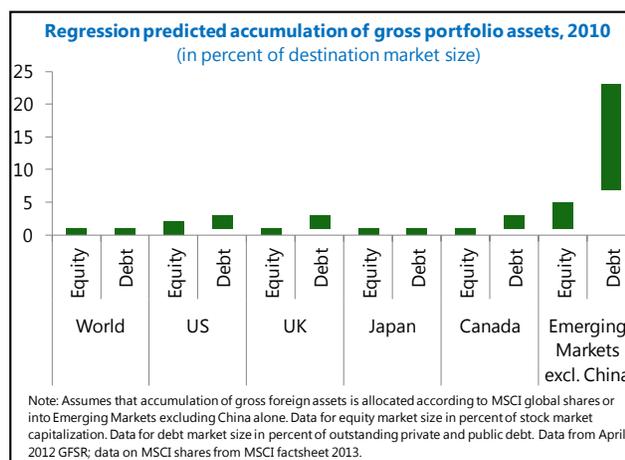
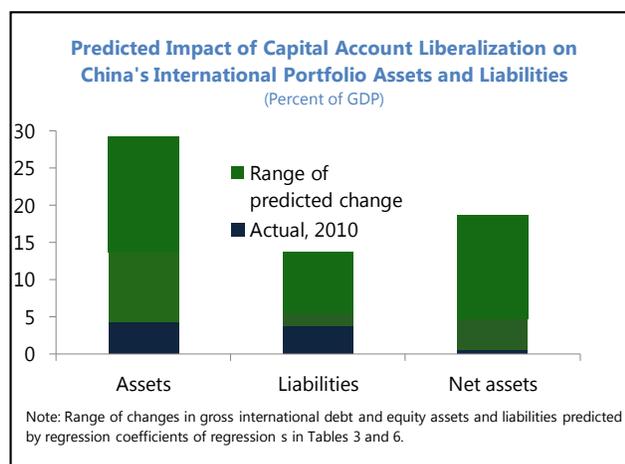
⁷² The counter-intuitive sign on destination market size in Columns III and IV reflects Japan and the United Kingdom: Japan—despite being the second largest bond market in the world—accounts for only half the average share of global bond holdings; the United Kingdom—with a bond market one-eighth the size of Japan's—on average accounts for four times the average share of bond holdings. If either of these two countries is removed from the sample, the sign reverses to the expected positive sign and is significant.

country (and, for bonds, lower returns at home) also encourage greater exposures of domestic investors in foreign markets. The correlation in bond yields has significantly the opposite of the expected sign, but removing either Japan (a mostly domestic market) or the United Kingdom (a very international market) from the sample yields a significant coefficient estimate with the expected sign. The other control variables have the expected signs: cross-border portfolio exposures are greater if home and host country have better governance and if there are greater other bilateral ties (greater trade and proximity). In general, bond exposures are more responsive than equity exposures to returns, source country financial market depth, destination country governance, and other bilateral ties.

28. **The results are broadly robust to alternative specifications.** Robustness tests included the elimination of any one source or destination country, the use of aggregate portfolio assets (bonds plus equity), an expanded sample including countries without liquid bond and equity markets, and alternative measures of capital controls (Chinn and Ito, 2008).

29. **Based on the estimated regression coefficients, one can speculate about the possible impact of capital account liberalization on portfolio asset allocations for any given macroeconomic environment.** The

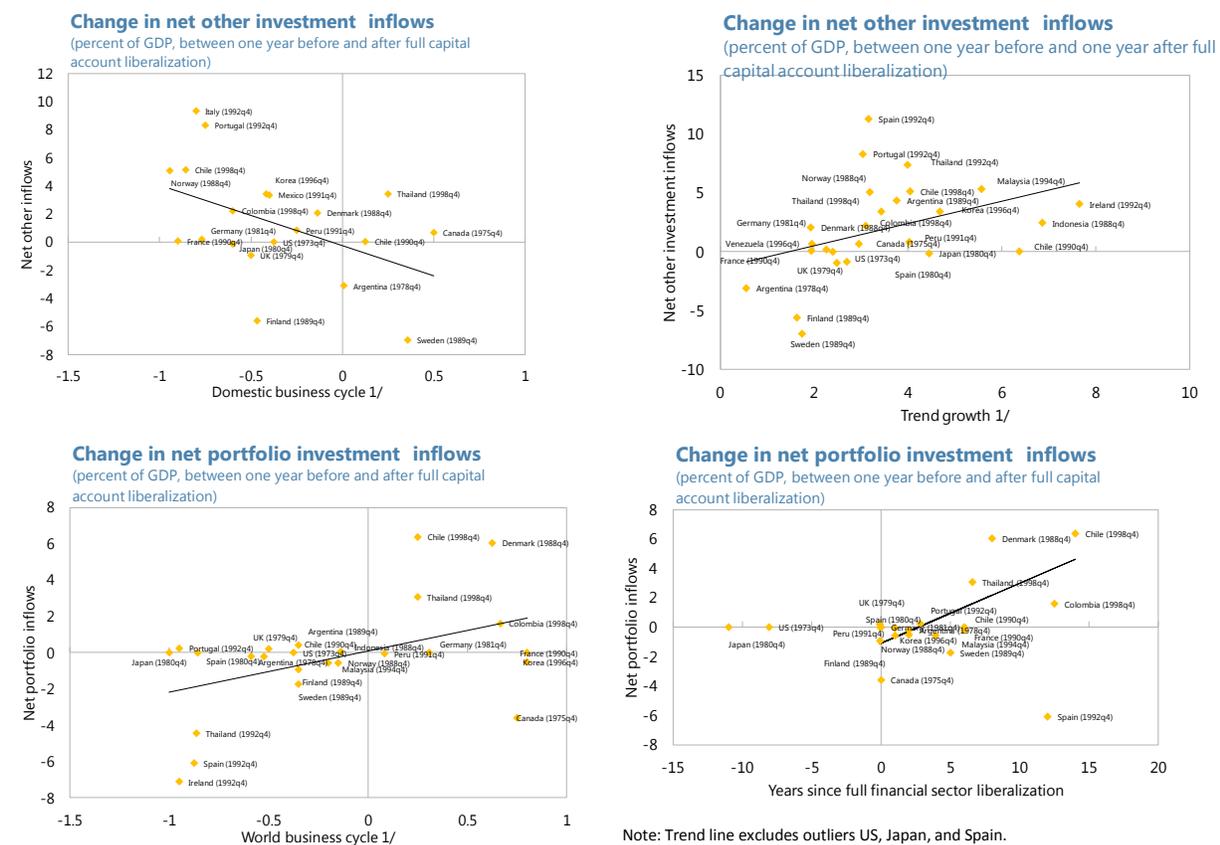
magnitude of the predicted stock adjustment in gross exposures and the resulting net flows is subject to substantial uncertainty, depending on the underlying regression specification. For example, applying the coefficient estimates on capital controls of Table 14.1. and some of the robustness tests to data for 2010 suggest that capital account liberalization may be followed by a stock adjustment of *Chinese assets abroad* on the order of 15–25 percent of GDP and a smaller stock adjustment for *foreign assets in China* on the order of 2–10 percent of GDP. This would imply a net accumulation of Chinese net international assets of 11–18 percent of GDP. While the magnitudes differ, the direction is in line with that estimated by He et al (2012) and Sendik and Sun (2012). One common concern is that the size of the Chinese financial markets may be overstated by aggregate market capitalization and outstanding debt. Nontradable shares account for about one quarter of equity market capitalization. In the bond market, bond market debt may have substituted for bank lending since almost half of the outstanding bond market debt is held by banks. Once equity and bond



market size is adjusted for these two factors, the predicted net accumulation of portfolio assets would narrow to 4-8 percent of GDP.⁷³

30. **An accumulation of 9-25 percent of GDP in international portfolio assets by Chinese residents of could have significant repercussions for global asset prices.** If allocated along MSCI portfolio shares, it would account for up to 3 percent of global financial markets and up to a quarter of financial markets in emerging market economies. If the Chinese authorities were to offset all or parts of these outflows by slowing reserve accumulation or reserve drawdown, yields on reserve assets could come under pressure.

Figure 14.1 Change in Net Financial Flows and Business Cycle at Time of Capital Account Liberalization



1/ Business cycle defined as share of real GDP growth upturn completed from trough to peak (+) or share of downturn completed from peak to trough (-). Peak and trough dated using Harding-Pagan (2002) algorithm. Timing of financial sector and capital account liberalization as in Kaminsky and Schmukler (2003).

⁷³ A similar thought experiment can be conducted for India, the other large economy with heavy capital account restrictions. For India, the regressions would predict a net decline in India's net international portfolio assets.

Table 14.1 FGLS Regression: Share of Bilateral Portfolio Assets in Total Portfolio, 2005–10

VARIABLES	(1) Stocks	(2) Stocks	(3) Bonds	(4) Bonds
Share of destination in global portfolio	0.115*** (0)	0.116*** (0)	0.141*** (0)	0.131*** (0)
Stock market capitalization or outstanding domestic bonds (% of GDP) in source	-0.00204*** (0)	-0.00200*** (0)	-0.00723*** (0)	-0.00571*** (0)
Stock market capitalization or outstanding domestic bonds (% of GDP) in destination	0.000376*** (0.00141)	0.000287** (0.0170)	-0.00286*** (0.00000148)	-0.00126** (0.0147)
Inflow or outflow restrictions in source	-0.107*** (1.18e-05)		-0.685*** (0)	
Outflow restrictions in source		-0.154*** (0)		-0.362*** (0)
Inflow or outflow restrictions in destination	-0.0448** (0.0249)		-0.711*** (0)	
Inflow restrictions in destination		-0.0495*** (0.00343)		-0.127** (0.0401)
Governance in source	0.218*** (0)	0.208*** (0)	0.136*** (0)	0.163*** (0)
Governance in destination	0.111*** (0)	0.113*** (0)	0.157*** (0)	0.203*** (0)
Bilateral trade (% of destination GDP)	0.0394*** (0)	0.0398*** (0)	0.0583*** (0)	0.0644*** (0)
Log distance	-0.353*** (0)	-0.355*** (0)	-0.826*** (0)	-0.774*** (0)
Stock market return or bond yield in source	0.0104 (0.157)	0.00716 (0.330)	-0.145*** (0)	-0.120*** (0)
Stock market return or bond yield in destination	0.0164*** (0.00849)	0.0195*** (0.00165)	0.0496*** (0)	0.0527*** (0)
Correlation in stock market returns or sovereign bond yields	0.359*** (0)	0.385*** (0)	0.114*** (1.76e-08)	0.0905*** (9.80e-06)
Constant	2.658*** (0)	2.711*** (0)	8.613*** (0)	7.338*** (0)
Observations	8,382	8,382	4,278	4,278
Number of country pairs	1,397	1,397	713	713
P-values in parentheses.				
*** p<0.01, ** p<0.05, * p<0.1				
Note: Regression includes time fixed effects.				

References

- Bertaut, Carol and Linda Kole (2004), "What makes investors over or underweight?: Explaining international appetites for foreign equities." International Financial Discussion Papers Number 819. Board of Governors of the Federal Reserve System.
- Chinn, Menzie D. and Hiro Ito (2008). "A New Measure of Financial Openness". *Journal of Comparative Policy Analysis*, Volume 10, Issue 3, p. 309 – 322 (September).
- Eichengreen, Barry (2001) "Capital Account Liberalization: What Do Cross-Country Studies Tell Us?" *World Bank Economic Review*, Vol. 15, No. 3, pp. 341-365.
- Forbes, Kristin (2010), "Why do foreigners invest in the United States?" *Journal of International Economics*, Vol. 80, No. 1, pp. 3-21.
- He, Dong, Cheung, Lillian, Zhang, Wenlang and Wu, Tommy T., How Would Capital Account Liberalisation Affect China's Capital Flows and the Renminbi Real Exchange Rates? (April 18, 2012). HKIMR Working Paper No. 09/2012.
- Harding, D. and A. Pagan (2002). "Dissecting the cycle: A methodological investigation," *Journal of Monetary Economics*, 49: 365–81.
- Kaminsky, Graciela and Sergio Schmukler, 2003. "Short-Run Pain, Long-Run Gain: The Effects of Financial Liberalization," NBER Working Papers No. 9787.
- Lane, Philip and Gian Maria Milesi-Ferretti (2008), "International investment patterns." *Review of Economics and Statistics* 90 (3), 538–549.
- Prasad, Eswar and Raghuram Rajan (2008), "A Pragmatic Approach to Capital Account Liberalization," *Journal of Economic Perspectives*, Vol. 22, No. 3, pp. 149-172.
- Quinn, Dennis P. 2003. "Capital Account Liberalization and Financial Globalization, 1890-1999." *International Journal of Finance and Economics*. 8(July):189-204.
- Sedik, Saadi Tahsin and Sun, Tao, Effects of Capital Flow Liberalization - What is the Evidence from Recent Experiences of Emerging Market Economies? (November 2012). IMF Working Paper No. 12/275.
- Schindler, Martin, 2009, "Measuring Financial Integration: A New Data Set," *IMF Staff Papers*, Vol. 56, No. 1, pp. 222–38.

VI. SPILLOVERS FROM THE EURO AREA

15. Dividends of Euro Area Stabilization⁷⁴

The stabilization of financial markets in the euro area has significantly lowered sovereign and bank financing costs but some fragmentation of the banking system has persisted nonetheless. The stabilization has contributed to normalize capital flows in other European countries. Emerging markets have benefited from increased participation of external investors in sovereign bond markets while safe haven flows and exchange rate pressures have receded in several advanced economies. An empirical analysis of bank capital flows shows that the reduction of home country bank funding stress had large impacts on the return of capital flows to other EA countries and to emerging EU countries. The stabilization of the stock market of Spain –the epicenter of last year euro area crisis— contributed significantly in reducing volatility of stock markets of core euro area countries and of the United States, Japan, and to a lower extent of the United Kingdom.

Stabilization in the euro area

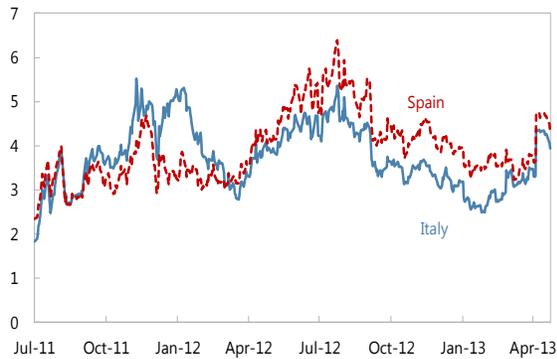
1. **Tail risks and uncertainties were mitigated in Europe as a result of policy actions, including:** the June 29 agreement of the EU Council on the creation of a Single Supervisory Mechanism; the July 26 well noticed speech by President Draghi stating that “within (the) mandate, the ECB is ready to do whatever it takes to preserve the euro”; the ECB’s announcement of the detailed Outright Monetary Transactions (OMT) program on September 6, 2012; the decision of the German Constitutional Court to back the ESM on September 12, 2012; the decision to support additional debt relief for Greece on November 26, 2012; the December 13-14 European Council agreement on the regulation of the SSM; and European announcements of a roadmap toward a Banking Union.
2. **Policy actions stabilized sovereign and bank borrowing costs in the euro area periphery (Figure 15.1).** External investors moved back to long positions on the periphery while fund managers considered re-entry into peripheral markets to take advantage of spreads. As sovereign spreads over German bunds declined, at short-term (2 year) but also long-term (10 years) maturity, bank funding conditions also improved both in the periphery and in the core. Exposures of banks to domestic sovereigns declined somewhat at the end of 2012, but have recently again increased in Italy and Spain – suggesting that sovereign-bank links remain significant in spite of the stabilization.

⁷⁴ Prepared by Thierry Tresselt (EUR).

Figure 15.1 Sovereign Funding Costs and Links to Domestic Banks

Sovereign yields have declined very substantially ...

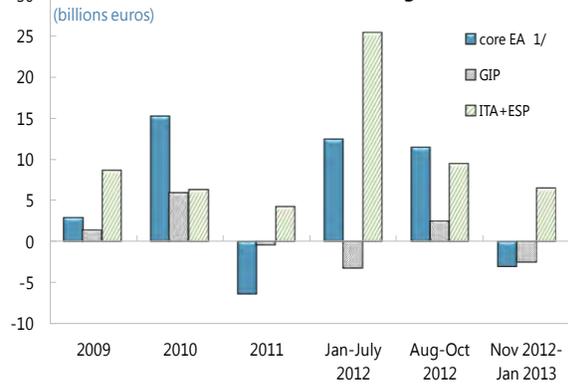
10-year Government Bond Yields
(Spread to German bund, percentage points)



Source: Bloomberg L.P.

... but sovereign-bank links are unbroken

Average monthly change in bank exposures to the domestic sovereign

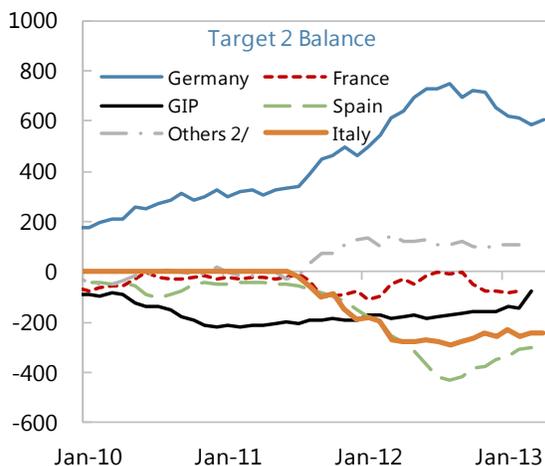


Source: IFS

3. **Indicators, however, depict a mixed state of the euro area banking system’s fragmentation (Figure 15.2.).** Signals are conflicting. On the one hand, price indicators of wholesale funding conditions have improved; the euro-system’s role in financing the periphery’s current accounts and in recycling the deposits of surplus countries has declined, as demonstrated by the recent narrowing of Target 2 imbalances. On the other hand, cross-border exposures of euro area banks vis-à-vis other euro area countries continued to decline through Q4 of 2012, in particular in the cross-border interbank market; issuances by periphery banks have remained low and the dispersion of retail lending rates between the core and the periphery has continued diverging.

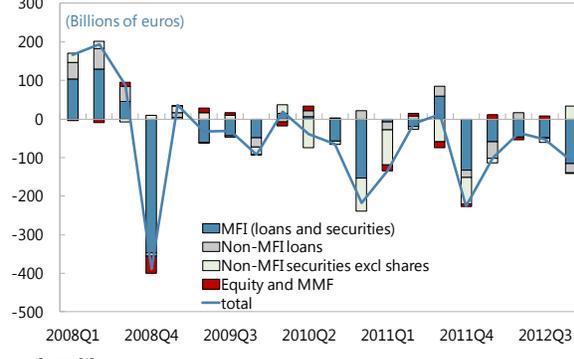
Figure 15.2 Fragmentation of the Euro Area Banking System

Target 2 imbalances have declined...



...but the cross-border interbank market remains broken

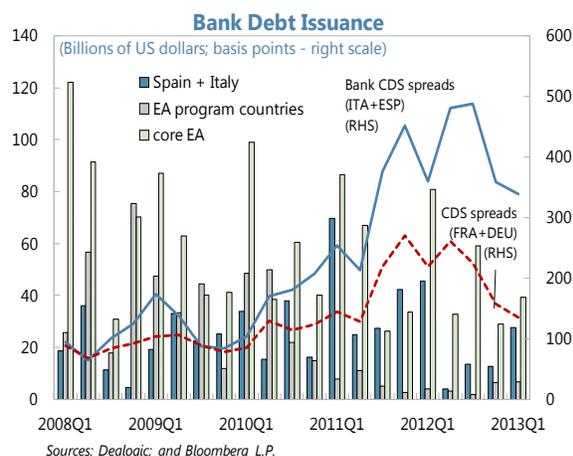
Change in EA Banks Cross-border Exposures: Intra Euro Area



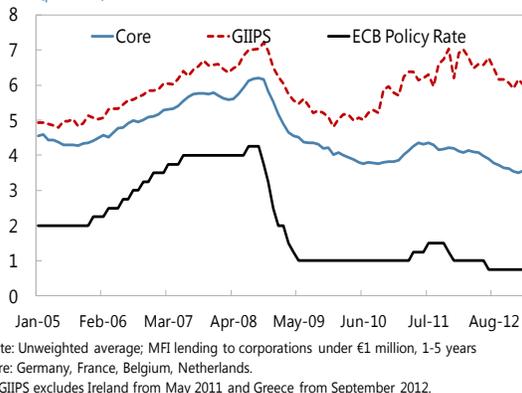
Source: BIS.

Bond issuance by periphery banks has picked up but remains low...

... and retail lending rates continue diverging



Euro Area Corporate Lending Rates
(percent)



Normalization of capital flows in other European countries

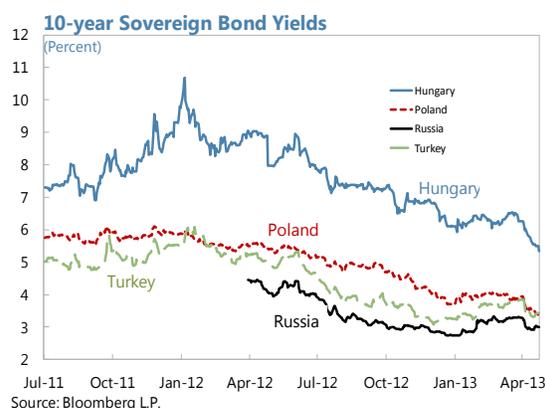
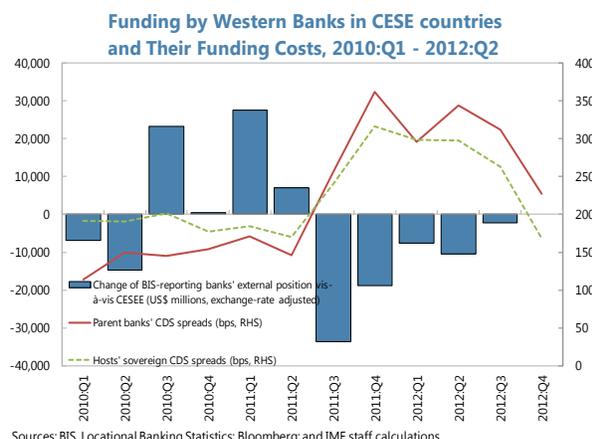
4. **The financial market stabilization of the euro area contributed in normalizing capital flows in other EU countries (Figure 15.3).** As financial market conditions improved in the euro area, capital flows showed signs of return in emerging Europe as investors took advantage of low funding costs in very liquid markets. As a result, funding costs of emerging European sovereigns have declined to record low levels. Meanwhile, safe haven flows stabilized in small advanced European countries, such as Switzerland and Denmark, contributing in relieving pressures on the exchange rate to appreciate.⁷⁵

⁷⁵ The exchange market pressure index is constructed based on the methodology of Chapter 3 of the October 2007 WEO.

Figure 15.3 Normalization of Capital Flows in Other European Countries

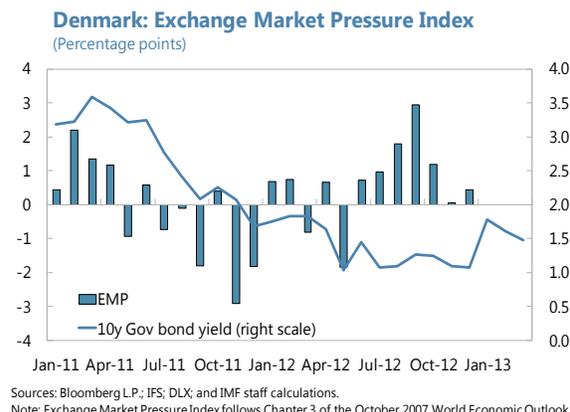
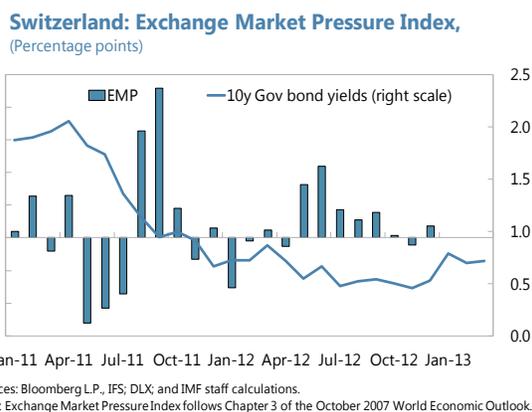
Stabilization of bank funding in emerging Europe...

...and low sovereign funding costs



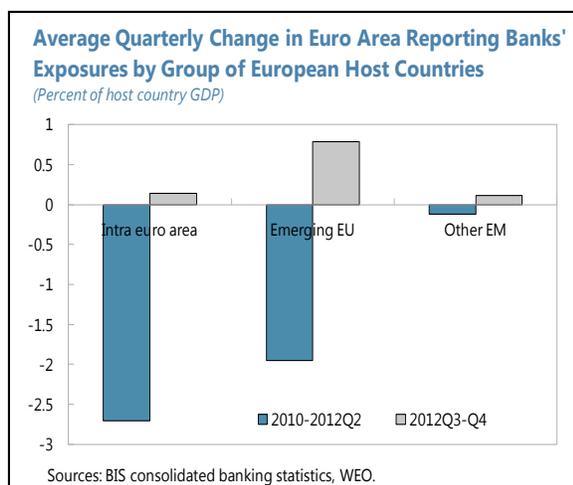
Exchange market pressures receding in Switzerland...

...and in Denmark

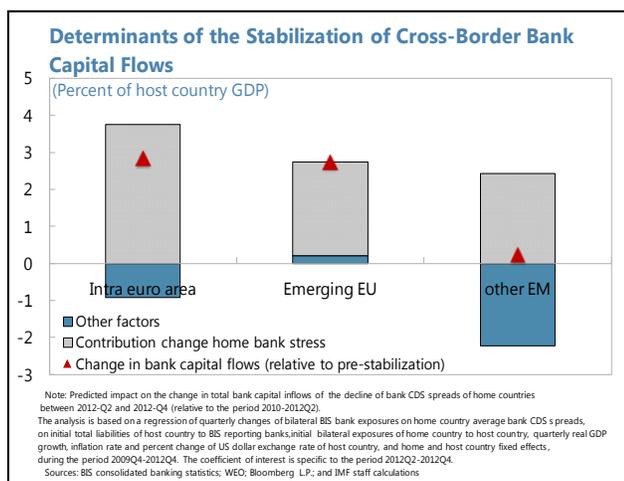


5. An empirical analysis is performed to assess the cross-border spillovers of stabilizing euro area banks. The analysis is based on a cross-country panel regression analysis of the home and host countries bilateral determinants of capital flows between euro area banks and other European emerging economies during the period 2010Q1-2012Q4. Home country factors include the quarterly average of 5 year CDS spreads of banks, the previous period's portfolio composition of banks' external exposures and their bilateral exposure to the host country. Host country factors include the quarterly real GDP growth, inflation rate and the previous period's total liabilities to foreign banks in percent of GDP. The analysis also estimates coefficients that are specific to the stabilization period 2012Q2-2012Q4, to provide a statistical basis to compute the impact of euro area bank improved funding conditions on bank capital flows to neighboring countries.

6. **The stabilization of euro area bank funding costs has directly benefited other euro area countries and neighboring emerging markets.** Between July and December 2012, the CDS spreads of euro area banks declined substantially (by about 180 basis point on average). During this period, the average quarterly change of exposures of euro area banks was 0.21 percent of host country GDP, compared to -2 percent of GDP during 2010-2012Q2. Hence the outflows of capital by euro area banks have substantially stabilized. The stabilization of euro area bank exposures was particularly noticeable vis-à-vis other euro area countries and vis-à-vis emerging EU countries.



7. **The stabilization of bank funding costs contributed very significantly to the stabilization of exposures.** The empirical model predicts that, within the euro area, the decline of bank CDS spreads in home countries on average contributed to a reversal of quarterly bank capital flows of 3.76 percent of host country GDP between Q2 and Q4 of 2012, relative to the period 2010Q1-2012Q2. This compares to an actual reversal of bank quarterly capital flows of 2.84 percent of host country GDP on average.⁷⁶ In emerging Europe, the



contribution of the decline of home bank CDS spreads contributed to a reversal of bank capital flows of 2.5 percent of host country GDP, compared to an actual reversal of bank capital flows 2.74 percent of host country GDP on average. In other European emerging markets, the actual reversal of quarterly bank capital inflows was much smaller than the predicted contribution of the decline in home country bank CDS spreads, suggesting that other factors were at play in these countries.⁷⁷

⁷⁶ Between 2010-Q1 and 2012Q2, the average quarterly decline of bank exposures vis-à-vis other euro area countries was 2.7 percent of host country GDP. Since mid-2012, exposures have increased by on average 0.14 percent of GDP per quarter.

⁷⁷ The sample of host countries includes euro area countries, EU emerging economies (Bulgaria, Hungary, Latvia, Lithuania, Romania, Poland and the Czech Republic) and other European emerging markets (Russia, Belarus, Turkey).

Spillovers to global markets**8. An analysis of euro area banks international positions shows that the stabilization in the euro area was associated with a slower deleveraging of their global activities (Figure 15.4).**

Data from the BIS locational banking statistics by nationality show that, while Italian and German banks increased their international positions after mid-2012, French and Spanish banks continued to reduce their international positions, in particular vis-à-vis related offices, even though funding costs declined. The pace of deleveraging of international activities however slowed down in Q3 and Q4 of 2012 relative to previous quarters, as bank funding stress progressively receded. Between July 2011 and July 2012, the average quarterly deleveraging of EA4 banks' international activities was USD 300 billion. In Q3 and Q4 of 2012, the quarterly deleveraging dropped to \$140 billion.

9. Stabilization in the euro area also generated a return of risk appetite and decline of market volatility.

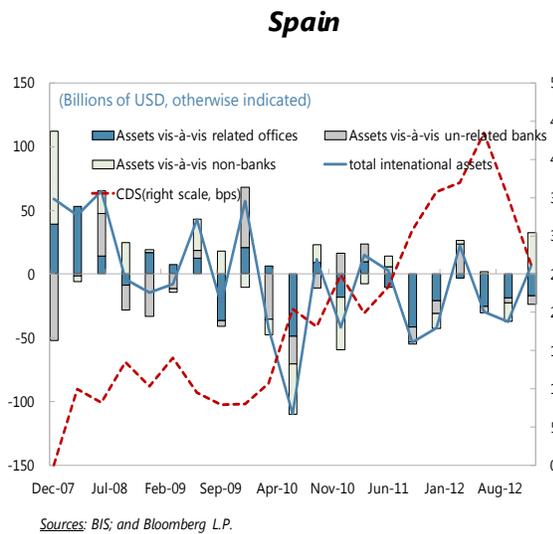
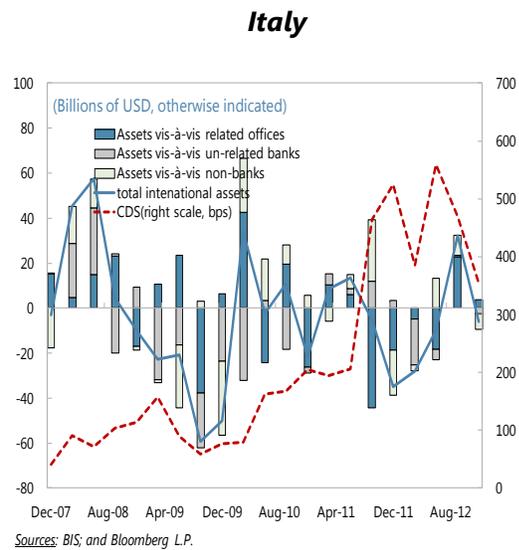
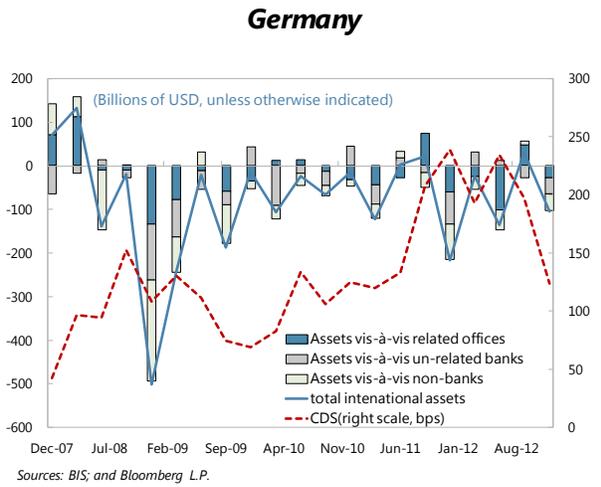
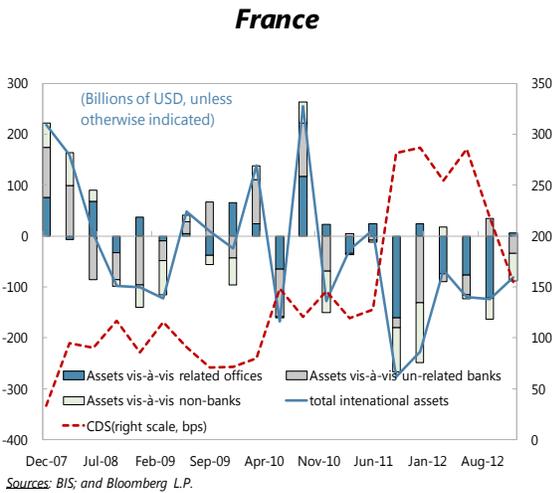
To assess the directionality of spillovers arising from the decline of market volatility, the analysis relies upon a generalized variance decomposition, following a 3 step approach. First, a VEC model is estimated with sovereign bond yields and stock market indices for 7 euro area countries (France, Germany, Italy, Spain, Greece, Ireland and Spain), the United Kingdom, the United States, Japan, China and several additional large advanced or emerging economies (Brazil, Korea, Mexico, Russia, Turkey, South Africa). The period of estimation is July 1st, 2012 to May 3rd 2013. Forecast errors of 12 days ahead forecasts and directional spillovers indexed, based on generalized forecast error variance decomposition of the forecast error's covariance matrix, are computed.⁷⁸

10. The analysis suggests that policy actions in the euro area generated stability spillovers to other regions, but there was also some reverse directionality from the United States and the United Kingdom.

During the period, the stock market of Spain –which was the epicenter of the euro area crisis – was the main source of gross volatility spillovers to other euro area stock markets (with the exception of Greece) and to the Spanish and Italian sovereign. Outside the euro area, it generated volatility spillovers to the stock markets of the United Kingdom, the United States, and Japan among advanced economies, and to the stock markets of South Korea and Brazil. Specifically, the directional spillover from the Spanish stock market accounted for 10.4 percent, 10.7 percent, 12.2 percent, 9.9 percent, 8.4 percent, and 8.8 percent of the forecast error variance of the stock markets of respectively France, Germany, Italy, the United States, the United Kingdom, and Japan. The German sovereign was the source of volatility spillovers to other large euro area sovereign, the United Kingdom, the United States and Japan. Conversely, the U.S. sovereign was source of spillovers to the sovereigns of France, Germany, Spain, Japan, the United Kingdom, and also of Brazil, Turkey, Russia, and South Africa (Annex Table 15.1.).

⁷⁸ Francis X. Diebold and Kamil Yilmaz, 2009. "Measuring Financial Asset Return and Volatility Spillovers, with Application to Global Equity Markets," *Economic Journal*, Royal Economic Society, vol. 119(534), pages 158-171, 01.

Figure 15.4 Exchange Rate Adjusted Changes of EA4 Banks' International Positions



Annex Table 15.1 Distribution of Directional Spillovers from Sovereign Yields and Stock Market Indices Forecast Error Variance

(in percent of the total forecast error variance of receiver B)

A to B	sov_Mexico	sov_South Korea	sov_Russia	stock_Brazil	Stock_Turkey	stock_Mexico	stock_Russia	stock_South Africa	stock_FR	stock_DEU	stock_GR	stock_IRE	stock_ITA	stock_Port	stock_ESP	stock_UK	stock_USA	stock_JAP	stock_CHINA	sov_FRA	sov_DEU	sov_GR	sov_IRE	sov_ITA	sov_PORT	sov_ESP	sov_UK	sov_USA	sov_JAP	sov_China	sov_Brazil	sov_Turkey	sov_South Africa
sov_Mexico	0.0	0.4	0.3	0.7	1.9	2.2	0.4	0.4	0.6	0.9	1.3	1.2	0.3	0.2	0.2	0.4	2.0	3.0	0.3	0.1	0.2	14.1	0.3	1.1	0.4	0.1	0.1	2.1	6.5	1.4	4.2	1.9	
sov_South Korea	3.9	0.0	0.2	0.2	4.5	0.6	0.1	0.1	0.3	0.1	5.1	0.3	0.8	0.5	1.6	0.2	0.5	2.8	1.9	0.2	9.7	17.0	1.1	0.9	4.5	1.0	0.9	10.7	2.0	0.6	1.9	0.9	
sov_Russia	0.7	1.2	0.0	0.6	1.1	0.2	0.4	0.4	0.6	1.2	2.8	1.3	0.3	0.8	0.3	0.1	0.3	1.3	0.3	6.3	0.8	6.5	1.3	1.3	2.4	1.2	0.3	0.2	0.7	4.3	7.5	4.6	
stock_Brazil	1.4	5.4	0.7	0.0	5.7	2.2	5.1	7.1	10.4	6.6	2.3	4.6	7.6	4.2	11.4	5.2	8.2	6.5	1.0	0.1	3.0	4.9	1.0	5.6	3.7	6.2	3.8	3.5	3.8	3.0	0.3	0.8	0.2
Stock_Turkey	1.2	2.3	1.9	0.4	0.0	0.4	0.1	0.2	0.6	0.5	0.7	0.1	0.8	2.3	0.7	0.1	0.1	0.6	1.1	0.6	0.2	0.4	1.8	0.2	0.1	0.6	0.6	0.6	3.2	1.2	2.9	3.5	1.4
stock_Mexico	0.7	0.5	0.0	5.3	6.6	0.0	5.3	5.7	2.2	2.2	0.8	0.5	0.9	1.4	0.5	4.4	6.8	1.6	3.4	2.0	1.6	3.4	8.3	0.5	0.4	0.8	0.9	1.7	0.7	0.6	0.2	1.8	0.6
stock_Russia	0.8	3.6	0.7	2.6	2.9	0.8	0.0	3.2	2.5	2.9	2.1	1.4	1.9	4.2	1.3	2.3	0.5	3.1	8.1	0.6	1.2	6.8	2.0	1.6	1.0	1.1	1.7	2.3	1.2	2.1	0.4	0.6	1.4
stock_South Africa	1.9	1.4	9.5	2.2	0.5	5.1	4.1	0.0	4.2	4.6	0.5	7.4	1.4	1.1	1.4	7.1	3.7	2.1	3.4	4.5	1.9	1.4	3.4	1.7	3.2	1.1	1.8	3.3	0.5	3.2	6.3	7.4	6.5
stock_FR	3.4	7.1	5.1	8.1	1.1	4.0	6.4	8.1	0.0	10.0	3.1	7.5	4.7	5.0	6.4	9.4	6.3	6.4	4.8	3.7	5.7	4.4	0.5	2.0	3.6	2.6	5.9	6.8	3.9	4.6	4.0	4.0	0.9
stock_DEU	4.2	4.6	3.0	6.7	4.0	3.3	5.6	6.1	8.8	0.0	1.5	10.6	3.2	3.2	4.5	8.0	6.7	5.4	4.6	2.2	3.6	5.0	0.6	1.5	2.3	1.7	4.6	5.5	2.8	4.6	3.1	2.7	1.0
stock_GR	3.2	0.8	0.6	0.5	4.7	1.3	0.2	0.2	0.4	0.7	0.0	2.5	0.5	3.9	1.3	0.2	0.5	0.9	0.6	1.0	0.3	8.6	2.7	0.4	4.8	0.8	0.8	0.5	1.0	2.5	1.6	0.2	0.5
stock_IRE	2.9	0.8	4.2	1.0	7.6	1.9	0.3	3.2	2.9	4.4	1.0	0.0	2.5	1.7	1.2	2.6	1.5	0.3	0.1	0.9	0.2	1.6	0.5	1.2	4.2	0.6	0.7	0.3	0.2	2.6	4.6	5.0	1.6
stock_ITA	3.6	8.1	4.3	4.8	1.5	5.8	6.1	5.3	5.1	4.9	4.7	3.3	0.0	7.4	6.7	5.9	4.0	5.2	7.5	6.7	7.0	2.3	0.4	7.6	3.3	4.1	6.6	5.1	8.5	5.0	2.6	1.2	2.4
stock_Port	4.2	3.4	4.9	1.0	1.4	1.1	3.8	3.8	2.9	2.7	14.2	4.1	6.1	0.0	5.5	3.6	2.9	1.5	12.0	6.8	4.7	6.8	2.7	3.0	5.3	1.3	6.0	4.4	5.0	6.8	5.8	1.5	0.9
stock_ESP	3.6	8.5	4.8	12.6	0.2	0.8	5.6	5.7	10.4	10.7	3.7	10.6	12.2	8.9	0.0	8.4	9.9	8.8	2.2	5.2	7.2	4.4	1.1	8.8	7.8	11.0	6.5	7.1	4.7	5.5	4.0	2.0	5.1
stock_UK	3.2	1.9	6.2	1.2	5.4	5.4	4.8	8.0	5.1	5.2	0.8	8.3	1.9	2.0	1.8	0.0	3.6	2.4	4.0	2.9	3.0	1.4	0.4	1.6	1.1	0.8	3.0	5.3	2.3	3.1	6.3	4.9	6.2
stock_USA	1.9	3.7	2.1	8.3	0.3	5.7	3.6	5.6	6.9	7.6	3.9	6.7	6.6	5.2	9.4	6.2	0.0	6.5	0.2	5.1	6.3	2.1	2.5	8.0	5.4	7.9	6.6	5.1	3.7	4.0	2.6	2.9	0.6
stock_JAP	6.8	1.9	0.5	0.1	0.2	1.6	0.5	0.6	0.3	0.6	3.0	2.3	0.2	0.6	0.6	0.1	1.0	0.0	1.4	0.2	0.3	1.3	0.8	0.6	0.6	0.8	0.1	0.2	3.6	5.9	1.3	3.7	0.7
stock_CHINA	1.6	0.9	1.0	0.2	0.2	14.7	0.8	2.6	0.4	0.7	4.8	3.2	0.3	0.9	0.9	0.2	0.3	0.9	0.0	0.4	0.8	1.3	0.6	1.0	0.5	0.3	0.7	0.5	2.0	0.9	1.2	0.3	3.2
sov_FRA	3.0	2.5	7.5	0.8	1.1	4.5	4.6	2.9	1.6	1.9	2.5	2.7	3.3	4.4	2.3	3.8	2.9	0.4	3.4	0.0	10.6	3.0	0.5	1.8	4.1	1.7	8.1	7.3	2.2	3.9	3.8	5.4	18.6
sov_DEU	5.6	7.7	6.5	5.7	2.1	2.5	7.3	4.7	6.7	5.3	6.6	0.9	9.5	9.3	8.1	6.3	6.4	6.5	5.4	9.6	0.0	5.2	1.6	9.0	8.7	9.8	12.9	12.6	7.8	6.6	4.4	3.6	4.9
sov_GR	0.8	1.5	1.1	2.1	3.7	0.7	4.7	0.2	1.8	2.7	10.9	3.2	0.8	6.4	1.4	1.6	1.2	2.7	3.0	0.6	0.4	0.0	0.2	1.0	8.0	0.6	2.0	1.4	1.4	1.4	0.6	0.3	4.1
sov_IRE	3.5	0.6	1.0	0.2	0.6	0.9	0.6	0.1	0.4	0.2	0.1	1.0	0.3	0.1	0.6	0.9	0.3	0.2	0.4	1.6	0.1	3.6	0.0	1.8	0.6	0.3	0.1	0.2	0.2	1.0	1.2	2.3	0.4
sov_ITA	0.5	3.9	0.5	4.6	0.6	1.0	2.4	0.5	1.5	1.6	1.6	0.8	5.0	2.8	3.5	0.9	2.2	4.3	1.1	0.5	3.6	0.7	0.7	0.0	2.1	13.2	3.8	1.9	3.3	0.7	0.4	1.2	1.8
sov_PORT	1.1	4.7	3.3	8.0	1.2	7.8	4.9	7.1	6.3	4.5	2.2	0.5	7.3	3.8	6.0	3.8	5.7	4.7	2.1	4.6	5.4	4.1	1.0	11.1	0.0	7.2	5.2	3.7	0.4	0.3	7.6	4.5	7.5
sov_ESP	0.5	2.2	0.4	9.9	5.4	1.3	2.8	2.6	4.2	4.3	0.4	1.6	4.1	2.2	5.1	3.1	3.6	4.1	0.8	0.4	1.2	0.8	1.3	9.3	2.9	0.0	0.9	1.5	0.6	1.1	0.2	0.3	0.3
sov_UK	4.3	7.0	4.8	3.9	8.9	1.4	6.4	4.4	4.5	4.8	7.0	2.6	6.6	7.9	6.2	5.2	6.4	5.4	4.6	8.9	14.1	5.6	0.6	8.8	6.7	7.8	0.0	11.0	8.1	5.3	4.7	3.5	2.9
sov_USA	3.8	6.8	8.3	4.7	5.3	2.5	4.0	4.6	5.7	4.5	2.1	2.3	4.8	5.2	7.0	4.1	6.0	4.5	1.0	9.8	11.0	1.8	1.5	5.7	4.9	8.0	10.7	0.0	6.7	4.4	11.5	7.3	9.0
sov_JAP	5.0	3.4	0.5	0.2	8.6	5.1	0.2	0.4	0.2	0.3	4.4	0.7	2.0	0.5	0.4	0.0	0.4	2.1	3.5	0.1	0.5	0.2	0.5	0.9	0.0	1.2	0.6	0.7	0.0	2.3	0.9	1.4	0.4
sov_China	9.7	0.2	0.1	0.4	5.0	4.6	0.8	0.3	0.6	0.6	2.5	0.4	0.6	0.4	0.2	0.5	0.8	2.3	3.6	0.3	0.2	0.3	12.3	0.4	0.2	0.4	0.1	0.1	3.4	0.0	1.8	3.6	1.8
sov_Brazil	2.9	2.1	11.4	1.3	3.8	3.9	5.9	4.1	0.9	1.3	2.1	6.3	2.5	2.7	2.9	3.2	4.8	2.7	6.8	9.7	3.1	0.1	2.5	0.6	1.8	0.5	3.4	4.0	3.0	2.7	0.0	9.3	5.4
sov_Turkey	9.5	0.4	2.0	1.4	2.9	4.8	1.2	0.8	0.2	0.4	0.2	0.2	0.2	0.4	0.1	0.4	0.5	1.3	3.0	0.8	0.4	0.2	13.5	1.1	1.8	0.3	0.2	0.2	1.9	5.3	2.3	0.0	2.5
sov_South Africa	0.7	0.4	2.5	0.2	1.3	1.6	0.8	0.8	0.7	0.9	1.1	1.0	1.0	0.4	0.6	2.1	1.8	0.5	1.5	3.6	1.1	1.8	2.1	0.5	6.6	1.1	0.4	2.2	1.1	0.3	7.1	1.1	0.0

Note: highlighted is greater than top decile of the distribution of bilateral FEV

16. Effects of a Protracted Slowdown in the Euro Area⁷⁹

This scenario is simulated with EUROMOD, and G20MOD modules in the Flexible System of Global Models (FSGM). In the downside scenario, monetary policy in euro area countries, the United States, Japan, and the United Kingdom is constrained by the ZIF and interest rates are only allowed to ease as much as the policy space in the WEO baseline allows.

Downside

1. This scenario entails gradual, but persistent deterioration in euro area growth.

Declining private investment owing to the debt overhang on firms' balance sheets is compounded by the knock-on effects to private consumption as lower investment would also imply less labor demand. Lower than expected growth outcomes prevent the anticipated fiscal improvement, pushing up sovereign risk premium and prompting more tightening in fiscal stances and private credit given the knock on effects to bank capital through mark-to-market and NPLs. The magnitudes of the jumps in sovereign risk premium would be proportional to the country's level of debt and dependence on foreign funding. So countries with larger current account deficits would be hit harder as investors' preferences become more skewed toward domestic assets. This reduces activity further preventing any improvement in debt-to-GDP ratios leading to further increases in sovereign spreads, additional fiscal tightening and credit contraction. The need to rely in part on distorting labor and capital taxes would undermine supply potential, contributing to the downward spiral as it would further raise expected debt-to-GDP paths in euro area countries. This is ongoing for many years, with the most negative impact felt in the periphery, but with the spillovers sufficient to stagnate the core. Milder-than-core effects on corporate and sovereign risk premium would occur outside the euro area.

2. Technical implementation: In 2013 euro area investment falls 3 percent below baseline (1 percent in the core, 5 percent in Italy, and 8 percent in the other periphery countries) and deteriorates further in 2014 to 5 percent below baseline (1.5 percent in the core, 9 percent in Italy, and 13 percent in the other periphery countries). In 2014, risk premium start to rise. The overall euro area sovereign risk premium rises by 25 basis points (10 basis points in the core, 40 basis points in Italy, and 65 basis points in the other periphery countries) and the corporate risk premium rises by roughly half of the increase in the sovereign risk premium (5 basis points in the core, 20 basis points in Italy, and 33 basis points in the other periphery countries). Risk premium surprises of the same magnitude arrive each year until 2018. Advance country risk premium rise by 30 percent of the increase in the average euro area risk premium, with emerging market risk premium rising by one half. In 2014, with risk premium rising, euro area periphery sovereigns are forced into front loading fiscal consolidation using labor and capital income taxes. For Italy the addition consolidation is 0.2 percent of GDP per year with other periphery countries tightening by an additional 0.3 percent of GDP each year.

⁷⁹ Prepared by Ben Hunt, Rene Lalonde, and Susanna Mursula (RES), and the Euro Area team.

Euro Area WEO Downside: Effect on GDP level							
<i>(cumulative percent difference from baseline)</i>							
	2012	2013	2014	2015	2016	2017	2018
World	0.0	-0.1	-0.3	-0.5	-0.6	-0.8	-0.9
Euro area	0.0	-0.5	-1.3	-2.0	-2.7	-3.4	-4.1
Rest of the world	0.0	-0.1	-0.2	-0.3	-0.4	-0.5	-0.5

17. Euro Area Rebalancing Scenario⁸⁰

- This scenario illustrates the global macroeconomic implications of euro area policies—both at the area-wide and national levels—that address market fragmentation, rebalance and raise trend growth, and reduce fiscal sustainability concerns.**
- The scenario has two main components: (i) euro area-wide policies (fuller banking union, with appropriate common backstops; further unconventional monetary policy measures) that help reverse market fragmentation; and (ii) country-specific policies that implement structural reforms and help rebalance demand both in the periphery and the core.**
 - Euro area policies.** The first component is a reduction in financial market fragmentation owing to proactive ECB policies and the implementation of a fuller banking union (SSM, single resolution authority with common backstops). The declines in risk premium in periphery countries reduce the overall interest rate on public debt by roughly 100 basis points by 2015; the market rate for firms declines by almost 300 basis points. The decline in core countries is much more modest. In addition, a small portion of the decline in average euro area risk premiums is transmitted to other economies.
 - National policies.** The second component has two separate layers:
 - Actions by the periphery:
 - Periphery countries implement labor and product market reforms, which result in higher productivity. The increases in productivity are based on OECD estimates of the implications of moving to best practice in product and labor market polices. It is assumed that roughly 50 percent of the best-practice gap is closed.

⁸⁰ Prepared by the Euro Area team.

(2) Better growth performance (due to the structural reforms) allows the fiscal stance to be temporarily easier and still achieve reductions in debt-to-GDP ratios. Specifically, the near-term fiscal stance in periphery countries is relaxed by roughly one percent of GDP.

- Actions by the core

(1) Core countries implement product market reforms that raise productivity (closing 50 percent of the best-practice gap).

(2) In Germany, policies are implemented to increase private investment. In the Netherlands, the fiscal policy stance is relaxed temporarily.

3. **The overall effect on output is positive in both the euro area and the rest of the world (see accompanying charts).** Over the medium term, the growth dividends over the medium term could be substantial (about $\frac{3}{4}$ percentage points per year), with positive spillovers to the rest of the world.

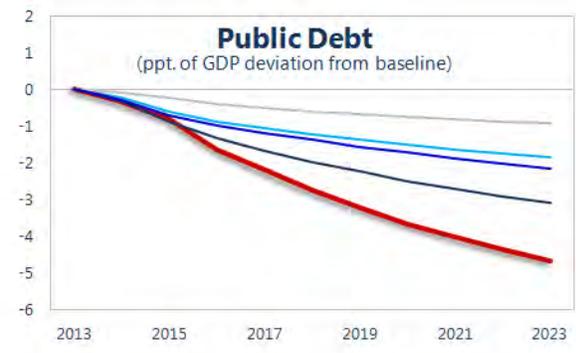
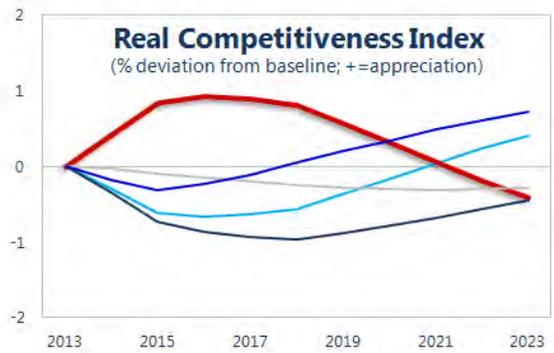
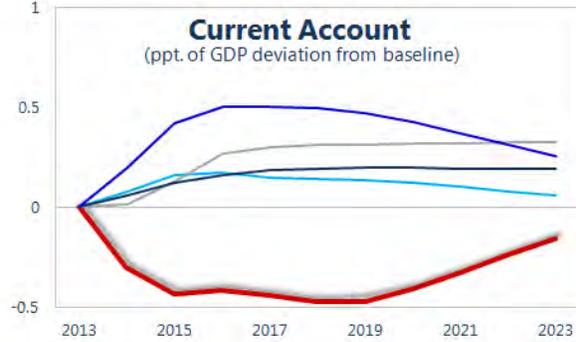
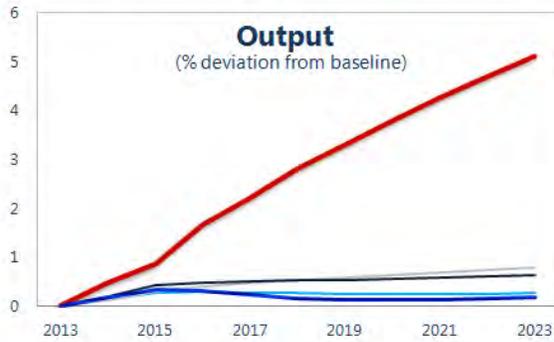
- The reductions in risk premium raise GDP everywhere as they more than offset the impact on interest rates from higher global demand for savings.
- The structural reform layer raises growth in all euro area countries. Outside the euro area, the result is a small decline in real GDP as increased demand for global savings to finance the increase in euro area investment increases global real interest rates.
- The increase in investment in Germany, which raises GDP and lowers the current account, also contributes to a higher global real interest rate and slightly lower GDP elsewhere.
- An easier fiscal stance in periphery countries and the Netherlands temporarily raises GDP in these countries, with mild positive spillovers elsewhere.

4. **Positive confidence effects and reduced uncertainty, which are not embedded in the scenario, could further increase growth dividends, especially in the short run.**



Euro Area: Rebalancing Scenario¹

China Euro Area Japan United Kingdom United States



¹ Assuming the implementation of policy actions by the Euro Area alone.

F

VII. SPILLOVERS FROM JAPAN⁸¹

1. **“Abenomics” aims to end decades-long deflation and revive growth.** The strategy is composed of three key pillars: aggressive monetary easing, flexible fiscal policy, and growth-enhancing structural reforms. In the new Quantitative and Qualitative Monetary Easing (QQME) framework, the Bank of Japan (BoJ) seeks to double the monetary base and widen the scope and scale of asset purchases to include long-dated government bonds and additional purchases of risk assets in an effort to achieve the recently adopted 2 percent inflation target with a time horizon of about two years. Earlier, the Diet approved 1.4 percent of GDP of new debt-financing spending to be executed during 2013–14. Broad outlines for the other two pillars—the medium-term fiscal and growth policy—were unveiled in June with detailed measures to be developed in coming months.
2. **Staff analysis show that, if all three arrows of Abenomics are successfully deployed, overall spillover effects would likely be positive, though moderate.** Spillover channels of a comprehensive reform are likely to operate through the exchange rate, higher growth, and financial interlinkages. Simulation results imply that higher growth in the third largest economy in the world is benefitting neighboring countries and the global economy through trade and financial channels (greater capital inflows in trading partners and a lower sovereign risk in Japan), more than offsetting the effects of yen depreciation on competitiveness in other countries.
3. **However, in the near term, overall spillover effects as well as the impact on individual countries would be more complex.** Regarding the financial channel, first, the BoJ’s purchases of Japanese government bonds (JGBs) could cause a substantial rebalancing of financial institutions’ portfolios, potentially leading to large financial spillovers to other countries. Second, the effects of capital inflows on recipient countries would not be uniform, but would depend on their cyclical conditions. While easier financing conditions can support growth in economies with slack and little inflation, they could raise overheating risks for those with already rapid credit growth and rising asset prices. Third, financial spillover effects could also occur through FDI and the overseas activities of Japanese banks. Regarding the latter, increased opportunities for lending in Japan following higher growth as well as movements in the yen could affect the expansion of Japanese banks’ overseas activities, which has been expanding rapidly partly as a result of the retreat by European banks in the region. On the former, yen depreciation could slow the long-term trend of outward FDI from Japan. Fourth, financial linkages can occur through complex instruments and offshore transactions, which would then make it difficult to track spillover effects and inform the policy debate. Regarding the trade channel, increased vertical integration of the production network implies that a significant amount of imported intermediate inputs from Japan would somewhat offset the effect of yen depreciation on trading partners’ export prices while higher Japanese growth and exports would benefit other countries through the supply chain structure. The following sections will discuss the model simulation and these various aspects in more detail.

⁸¹ Prepared by Dennis Botman, Stephan Danninger, Joong Shik Kang, and W. Raphael Lam (APD); and Irineu de Carvalho Filho, Ben Hunt, and Rene Lalonde (RES).

18. Spillovers of the New Policy Framework: A Model-Based Evaluation

Spillovers of Abenomics are complex and conditional on the new macro policies being fully completed (“three arrows”). Spillover channels of a successful effort to revitalize Japan are likely to operate through the exchange rate, higher growth in Japan, and financial interlinkages. Illustrative simulations using the new IMF’s G20MOD suggest that if all three arrows of Abenomics are successfully deployed and succeed to raise growth and inflation and help bring down public debt, spillover effects to G20 economies are positive, albeit small—about 0–0.1 percent of GDP in the short-term, before rising over the medium term once the effects of structural reforms translate into higher growth in Japan. The effects of yen depreciation on competitiveness in other countries is broadly offset by the positive effects of higher growth in Japan and lower interest rates in trading partners as a result of greater capital inflows and lower sovereign risk in Japan.

1. **Analyzing the spillovers of Abenomics requires careful construction of a baseline.** One option would be to use the latest World Economic Outlook (WEO, April) as the baseline. However, this already incorporates those parts of Abenomics that have been announced, such as (i) fiscal stimulus during FY2013–14; (ii) the adoption of QQME; (iii) fiscal consolidation through the increase in the consumption tax rate during 2014–15 as well as the phasing out of stimulus and reconstruction spending; and (iv) modest gains from structural reforms following the decision to participate in the Trans Pacific Partnership negotiations. As such, we consider an earlier vintage of the WEO before these policies were announced. However, these do not build in further fiscal consolidation beyond what has been announced, which leads to an explosive debt trajectory in the long-term. As such, we augmented the pre-Abenomics WEO projections with further fiscal consolidation over the medium term and a rising risk premium as the country needs to increasingly tap foreign investors as private savings start to fall short of the government’s financing requirement, which remains large despite the fiscal adjustment.
2. **We consider each component of Abenomics in separate scenarios to quantify their contribution to key macroeconomic indicators.** For illustrative purposes, the control scenario (shown as straight lines at zero values) should be understood as an earlier vintage of WEO that precedes the implementation of any component of Abenomics. In this case, inflation was projected to rise only gradually, reaching 1 percent in the medium term, while public debt continues to rise. The effects of other scenarios will be represented relative to this control scenario. Each scenario is designed as follows:
 - **Pre-Abenomics counterfactual scenario** (blue line). In this baseline scenario, lack of decisive policy action to end deflation and low growth would lead to an increase in the sovereign risk premium by 50 bps in 2016 and a further 50 bps in 2017, which remains at the elevated level for an extended period. This occurs despite the implementation by the government of a fiscal consolidation of 1 percent of GDP starting in 2016, rising to 5 percent of GDP by 2020 as the country needs to increasingly tap foreign investors to fund the government’s financing requirement.

- **Plus fiscal stimulus scenario** (orange line). In addition to the assumptions in the scenario above, this simulation includes the Diet's adoption of fiscal stimulus, equivalent to $\frac{3}{4}$ percent of GDP in 2013 and 2014 for a total of $1\frac{1}{2}$ percent of GDP in effective terms.
- **Plus successful inflation scenario** (black line). In response to aggressive monetary policy easing by the BoJ, inflation expectations reach 2 percent in two years as targeted by the BoJ.
- **Plus structural reform scenario** (dotted line). Successful implementation of growth-enhancing structural reforms raises potential output growth by $\frac{1}{4}$ percentage points in 2015 rising to $\frac{1}{2}$ percentage points by 2018.

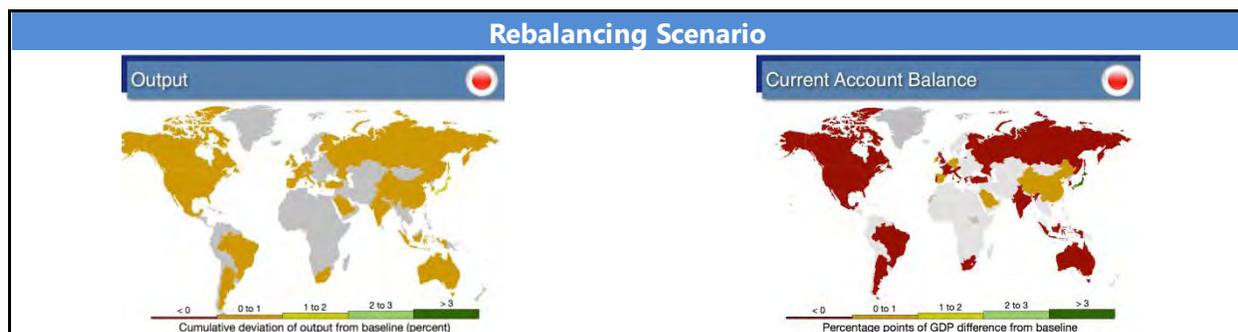
3. **It is critical to implement all components of Abenomics for sustained growth and inflation in Japan.**

- **Pre-Abenomics counterfactual scenario** (blue line). Fiscal consolidation would help lower the public debt-to-GDP ratio in the medium term, but at the cost of lower growth and inflation.
- **Plus fiscal stimulus scenario** (orange line). Fiscal stimulus will boost short-term growth by about $\frac{1}{2}$ to 1 percent and yields a modest pickup in inflation, but these effects would gradually disappear in the medium term with the unwinding of the stimulus.
- **Plus successful inflation scenario** (black line). As inflation expectations rise to 2 percent on the back of aggressive monetary policy easing, the economy would reach 2 percent of actual inflation in two years as targeted by the BoJ and economic activity would pick up strongly in the short-term mainly due to higher investment on the back of lower real interest rates. However, both growth and inflation would not be sustained at these levels due to medium-term fiscal consolidation and the unwinding of fiscal stimulus.
- **Plus structural reform scenario** (dotted line). The model simulation implies that, when these measures are complemented by growth-enhancing structural reforms, actual inflation not only reaches the inflation target within two years, but also will be sustained at this level. Higher growth and inflation would further improve public debt dynamics. As private savings recover and the government's financing requirement declines sharply, the rise in the risk premium will be avoided.

4. **Simulation results show that, while varying across countries and regions, the net spillover effects are generally positive, though small.**

- **Main channels.** Japanese successful reflation would affect other countries through (i) yen depreciation and corresponding appreciation of trading partner currencies; (ii) higher growth in Japan as well as the global economy; and (iii) lower interest rates in trading partners due to capital inflows and higher global savings as a result of falling debt in Japan.
- **Net positive spillover.** Negative spillovers arising from yen depreciation are offset by positive spillovers through the other two channels. Japan's rising current account surplus implies capital inflows into trading partners, reducing interest rates and stimulating investment and growth.

Higher growth in Japan increases import demand. From the simulations, structural reforms in Japan appear to exert particularly important positive spillover effects.

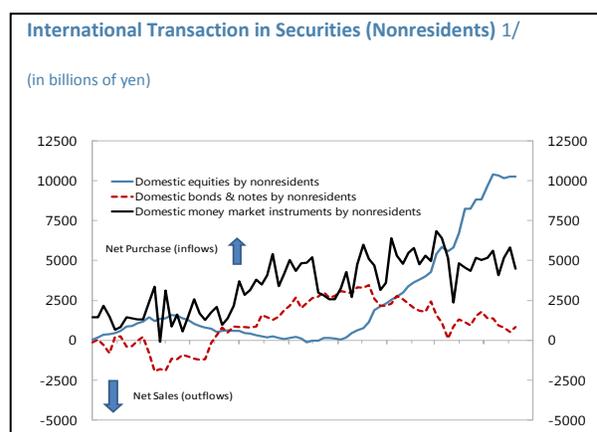


- **Sensitivity analysis.** To understand the impact of sharper depreciation of yen, relative to a gradual depreciation in above simulations, we also consider a case in which the yen real effective exchange rate depreciates by 10 percent in the near term and is sustained at this level (the estimated share of the depreciation attributable to QQME). The simulation shows smaller net growth spillover, with selected countries (e.g., China, Germany, Korea) slowing in the near to medium term before benefiting in the long-term.

19. Will Abenomics in Japan Generate Sizeable Spillovers on Capital Flows?

The three-pronged policies to exit deflation and raise growth have generated limited capital outflows thus far, despite yen depreciation by about 20 percent in real effective terms by April 2013 compared to the average level in 2012. Foreigners' net purchases of domestic equities increased while domestic investors sold foreign securities. This note assesses the potential drivers of direct investment (FDI) and portfolio investment flows. Low global interest rates and the relatively "closed" financial system in Japan have contributed to limited spillovers and point to a cautious and gradual shift of investment strategies by Japanese investors. Thus, financial spillovers from capital outflows are likely to be moderate and gradual, though those flows may be considered large by some recipient countries. Larger capital outflows could occur if the yen depreciates further and global interest rates begin to normalize. Tail risks of a failed Abenomics that poses a threat to financial stability could trigger negative spillovers.

1. **Asset prices soared and the yen weakened following the government's "three-pronged" strategies to exit deflation and lift growth.** The yen has weakened by about 20 percent in real effective terms while equity prices have risen by over 50 percent. Financial markets rallied, in particular after the announcement of the new QQME. The immediate impact on domestic capital markets was significantly larger than previous monetary easing announcements. Concerns over capital outflows



from Japan to other countries, including emerging market economies, have emerged as the monetary easing will inject sizeable liquidity into the financial system.

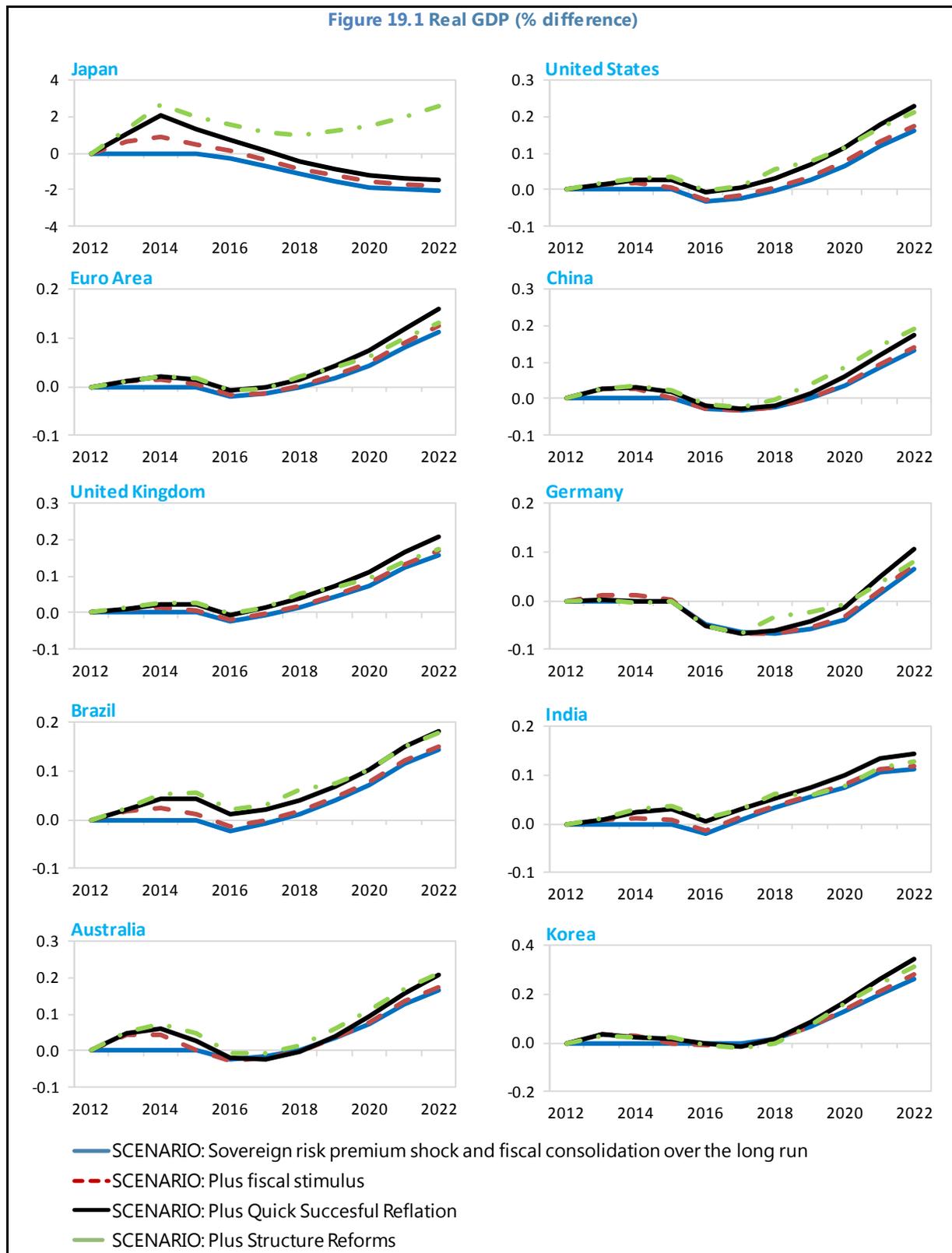


Figure 19.2 Current Account (%pt GDP difference)

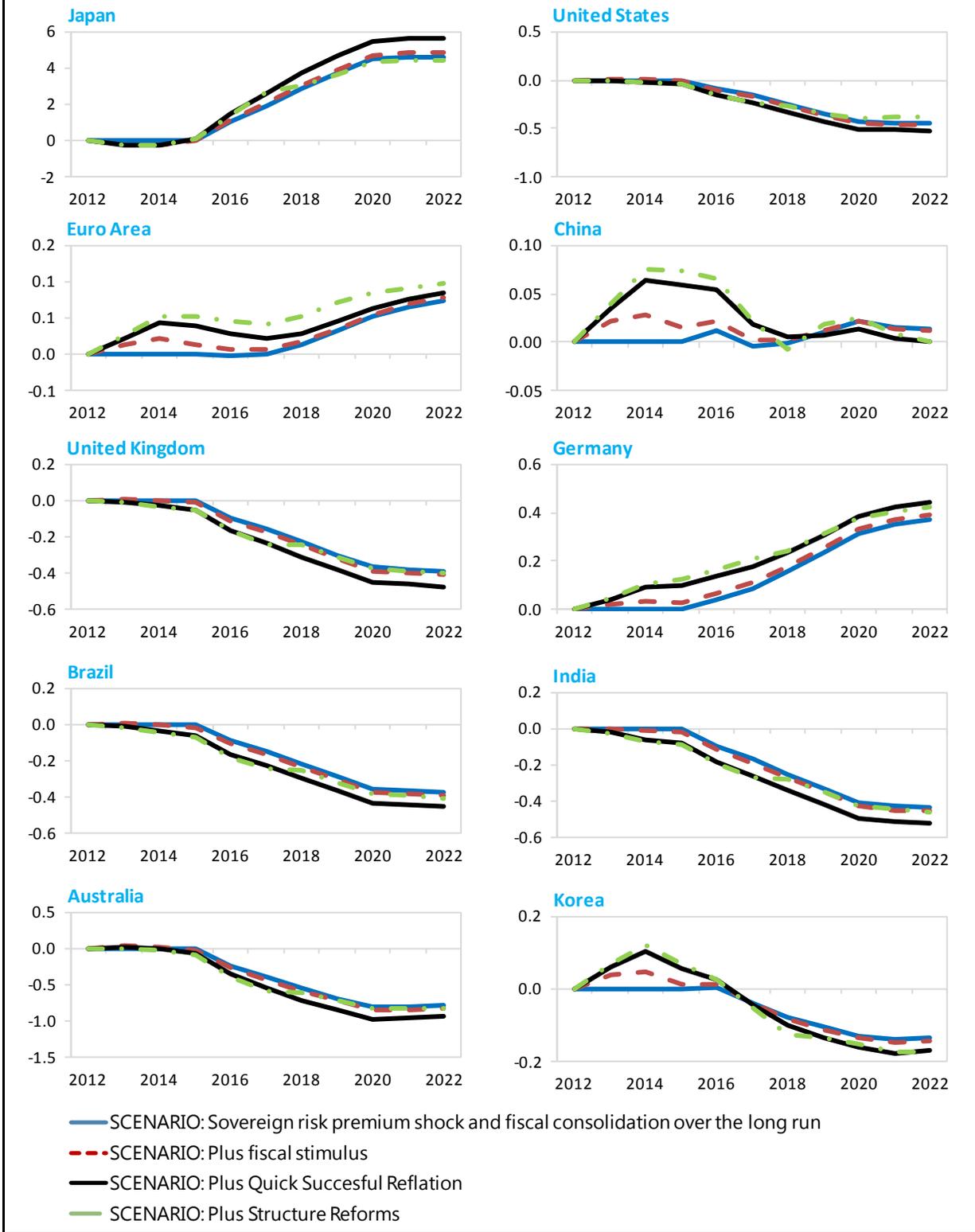


Figure 19.3 Real Effective Exchange Rate (% difference)

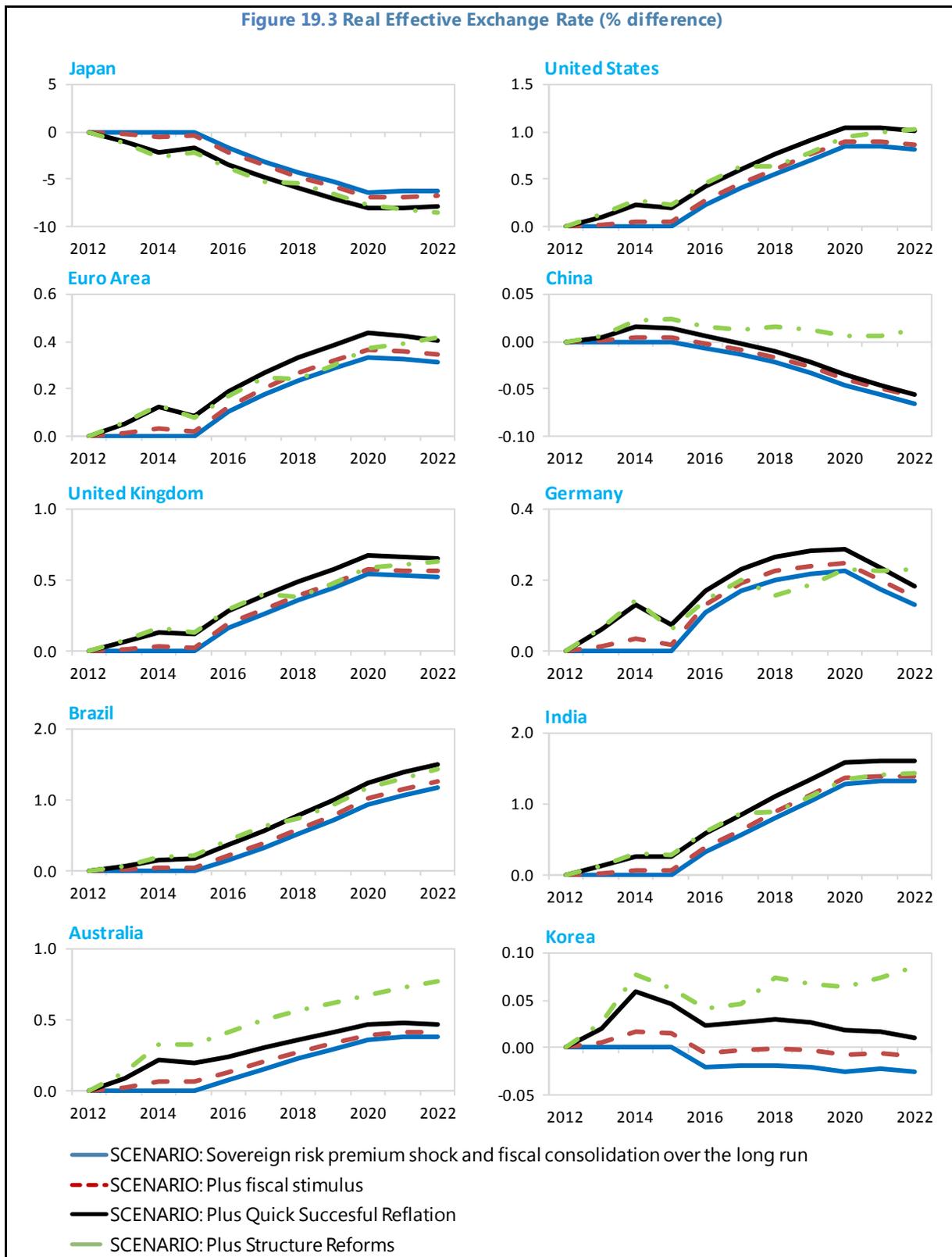
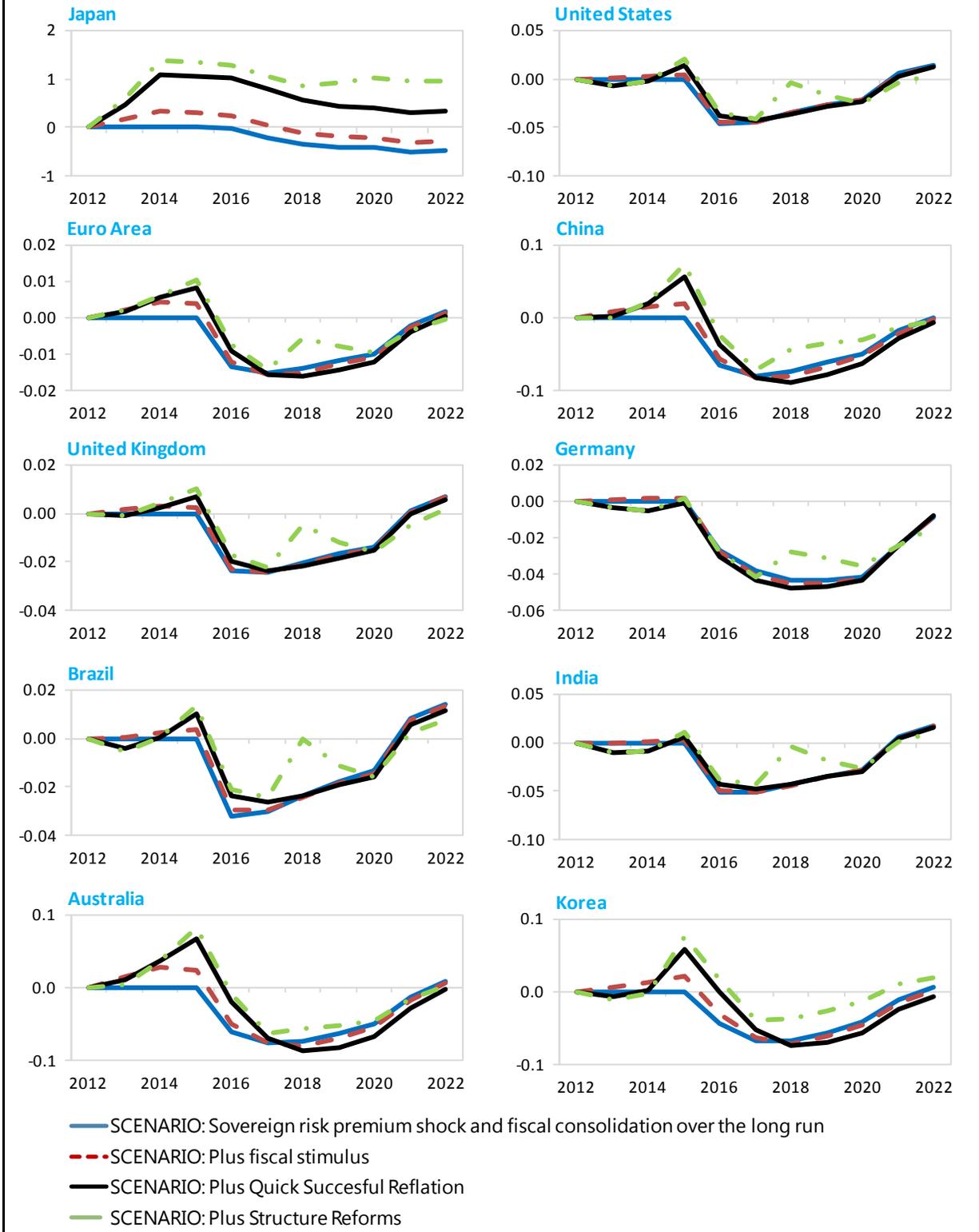
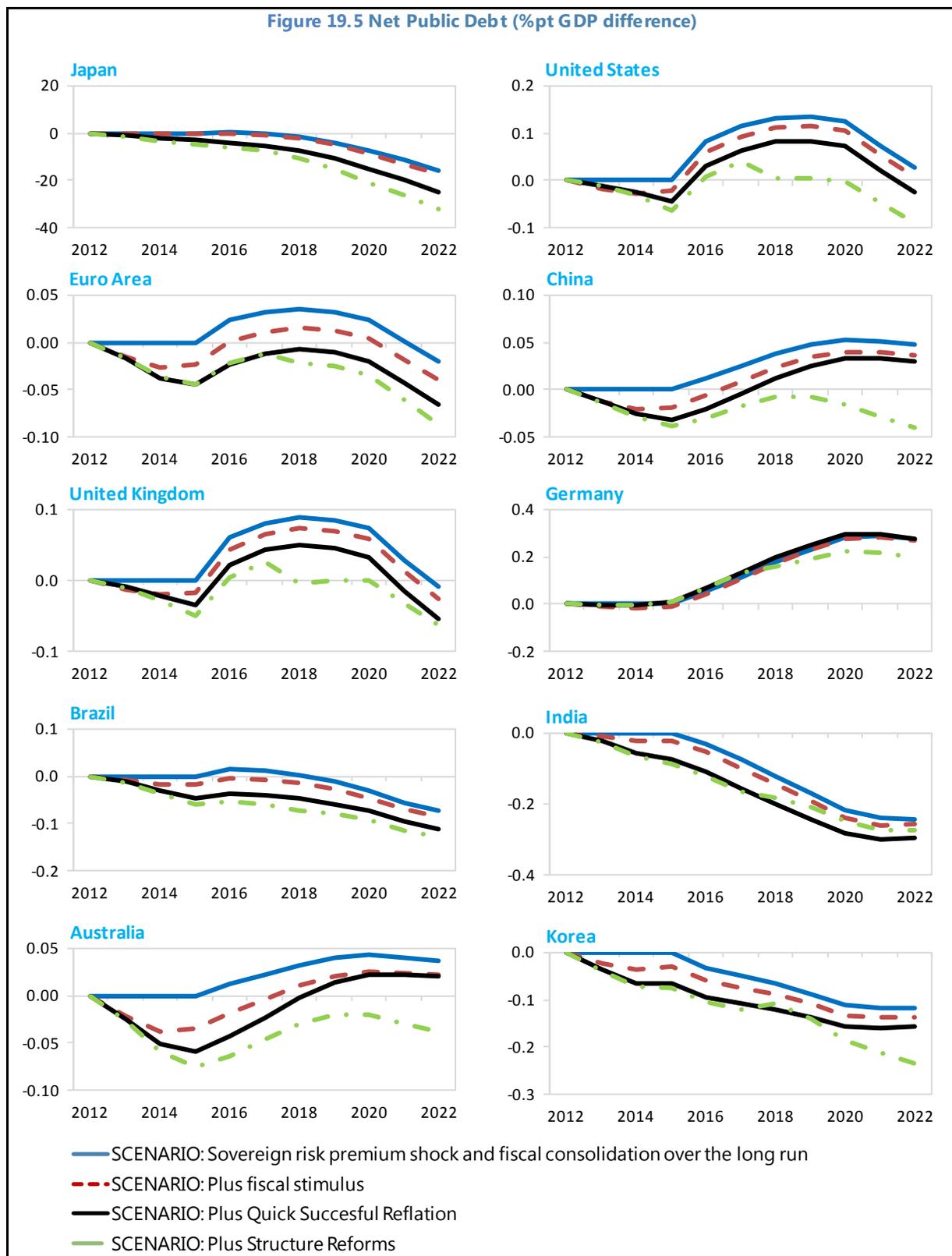


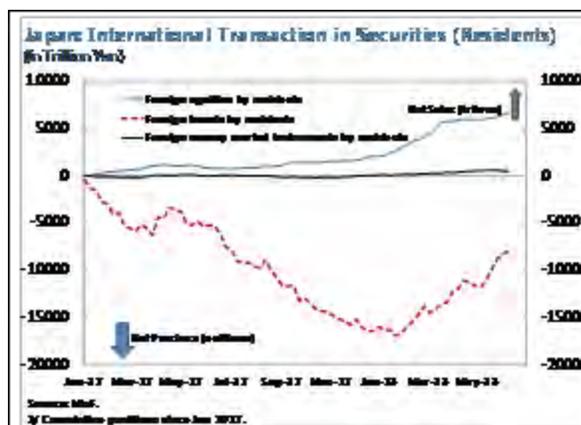
Figure 19.4 Inflation (% pt difference)





2. **Despite the sharp yen depreciation, capital outflows from Japan have been limited thus far.**

Weekly portfolio flows show that foreign investors continued to pour into Japanese equity markets (cumulative about ¥10 trillion since November), more than offsetting net sales of domestic bonds and notes (cumulative about ¥2.1 trillion) during the same period. Domestic investors have sold foreign equities and scaled down foreign bond holdings, though they made modest net purchases during late April and early May. Net assets held in the retail investment trusts (toshin funds)—particularly on equity funds—have increased in early 2013, after net declines in 2012. The increase, however, is mostly driven by valuation effects rather than increasing outflows.



3. **The extent to which portfolio rebalancing under QQME will lead to capital outflows remains uncertain.** The BoJ intends to double the monetary base by about ¥130 trillion (or 27 percent of GDP) in two years. Market analysts expect about ¥40 trillion (US\$400 billion) of private assets would be displaced under the QQME. The magnitude is certainly subject to high degree of uncertainty given that the private sector can leverage up their financial assets for investments abroad. Historically, Japanese investors have often been a net purchaser of foreign assets (mostly foreign bonds and notes) over the last decades, with an average of about ¥12½ trillion per year and never exceeding ¥25 trillion per year. Financial spillovers may have implications to the rest of the world through the following channels:

- **Corporates expanding abroad.** More accommodative financing conditions and an improved growth outlook, will affect incentives for firms to expand abroad.⁸²
- **Rebalancing of portfolio flows.** Financial institutions—notably life insurers and public pension funds—and retail investors may shift their investment portfolios away from domestic government bonds to more risky assets (such as domestic equities, foreign bonds, and equities) over the medium term. This would generate capital outflows, though this could be partly offset by continued foreign inflows into domestic equity markets.
- **Banks' foreign exposures.** Notwithstanding the fact that a pickup of activity in Japan would imply higher domestic lending, with ample liquidity, banks are likely to continue expanding overseas over the medium term, especially in Asia.⁸³

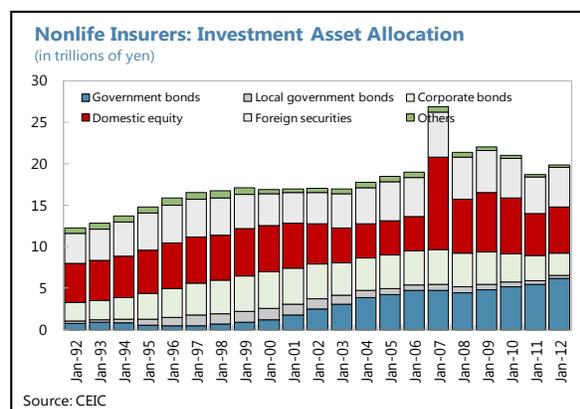
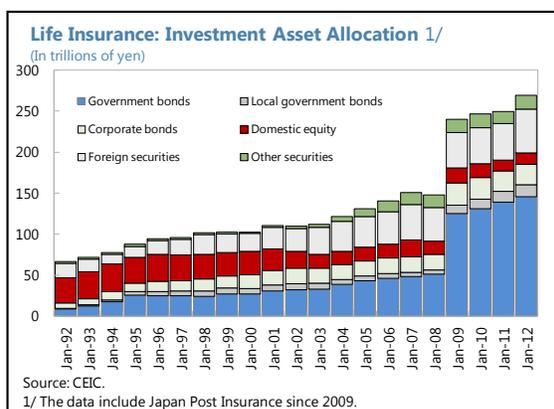
⁸² The IMF Spillover Report 2012 examined the impact of higher FDI from Japan on growth in recipient countries. Banking Sector Risks." See forthcoming Selected Issues Paper of Japan's Article IV.

⁸³ See forthcoming Selected Issues Paper of Japan's Article IV "Japanese Financial Institutions Expanding Abroad: Risks and Opportunities".

4. **The rising trend of outward FDI flows is likely to continue but a successful deflation in Japan may slow the flows.** Japanese corporations have increasingly moved abroad for lower costs and local markets, often in the Asian region—a rise of 1 percent of GDP in Japanese FDI boosts growth by 0.5–0.7 percentage point in recipient countries (IMF, 2012). Empirical analysis also suggests that overseas production and outward FDI are sensitive to real effective exchange rate (REER) movements. For instance, a 10-percentage point depreciation in the REER would slow the overseas production ratio by 1.3 percentage points.⁸⁴ But outward FDI is a long-term trend, as firms aim to locate where the demand is growing and take advantage of cost differentials. Reversal of increasing overseas production or FDI abroad is therefore unlikely given relatively high rate of return on these investments.

5. **As Japanese institutional investors gradually adjust their investment strategies, they may generate some financial spillovers.** The process is likely to be gradual and phased depending on market conditions. In Japan, three significant portfolio sources with foreign exposures are life insurers, government pension investment fund (GPIF), and retail investment trusts (toshin funds).⁸⁵

- **Life insurers have announced a gradual diversification toward foreign securities over the medium-term.** Most insurers acknowledge in their investment plans the strategy to increase holdings of foreign assets, but at the same time, few insurers intend to unwind substantially the JGB holdings in the near future (text table).⁸⁶ Net purchases of foreign bonds and notes were about ¥3.7 trillion for insurers in 2012, of which about two-thirds of foreign bond investments are FX-hedged.⁸⁷



⁸⁴ See 2012 Spillover Report Background Papers: Spillovers through Japan's Overseas Direct Investment.

⁸⁵ Though capital flows over the last years are usually dominated by banks and trust banks, some of these flows are clients of other institutional investors and majority of banks' flows are hedged against FX risks.

⁸⁶ Total assets for life and nonlife insurance sectors reached ¥335 trillion and ¥27.5 trillion as of end-2012, of which about 15–20 percent are invested abroad, mostly in foreign government bonds. If only considering investment assets in life and nonlife insurers, foreign securities account for about 19–24 percent of investment assets.

⁸⁷ Some life insurers also plan to reduce the FX-hedged ratios but the reduction is likely to be small given that the capital requirement for FX-unhedged positions is much higher. For instance, the risk weight for FX-hedged foreign bond investments is 1 percent while that for unhedged ones climb to 11 percent in the calculation of the solvency margin ratio.

- Unless the GPIF increases the investment quota on foreign securities, the scope for further outflows is modest** (text table). The GPIF (total investment assets at ¥112 trillion as of end-2012, about 23 percent of GDP) has been a net seller of JGBs in recent years. Foreign securities holdings have been slightly above the target levels for both bonds and equities (but still within the permissible range). Reaching the maximum of the permissible range on foreign securities would imply less than ¥5 trillion of outflows based on current investment assets as of end-2012. The GPIF has indicated it would gradually diversify toward emerging markets for higher yields over the medium term.⁸⁸

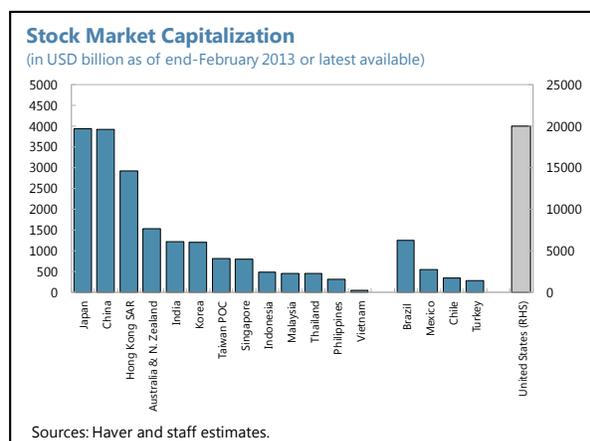
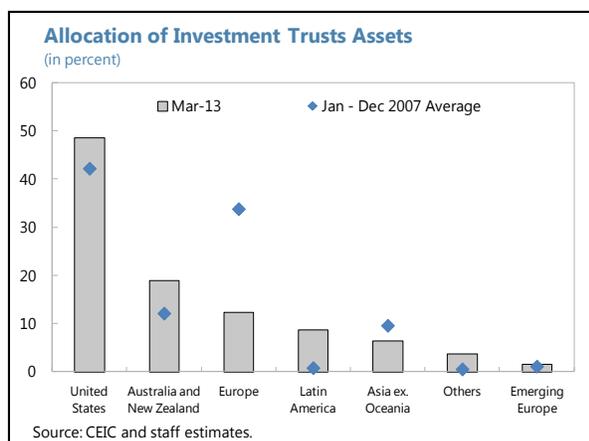
	end-Dec		end-Dec	
	FY2011	2012	FY2011	2012
	in trillions of yen		in percent of total	
Total investment assets	113.6	111.9	100.0	100.0
Domestic bonds 1/	71.9	67.3	63.3	60.1
Domestic equity	14.2	14.5	12.5	12.9
Foreign bonds	9.9	11.0	8.7	9.8
Foreign equities	13.0	14.4	11.5	12.9
Short-term assets	4.5	4.7	4.0	4.2
Asset allocation policy mix 2/				
Domestic bonds			67	(59 - 75)
Domestic equity			11	(5 - 17)
Foreign bonds			8	(3 - 13)
Foreign equities			9	(4 - 14)

Source: GPIF.
 1/ Including FILP bonds
 2/ Each asset class has a permissible range of deviation from the policy asset mix, which is shown in figures in parentheses.

- Households may allocate more of their savings toward foreign assets.** Foreign assets made up only 2½ percent of household financial assets as of end-2012 (a decline from the peak of 3.1 percent in 2007). Foreign exposures in toshin funds are largely unhedged, making those exposures more sensitive to changes in asset prices and exchange rates. For instance, investments in these trusts were one of the key drivers of capital outflows during the mid-2000s.

6. **Emerging Asia has not been a major recipient of Japanese portfolio flows in the past.** Based on past trends, only a modest share (less than 10 percent) of any additional portfolio flows would go to emerging Asia (text charts). Rather most portfolio flows would likely go to advanced economies (except peripheral European countries), which have deeper and more stable debt markets. Relative to pre-crisis levels, more funds are now allocated toward Latin America in search of higher yields. Nonetheless, moderate flows from Japan may be considered large by the recipient countries given that capital markets in some emerging economies are relatively thin.

⁸⁸ The GPIF consists of about 60 percent of total pension assets and other private pensions usually follow similar asset allocation.



7. **Major banks may also generate some financial spillovers through higher overseas lending activities.** These activities have already been expanding, partly as a result of the deleveraging by European banks in the region. These trends are mainly driven by robust growth in Asia, particularly in loan syndication and project finance. In addition to lending, domestic banks increased foreign assets holdings by ¥9.4 trillion in 2012 (¥8.8 trillion excluding the trust banks), but those flows are likely to have limited effect on exchange rates given that major banks usually fund those flows through repo transactions and avoid large open FX positions on foreign securities.

Assessment of capital outflows under Abenomics

8. **Financial linkages have become more complicated, making it difficult to quantify the spillover effects on individual countries.** Policies under Abenomics, if successful, would likely have multiple effects that often work as opposing forces regarding capital flows. Lower interest rates would encourage more capital outflows while an improved domestic outlook and asset prices would discourage outflows or even attract more inflows to Japan. Movements of bilateral exchange rates would exacerbate or alleviate the flows between Japan and other countries.

9. **Financial spillovers may remain moderate in terms of capital outflows, as push factors are less sharp, but those flows may be considered large by some recipient countries.** During Japan's recent past of several aborted recoveries, portfolio outflows to Asia, despite strong trade and investment links, have been modest. For instance after the 2011 earthquake, spillovers to Asia were mainly through supply chains and trade links, rather than capital flows as one might have expected. The effects of easing in Japan on the rest of the world through financial spillovers may be different from other advanced countries:

- **Closed financial system.** Japanese financial system is largely "inward-looking," portfolio rebalancing has been toward domestic securities rather than an outright shift of capital outflows abroad. Japanese investors have been steady net purchaser of foreign securities (average about ¥12½ trillion per year) over the past decade. The higher risk weight of unhedged foreign exchange positions also justifies a gradual and cautious approach in terms of asset reallocation, which tends to limit financial spillovers.

- **External developments.** Global interest rates are likely to remain low in the near term, as easing by major central banks have narrowed the interest differentials. Like some other Asian countries, Japan was sometimes a recipient for portfolio flows, especially from U.S. money-market funds.

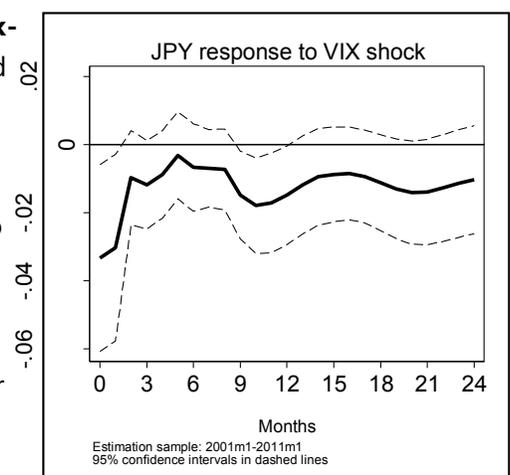
10. **A rise in capital outflows could occur if the yen depreciates further and interest rates in other advanced countries begin to normalize.** First, yen carry-trades could revive once interest rate differentials widen, similar to the previous quantitative easing during mid-2000s when sizeable positions were taken in currencies such as the Australian and New Zealand dollars, and the Brazilian real. Second, a normalization of interest rates in the United States would support a reallocation toward foreign securities, though it would be partly offset by the higher cost of foreign exchange hedging.

11. **Tail risks under an incomplete Abenomics could trigger sizeable negative financial spillovers through domestic financial stability concerns.** An incomplete policy package could likely raise interest risk exposures of Japanese financial institutions, giving a possibility of a spike in interest rates—a tail risk scenario. This could prompt an outright shift away from domestic bonds and generate sizeable financial spillovers through capital flows.

20. The Curious Case of the Yen: A Safe Haven Currency without Inflows

Japan's real exchange rate tends to be relatively volatile: it appreciates during risk-off episodes and more so than other safe haven currencies such as the Swiss franc. More recently, the launch of Abenomics has contributed to large exchange rate depreciation. Curiously though, there are no detectable net capital in- or outflows during these episodes. If it is not through flows, how does the yen fluctuate during these episodes? During risk-off periods, we find that self-fulfilling expectations of currency appreciation leads to forward hedging and reduced short positions, which in turn leads to spot appreciation, which drives the behavior of the real exchange rate.

1. **Large movements in the yen often coincide with risk-on/off episodes.** Following various shocks, the yen appreciated steadily against the U.S. dollar in effective terms since 2008. First, the global financial crisis was associated with a large real exchange rate appreciation. Likewise, following the Tohoku earthquake, the yen appreciated further, complicating efforts to jump-start the economy and exit from deflation. In May 2010, higher market volatility from European sovereign concerns led to a large jump in the VIX and strengthened the yen by about 10 percent against the euro within a matter of weeks. To further illustrate the relevance of risk aversion, uncertainty created by the outcome of the Italy elections led to a whopping intra-day appreciation of the yen against the euro of 5¼ percent and



about 4 percent against the dollar on February 25, 2013. These events are illustrative for the yen's safe haven status.⁸⁹ Indeed, since the mid-1990s, nominal effective yen appreciations of 6 percent or more within one quarter occurred 12 times and were in many cases closely linked to events outside of Japan.⁹⁰ A one-standard deviation shock to the logarithms of VIX would appreciate the yen by close to 4 percent on impact.

2. **More recently, during a global “risk-on” episode and following the adoption of Abenomics, the yen has depreciated substantially.** The combination of a decline in global risk aversion, the larger trade deficit, the widening of the expected interest rate differential with the United States and Abenomics contributed to a significant depreciation of the yen against the U.S. dollar and in effective terms.

3. **Safe haven currencies tend to have low interest rates, a strong net foreign asset position, and deep and liquid financial markets.** Habib and Stracca (2012) find that, focusing on the carry trade, the interest rate spread is consistently associated with a safe haven status in advanced countries, but not in emerging countries, probably reflecting the low liquidity and high transaction costs that are typical for emerging market currencies. This confirms the notion that the interest rate differential is not a fundamental driver of safe haven status, rather it depends on carry trade strategies being pursued. After controlling for the carry trade, they find that safe haven status is robustly associated with stronger net foreign asset positions, an indicator of external vulnerability, and to a lesser extent the absolute size of the stock market, an indicator of market size and financial development. For advanced countries, in addition to the net financial asset position, the public debt to GDP ratio and some measures of financial development and the liquidity of the foreign exchange market (measured by the bid-ask spread) are associated with safe haven status.

4. **Among safe haven currencies, the yen stands out as the one that appreciates the most.**

We follow the methodology introduced in De Bock and de Carvalho Filho (2013) for identifying risk-off episodes. Risk-off episodes are defined as beginning on days when the VIX is 10 percentage points higher than its 60 days backward-looking moving average (see right). Under this definition, there were 11 risk-off episodes during 1992 to end-March 2013. The yen has tended to appreciate on average during these episodes, against the U.S. dollar, the euro and in

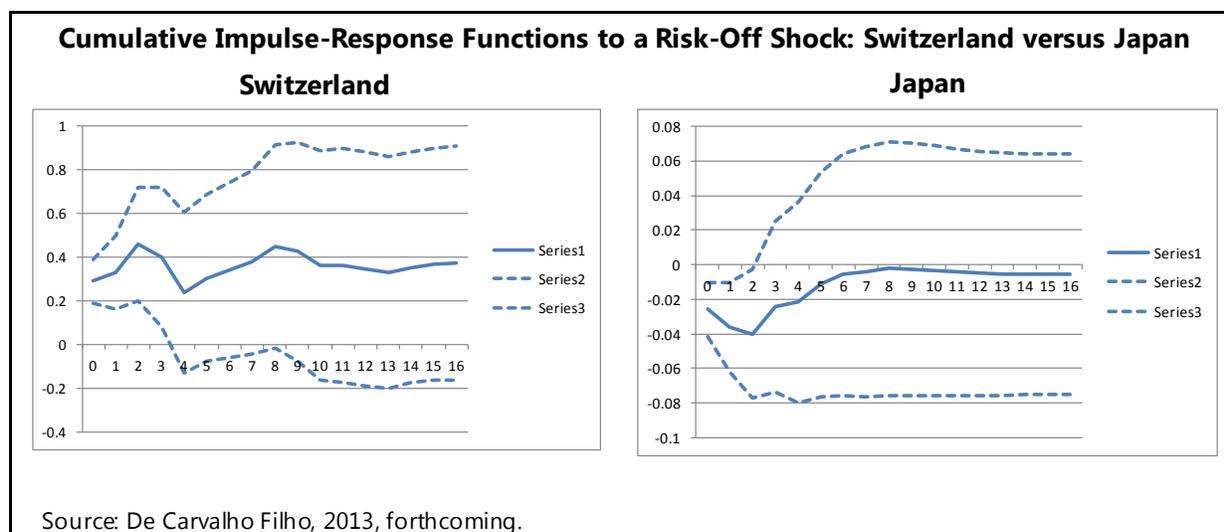
Table 1 Risk-off episodes		
1	3-Aug-90	U.S. savings and loans
2	14-Jan-91	Iraq War
3	29-Oct-97	Escalation of Asian crisis
4	4-Aug-98	Concerns on Russian economy
5	12-Oct-00	Fear of slowing US economy
6	11-Sep-01	9/11 Attacks
7	10-Jul-02	Fear of slowing US economy
8	10-Aug-07	BNP Paribas halts withdrawals from three money market mutual funds announcing it can no longer value holdings of US subprime mortgage backed securities
9	12-Nov-07	Disruptions in USD money markets
10	17-Sep-08	Lehman failure
11	6-May-10	Greek crisis
12	16-Mar-11	Uncertainty over impact of Japan's March 11 Earthquake
13	8-Aug-11	Confrontation over US debt ceiling and deterioration of crisis in euro area

Source: De Carvalho Filho (2012)

⁸⁹ De Bock and de Carvalho Filho (2013) study the behavior of currencies during risk-off episodes. The Japanese yen and the Swiss franc are the only two currencies that on average appreciate against the U.S. dollar during risk-off episodes.

⁹⁰ These include: the Asian crisis in 1998, the 2008 Lehman shock, and the 2010–11 escalation of the euro area crisis and uncertainty surrounding the debt ceiling debate in the United States.

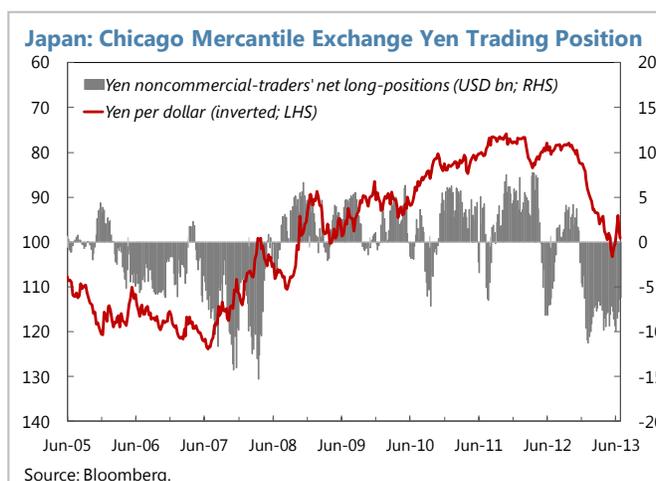
nominal and real effective terms. The relatively larger increase in the yield spread with the United States might be related to the zero-lower bound and correspondingly low yields in the case of Japan, whereas yields in other countries can decline to some extent with lower interest rates in the United States.



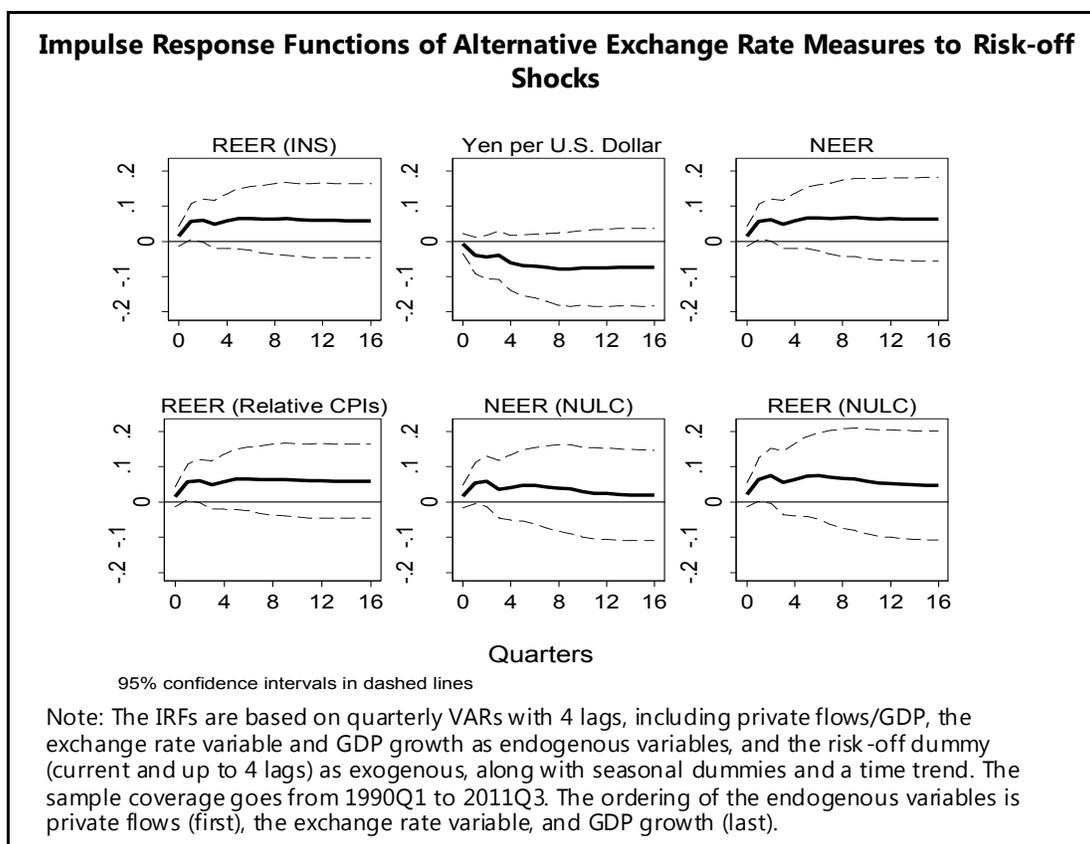
5. **Curiously though, and in contrast to other safe haven currencies, there appear to be limited capital inflows during risk-off episodes in Japan, nor for that matter outflows during the recent depreciation** (Botman, de Carvalho Filho, and Lam, 2013). In

the case of the Swiss franc, appreciation during risk-off episodes occurs through net capital inflows, specifically withdrawals of foreign investment by residents. For the yen, portfolio flows in the Balance of Payments (BoP) did not show a significant change. This raises the question through which channel the

real appreciation is triggered and derivatives transactions are one potential candidate, which are only partially captured in balance of payments data. Specifically, derivatives markets transactions (forwards, currency swaps, and options) get captured by the balance of payments statistics insofar they give rise to an actual payment between onshore and offshore parties, and cash payments usually represent only a very small fraction of the notional value of derivatives contracts. Hence, the balance of payments data tend to underestimate the magnitude of cross-border financial transactions and their potential impact on the spot exchange rate.



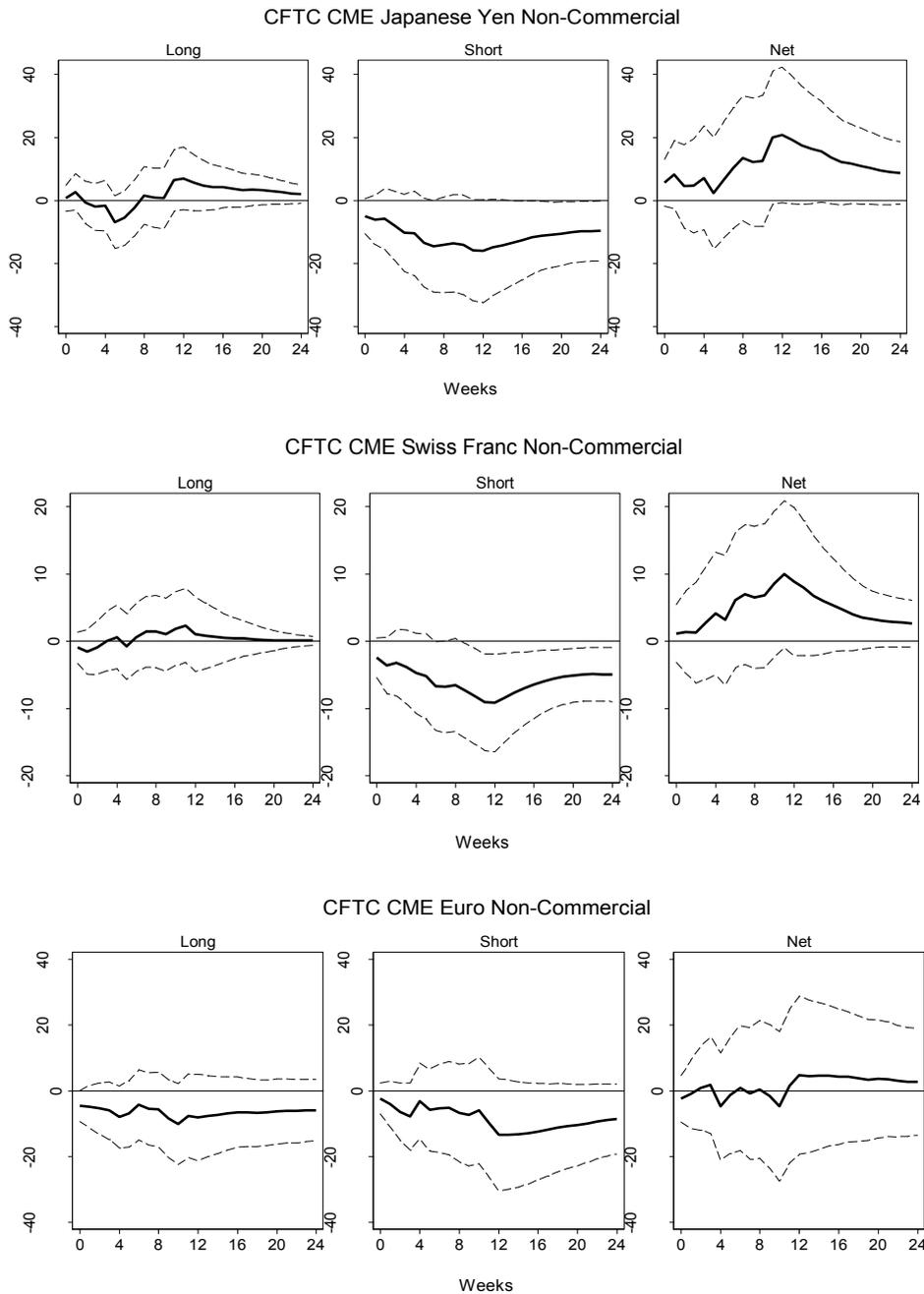
In log changes



6. **How can derivative positions affect the spot exchange rate?** In theory, derivative positions affect the exchange rate through portfolio effects. The impact of forward transactions on spot is instantaneous because banks break forward transactions between a spot and forward desk. Currency swaps affect the spot over time as they are equivalent to a series of forward transactions. Options affect the spot rate through hedging that usually takes place through the forward market (Dwor-Frécaut, 2008). Transactions in the FX derivatives markets largely reflect hedging, funding activities as well as speculation.

7. **We find that risk-off episodes trigger a large reduction in yen short positions, more so than for the Swiss franc and in contrast to the euro.** Self-fulfilling expectations of currency appreciation in combination with fundamental factors could play an important role for the yen's safe haven status. Japan's exporters, overseas affiliates, as well as resident investors who hold dollar assets all have an incentive to step up their FX hedging activities once a risk-off event occurs, given the well-established phenomenon of yen appreciation during these periods. In contrast, importers or institutions with dollar-denominated debt have no incentive to increase their hedges during such episodes. The expectation of yen appreciation can well be supported or triggered by fundamental factors, such as the expectation of narrowing yield and inflation differentials during a risk-off episode, but it are the increased derivative positions that subsequently trigger the exchange rate movement.

Figure 20.1 Cumulative IRFs to a Risk-Off Shock, Non-Commercial Derivative Positions



Note: The IRFs are based on an autoregressive distributed lags (ADL) model $A(L)y_t = B(L)r_t + \gamma t + \varepsilon_t$ where $A(L)$ and $B(L)$ are polynomials of the 12th order on the lag operator. The sample frequency is weekly and coverage goes from March 21, 1995 to December 4, 2012 for the Swiss franc; January 5, 1993 to December 4, 2012 for the yen; March 30, 1999 to December 4, 2012 for the euro.

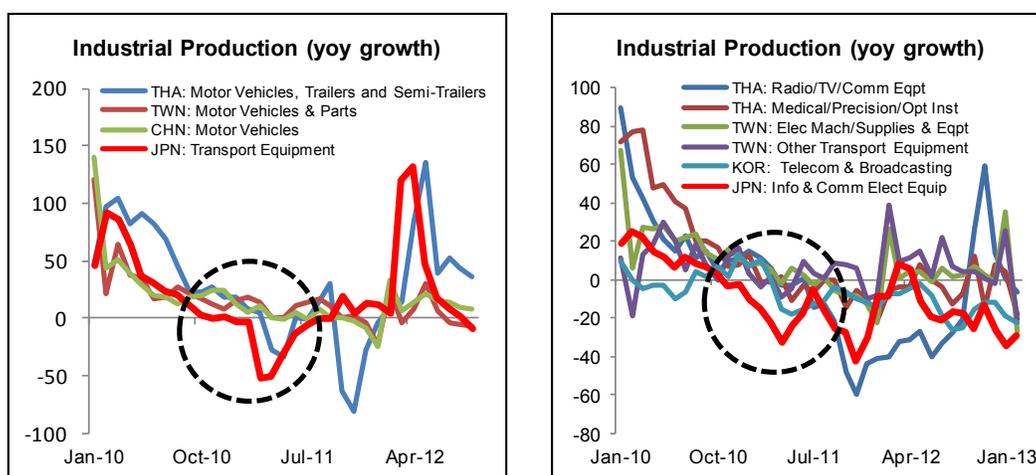
8. **These findings raise a number of issues of wider interest:**

- First, when assessing spillover effects, there is traditionally a focus on capital flows, while it may be the case that the main channel occurs through complex financial instruments that are not (fully) reflected in such flows.
- Second, the welfare effects of spillovers may vary depending on whether exchange rates changes occur with or without capital inflows. A country that experiences exchange rate appreciation as a result of capital inflows may on the one hand lose competitiveness, but on the other hand will experience an offset through lower domestic interest rates and higher investment. To some extent, similar effects on interest rates and domestic activity occur if the appreciation is triggered by derivatives activities instead, although these might be more volatile—indeed, aside from the recent depreciation, there is a strong negative correlation between the implied JGB interest rate in forward contracts and exchange rate appreciation in the case of Japan. More generally, the findings here point to the importance of expanding the analysis of spillovers to offshore financial activities and their repercussions on onshore financial markets and the economy more broadly.
- Third, the fact that the recent sharp depreciation of the yen has occurred despite large capital outflows, qualifies the general belief that quantitative easing will lead to large flows of liquidity to emerging markets, at least for Japan so far.
- Finally, it is less clear whether macro-prudential policies will help to limit excessive exchange rate volatility if this occurs through speculative positions rather than through capital inflows.

21. **The Impact of Yen Depreciation on Exports Prices in Asian Economies**

With the vertical integration of global production processing, a significant amount of imported intermediate inputs are embodied in final exports, mitigating the impact of currency movements on export prices. In the Asia supply chain, Japan is an important supplier of sophisticated manufacturing inputs, limiting the deterioration of price competitiveness of neighboring countries in response to yen depreciation. This also affects price competitiveness in third markets compared to competitors who rely less on Japan for intermediate inputs. Substitution of intermediate inputs to Japanese inputs would further mitigate the negative effects from currency appreciation, but at the cost of lower domestic production.

1. **This section uses a micro-based approach to understand the impact of yen depreciation on price competitiveness of trading partners in the region.** In particular, we consider explicitly the international fragmentation of production processes in understanding the implication on export prices.
2. **Japan plays an important role in the so-called Asia supply chain.** With the vertical integration of production, a significant amount of imports is embodied directly and indirectly in the final exports of trading partner countries. The 2011 earthquake showed the importance of these supply chain linkages in the region: following the earthquake, industrial production and exports in both Japan and many other countries in the region declined on the back of sharp drop of supplies of key intermediate inputs from Japan, which are not easily substitutable.

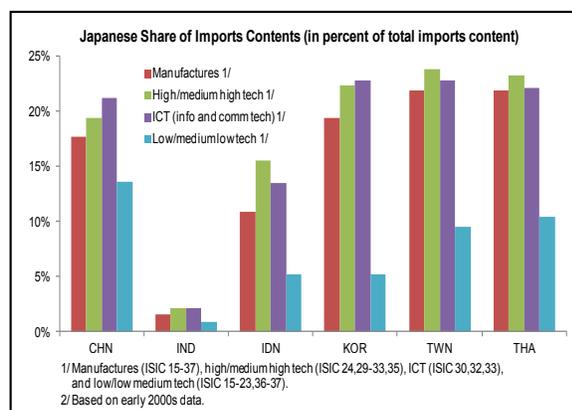
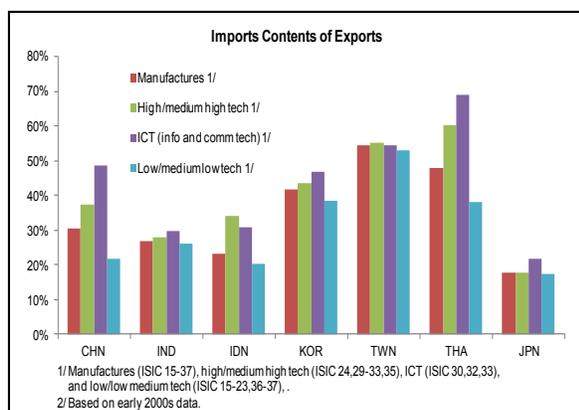


3. **In a world with high vertical integration of global production, the pass-through of changes in exchange rates to export prices is less than one.**⁹¹ In a world where final products are made only with domestically produced inputs, a 10 percent appreciation implies that export prices would increase by 10 percent in the global market. However, in a world with vertical integration, a significant amount of imports is embodied directly and indirectly in the final exports. In such a world, the more imported intermediate inputs are used for final products, the lower the degree of pass-through from exchange rate changes to export prices. For example, as an extreme case, if a country imports intermediate inputs and re-exports them as final products without any domestic processing or mark up, export prices would remain the same and price competitiveness is not affected by currency movements.

4. **The value of imported intermediate inputs embodied in exports, the so-called “imports content of exports,” is sizeable in the manufacturing sector of Asian countries.** By combining the OECD’s harmonized national input-output tables (which shows countries’ inter-industry transaction patterns) with bilateral trade data from industry statistics, we can measure the import content of exports by country and industry.⁹² Significant portions of manufacturing exports from Asian countries are imported intermediate inputs: about 20 to 30 percent for China, India, and Indonesia, and about 40 to 50 percent for Korea, Taiwan Province of China, and Thailand. In particular, those industries that require more advanced technology rely more on imports for their intermediate inputs. For example, almost 70 percent of Thailand’s exports in the information and communication technology industry are actually imported intermediate imports. In contrast, imports content of exports in Japan is relatively small at about 15 percent, reflecting its role as the main supplier of sophisticated manufacturing inputs.

⁹¹ See Riad and others (2012) and IMF (2013) on the increasing importance of global value chains, and Bems and Johnson (2012) and Saito and Turunen (2013) on implications for measuring competitiveness.

⁹² National input-output tables for mid-2000s are available for China, India, Indonesia, Japan, Korea, Taiwan Province of China, and Thailand. Only early 2000s data are available for Singapore and Vietnam.



5. **Several industries in these countries rely heavily on Japan as a source of intermediate inputs (text table).** For example, more than 20 percent of exports are intermediate inputs from Japan for motor vehicles, trailers, and semi-trailers and radio, television, and communication equipment industries in Thailand. Similarly, for motor vehicles, trailers, and semi-trailers, electrical machinery and apparatus, and machinery and equipment industries in Taiwan Province of China, more than 15 percent of exports are intermediate inputs imported from Japan.⁹³

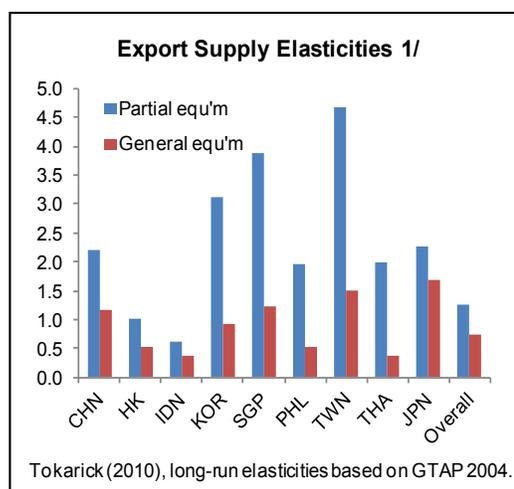
Industries with higher dependency on imports from Japan		
Country	Industry	Japanese Share
Taiwan	C24 Chemicals and chemical products	14.4%
Province of China	C25 Rubber and plastics products	13.8%
	C27 Basic metals	12.8%
	C29 Machinery and equipment n.e.c	15.4%
	C30 Office, accounting and computing machinery	13.0%
	C31 Electrical machinery and apparatus n.e.c	15.8%
	C32 Radio, television and communication equipment	12.3%
	C33 Medical, precision and optical instruments	13.2%
	C34 Motor vehicles, trailers and semi-trailers	16.1%
	C35 Other transport equipment	12.4%
Thailand	C27 Basic metals	10.4%
	C28 Fabricated metal products except machinery and equipment	14.2%
	C29 Machinery and equipment n.e.c	15.7%
	C31 Electrical machinery and apparatus n.e.c	15.9%
	C32 Radio, television and communication equipment	21.6%
	C33 Medical, precision and optical instruments	14.0%
	C34 Motor vehicles, trailers and semi-trailers	22.2%
Korea	C30 Office, accounting and computing machinery	11.0%
	C32 Radio, television and communication equipment	10.8%
China	C30 Office, accounting and computing machinery	11.2%

⁹³ Estimates by Koopman and others (2010), based on GTAP data for 2004, also shows that, for high tech industries in the region, about 15 to 20 percent of value added are coming from intermediate inputs from Japan.

6. **Imported intermediate inputs from Japan would offset some of the impact of yen depreciation on export prices.** Under a Leontief production function in which there is no substitution between factors even with changes in relative prices, including between domestically-produced and imported intermediate inputs, the impact of currency appreciation on export prices would be offset by the size of imports content of exports. In Taiwan Province of China and Thailand, more than 10 percent of exports are imported intermediate inputs from Japan, implying that the effect of yen depreciation would be offset by more than 10 percent. However, this benefit would not be fully passed through to importing countries if prices are set in the importer's currency (so-called local currency pricing).⁹⁴

7. **Substitution toward more use of imported intermediate inputs from Japan would further limit rising export prices.** While estimated elasticities of substitution across countries and sectors by Kee, Nicita, and Olarreaga (2008) show large differences across countries and sectors, the median estimates for machinery/electrical and transportation sectors are about -1 for many Asian countries, implying that there could be substitution toward relatively cheaper Japanese intermediate inputs in response to yen depreciation. If so, export prices would rise by less but potentially at the cost of lower domestic production if those substitutions are away from domestically-produced intermediate inputs.

8. **The impact on export supply also depends on the degree of vertical integration of production.** Relative to the case without any use of imported intermediate inputs, currency depreciation increases the prices of imported intermediate inputs, leading to a lower export supply response. Consistent with the high degree of international fragmentation of production processes in the region, there are large differences for estimated export supply elasticities depending on whether this vertical integration structure is considered or not. Tokarick (2010) shows that long-run export supply elasticities are more than halved for most countries in the region if the feedback through



imported intermediated inputs is considered. For example, in the case of Thailand, the estimates with considering this effect (general equilibrium) is smaller than one-fifth of the estimate without this effect (partial equilibrium). The estimated elasticities in general equilibrium model are smaller than one-third of those in partial equilibrium model also for Korea, Singapore, the Philippines, and Taiwan Province of China.

9. **There is also some potential to gain price competitiveness in third markets.** Since uses of imported intermediate goods will benefit from lower import prices of intermediate inputs from Japan relative to those in other regions who rely less on imports from Japan, if bilateral exchanges

⁹⁴ Ito, Koibuchi, Sato, and Shimizu (2013) find some evidence that Japanese exporters choose the currency of the importer's country in intra-firm trade, while preferring yen-invoicing for arms-length trade.

rates among other currencies remain the same, export prices of Asian countries would increase less than those in other regions in the third market. Thus, countries or industries that are competing less with Japan in their final products could potentially benefit from yen depreciation in third markets.

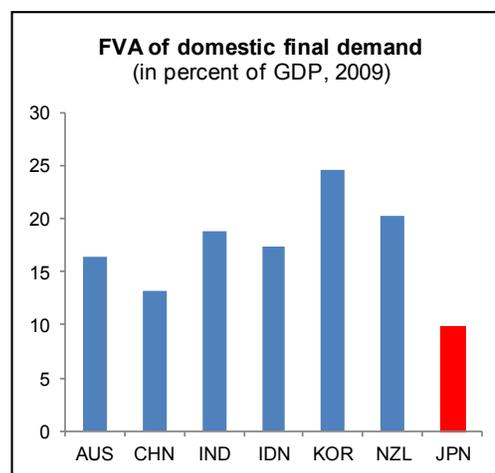
10. **Japanese export prices would also decrease by less than the size of yen depreciation.**

Though lower than those in other Asian countries, the import content of Japanese exports are at around 10 to 15 percent in the manufacturing sector. As imported intermediate inputs from other countries become more expensive by yen depreciation, export prices of Japanese final products would fall by less than the size of yen depreciation. Reflecting the relatively small imports content of Japanese exports, the difference between export supply elasticities with or without considering the vertical integration of production is also relatively smaller compared to other countries in the region.

22. Revitalization of the Japanese Economy and the Asia Supply Chain

Significant portions of Japanese domestic final demand (consumption, investment, and government spending) and gross exports are value added imported from other Asian countries. The recently released database by the OECD-WTO reveals that domestic value added, which is directly or indirectly exported to Japan for their final demand or for intermediate inputs for exports, account for about 3 percent of GDP in Australia, Indonesia, and Korea, and about 1.5 percent in China and New Zealand. This implies that a successful revitalization of Japan's economy would be beneficial to other countries in the region through demand spillovers.

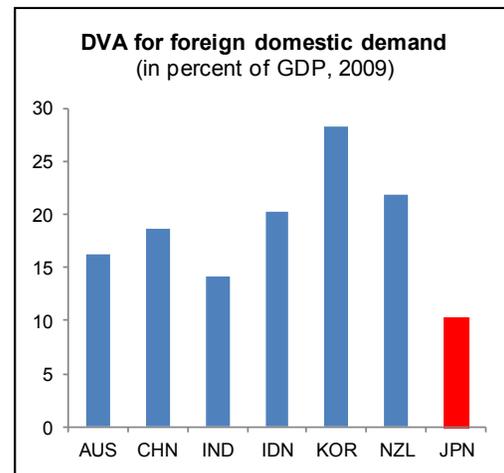
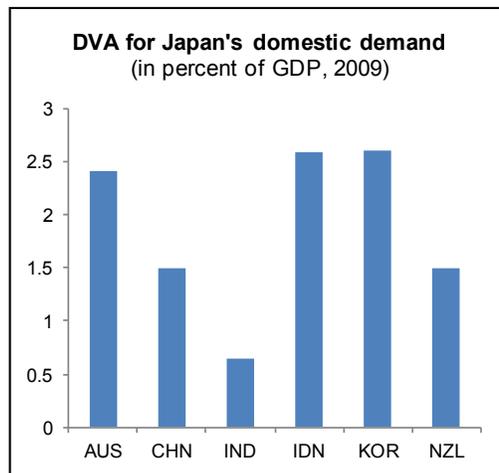
1. **To assess the potential positive spillover from higher Japanese growth, this section quantifies the size of value added exports from Asian countries to Japan for their final demand or intermediate inputs for exports.** Conventional approaches combine each country's input-output tables and bilateral trade database, but this captures only direct export linkages between countries. In contrast, the recently released "Trade in Value Added" database by OECD-WTO traces both direct and indirect exports among countries and industries and thus better reflects the vertical integration of the production structure of the global economy.⁹⁵ For example, if country A's intermediate goods that are exported to country B are re-exported to country C, it is captured as country A's value added exports to country C in this approach. It allows us to quantify the relative size of domestic and foreign value added (FVA) contents in both gross exports and final demand (private consumption, investment, and government spending) of a country or industry of interest. In this section, we focus on the six Asian countries and Japan included in this database.



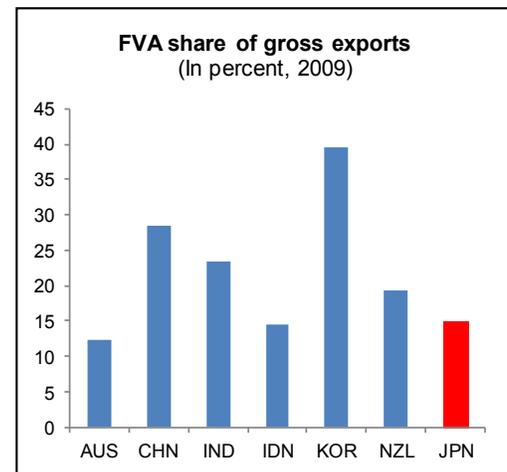
⁹⁵ This database was recently released for the first time on January 2013 and is based on input-output tables as of 2005 and bilateral trade database of 2005, 2008, and 2009. It covers 40 countries (OECD countries, BRICs, Indonesia, and South Africa) and 18 industries. Seven Asia and Pacific countries are included in this database: Australia, China, India, Indonesia, Japan, Korea, and New Zealand.

2. **Significant portions of final domestic demand in Asian countries are value added imported from other countries.** In the case of Korea, imported FVA that is used for domestic final demand amounts to about a quarter of GDP. Foreign value added for domestic final demand is significant in other Asian countries, at about 20 percent of GDP in New Zealand and more than 15 percent for Australia, India and Indonesia. In the case of Japan, imported FVA embodied in final domestic demand is less than 10 percent of GDP, of which more than 2 percent are for the mining and quarrying industry and about 3 percent are from the six Asian countries in the sample.

3. **Correspondingly, significant portions of domestic value added (DVA) from Asian countries are exported for final demand in other countries, including Japan.** Reflecting high trade openness, DVA corresponding to more than 28 percent of GDP in Korea are exported to foreign countries for their final domestic demand. Similarly, Indonesia and New Zealand export domestically created value added amounting to more than 20 percent of their GDP to meet final domestic demand of other countries. Reflecting the importance of Japan as a final consumption destination in Asia supply chain, domestically created value added of these Asian countries that are directly or indirectly exported to Japan to meet their final domestic demand is also sizeable: about 2½ percent of GDP for Australia, Indonesia, and Korea, and 1½ percent for China and New Zealand.

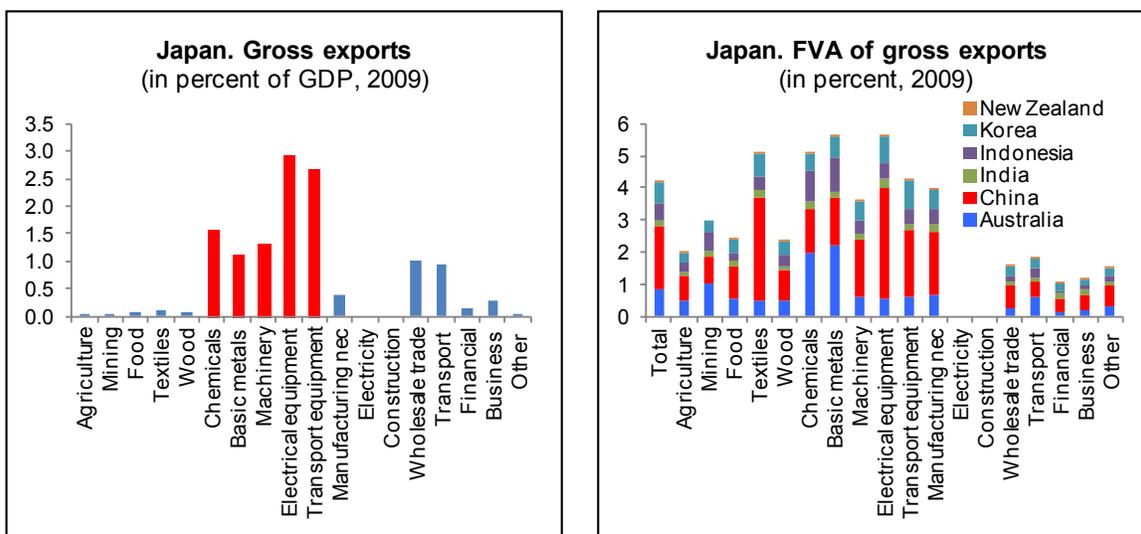


4. **Imported intermediate inputs account for significant portion of gross exports for Asian economies.** Foreign value added of gross exports varies across countries, with Korea the highest at more than 35 percent among Asian countries, which means that DVA contents are less than 65 percent of its total gross exports. In the case of Japan, reflecting that they are the main supplier of sophisticated manufacturing inputs, FVA of gross exports are relatively small at less than 15 percent, which means that more of than 85 percent of its gross exports are domestically created value added. In Japan, five manufacturing industries account for 87½ percent of total exports and FVA of gross exports are among the highest in these five industries;

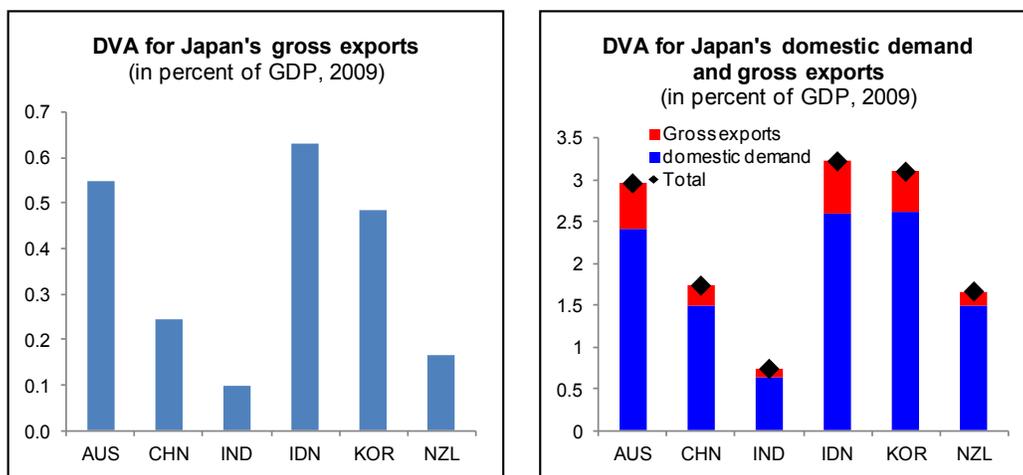


(i) chemicals and non-metallic mineral products, (ii) basic metals and fabricated metal products, (iii) machinery and equipment, nec, (iv) electrical and optical equipment, and (v) transport equipment.

5. **Value added created in the six Asian countries in the sample accounts for about 4¼ percent of total Japanese gross exports.** While varying across industries, in total, China (1.9 percent) and Australia (0.9 percent) are the two largest exporters of intermediate inputs to Japan to be used for gross exports. In terms of each exporting country's GDP (in 2009), exported value added that are eventually used for Japanese gross exports varies from about 0.1 percent in India to more than 0.6 percent in Australia.



6. **A successful revitalization of Japan's economy would be beneficial to other countries in the region through demand spillovers.** Domestic value added—which are directly or indirectly exported to Japan for their final demand (private consumption, investment, and government spending) or intermediate inputs for exports—account for about or more than 3 percent of GDP (2009) in Australia, Indonesia, and Korea, and more than 1.5 percent in China and New Zealand. So if Japanese economy revives and maintains sustained growth going forward with strong growth both in exports and domestic demand, it would be also beneficial to other countries in Asia supply chain through this value added network.



References

- Bems, Rudolfs, and Robert C. Johnson, 2012, "Value-Added Exchange Rates," NBER Working Paper No. 18498 (Cambridge, MA: The National Bureau of Economic Research).
- Botman, Dennis, Irineu de Carvalho Filho, and Raphael Lam, 2013, "The Curious Case of the yen: A Safe Haven Currency without Inflows," mimeo.
- De Bock, Reinout, and Irineu de Carvalho Filho, 2013, "The Behavior of Currencies during Risk-Off Episodes," IMF Working Paper 13/08 (Washington: International Monetary Fund).
- De Carvalho Filho, Irineu, 2013, "Risk-Off Episodes and Swiss Franc Appreciation: The Role of Capital Flows," mimeo.
- Dwor-Frécaut, Dominique, 2008, "Korea's Money Market," in: *Korea's Economy 2008*, Korea Economic Institute and Korea Institute for International Economic Policy, pp. 27-29
- Habib, Maurizio M., and Livio Stracca, 2012, "Getting Beyond Carry Trade: What Makes a Safe Haven Currency?" *Journal of International Economics* Vol. 87(1), pp. 50-64.
- International Monetary Fund, 2012, *2012 Spillover Report—Background Papers*, IMF Policy Papers (Washington).
- International Monetary Fund, 2013, *Trade Interconnectedness: The World with Global Value Chains*, (Washington).
- Ito Takatoshi, Satoshi Koibuchi, Kiyotaka Sato, and Junko Shimizu, 2013, "Choice of Invoicing Currency: New Evidence from a Questionnaire Survey of Japanese Export Firms," REITI Discussion Paper Series 13-E-034 (Tokyo: The Research Institute of Economy, Trade and Industry).
- Kee, Hiau Looi, Alessandro Nicita, and Marcelo Olarreaga, 2008, "Import Demand Elasticities and Trade Distortions," *The Review of Economics and Statistics*, November, 90(4), pp. 666-82.
- Koopman, Robert, William Powers, Zhi Wang, and Shang-Jin Wei, 2010, "Give Credit Where Credit Is Due: Tracing Value Added in Global Production Chains," NBER Working Paper No. 16426 (Cambridge, MA: National Bureau of Economic Research).
- Riad, Nagwa, Luca Errico, Christian Henn, Christian Saborowski, Mika Saito, and Jarkko Turunen, 2012, *Changing Patterns of Global Trade*, IMF Departmental Paper (Washington: International Monetary Fund).
- Saito, Mika, and Jarkko Turunen, 2013, "Measuring Competitiveness: Add the Supply Chain?" manuscript (Washington: International Monetary Fund).
- Tokarick, Stephen, 2010, "A Method for Calculating Export Supply and Import Demand Elasticities," IMF Working Paper No. 10/180 (Washington: International Monetary Fund).

VIII. SPILLOVERS FROM THE UNITED KINGDOM⁹⁶

23. Spillovers from United Kingdom Macroeconomic Policies

We look at how a combined policy package of monetary easing, targeted fiscal stimulus, and structural reforms could benefit the U.K. economy, and its effects on other countries. The exercise is done using the G20MOD model, a multi-country structural macro model of the global economy with individual blocks for each G20 country and several other regions. In sum, we find that such a policy package would have positive outward spillovers for the U.K.'s major trading partners, despite the sterling's depreciation (see Figure 23.1.).

1. **The exercise starts by matching the path of the WEO projection output gap with a (temporary) negative demand shock producing an output gap of about -4 percent.** In the baseline, the recovery is slow—the output gap takes 6 years to close—in part because policy rates are assumed to be constrained by the zero bound and hence there is little scope for traditional monetary policy easing. Weak demand is associated with higher-than-usual saving rates and a current account surplus, and puts downward pressure on underlying inflation. With decreasing nominal demand, public debt to GDP increases, before coming down as nominal GDP rises and the need for automatic fiscal stabilizers wanes. With nominal rates at the zero bound for 3 years and lower inflation, real rates are higher, putting additional downward pressure on consumption and investment. The real exchange rate initially moves in line with real interest differentials.
2. **We sequentially layer growth-supporting policies, starting with monetary stimulus, extending to temporary fiscal stimulus, and finally immigration and education reforms.** In the first variation, we assume that the central bank adopts unconventional monetary policy measures, equivalent to a 60 bps easing in policy rates relative to the baseline. In the second variation, temporary fiscal stimulus is added to the monetary support: 1 percentage point of additional expenditure on public investment for two years, financed with debt. In the third variation, immigration reforms are enacted that boost the labor supply by 1½ percent over the course of 4 years, in addition to the fiscal and monetary support. Finally, education reforms are assumed to boost potential output by 3 percent over a 5-year period from 2016 to 2020.
3. **The impact on the U.K.'s own growth, cyclical and potential and, hence, public debt trajectory is favorable.** The monetary stimulus has immediate effects, boosting demand by about 1 percent (although the effect dissipates after 5 years). Demand is also boosted by the fiscal stimulus; in that case the spending on public investment also brings with it permanent increases in productive potential. The structural reforms only bear slight improvements to output initially, but have more significant effects later. Inflation is also higher than in the baseline path, reducing real rates. With greater domestic absorption, the current account surplus is not as large. With higher nominal output, the increase in the public debt ratio is less than that in the baseline.

⁹⁶ Prepared by the U.K. country team.

2. **The real exchange rate depreciates.** The increases in productive potential require a shift in the terms of U.K. trade to shift some of the extra production externally—the long-run effect is therefore a net depreciation. In the short run, positive real exchange rate differentials in the United Kingdom encourage an appreciation from the starting point (i.e. before the negative demand shock), but this is gradually offset by the policy measures such that the exchange rate is very slightly below its starting point (and about 2½ percentage points below the baseline level in 2013).

3. **Favorable spillovers to other countries follow from a combination of these effects.** By definition, sterling depreciation requires offsetting real exchange rate appreciation in other economies. Appreciations are largest in the cases of Canada, India, Russia, and the United States. But despite the appreciation, the improved demand from the United Kingdom dominates and the net effect for all countries is stronger exports than in the baseline.

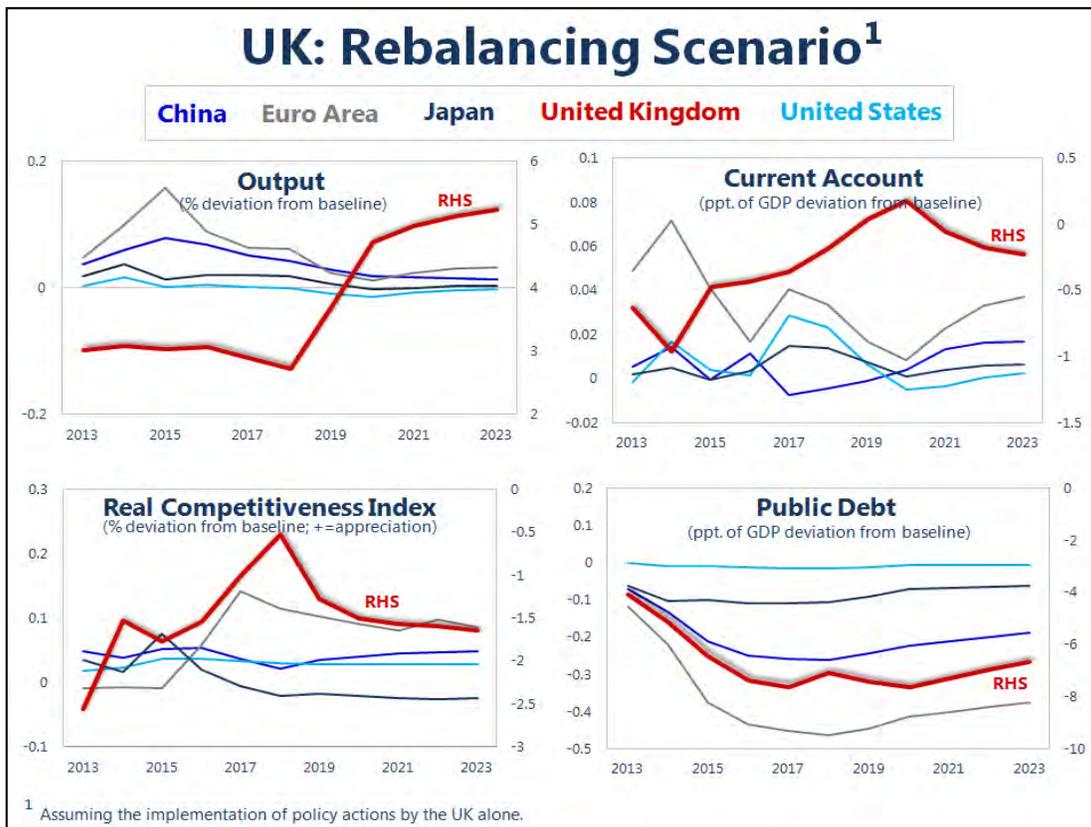
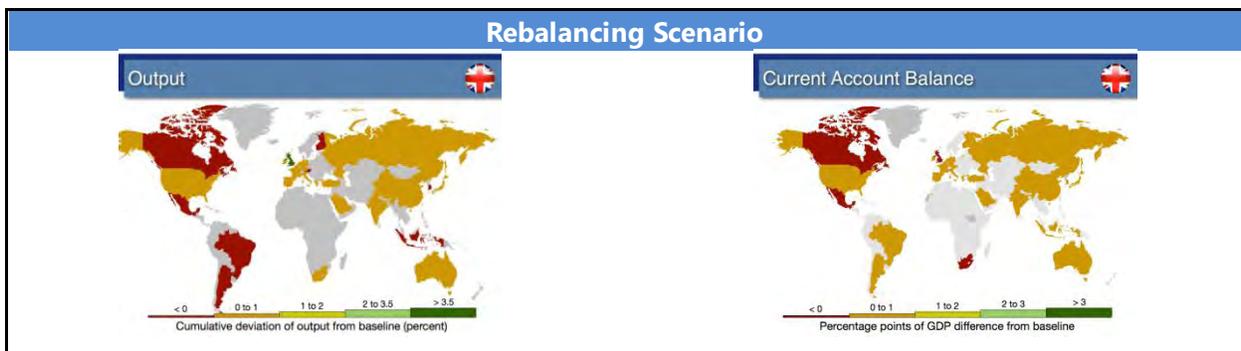
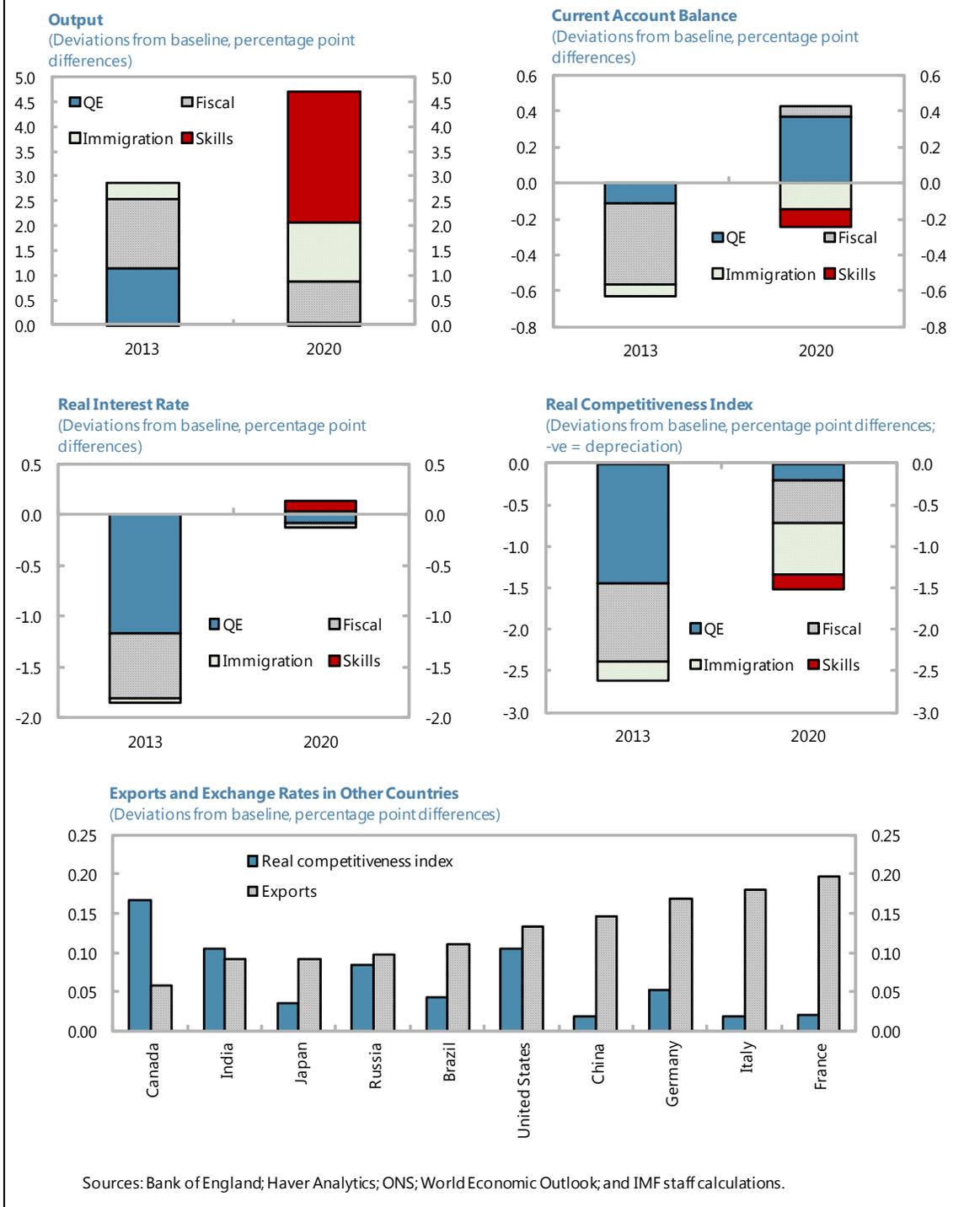


Figure 23.1 United Kingdom: Real Spillovers



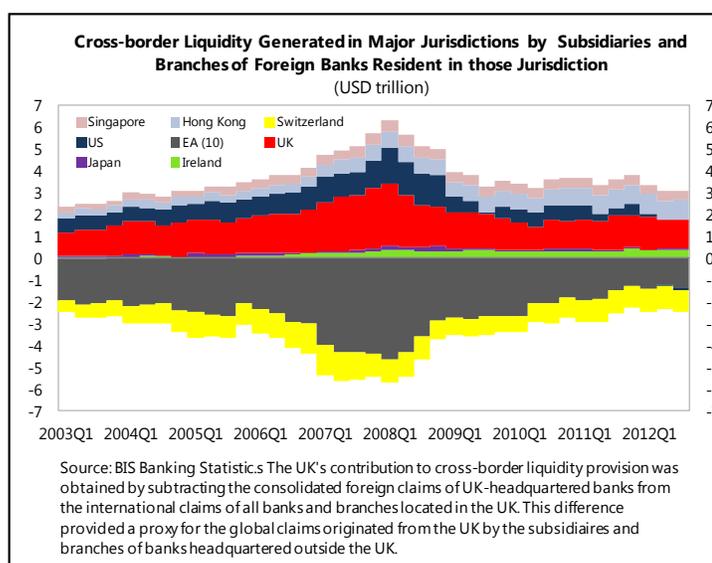
24. Financial Spillovers

We show that the United Kingdom has preserved its status as a major financial center, with its near-50 percent half share of global cross-border liquidity generation by branches and subsidiaries of foreign banks broadly unchanged from pre-crisis levels. At the same time, Asian financial centers (Hong Kong and Singapore) are rising and, together, match the U.K.'s share. Given that the United Kingdom is the reporting home of many global banks with substantial presence in Asia, this highlights the importance of coordination between U.K. and Asian regulators, including in relation to macroprudential capital requirements. We also study the emerging risks of activity migration to the nonbank sector, showing that U.K.'s globally-systemically important banks are now more vulnerable to U.K. nonbanks. One of the upshots for policy is that intensive supervision of the U.K.'s financial system is vital for the safety and soundness of global finance.

The United Kingdom remains the world's leading liquidity hub, but Asian centers are rising

1. **Despite being affected severely by the crisis, the United Kingdom has held its position as the most important global hub for cross-border liquidity generation.** A number of subsidiaries and branches of banks headquartered *outside* the United Kingdom generate and distribute global liquidity (i.e. claims on non-U.K. jurisdictions) *through* the United Kingdom. Although the current quantum of such liquidity is half its pre-crisis peak of U.S.\$ 2.8 trillion, it is comparable to 2003-06 levels, and has been broadly stable since early 2010. Thus, the United Kingdom has retained its status as the world's leading liquidity hub, while the United States and Japan appear to have withdrawn from this function.

2. **The rise of Asian financial centers will reinforce the significance of the United Kingdom as the reporting home of two major Asia-centered banks.** Preliminary estimates – based on an approximation of the consolidated foreign claims of Hong Kong SAR and Singapore using BIS locational data by nationality – suggest that these two hubs together generate a similar amount of cross-border liquidity as the United Kingdom. On one hand, this implies stiffer competition for the position of the world's leading liquidity generator. On the other hand, it will reinforce the U.K.'s role in its position as the home of HSBC and Standard Chartered, which have substantial and expanding presence in Asia.



Capital requirements for U.K.'s global banks can generate significant outward spillovers

3. **As the headquarters of several large global banks, the impact of U.K. regulation will be transmitted globally.** HSBC and Standard Chartered are just two examples of several internationally-focused banks that have chosen the United Kingdom as their reporting home. Indeed, the size of all U.K.-headquartered MFIs' outstanding foreign currency assets (£8.1 trillion at end-April 2013) was 2¼ times the size of their sterling assets (£3.7 trillion), and why sound regulation and supervision of these banks constitutes a global public good. This setting, however, also implies that the imposition by U.K. regulators of capital charges tied to U.K.-headquartered MFIs' U.K. operations could end up significantly impacting the size and distribution of those MFIs' "global" asset portfolios as well, insofar as capital requirements are not exclusively met through new capital raising.

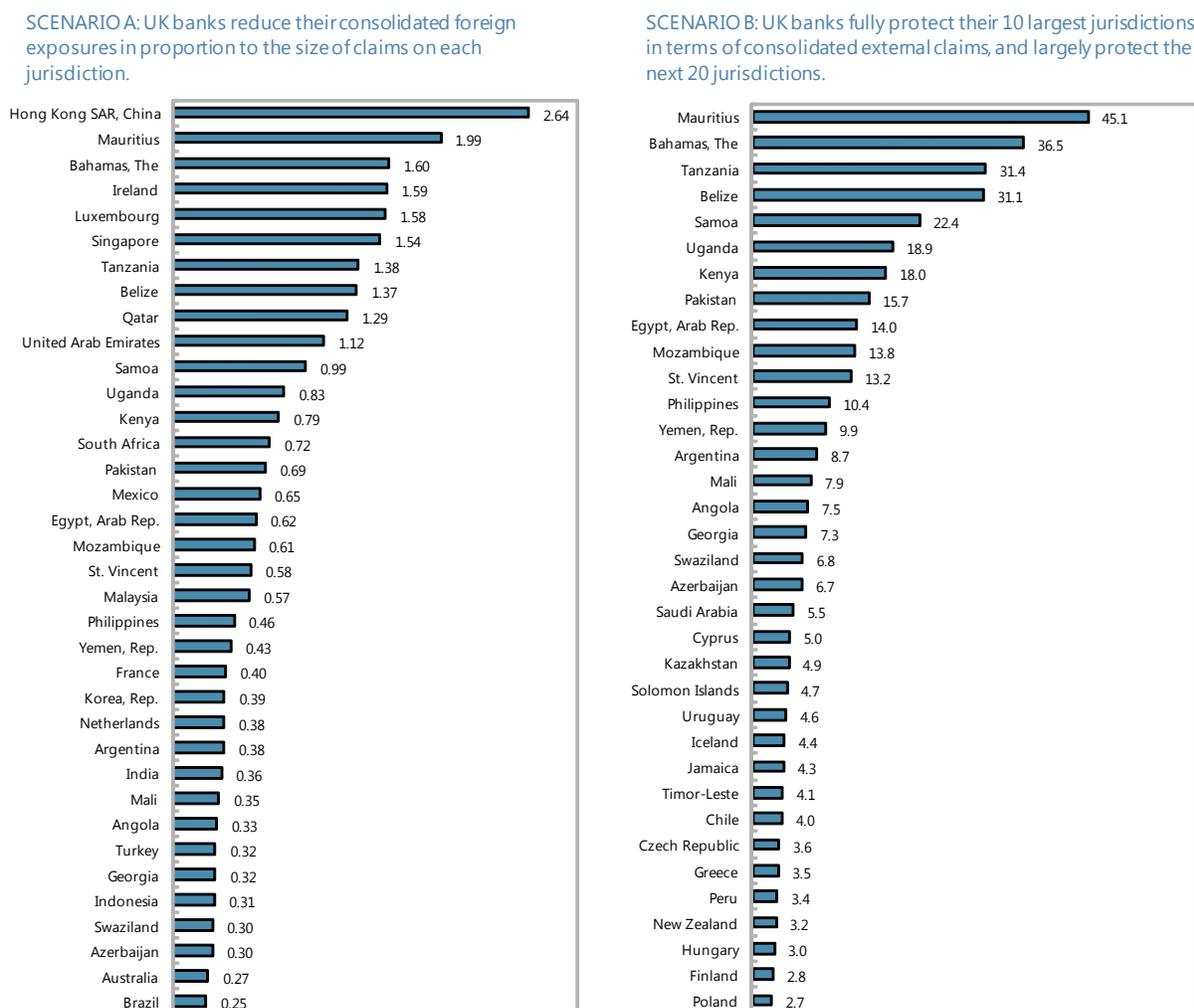
4. **It is instructive to attempt an approximate quantification of the impact of new anticipated capital requirements in the United Kingdom.** Two new capital charges are expected to apply to U.K.-headquartered banks over the medium-term, including as part of the new macroprudential framework: the 2.5 percent charge for globally-systemically important banks, and 2.5 percent countercyclical capital buffer. In order to broadly size the impact of such requirements, we make use of recent empirical estimates by Aiyar et al (2013) of the cross-border lending effect of higher capital charges on U.K. banks (4 percent reduction in lending for a 1 percentage point higher capital ratio). We extrapolate this to the case of a 2.5 percentage point higher capital requirement (so a 10 percent impact on cross-border lending), and assume that British banks' foreign affiliate claims on nonbanks will be similarly affected as their cross border claims.

5. **The results of the exercise intuitively highlight the importance of U.K. banks' global strategies for determining which jurisdictions are affected by how much.** For instance, it is possible that affected U.K. banks respond to higher capital requirements by adopting option A: reducing their cross-border and affiliate lending *in proportion to their exposure to each economy*. This is unlikely, but if it happens, it could tighten domestic credit in Hong Kong, Singapore and Ireland by over 1 percent. Alternatively the banks could opt for an arguably more realistic option B: *cutting lending to and operations in non-core destinations only*, while protecting top (or largest) 10 destinations. In this case, lending to higher-risk jurisdictions, such as Egypt, Kenya, Pakistan, Tanzania could drop to zero. Banks can also outright relocate their headquarters (for instance, HSBC and SCB could decide to relocate to Asia, given that much of their operations are that jurisdiction any way), but this is not shown below.

6. **This suggests that U.K. regulators should internalize these outward spillovers, which could be positive or negative for recipient economies.** Whether the identified spillovers are beneficial or not depends partly on the macroeconomic and financial circumstances prevailing in the recipient economies. Consider, for instance, the case where the United Kingdom imposes countercyclical capital requirements on British banks' U.K. exposures to address overheating in the U.K. economy and banks partially meet this requirement by reducing their exposures to a jurisdiction that is also over-heating. In this case, the associated reduction in credit in that jurisdiction will clearly constitute a positive spillover. However, if some banks decided to reduce their exposures to economies already facing a slowdown, or closed entirely their operations in some non-core

jurisdictions, this would carry significant negative spillovers. To the extent possible, the U.K. authorities should seek to consider such impacts before altering micro- or macroprudential policies as they apply to global banks.

Figure 24.1 Percentage Decline in Domestic Credit Due to 2.5 ppt. Higher Capital Requirement Imposed by U.K. Regulator on Banks Headquartered in the United Kingdom.



Source: (a) *BIS*, for British banks' consolidated foreign nonbank claims (calculated as British banks' average consolidated total foreign claims in 2010-11 multiplied by 0.44, where 0.44 was the average share of nonbank claims in *international* consolidated claims across all countries in 2010-11; (b) *WDI*, for average 2010-11 credit to private sector for each country. The percentage decline in domestic lending was then calculated as $100 \times (a/b) \times (0.04 \times 2.5)$, where 0.04 is the assumed semi-elasticity of UK-headquartered banks' consolidated foreign claims to capital requirements. This is an extrapolation of the 0.04 estimate for U.K. banks' cross-border credit spillover from capital requirements produced by Aiyar et al (2013), "The International Transmission of Bank Capital Requirements: Evidence from the U.K.", paper presented at NBER conference in Cambridge, MA (April 2013).

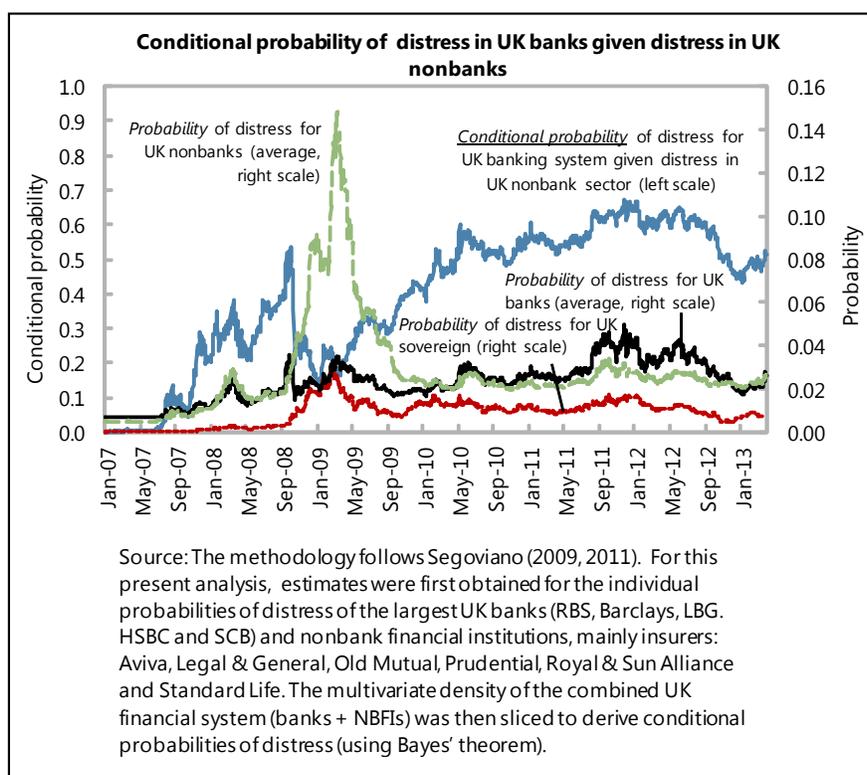
The systemic importance of U.K. nonbanks is rising

7. **Despite a low aggregate probability of default, the U.K. banking system's vulnerability to the nonbank sector has increased sharply since 2009.** The conditional probability of distress (CoPoD) of the U.K. banking system given distress in the nonbank sector (mainly insurance companies) is about 0.5, which seems high, and has doubled from 2009 levels. At this point, we can

only conjecture about underlying reasons: perhaps banks are more reliant on funding from insurance companies; or insurance companies are helping to shore up a range of asset prices (for the sovereign, banks and firms) that improves prospects for banks. Notwithstanding this ambiguity, the results are “interesting” in that they highlight the future systemic risk associated with any “activity migration” from banks to (lightly-regulated) nonbanks that could result from an asymmetric tightening of price-based and structural measures for banks. Although only the probability of distress of U.K. banks following distress on U.K. nonbanks is shown below, it is easy to see that there would be spillovers for non-U.K. banks and non-banks as well, given the G-SIB status of several U.K. banks.

8. **This result is important, because tighter regulation/ring-fencing of banks could lead significant banking activity and risks to migrate to nonbanks and shadow banks.** Vinals et al (2013, p. 24) notes the clear possibility of regulatory arbitrage in the context of these changes: “Banks, particularly the internationally active ones, will optimize across different rule books by moving operations, changing corporate structures, and redesigning products in ways that could weaken policy effectiveness. This could push risks outside the regulated financial sector into shadow banks whose regulation and supervision may not be as strong.”

9. **Intensive and pro-active supervision of U.K. nonbanks and shadow banks is essential to effectively contain systemic risks.** The United Kingdom is as vulnerable as any other major jurisdiction to this risk. And to their credit, the U.K. authorities have positioned themselves well for these risks by adopting a “twin-peaks” model where the supervision of all systemic institutions, including insurers, for instance, is housed in a single agency, the Prudential Regulatory Authority. However, the authorities will need to keep a close watch on the activities of nonbanks that are currently not deemed systemic, but may be becoming so.



IX. SPILLOVERS FROM THE UNITED STATES

25. Effects of Accelerated Monetary Normalization in the US Using G-35⁹⁷

1. **This note analyzes the global macroeconomic effects of an accelerated normalization of the stance of monetary policy in the United States, ahead of the other major currency areas.**

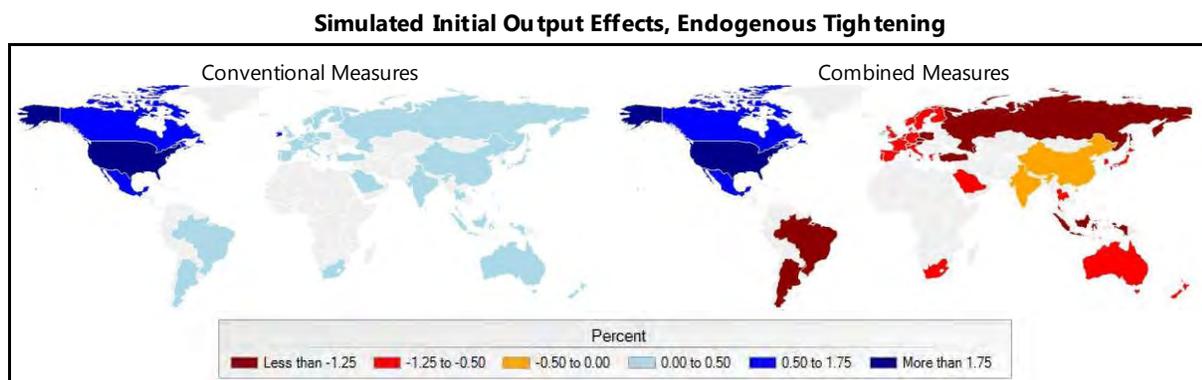
This analysis is based on scenarios simulated with the structural macroeconomic model of the world economy, disaggregated into thirty five national economies, documented in Vitek (2013). Within this framework, each economy is represented by interconnected real, external, monetary, fiscal, and financial sectors. Spillovers are transmitted across economies via trade, financial, and commodity price linkages. Financial linkages are both direct, through cross-border debt and equity portfolio holdings, and indirect via international comovement in asset risk premia.

2. **Our scenarios account for an accelerated monetary normalization in the United States with a combination of conventional and unconventional measures.** Under our first scenario, conventional monetary policy tightening is the result of endogenous nominal policy interest rate increases in response to a stronger than expected private domestic demand driven cyclical expansion generated with a sequence of temporary but persistent intertemporal substitution shocks, which shift private consumption and investment expenditures. These intertemporal substitution shocks are phased in gradually to raise the nominal policy interest rate by 100 basis points over two years starting in 2014Q3, and to subsequently lower it by this amount over two and a half years. Under our second scenario, conventional monetary policy tightening is instead the result of exogenous nominal policy interest rate increases generated with a sequence of temporary monetary policy shocks, which represent deviations from the monetary policy rule. These monetary policy shocks are phased in gradually to raise the nominal policy interest rate by 100 basis points over one year starting in 2014Q3, and to subsequently lower it by this amount over three and a half years. Under both of these scenarios, unconventional monetary policy tightening is represented by exogenous increases in long term nominal market interest rates generated with sequences of internationally correlated and temporary but persistent duration risk premium shocks. These duration risk premium shocks alter the slope of the yield curve, and are phased in gradually to contribute to raising the long term nominal market interest rate by 100 basis points over one year starting in 2014Q3, and to subsequently lower it by this amount over three and a half years. We assume that monetary policy responses remain constrained by the zero lower bound on the nominal policy interest rate through 2015Q2 in the Czech Republic, Denmark, the Euro Area, Japan, Switzerland, and the United Kingdom. All of the simulation results that follow are linearly scalable, and would be halved under 50 as opposed to 100 basis point interest rate increases in the United States.

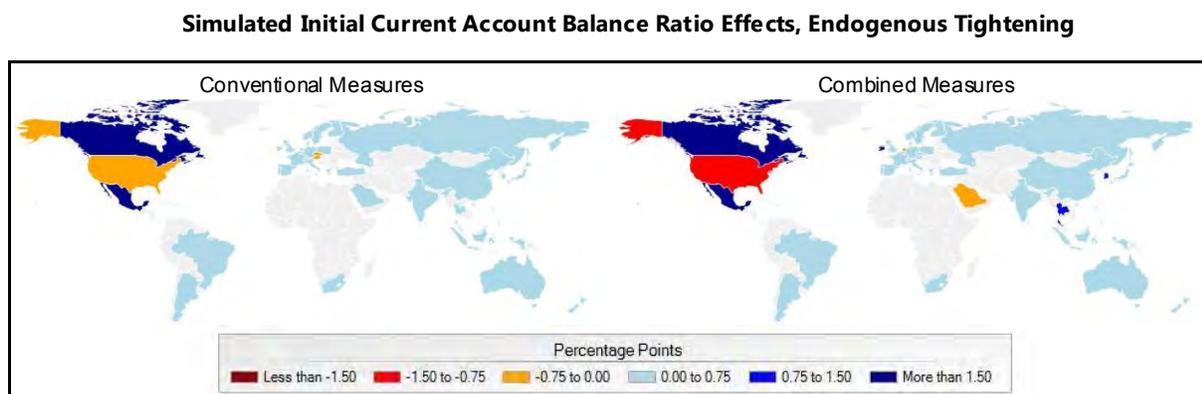
3. **Under our endogenous accelerated monetary normalization scenario, a large output gain in the United States is associated with moderate output gains in geographically close trading partners, versus small to moderate output losses in most of the rest of the world due to tighter global financial conditions.** Simulated output gains are 2.3 percent for the United States,

⁹⁷ Prepared by Francis Vitek.

1.0 percent for Canada, 0.9 percent for Mexico, and 0.1 percent for Ireland in 2015. In the rest of the world, simulated output losses range from 0.9 to 1.3 percent in other advanced economies, from 0.6 to 1.6 percent in other emerging economies with open capital accounts, and from 0.2 to 1.1 percent in emerging economies with closed capital accounts. These output losses reflect tighter financial conditions due to higher long-term nominal market interest rates, particularly in emerging economies with open capital accounts, and to a lesser extent in other advanced economies. They occur in spite of output gains from the assumed private domestic demand driven cyclical expansion in the United States, which generates higher export demand. Aggregating these simulated output effects implies a world output gain of 0.0 percent. Nevertheless, the prices of energy and nonenergy commodities respectively decline by 1.7 and 1.4 percent, commensurate with a 2.6 percent appreciation of the dollar in nominal effective terms.



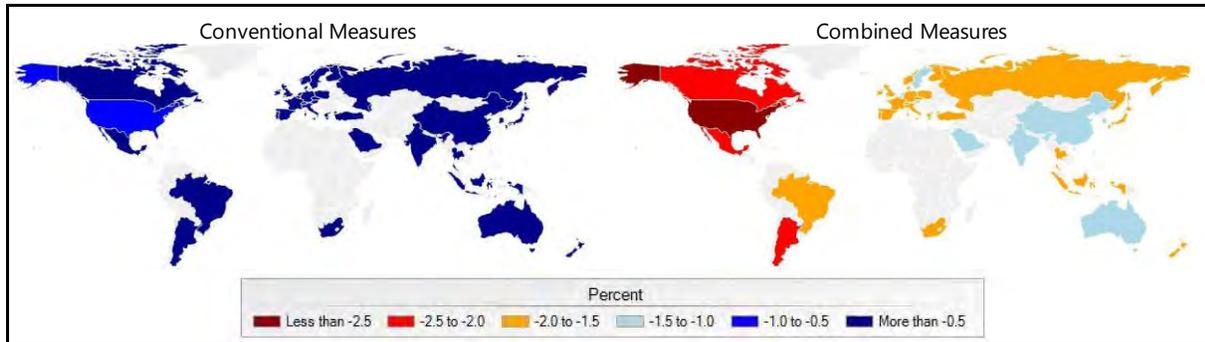
4. This endogenous accelerated monetary normalization scenario implies moderate net capital inflows into the United States to finance the deterioration in its current account balance, mirrored by moderate to large net capital outflows from geographically close trading partners and emerging economies with open capital accounts. In the United States, a reduction in the current account balance ratio of 1.2 percentage points in 2015 is associated with a 3.2 percent appreciation of the dollar in real effective terms. In the rest of the world, the largest current account balance ratio increases occur in Mexico at 2.7 percentage points, in Canada at 2.3 percentage points, in Ireland at 1.5 percentage points, and in Korea and Thailand at 1.0 percentage points. The implied large net capital outflows from these economies would be reduced if they simultaneously experienced private domestic demand driven cyclical expansions to some degree.



5. Under our exogenous accelerated monetary normalization scenario, a large output loss in the United States is associated with moderate output losses in the rest of the world due to

tighter global financial conditions. For the United States, we simulate an output loss of 4.0 percent in 2015, of which 1.0 percentage points is due to conventional measures. In the rest of the world, simulated output losses range from 1.4 to 2.2 percent in other advanced economies, from 1.5 to 2.5 percent in emerging economies with open capital accounts, and from 1.1 to 1.4 percent in emerging economies with closed capital accounts. Aggregating these simulated output losses implies a world output loss of 2.2 percent. The associated decline in the price of energy commodities is 23.2 percent, while that for the price of nonenergy commodities is 15.3 percent.

Simulated Initial Output Effects, Exogenous Tightening



6. **This exogenous accelerated monetary normalization scenario implies moderate net capital outflows from the United States, mirrored by moderate to large net capital inflows to geographically close trading partners and commodity exporters.** In the United States, an improvement in the current account balance ratio of 0.6 percentage points in 2015 is associated with a 0.8 percent appreciation of the dollar in real effective terms. In the rest of the world, the largest current account balance ratio reductions occur in Saudi Arabia at 2.3 percentage points, in Canada at 1.2 percentage points, in Norway at 1.0 percentage points, and in Mexico and Russia at 0.7 percentage points.

Simulated Current Account Balance Ratio Effects, Exogenous Tightening

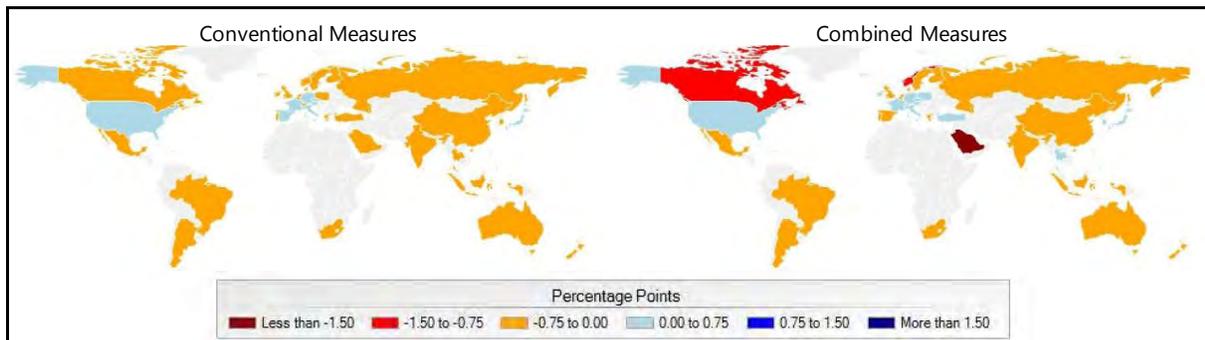


Figure 25.1 Simulation Results, Endogenous Tightening



Note: Depicts the simulated paths of consumption price inflation ■, output ■, the short-term nominal market interest rate ■, the long-term nominal market interest rate ■, the real effective exchange rate ■, the fiscal balance ratio ■, and the current account balance ratio ■, expressed as deviations from baseline in percent or percentage points.

Figure 25.2 Simulation Results, Exogenous Tightening



Note: Depicts the simulated paths of consumption price inflation ■, output ■, the short-term nominal market interest rate ■, the long-term nominal market interest rate ■, the real effective exchange rate ■, the fiscal balance ratio ■, and the current account balance ratio ■, expressed as deviations from baseline in percent or percentage points.

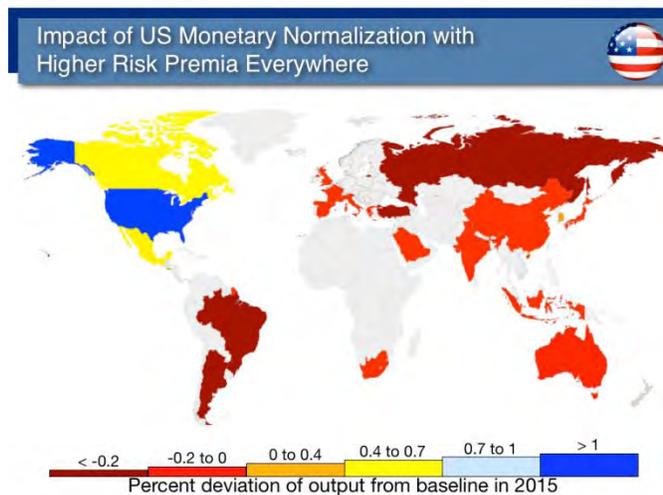
26. Effects of Accelerated Monetary Normalization in the United States Using GIMF⁹⁸

These scenarios consider the implications of a faster than expected recovery in the United States.

1. **In the first scenario, faster than expected recovery in private consumption and investment starting in 2014 results in the U.S. output gap closing more quickly than in the baseline.** Consequently, monetary policy starts to normalize earlier with the policy rate roughly 50 basis points higher than expected in 2014, 100 basis points higher in 2015, and 150 basis points higher in 2016. Over the subsequent 4 years the policy rate returns to baseline.
2. **In the second scenario, once the U.S. policy rate starts to adjust, increases in risk premium elsewhere are used to normalize interest rates earlier than expected in the baseline.** The jump in the premium is 50 basis points for advanced countries and 100 basis points for emerging markets. The jump is relatively short lived, decaying with a root of 0.5.
3. **In the third scenario, the U.S. risk premium also jumps in line with the increase in other advanced economies.**

Outcomes

4. **Across the three scenarios, the increase in U.S. GDP is very similar, although when interest rates normalization is sped up with moves in risk premium, the increase is reduced slightly.**
5. **Outside the United States, when risk premium don't respond the near-term spillovers are positive.** For those countries with strong trade links to the United States, particularly Canada and Mexico, there is some secondary cycling relative to the baseline to stabilize inflation. When risk premiums rise, the spillovers to Canada and Mexico remain positive while those to most other countries generally become negative. The financial tightening reduces domestic demand and exports also decline as the fall in imports by countries other than the United States more than offsets higher U.S. imports.



⁹⁸ Prepared by Ben Hunt (RES).

27. Estimating the Output Loss from the Fiscal Cliff Relative to the 2012 Spillover Report ⁹⁹

1. In the United States, the most relevant stabilization action since last year's Spillover Report was the passage of the American Taxpayer Relief Act in early 2013, which largely avoided the much feared abrupt fiscal consolidation or "fiscal cliff" by partially extending the tax cuts that had been set to expire automatically and by reducing the size of the spending cuts under "sequestration." Last year's Spillover Report estimated the cost of the full fiscal cliff between 2 percent and over 4 percent of U.S. GDP, with the upper range reflecting the assumption of pervasive financial market disruptions. Spillovers to China and several advanced countries would total up to one quarter of the hit taken by US growth.¹⁰⁰

2. This year, we factor in that the amount of consolidation avoided was smaller than the full fiscal cliff and that the composition of the consolidation was also different than it would have been under the full fiscal cliff. Using standard multipliers from the literature, we come up with an "adjustment coefficient" of 0.6

Derivation of an Adjustment Coefficient for Estimated Output Losses Relative to 2012 Spillover Report

distinguish between high-multiplier and low-multiplier components and apply the relevant fiscal multiplier to each component (the fiscal multipliers come from the April 2012 *Fiscal Monitor*). The ratio of the computed output impact under the fiscal cliff relief to that under the full fiscal cliff is the adjustment coefficient we are looking for (see text table). We then apply this coefficient to the results of the 2012 exercise for a number of methodologies/models—fiscal multipliers, GIMF, and GPM—to come up with estimates of the cost of the fiscal cliff for this year's exercise. Thus, we estimate U.S. output to be 1-1³/₄ percent higher in 2013 than in a fiscal cliff scenario.

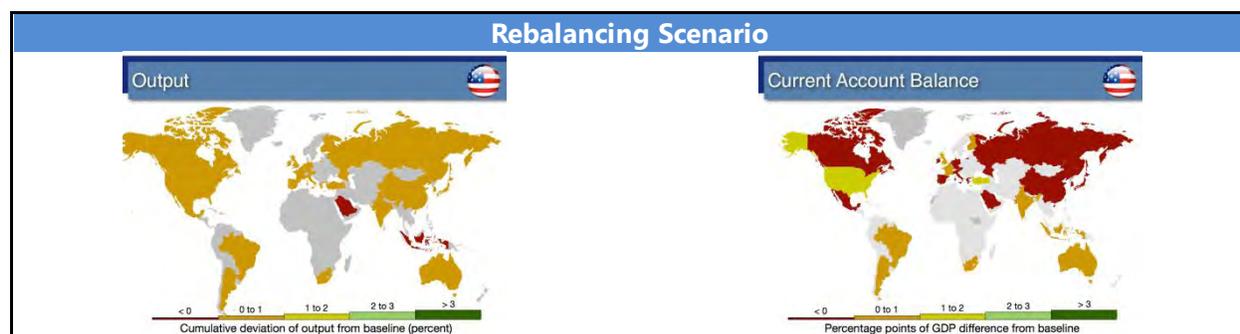
	Composition of Consolidation in 2013 (percent deviation from baseline)		
	Fiscal Cliff	Fiscal Cliff Relief	
Primary spending	1.1	0.3	
Government consumption	0.4	0.1	
Government investment	0.1	0.0	
Targeted transfers	0.5	0.1	
Other transfers	0.1	0.1	
Revenues	-2.0	-2.5	
Primary balance	-3.1	-2.8	
<i>Multipliers:</i>			
On high-impact expenditures (C&I, targeted transfers)		1.2	
On revenues and low-impact expenditures		0.4	
Output impact	-1.8	-1.2	
Adjustment coefficient:	-1.2 / -1.8 =	0.6	
	Fiscal	GIMF	GPM
<i>Estimated U.S. output losses:</i>	Multipliers	Model	Model
in 2012 Spillover Report	-1.8	-2.7	-2.0
in 2013 Spillover Report	-1.1	-1.7	-1.3

⁹⁹ Prepared by Deniz Igan (WHD).

¹⁰⁰ See 2012 Spillover Report, at <http://www.imf.org/external/np/pp/eng/2012/070912.pdf> (page 10).

28. United States Rebalancing Scenario¹⁰¹

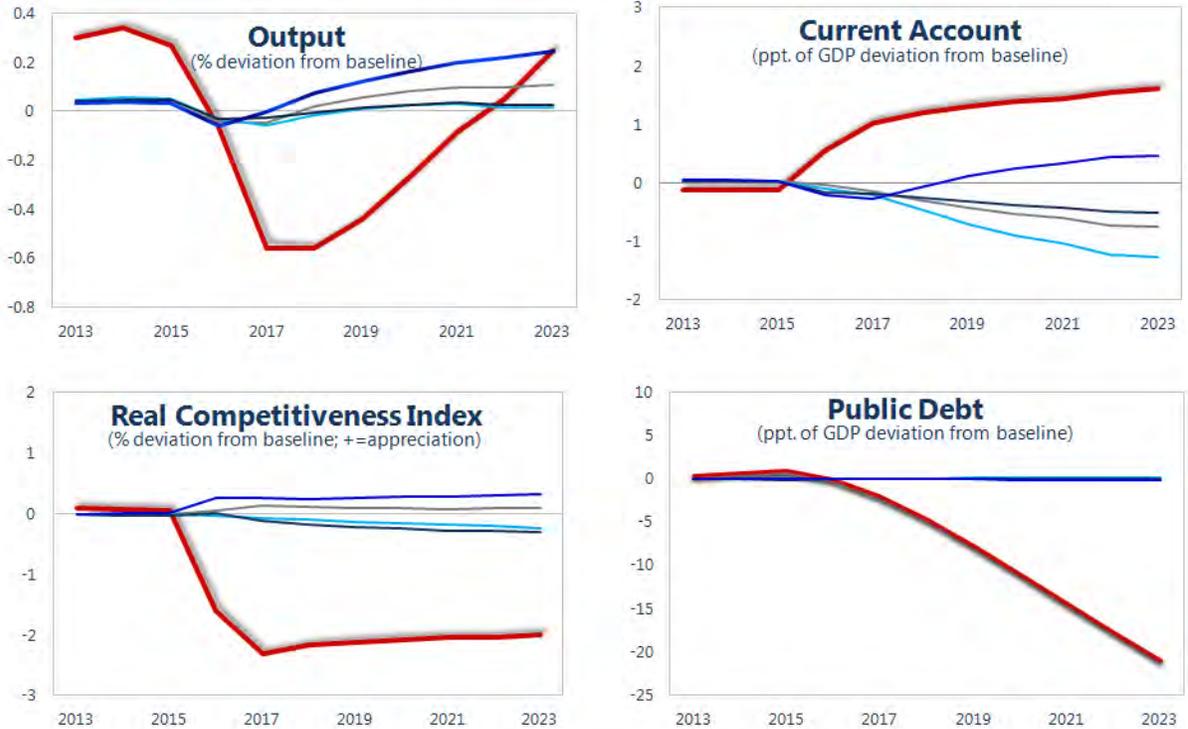
1. **In the United States, the scenario features a fiscal adjustment plan that combines less fiscal consolidation in the near term and more consolidation in the medium term, raising the U.S. saving rate as households reduce consumption to partially compensate for less generous entitlements after the fiscal reforms.** The fiscal adjustment plan involves both additional revenues and cuts in mandatory spending (mostly in social security and health care programs), consistent with a general government primary balance of about 1 percent of GDP in the medium term. The more gradual consolidation supports stronger GDP growth in the near term (by about 0.3 pp for 2013-15 *vis-à-vis* the baseline), but faster fiscal adjustment subsequently implies that the output gap is closed later than in the baseline. The external current account would improve (by about 2 pp *vis-à-vis* the baseline) on the back of stronger fiscal accounts and a weaker real exchange rate. Given the cuts in the entitlement programs (which result in a decrease of disposable income of more than 1 pp of GDP), households are assumed to react by reducing consumption, albeit by less than the decline in income--thus, the resulting decrease in the personal saving rate would be of only 0.5 pp of GDP in the medium term. The near-term impact on global output would be positive, with GDP growth in other S5 countries increasing by around 0.1 pp *vis-à-vis* the baseline; over the medium term, the larger fiscal consolidation in the United States implies some reduction in output relative to the baseline, with attendant spillovers to other countries; while the long-term impact on U.S. and global output would be positive given the higher saving rate and lower interest rates.



¹⁰¹ Prepared by the U.S. country team.

US: Rebalancing Scenario¹

China Euro Area Japan United Kingdom United States



¹ Assuming the implementation of policy actions by the US alone.