



FEDERAL RESERVE BANK *of* NEW YORK

The Global Factor in International Financial Flows

Linda S. Goldberg

February 2018 : Panel for Central Bank of Ireland/ Banque de France Symposium on Financial Globalization

The views expressed are those of the author and do not necessarily represent those of the Federal Reserve Bank of New York or Federal Reserve System

Global factor is the common component in movements across countries in international financial flows , asset prices, real economic aggregates.

The size of the global factor is relevant for debates on the role of exchange rate flexibility in the international monetary system, and on the use of macro-prudential and capital flow management tools.

Big picture questions are not new.

Main global drivers in financial flows and asset prices across economies:

- Global risk conditions, AE (US!) monetary policy, global growth (push factors)
- Local factors: own policy, institutions, economic conditions, capital flow management, sovereign risk (pull factors)

Where does this debate stand?

Introduce new indices for International Capital Flow pressures: *Exchange Market Pressure (EMP) & Global Risk Response (GRR)*

Is the global factor important?

YES. Rey at Jackson Hole 2013. BIS, Borio and Shin.

- Key roles of VIX, US MP; leverage and international credit channels.
- Large and potentially destabilizing effects on real economy, credit, asset prices, mortgage spreads, term premia.

SOMETIMES. Avdjiev, Gambacorta, Goldberg, Schiaffi 2017. Forbes.

- Importance shifts over time, with post crisis escalated attribution to US MP, and post crisis decline in role of VIX. Attribution to contribution of market participants and their behaviors. (WB 1/2017).

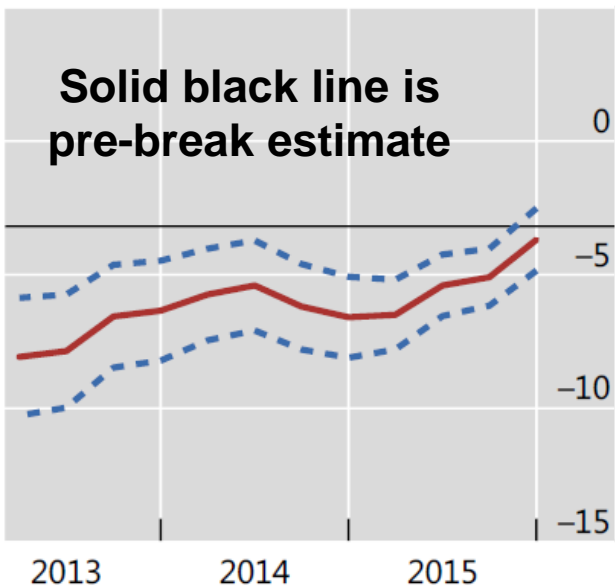
MEH. Cerutti, Claessens, and Rose 2017. Obstfeld.

- Attention overstated, international monetary system critique not justified.
- “Low” explanatory power of global in international capital flows data: FDI, Portfolio Debt, Portfolio Equity, Credit; AEs, EMs; inflows, outflows.
- Insulating power of flexible exchange rates, open on prospects for CFMs.

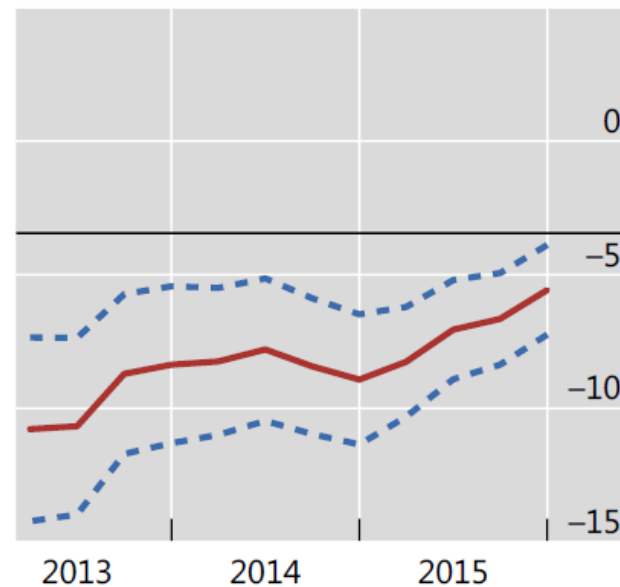
- Time varying effects from analysis of BIS cross-country global liquidity data.
 - Sensitivity of cross-border claims flows and international bond issuance to US MP rose substantially after the GFC, peaked around the 2013 Fed "taper tantrum", and partially reverted back. US as signal of broader AE policies!
 - A 25 basis-point (bp) decline in the FFR is associated with quarterly growth rate of cross-border bank lending that is 80 bp higher before the break versus 202 bp higher afterward. (Plus separate role of VIX)

Post-break sensitivities to US MP (β_1), evolution over time

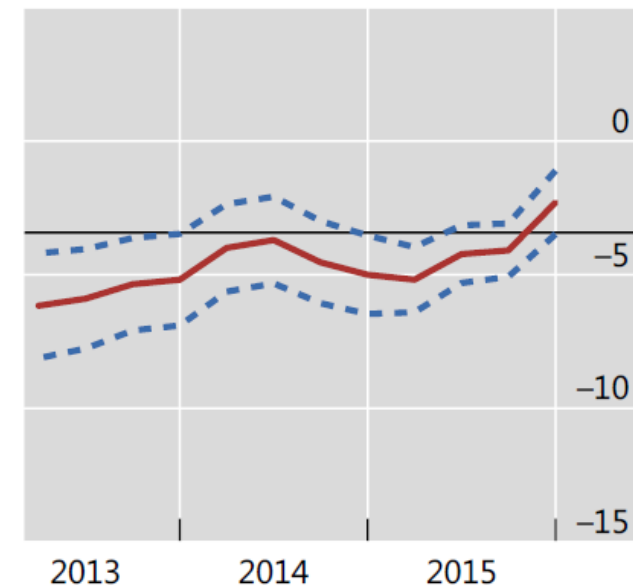
Cross border loans to all



Cross border loans to banks



Cross border loans to non-banks



New approach to monitoring international pressures and global factor

Looking across countries and over time, international capital flow pressures may not be well captured by our standard data. Exchange rate and monetary regimes imply that various policy interventions mask observed stresses.

- Some key data are available only with delays.
- Exchange rates are readily available. However, active use of foreign exchange reserves limits the information content of exchange rates.
- Capital flow data may not fully exhibit changes when exchange rates rapidly adjust to news.

Introduce **New Exchange Market Pressure** index, a “super exchange rate” that incorporates both realized exchange rate movement and policy intervention (purchases and sales of FX reserves, rate changes) by central banks.

New approach to monitoring international pressures and global factor

Key difficulty is how to *add up different price and quantity measures in a logically consistent way*. Define a measure in units of value of own currency against the base currency relevant for country policy and interventions.

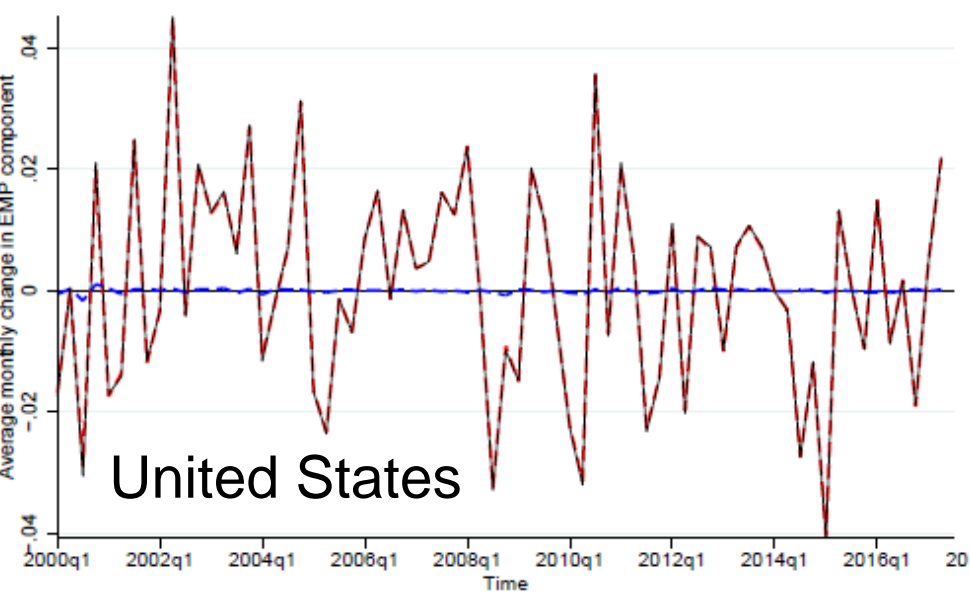
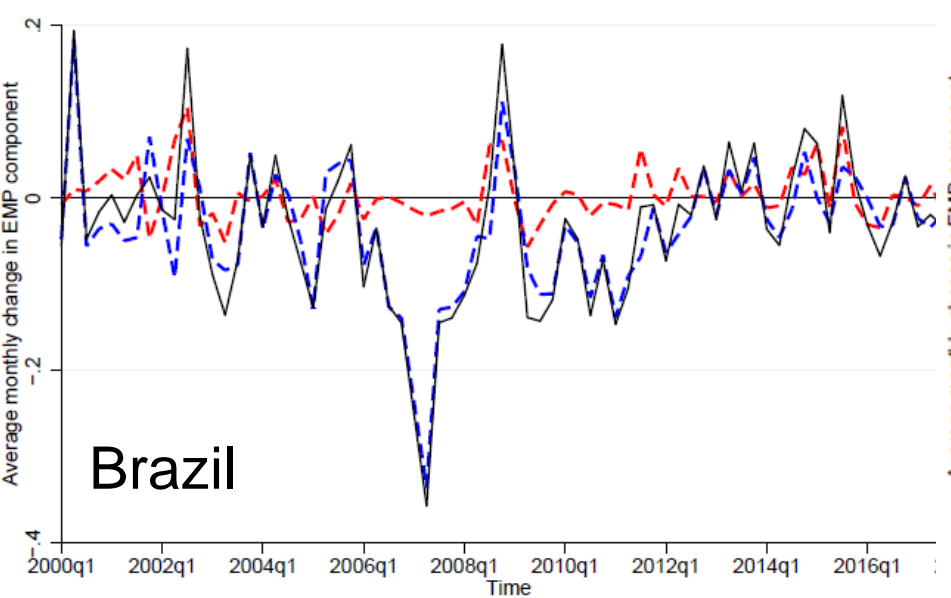
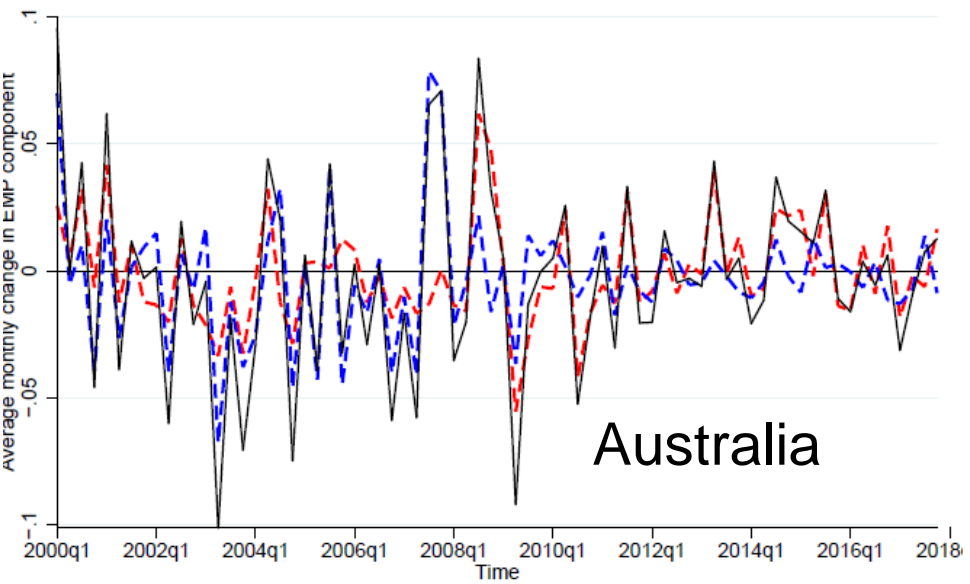
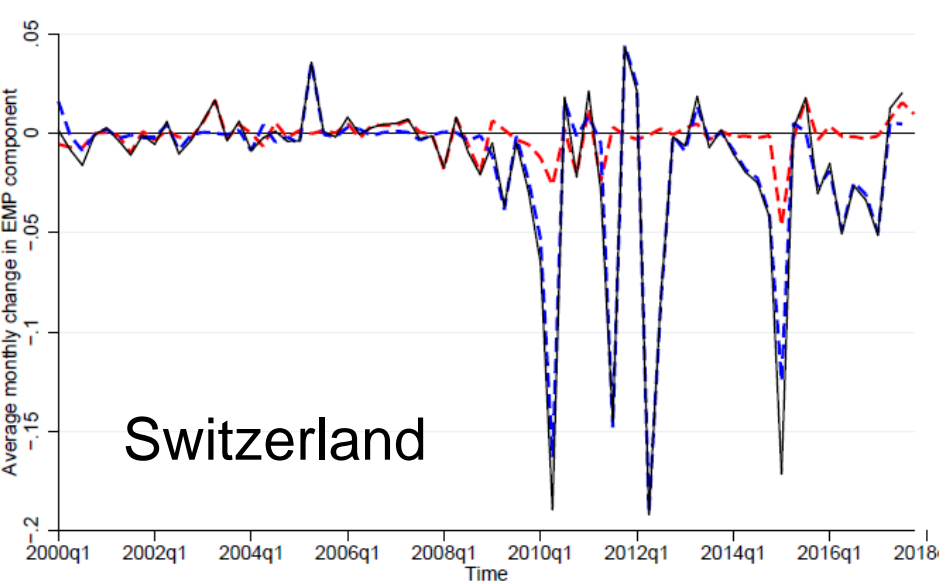
$$EMP_t = \frac{de_t}{e_t} - \frac{1}{\Pi_{e,t}} dR_t - \frac{\Pi_{i,t}}{\Pi_{e,t}} di_t$$

- A theory-based approach to adding up exchange rate depreciation against a base currency $\frac{de_t}{e_t}$, central bank foreign exchange reserve purchases (dR_t) or sales, and monetary policy tightening di_t
- Given some flow change in demand or supply of a currency as reflected in official FX reserves sales, derive the equivalent exchange rate depreciation that would have restored balance of payments equilibrium.
- Yields a conceptual weighting approach relying on *volumes* of gross foreign assets and liabilities, with their elasticities of response to exchange rates or other, exchange rates, payments and receipts on external debt, and wealth.

Examples of Goldberg Krogstrup-EMP, with components from exchange rate depreciation against base currency, and scaled

--- $\Delta(E)/E$ KS --- $-\Delta(R)/\Pi_e$

— Goldberg Krogstrup EMP



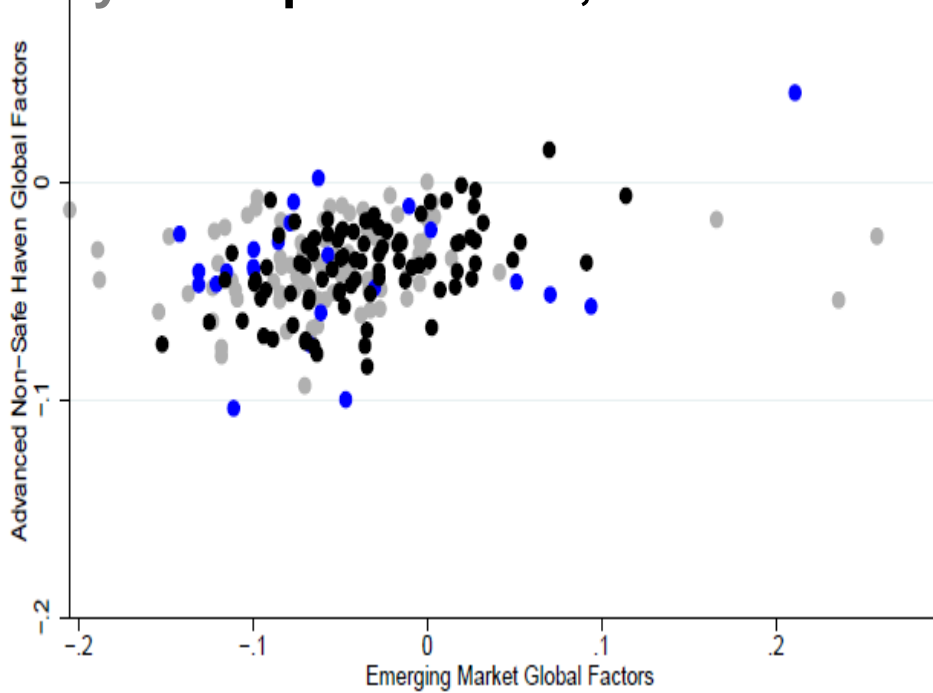
Exploring different aspects of uses of new measure

Example 1. Revisit debate on size and importance of global factor

- Cross-country panel of 48 countries, 2001m1-2017m10, monthly EMP defined against base currency
- Specifications control for domestic monetary policy, capture common global factor.
- Three country groupings: “Safe-havens” (US, Japan, Switzerland), Emerging Markets, and Other AEs.

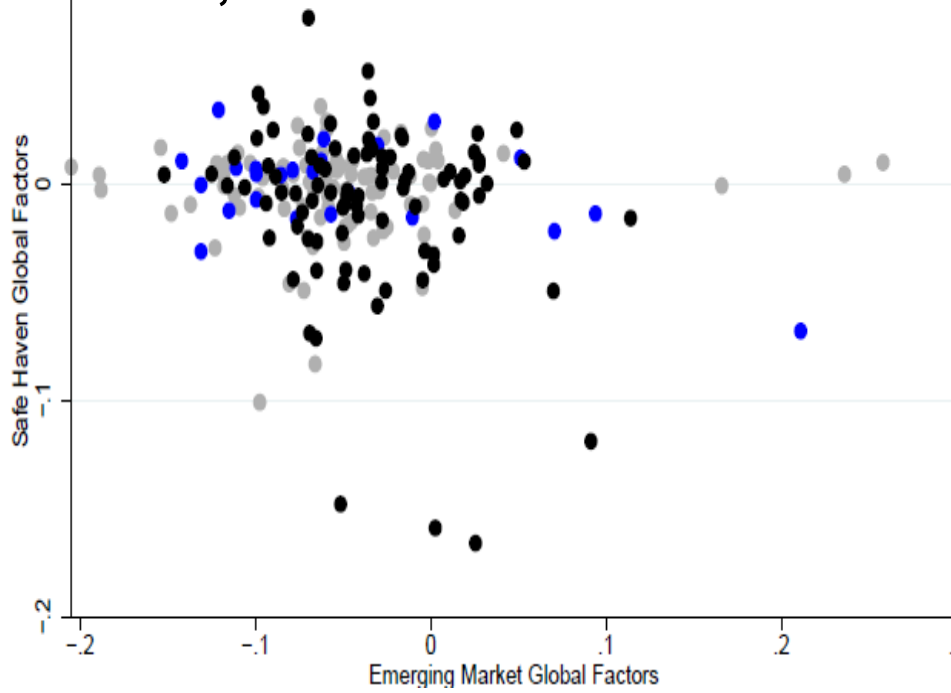
Global Factors by month from panel regressions of *EMP*. Factors within different time periods color coded, with tests shown for relationships across global factors of different country groupings.

Grey dots: pre-2007m7, blue: 2007m7-2009m6, black: 2009m7-2017m6



(a) EMs v. Non-Safe Haven AEs

Pre-crisis: $y = 0.04x$, $Pval = 0.15$, $R^2 = .02$
 Crisis: $y = 0.12x$, $Pval = 0.11$, $R^2 = .11$
 Post-crisis: $y = 0.19x$, $Pval = 0.00$, $R^2 = .22$



(b) EMs v. Safe Haven AEs

Pre-crisis: $y = 0.02x$, $Pval = 0.51$, $R^2 = .01$
 Crisis: $y = -0.13x$, $Pval = 0.01$, $R^2 = .25$
 Post-crisis: $y = -.17x$, $Pval = .05$, $R^2 = .04$

Exploring different aspects of uses of new measure

Example 1. Revisit debate on size and importance of global factor

- Size of global factor varies considerably over time and by country type.
- EM global factors on average 5 times larger than the AE global factors.
- Similar directional impact on EMs and non-safe haven AEs.
- Opposite directional impact on EMs and “safe havens” in crisis and post
- Strongest in major stress periods.

Example 2. Explore evolving EMP response, by country, to global risk sentiment. What currency acts as a “safe asset”? When?

Introduce a **Global Risk Response** index -- **GRR**.

- Test using 5 year rolling window over monthly data, 48 countries. Generate country specific partial correlation between EMP and VIX, controlling for domestic and foreign policy rates. Standardize across countries.
 - GRR (global risk response measure) shows evolving “safe haven” status.
 - Results using this initial exploratory version of the GRR plausible, but can be improved with more country-specific constructions.
- This type of analysis can be used to decompose which types of country/ currencies respond to different types of risks and against which currencies.
- Note: currently all analysis is about the strength of depreciation of a currency relative to a base currency. E.g. for Switzerland, results would be different if measurement were relative to USD instead of relative to euro.

Overall conclusions

- Both exchange rate and capital flow data have shortcomings for analysis of global factors as these are biased by exchange rate regimes in place.
- New Exchange Market Pressure and GRR complement analysis of international pressures on currencies, and across exchange rate regimes.
- Global factor is sometimes important**, particularly around **stress events**, and differs by **type of country**.
- Body of analysis shows role of **global factor may not be a constraint on country policy autonomy under most conditions**, with flexibility of exchange rates providing important insulation from foreign shocks.

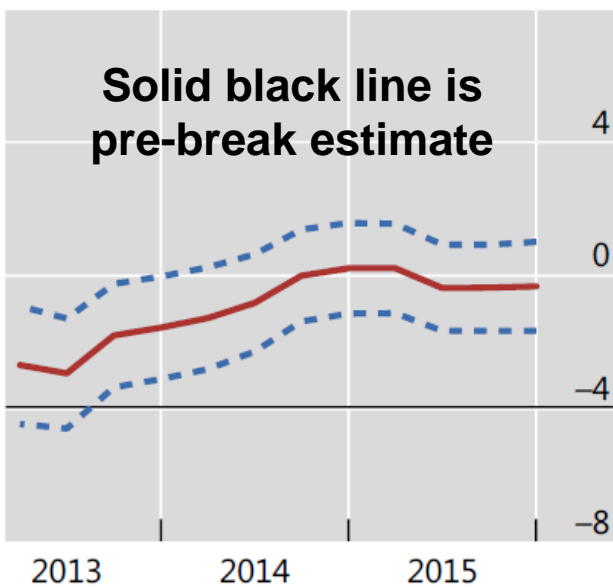
Reference slides

Exhibit shows change in sensitivities to VIX, pre- vs. post-break. The responsiveness of international bank lending to global risk conditions declined considerably post-crisis. Sensitivity of cross-border lending became more similar to that of international debt securities.

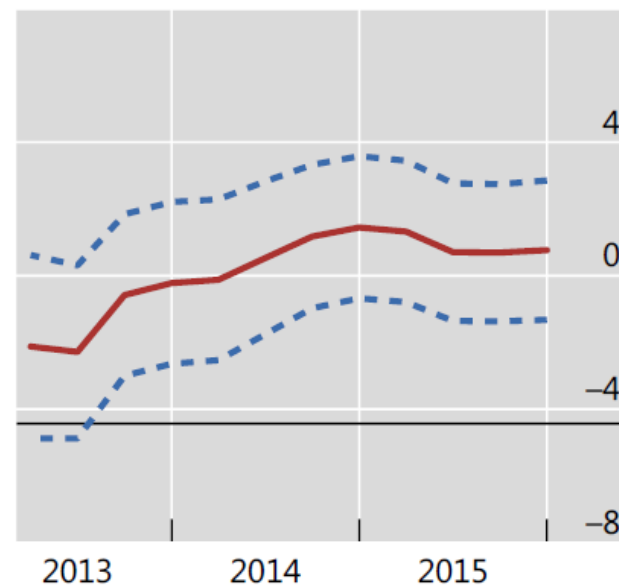
Hyun Shin: VIX may no longer be important. “Ding dong the VIX is dead”, Reuters.

Post-break sensitivities to global risk (β_2), evolution over time

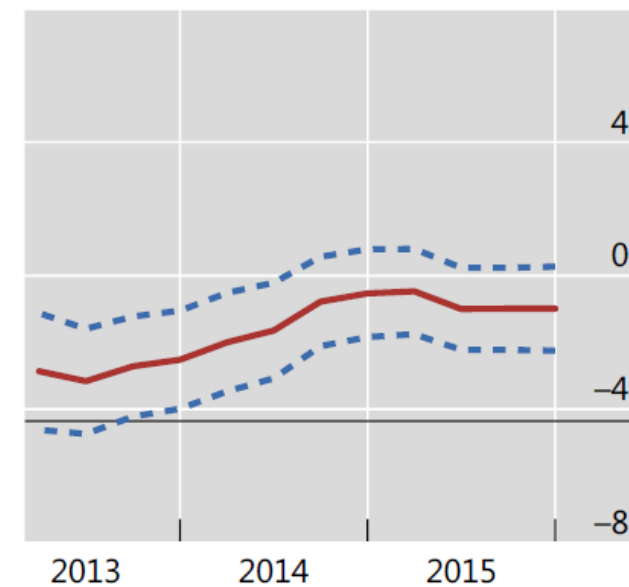
Cross border loans to all



Cross border loans to banks



Cross border loans to non-banks



Goldberg – Krogstrup new Exchange Market Pressure Index

$$EMP_t = \frac{de_t}{e_t} - \frac{1}{\Pi_{e,t}} dR_t - \frac{\Pi_{i,t}}{\Pi_{e,t}} di_t$$

Exchange rate e and FX reserves R defined against a base currency, and i the domestic monetary policy rate where weights depend on foreign assets and foreign liabilities, funding costs, and respective

elasticities

$$\Pi_{e,t} = \frac{FL_{t-1}}{e_t} i_t + \epsilon_e^{FL} \frac{FL_t}{e_t} - \epsilon_e^{FA} FA_t$$

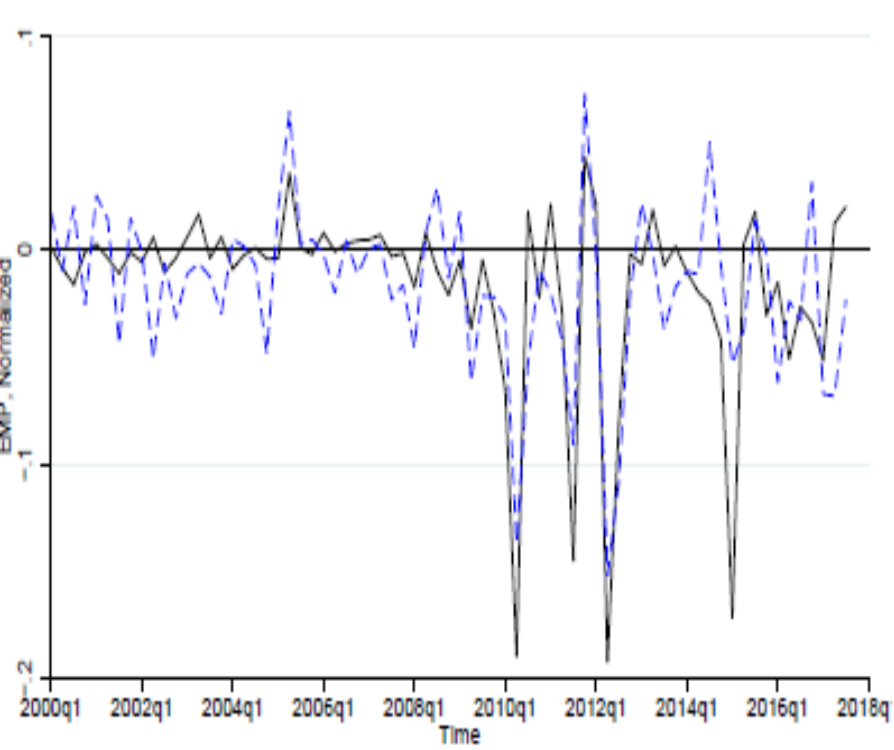
$$\Pi_{i,t} = \frac{1}{i_t} \left[\frac{FL_t}{e_t} (i_t - \epsilon_i^{FL}) + \epsilon_i^{FA} FA_t \right]$$

$$\Pi_{i^*,t} = \frac{1}{i_t^*} \left[FA_{t-1} (i_t^* - \epsilon_{i^*}^{FL}) + \epsilon_{i^*}^{FA} \frac{FL_t}{e_t} \right]$$

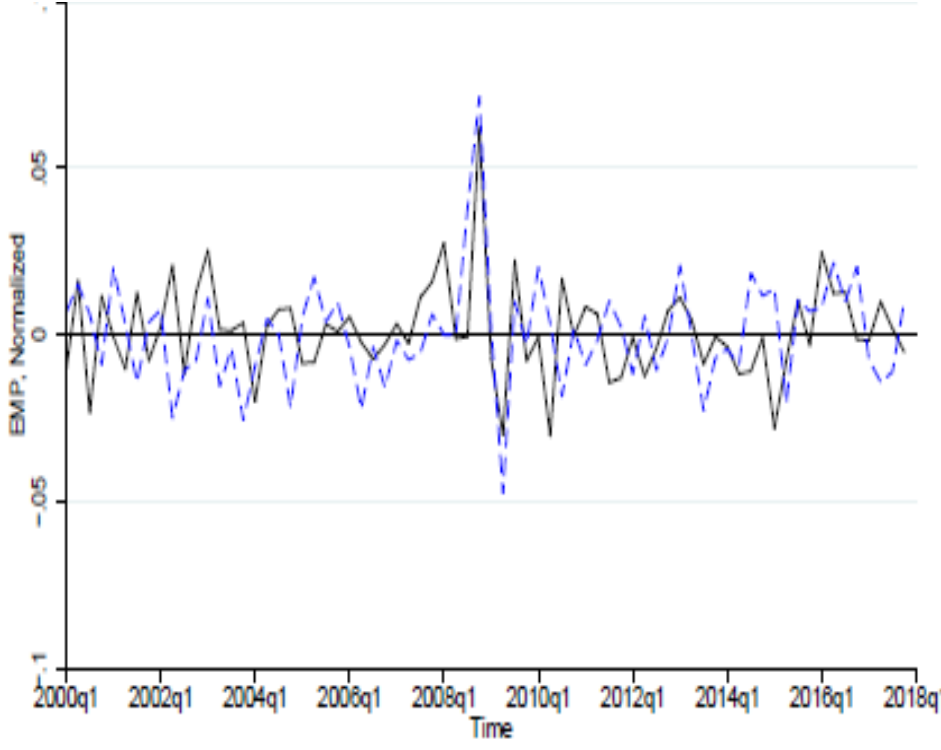
Elasticities of foreign asset demand and foreign liability supply with respect to exchange rates as $\epsilon_e^{FL}, \epsilon_e^{FA} > 0$, and wrt foreign rates $\epsilon_{i^*}^{FL}, -\epsilon_{i^*}^{FL} < 0$. Drivers:

$$-di_t^* \frac{\Pi_{i^*,t}}{\Pi_{e,t}} - \frac{\frac{1}{e_t} FL'_s}{\Pi_{e,t}} ds_t^* + \frac{FA'_s}{\Pi_{e,t}} ds_t - \frac{\frac{1}{e_t} FL'_W}{\Pi_{e,t}} dW^* + \frac{FA'_W}{\Pi_{e,t}} dW$$

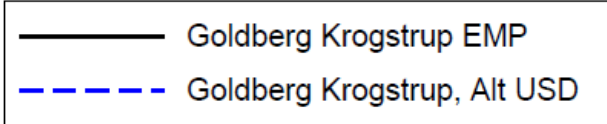
EMP for Switzerland and United Kingdom using euro as base currency, versus using the USD as base currency.



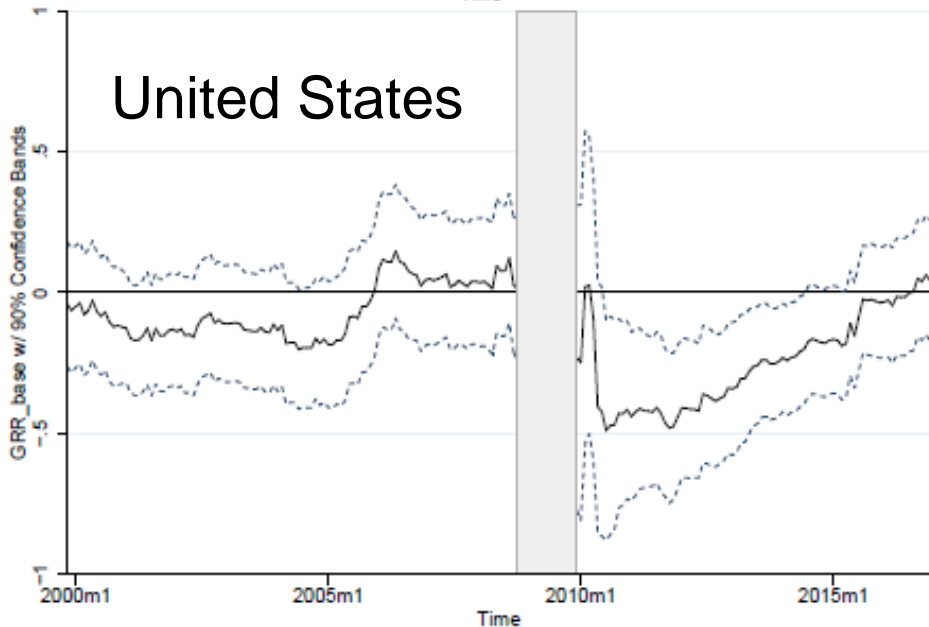
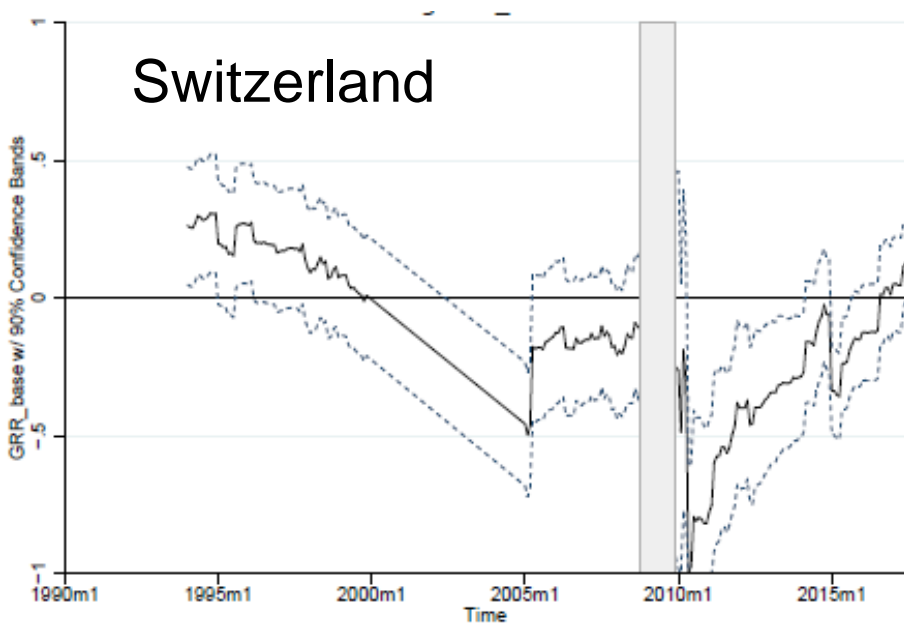
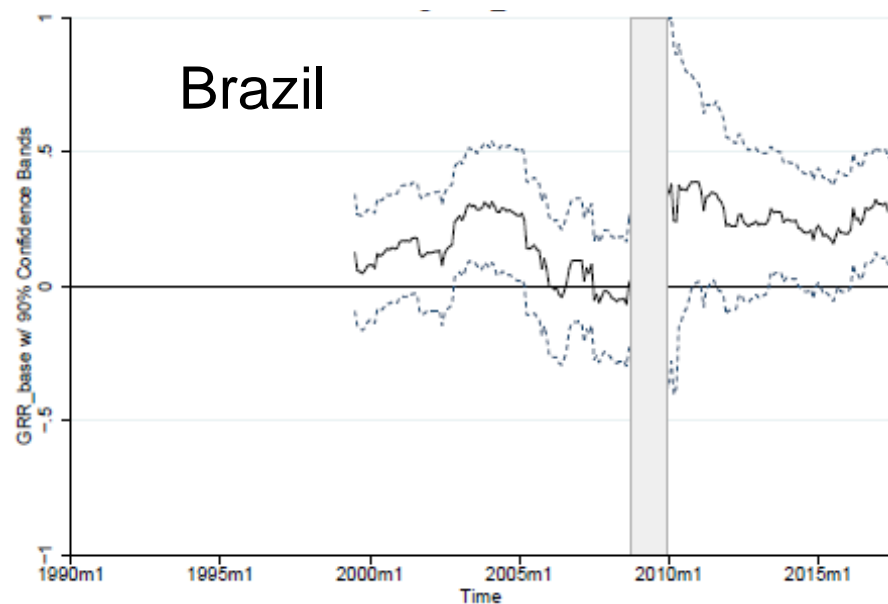
Switzerland



United Kingdom



Rolling GRR for Australia, Brazil, Switzerland, and US EMP baseline in regressions using the VIX . GFC structural break assumed.



EMP and Realized Net Private Capital Outflows

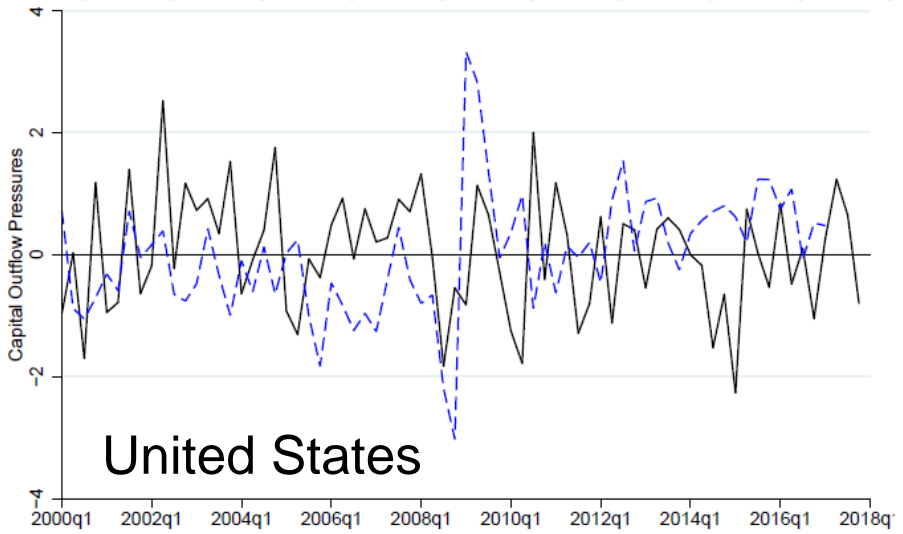
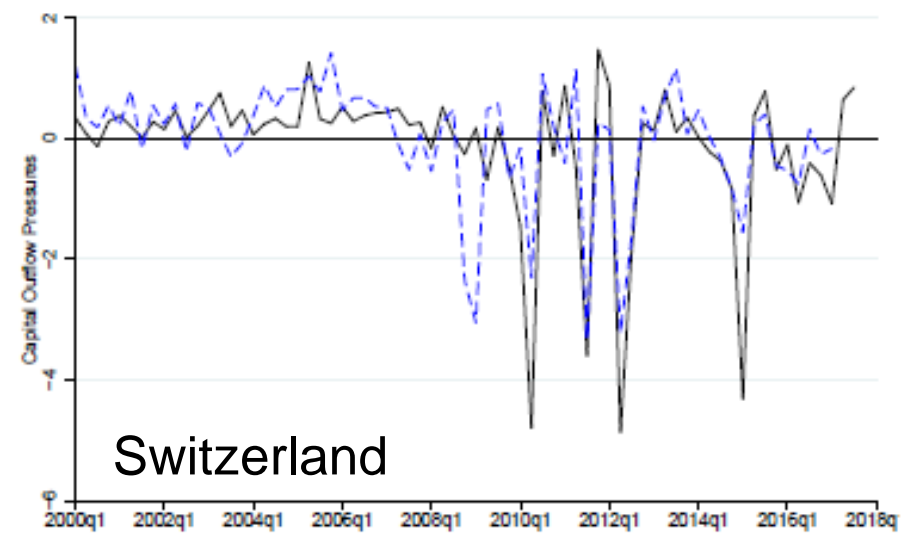
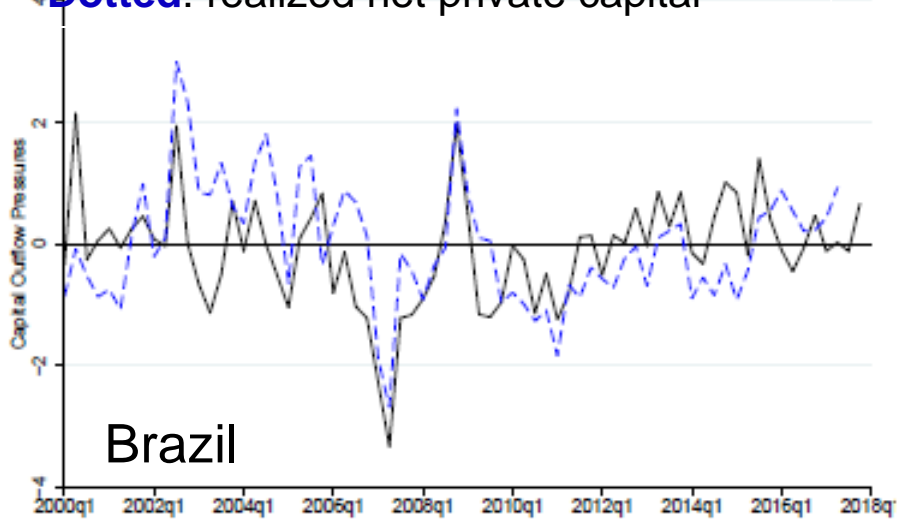
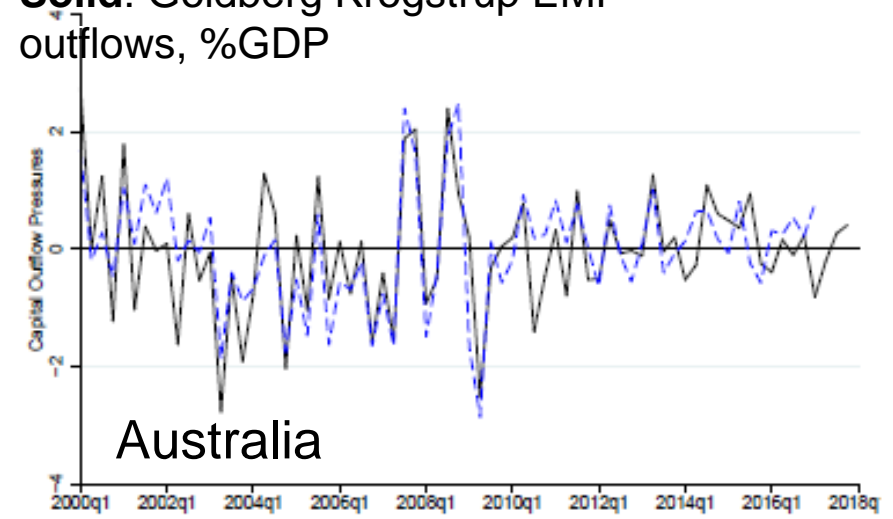
Quarterly averages of monthly values of the Goldberg Krogstrup baseline EMP and net capital outflows in percent of GDP (both series standardized for comparability). Positive values reflect net capital outflows and depreciation pressures against the base currency.

base currency.

Solid: Goldberg Krogstrup EMP

outflows, %GDP

Dotted: realized net private capital



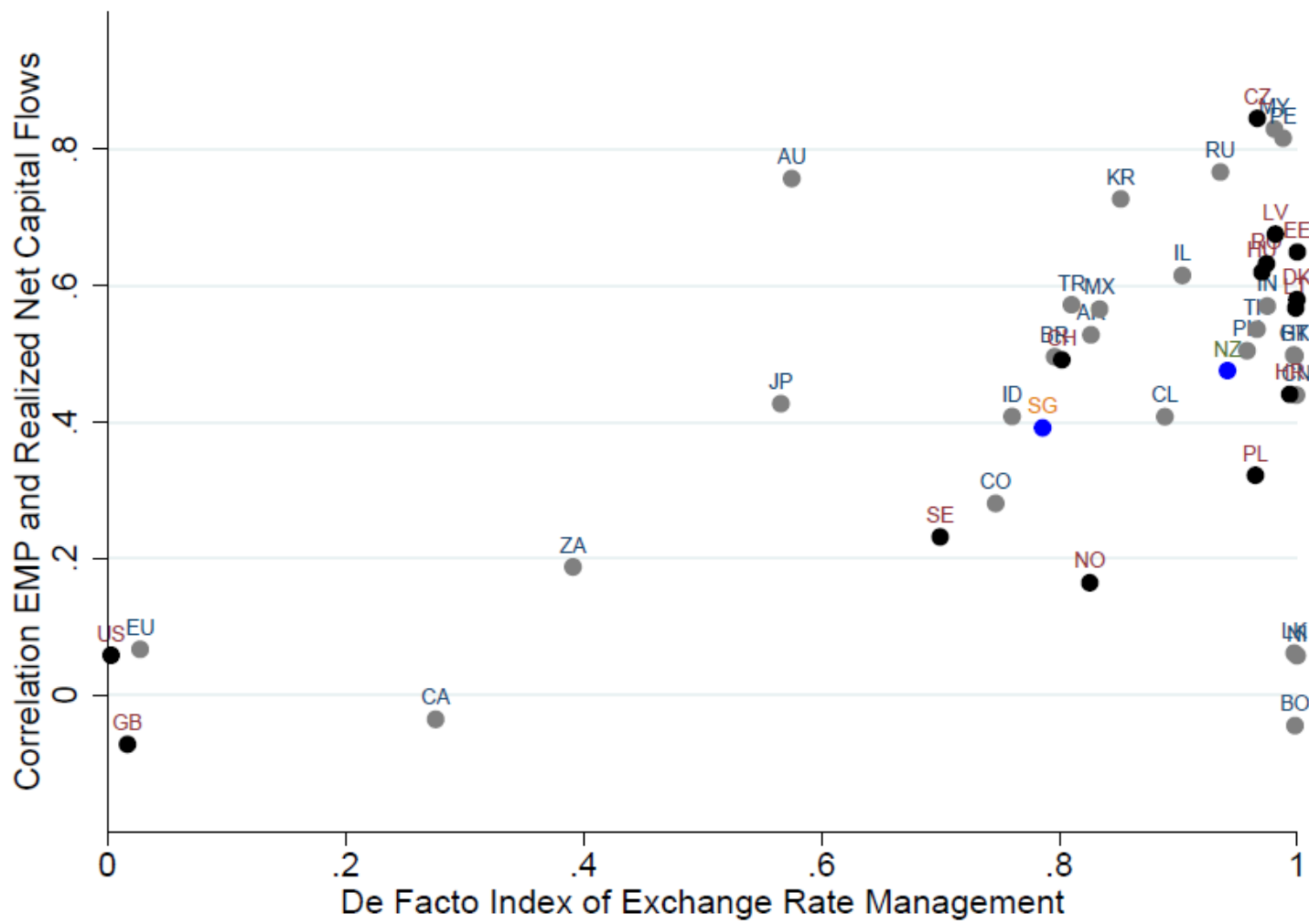
Effective Exchange Rate Regime Versus Correlations of The EMP and Realized Flows

Y-axis: unconditional correlation of the Goldberg-Krogstrup baseline EMP with realized net capital flows by country in quarterly frequency. X-axis: an index of effective exchange rate management by country for the sample period (2000Q1 - 2017Q3)

Black: Countries with USD base

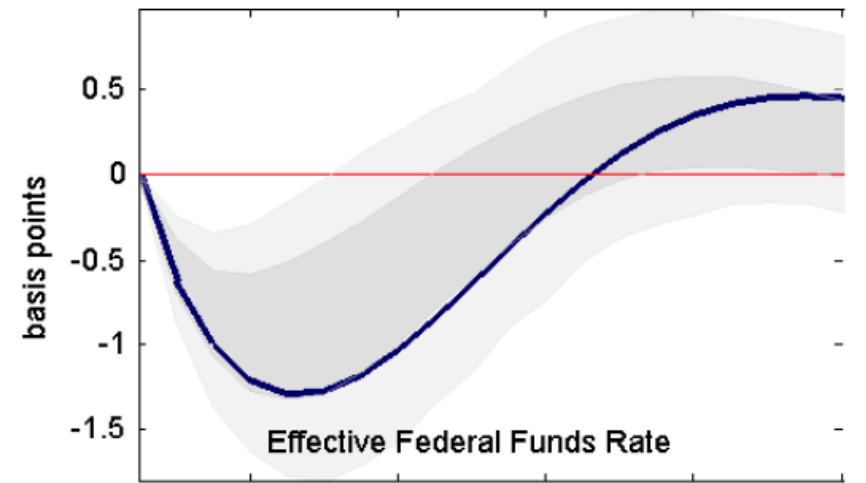
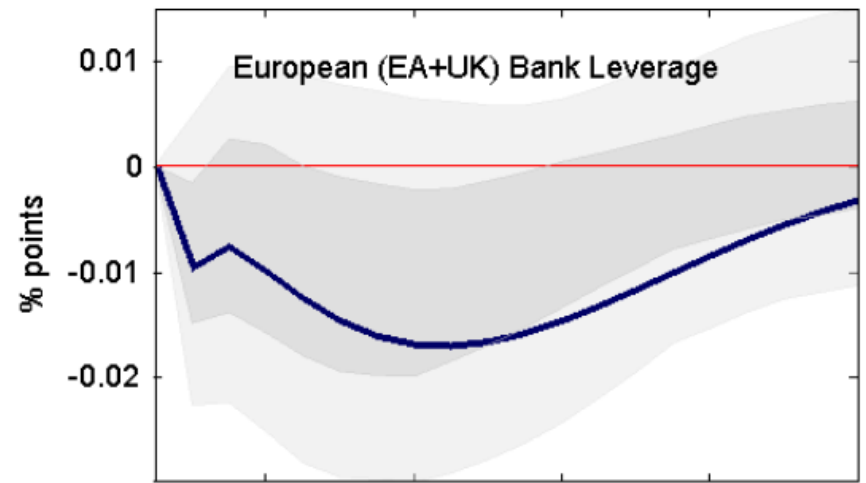
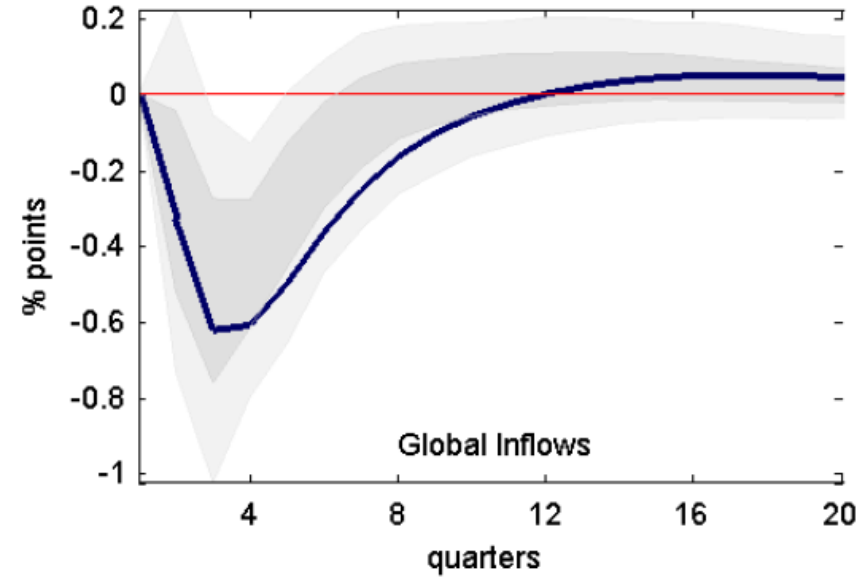
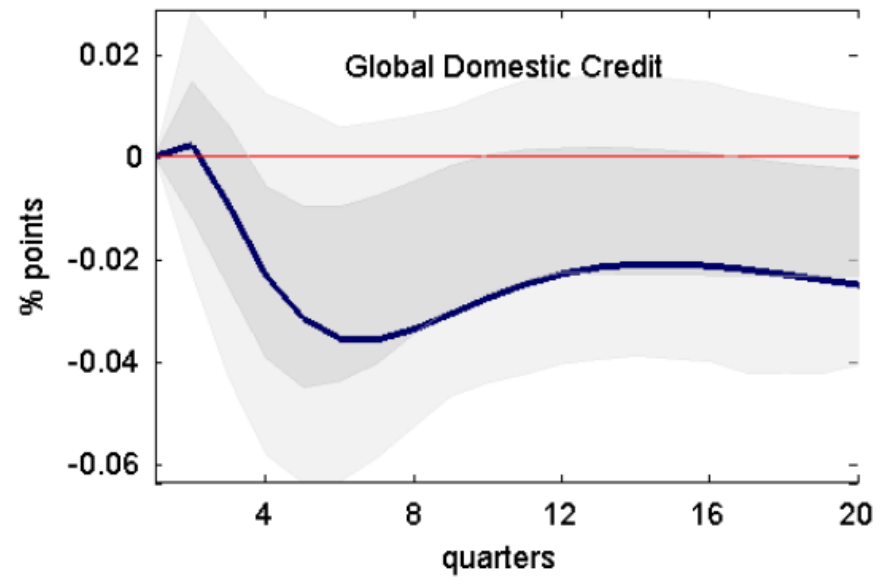
Gray: Countries with euro base

Blue: Countries with other base



Rey's evidence: US monetary policy and VIX are destabilizing externally.

Responses to 1% increase in VIX



Rey "Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence". Positive feedback loop: Recursive VAR where EFFR drives VIX, and VIX