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Abstract

This paper examines the relevance of exchange rate regimes in the transmission of global financial shocks to domestic financial and macroeconomic conditions. Our findings suggest that even in today's highly financially integrated world, the nominal exchange rate regime does matter—at least for emerging market economies. The transmission of global financial shocks to domestic variables is magnified under fixed exchange rate regimes relative to more flexible regimes. For advanced economies, however, the jury is still out, as the recent paucity of truly fixed regimes among these economies poses a challenge for estimating the effect of exchange rate flexibility.

JEL Classification: F31, F36, F41

Keywords: trilemma, global financial cycle, emerging market economies

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I. Introduction

The synchronous rise and fall of cross-border capital flows, domestic credit, and asset prices across countries in response to changing financial conditions at the center of the system—the "global financial cycle"—has raised questions about the degree of insulation the exchange rate regime can provide for domestic economic and financial variables. Rey (2016), for example, shows that US monetary policy shocks affect financial conditions in inflation-targeting advanced economies, and argues that flexible exchange rates are not enough to safeguard monetary autonomy in a world of high capital mobility—a contradiction to the monetary policy trilemma (Mundell, 1963; Obstfeld and Taylor, 1998). Similarly, in a combined sample of advanced and emerging market economies, Passari and Rey (2015) show that global financial shocks (proxied by the VIX index) affect domestic credit and equity returns with similar force regardless of the exchange rate regime.

In this paper, we argue that the validity of such conclusions hinges critically on the country composition of the sample. For advanced economies (AEs), it is difficult to identify the effect of the exchange rate regime for two reasons. First, several AEs alongside the United States experience the global financial cycle asymmetrically from other economies given their tendency to receive "safe-haven" flows during risk-off episodes. As global financial conditions tighten, these countries therefore receive capital inflows rather than the bouts of outflows typically experienced by emerging markets. Second, there is a genuine difficulty in the interpretation of exchange rate regime data for AEs, given that the fixed end of the regime spectrum consists almost entirely of Eurozone (EZ) economies. Although EZ countries have fixed exchange rates vis-à-vis each other, their joint currency floats internationally, affording the European Central Bank monetary autonomy in the sense of the trilemma. In a real sense, AEs therefore lack the genuine variation in exchange rate regime essential for identifying its role in cross-border shock transmission.

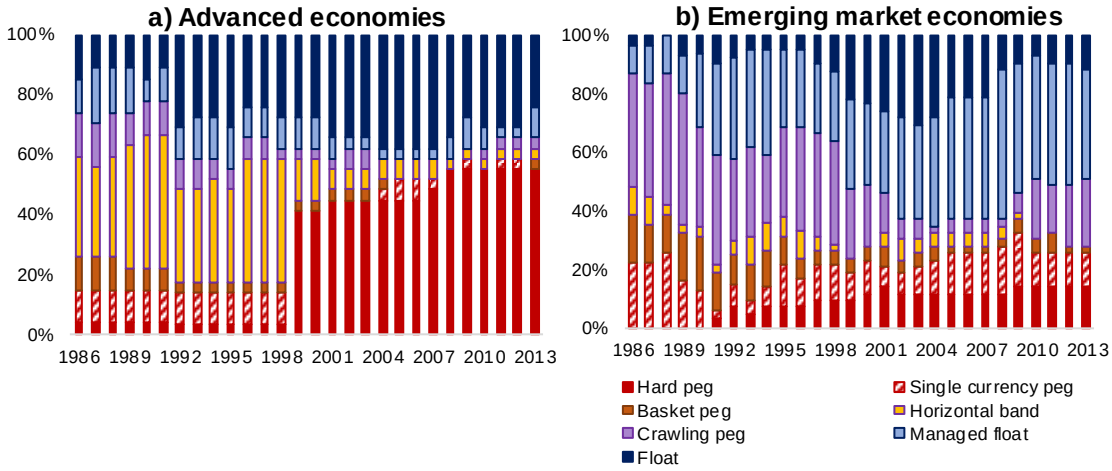
By contrast, for emerging market economies (EMEs), the data speak clearly and show that as postulated by the trilemma, the exchange rate regime retains an essential role. For EMEs, the transmission of global financial shocks to domestic financial conditions (credit, house prices, and banking sector leverage) and to output is magnified under fixed exchange rate regimes relative to more flexible regimes.

II. Does the Exchange Rate Regime Matter?

To examine the importance of the exchange rate regime in the transmission of global financial shocks, we consider quarterly data for 29 AEs and 43 EMEs over 1986–2013.[1] We base our analysis on a three-way (de facto) regime categorization (fixed, intermediate, and float) together with a finer classification that distinguishes within these broad buckets, all taken from Ghosh et al. (2015).

A snapshot of the data shows that over 50 percent of the AE sample since 2005 is classified as a fixed exchange rate regime (i.e., a hard peg or conventional peg to a single anchor currency). Yet, except for Hong Kong SAR, all countries in the fixed category belong to the EZ (Figure 1).[2] For EMEs, however, there is a much richer diversity. Since 2005, only about 27 percent of the regimes in the EME sample are fixed (with countries in different regions pegged to different anchor currencies, e.g., the US dollar, euro, etc.), 60 percent are intermediate (basket pegs, horizontal bands, crawling arrangements, or managed floats), while the remaining 13 percent float freely.

FIGURE 1. DE FACTO EXCHANGE RATE REGIMES, 1986–2013



Source: Authors' calculations.

Looking at the (unconditional) correlation between domestic economic variables and global financial conditions (proxied by the VXO index) across exchange rate regimes, we obtain

[1] See the Appendix for data description and sources.

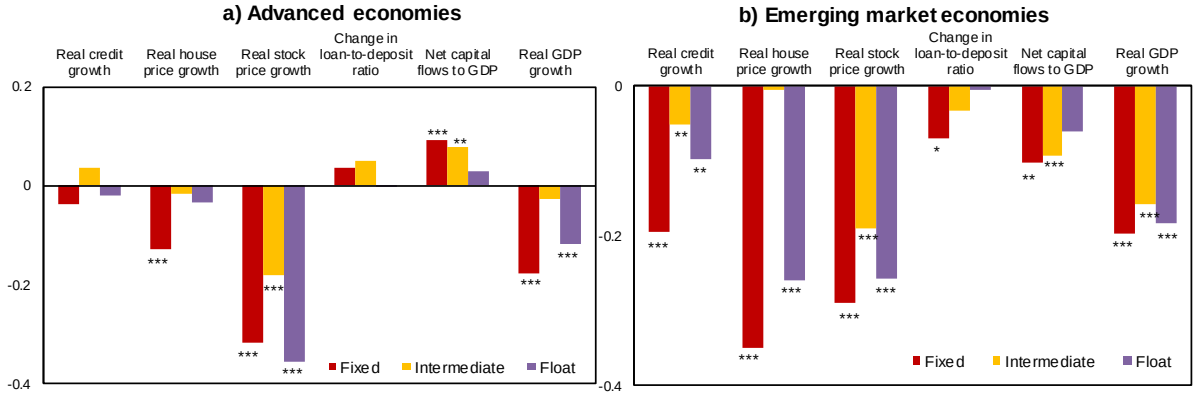
[2] From 2008 onward, the IMF started to classify the EZ countries as having a floating exchange rate regime, but they are generally treated as fixed regimes in empirical analysis, and in most other exchange rate regime classifications including Ghosh et al (2015) that we use here.

sharply contrasting pictures for AEs and EMEs (Figure 2).[3] For AEs, the correlations show no discernible pattern: some variables (credit, asset prices, and real GDP growth) are generally negatively correlated with the VXO, while financial sector leverage and net private capital flows (in percent of GDP) are positively correlated, underscoring the safe-haven status of some AEs. Moreover, there appears to be no systematic difference in the correlations across exchange rate regimes—house prices, output growth, and net private capital flows have a stronger correlation with the VXO under fixed exchange rate regimes, but this is not the case for credit, stock prices, and leverage growth.

For EMEs, correlations between the VXO and domestic variables are unambiguously negative—suggesting a much stronger boom-bust cycle due to changes in global financial conditions. In addition, the correlations are larger (in absolute terms) for fixed regimes, implying higher sensitivity of domestic conditions to global financial shocks.[4]

These preliminary statistics suggest that both the relationship between global and domestic economic conditions and the role of the exchange rate regime tend to differ markedly between AEs and EMEs.

FIGURE 2. CORRELATION WITH THE VXO



Source: Authors' calculations.

Notes: Figure shows the correlation between (log) VXO and real private sector credit growth, house price growth, equity returns, change in loan-to-deposit ratio, net private capital flows to GDP, and real GDP growth across countries in each exchange rate regime category. *,**, *** indicate significance at the 10, 5, and 1 percent levels, respectively.

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[3] Several studies (e.g., Bruno and Shin, 2015; Rey, 2015; Miranda-Agrippino and Rey, 2015; IMF, 2017) establish that the VIX index is a key indicator of global financial conditions, with lower values indicating greater tolerance for risk-taking and increases in leverage. We use the VXO index—precursor of the VIX—to maximize data coverage (the VXO and VIX are available from 1986 and 1990 onward, respectively). Correlation between the two series is 0.99, and the results reported here remain very similar if the VIX is used instead.

[4] A similar picture emerges from the correlation between capital flows and domestic variables (see Figure A1 in the Appendix).

III. Estimation Methodology

To examine the transmission of global financial conditions more formally, one can estimate the following specification:

$$f_{i,t} = \beta_0 + \beta_1 Fixed_{it} + \beta_2 Int_{it} + \beta_3 VXO_t + \beta_4 Fixed_{it} \times VXO_t + \beta_5 Int_{it} \times VXO_t + \sum_k \lambda_k z_{it,k} + \mu_i + \varepsilon_{it} \quad (1)$$

where $f_{i,t}$ is a domestic variable (real credit growth; real house price growth; real equity return; change in loan-to-deposit ratio; and real output growth) in country *i* at time *t*; *Fixed* and *Int* are dummy variables for fixed and intermediate exchange rate regimes, respectively (float is the reference category); *VXO* is the VXO index (in logs); *z* is a set of relevant (global and domestic) control variables; μ captures country-fixed effects; and ε is the random error term.[5] If financial conditions across countries are affected by global financial conditions (regardless of the exchange rate regime), then β_3 in (1) would be statistically significant. To the extent that the exchange rate regime matters in the transmission of global conditions, the coefficients on the interaction terms (β_4 or β_5) would also be statistically significant.

We estimate (1) using ordinary least squares, and cluster the standard errors at the country level to address the possibility of serial correlation in the error term.[6] The fact that exchange rate regimes are slow-moving variables, which generally do not respond to short-run fluctuations in macroeconomic activity, helps to mitigate potential simultaneity concerns in our estimations. To further attenuate endogeneity concerns, we drop from the estimation sample country-specific financial crisis observations (as identified by Laeven and Valencia, 2013), when the exchange rate regime is more likely to switch due to domestic financial and economic developments. We lag other domestic control variables sufficiently to mitigate potential endogeneity concerns. Moreover—since the question of insulation by flexible exchange rates is most relevant for financially open economies—we include in the estimations only countries that are at least partially open (defined as those country observations where capital account openness, measured by the Quinn-Toyoda (2008) index, is above the 25th percentile for the sample).

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[5] All variables are at the quarterly frequency, except for exchange rate regimes, which are available at annual frequency.

[6] To account for possible cross-sectional and temporal dependence in the error term, we also compute the Driscoll-Kraay standard errors, but the results remain very similar.

While (1) gives an estimate of the effect of the VXO, it could be biased if the VXO is correlated with other global factors (such as US interest rates or commodity prices) that may also impact domestic variables directly. We therefore also present an alternative estimate of (1) that adds quarter-year (η_t) effects to control for global factors more generally:

$$f_{i,t} = \beta_0 + \beta_1 Fixed_{it} + \beta_2 Int_{it} + \beta_3 VXO_t + \beta_4 Fixed_{it} \times VXO_t + \beta_5 Int_{it} \times VXO_t + \sum_k \lambda_k z_{it,k} + \mu_i + \eta_t + \varepsilon_{it} \quad (2)$$

In the version (2) that includes quarter-year effects, we cannot estimate the influence of the VXO (β_3) separately, but we will obtain estimates for β_4 and β_5.

IV. Empirical Results

We first focus on domestic credit growth and begin by considering the impact of global financial conditions on AEs. The results in Table 1 (cols. [1]-[2]) show that controlling for relevant factors—such as (lagged) real GDP growth, the credit to GDP ratio (as a measure of financial development), capital account openness, a time trend, a dummy variable for the global financial crisis to capture the extraordinary size of the shock (and corresponding potential policy responses), and country-specific effects—credit growth is neither statistically significantly associated with the VXO nor with exchange rate regimes. The coefficients on the interaction terms β_4 and β_5 are also wholly insignificant, whether quarter-year effects are included or not.

For EMEs, however, the picture is quite different. Credit growth is negatively related to the VXO in col. [3] (with the coefficient statistically significant at the 10 percent level): a one standard deviation increase in the VXO (in log terms) lowers credit growth by about 0.5 percentage points (against mean quarterly credit growth rate of 2 percent for the EME sample). Countries with fixed exchange rate regimes have, on average, about 2 to 4 percentage points higher credit growth than those with intermediate or floating regimes, respectively. Importantly, the coefficient on the interaction term between the VXO and the fixed exchange rate regime is strongly negative, implying that a one standard deviation shock to the VXO lowers credit growth by about 1 percentage point in fixed exchange rate regimes compared to more flexible exchange rate regimes.

Table 1. Real Domestic Credit Growth in AEs and EMEs, 1986Q1–2013Q4

	Advanced		Emerging Market		Advanced and Emerging Market							
					All	All	Excluding USA	Excluding USA	Excluding EZ	Excluding EZ	EZ Weighted Average	EZ Weighted Average
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Fixed regime	1.575	0.380	11.799***	13.611***	4.691**	5.191**	4.687**	5.277**	8.072***	9.317***	8.211***	9.453***
	(1.958)	(1.797)	(3.654)	(3.532)	(2.174)	(2.163)	(2.232)	(2.218)	(2.728)	(2.585)	(2.691)	(2.549)
Intermediate regime	-2.161	0.025	-0.113	2.002	-1.135	0.711	-1.067	0.861	-1.071	0.817	-0.936	0.949
	(2.083)	(2.031)	(2.382)	(2.655)	(1.683)	(1.614)	(1.764)	(1.670)	(1.718)	(1.672)	(1.667)	(1.626)
Log (VXO)	-0.268		-1.348*		-0.984*		-1.026*		-0.979*		-0.937*	
	(0.526)		(0.719)		(0.493)		(0.522)		(0.501)		(0.480)	
Fixed x log (VXO)	-0.293	0.075	-2.687**	-3.151***	-0.917	-1.017	-0.877	-1.002	-1.880**	-2.136***	-1.927**	-2.186***
	(0.581)	(0.596)	(1.141)	(1.114)	(0.664)	(0.654)	(0.685)	(0.674)	(0.847)	(0.805)	(0.833)	(0.792)
Intermediate x log (VXO)	0.768	0.107	0.609	0.054	0.714	0.240	0.732	0.238	0.686	0.213	0.640	0.165
	(0.658)	(0.726)	(0.801)	(0.879)	(0.563)	(0.571)	(0.591)	(0.594)	(0.574)	(0.588)	(0.555)	(0.571)
Real GDP growth	0.193***	0.148***	0.318***	0.246**	0.331***	0.289***	0.331***	0.289***	0.334***	0.283***	0.333***	0.283***
	(0.053)	(0.053)	(0.111)	(0.111)	(0.077)	(0.080)	(0.078)	(0.080)	(0.082)	(0.082)	(0.082)	(0.082)
Domestic credit/GDP	-0.020***	-0.018***	-0.121***	-0.112***	-0.030***	-0.027***	-0.030***	-0.026***	-0.031***	-0.028***	-0.031***	-0.028***
	(0.007)	(0.006)	(0.017)	(0.015)	(0.008)	(0.007)	(0.008)	(0.007)	(0.011)	(0.010)	(0.011)	(0.010)
Capital account openness	-0.014	-0.013	0.071***	0.071***	0.025	0.025*	0.026*	0.026*	0.022	0.024	0.023	0.024
	(0.022)	(0.022)	(0.022)	(0.022)	(0.016)	(0.015)	(0.016)	(0.015)	(0.016)	(0.015)	(0.016)	(0.015)
Linear trend	0.002		0.005		-0.003		-0.004		-0.001		-0.001	
	(0.007)		(0.010)		(0.006)		(0.007)		(0.007)		(0.007)	
Global financial crisis	0.570		1.907**		1.184**		1.161**		1.195**		1.214**	
	(0.740)		(0.720)		(0.502)		(0.510)		(0.574)		(0.564)	
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter-year effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,493	2,493	2,592	2,592	5,083	5,083	4,979	4,979	4,437	4,437	4,495	4,495
Adjusted R2	0.054	0.088	0.116	0.151	0.074	0.101	0.073	0.100	0.069	0.094	0.070	0.095
No. of countries	29	29	43	43	72	72	71	71	72	72	73	73

Note: Dependent variable is quarterly real domestic private sector credit growth rate (in percent). Real GDP growth rate (in percent) and the capital account openness index are lagged one period, and domestic private sector credit (in percent of GDP) is lagged two period to mitigate endogeneity concerns. See online appendix for description of variables and data sources. Sample comprises all AEs in cols. [1]-[2], all EMEs in cols. [3]-[4], all AEs and EMEs in cols. [5]-[6], excludes the United States in cols. [7]-[8], excludes the Eurozone countries from year 1999 onward in cols. [9]-[10], and excludes individual Eurozone countries from 1999 onward but takes their weighted average in cols. [11]-[12]. Constant is included in all specifications. Clustered standard errors (by country) are reported in parentheses. ***, **, * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

That intermediate regimes are, on average, significantly less affected than fixed regimes may reflect the less binding constraint imposed on monetary policy in such regimes. Considering the more disaggregated regime classification, the effect of the VXO on credit growth is the strongest for both hard and conventional pegs—which forgo monetary autonomy by rigidly fixing their exchange rates (see the Appendix).

Pooling the AEs and EMEs to form a single population (cols. [5]-[6]), we obtain both a smaller effect of the VXO in col. [5] and an insignificant coefficient (in both specifications) on the interaction term with the fixed exchange rate regime. Excluding the US—a major financial center—from the sample does not change these results (cols. [7]-[8]); however, if we exclude the individual EZ countries from the sample (considering their euro membership), the coefficient on the interaction term with the fixed exchange rate regime turns highly statistically significant (cols. [9]-[10]). Moreover, even if we include the EZ countries but treat them as a single entity with a floating exchange rate (while taking the GDP-weighted average of their domestic variables), the estimated β_4 remains significantly negative (cols. [11]-[12]). These

results make it amply clearly that it is the difficulty associated with the interpretation of the exchange rate regime for individual EZ countries, and treating them as a fixed regime, that drives the irrelevance of the exchange rate regime in the full sample (cols. [5]-[6]).

Turning to the other outcome variables, a similar picture emerges from the regression results for house prices, leverage, and output growth: the sensitivity of these variables to global financial shocks is magnified under fixed exchange rate regimes in EMEs but not when AEs are also considered (see the Appendix). Excluding the EZ countries from the sample (or treating them as a single entity with a float), however, validates the relevance of the exchange rate regime even in the broader sample.[7]

V. Conclusion

The notion that the exchange rate regime is of little relevance for the transmission of global monetary and financial shocks, if true, would represent a fundamental break with longstanding academic thinking and policy advice. This paper suggests that arguing for irrelevance of the exchange rate regime in the face of global financial shocks is not consistent with the empirical evidence—at least for EMEs. For AEs only, the jury is still out, as the recent paucity of truly fixed regimes among AEs poses a challenge for estimating the effect of exchange rate flexibility.

[7] For equity returns, exchange rate regimes do not matter in the EME sample, nor in the pooled AE and EME sample when the EZ countries are excluded.

REFERENCES

Bruno, Valentina, and Hyun Song Shin, 2015, "Cross-Border Banking and Global Liquidity," *Review of Economic Studies*, 82(2): 535-564

Ghosh, Atish R., Jonathan D. Ostry, and Mahvash S. Qureshi, 2015, "Exchange Rate Management and Crisis Susceptibility: A Reassessment." *IMF Economic Review*, 63(1): 238-276.

IMF, 2017, "Are Countries Losing Control of Domestic Financial Conditions?" Chapter 3 in *Global Financial Stability Report: April 2017* (Washington DC: International Monetary Fund).

Laeven, Luc, and Fabian Valencia, 2013, "Systemic Banking Crises Database," *IMF Economic Review*, 61(2): 225-270.

Miranda-Agrippino, Silvia, and Hélène Rey, 2015, "World Asset Markets and the Global Financial Cycle," NBER Working Paper 21722 (Cambridge, MA: NBER).

Mundell, Robert, 1963, "Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rates," *Canadian Journal of Economics and Political Science*, 29(4): 475-485.

Obstfeld, Maurice, and Alan Taylor, 1998, "The Great Depression as a Watershed: International Capital Mobility Over the Long Run," in M. Bordo, C. Goldin, and E. White (eds.), *The Defining Moment: The Great Depression and the American Economy in the Twentieth Century*, 353–402 (Chicago: University of Chicago Press).

Passari, Evgenia, and Hélène Rey, 2015, "Financial Flows and the International Monetary System," *Economic Journal*, 125(584): 675–698.

Quinn, Dennis, and A. Maria Toyoda, 2008, "Does Capital Account Liberalization Lead to Economic Growth?" *Review of Financial Studies*, 21(3): 1403-1449.

Rey, Hélène, 2016, "International Channels of Transmission of Monetary Policy and the Mundellian Trilemma," *IMF Economic Review*, 64(1): 6-35.

APPENDIX

Table A1. List of Countries in the Sample

Advanced economies (AEs)			Emerging market economies (EMEs)			
Australia	Iceland	Singapore	Argentina	Ecuador	Kazakhstan	Russia
Austria	Ireland	Slovenia	Belarus	Egypt	Korea, Rep.	Serbia
Belgium	Italy	Spain	Brazil	El Salvador	Latvia	Slovak Rep.
Canada	Israel	Sweden	Bulgaria	Estonia	Lithuania	South Africa
Cyprus	Japan	Switzerland	Chile	Georgia	Malaysia	Sri Lanka
Denmark	Luxembourg	United Kingdom	China	Guatemala	Mexico	Thailand
Finland	Malta	United States	Colombia	Hungary	Morocco	Tunisia
France	Netherlands		Costa Rica	India	Peru	Turkey
Germany	New Zealand		Croatia	Indonesia	Philippines	Uruguay
Greece	Norway		Czech Rep.	Jamaica	Poland	Venezuela
Hong Kong SAR	Portugal		Dominican Rep.	Jordan	Romania	

Table A2. Variable Description and Data Sources

Variables	Description	Source
Capital account openness	Index (high=liberalized, low=closed)	Quinn and Toyoda (2008)
Net capital flows	In USD billions (BPM5 presentation), derived from the financial account of the Balance of Payments. Net capital flows exclude, reserve assets, financing items and other investment liabilities of general government, i.e., the difference between IFS series codes "..4995W.9" and "..4753ZB9." Liability flows also exclude other investment liabilities of the general government	IMF's IFS database
Capital flows/GDP	In percent. Capital flows scaled by (1/4)*annual GDP	Authors' calculations
Consumer price index (CPI)	Index	IMF's INS database
Domestic private sector credit	In local currency (LC)	IMF's IFS database
Exchange rate regime	De facto, de jure	Ghosh et al. (2015)
GDP current/constant prices	In billions of USD (or LC). Seasonally adjusted	IFS database and Haver analytics
Global financial crisis (GFC)	Binary variable equal to 1for 2008Q4/2009Q1, 0 otherwise	Authors' calculations
House prices	Index (in real terms)	IMF's Macrofinancial Unit database
Loan to deposit (LTD) ratio	In percent	IMF's IFS database
Stock prices (in real terms)	Stock price index deflated by quarterly CPI	Bloomberg and authors' calculations
VXO/VIX index	Chicago Board Options Exchange Market Volatility Index	Bloomberg

Table A3. Estimation Results with Disaggregated Exchange Rate Regimes, 1986Q1–2013Q4

	Credit growth		House price growth		Stock price growth		Change in LTD ratio		Real GDP growth	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Hard peg	10.349***	11.979***	6.949	9.767**	12.750	14.463	7.908***	8.881***	2.831**	3.160**
	(3.770)	(3.484)	(5.573)	(3.618)	(10.332)	(9.849)	(2.520)	(2.488)	(1.380)	(1.401)
Conventional peg	15.660***	18.217***	29.583**	32.956***	-11.387	-7.972	8.838**	9.750***	1.288	1.905
	(5.523)	(5.579)	(12.083)	(10.588)	(8.937)	(9.839)	(3.775)	(3.155)	(1.694)	(1.725)
Basket peg	-10.301	-6.828	-19.279*	-9.767	-49.727***	-23.753*	0.900	2.280	0.613	0.596
	(8.129)	(7.440)	(9.647)	(12.068)	(16.678)	(13.163)	(9.650)	(8.968)	(2.202)	(2.458)
Horizontal band	-7.353	-6.435	-7.768	-7.622	-7.727	-7.307	1.438	2.318	1.018	1.632
	(5.177)	(5.085)	(6.094)	(5.352)	(7.516)	(12.777)	(4.382)	(3.997)	(1.158)	(1.461)
Crawling peg	-1.355	1.727	-9.092*	1.043	-18.399**	-2.289	1.645	3.650	0.346	1.264
	(3.782)	(4.790)	(4.780)	(8.250)	(8.750)	(8.379)	(5.927)	(6.055)	(0.940)	(0.991)
Managed float	2.110	4.299	-8.379***	-4.980	-8.314	-2.695	4.329	5.273*	-0.144	0.571
	(2.673)	(3.025)	(2.786)	(4.282)	(8.148)	(7.822)	(2.730)	(2.834)	(0.670)	(0.688)
Log (VXO)	-1.336*		-1.860**		-10.251***		0.398		-0.445***	
	(0.724)		(0.901)		(1.523)		(0.714)		(0.127)	
Hard peg x log (VXO)	-2.332*	-2.819**	-3.590*	-4.059***	-2.851	-3.351	-1.850*	-2.150**	-0.914**	-1.007**
	(1.213)	(1.176)	(1.827)	(1.108)	(3.183)	(3.042)	(1.047)	(1.021)	(0.452)	(0.462)
Conventional peg x log (VXO)	-3.669**	-4.258**	-9.288**	-9.045**	4.457	3.559	-1.504	-1.816**	-0.263	-0.433
	(1.751)	(1.741)	(4.249)	(3.622)	(3.714)	(3.898)	(1.019)	(0.885)	(0.534)	(0.551)
Basket peg x log (VXO)	4.763*	4.009	7.347	5.121	15.768**	7.860*	0.658	0.367	-0.179	-0.134
	(2.650)	(2.450)	(4.313)	(5.040)	(5.948)	(4.615)	(2.921)	(2.731)	(0.641)	(0.726)
Horizontal band x log (VXO)	3.783**	3.331**	2.565	2.416	2.392	3.490	0.567	0.080	-0.194	-0.418
	(1.610)	(1.516)	(2.008)	(1.759)	(2.347)	(4.949)	(1.428)	(1.364)	(0.325)	(0.439)
Crawling peg x log (VXO)	1.187	0.470	2.822	0.253	5.918*	1.274	0.062	-0.539	-0.158	-0.392
	(1.305)	(1.578)	(1.767)	(2.982)	(3.213)	(2.664)	(2.019)	(2.062)	(0.301)	(0.329)
Managed float x log (VXO)	-0.223	-0.818	2.407**	1.884	2.803	1.563	-1.162	-1.481	0.091	-0.119
	(0.889)	(0.990)	(0.909)	(1.321)	(2.704)	(2.496)	(0.888)	(0.944)	(0.200)	(0.217)
Real GDP growth	0.312***	0.241**	0.147	0.196	-0.173	0.215	0.232***	0.177**		
	(0.109)	(0.110)	(0.287)	(0.216)	(0.215)	(0.189)	(0.068)	(0.077)		
Private credit/GDP	-0.119***	-0.111***							-0.026***	-0.025***
	(0.018)	(0.016)							(0.006)	(0.006)
Capital account openness	0.066***	0.065***	-0.050**	-0.024	0.028	0.008	0.031*	0.038**	0.006	0.005
	(0.024)	(0.022)	(0.023)	(0.021)	(0.035)	(0.025)	(0.017)	(0.016)	(0.005)	(0.005)
Real credit growth			0.080**	0.074***	0.004	0.030				
			(0.032)	(0.024)	(0.062)	(0.067)				
LTD ratio							-0.064***	-0.061***		
							(0.014)	(0.012)		
Real GDP per capita									-0.830	-0.908
									(0.740)	(0.718)
Institutional quality									0.985	0.806
									(1.152)	(0.960)
Linear trend	0.011		0.004		-0.051***		0.004		0.007	
	(0.013)		(0.017)		(0.016)		(0.009)		(0.005)	
Global financial crisis	2.294***		-1.722*		-12.444***		1.375		-2.117***	
	(0.693)		(0.978)		(2.174)		(0.836)		(0.380)	
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter-year effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,592	2,592	1,119	1,119	2,049	2,049	2,602	2,602	2,524	2,524
Adjusted R2	0.122	0.159	0.128	0.228	0.061	0.320	0.0779	0.126	0.108	0.147
No. of countries	43	43	25	25	37	37	43	43	42	42

Note: Dependent variable is quarterly real domestic private sector credit growth rate (in percent) in cols. [1]-[2]; real house price growth (in percent) in cols. [3]-[4]; real equity returns (in percent) in cols. [5]-[6]; change in LTD ratio (in percentage points) in cols. [7]-[8]; real GDP growth (in percent) in cols. [9]-[10]. All domestic control variables are lagged to mitigate endogeneity concerns. Sample comprises open countries (i.e., those above the 25th sample percentile of the Quinn-Toyoda capital account openness index) and non-financial crisis years. Constant is included in all specifications. Clustered standard errors (by country) are reported in parentheses. ***, **, * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

Table A4. Real House Price Growth in AEs and EMEs, 1986Q1–2013Q4

	All AEs	All AEs	Excluding USA	Excluding USA	Excluding Eurozone	Excluding Eurozone	Eurozone Weighted Average	Eurozone Weighted Average
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fixed regime	2.091	1.291	2.208	1.367	6.436**	6.858**	6.456**	7.013**
	(1.343)	(1.548)	(1.416)	(1.616)	(2.920)	(2.585)	(2.895)	(2.566)
Intermediate regime	2.964	5.185**	3.370	5.346**	3.849	5.793***	3.804	5.881***
	(2.590)	(2.164)	(2.705)	(2.255)	(2.459)	(2.009)	(2.445)	(1.983)
Log (VXO)	0.295		0.324		0.379		0.360	
	(0.359)		(0.387)		(0.380)		(0.359)	
Fixed x log (VXO)	-0.577	-0.430	-0.589	-0.438	-1.841**	-2.158**	-1.851**	-2.203**
	(0.417)	(0.511)	(0.440)	(0.534)	(0.844)	(0.816)	(0.837)	(0.810)
Intermediate x log (VXO)	-0.801	-1.475**	-0.897	-1.497*	-1.010	-1.645**	-1.001	-1.673**
	(0.823)	(0.704)	(0.852)	(0.731)	(0.793)	(0.658)	(0.786)	(0.648)
Real GDP growth (lagged)	0.431***	0.393***	0.431***	0.392***	0.396***	0.357**	0.392***	0.351**
	(0.106)	(0.118)	(0.107)	(0.119)	(0.137)	(0.136)	(0.135)	(0.136)
Credit growth (lagged)	0.055**	0.040*	0.054**	0.040*	0.037*	0.026	0.037*	0.026
	(0.026)	(0.023)	(0.025)	(0.023)	(0.019)	(0.018)	(0.019)	(0.017)
Capital acc. openness (lagged)	-0.011	-0.008	-0.011	-0.008	-0.031**	-0.024*	-0.030**	-0.024*
	(0.011)	(0.011)	(0.012)	(0.011)	(0.013)	(0.013)	(0.013)	(0.013)
Linear trend	0.005		0.005		0.017***		0.016***	
	(0.006)		(0.006)		(0.006)		(0.006)	
Global financial crisis	-1.794***		-1.882***		-2.717***		-2.562***	
	(0.609)		(0.633)		(0.909)		(0.851)	
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter-year effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,302	2,302	2,198	2,198	1,686	1,686	1,744	1,744
Adjusted R2	0.082	0.159	0.083	0.159	0.092	0.164	0.091	0.163
No. of countries	29	29	28	28	27	27	28	28

Note: Dependent variable is quarterly real house price growth rate (in percent). Real GDP growth (in percent), domestic credit growth (in percent), and the capital account openness index are lagged one period. See online appendix for description of variables and data sources. Sample comprises all AEs in cols. [1]-[2], excludes the United States in cols. [3]-[4], excludes the eurozone countries from year 1999 onward in cols. [5]-[6], and excludes individual eurozone countries from 1999 onward but takes their weighted average in cols. [7]-[8]. Constant is included in all specifications. Clustered standard errors (by country) are reported in parentheses. ***, **, * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

Table A5. Real Stock Returns in AEs and EMEs, 1986Q1–2013Q4

	All AEs	All AEs	Excluding USA	Excluding USA	Excluding Eurozone	Excluding Eurozone	Eurozone Weighted Average	Eurozone Weighted Average
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fixed regime	5.884*	6.740**	6.190*	6.570*	3.350	6.236	2.312	5.560
	(3.353)	(3.068)	(3.552)	(3.258)	(5.104)	(7.173)	(5.089)	(7.187)
Intermediate regime	4.603	2.815	5.643	2.965	6.673	3.837	5.615	3.247
	(7.547)	(6.873)	(8.046)	(7.142)	(8.109)	(7.418)	(8.091)	(7.441)
Log (VXO)	-8.278***		-8.361***		-7.867***		-8.200***	
	(0.878)		(0.979)		(0.921)		(0.919)	
Fixed x log (VXO)	-2.671**	-3.480***	-2.640**	-3.440***	-1.073	-3.493	-0.722	-3.281
	(1.190)	(1.076)	(1.262)	(1.131)	(2.597)	(3.087)	(2.586)	(3.091)
Intermediate x log (VXO)	-0.940	-0.892	-1.107	-0.915	-1.568	-1.194	-1.217	-1.000
	(2.512)	(2.210)	(2.666)	(2.274)	(2.651)	(2.378)	(2.643)	(2.389)
Real GDP growth (lagged)	-0.253**	0.242*	-0.241*	0.227*	-0.067	0.088	-0.099	0.096
	(0.117)	(0.130)	(0.118)	(0.131)	(0.178)	(0.140)	(0.175)	(0.134)
Credit growth (lagged)	-0.037	-0.078*	-0.042	-0.076*	-0.045	-0.070	-0.046	-0.072
	(0.040)	(0.042)	(0.041)	(0.041)	(0.038)	(0.045)	(0.038)	(0.046)
Capital acc. openness (lagged)	-0.001	0.050*	-0.001	0.049*	-0.004	0.061**	-0.004	0.062**
	(0.028)	(0.026)	(0.029)	(0.027)	(0.030)	(0.027)	(0.030)	(0.027)
Linear trend	0.011		0.013		0.020		0.019	
	(0.008)		(0.008)		(0.012)		(0.011)	
Global financial crisis	-5.337***		-4.888***		-7.530***		-7.746***	
	(1.264)		(1.250)		(1.440)		(1.353)	
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter-year effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,189	2,189	2,085	2,085	1,555	1,555	1,613	1,613
Adjusted R2	0.098	0.588	0.097	0.585	0.085	0.540	0.0893	0.551
No. of countries	29	29	28	28	28	28	29	29

Note: Dependent variable is quarterly real stock price growth rate (in percent). Real GDP growth (in percent), domestic credit growth (in percent), and the capital account openness index are lagged one period. See online appendix for description of variables and data sources. Sample comprises all AEs in cols. [1]-[2], excludes the United States in cols. [3]-[4], excludes the eurozone countries from year 1999 onward in cols. [5]-[6], and excludes individual eurozone countries from 1999 onward but takes their weighted average in cols. [7]-[8]. Constant is included in all specifications. Clustered standard errors (by country) are reported in parentheses. ***, **, * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

Table A6. Change in Loan-to-Deposit (LTD) Ratio in AEs and EMEs, 1986Q1–2013Q4

	Advanced		Emerging Market		Advanced and Emerging Market							
					All	All	Excluding USA	Excluding USA	Excluding EZ	Excluding EZ	EZ Weighted Average	EZ Weighted Average
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Fixed regime	-1.336	0.583	7.968***	8.675***	1.751	2.535	1.856	2.675	4.709***	5.566***	4.783***	5.640***
	(2.041)	(2.326)	(2.655)	(2.421)	(1.698)	(1.745)	(1.748)	(1.794)	(1.735)	(1.726)	(1.695)	(1.682)
Intermediate regime	-2.943	-2.829	3.154	4.251	-0.066	0.881	0.024	1.036	0.055	0.909	0.117	0.977
	(3.330)	(3.784)	(2.794)	(2.662)	(1.783)	(1.777)	(1.848)	(1.829)	(1.778)	(1.781)	(1.734)	(1.736)
Log (VXO)	-0.062		0.318		-0.107		-0.074		-0.108		-0.077	
	(0.612)		(0.721)		(0.455)		(0.482)		(0.471)		(0.455)	
Fixed x log (VXO)	0.744	0.090	-1.574*	-1.860**	-0.045	-0.254	-0.081	-0.301	-0.953	-1.118*	-0.977	-1.140*
	(0.686)	(0.847)	(0.878)	(0.852)	(0.581)	(0.619)	(0.601)	(0.637)	(0.638)	(0.665)	(0.624)	(0.648)
Intermediate x log (VXO)	1.043	1.127	-0.663	-1.045	0.184	-0.033	0.154	-0.085	0.148	-0.037	0.126	-0.059
	(1.193)	(1.376)	(0.889)	(0.875)	(0.622)	(0.643)	(0.643)	(0.658)	(0.621)	(0.645)	(0.605)	(0.629)
Real GDP growth	0.291	0.260	0.236***	0.181**	0.258***	0.221***	0.258***	0.220***	0.269***	0.231***	0.269***	0.231***
	(0.190)	(0.236)	(0.070)	(0.077)	(0.073)	(0.080)	(0.074)	(0.081)	(0.077)	(0.082)	(0.076)	(0.082)
LTD ratio	-0.020**	-0.019***	-0.062**	-0.060***	-0.034**	-0.034**	-0.034***	-0.034***	-0.037***	-0.036***	-0.037***	-0.036***
	(0.005)	(0.005)	(0.014)	(0.012)	(0.009)	(0.009)	(0.009)	(0.009)	(0.011)	(0.011)	(0.011)	(0.011)
Capital acc. openness	-0.002	-0.006	0.035**	0.043***	0.014	0.015	0.014	0.015	0.011	0.013	0.012	0.013
	(0.016)	(0.018)	(0.016)	(0.016)	(0.012)	(0.013)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Linear trend	0.006		-0.005		0.003		0.003		0.005		0.004	
	(0.008)		(0.008)		(0.006)		(0.006)		(0.007)		(0.007)	
Global financial crisis	-0.535		1.205		0.200		0.226		0.388		0.350	
	(0.633)		(0.926)		(0.608)		(0.620)		(0.724)		(0.711)	
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter-year effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No
Observations	2,457	2,457	2,602	2,602	5,057	5,057	4,953	4,953	4,411	4,411	4,469	4,469
Adjusted R2	0.017	0.021	0.075	0.123	0.034	0.047	0.034	0.047	0.034	0.044	0.034	0.045
No. of countries	29	29	43	43	72	72	71	71	72	72	73	73

Note: Dependent variable is quarterly change in loan-to-deposit ratio (in ppt). Real GDP growth and the capital account openness index are lagged one period. LTD ratio is lagged two periods. See online appendix for description of variables and data sources. Sample comprises all AEs in cols. [1]-[2], all EMEs in cols. [3]-[4], all AEs and EMEs in cols. [5]-[6], excludes the United States in cols. [7]-[8], excludes the Eurozone countries from year 1999 onward in cols. [9]-[10], and excludes individual Eurozone countries from 1999 onward but takes their weighted average in cols. [11]-[12]. Constant is included in all specifications. Clustered standard errors (by country) are reported in parentheses. ***, **, * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

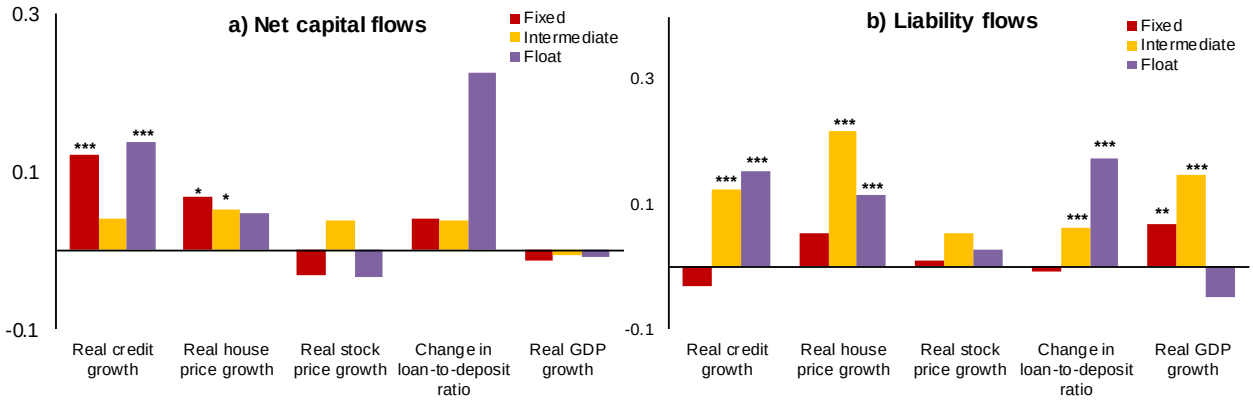
Table A7. Real GDP Growth in AEs and EMEs, 1986Q1–2013Q4

	Advanced		Emerging Market		Advanced and Emerging Market							
					All	All	Excluding USA	Excluding USA	Excluding EZ	Excluding EZ	EZ Weighted Average	EZ Weighted Average
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Fixed regime	0.566	0.115	2.322*	2.776**	0.833	0.852*	0.799	0.835	1.224	1.606**	1.204	1.583**
	(0.455)	(0.447)	(1.184)	(1.165)	(0.521)	(0.506)	(0.528)	(0.511)	(0.803)	(0.746)	(0.801)	(0.747)
Intermediate regime	-0.162	0.625	0.129	0.808	-0.043	0.579	-0.059	0.575	0.079	0.737*	0.058	0.714*
	(0.728)	(0.795)	(0.623)	(0.585)	(0.424)	(0.387)	(0.438)	(0.396)	(0.424)	(0.392)	(0.418)	(0.388)
Log (VXO)	-0.135		-0.461***		-0.311***		-0.318***		-0.301***		-0.309***	
	(0.098)		(0.122)		(0.091)		(0.096)		(0.088)		(0.086)	
Fixed x log (VXO)	-0.276*	-0.146	-0.657*	-0.782**	-0.282*	-0.279*	-0.273	-0.274*	-0.346	-0.444*	-0.339	-0.438*
	(0.146)	(0.153)	(0.369)	(0.371)	(0.164)	(0.155)	(0.167)	(0.157)	(0.249)	(0.228)	(0.249)	(0.228)
Intermediate x log (VXO)	0.018	-0.241	-0.029	-0.214	-0.000	-0.162	0.003	-0.160	-0.031	-0.203	-0.024	-0.196
	(0.253)	(0.286)	(0.190)	(0.190)	(0.137)	(0.132)	(0.141)	(0.134)	(0.135)	(0.132)	(0.133)	(0.131)
Domestic credit/GDP	-0.004**	-0.004**	-0.025***	-0.024***	-0.007***	-0.006***	-0.007***	-0.006***	-0.006**	-0.005**	-0.006**	-0.005**
	(0.002)	(0.002)	(0.006)	(0.005)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)
Real GDP per capita	0.481	-0.292	-0.775	-0.845	-0.199	-0.362	-0.215	-0.376	-0.639	-0.680	-0.638	-0.699
	(0.624)	(0.503)	(0.708)	(0.695)	(0.381)	(0.403)	(0.385)	(0.407)	(0.426)	(0.437)	(0.420)	(0.430)
Capital acc. openness	-0.002	-0.002	0.005	0.005	-0.002	-0.001	-0.002	-0.001	-0.003	-0.002	-0.003	-0.002
	(0.003)	(0.003)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Linear trend	-0.003		0.007		0.001		0.001		0.004		0.004	
	(0.003)		(0.005)		(0.003)		(0.003)		(0.003)		(0.003)	
Global financial crisis	-2.271**		-2.005***		-2.256***		-2.258***		-2.234***		-2.231***	
	(0.303)		(0.377)		(0.278)		(0.284)		(0.311)		(0.304)	
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter-year effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,531	2,531	2,524	2,524	5,147	5,147	5,043	5,043	4,499	4,499	4,558	4,558
Adjusted R2	0.133	0.216	0.107	0.147	0.113	0.160	0.112	0.160	0.093	0.137	0.097	0.140
No. of countries	29	29	42	42	72	72	71	71	72	72	73	73

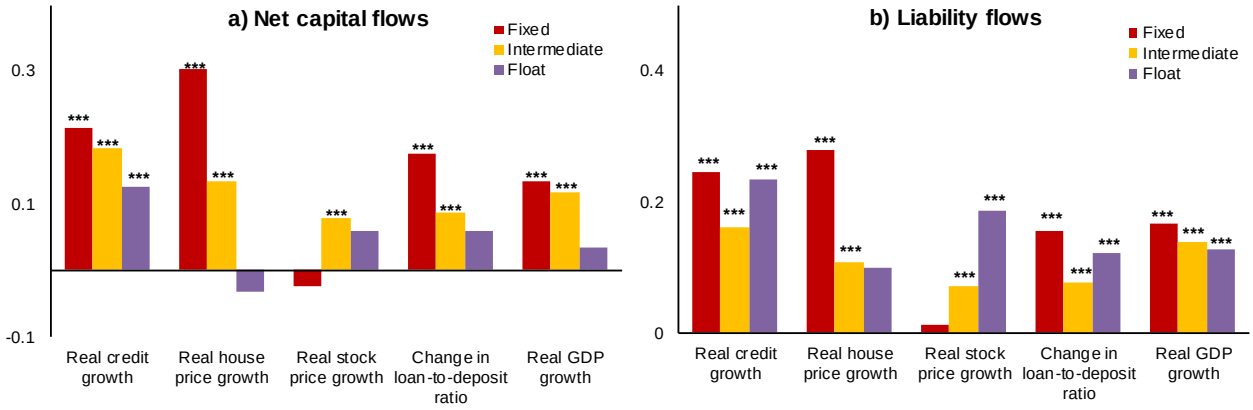
Note: Dependent variable is quarterly (seasonally adjusted) real GDP growth rate (in percent). Domestic credit to GDP, real GDP per capita, and the capital account openness index are lagged one period. See online appendix for description of variables and data sources. Sample comprises all AEs in cols. [1]-[2], all EMEs in cols. [3]-[4], all AEs and EMEs in cols. [5]-[6], excludes the United States in cols. [7]-[8], excludes the Eurozone countries from year 1999 onward in cols. [9]-[10], and excludes individual Eurozone countries from 1999 onward but takes their weighted average in cols. [11]-[12]. Constant is included in all specifications. Clustered standard errors (by country) are reported in parentheses. ***, **, * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

Figure A1. Correlation with Capital Flows

i) Advanced economies



ii) Emerging market economies



Source: Authors' calculations.

Note: Panel a) shows the unconditional correlation across countries between quarterly net capital flows (in percent of GDP) and real domestic private sector credit growth, real house price growth, real stock price growth, change in loan-to-deposit ratio, and real GDP growth. Panel [b] shows the unconditional correlation across countries between quarterly liability (non-resident) capital flows (in percent of GDP) and real domestic private sector credit growth, real house price growth, real stock price growth, change in loan-to-deposit ratio, and real GDP growth. *,**, *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.