

Decomposing International Portfolio Flows

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Decomposition of Flows: Motivation

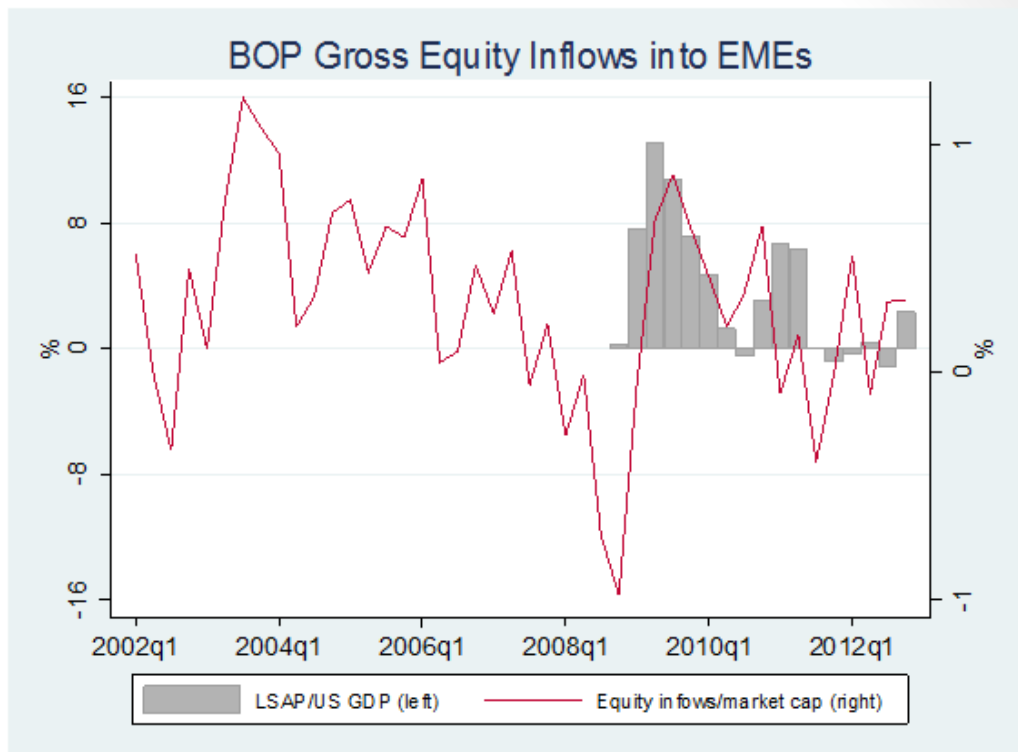
- We often examine capital flows without realizing that they can be decomposed into two very different components.
 - The different components might have different determinants, might react differently to policy, etc.
- We'll show this in multiple ways:
 - Following decompositions suggested by Kraay and Ventura (2000, 2003) and Tille and van Wincoop (2010).
 - Components: “Portfolio Growth” and “Portfolio Reallocation” flows
 - The reallocation component of that decomposition doesn't necessarily identify active portfolio reallocations, but we'll propose a positions-based measure (“Relative Weight”) that does.
- Recognizing that portfolio flows have two components—“baseline” flows unrelated to recipient country conditions and, separately, more active reallocations—can lead to a better understanding of their drivers.
 - Using data on flows into and positions in EME equities, we'll make this point through a set of simple pictures and simple reduced-form regressions.

A familiar picture (using equity flow data through mid-2013):

Capital Flows to EMEs were sizable pre-GFC, plummeted during the crisis and rebounded strongly post-GFC.

Qu: Were the observed flow dynamics from “portfolio reallocation” decisions (i.e., active decisions to reallocate toward EME equities)?

Or perhaps the flows to EMEs are mainly from the dynamics of new savings?



Dataset in this paper: quarterly 2002-2012, equity flows to a set of nineteen countries (India, Indonesia, Korea, Malaysia, Philippines, Taiwan, and Thailand; Argentina, Brazil, Chile, Colombia, and Mexico; Czech Republic, Hungary, Poland, and Romania; and Israel, Turkey, and South Africa) that we'll call EMEs even though some aren't.

More generally, while we often think of flows being due to active portfolio decisions, there are many reasons to believe there are some aspects that are more passive.

- Inertia—due to both behavioral characteristics and transaction costs—figures prominently in economic and financial decision making.
 - Inertia due to agents’ “rational inattention” impacts the effectiveness of monetary policy (Sims 2010).
 - Inattention and inertia influence homeowners’ refinancing behavior (Andersen et al. 2015) and individuals’ decisions on retirement savings (Madrian and Shea 2001, Benartzi and Thaler 2013, Chetty et al. 2014).
 - Investors’ inertia coupled with transaction costs can lead to sluggish adjustments of portfolios—for example, the Friedman (1977) “optimal marginal adjustment”—and, in turn, impact corporate financing strategies (Baker, Coval and Stein 2007).
- Institutional features of the financial intermediation industry
 - Most cross-border portfolio flows are intermediated by institutions, most institutional fund managers are graded and compensated relative to size-based benchmarks, and even many so-called active portfolio managers stay close to indices (which tend to be size-based benchmarks)
- A substantial portion of today’s flows might be “new money”—that is, new savings that are driven primarily by today’s income. That, combined with inertia and institutional features, suggest much flows have nothing to do with current conditions in recipient countries.

Three Decompositions of Flow- and Stock-Based Measures of Portfolio Flows

<u>Underlying Data</u>	<u>Measure</u>		
Flows	Capital Flows	Portfolio Growth <i>flows from allocation of new savings based on past weights</i>	Reallocations <i>flows to change portfolio composition</i>
Stocks	Change in Portfolio Weights	Passive Portfolio Reallocations <i>due to relative price changes</i>	Active Portfolio Reallocations <i>defined relative to buy-and-hold weights</i>
Stocks	Change in Normalized Relative Weight		Active Portfolio Reallocations <i>defined relative to a benchmark</i>

Flow data has portfolio growth (due to new savings) and reallocation components.

If instead have stock data, portfolio weights can change for passive reasons (relative price changes) or from active decisions (switching, defined relative to buy-and-hold weights). Isolating the active reallocations requires good returns data.

Normalized Relative Weight isolates active portfolio reallocations (and the data requirements aren't onerous).

Decomposition (1):

Flow-based data into portfolio growth and reallocation components
inspired by Kraay and Ventura (2000, 2003) and Tille and van Wincoop (2010)

Can consider portfolio flows (and, hence, the flows EMEs experience) as the result of *allocating new savings based on existing weights* and *active portfolio reallocation*.

Let $CF_{i,t+1}$ be capital flows in period $t+1$ to country i

$$CF_{i,t+1} = \eta_{i,t} * S_{t+1} + \text{ReallocationFlow}_{i,t+1} \quad (1)$$

Portfolio growth component of flows are those due to new savings, S_{t+1} , allocated passively based on existing portfolio weights ($\eta_{i,t}$).

Reallocation Flows are the residual.

Decomposition (1):

Flow-based data into portfolio growth and reallocation components (cont.)

$$CF_{i,t+1} = \eta_{i,t} * S_{t+1} + \text{ReallocationFlow}_{i,t+1} \quad (1)$$

Off-the-shelf measures of capital flows will conflate “portfolio growth” flows ($\eta_{i,t} * S_{t+1}$) with reallocations ($\text{ReallocationFlow}_{t+1}$).

Portfolio growth flows can be substantial. Over the past few years,

Annual US portfolio growth flows into all foreign equities: \$100 billion

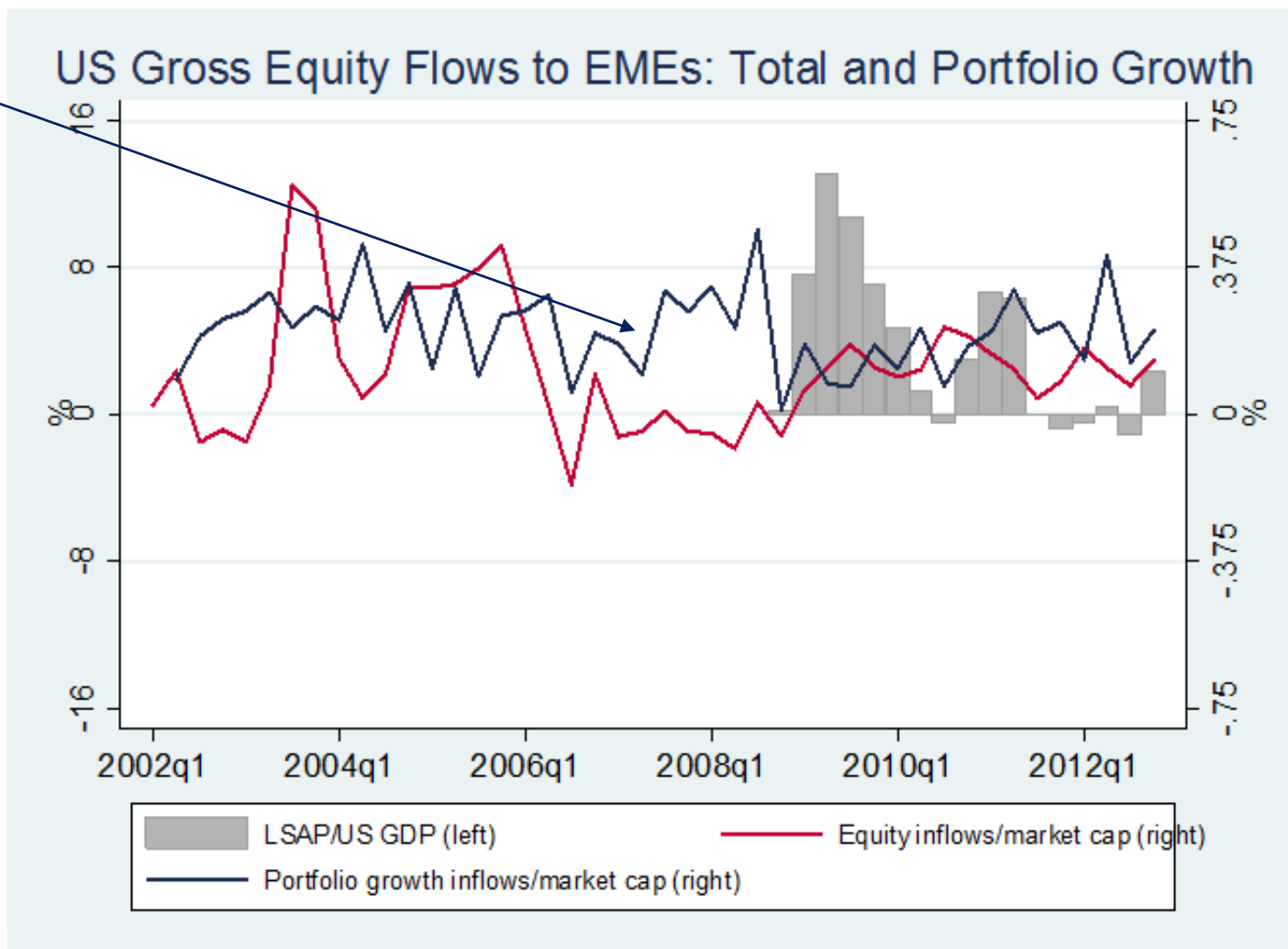
Total US flows into foreign equities: \$128b.

Do the two components behave the same? Do they behave like the aggregate (which is what is usually assessed)?

Decomposition (1):

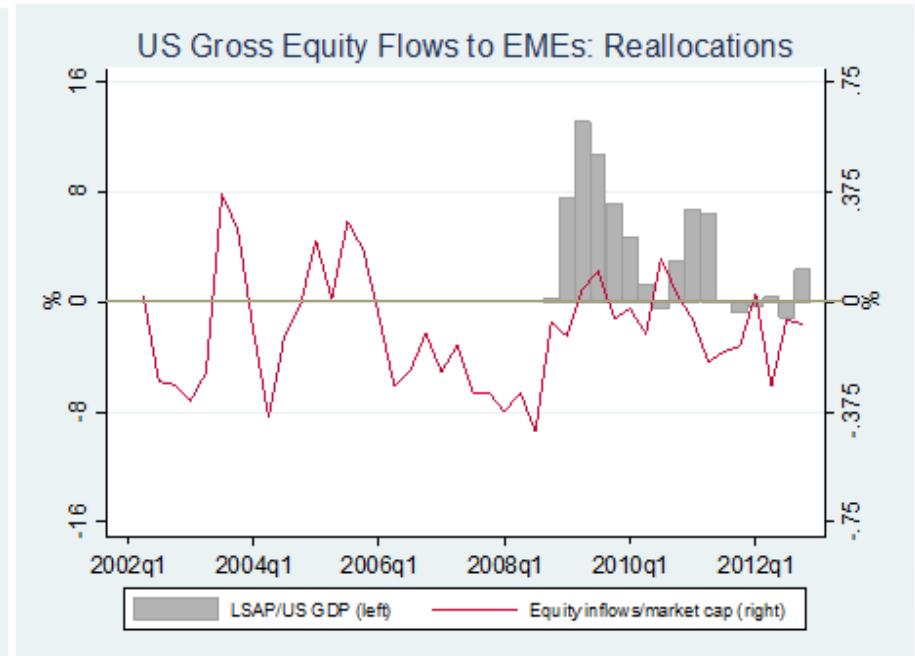
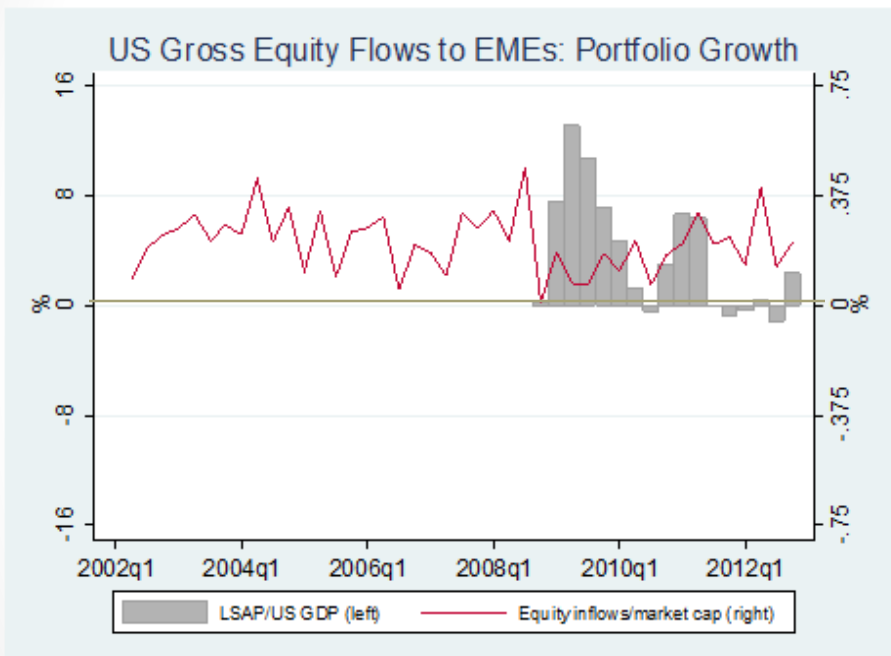
Much flows to EMEs can be characterized as portfolio growth flows.

Portfolio
Growth



Portfolio Growth v Reallocation Flows

EMEs receive positive portfolio growth flows every year, sometimes substantial. Reallocation flows are more volatile, sometimes positive sometimes negative.



Portfolio Growth flows calculated with weights based on total US financial assets.

Note re currency wars: Reallocation Flows are rarely large and positive.

Decomposition (2): Stock-based data into active and passive components

$$\Delta \text{Portfolio Share} = \omega_{i,t+1} - \omega_{i,t}$$

Can be rewritten as:

$$\begin{aligned} \Delta \text{Portfolio Share} &= \text{Passive Change} + \text{Active Change} \\ &= \omega_{i,t}(R_i/R_p - 1) + \omega_{i,t+1} - \omega_{i,t}(R_i/R_p) \end{aligned}$$

where R_i and R_p are gross returns on country i equities (for example) and the entire portfolio, respectively.

Off-the-shelf portfolio share data will conflate two components (passive and active reallocations).

But...with portfolio share data one can isolate active reallocations as long R_i/R_p can be computed. This is what Ferson and Khang (2002), Badrinath and Wahal (2002), and Curcuru et al (2011, 2014) do.

Decomposition (3):

Isolating portfolio reallocations using *Normalized Relative Weight*

A measure, consistent with theory (Int'l CAPM), that isolates a set of investors' active reallocations is relative weight, defined here as a country's share in the investors' portfolios divided by the country's share in the global market.

For US investors the relative weight on country i 's equities:

$$RW_i^{US} = \omega_i^{US} / \left(\frac{MC_i}{MC_{world}} \right) \quad (5)$$

The level of (5) is essentially a standard home bias measure, used in Ahearne et al (2004) and many others, with home bias defined relative to a benchmark.

Decomposition (3)

The Normalized Relative Weight

One modification is necessary. If portfolio and benchmark weights differ, relative price changes produce changes in raw relative weight.

A simple fix is to normalize relative weight by the country's relative weight on its own securities:

$$\text{Norm}RW_i^{US} = RW_i^{US} / RW_{US}^{US} \quad (6)$$

Normalized relative weight—essentially, relative weight controlled for the degree of home bias—isolates active reallocations and is not affected by passive reallocations due to relative valuation changes.

Normalized Relative Weight is a function of portfolio weights, not prices.

Q^H and Q^F : *quantity* of Home investors' holdings of H and F equities

$\overline{Q^H}$ and $\overline{Q^F}$: supply of Home and Foreign equities

P^H and P^F : prices of Home and Foreign equities.

Total value of Home investors' holdings of Home and Foreign equities is $P^H Q^H + P^F Q^F$; call that X_1 .

The world market capitalization is $P^H \overline{Q^H} + P^F \overline{Q^F}$; call that X_2 .

The weight of Foreign equities in Home portfolios is $P^F Q^F / X_1$ and their weight in world market is $P^F \overline{Q^F} / X_2$.

Home investors' Relative Weight in Foreign equities—foreign equities' weight in Home portfolios relative to their weight in the world market portfolio—is

$$RW_F^H = P^F Q^F / X_1 / (P^F \overline{Q^F} / X_2).$$

Home investors' Relative Weight in Home equities is

$$RW_H^H = P^H Q^H / X_1 / (P^H \overline{Q^H} / X_2).$$

Normalized Relative Weight is RW_F^H / RW_H^H , which equals $(Q^F / \overline{Q^F}) / (Q^H / \overline{Q^H})$.

Normalized Relative Weight—the share of foreign equities owned by Home investors divided by the share of home equities owned by Home investors—is not a function of prices.

Three Decompositions of Flow- and Stock-Based Measures of Portfolio Flows

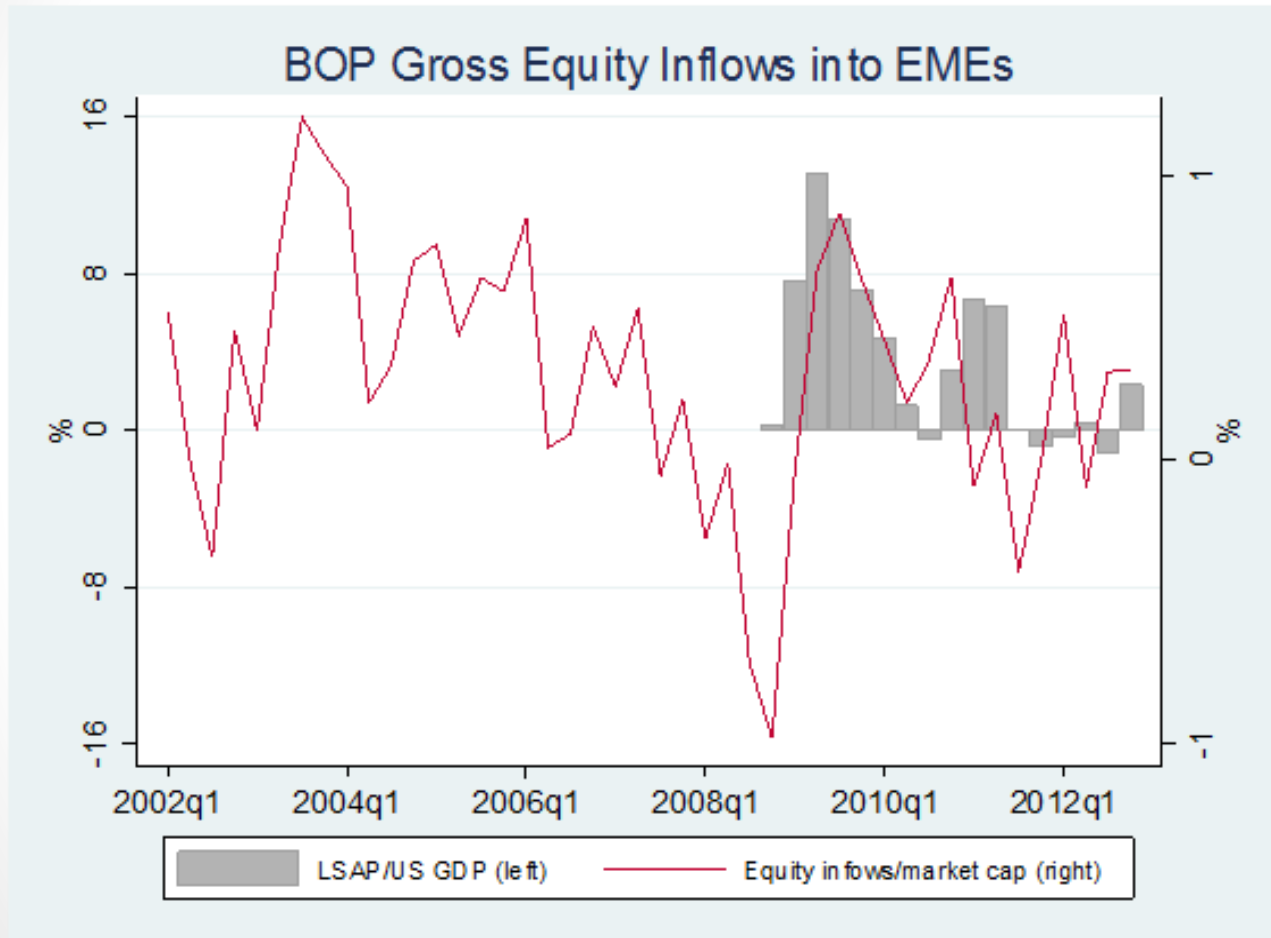
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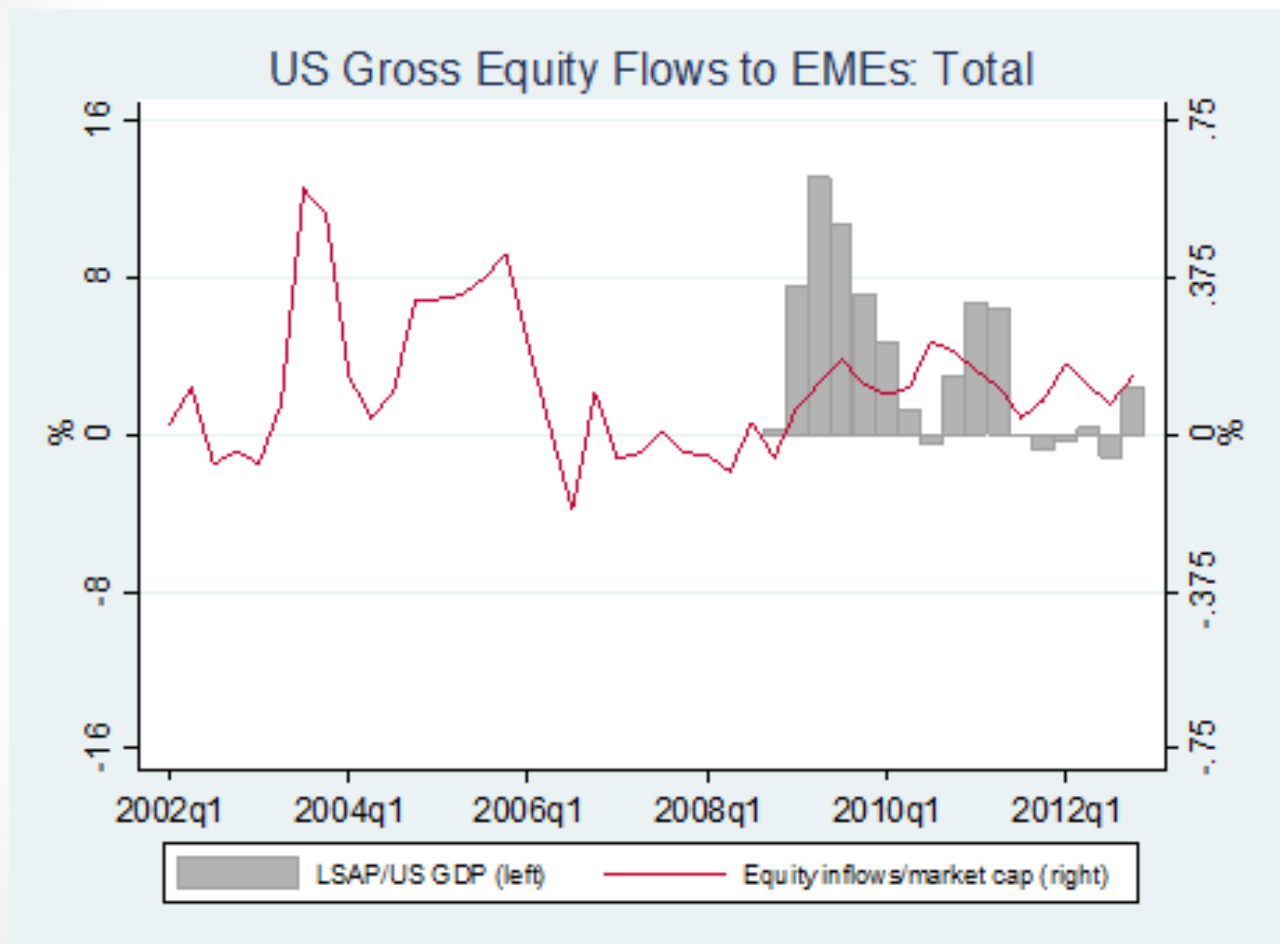
EMEs BOP equity inflows—that is, Rest of World inflows into recipient-country equities, whether scaled by recipient country GDP or market capitalization—surged after the GFC.



This surge in flows occurred at the same time as the Fed's QE policies and appeared to have abated somewhat during pauses in QE, prompting many to wonder if QE led to EME inflows.

Recall that flows have portfolio growth and reallocation components.

Flows to EMEs increased during the QE period, suggesting that Fed policy led to massive switching from AEs to EMEs.



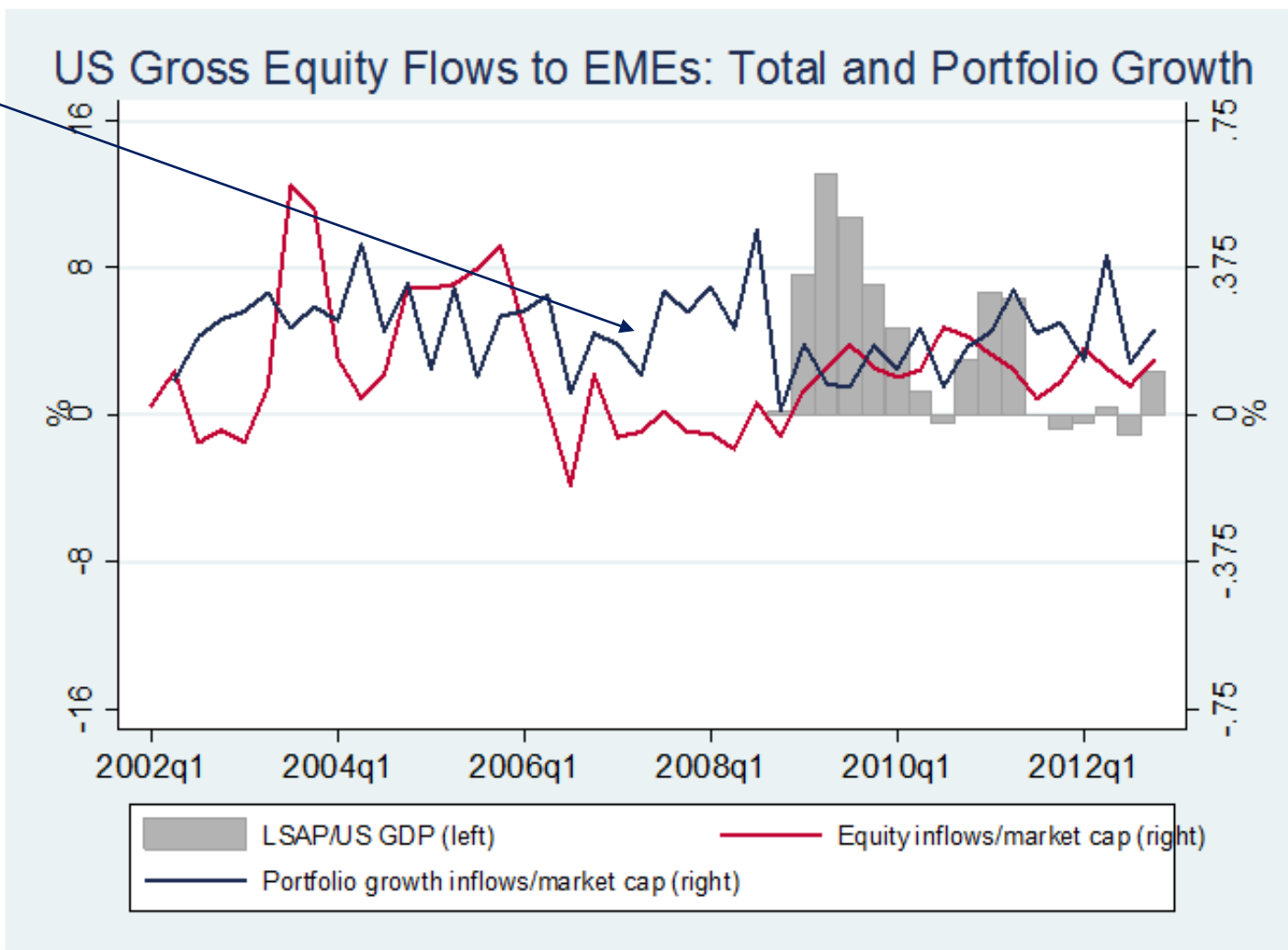
We've shifted here to US data, because it'll enable us to go from flows and portfolio changes to relative weight.

Can we say anything about "switching"? First must recognize that flows have reallocation (switching) and portfolio growth components.

Decomposition (1):

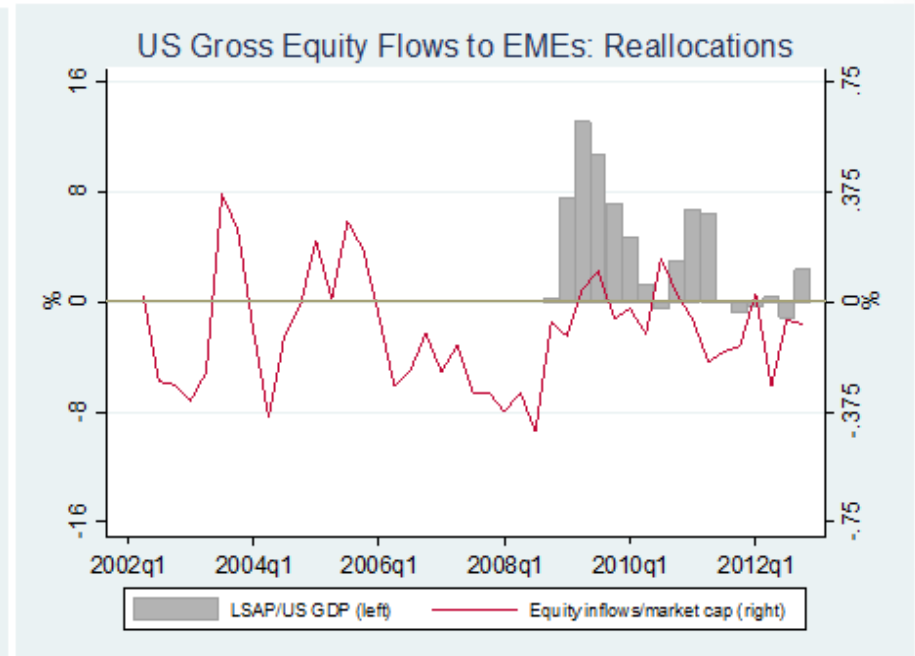
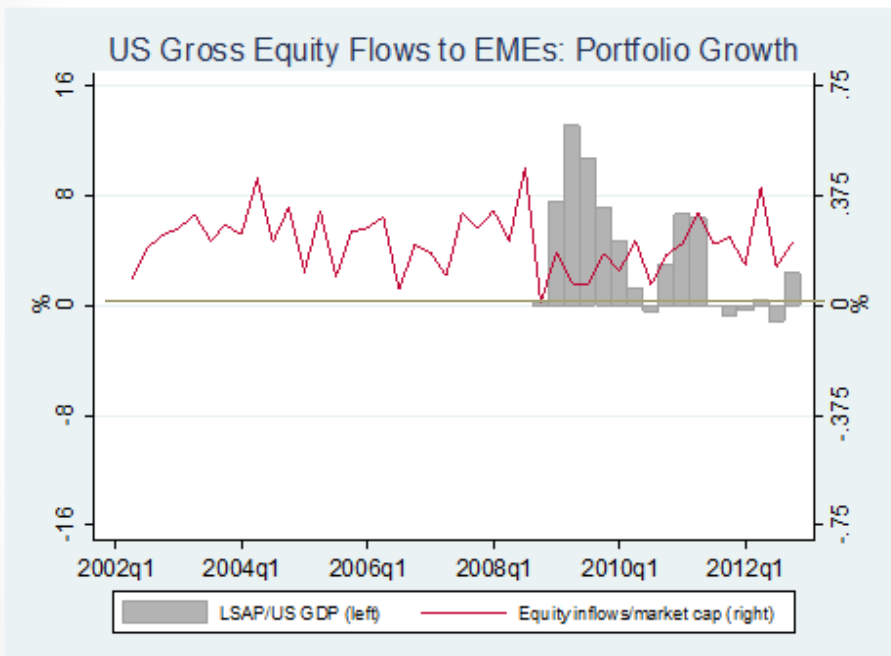
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Growth



Portfolio Growth v Reallocation Flows

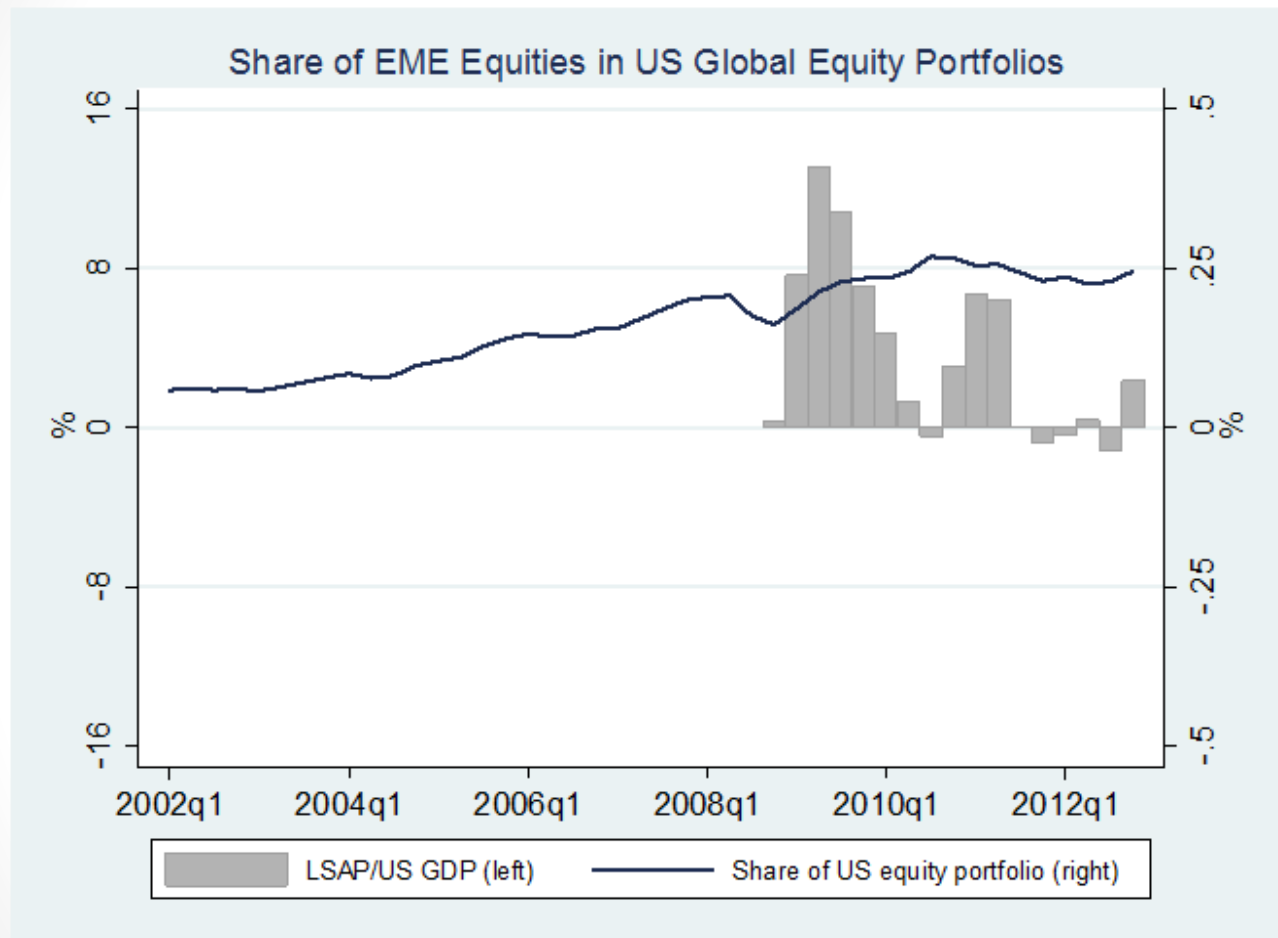
EMEs receive positive portfolio growth flows every year, sometimes substantial. Reallocation flows are more volatile, sometimes positive sometimes negative.



Portfolio Growth flows calculated with weights based on total US financial assets.

Note re currency wars:
Reallocation Flows—sometimes positive, sometimes negative—are rarely large and positive.

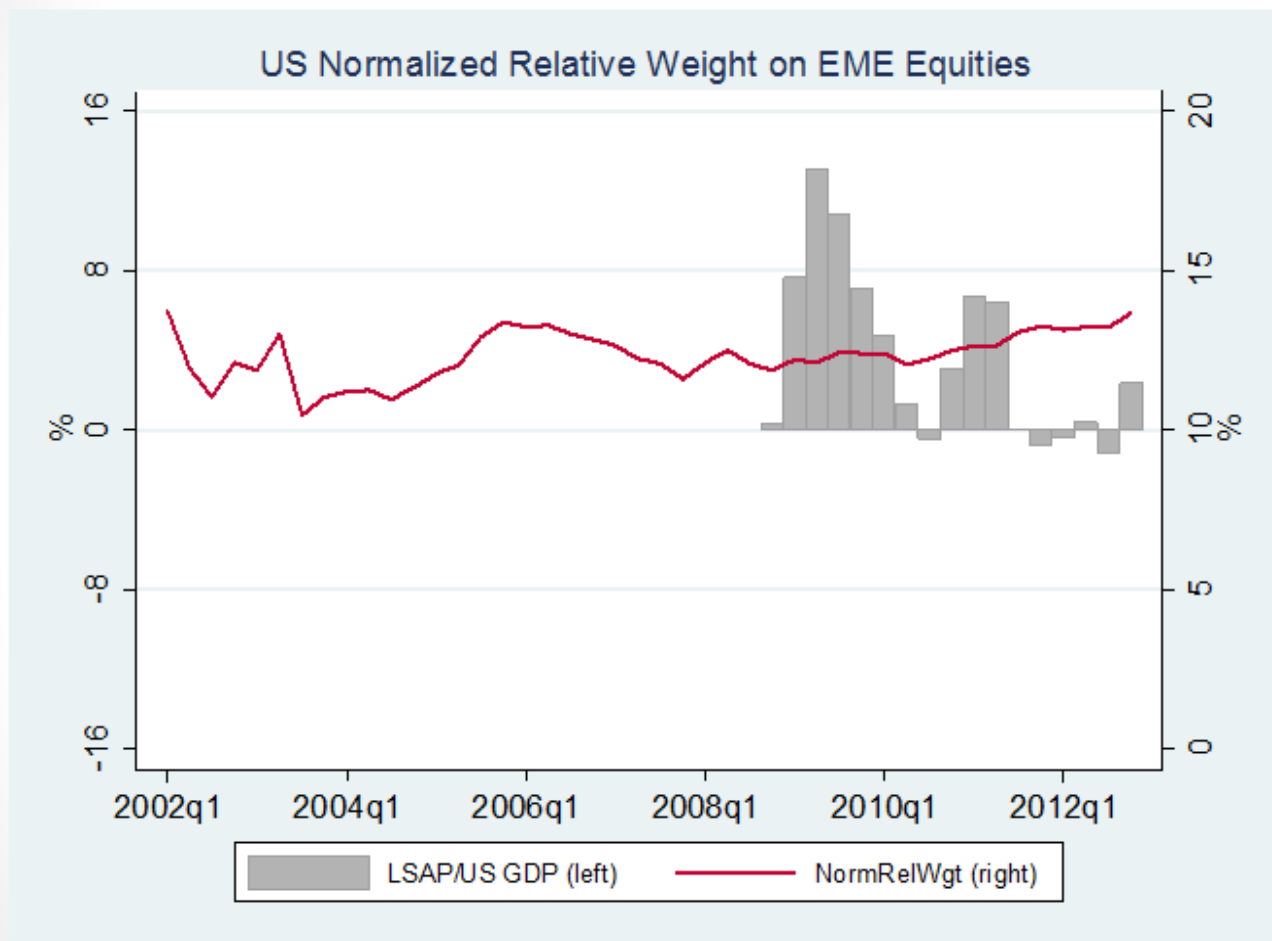
Changes in Portfolio Weights: The weight of EMEs in US equity portfolios increased during QE (especially during QE1).



While immune to changes in the size of the portfolio, portfolio shares still combine active and passive reallocations.

Can we say anything about “switching”? First must recognize that portfolio shares change for active (switching) and passive (relative price changes) reasons.

Relative weight measure suggest that the increase of EME equities in US portfolios was due not to active reallocations.



Normalized relative weight measure—based on the total US equity portfolio—was flat, suggesting no active increase in portfolio allocations to EME equities.

Relatedly, the reallocation portion of equity capital flows to EMEs are sometimes positive, sometimes negative, definitely not persistently positive.

Summary of Pictures:

Different measures of capital flows measure different things.

Flows show a surge of inflows into EME equities after the GFC, but flows conflate a portfolio growth component (from new savings allocated according to existing portfolio weights) with active portfolio reallocations.

Changes in portfolio shares are immune to portfolio growth and do indeed measure portfolio reallocations, but those reallocations can be both active and passive.

The change in the normalized relative weight measure is a clean measure, as it is function of only one thing—active portfolio reallocations.

US normalized relative weights in EME equities have not increased since the GFC, consistent with the robust equity inflows experienced by EMEs being due more to portfolio growth than active reallocations.

Does It Matter:

The Story from Simple Reduced Form Regressions

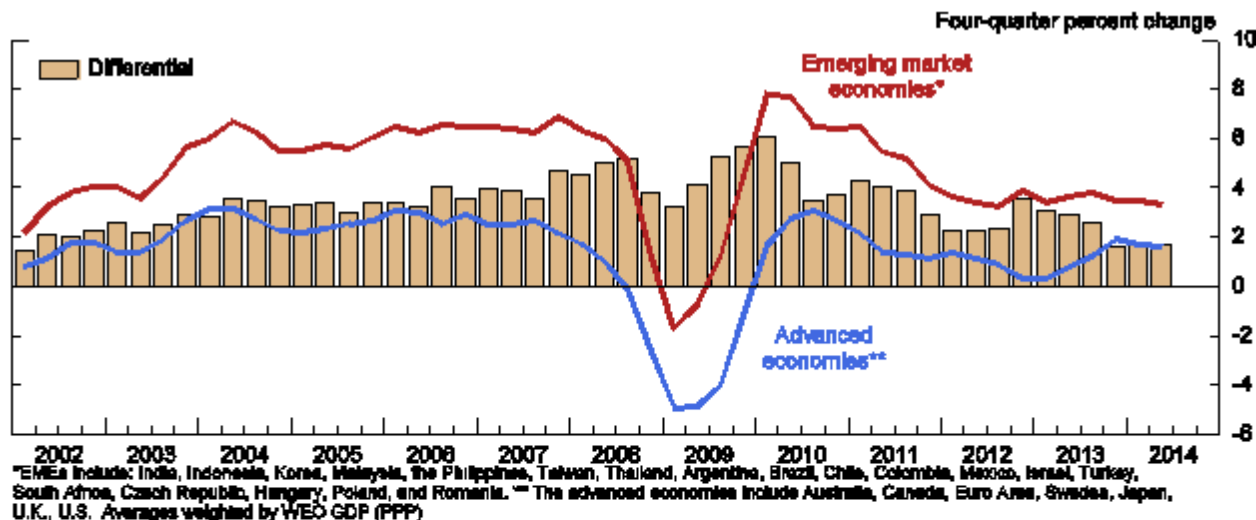
Do different measures lead to different conclusions about factors that drive capital flows?

We assess this through simple reduced form regressions that include many traditional factors from the long-standing empirical literature on capital flows that focuses on push (global) and pull (local) factors.

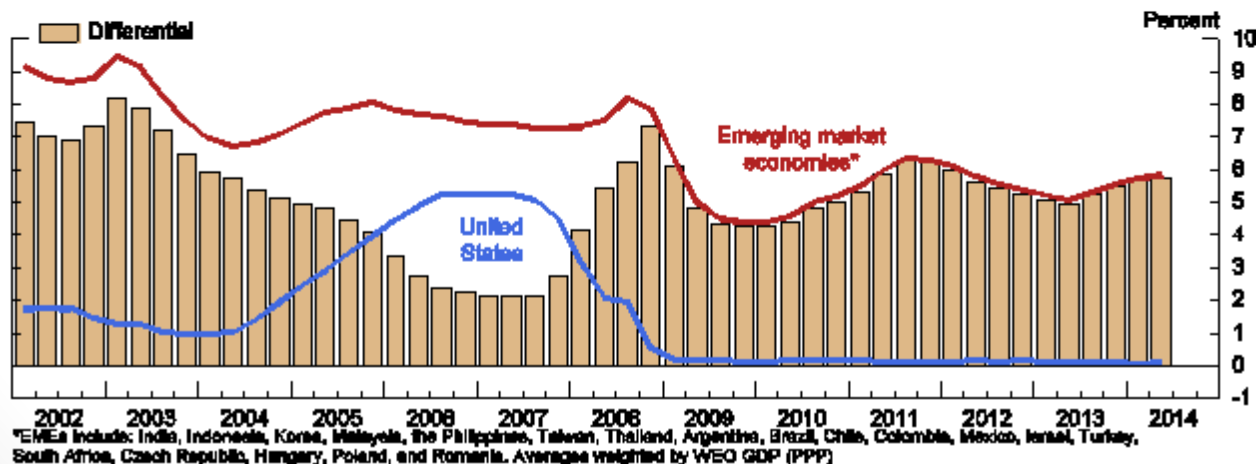
Our goal is not to provide a definitive explanation of capital flows but to use regression analysis to illustrate that different measures tell different stories.

Potential Factors (1): Growth and Policy Rate Differentials

(a) Real GDP



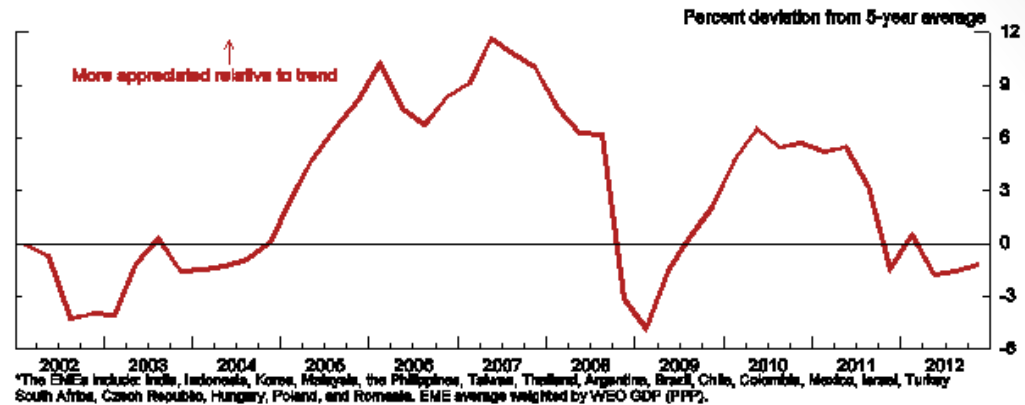
(b) Policy Interest rate



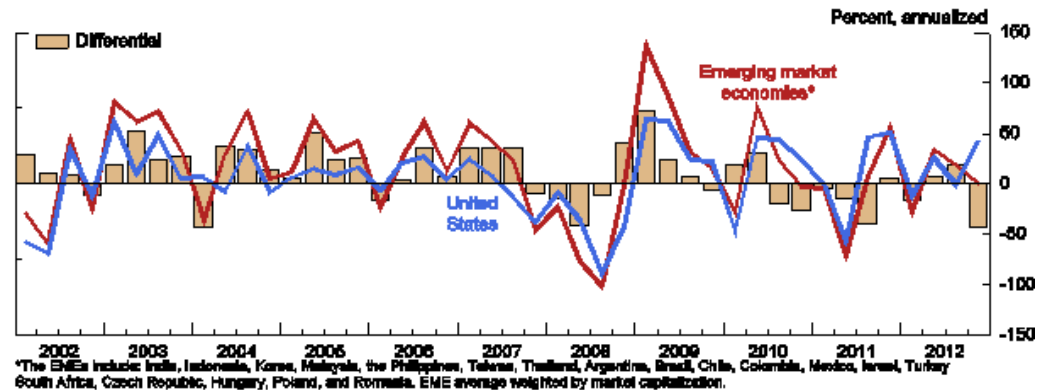
Potential Factors (2):

Exchange Rates, Equity Returns, and the VIX

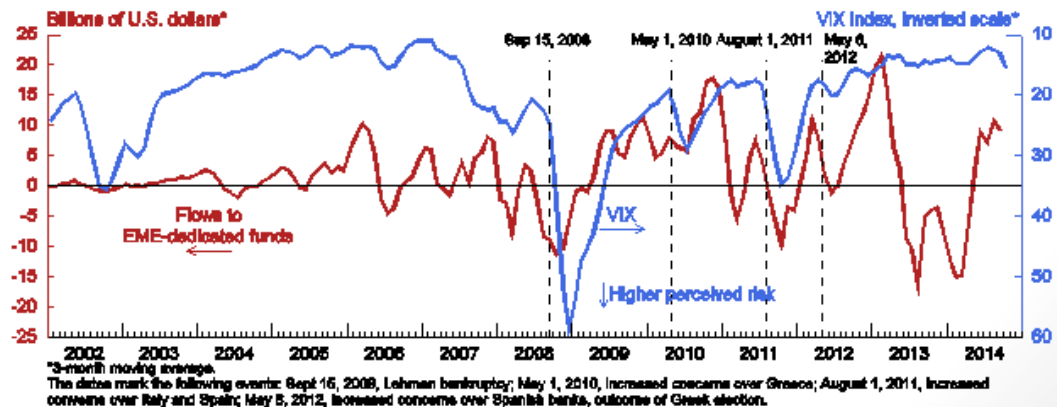
(a) Aggregate EME Real Effective Exchange Rate*



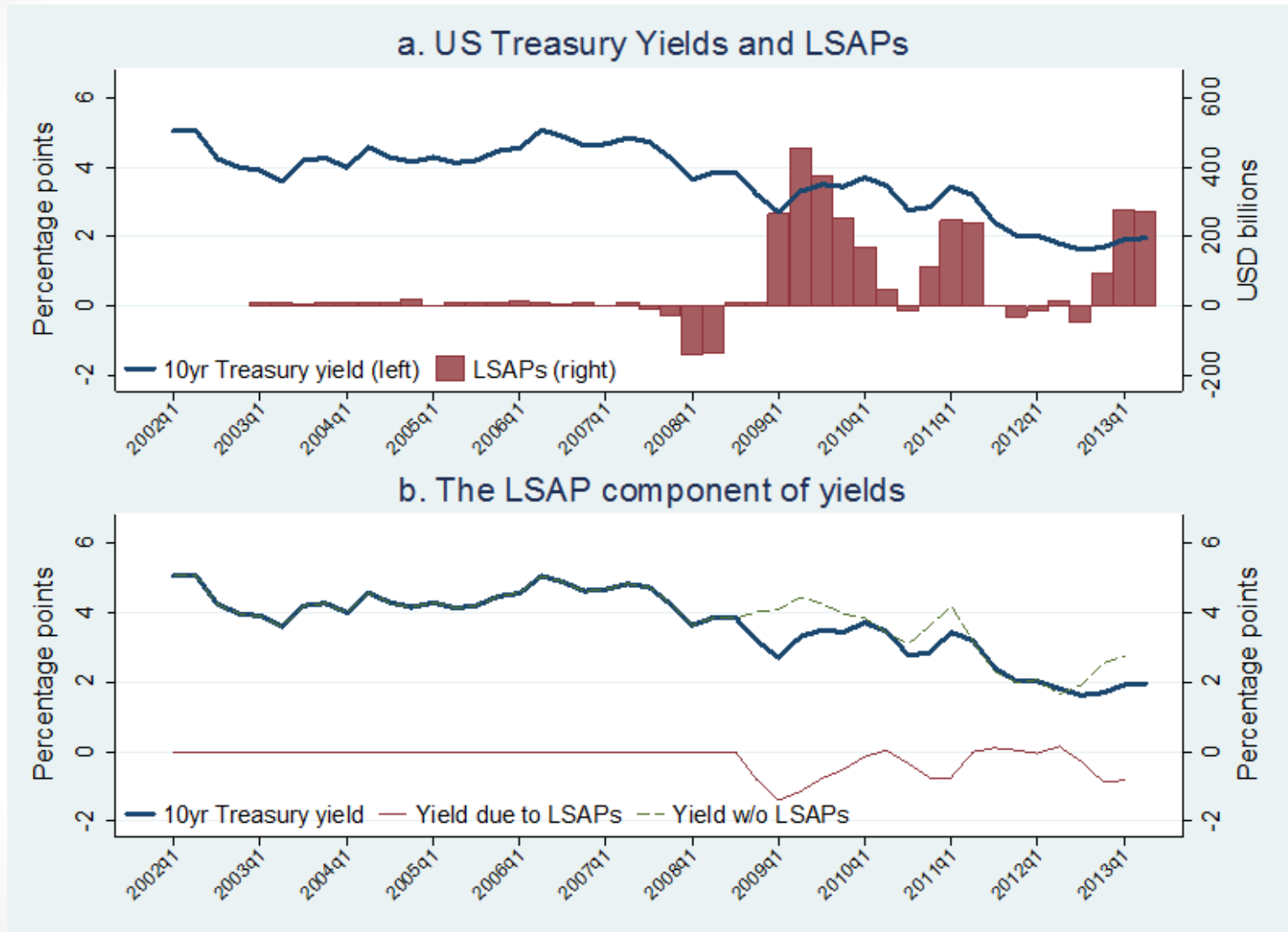
(b) Equity returns



(c) VIX



Potential Factors (3): Fed QE Policies



Yield due to LSAPs is from a regression of Treasury yields on one-quarter ahead Fed net asset purchases over the period from 2002:Q4 to 2013:Q2. We set it to zero for the period prior to the first LSAP (2008:Q4)

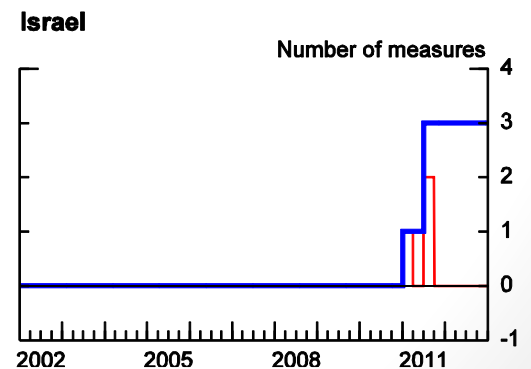
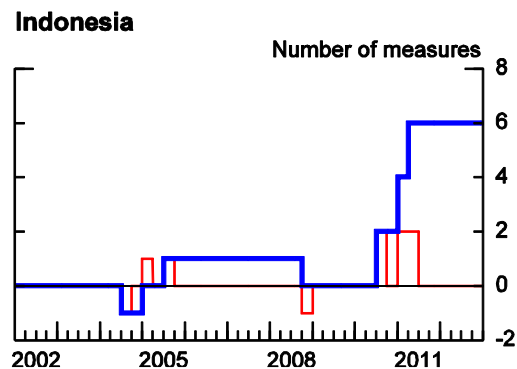
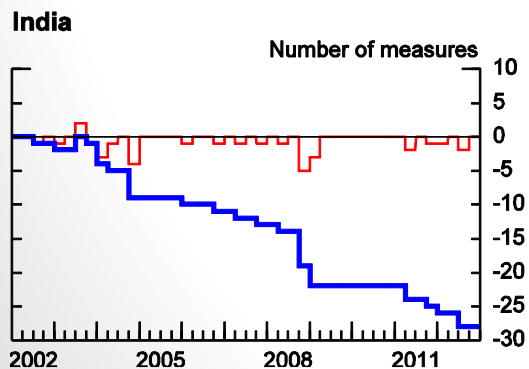
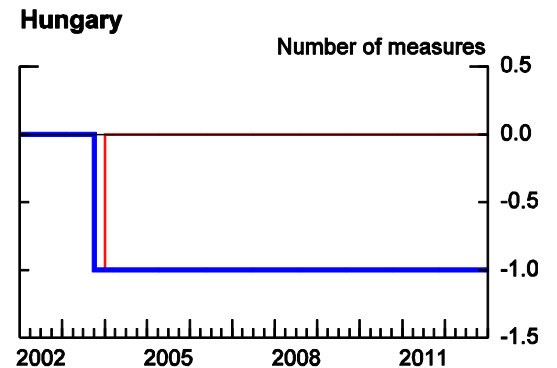
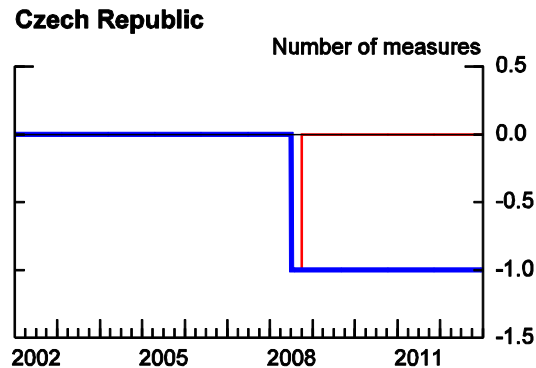
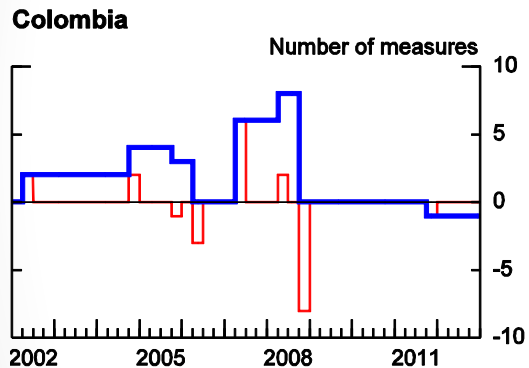
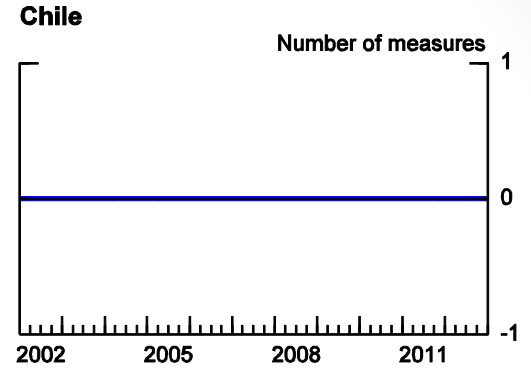
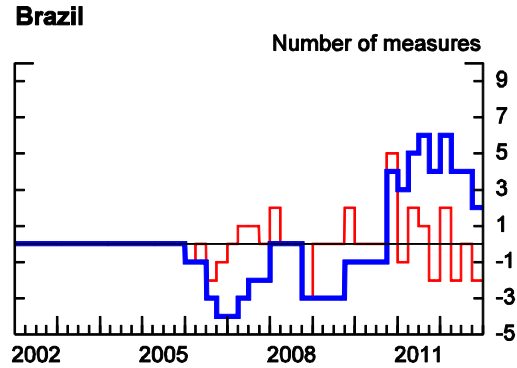
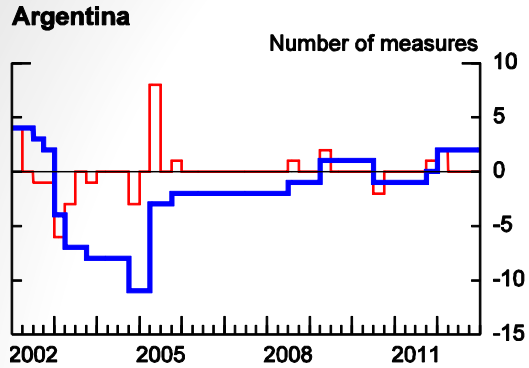
Potential Factors (4):

Capital flow management measures

- How to measure capital controls?
 - There are many annual measures, but few at the quarterly frequency and few that have time variation.
 - Extending Ahmed and Zlate (2013), we've created a "number of new measures" CFM measure for 22 countries, 2002-2013.
 - Pro: Time stamped and provide a measure of time-varying intensity. Can help assess how CFMs change with flows etc and in turn impact them.
Pro: Differentiated by flow type (portfolio equity, portfolio bond, FDI, banking/other).
 - Con: It is a count of the # of measures, not a precise measure of the overall intensity of capital controls.
 - Measure is available [online](#).

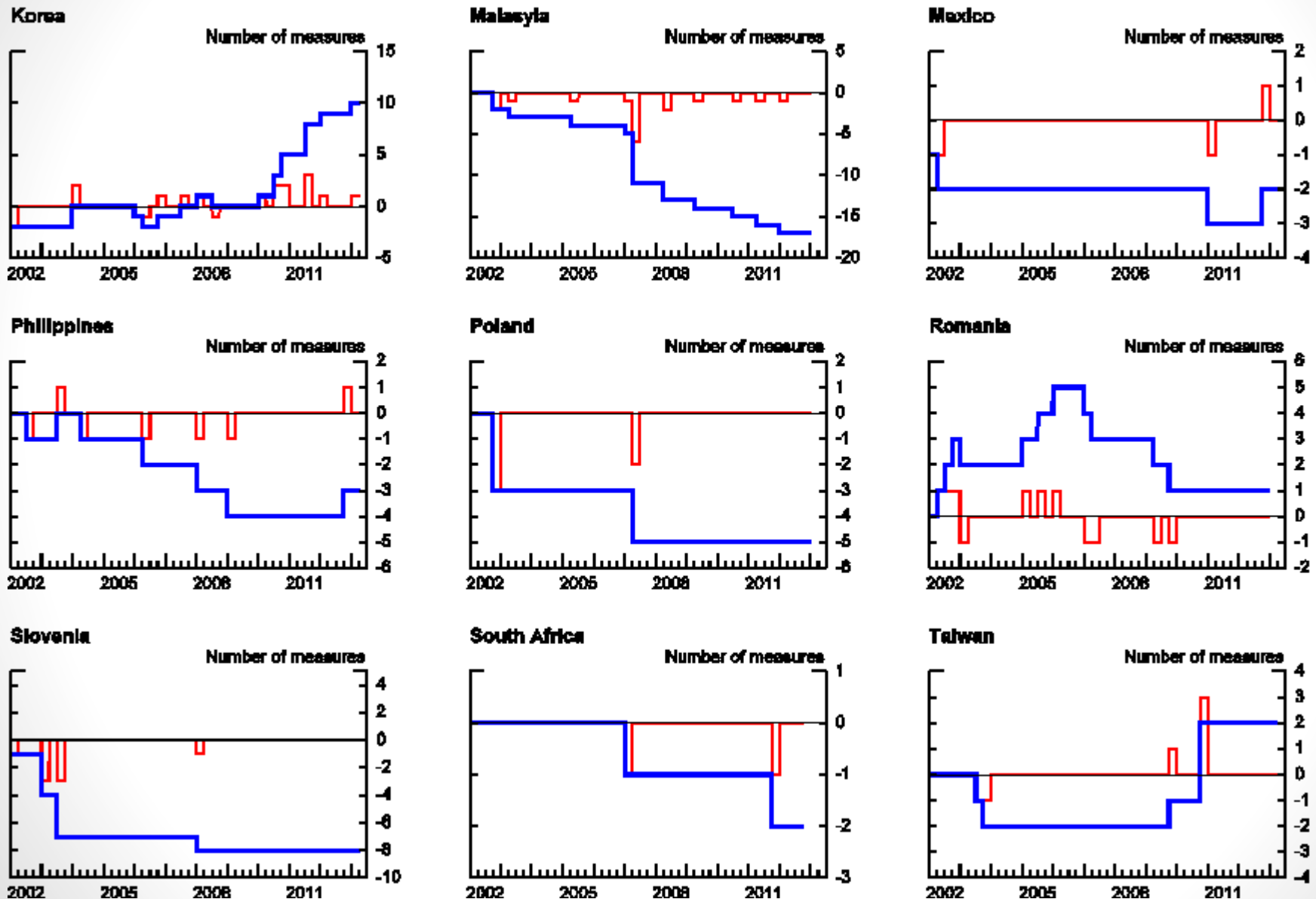
CFM Measures for Selected Countries

— Measures introduced each quarter — Cumulative measures



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Results (4a): Full Sample (2002Q1-2012Q4)

	BOP Equity Inflows	US Equity Inflows			US Portfolio	Normalized
	Total	Total	Portfolio Growth	Reallocation	Share	Relative Weight
Sample:	Full	Full	Full	Full	Full	Full
GDP diff	-0.020* (0.012)	0.009 (0.008)	-0.002 (0.001)	0.008 (0.008)	-0.0005 (0.0004)	0.0179 (0.0150)
VIX	-0.032*** (0.004)	-0.005** (0.002)	-0.000 (0.001)	-0.004 (0.002)	-0.0002* (0.0001)	-0.0010 (0.0061)
10-year Treasury: non-LSAPs	-0.045 (0.044)	-0.025 (0.025)	-0.014*** (0.005)	-0.004 (0.026)	-0.0003 (0.0014)	-0.1911*** (0.0574)
Lag equity returns diff	0.229*** (0.062)	-0.013 (0.029)	-0.047*** (0.007)	0.042 (0.030)	0.0206*** (0.0016)	0.2425*** (0.0829)
REER dev	0.001 (0.003)	0.002 (0.003)	-0.000 (0.000)	0.002 (0.003)	0.0001 (0.0002)	0.0033 (0.0045)
Policy diff	0.004 (0.008)	0.007 (0.006)	-0.000 (0.001)	0.007 (0.006)	-0.0003 (0.0003)	-0.0006 (0.0094)
Total CFM	-0.012 (0.008)	0.004 (0.006)	0.000 (0.001)	0.004 (0.006)	-0.0006 (0.0004)	0.0026 (0.0087)
10-year Treasury: LSAPs	-0.239** (0.110)	-0.039 (0.056)	0.093*** (0.013)	-0.127** (0.059)	-0.0124*** (0.0033)	-0.1416 (0.1497)
N	758	801	801	801	801	801
R-sq	0.112	0.038	0.601	0.089	0.174	0.043

Total flows, whether BOP or US, related to VIX. Other measures aren't.

Determinants of PG and Realloc fundamentally different.

NormRelWgt driven by Treasury yields and equity returns.

Summary of Sub-sample Results

We also split into pre- and post-GFC samples. Results differ, but

- the result that portfolio growth and reallocation flows are very different hold in all samples.
 - CFMs, which are not significant in the full and pre-GFC samples, become significant for some flow measures in the post-GFC period (when they were used more actively).
- CFMs do not appear to impact measures of active reallocations.

Summary of Regression Results:

Flows comprised of very different components

Two Examples:

VIX is highly significant in total flows regressions but less so elsewhere. Suggests that VIX is mainly capturing an economic activity effect.

CFMs are sometimes significant when a measure that includes a portfolio growth component is used, but never when active changes are isolated. Suggests that CFMs are not impacting active reallocations.

And the determinants of portfolio growth and reallocation flows are fundamentally different.

Conclusions

For equities, simple pictures and reduced-form regressions show that the different forms of capital flows yield very different stories.

Post-GFC surge in flows to EME equities is apparent in total flows, portfolio growth flows and portfolio allocations but not in the relative weight measure that isolates active portfolio reallocations.

Suggests that the robust equity inflows experienced by EMEs were due more to portfolio growth than active reallocations.

Simple regressions that focus on the determinants of flows suggest that the VIX was mainly capturing income growth and CFMs seem to not impact active reallocations.

Conclusion (cont.)

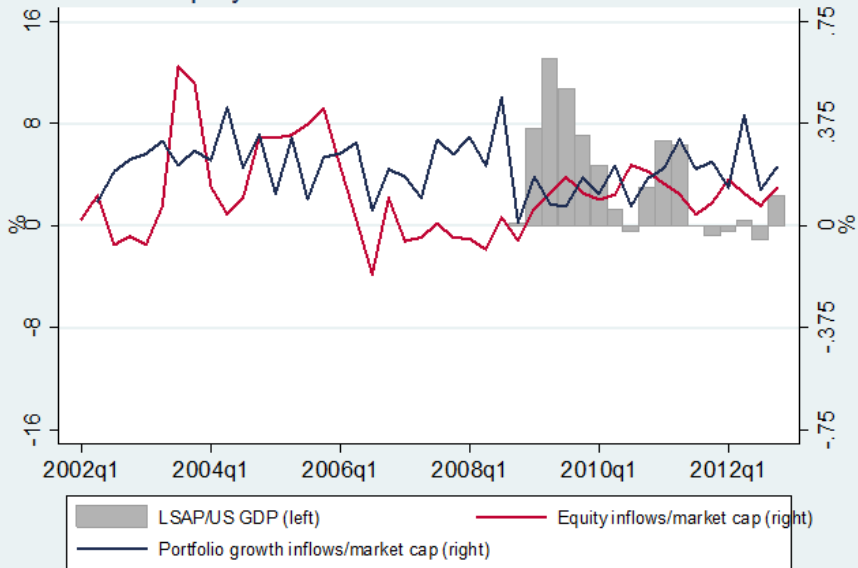
Many forms of international capital flows are used in the literature.

But most forms conflate active portfolio reallocations with a component that can be described as “baseline” flows.

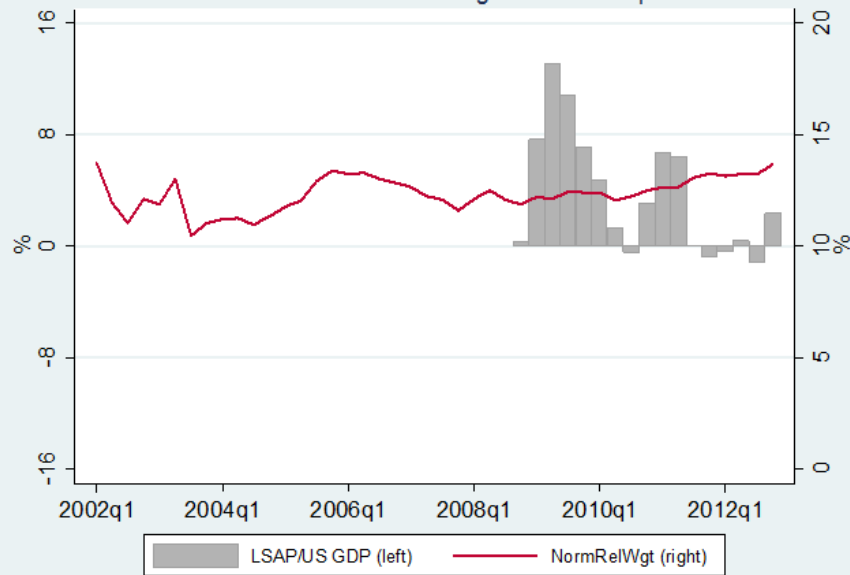
Whatever form of capital flows you use—and different questions surely call for different forms—please think carefully about any underlying components.

Two Key Pictures

US Gross Equity Flows to EMEs: Total and Portfolio Growth



US Normalized Relative Weight on EME Equities



Much flows are “baseline” flows. Level of flows determined by baseline; variation around that level due to reallocations.

No evidence of active reallocations to EME equities over the past decade or so.