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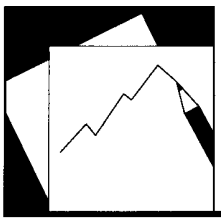

IMF Working Paper

Does G-4 Liquidity Spill Over?

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Monetary and Capital Markets Department

Does G-4 Liquidity Spill Over?

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Abstract

The resumption of strong capital flows into emerging markets in mid-2009 brought back the debate over whether pull or push factors are the main determinants. This paper, using panel specifications with alternative measures of global liquidity, asks the question whether G-4 liquidity expansion spills over to the rest of the world. The paper finds strong positive links between G-4 liquidity expansion and asset prices, such as equities, in the liquidity receiving economies, which indicates that the push factor plays an important role in asset prices. Liquidity also has a strong positive link with the accumulation of official reserves and with equity portfolio inflows in receiving economies. Moreover, the association between excess equity returns, excess credit growth, and global liquidity has implications for rising risks to financial stability in the receiving economies.

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[1] An earlier version of this approach appeared in chapter 4 of the IMF's April 2010 Global Financial Stability Report.We are grateful to Laura Kodres for her insightful comments and to Andrea Michaela Maechler and Chris Marsh for suggesting using core and noncore liabilities as an alternative liquidity indicator. Oksana Khadarina provided expert research support. Any remaining errors are our own.

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I. INTRODUCTION

Since the resumption of strong capital flows into emerging markets in mid-2009, the debate has revived whether this is caused by pull factors, such as stronger growth and higher interest rates, or push factors, such as the G-4 highly accommodative monetary policy and unconventional monetary support following the crisis.[2] If the latter, the argument goes, there are policy challenges facing liquidity receiving economies not only associated with managing strong capital inflows but also because inflows could reverse abruptly if the G-4 cycle turns. More specifically, the gradual shift in global portfolio allocation toward emerging markets over the past decade has led to portfolio inflows that for a number of these countries are large in relation to the absorptive capacity of the domestic markets.[3] And, although the financial crisis arrested capital flows for over a year, their resumption coincided with a decoupling of the economies of the G-4 and much of the rest of the world in 2009 and 2010.

So, are strong capital flows, especially due to portfolio allocations, to emerging markets a permanent, structural shift for which recipient economies need to adjust or can a G-4 monetary tightening suddenly stop or reverse this capital resumption? Conclusions as to whether this is a primarily push/cyclical or pull/structural phenomenon feature in the debate about the different policy implications for liquidity-receiving economies and G-4 economies.[4]

The paper tests the push factor for capital flows. It asks the question whether global (G-4) liquidity expansion spills over to the rest of the world. It uses a panel specification with 41 economies, of which 37 are liquidity-receiving economies, mostly emerging markets but including several advanced economies on the liquidity-receiving end. The estimations use a number of alternative measures of G-4 liquidity.

The paper finds strong positive links between global liquidity expansion and asset prices, such as equity returns and real interest rates, in the receiving economies, leading us to conclude that the push factor plays an important role in driving asset prices. Global liquidity expansion also has a strong positive link with the accumulation of official reserves and with equity inflows in liquidity-receiving economies. There is also evidence that global liquidity expansion has implications for rising risks to financial stability in the receiving economies, as shown using our measures of excess equity returns and excess credit growth. These results hold consistently under all the metrics of G-4 liquidity considered in the paper.

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[2] Japan, the euro area, the United Kingdom, and the United States constitute the G-4.

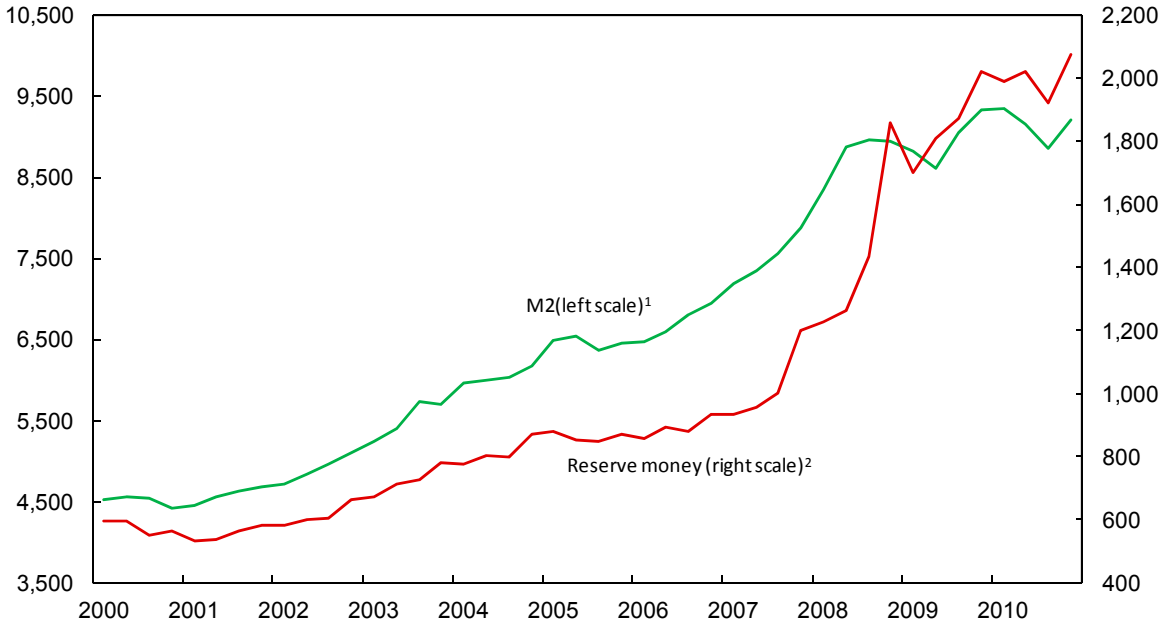
[3] See IMF 2007b and Ostry and others (2010).

[4] See "Global Liquidity Expansion: Effects on "Receiving" Economies and Policy Response Options," in *Global Financial Stability Report,* World Economic and Financial Surveys (Washington, April 2010).

II. Setting the Stage for The 2003–10 Global Liquidity Expansion

Global liquidity began to expand in earnest in 2003 and accelerated from the second half of 2007 when country authorities started to implement unprecedented liquidity-easing measures to mitigate the effects of what rapidly became a global financial crisis (Figure 1).

Figure 1. Global Liquidity
(In billions of U.S. dollars; GDP-weighted; quarterly data)

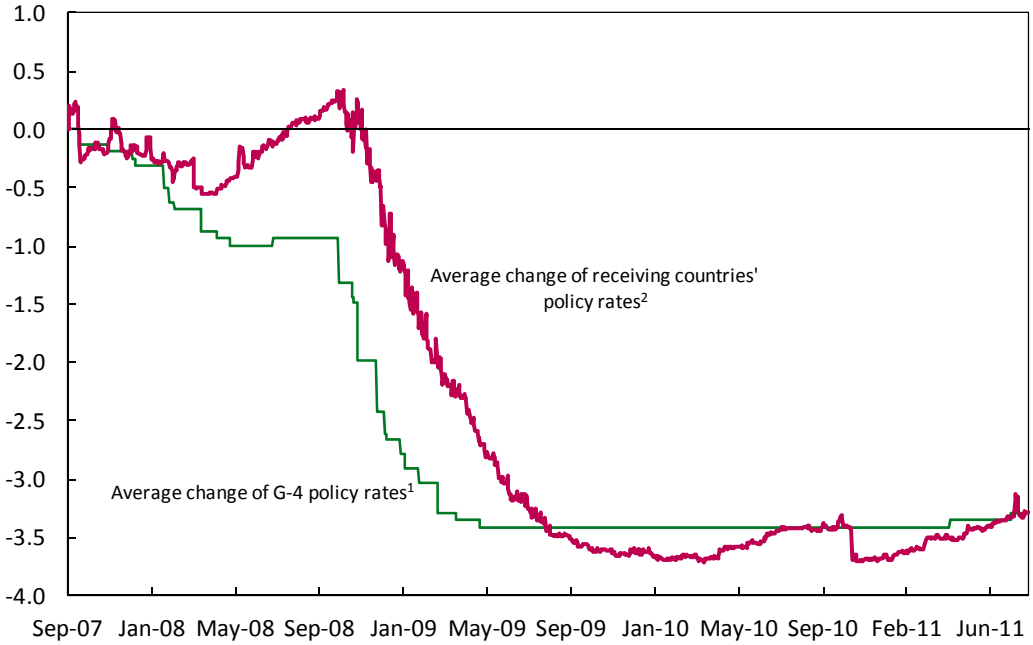


Sources: Datastream; IMF, International Financial Statistics database; and IMF staff estimates.
[1]Sum of GDP-weighted M2 for the euro area, Japan, the United Kingdom, and the United States.
[2]Sum of GDP-weighted reserve money for the euro area, Japan, the United Kingdom, and the United States.

In response to the financial crisis that started in the summer of 2007, the United States began to aggressively reduce its policy interest rate in September 2007, followed by the United Kingdom in December.[5] Emerging markets and advanced economies with little or no exposure to the first phase of the financial crisis did not reduce rates for some time, and actually raised them on average in response to rapidly rising commodity prices. It was not until late 2008 that these countries began to ease monetary conditions in response to declining global demand in the second phase of the crisis, on average easing even further than the G-4 (Figure 2).

[5] The European Central Bank (ECB) and the Bank of Japan did not begin to reduce their policy rates until about a year later in October 2008, with the ECB raising its rate in the interim to prevent inflation expectations from rising in view of high commodity prices.

Figure 2. Change of Central Bank Policy Rates
(In percentage points; September 1, 2007 = 0)



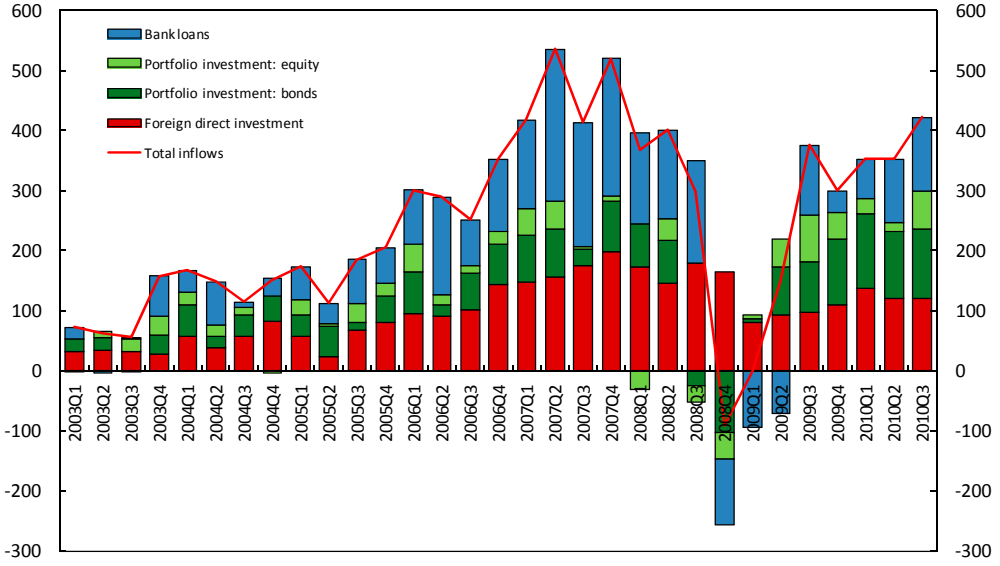
Sources: Bloomberg L.P.; and IMF staff estimates.
[1]G-4 includes the euro area, Japan, the United Kingdom, and the United States.
[2]Receiving countries are Argentina, Australia, Brazil, Canada, China, India, Indonesia, Korea, Mexico, Norway, Russia, Saudi Arabia, South Africa, Sweden, Switzerland, and Turkey.

In 2008, global capital inflows retreated to 16 percent of their 2007 volume, with portfolio flows showing the most severe decline.[6] Foreign direct investment diminished, but was more stable than other types of flows over the crisis period. In the second and third quarters of 2009 capital flows resumed to many emerging markets (Figure 3 shows capital inflows for the 37 liquidity-receiving economies in the sample.)

In the context of abundant global liquidity, the resumption of capital flows to countries with a strong growth outlook or appreciation expectations brought back pressures on the exchange rate and rising asset valuations, including equities (Figure 4).

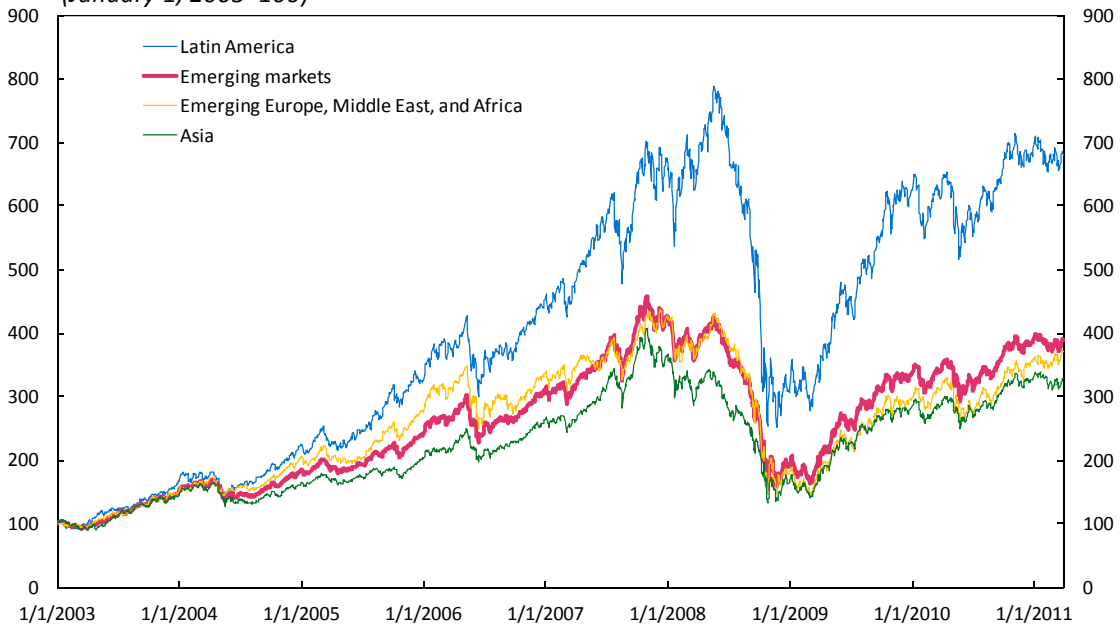
[6] Capital inflows refer to changes (increases/decreases) in the liabilities of countries' financial account.

Figure 3. Liquidity-Receiving Economies: Composition of Capital Inflows[1]
(In billions of U.S. dollars)



Source: IMF, *International Financial Statistics* database.
[1]See the Annex 4.2. for a complete list of countries.

Figure 4. Emerging Markets Equity Indices
(January 1, 2003=100)



Source: Bloomberg L.P.

III. Literature Review

Much research has taken place, in the past eight years in particular, to try to understand the impact of global liquidity. This area of work has looked at the definition and at alternative measures of global liquidity. On definition, IMF (2007a) discusses some indicators of global liquidity and considers how far these drove the decline of the global risk premium. Adrian and Shin (2010a) show that aggregate liquidity can be viewed as the rate of change of the aggregate balance sheet of financial intermediaries.

Bruno and Shin (2011) develop a model of global liquidity with international banks as the carriers of cross-border liquidity conditions. Their theory draws on two themes. The first is the role of financial intermediaries in driving fluctuations in risk premia and financial conditions, especially in connection with the growing use of wholesale (or market-based) bank funding. The second is the role of interlocking claims and obligations in transmitting credit availability conditions across borders.

Considerable research effort has been devoted to understanding the impact of global liquidity on inflation. Ciccarelli and Mojon (2005) find that global liquidity appears to be an important, if not the most important, determinant of inflationary pressure at a global level. Rüffer and Stracca (2006) provide a comprehensive analysis of the nature and measure of global excess liquidity. They conclude that excess liquidity is a useful indicator of inflationary pressure at a global level as is the level of interest rates.

D'Agostino and Sorico (2009) construct a measure of global liquidity using the growth rates of broad money for the G-7 economies. Global liquidity produces forecasts of U.S. inflation that are significantly more accurate than the forecasts based on U.S. money growth, the Phillips curve, and autoregressive and moving average models. Berger and Harjes (2009) adjust liquidity for longer-term interest rate and output effects and focus on U.S. and Japanese liquidity as relevant proxies for global developments from a euro area perspective. They find that U.S. excess liquidity enters consistently positive as a determinant of euro area inflation and is shown to be Granger-causal for euro area inflation in an out-of-sample forecasting exercise.

There is also research on the impact of global liquidity on asset prices. Becker (2007) finds that abundant liquidity has contributed to the strong performance of stock and bond markets. In particular, excess liquidity has likely contributed to overheated real estate markets in the UK and the United States. Giese and Tuxen (2008) present evidence for a surge in global liquidity beginning in 2001 which has depressed bond yields and raised house prices but has had limited effects on share prices. Becker (2009) shows that excess liquidity could still potentially stoke new asset price bubbles. Once investors try to reduce their liquidity holdings, asset prices and inflation may again receive a temporary boost from global excess liquidity. Amihud and Mendelson (1986) show that the risk-adjusted expected return is

related to the expected level of liquidity. Stahel (2004) suggests that global liquidity is a priced risk factor on a portfolio and individual stock level.

Another area of work discusses the transmission of global liquidity to domestic credit. Caruana (2011) points out that international credit, including cross-currency credit involving maturity mismatches, tends to amplify domestic credit developments and poses challenges to policymakers. In this context, Basel III proposes a framework to mitigate the risks of rising global liquidity, for example, by responding to rapid credit growth with higher capital requirements.

The transmission of global liquidity between assets and goods inflation is another area of interest. Orth and Setzer (2009) examine the interactions between money and goods and asset prices at the global level. Using aggregate data for major OECD countries, their VAR results support the view that different price elasticities on assets and goods markets explain the observed relative price change between asset classes and consumer goods. Belke and Gros (2010) find that the key drivers of asset prices are global liquidity conditions. Their analysis has shown that liquidity will affect asset price inflation first and only later have an impact on consumer goods inflation. This result raises questions as to the mandate of central banks that focuses exclusively on consumer price stability.

Research has also been performed on the linkages between global liquidity and global imbalances. Bracke and Fidora (2008) show that monetary shocks potentially explain the largest part of the variation in imbalances and financial market prices. Hence, a liquidity glut may have been a more important driver of real and financial imbalances than a savings glut in the United States and emerging Asia.

Global liquidity also affects output. Sousa and Zaghini (2004) analyze the international transmission of monetary policy shocks with a focus on the effects of foreign liquidity on the euro area. They estimate two domestic structural VAR models for the euro area and introduce a global liquidity aggregate. They find that innovations in global liquidity play an important role in explaining price and output fluctuations.

This paper contributes to the broader topic of global liquidity by exploring the impact of different measures of global liquidity on the asset prices of liquidity receiving economies.

IV. METHODOLOGY AND DATA

This section describes the methodology for the tests undertaken in this paper and lists the sources of data used in the analysis.

First, we perform various econometric exercises to test different assumptions regarding the transmission of global (G-4) liquidity.[7] Specifically:

- taking G-4 M2 and receiving economies' M2 as respective global and domestic liquidity measures to see their impact on the accumulation of official reserves;
- alternatively using asset returns and the level of real interest rates in the receiving economies, to test their relation to G-4 liquidity growth; and
- replacing G-4 M2 as a liquidity measure with several other quantity and price-based measures, respectively, and the receiving economies' M2 with their reserve money separately as explanatory variables.

Second, we perform Granger Causality tests to check whether global liquidity Granger-causes domestic liquidity, i.e., the growth of monetary indicators in the 37 "liquidity receiving" economies.

Third, the relation between capital inflows in the 37 "liquidity receiving" and G-4 (global) liquidity is tested by performing regressions using components of capital flows as dependent variables, with all other same global and domestic variables as the independent variables.

Finally, we test the relation between global liquidity expansion and risks to financial stability in the 37 liquidity-receiving economies by regressing the following metrics of financial risk on different G-4 liquidity indicators:

- excess equity returns defined as the deviation of equity returns from their one-year moving average; and
- excess credit growth defined as the deviation of private credit growth from its one-year moving average.

In all panel data specifications, a monthly sample of 41 advanced and emerging market economies covering the period from January 2003 to December 2010 is employed.[8] We use two groupings of explanatory variables in the panel specifications:

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[7] Global liquidity-creating economies are selected based on the following criteria: (i) they are systemic in terms of economic size, role of monetary policy, and depth and openness of their financial system; and (ii) they create money supply domestically rather than that transmitted from abroad, such as foreign reserves or sovereign foreign assets.

[8] This period is chosen because it can capture the rapid increase in global liquidity; GDP-weighted G-4 M2, for instance, has increased twofold during this period.

(1) Domestic or fundamental factors include changes in economic growth, the growth in forward exchange rate, the growth in money supply (M2) or reserve money, the three-month interbank rate, the LIBOR or treasury rate, and consumer price inflation.

(2) Global factors include proxies for: (i) global liquidity; (ii) the credit risk premium defined as the level of the 10-year U.S. dollar swap spread, which is the difference between the 10-year US dollar swap rate and the 10-year U.S. treasury bond, as a proxy for aggregate (G-4) default risk; and (iii) a market risk premium defined as the implied volatility of the at-the-money option on the S&P 500 index (VIX).[9]

The main global liquidity proxy we use is G-4 M2. We have run all estimations with the following alternative G-4-liquidity quantity and price measures: reserve money; GDP-weighted M2; excess liquidity;[10] international reserves; 3 month LIBOR-OIS spread; systemic liquidity risk index; core (banking system) liabilities; and noncore liabilities. See Annex 1 for detailed definitions of the G-4 liquidity indicators used.

The 37 liquidity-receiving economies in the sample are organized according to three broad geographical regions: (i) Asia-Pacific; (ii) Europe, Middle East, and Africa; and (iii) the Western Hemisphere (see Annex 2).

The main data sources are the World Economic Outlook database, International Financial Statistics databases, the World Development Indicators database, Bloomberg L.P., Consensus Forecasts, and Datastream.

V. G-4 Spillover channels to Liquidity Receiving Economies

Although, as a rule, asset valuations in the receiving economies are not yet at pre-crisis levels, observers are asking whether asset prices may be rising too fast. Are capital flows into receiving economies primarily driven by the countries' strong economic fundamentals and, therefore, likely to remain stable over the medium to long term, or are they primarily driven by the abundant global liquidity?

A. G-4 Liquidity and Receiving Economies' Official Foreign Reserves

The transmission of G-4 liquidity to liquidity-receiving economies is shown by examining the relationship between G-4 liquidity growth and official reserve accumulation in the receiving economies, with G-4 liquidity defined alternatively as G-4 M2, reserve money, international reserves, core and noncore liabilities, or price-based measures. The estimation

[9] See similar frameworks in IMF 2008a, 2008b, and Psalida and Sun (2009).

[10] Baks and Kramer (1999) use similar approaches to define global liquidity.

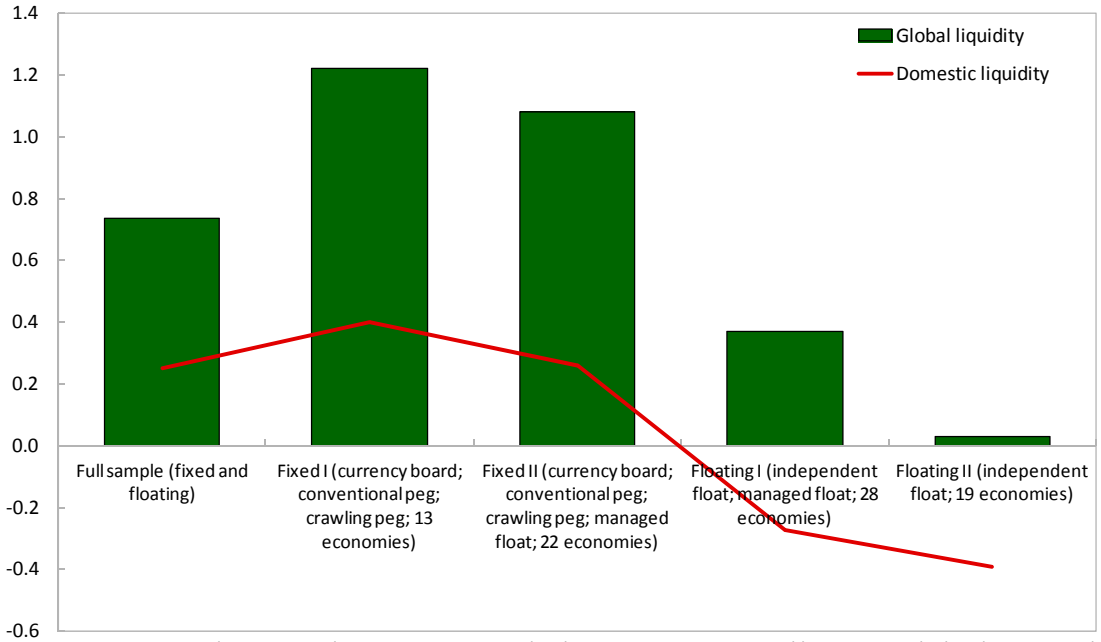
results show that rising global liquidity is positively associated with rising official reserves in the 37 receiving economies, even after controlling for domestic (receiving-economy) liquidity (Table 1).

B. G-4 Liquidity and Receiving Economies' Asset Returns

We perform a panel estimation to gain a better understanding of the relation between asset returns in the 37 liquidity-receiving countries in our sample and G-4 (global) liquidity. The estimation results show that rising global liquidity is associated with rising equity returns and declining real interest rates in the 37 receiving economies, even after controlling for domestic (receiving-economy) liquidity. This relationship supports the view that both global and domestic liquidity has provided support to the rising asset prices and declining real interest rates during 2003–10 (Table 2 and 3).

When receiving economies are separated into those with fixed and those with flexible exchange rate regimes, we find that, as exchange rate flexibility increases, the association of global liquidity with equity returns declines, as indicated by the larger positive coefficient for global liquidity starting from the left and moving to the right side of Figure 5 (green bars). Furthermore, the coefficient for domestic liquidity becomes statistically significant and negative in the group of independently floating regimes. These results further support the view that the higher the flexibility of the exchange rate, the lower the spillover of global liquidity and the more the cushioning impact of domestic liquidity on domestic asset returns (red line in Figure 5).

Figure 5. Relation between Equity Returns and Liquidity under Alternative Exchange Rate Regimes



Sources: IMF, Annual Report on Exchange Arrangements and Exchange Restrictions; IMF, World Economic Outlook and International Financial Statistics databases; World Bank, World Development Indicators database; Bloomberg L.P.; Consensus Forecasts; and Datastream; and IMF staff estimates.

Note: The definitions of exchange rate regimes follow the Annual Report on Exchange Arrangements and Exchange Restrictions in 2007. The vertical axis shows the coeffcient value of each group. All coefficients are statistically significant at 1 percent level except that of global liquidity under floating II exchange rate regime.

We separate the full sample into three geographic groupings to test the impact of global liquidity on equity returns by region: Asia-Pacific; Europe, Middle East and Africa; and the Western Hemisphere. The results show that both global and domestic liquidity are positively associated with equity returns for Asia-Pacific equities, probably owing to this group's higher proportion of economies with fixed or managed exchange rates (Table 4). This is consistent with the results on fixed versus flexible-rate economies as shown in Figure 5 above.

C. Relation between G-4 Liquidity and Receiving Economies' Liquidity Using Granger Causality Tests

We perform Granger causality tests to see whether global liquidity Granger-causes domestic liquidity, that is, the growth of monetary indicators in the 37 liquidity-receiving economies in our sample. We look specifically at broad money and reserve money growth in the G-4, as an approximation of global liquidity, and at domestic broad money and reserve money in the 37 liquidity receiving economies. Table 5 indicates that both global and domestic liquidity Granger-cause each other. Specifically, G-4 liquidity growth spills over into the other countries in our sample—economies where the crisis did not originate—but liquidity also

spills over from these economies into the G-4, although the strength of the relationship is weaker.[11] Evidence of these relationships is further strengthened by the long-run Granger causality tests using nonstationary level data (row of "level" in table 5). The advantage of this approach is that we can use nonstationary data to capture the long-run causal relationships. These results indicate that both global and domestic liquidity are determinants of asset returns (Pedroni, 2007).

D. G-4 Liquidity and Capital Flows to Receiving Economies

We perform regressions using equity flows from the portfolio flows part of the balance sheet statistics into the 37 liquidity-receiving economies as dependent variables to capture the links between global liquidity and capital flows.[12] In this test, we take global liquidity as an independent variable and control for domestic and other global factors (Table 6 and 7). The results indicate that global liquidity, as measured by excess liquidity, core and noncore liabilities, respectively, has a statistically significant impact on equity inflows.

VI. G-4 Liquidity and Financial Stability in Receiving Economies

A test of whether global liquidity expansion affects risks to financial stability regresses excess equity returns (defined as the deviation of equity returns from their one-year moving average) and excess credit growth (defined as the deviation of private credit growth from its one-year moving average) on G-4 liquidity. As expected, global liquidity is positively associated with excess equity returns and excess credit growth (Tables 8 and 9). These results hold for most measures of global liquidity.

VII. Concluding Remarks

Despite their beneficial effects, capital inflow surges can pose challenges to receiving economies. Specifically, capital inflow benefits include providing additional financing to countries with limited savings, allowing risk diversification, and contributing to the depth and development of financial markets.[13] However, surges of capital inflows can complicate macroeconomic management as the real economy may not be able to adapt to large swings in the exchange rate. The appreciation of the real exchange rate can fuel a boom in domestic demand leading to overheating and a combination of accelerating inflation and a widening current account deficit. Capital inflow surges may also lead to asset price bubbles and increase systemic risk in the financial sector, even sometimes in the case of a generally effective prudential supervisory and regulatory system. In particular, the policy challenges posed by easy monetary conditions is greater in economies—primarily emerging markets—

[11] This is indicated by a smaller probability of rejecting the null hypothesis of no Granger causality.

[12] The capital flows are gross capital flows with valuation changes being included.

[13] For more on financial globalization see Dell'Ariccia and others (2008) and Kose and others (2009).

that have fixed or managed exchange rates, in addition to stronger growth prospects than the "liquidity creating" countries.

The analysis in this paper supports the argument that surges in capital inflows and asset prices can be explained, at least partially, by push factors such as global (G-4) liquidity expansion. The paper finds that global liquidity, measured by various alternative indicators, spills over to liquidity-receiving economies as evidenced by their:

- rising equity returns and declining real interest rates;
- higher equity inflows;
- accumulation of official reserves; and
- growing risks to domestic financial stability.

The paper also finds that using the exchange rate as an automatic stabilizer can mitigate the spillover of global liquidity into receiving economies with an undervalued exchange rate. For economies with a floating exchange rate regime, the statistical positive link between global liquidity and domestic asset valuations declines, and the correlation between domestic liquidity and asset valuations turns negative. This suggests that a flexible exchange rate could reduce the transmission of global liquidity to liquidity-receiving economies, including valuation pressures on domestic assets. Thus liquidity receiving economies may want to consider a more flexible exchange rate policy in the presence of large liquidity inflows from abroad.

More broadly, the menu of policy responses for managing capital inflow surges includes, in addition to considering exchange rate flexibility, an appropriate remix of fiscal and monetary policies, prudential regulation, and, in some cases, liberalization of capital outflows or a restriction on capital inflows.[14] The adequate response depends on the specific conditions in each country.[15]

[14] For a discussion on policy options see also Ostry and others (2010).

[15] See also Baqir and others (2010).

Table 1. Fixed-Effects Panel Least-Square Estimation of the Determinants of Official Foreign Reserves—Monthly Observations, 37 Economies, January 2003–December 2010

	reg1	reg2	reg3	reg4	reg5	reg6	reg7	reg8	reg9
M2 in G4	0.209**								
	(2.351)								
VIX	-0.002***	-0.003***	-0.003***	-0.003***	-0.001***	-0.002***	-0.002***	-0.002***	-0.003***
	(-5.371)	(-5.491)	(-5.304)	(-5.457)	(-2.954)	(-4.558)	(-2.759)	(-3.791)	(-5.967)
Credit risk premium	0.148***	0.133***	0.211***	0.133***	0.082***	0.081***	0.242***	0.176***	0.086***
	(6.117)	(4.991)	(7.707)	(4.611)	(2.776)	(2.606)	(11.700)	(8.080)	(3.016)
Domestic money supply (M2)	0.645***	0.642***	0.629***	0.638***	0.647***	0.645***		0.640***	0.584***
	(10.483)	(10.451)	(9.347)	(10.392)	(10.560)	(10.523)		(10.287)	(9.416)
Change in GDP growth	0.011***	0.011***	0.011***	0.012***	0.009**	0.010**	0.009**	0.012***	0.016***
	(2.920)	(2.930)	(2.745)	(2.958)	(2.150)	(2.439)	(2.360)	(2.988)	(4.019)
Inflation	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***	-0.014***	-0.009***	-0.010***
	(-6.819)	(-6.852)	(-6.313)	(-6.862)	(-6.674)	(-6.851)	(-10.636)	(-6.658)	(-7.633)
Exchange rate	0.197***	0.197***	0.211***	0.177**	0.244***	0.228***	-0.173***	0.171**	0.090
	(2.701)	(2.710)	(2.712)	(2.469)	(3.319)	(3.121)	(-3.512)	(2.362)	(1.241)
GDP-weighted M2 in G4		0.252**							
		(2.571)							
Excess liquidity			0.009**						
			(2.575)						
Core liabilities				0.233**					
				(2.137)					
Non-core liabilities					0.399***				
					(4.441)				
Core and non-core liabilities						0.450***			
						(4.068)			
Reserve money in G4							-0.059		
							(-1.260)		
Domestic reserve money							0.281***		
							(9.437)		
3 month LIBOR-OIS spread								-0.020	
								(-1.112)	
Systemic liquidity risk index									0.034***
									(4.700)
Constant	0.086***	0.091***	0.083***	0.097***	0.074***	0.088***	0.124***	0.083***	0.143***
	(5.900)	(6.228)	(4.754)	(6.345)	(5.010)	(6.016)	(8.589)	(5.502)	(7.623)
Number of countries	32	32	31	32	32	32	32	32	32
Number of observations	2,254	2,254	1,811	2,254	2,254	2,254	2,269	2,240	2,254
Adjusted R2	0.276	0.277	0.296	0.276	0.281	0.280	0.276	0.275	0.282

Sources: IMF, World Economic Outlook and International Financial Statistics databases; World Bank, World Development Indicators database; Bloomberg L.P.; Consensus Forecasts; and Datastream.

Note: Probability values for a test that the coefficient is different from zero are in parentheses (***significant at 1 percent level; **significant at 5 percent level; *significant at 10 percent level).

Table 2. Fixed-Effects Panel Least-Square Estimation of the Determinants of Equity Returns—Monthly Observations, 37 Economies, January 2003 – December 2010

	reg1	reg2	reg3	reg4	reg5	reg6	reg7	reg8	reg9	reg10	reg11	reg12	reg13	reg14
M2 in G4	0.736***													
	(6.212)													
VIX	-0.022***	-0.022***	-0.022***	-0.022***	-0.023***	-0.021***	-0.017***	-0.020***	-0.019***	-0.022***	-0.019***	-0.020***	-0.019***	-0.020***
	(-35.370)	(-36.054)	(-35.417)	(-36.993)	(-33.852)	(-31.722)	(-27.393)	(-34.024)	(-26.560)	(-34.916)	(-26.696)	(-32.266)	(-33.840)	(-34.057)
Credit risk premium	-0.361***	-0.404***	-0.408***	-0.524***	-0.280***	-0.242***	-0.714***	-0.599***	-0.230***	-0.299***	-0.263***	-0.026	-0.534***	-0.611***
	(-11.306)	(-12.661)	(-11.546)	(-15.618)	(-7.794)	(-6.262)	(-19.166)	(-14.685)	(-8.601)	(-10.690)	(-9.111)	(-0.700)	(-17.328)	(-15.364)
Domestic money supply (M2)	0.249***	0.250***	0.238***	0.222***	0.237***	0.212**	0.272***	0.247***			0.282***	0.361***	0.213***	0.243***
	(3.013)	(3.063)	(2.891)	(2.782)	(2.652)	(2.557)	(3.481)	(3.049)			(3.391)	(4.379)	(2.735)	(3.018)
Change in GDP growth	0.065***	0.063***	0.065***	0.060***	0.067***	0.066***	0.050***	0.058***	0.062***	0.065***	0.067***	0.053***	0.056***	0.057***
	(12.966)	(12.778)	(12.990)	(12.402)	(12.352)	(13.062)	(10.472)	(11.752)	(12.354)	(13.173)	(12.789)	(10.536)	(11.809)	(11.662)
Inflation	-0.012***	-0.013***	-0.012***	-0.014***	-0.009***	-0.011***	-0.011***	-0.012***	-0.014***	-0.014***	-0.011***	-0.007***	-0.014***	-0.012***
	(-6.701)	(-7.143)	(-6.739)	(-8.026)	(-4.804)	(-6.047)	(-6.734)	(-6.930)	(-8.154)	(-8.325)	(-6.013)	(-3.817)	(-8.560)	(-7.129)
Exchange rate	-1.091***	-1.008***	-1.097***	-0.878***	-1.147***	-1.240***	-0.809***	-0.983***	-1.468***	-1.299***	-1.115***	-1.029***	-0.749***	-0.951***
	(-11.161)	(-10.336)	(-11.277)	(-9.141)	(-11.123)	(-12.823)	(-8.662)	(-10.230)	(-22.763)	(-19.445)	(-11.537)	(-10.741)	(-7.965)	(-9.918)
M2 in G4 plus international reserve		1.106***												
		(8.931)												
GDP-weighted M2 in G4			0.849***											
			(6.527)											
GDP-weighted M2 in G4 plus international reserve				1.791***										
				(13.290)										
Excess liquidity					0.036***									
					(7.508)									
Core liabilities						-0.167								
						(-1.140)								
Non-core liabilities							1.942***							
							(17.214)							
Core and non-core liabilities								1.597***						
								(11.035)						
Reserve money in G4									-0.224***					
									(-3.766)					
Domestic reserve money									-0.039	0.008				
									(-0.989)	(0.219)				
Reserve money in G4 plus international reserve										0.951***				
										(8.160)				
3 month LIBOR-OIS spread											-0.166***			
											(-6.937)			
Systemic liquidity risk index												-0.096***		
												(-10.199)		
International reserve													1.899***	
													(17.493)	
International reserve plus core and noncore														1.728***
														(11.960)
Global liquidity price index														
Constant	0.688***	0.665***	0.706***	0.624***	0.727***	0.684***	0.633***	0.695***	0.714***	0.629***	0.660***	0.537***	0.472***	0.681***
	(35.873)	(34.634)	(36.616)	(32.354)	(31.997)	(33.608)	(34.292)	(36.960)	(38.032)	(30.374)	(33.295)	(22.174)	(21.432)	(36.303)
Number of countries	32	32	32	32	31	32	32	32	32	32	32	32	32	32
Number of observations	2,205	2,205	2,205	2,205	1,763	2,205	2,205	2,205	2,219	2,219	2,183	2,205	2,205	2,205
Adjusted R2	0.670	0.676	0.670	0.689	0.709	0.664	0.704	0.682	0.665	0.673	0.673	0.679	0.705	0.685

Sources: IMF, World Economic Outlook and International Financial Statistics databases; World Bank, World Development Indicators database; Bloomberg L.P.; Consensus Forecasts; and

Note: Probability values for a test that the coefficient is different from zero are in parentheses (***significant at 1 percent level; **significant at 5 percent level; *significant at 10 percent level).

Table 3. Fixed-Effects Panel Least-Square Estimation of the Determinants of Real Interest Rates—Monthly Observations, 37 Economies, January 2003 – December 2010

	reg1	reg2	reg3	reg4	reg5	reg6	reg7	reg8	reg9	reg10	reg11	reg12	reg13	reg14
M2 in G4	-7.898***													
	(-3.196)													
VIX	-0.019	-0.019	-0.017	-0.019	-0.016	-0.009	-0.041***	-0.030**	0.005	0.011	-0.029**	-0.019	-0.033***	-0.031**
	(-1.537)	(-1.540)	(-1.380)	(-1.614)	(-1.360)	(-0.709)	(-3.186)	(-2.559)	(0.373)	(0.795)	(-2.091)	(-1.538)	(-2.794)	(-2.575)
Credit risk premium	-1.036	-0.814	-0.704	-0.192	-2.588***	-0.244	-0.464	0.068	-1.728***	-0.568	-2.238***	-0.827	-0.358	0.145
	(-1.644)	(-1.280)	(-0.995)	(-0.277)	(-4.447)	(-0.315)	(-0.588)	(0.081)	(-3.261)	(-1.010)	(-4.052)	(-1.082)	(-0.553)	(0.176)
Domestic money supply	2.708	2.705	2.853*	2.891*	1.582	2.982*	3.016*	2.954*			3.185*	3.691**	2.998*	2.957*
	(1.625)	(1.627)	(1.714)	(1.745)	(1.027)	(1.796)	(1.816)	(1.779)			(1.891)	(2.207)	(1.813)	(1.782)
Change in GDP growth	-0.195*	-0.184*	-0.196*	-0.168*	-0.223**	-0.196*	-0.151	-0.157	-0.257**	-0.234**	-0.257**	-0.259**	-0.148	-0.153
	(-1.944)	(-1.835)	(-1.957)	(-1.670)	(-2.388)	(-1.959)	(-1.479)	(-1.551)	(-2.515)	(-2.312)	(-2.444)	(-2.516)	(-1.473)	(-1.511)
Exchange rate	2.838	2.323	3.060	1.765	2.621	3.551*	2.908	2.802	-1.659	-3.792***	4.293**	5.186***	1.326	2.587
	(1.417)	(1.151)	(1.534)	(0.868)	(1.449)	(1.814)	(1.442)	(1.400)	(-1.253)	(-2.731)	(2.168)	(2.636)	(0.650)	(1.289)
M2 in G4 plus international reserve		-9.719***												
		(-3.737)												
GDP-weighted M2 in G4			-8.053***											
			(-2.981)											
GDP-weighted M2 in G4 plus international reserve				-12.38***										
				(-4.315)										
Excess liquidity					0.011									
					(0.126)									
Core liabilities						-9.888***								
						(-3.275)								
Non-core liabilities							-6.972***							
							(-2.793)							
Core and non-core								-10.18***						
								(-3.296)						
Reserve money in G4									-3.531***					
									(-2.863)					
Domestic reserve									-2.677***	-2.814***				
									(-3.306)	(-3.502)				
Reserve money in G4 plus international reserve										-12.84***				
										(-5.204)				
3 month LIBOR-OIS											0.020			
											(0.040)			
Systemic liquidity risk												-0.437**		
												(-2.293)		
International reserve													-11.45***	
													(-4.811)	
International reserve plus core and noncore														-10.97***
														(-3.542)
Global liquidity price index														
Constant	3.197***	3.393***	3.024***	3.639***	3.224***	2.731***	3.346***	3.116***	3.499***	4.410***	3.312***	2.488***	4.484***	3.212***
	(8.199)	(8.598)	(7.708)	(8.988)	(8.018)	(6.653)	(8.450)	(7.993)	(9.000)	(10.205)	(8.149)	(5.118)	(9.402)	(8.240)
Number of countries	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Number of	2,100	2,100	2,100	2,100	1,675	2,100	2,100	2,100	2,114	2,114	2,078	2,100	2,100	2,100
Adjusted R2	0.016	0.017	0.015	0.020	0.019	0.016	0.014	0.016	0.017	0.026	0.012	0.013	0.022	0.017

Sources: IMF, World Economic Outlook and International Financial Statistics databases; World Bank, World Development Indicators database; Bloomberg L.P.; Consensus Forecasts; and
Note: Probability values for a test that the coefficient is different from zero are in parentheses (***significant at 1 percent level; **significant at 5 percent level; *significant at 10 percent

Table 4. Fixed-Effects Panel Least-Square Estimation of the Determinants of Equity Returns, Regional Disaggregation, January 2003 – December 2010

	Asia	Europe, Middle East and Africa	Western Hemisphere
M2 in G4	0.800***	0.294	0.544***
	(5.053)	(0.933)	(3.508)
VIX	-0.020***	-0.026***	-0.016***
	(-22.891)	(-19.535)	(-19.171)
Credit risk premium	-0.411***	-0.380***	-0.242***
	(-9.507)	(-4.901)	(-5.539)
Domestic money supply (M2)	0.712***	0.574***	-0.229**
	(4.399)	(3.083)	(-2.189)
Change in GDP growth	0.053***	0.072***	0.039***
	(6.370)	(7.788)	(5.345)
Inflation	-0.017***	-0.010**	-0.003
	(-7.487)	(-2.129)	(-0.997)
Exchange rate	-0.942***	-0.759***	-1.570***
	(-5.305)	(-3.611)	(-13.436)
Constant	0.650***	0.738***	0.614***
	(20.816)	(18.905)	(19.470)
Number of countries	11	14	7
Number of observations	910	706	589
Adjusted R2	0.681	0.675	0.738

Sources: IMF, World Economic Outlook and International Financial Statistics databases; World Bank, World Development Indicators database; Bloomberg L.P.; Consensus Forecasts; and Datastream.

Note: Probability values for a test that the coefficient is different from zero are in parentheses (***significant at 1 percent level; **significant at 5 percent level; *significant at 10 percent level).

Table 5. Granger Causality Relations between Global and Domestic Liquidity

	Probabilities[1]			
Data	M2 in 37 economies does not Granger cause G4 M2	G4 M2 does not Granger cause M2 in 37 economies	Reserve money in 37 economies does not Granger cause G4 reserve money	G4 reserve money does not Granger cause reserve money in 37 economies
Growth rate	$2.3*10^{-14}$	$1.6*10^{-38}$	$1.3*10^{-4}$	$3.6*10^{-7}$
Level	0	0	0.05	0

Source: IMF, World Economic Outlook and International Financial Statistics databases; World Bank, World Development Indicators database; Bloomberg L.P.; Consensus Forecasts; and Datastream.

Note: The null hypothesis is that there is no Granger causality between the respective pairs of variables. Granger causality tests using data in growth rate are in 12 lags .

[1]Probabilities of rejecting the null hypothesis.

Table 6. Fixed-Effects Panel Least-Square Estimation of the Determinants of Capital Flows, 37 Economies, January 2003 – December 2010

	Foreign Direct Investment	Equity Securities	Debt Securities	Other Investments
Core and non-core liabilities	1.860***	6.027***	0.633	-2.954**
	(3.070)	(3.693)	(0.412)	(-2.051)
VIX	-0.015***	-0.039***	-0.018**	-0.011*
	(-6.318)	(-4.430)	(-2.390)	(-1.868)
Credit risk premium	0.192	-0.981**	-0.036	0.635
	(1.123)	(-2.088)	(-0.079)	(1.556)
Domestic money supply (M2)	1.360***	-2.542***	-3.602***	0.581
	(4.145)	(-2.847)	(-3.388)	(0.641)
Change in GDP growth	0.020	0.146**	0.038	0.123*
	(0.929)	(2.371)	(0.532)	(1.666)
Inflation	-0.020***	-0.054***	-0.032	-0.020
	(-2.904)	(-2.767)	(-1.310)	(-1.261)
Exchange rate	1.681***	-2.589**	-2.275**	-1.871**
	(4.309)	(-2.553)	(-1.963)	(-2.009)
Constant	0.085	1.465***	1.046***	0.345*
	(1.041)	(5.350)	(4.471)	(1.723)
Number of countries	30	28	26	30
Number of observations	1,779	778	707	901
Adjusted R2	0.096	0.104	0.037	0.060

Sources: IMF, World Economic Outlook and International Financial Statistics databases; World Bank, World Development Indicators database; Bloomberg L.P.; Consensus Forecasts; and Datastream.

Note: Probability values for a test that the coefficient is different from zero are in parentheses (***significant at 1 percent level; **significant at 5 percent level; *significant at 10 percent level); Global liquiduity is proxied by the sum of core and noncore liabilities.

Table 7. Fixed-Effects Panel Least-Square Estimation of the Determinants of Portfolio Flows, 37 Economies, January 2003 – December 2010

	reg1	reg2	reg3	reg4	reg5	reg6	reg7	reg8	reg9	reg10	reg11	reg12	reg13	reg14
M2 in G4	1.232													
	(1.009)													
VIX	-0.044***	-0.044***	-0.045***	-0.045***	-0.056***	-0.048***	-0.030***	-0.039***	-0.047***	-0.048***	-0.043***	-0.030***	-0.042***	-0.039***
	(-4.945)	(-4.950)	(-5.060)	(-5.017)	(-5.241)	(-5.319)	(-3.244)	(-4.430)	(-4.618)	(-5.122)	(-4.412)	(-3.382)	(-4.807)	(-4.496)
Credit risk premium	-0.025	-0.037	-0.214	-0.188	-0.657	-0.433	-1.067**	-0.981**	-0.348	-0.494	0.122	1.656***	-0.143	-0.901*
	(-0.063)	(-0.094)	(-0.499)	(-0.444)	(-1.452)	(-1.029)	(-2.251)	(-2.088)	(-1.025)	(-1.449)	(0.333)	(3.511)	(-0.352)	(-1.941)
Domestic money supply (M2)	-2.656***	-2.665***	-2.684***	-2.701***	-3.137***	-2.654***	-2.473***	-2.542***			-2.701***	-2.107**	-2.675***	-2.567***
	(-2.952)	(-2.962)	(-2.987)	(-3.006)	(-3.110)	(-2.963)	(-2.770)	(-2.847)			(-2.970)	(-2.361)	(-2.977)	(-2.874)
Change in GDP growth	0.169***	0.168***	0.169***	0.162***	0.151**	0.177***	0.123**	0.146**	0.201***	0.196***	0.172***	0.101	0.157**	0.145**
	(2.742)	(2.707)	(2.737)	(2.614)	(2.327)	(2.872)	(1.970)	(2.371)	(3.211)	(3.176)	(2.756)	(1.622)	(2.521)	(2.356)
Inflation	-0.053***	-0.052***	-0.054***	-0.053***	-0.048**	-0.056***	-0.050***	-0.054***	-0.028	-0.029	-0.050**	-0.033*	-0.051***	-0.054***
	(-2.640)	(-2.637)	(-2.728)	(-2.677)	(-2.204)	(-2.828)	(-2.577)	(-2.767)	(-1.538)	(-1.582)	(-2.526)	(-1.654)	(-2.594)	(-2.750)
Exchange rate	-3.320***	-3.283***	-3.251***	-3.146***	-3.502***	-3.235***	-2.281**	-2.589**	-1.655**	-1.361*	-3.541***	-2.794***	-3.064***	-2.596**
	(-3.285)	(-3.227)	(-3.232)	(-3.073)	(-3.110)	(-3.260)	(-2.211)	(-2.553)	(-2.408)	(-1.887)	(-3.507)	(-2.836)	(-2.952)	(-2.553)
M2 in G4 plus international reserve		1.336												
		(1.034)												
GDP-weighted M2 in G4			2.116											
			(1.506)											
GDP-weighted M2 in G4 plus international reserve				2.154										
				(1.444)										
Excess liquidity					0.160***									
					(3.277)									
Core liabilities						3.836***								
						(2.634)								
Non-core liabilities							5.640***							
							(3.891)							
Core and non-core liabilities								6.027***						
								(3.693)						
Reserve money in G4									0.473					
									(0.618)					
Domestic reserve money									-0.600	-0.566				
									(-1.470)	(-1.385)				
Reserve money in G4 plus international reserve										1.738				
										(1.337)				
3 month LIBOR-OIS spread											0.027			
											(0.081)			
Systemic liquidity risk index												-0.586***		
												(-5.020)		
International reserve													1.912	
													(1.473)	
International reserve plus core and noncore														5.775***
														(3.534)
Global liquidity price index														
Constant	1.563***	1.538***	1.618***	1.495***	2.211***	1.648***	1.277***	1.465***	1.401***	1.287***	1.545***	0.559*	1.330***	1.429***
	(5.660)	(5.587)	(5.784)	(5.395)	(6.556)	(5.945)	(4.542)	(5.350)	(5.208)	(4.528)	(5.534)	(1.672)	(4.286)	(5.198)
Number of countries	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Number of observations	778	778	778	778	613	778	778	778	787	787	778	778	778	778
Adjusted R2	0.088	0.089	0.090	0.090	0.111	0.096	0.105	0.104	0.077	0.079	0.087	0.117	0.090	0.102

Sources: IMF, World Economic Outlook and International Financial Statistics databases; World Bank, World Development Indicators database; Bloomberg L.P.; Consensus Forecasts; and Datastream.
Note: Probability values for a test that the coefficient is different from zero are in parentheses (***significant at 1 percent level; **significant at 5 percent level; *significant at 10 percent level).

Table 8. Fixed-Effects Panel Least-Square Estimation of the Determinants of Equity Overvaluation, 37 Economies, January 2003 – December 2010

	reg1	reg2	reg3	reg4	reg5	reg6	reg7	reg8	reg9	reg10	reg11	reg12	reg13	reg14
	coef/t	**coef/t**	**coef/t**	**coef/t**	**coef/t**	**coef/t**	**coef/t**	**coef/t**	**coef/t**	**coef/t**	**coef/t**	**coef/t**	**coef/t**	**coef/t**
M2 in G4	1.050***													
	(-7.743)													
VIX	-0.004***	-0.005***	-0.005***	-0.005***	-0.004***	-0.005***	0.001*	-0.002***	-0.002**	-0.007***	-0.005***	-0.004***	-0.001*	-0.002***
	(-6.157)	(-6.581)	(-6.910)	(-6.999)	(-5.118)	(-6.862)	(-1.760)	(-3.309)	(-2.282)	(-8.929)	(-5.932)	(-5.598)	(-1.802)	(-3.166)
Credit risk premium	0.075**	0.005	-0.019	-0.201***	0.239***	0.015	-0.286***	-0.270***	0.247***	0.147***	0.200***	0.089**	-0.189***	-0.295***
	(-2.018)	(-0.125)	(-0.477)	(-5.401)	(-5.669)	(-0.329)	(-6.636)	(-5.853)	(-7.756)	(-4.634)	(-5.980)	(-2.006)	(-5.569)	(-6.598)
Domestic money supply	0.548***	0.553***	0.537***	0.511***	0.598***	0.511***	0.561***	0.544***			0.456***	0.434***	0.496***	0.539***
	(-5.791)	(-5.954)	(-5.720)	(-5.787)	(-5.703)	(-5.384)	(-6.219)	(-5.944)			(-4.738)	(-4.478)	(-5.836)	(-5.950)
Change in GDP growth	0.045***	0.043***	0.045***	0.038***	0.046***	0.046***	0.029***	0.036***	0.041***	0.048***	0.048***	0.052***	0.032***	0.034***
	(-7.586)	(-7.317)	(-7.650)	(-6.746)	(-7.310)	(-7.674)	(-5.048)	(-6.114)	(-6.763)	(-8.266)	(-7.986)	(-8.398)	(-5.868)	(-5.952)
Inflation	0.006***	0.005**	0.006***	0.003	0.009***	0.006***	0.007***	0.006***	0.005**	0.004*	0.007***	0.005**	0.002	0.005***
	(-2.932)	(-2.431)	(-2.788)	(-1.347)	(-3.852)	(-2.770)	(-3.481)	(-2.816)	(-2.417)	(-1.896)	(-3.320)	(-2.527)	(-1.181)	(-2.607)
Exchange rate	-0.929***	-0.794***	-0.909***	-0.561***	-1.054***	-1.040***	-0.655***	-0.766***	-1.447***	-1.153***	-1.189***	-1.212***	-0.408***	-0.713***
	(-8.295)	(-7.168)	(-8.205)	(-5.293)	(-8.726)	(-9.423)	(-6.073)	(-7.050)	(-19.340)	(-15.157)	(-10.628)	(-10.767)	(-3.977)	(-6.611)
M2 in G4 plus international reserve		1.661***												
		(-11.820)												
GDP-weighted M2 in G4			1.392***											
			(-9.393)											
GDP-weighted M2 in G4 plus international reserve				2.881***										
				(-19.383)										
Excess liquidity					0.020***									
					(-3.533)									
Core liabilities						1.081***								
						(-6.451)								
Non-core liabilities							2.176***							
							(-16.624)							
Core and non-core								2.337***						
								(-14.224)						
Reserve money in G4									-0.219***					
									(-2.934)					
Domestic reserve money									0.147***	0.202***				
									(-3.230)	(-4.608)				
Reserve money in G4 plus international reserve										1.719***				
										(-12.460)				
3 month LIBOR-OIS spread											0.097***			
											(-3.498)			
Systemic liquidity risk												0.043***		
												(-3.851)		
International reserve													2.839***	
													(-23.964)	
International reserve plus core and noncore														2.568***
														(-15.746)
Global liquidity price index														
Constant	-0.127***	-0.161***	-0.100***	-0.232***	-0.147***	-0.076***	-0.192***	-0.120***	-0.082***	-0.247***	-0.104***	-0.051*	-0.450***	-0.142***
	(-5.746)	(-7.324)	(-4.518)	(-10.797)	(-5.529)	(-3.274)	(-8.918)	(-5.593)	(-3.701)	(-10.112)	(-4.552)	(-1.746)	(-18.589)	(-6.662)
Number of countries	32	32	32	32	31	32	32	32	32	32	32	32	32	32
Number of observations	2,183	2,183	2,183	2,183	1,763	2,183	2,183	2,183	2,195	2,195	2,183	2,183	2,183	2,183
Adjusted R2	0.447	0.467	0.454	0.517	0.486	0.443	0.497	0.481	0.428	0.465	0.435	0.436	0.552	0.491
Adjusted R2_between	0.056	0.049	0.045	0.022	0.008	0.057	0.053	0.051	0.070	0.043	0.057	0.060	0.029	0.048
Adjusted R2_overall	0.421	0.441	0.429	0.496	0.467	0.414	0.464	0.450	0.398	0.439	0.409	0.409	0.529	0.461

Sources: IMF, World Economic Outlook and International Financial Statistics databases; World Bank, World Development Indicators database; Bloomberg L.P.; Consensus Forecasts; and
Note: Probability values for a test that the coefficient is different from zero are in parentheses (***significant at 1 percent level; **significant at 5 percent level; *significant at 10 percent

Table 9. Fixed-Effects Panel Least-Square Estimation of the Determinants of Excess Credit Growth, 37 Economies, January 2003 – December 2010

	reg1	reg2	reg3	reg4	reg5	reg6	reg7	reg8	reg9	reg10	reg11	reg12	reg13	reg14
	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t
M2 in G4	0.290***													
	(6.115)													
VIX	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***	0.003***	0.001***	0.002***	0.002***	0.002***	0.003***	0.003***
	(9.207)	(9.445)	(8.516)	(9.740)	(8.164)	(6.542)	(8.901)	(10.670)	(4.470)	(7.546)	(7.496)	(6.941)	(10.582)	(10.682)
Credit risk premium	0.097***	0.096***	0.067***	0.080***	0.131***	0.036**	0.150***	0.094***	0.170***	0.126***	0.132***	-0.015	0.115***	0.094***
	(7.052)	(6.889)	(4.501)	(5.330)	(8.265)	(2.338)	(8.858)	(5.400)	(14.160)	(10.372)	(10.401)	(-0.938)	(7.880)	(5.471)
Domestic money supply (M2)	0.132***	0.127***	0.127***	0.117***	0.135***	0.126***	0.119***	0.123***			0.105***	0.052	0.119***	0.122***
	(3.937)	(3.805)	(3.817)	(3.501)	(3.642)	(3.846)	(3.546)	(3.664)			(3.093)	(1.580)	(3.533)	(3.642)
Change in GDP growth	-0.007***	-0.007***	-0.006***	-0.007***	-0.006***	-0.006***	-0.005**	-0.007***	-0.004	-0.006***	-0.005**	0.001	-0.007***	-0.007***
	(-2.876)	(-3.012)	(-2.858)	(-3.202)	(-2.636)	(-2.791)	(-2.358)	(-3.037)	(-1.586)	(-2.688)	(-2.349)	(0.394)	(-2.943)	(-3.061)
Inflation	0.006***	0.006***	0.006***	0.006***	0.007***	0.006***	0.007***	0.007***	0.006***	0.006***	0.007***	0.005***	0.006***	0.007***
	(8.808)	(8.673)	(8.577)	(8.370)	(8.347)	(8.397)	(9.257)	(9.102)	(9.454)	(8.884)	(9.071)	(6.371)	(8.907)	(9.055)
Exchange rate	-0.359***	-0.355***	-0.353***	-0.347***	-0.386***	-0.366***	-0.425***	-0.382***	-0.530***	-0.479***	-0.433***	-0.498***	-0.383***	-0.380***
	(-9.055)	(-8.900)	(-8.989)	(-8.685)	(-8.911)	(-9.516)	(-10.515)	(-9.551)	(-18.611)	(-16.141)	(-10.915)	(-13.079)	(-9.421)	(-9.480)
M2 in G4 plus international reserve		0.296***												
		(5.934)												
GDP-weighted M2 in G4			0.417***											
			(7.905)											
GDP-weighted M2 in G4 plus international reserve				0.359***										
				(6.390)										
Excess liquidity					0.006***									
					(3.280)									
Core liabilities						0.580***								
						(10.157)								
Non-core liabilities							-0.083*							
							(-1.647)							
Core and non-core								0.190***						
								(3.131)						
Reserve money in G4									0.236***					
									(8.705)					
Domestic reserve money									0.006	-0.003				
									(0.328)	(-0.145)				
Reserve money in G4 plus international reserve										0.360***				
										(7.297)				
3 month LIBOR-OIS spread											0.035***			
											(3.617)			
Systemic liquidity risk index												0.055***		
												(13.634)		
International reserve													0.115**	
													(2.393)	
International reserve plus core and noncore														0.198***
														(3.254)
Global liquidity price index														
Constant	-0.163***	-0.167***	-0.155***	-0.173***	-0.155***	-0.140***	-0.159***	-0.162***	-0.168***	-0.183***	-0.156***	-0.068***	-0.174***	-0.163***
	(-18.633)	(-19.041)	(-17.736)	(-19.418)	(-15.076)	(-15.898)	(-17.665)	(-18.431)	(-19.736)	(-19.396)	(-17.440)	(-6.280)	(-17.082)	(-18.557)
Number of countries	32	32	32	32	31	32	32	32	32	32	32	32	32	32
Number of observations	2,007	2,007	2,007	2,007	1,681	2,007	2,007	2,007	2,038	2,038	2,007	2,007	2,007	2,007
Adjusted R2	0.370	0.369	0.378	0.371	0.374	0.390	0.359	0.361	0.374	0.367	0.362	0.413	0.360	0.361
Adjusted R2_between	r2_b													
Adjusted R2_overall	0.364	0.364	0.374	0.368	0.374	0.384	0.355	0.355	0.378	0.371	0.361	0.420	0.355	0.355

Sources: IMF, World Economic Outlook and International Financial Statistics databases; World Bank, World Development Indicators database; Bloomberg L.P.; Consensus Forecasts; and
Note: Probability values for a test that the coefficient is different from zero are in parentheses (***significant at 1 percent level; **significant at 5 percent level; *significant at 10 percent level).

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ANNEX 1. DEFINITIONS OF G-4 LIQUIDITY INDICATORS USED IN THE PAPER

Measures	Defintion
Reserve money	Notes and coins (currency) in circulation outside the central bank.
M2	A measure of the amount of money in circulation and money held in current (checking) accounts (M1) plus money held in savings accounts or deposits that are not immediately available.
GDP-weighted M2	M2 weighted by G-4 GDP
Excess liquidity	The difference between broad money growth and estimates for money demand in the G-4.
International reserves	Official foregin exchange reserves
3 month LIBOR-OIS spread	The difference between the 3 month LIBOR rate and the OIS rate
Systemic liquidity risk index	A measure to identify the simultaneous tightening of global market liquidity and funding liquidity conditions. It is based on violations of arbitrage conditions across various asset classes
Core (banking system) liabilities	Traditional bank-based deposit funding—e.g., retail deposits as in standard monetary aggregates – and net of equivalent assets, to consolidate intra-financial sector claims. The series are broadly in line with M3 monetary aggregates.
Noncore liabilities	All other less-traditional (and more volatile) funding sources—e.g., securities, repurshase agreements, money market mutual funds, and, more recently, structured products.

Sources: IMF, World Economic Outlook and International Financial Statistics databases; World Bank, World Development Indicators database; Bloomberg L.P.; Consensus Forecasts; Datastream; Haver Analytics; and Federal Reserve.

ANNEX 2. LIST OF ECONOMIES IN THE SAMPLE AND THEIR EXCHANGE RATE REGIMES

Economies	Exchange Rate Regimies (2007)	Exchange Rate Regimies (2009)
Asia		
China	Crawling peg	Stabilized arrangement
Hong Kong SAR	Currency board arrangement	Currency board
India	Managed floating with no predetermined path for the exchange rate	Floating
Indonesia	Managed floating with no predetermined path for the exchange rate	Floating
Korea	Independently floating	Free floating
Malaysia	Managed floating with no predetermined path for the exchange rate	Other managed arrangement
Pakistan	Conventional pegged arrangement	Floating
Philippines	Independently floating	Free floating
Singapore	Managed floating with no predetermined path for the exchange rate	Other managed arrangement
Sri Lanka	Conventional pegged arrangement	Stabilized arrangement
Thailand	Managed floating with no predetermined path for the exchange rate	Floating
Vietnam	Conventional pegged arrangement	Stabilized arrangement
Japan	Independently floating	Free floating
Australia	Independently floating	Free floating
New Zealand	Independently floating	Free floating
Europe, Middle East, and Africa		
Bulgaria	Currency board arrangement	Currency board
Croatia	Conventional pegged arrangement	Stabilized arrangement
Czech Republic	Independently floating	Free floating
Estonia	Currency board arrangement	Currency board
Euro Area	Independently floating	Free floating
Hungary	Independently floating	Floating
Latvia	Conventional pegged arrangement	Conventional peg
Lithuania	Currency board arrangement	Currency board
Nigeria	Managed floating with no predetermined path for the exchange rate	Other managed arrangement
Norway	Independently floating	Free floating
Poland	Independently floating	Free floating
Romania	Managed floating with no predetermined path for the exchange rate	Floating
Russia	Conventional pegged arrangement	Other managed arrangement
Iceland	Independently floating	Free floating
Saudi Arabia	Conventional pegged arrangement	Conventional peg
South Africa	Independently floating	Floating
Turkey	Independently floating	Free floating
United Kingdom	Independently floating	Free floating
Western Hemisphere		
Argentina	Conventional pegged arrangement	Floating
Brazil	Independently floating	Floating
Canada	Independently floating	Free floating
Chile	Independently floating	Free floating
Colombia	Managed floating with no predetermined path for the exchange rate	Floating
Mexico	Independently floating	Floating
Peru	Managed floating with no predetermined path for the exchange rate	Floating
United States	Independently floating	Free floating

Source: IMF, Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).

Note: The AREAER provides a detailed description of the exchange arrangements and exchange restrictions of individual member countries in 2007 and 2009. This paper takes the defintion of exchange rate regimes of AREAER in 2007, which can better capture the features of the sample period, which starts in 2003.