Boom-Bust Capital Flow Cycles: Global or Regional?

Graciela Laura Kaminsky
Department of Economics
George Washington University and NBER
Washington, DC 20052
graciela@gwu.edu

Leandro Medina
Strategy, Policy, and Review Department
International Monetary Fund
Washington, DC 20431
lmedina@imf.org

Shiyi Wang
Department of Economics
George Washington University
Washington, DC 20052
shiyiwang@gwu.edu

Preliminary Version
November 11, 2019

Abstract

The collapse of the Bretton Woods System in 1973 heralded the restart of financial globalization. With no need to defend the peg, countries could choose their own monetary policy without the need to restrict capital mobility, capital controls were gradually eliminated, and capital flows surged. Naturally, the research on capital flows flourished. While the focus of the earlier literature was on pull versus push factors, most of the emphasis was on the borrowers' economic and financial characteristics. Most recently, amid the 2007-2009 Global Crisis, the focus of attention of the literature drastically changed to the financial center, with its boom-bust cycles in leverage, monetary policy, and financial risk. Most of the empirical evidence on the predominant role of the financial center on capital flows focuses on the years around the Global Crisis since data on capital flows for earlier decades is unavailable for many countries. In this paper, we construct a new database on capital flows starting with the collapse of the Bretton Woods System. This new database allows us to study the importance of the global cycle using almost 50 years of data. Our focus is on those countries in the periphery (both advanced and emerging) that heavily tap international capital markets. For these countries, we estimate a dynamic latent factors model, allowing for the possibility of not just a global cycle but also regional cycles. Our results indicate that regional cycles, and not the global cycle, are at the core of the boom-bust cycles in capital flows around the world. We also find that cycles in the center matter for capital flow booms and busts in the periphery. But the effects are not global. Over different episodes of bonanzas and busts in capital flows around the world, the financial center has only a regional reach. These regional effects are time-varying, with strong effects on emerging economies in various regions during the first half of the globalization episode but only affecting advanced economies in Europe in the second half. These findings indicate the need to untangle the route through which shocks in the financial center are transmitted to the periphery.

Keywords: boom-bust capital flow cycles, global, regional, and idiosyncratic factors.
JEL Codes: F30, F34, F65

I. Introduction

About four decades after barriers to capital flows were erected around the world in the aftermath of the Great Depression, the collapse of the Bretton Woods System in 1973 launched a new era of financial globalization. With floating exchange rates, countries can follow independent monetary policies even in the presence of capital mobility. Thus, as currencies started to float in 1973, countries began removing restrictions to capital mobility. United States and Germany were the first to eliminate capital controls. Japan and the United Kingdom followed later in the 1970s. Latin American countries also deregulated capital flows in the late 1970s, with European countries relaxing controls in their path to the monetary union. Since then, capital flows have dramatically increased and have played an important role on economic growth, the business cycle, and financial crises.

Naturally, the research on capital flows has flourished. One of the areas of research that has grown the most is that of understanding what triggers boom-bust cycles in international capital flows. One theme of this research is the distinction between global "push" factors and country-specific "pull" factors. Still initially, most of the emphasis was on the recipient countries' economic and financial characteristics, including indicators of financial development, economic activity, terms of trade, and institutions. Most recently, amid the 2007-2009 global crisis, the focus of attention of the literature drastically changed to the role of the financial center. The emphasis on the global financial cycle became so strong that the trilemma was declared dead and the dilemma was born: "Independent monetary policies are possible if and only if the capital account is managed."[1] While early on, the focus of attention was just on the role of monetary policy in the financial center,[2] the eruption of the global crisis led researchers to focus on other manifestations of the global financial cycle. The role of leverage of international global banks[3] and risk appetite in amplifying capital flow cycles became the new focal point.[4]

Most of the empirical evidence on the role of the global factor on capital flows focuses on the years around the global crisis. This is because the data on capital flows for earlier decades is unavailable for many countries.[5] In this paper, we construct a new database on capital flows starting with the collapse of the Bretton Woods System, allowing us to study the importance of the "global cycle" using almost 50 years of data. Our focus is on those countries in the periphery (both advanced and emerging) that heavily tap international capital markets. For these countries, we estimate a dynamic latent factors model,

[1] See Rey (2015) and Miranda-Agrippino and Rey (2015) and Rey (2015).
[2] See for example, Calvo, Leiderman, and Reinhart (1993, 1996).
[3] See for example, Acharya and Schnabl (2010), Borio and Disyatat, and Bruno and Shin (2015a and 2015b).
[4] See also, Forbes and Warnock (2012), Ghosh, Qureshi, Kim, and Zalduendo (2014), and Rey (2015).
[5] See, for example, Cerutti, Claessens, and Puy (2017), and Cerutti and Hong (2018).

allowing for the possibility of not just a global cycle but also regional cycles. Our results indicate that regional cycles and not the global cycle are at the core of the booms and busts in international capital flows around the world. Overall, regional cycles can explain on average about 45 percent of the variance of capital flows around the world. In contrast, the global factor explains about 15 percent of the variance of capital flows worldwide.

We then examine the role of what we call the "monetary cycle" in the financial center (which includes not just monetary policy but also leverage and risk in the United States as well as the commodity cycle) on the three regional factors that are at the core of capital flows around the world. Following the recent empirical literature on capital flows we capture the monetary cycle in the financial center with the Federal Funds interest rate, the US broker-dealer financial leverage index, risk as captured by the Moody's Baa Corporate Bond-10 year Treasury Yield Spread, and the commodity cycle as captured with the Chicago Board of Trade Commodity index. Our results indicate that the monetary cycle in the financial center matters for capital flow booms and busts in the periphery, but it does not reach simultaneously flows around the world, it only has regional effects. Importantly, these regional effects are time-varying, with strong effects on emerging economies in various regions during the first half of the globalization episode but only affecting advanced economies in Europe in the second half. These findings indicate the need to untangle the route through which monetary cycles in the financial center are transmitted to the periphery.

The rest of the paper is organized as follows. Section II reviews the empirical literature on "push" and "pull" factors. Section III presents our database. Section IV presents the estimated dynamic factor model and reports the results. Section V estimates the role of the financial center over regional cycles using Jordà (2005) local projections, allowing for a time-varying effects of the financial center cycles on capital flows in the periphery. Section VI presents the conclusions and discusses future areas of research.

II. Literature Review

Starting in the 1970s capital flows to every corner of the world rapidly increased. Naturally, the research on capital flows has surged. One of the areas of research that has flourished the most is that of understanding what triggers boom-bust cycles in international capital flows. With developing countries suffering a variety of currency, banking, and sovereign debt crises in the 1980s and 1990s in the aftermath of capital flow bonanzas, the focus during the earlier phase of financial globalization is on these countries. One theme of this research is the distinction between global "push" factors and country-specific "pull" factors.[6] The questions most frequently asked are about the role of idiosyncratic factors, such as the

[6] See, for example, Fernandez-Arias (1996) and Fostel and Kaminsky (2008).

recipient-country economic activity, terms-of-trade, quality of institutions, fiscal and monetary policies, and openness of the real economy. Starting in the 1990s various researchers brought to center of attention the role of the push-factors. Calvo, Leiderman, and Reinhart (1993, 1996) are the first to emphasize the importance of external push factors in explaining capital flows to emerging economies. They isolate fluctuations in the US interest rate one of the main culprits in fueling capital flow bonanzas to the emerging periphery.

The US Subprime crisis in 2007-2009 and the EMU crisis in 2010-2012 change the center of attention to the advanced economies and to the role of international banks on cross border capital flows. For example, Bruno and Shin (2015a, 2015b) pay attention to the amplifying role of global bank leverage and the dollar exchange rate on cross-border capital flows. In their research, an expansionary shock to US monetary policy increases cross-border bank capital flows through higher leverage of international banks. Such an increase in cross-border flows is associated with a depreciation of the US dollar. The global banks finance cross-border lending to regional banks by tapping U.S. dollar money market funds in the financial center. The transmission channel in this model is via fluctuations in the effective credit risk faced by banks who lend to local borrowers that have a currency mismatch. When the local currency appreciates vis-à-vis the US dollar, local borrowers' balance sheets become stronger, resulting in lower credit risk and hence expanding bank lending capacity. Thus, in this model, currency appreciation leads to greater risk-taking by banks. In this literature, the push factors do not just include monetary policy in the financial center but also include fragilities in the global banking sector, such as global leverage and equity growth of major global banks.

In the aftermath of the global crisis, the "push-pull" literature takes also another turn. Now the focus is not on the overall behavior of capital flows during booms and busts but on extreme events of capital flow. These new studies focus on "surges" and "stops" (sharp increases and decreases of gross inflows) as well as "flight" and "retrenchment" (sharp increases and decreases of gross outflows). See for example, Forbes and Warnock (2012) and Gosh, Kim, Qureshi, and Zalduendo (2014). These studies as well as the earlier literature indicate that waves of capital flows are primarily associated with global factors, which now also include global risk, which incorporates both risk aversion and economic uncertainty

The boom and bust in capital flows around the global crisis of 2007-2009 also motivated a new area of research, that of capturing the "global factor." Since the global financial cycle is unobservable, a new branch of the literature has captured this factor indirectly using dynamic common factors extracted from actual capital flows or by overall movements in asset prices. One of the earliest papers is this area

is that of Rey (2013). In her Jackson Hole paper, Rey examines capital flow booms and busts and documents a positive correlation in capital gross inflows as well as outflows across mostly all regions in the world. She finds particularly strong positive correlations between all the major flows into North America and Western Europe. This evidence prompts Rey to examine the characteristics of this global cycle. She examines the correlations between capital flows and the VIX and finds negative correlations between various types of capital flows and the VIX, both globally and for various sub-regions averaging around -0.23. She then documents, using a common factor obtained from a large number of asset prices for various regions of the world, that this factor shows a relatively high negative correlation with the VIX, suggesting that there is a global financial cycle in capital flows, asset prices and in credit growth. Rey also reports a VAR estimation indicating that one of the determinants of the global financial cycle is monetary policy in the center country, which in turn affects the leverage of global banks, capital flows, and credit growth in the international financial system. She concludes that whenever capital is freely mobile, the global financial cycle constrains national monetary policies regardless of the exchange rate regime, invalidating the "trilemma," which postulates that in a world of free capital mobility, independent monetary policies are feasible if and only is exchange rates are floating.

Naturally, this provoking conclusion that "*cross-border flows and leverage of global institutions transmit monetary conditions globally, even under floating exchange-rate regimes"* has stimulated further research in this area. Cerutti, Claessens, and Puy (2017) scrutinize these results using data on gross capital inflows across 34 emerging markets for the period 2001-2013. In the spirit of the literature in common factors, the authors examine whether aggregate inflows to EMs co-move using latent factors. They do not just examine whether total flows co-move together around the world and regionally but also study the co-movement across different types of capital flows. They find that the global factor explains about 21% of total capital flows and the regional factors explain about 25%, but they find that not all components co-move across emerging markets, just portfolio equity flows, portfolio bond flows, and bank flows are highly integrated. Importantly, they also find that the sensitivity to common dynamics varies significantly across borrower countries. They find that financial market characteristics, such as liquidity in the recipient country and composition of the foreign investor bases, rather than macroeconomic or institutional fundamentals, explain better countries' sensitivities. In particular, they find that the countries most affected by push factors are those countries relying more on international funds, such as mutual funds and ETFs, and global banks.

Starting in 2003, the IMF Balance of Payments data on capital flows provides information not just about type of instruments but also by type of borrowers. While this database only includes 14 years, it

includes the bonanza preceding the global crisis and the retrenchment in its aftermath and can help us to understand not just the behavior of bank, bond, and equity flows but also the behavior of banks, corporates, and sovereigns. Cerutti and Hong (2018) use this disaggregation to examine the behavior of borrowers in 43 advanced and emerging economies. To examine the behavior across borrowers and instruments, they decompose each capital inflow series into a global factor, borrower-type sub-factors, and a country-specific component. Their estimations indicate that gross capital flows do not move in tandem across countries regardless of borrower characteristics: Different borrowing sectors have different sensitivity to the global financial cycle. For example, advanced economy corporates borrowing before the crisis show a complementary behavior with both an increase in their borrowing through both debt securities and loans. This changed since the crisis, with advanced economies corporates borrowing showing an increase in borrowing through debt securities replacing international bank loans but emerging market corporates show both an increase in bond and loan financing.

Finally, Cerutti, Claessens, and Rose (2017) intensively scrutinize the extent of the comovement of capital flows, using a variety of methods and variables to capture the global factor. The estimations are not limited to total gross inflows and outflows, they also include different type of flows. They estimate the global factor using observable indicators, such as the VIX and the interest rate in the financial center, and unobservable indicators extracted from capital flows using dynamic factor models. In total they estimate about 600 regressions using different combinations of observable variables from different financial centers for both panels of countries and individual countries. They find that on average the R^2 from all these regressions is just about 0.25, indicating that the global factor can only explain a small fraction of the variance of capital flows.

III. The Data

The empirical research on "push" and "pull" factors examines mostly the boom-bust cycles starting in the mid-1990s and even later starting in the 2000s because of limitations with data on capital flows as collected by the IMF for the Balance of Payments Statistics. In this paper we examine capital flows since the collapse of the Bretton Woods System in the 1970s using data on international primary issuance we collected from the archives of the World Bank (for the 1970s), which we combined with data from Dealogic and Bloomberg (which collect data on issuance since 1980s) to have a database spanning almost fifty years of capital flow cycles. The database so compiled includes sovereign and private issuance of syndicated loans, bonds, and equities. The measure of capital flows we collected is what is known as international gross primary issuance. This measure of capital flows captures gross capital inflows and is

defined as purchases of domestic assets by foreign residents. This database allows us to capture the boom-bust cycles of the mid-1970s-beginning of the 1980s that mostly affected developing countries in Africa, East Asia, Eastern Europe, and Latin America; the boom-bust cycles of the mid-1990s that affected Latin America, Asia, and Europe; and the boom-bust cycles of the mid-2000s that affected most dramatically advanced countries in Europe. The database is granular. It contains information on each single issue. For bonds and syndicated loans, the data includes the date of the issue, the name of the borrower, the purpose of the issue, the type of business of the borrower, the amount issued, the currency of issue, the interest rate, the maturity, the banks participating in the syndicates for loans, and the markets where the bonds are issued.[7] For shares, the data includes the date of the floating, the name of the company issuing the shares, the price of the shares, the currency of issue, and the markets where the shares are issued. This database includes all the countries that participated at least once in international capital markets.

In this paper, we study capital flows to advanced and emerging periphery countries that heavily tap international capital markets. We focus on issuance of 28 countries in three regions: Latin America, Asia, and Europe. The countries in Latin America are: Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Uruguay; the countries in Asia are: China, Indonesia, Malaysia, Philippines, South Korea, Thailand, and Vietnam; the countries in Europe are: Austria, Belgium, Denmark, Finland, France, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Portugal, Spain, and Sweden. For each country, we construct a measure of total gross capital inflows which include primary issuance of bonds, syndicated loans, and equities. To have a measure of participation in international capital markets relative to the size of the economy, we study total issuance as a share of exports. Exports are quite volatile. For the issuance/export ratio to capture the volatility of capital flows only, we use trend exports as the scale variable. Trend exports are estimated by applying the Hodrick-Prescott filter to the series of nominal exports.

Figure 1 shows the evolution of capital flows since the 1970s. Note that all the emerging economies in Asia and Latin America experienced pronounced boom-bust cycles in the late 1970s beginning of the 1980s and in the mid-1990s. Only 20 percent of those countries experienced large bonanzas in the 2000s. In contrast to the evidence from emerging markets, basically all advanced economies in Europe experienced dramatic bonanzas and busts only in the 2000s.

[7] We identify bonds as international when they are issued in the euro market, foreign market, or global market, including both private placements and public issues. We follow the BIS in the identification of international syndicated loans (See, Gadanecz, 2004) and identify international loans as those loans in which the nationality of at least one of the senior syndicate banks differs from that of the borrower.

IV. Global and Regional Factors

In this section we first present the model estimated and then we discuss the results.

IV.1 The Model

We estimate global and regional factors using the methodology developed by Kose, Otrok, and Whiteman (2003).[8] We estimate the following latent factor model:

$$y_{i,t} = \alpha_i + \beta_i^{global} f_t^{global} + \beta_i^{region} f_t^{region} + \varepsilon_{i,t} \quad (1)$$

where:

$y_{i,t}$ is the (normalized) international primary issuance (share of exports) of country *i* in year *t*.

f_t^{global} is the unobserved global factor affecting all the countries in the sample.

f_t^{region} is the unobserved regional factor affecting all the countries in a particular region.

β_i^{global} is the country-specific factor loading measuring the response of county *i* to the global factor.

β_i^{region} is the country-specific factor loading measuring the response of country *i* to the regional factor

$\varepsilon_{i,t}$ is the unobserved country-specific residual factor.

As in Kose, Otrok, and Whiteman (2003), we estimate a dynamic latent factor model where all factors follow AR processes.

More precisely, we assume that the idiosyncratic factors follow an AR(p) process:

$$\varepsilon_{i,t} = \rho_{i,1}\varepsilon_{i,t-1} + \rho_{i,1}\varepsilon_{i,t-2} + \cdots + \rho_{i,p}\varepsilon_{i,t-p} + u_{i,t} \quad (2)$$

where:

$u_{i,t} \sim N(O, \sigma_i^2)$ and $E(u_{i,t}u_{i,t-s}) = 0$ for $s \neq 0$.

We also assume that the global and regional factors follow AR(q) processes:

$$f_t^{global} = \rho_1 f_{t-1}^{global} + \rho_2 f_{t-2}^{global} + \cdots + \rho_q f_{t-q}^{global} + u_t^{global} \quad (3)$$

$$f_{t,j}^{region} = \rho_1 f_{t-1,j}^{region} + \rho_2 f_{t-2,j}^{region} + \cdots + \rho_q f_{t-q,j}^{region} + u_{t,j}^{region} \quad (4)$$

where:

$u_t^{global} \sim N(0, \sigma_{global}^2)$, $u_t^{region\ j} \sim N(0, \sigma_{region\ j}^2)$,

and

$E(u_t^{global} u_{t-k}^{global}) = 0$, $E(u_{t,j}^{region} u_{t-k,j}^{region}) = 0$ for $k \neq 0$.

[8] See also, Jackson, Kose, Otrok, and Owyang (2016), Kose, Otrok, and Prasad (2012).

It is difficult to estimate dynamic factor models when the factors are unobservable, which calls for alternative methods. To estimate the model above, we rely on the Otrok-Whiteman Bayesian approach with multi-level extension which has been employed in Kose et al. (2003, 2008, 2012). The essential idea is to determine posterior distributions for all unknown parameters conditional on the latent factor and then determine the conditional distribution of the latent factor given the observables and the other parameters. The joint posterior distribution for the unknown parameters and the unobserved factor can be sampled by the MCMC procedure on the full set of conditional distribution. Kose et al. (2003) indicate that there are two related identification problems in the model shown in equations (1)-(4): neither the signs nor the scales of the factors and the factor loadings are separately identified. Therefore, we follow the strategy in Kose et al. (2003) to restrict the loadings on the global factor for the first country in the sample to be positive and restrict the loadings on the regional factor for one country in each regional factor to be positive. Then, we assume that each of the factor variances are equal to a constant to solve the normalization problem. As it is usual in these estimations, we standardize the capital flow data (as a share of trend exports) to a mean zero and variance equal to one indicator.

To implement the Bayesian techniques, we summarize the conjugate priors to estimate the model here:

$$\left(\beta_i^{global}, \beta_{i,j}^{region}\right)' \sim N(0, I_2) \tag{5}$$

$$\left(\rho_{i,1}, \rho_{i,2}, \cdots, \rho_{i,p}\right)' \sim N[0, diag(1, 0.5, 0.5^{p-1})] \tag{6}$$

$$\left(\rho_1^{global}, \rho_2^{global}, \cdots, \rho_q^{global}\right)' \sim N[0, diag(1, 0.5, 0.5^{q-1})] \tag{7}$$

$$\left(\rho_{1,j}^{region}, \rho_{2,j}^{region}, \cdots, \rho_{q,j}^{region}\right)' \sim N[0, diag(1, 0.5, 0.5^{q-1})] \tag{8}$$

$$(\sigma_i^2)' \sim IG(6, 0.001) \tag{9}$$

We set the length of both the idiosyncratic and factor autoregressive polynomials at 2 ($p = 2$ and $q = 2$), and we assume the AR processes are stationary. The prior on all the factor loading coefficients is $N(0,1)$. For the autoregressive polynomial parameters, the prior is $N(0, \sum)$, where the $\sum = \begin{bmatrix} 1 & 0 \\ 0 & .5 \end{bmatrix}$.

As in Otrok and Whiteman (1998), the prior on the innovation variances in the observable equations is the Inverted Gamma distribution $IG(6, 0.001)$. The number of Monte Carlo draws is 10,000 and the number of initial draws to discard (burn-in replication) is 5000.

In order to measure the relative contributions of global and regional factors to the variations in capital flows of each country, we decompose the variance of observable into the fraction that is due to

each of the two factors and the idiosyncratic component. With orthogonal factors that variance of observable i can be written as:

$$var(y_{i,t}) = \left(\beta_i^{global}\right)^2 var\left(f_t^{global}\right) + (\beta_{i,j}^{region})^2 var\left(f_{t,j}^{region}\right) + var(\varepsilon_{i,t}) \quad (10)$$

With the fraction of volatility due to the global factor equal to:

$$\frac{(\beta_i^{global})^2 var\left(f_t^{global}\right)}{var(y_{i,t})}$$

and the fraction of volatility due to the regional factor *j* equal to:

$$\frac{(\beta_{i,j}^{region})^2 var\left(f_{t,j}^{region}\right)}{var(y_{i,t})}$$

These measures are calculated at each pass of the Markov chain; dispersion in their posterior distributions reflects uncertainty regarding their magnitudes.

IV.2 Estimations

Figure 2 shows the evolution of the global factor and the regional factors for Asia, Europe, and Latin America. Interestingly, the global factor captures two highly protracted episodes of the expansion of financial globalization and their demise. The first episode starts in the 1970s with the collapse of the Bretton Woods system and ends in the aftermath of the Debt crisis. The second one starts in the early 1990s and ends in the aftermath of the Global Crisis.

In contrast, the regional factors capture less prolonged cycles, some of them around regional crises, such as the Asian crisis in 1997. The regional factor for Asia captures two episodes of highly pronounced bonanzas, one peaking in 1981 and the other in 1995. Both bonanzas end with crises in the region. The other boom-bust cycles in Asia in the 2000s are far less pronounced. These cycles peak in 2005 and 2011. The regional factor for Europe also captures the dramatic booms that preceded systemic crises in Europe: The EMS crisis in 1992-1993 and the European crisis in 2010-2012. Finally, the regional factor for Latin America captures two highly pronounced boom-bust cycles, one starting in the mid-1970s and the other starting in the early 1990s. Both cycles end with banking, currency, and sovereign debt crises. As in Asia, the boom-bust cycles in Latin America are far less pronounced in the 2000s.

Figure 3 shows the variance decomposition of capital flows since the collapse of the Bretton Woods System until 2017. The global factor only explains 16 percent of the variance of capital flows across all countries. In contrast, the regional factors explain 42 percent of the variance of capital flows across all

countries. Finally, the idiosyncratic factor explains the remaining 42 percent of the variance of capital flows across all countries.

Figure 4 decomposes annual capital flows into the share of global, regional, and idiosyncratic factors. It is interesting to note that the share of the regional factors is far more important during bonanzas, suggesting a positive loop of high returns, more optimistic investors, and higher leverage. In contrast, during busts, idiosyncratic factors seem to be playing a larger role.[9] (Need to have estimates)

V. The Role of the Financial Center

The focus of attention in the capital flow literature since the onset of the global crisis has been on monetary policy, leverage, and risk cycles in the financial center and their spillovers on booms and busts around the world. In this section, we use local projections to examine the role of these shocks (to which we add the commodity cycle as another manifestation of what we call the monetary cycle in the financial center) on the regional factors. We examine separately the role of the different components of the monetary cycle in the financial center on the regional factors allowing for time-varying effects. Figure 5 shows our four indicators. Since most of the literature has focused on the role of the financial center on the capital flow bonanza and bust of the 2000s, we test for the possibility of different responses to shocks in the financial center in two different episodes: The earlier episode starting with the collapse of the Bretton Woods System until 1999, and the most recent episode, from 2000 until 2017. We use Jordà's (2005) local projection method to estimate impulse responses.

The Jordà methodology simply requires the estimation of a series of regressions for each horizon *h* for each variable. If we impose similar responses across the two episodes, the model is linear and it looks as follows:

$$\Delta F_{t+h} = \alpha_h + \beta_h(L) \cdot \Delta F_{t-1} + \gamma_h \cdot \Delta fc_t + \varepsilon_{t+h} \qquad (11)$$

for h = 0, 1, 2, 3, and 4.

where Δ is the annual change of the various indicators, F is alternatively each of our three regional factors, $\beta_h(L)$ is a polynomial in the lag operator, and fc is the financial center shock that captures alternatively the Federal Reserve Real interest rate, the US Broker-Dealer financial leverage, US financial risk as captured by Moody's Baa Corporate Bond-10 Year Treasury Yield Spread, and the commodity prices

[9] This is not the case for Latin American countries in the aftermath of the boom of the 1970s, when all countries defaulted and could not access international capital markets.

shock captured with the Chicago Board of Trade Commodity Index deflated by the US CPI Index. The coefficient γ_h gives the response of ΔF at time $t+h$ to the shock at time t.

Following Ramey and Zubairy (2018), we modify the local linear projection method to estimate a state-dependent model. Again, as with the linear model, we estimate the model with state-dependence by estimating a set of regressions for each horizon *h*:

$$\Delta F_{t+h} = I_{t-1}\left[\alpha_{e,h} + \beta_{e,h}(L)\cdot \Delta F_{t-1} + \gamma_{e,h}\cdot \Delta fc_t\right] + (1 - I_{t-1})\left[\alpha_{r,h} + \beta_{r,h}(L)\cdot \Delta F_{t-1} + \gamma_{r,h}\cdot \Delta fc_t\right] + \varepsilon_{t+h} \quad (12)$$

where *I* is a dummy variable that indicates the state of the economy when the shock hits. We allow all the coefficients of the model to vary in our two episodes, the earlier (e) and the recent (r) episodes of financial globalization. Thus, we are allowing the forecast of ΔF_{t+h} to vary according to the episode (earlier or recent) globalization episode when the shock hits. In our notation, $\gamma_{e,h}$ ($\gamma_{r,h}$) captures alternatively the response of the regional cycle in period $t+h$ to the financial center shock at time t during the earlier (recent) episode of financial globalization.

Our results are shown in Figure 6. This figure reports the separate effects of our four indicators capturing monetary policy, leverage, and risk in the financial center as well as the commodity cycle. We first estimate the linear model. The results indicate that basically none of these indicators can explain the three regional capital flow cycles over all our sample starting with the collapse of the Bretton Woods System. The exceptions are the leverage cycle for the Regional Factor for Europe and monetary policy in the United States (using the Federal Funds real interest rate) for Latin America. These figures also show the local projections in the earlier episode (shown in blue) and the local projections in the recent episode (shown in red). Interestingly, when we allow for different responses in the earlier and recent episodes, we find that now leverage in the financial center affects all the three regional factors, with a twist. Cycles of leverage in the financial center affect the regional factors in the emerging periphery during the first episode of financial globalization (from the collapse of the Bretton Woods System to 1999) but the European periphery only during the later episode of financial globalization starting in 2000.

These preliminary results suggest the need to understand the route through which cycles of leverage in the financial center affect emerging countries in Asia and Latin America and advanced economies in Europe differently.

VI. Preliminary Conclusions and Future Research

We have examined whether capital flow cycles to the periphery share a common pattern possible capturing the monetary cycle in the financial center as suggested by Rey (2015). Our results indicate that cyclical monetary policy at the epicenter is not transmitted equally around the world, suggesting that the monetary cycle in the financial center is reinforced in different episodes by a variety of other shocks, such as the OPEC shocks in the 1970s and the creation of the Euro zone in 1999. The creation of the European Monetary Union starting in 1999 which brought financial deregulation across all countries in the Euro zone may have contributed to the explosion in capital flows to the region. In contrast, the transmission of the monetary cycle in the financial center to the emerging world was far more pronounced in the mid-1970s to mid-1980s. It is important to study possible reinforcing shocks in this episode triggered not just by cyclical monetary policy in the United States but exacerbated by the OPEC shocks in the early 1970s. It is in this episode that the high savings of OPEC countries were channeled through the Eurodollar market to emerging economies amplifying the bonanzas of the late 1970s beginning of the 1980s.

References

Acharya, Viral and Philipp Schnabl, 2010. "Do Global Banks Spread Global Imbalances? Asset-Backed Commercial Paper During the Financial Crisis of 2007–09," *IMF Economic Review*, 58 (1), 37–73.

Borio, Claudio and Piti Disyatat (2011), "Global Imbalances and the Financial Crisis: Link or no Link?", BIS Working Papers 346, May.

Bruno, Valentina and Hyun Song Shin, 2015, "Capital Flows, Cross Border Banking and Global Liquidity," *The Review of Economic Studies*, 82 (2), 535–564.

Bruno, Valentina and Hyun Song Shin, 2015, "Capital Flows and the Risk-Taking Channel of Monetary Policy", *Journal of Monetary Economics*, 71, 119-132.

Bussière, Matthieu, Julia Schmidt, and Natacha Valla, 2016, "International Financial Flows in the New Normal: Key Patterns (and Why We Should Care)," Policy Brief CEPII No. 10, March.

Calvo, Guillermo, Leonardo Leiderman, and Carmen Reinhart, 1993, "Capital Inflows and Real Exchange Rate Appreciation in Latin America: The Role of External Factors," *International Monetary Fund Staff Papers*, 40 (1), 108-151.

Calvo, Guillermo, Leonardo Leiderman, and Carmen Reinhart (1996) "Inflows of Capital to Developing Countries in the 1990s" *Journal of Economic Perspectives* 10, 123-39.

Cerutti, Eugenio, Stijn Claessens, and Andrew Rose, 2017, "How Important is the Global Financial Cycle: Evidence from Capital Flows," IMF WP 17/193.

Cerutti, Eugenio and Gee Hee Hong, 2018, **"**Portfolio Inflows Eclipsing Banking Inflows: Alternative Facts?" IMF WP/18/29.

Cerutti, Eugenio, Stijn Claessens, and Damien Puy, 2017, "Push Factors and Capital Flows to Emerging Markets: Why Knowing Your Lender Matters More Than Fundamentals," IMF WP/15/127.

Fernandez-Arias, Eduardo, 1996, "The New Wave of Private Capital Inflows: Push or Pull?" *Journal of Development Economics*, 48 (2), 389-418.

Forbes, Kristin and Francis Warnock, 2012, "Capital Flow Waves: Surges, Stops, Flight, and Retrenchment," *Journal of International Economics*, 88 (2), 235-251.

Fostel, Ana and Graciela Kaminsky, 2008, "Latin America´s Access to International Capital Markets: Good Behavior or Global Liquidity?" Central Banking, Analysis, and Economic Policies Book Series, in: Kevin Cowan & Sebastián Edwards & Rodrigo O. Valdés & Norman Loayza (Series Editor) & Klaus Schmid (ed.), *Current Account and External Financing*, edition 1, volume 12, chapter 4, 117-158, Central Bank of Chile.

Fratzscher, Marcel (2011), "Capital Flows, Push versus Pull Factors and the Global Financial Crisis", J*ournal of International Economics*, Elsevier, 88 (2), 341-356.

Gadanecz Blaise, 2004, "The Syndicated Loan Market: Structure, Development, and Implications," *BIS Quarterly Review*, December, 75-89.

Ghosh, Atish, Mahvash Qureshi, Jun Kim, and Juan Zalduendo, 2014, "Surges," *Journal of International Economics,* Elsevier, 92 (2), 266-285.

Jackson, Laura, Ayhan Kose, Christopher Otrok, and Michael Owyang, 2016, "Specification and Estimation of Bayesian Dynamic Factor Models: A Monte Carlo Analysis with an Application to Global House Price Comovement," in *Dynamic Factor Models*, 361-400. Emerald Group Publishing Limited, 2016.

Kaminsky, Graciela, 2008, "Crises and Sudden Stops: Evidence from International Bond and Syndicated-Loan Markets," *Monetary and Economic Studies,* Vol. 26, December, 107-129.

Kaminsky, Graciela, 2019, "The Center and the Periphery: Two Hundred Years of International Borrowing Cycles, NBER Working Paper No. 23975, November 2018.

Kose, Ayhan, Christopher Otrok, and Eswar Prasad. 2012, "Global Business Cycles: Convergence or Decoupling?" *International Economic Review* 53, no. 2, 511-538.

Kose, Ayhan, Christopher Otrok, and Charles Whiteman, 2003, “International Business Cycles: World, Region, and Country-Specific Factors." *American Economic Review* 93, no. 4, 1216-1239.

Kose, Ayhan, Christopher Otrok, and Charles Whiteman. "Understanding the Evolution of World Business Cycles.” 2008, *Journal of international Economics* 75, no. 1, 110-130.

Miranda-Agrippino, Silvia and Hélène Rey, 2015, “World Asset Markets and the Global Cycle,” in: www.helenerey.eu.

Milesi-Ferretti, G., Tille, C., 2010. The Great Retrenchment: International Capital Flows during the Global Financial Crisis.” *Economic Policy*, 66, 285–330.

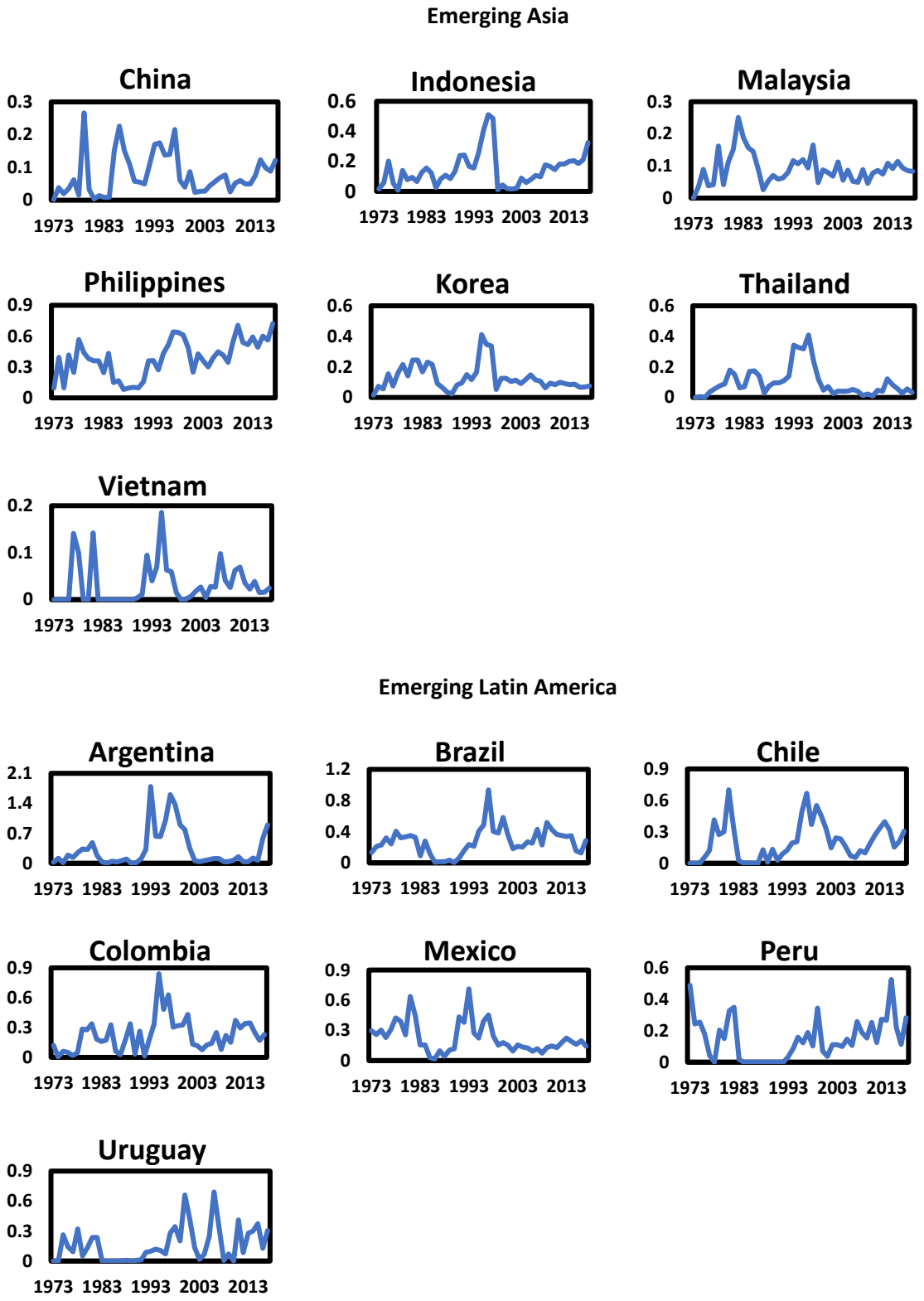
Otrok, Christopher, and Charles Whiteman, 1998, "Bayesian Leading Indicators: Measuring and Predicting Economic Conditions in Iowa." *International Economic Review,* 997-1014.

Ramey, Valerie and Sarah Zubairy, 2018, “Government Spending Multipliers in Good Times and in Bad: Evidence from US Historical Data,” *Journal of Political Economy*, 126, no. 2, 850 - 901

Rey, Hélène, 2015, “Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence, NBER Working Paper No. 21162.

Shin, Hyun Song, 2011, “Global Banking Glut and Loan Risk Premium,” Paper presented at the 12th Jacques Polak Annual Research Conference Hosted by the International Monetary Fund Washington, DC–November 10–11.

Figure 1: Issuance/Exports Trend for Each Country



Advanced Europe

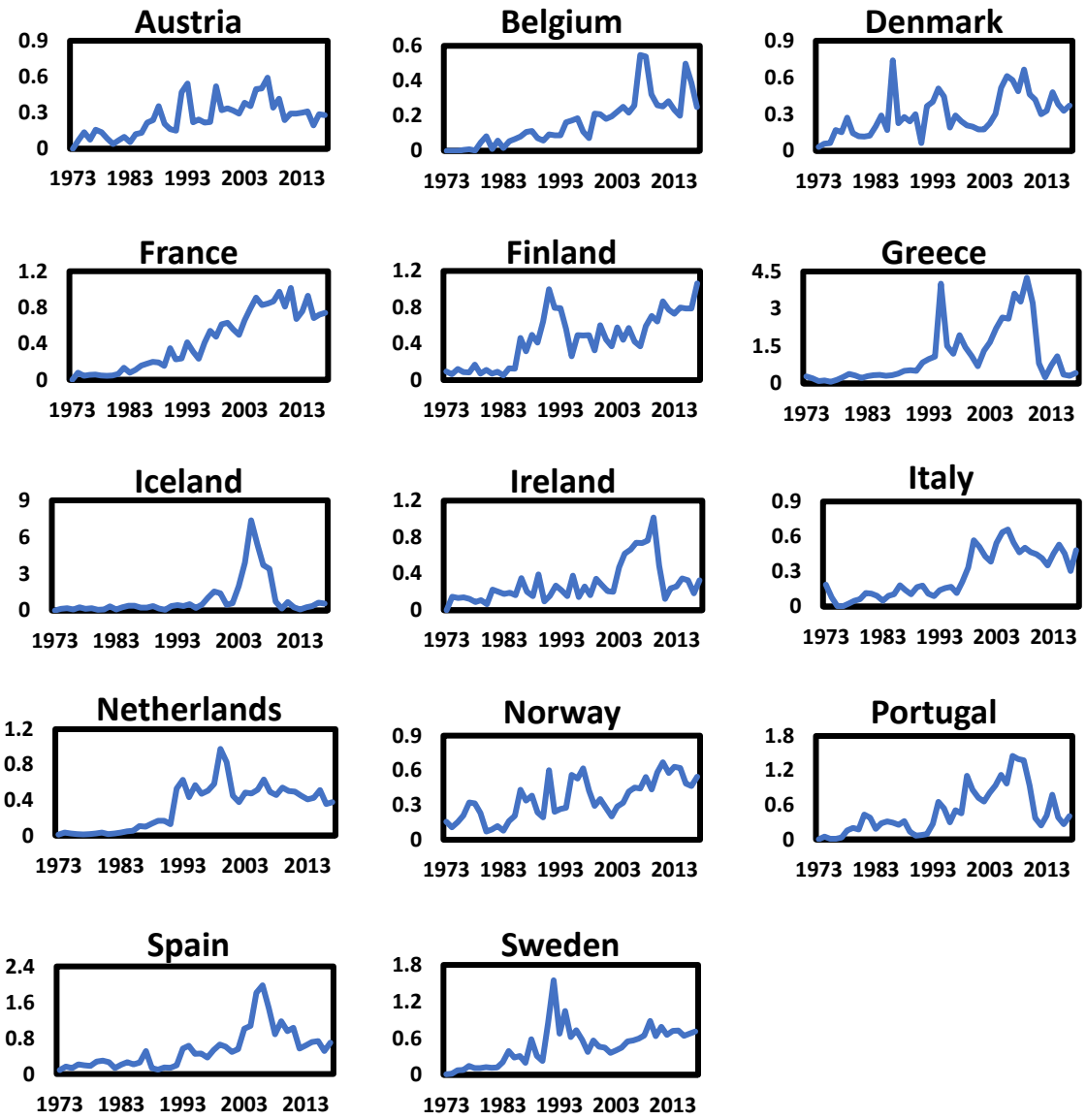


Figure 2: Global and Regional Factors of Issuances

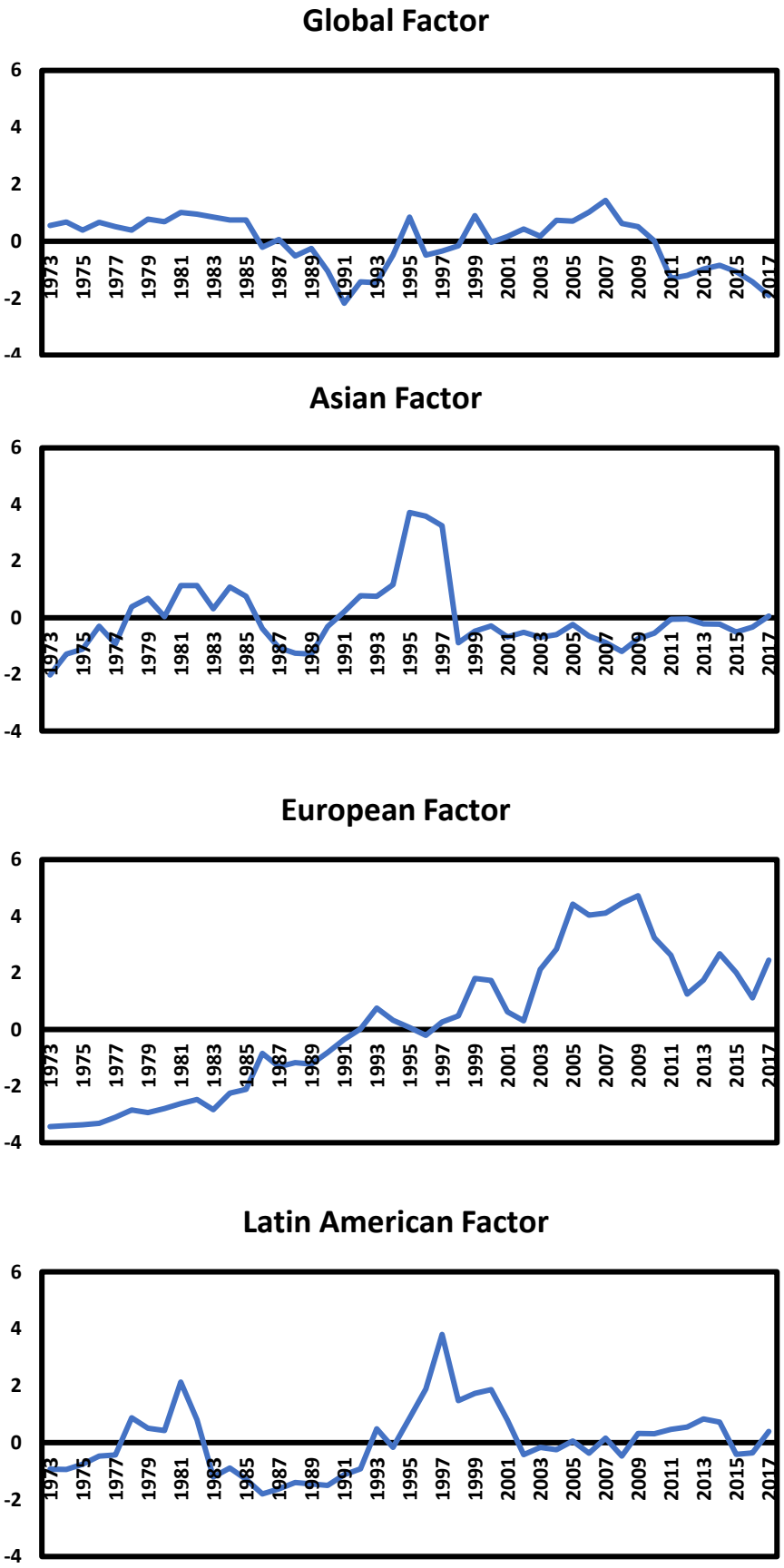
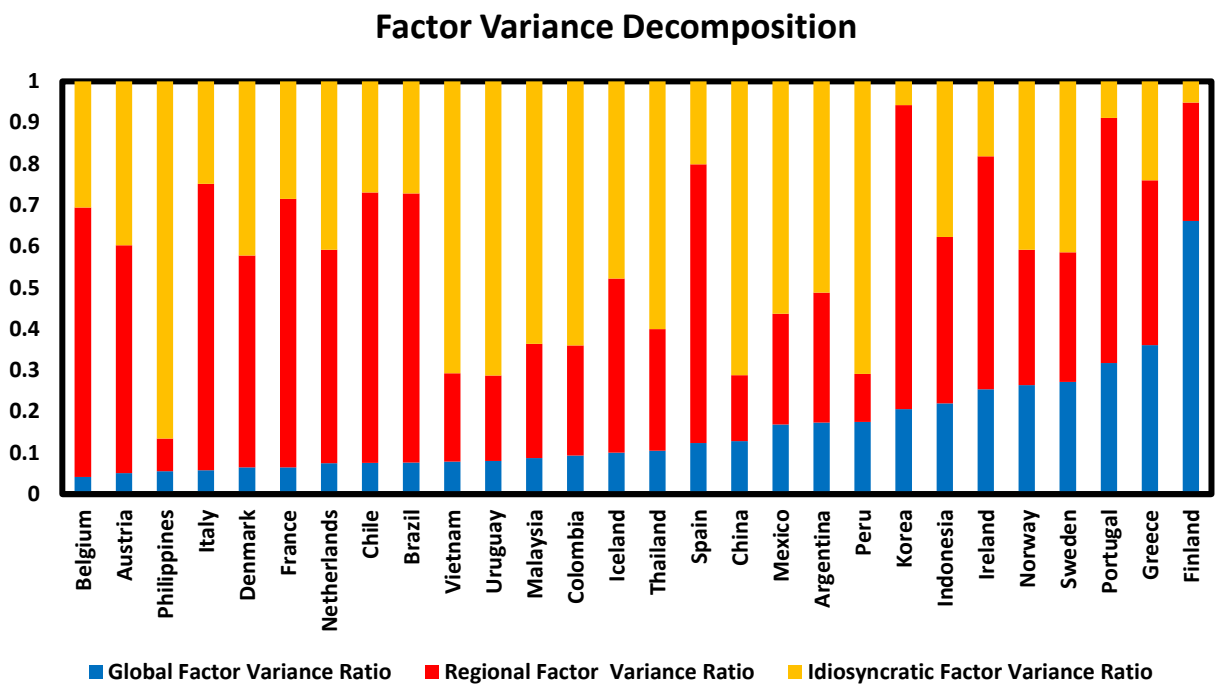


Figure 3: Decomposition of Boom-Bust Cycles into Global, Regional, and Idiosyncratic Factors



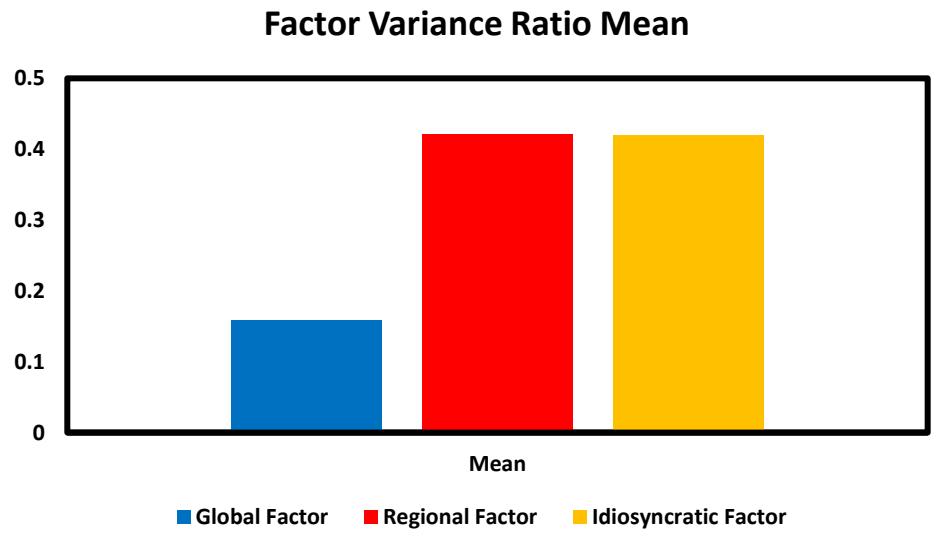
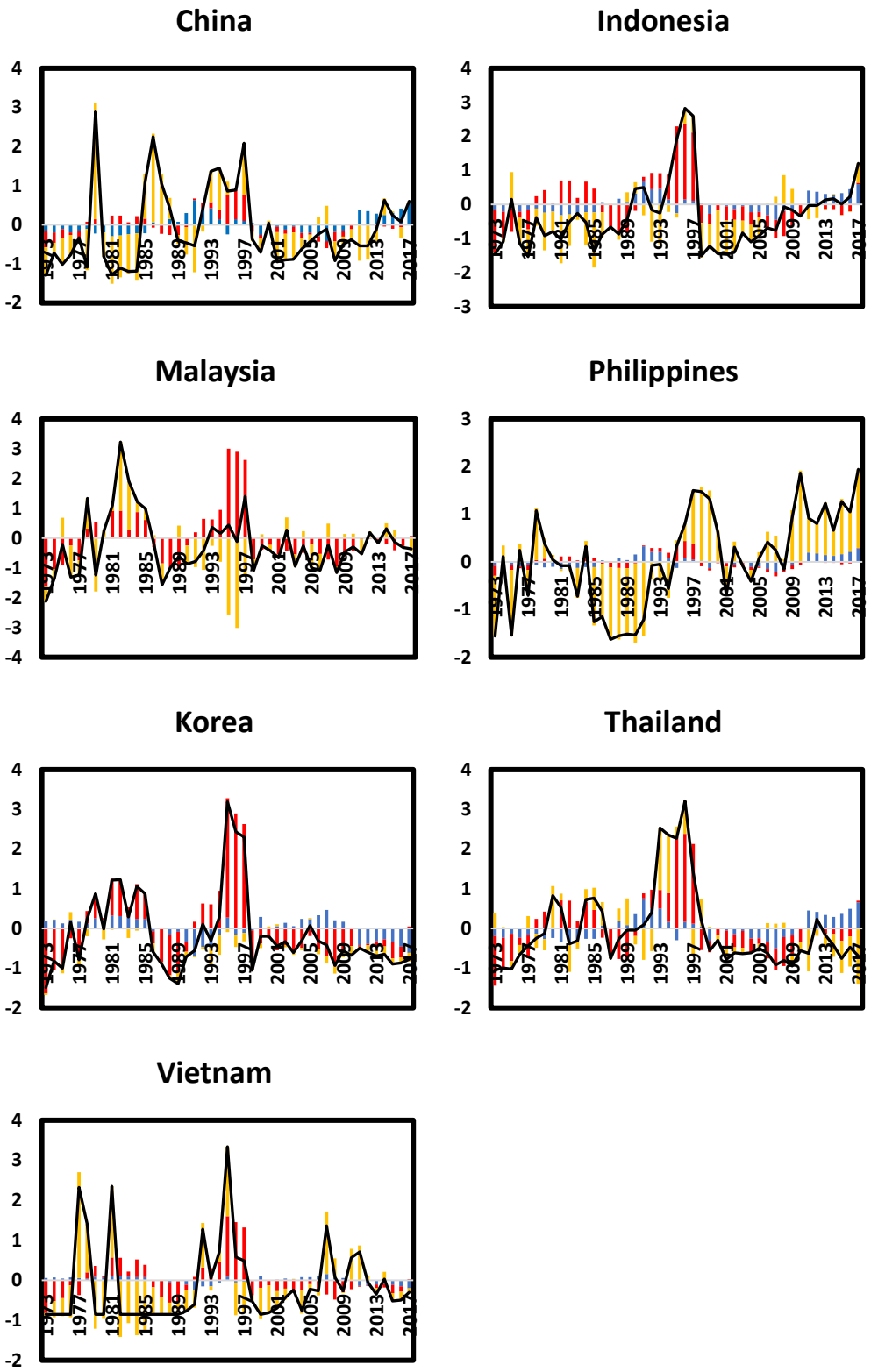


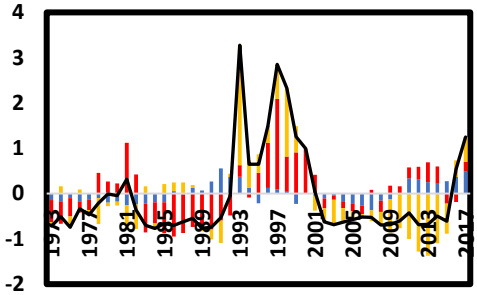
Figure 4: Issuance/Exports Trend for each country with the decomposition over time

Emerging Asia

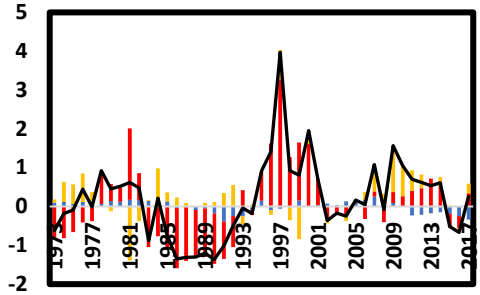


Emerging Latin America

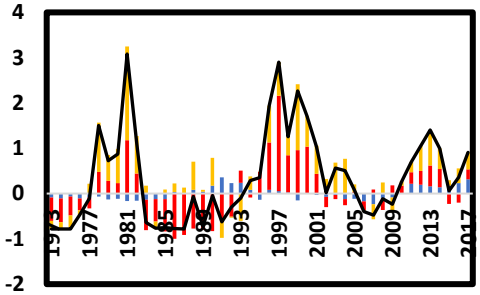
Argentina



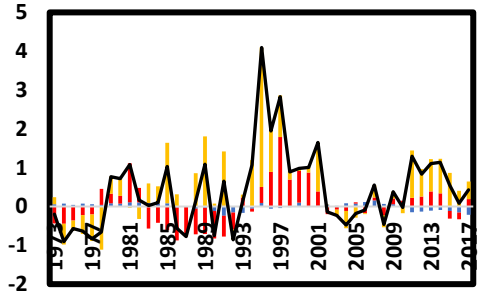
Brazil



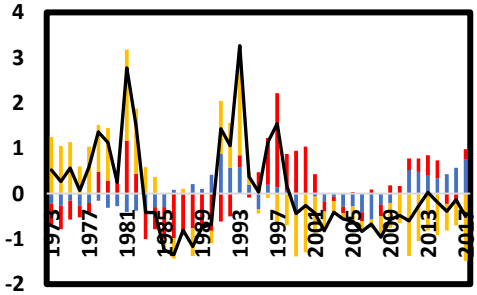
Chile



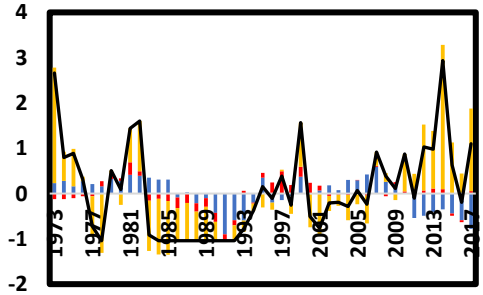
Colombia



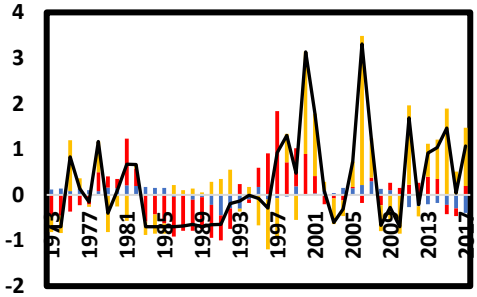
Mexico



Peru

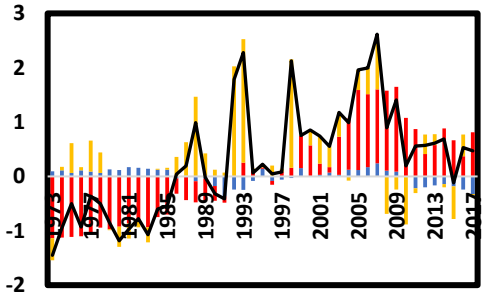


Uruguay

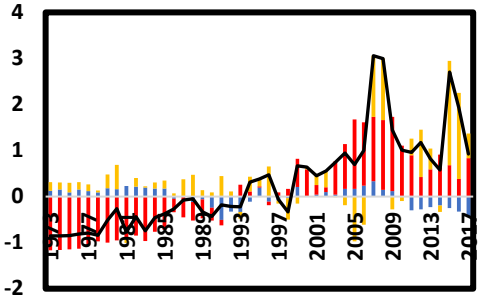


Advanced Europe

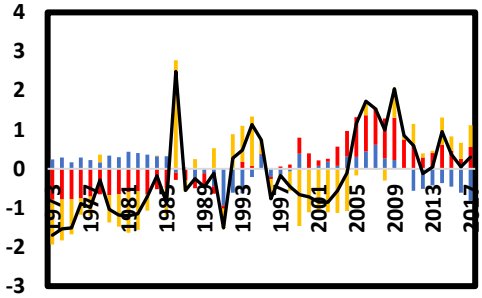
Austria



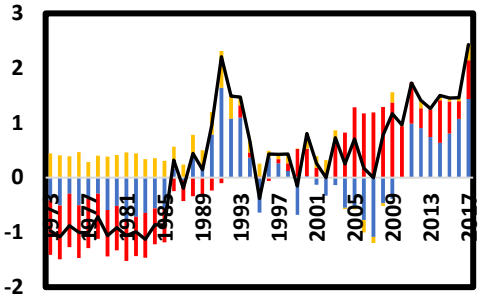
Belgium



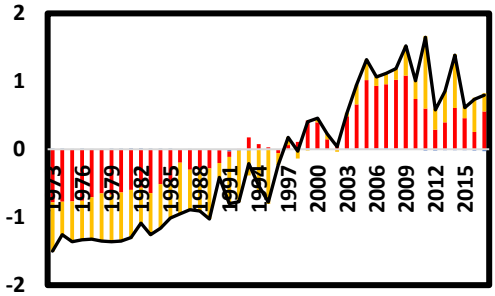
Denmark



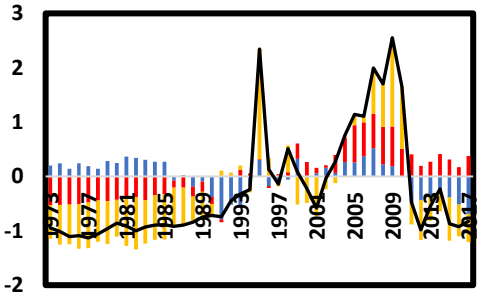
Finland



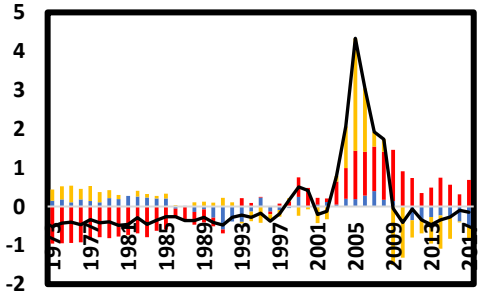
France



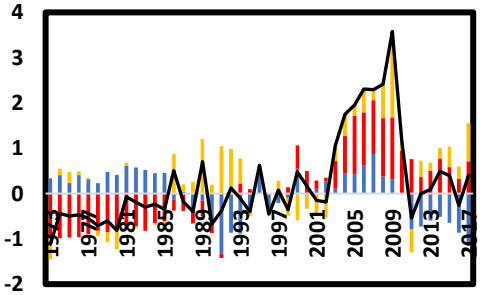
Greece



Iceland



Ireland



Advanced Europe

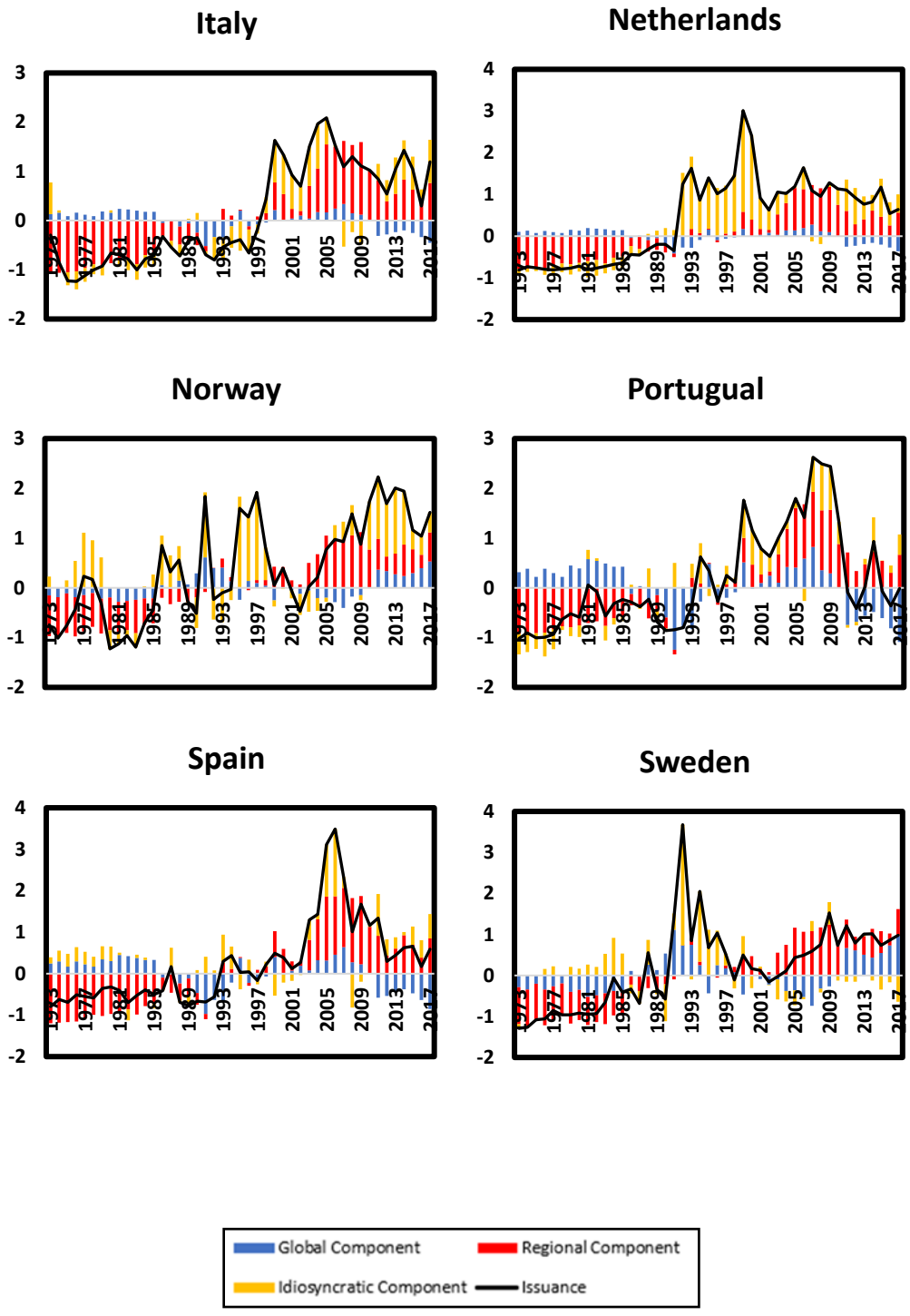


Figure 5: The Global Indicators: US interest rates, US Leverage, US Risk, and Commodity Prices

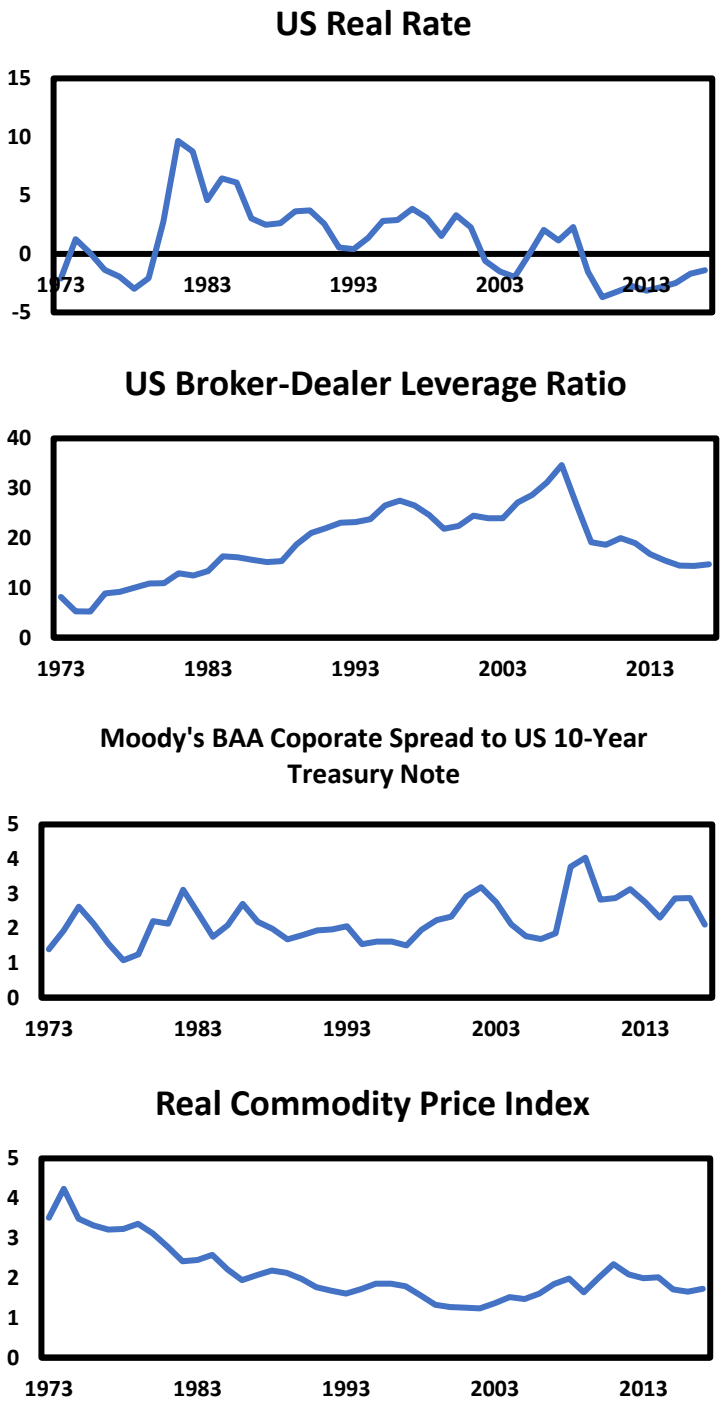
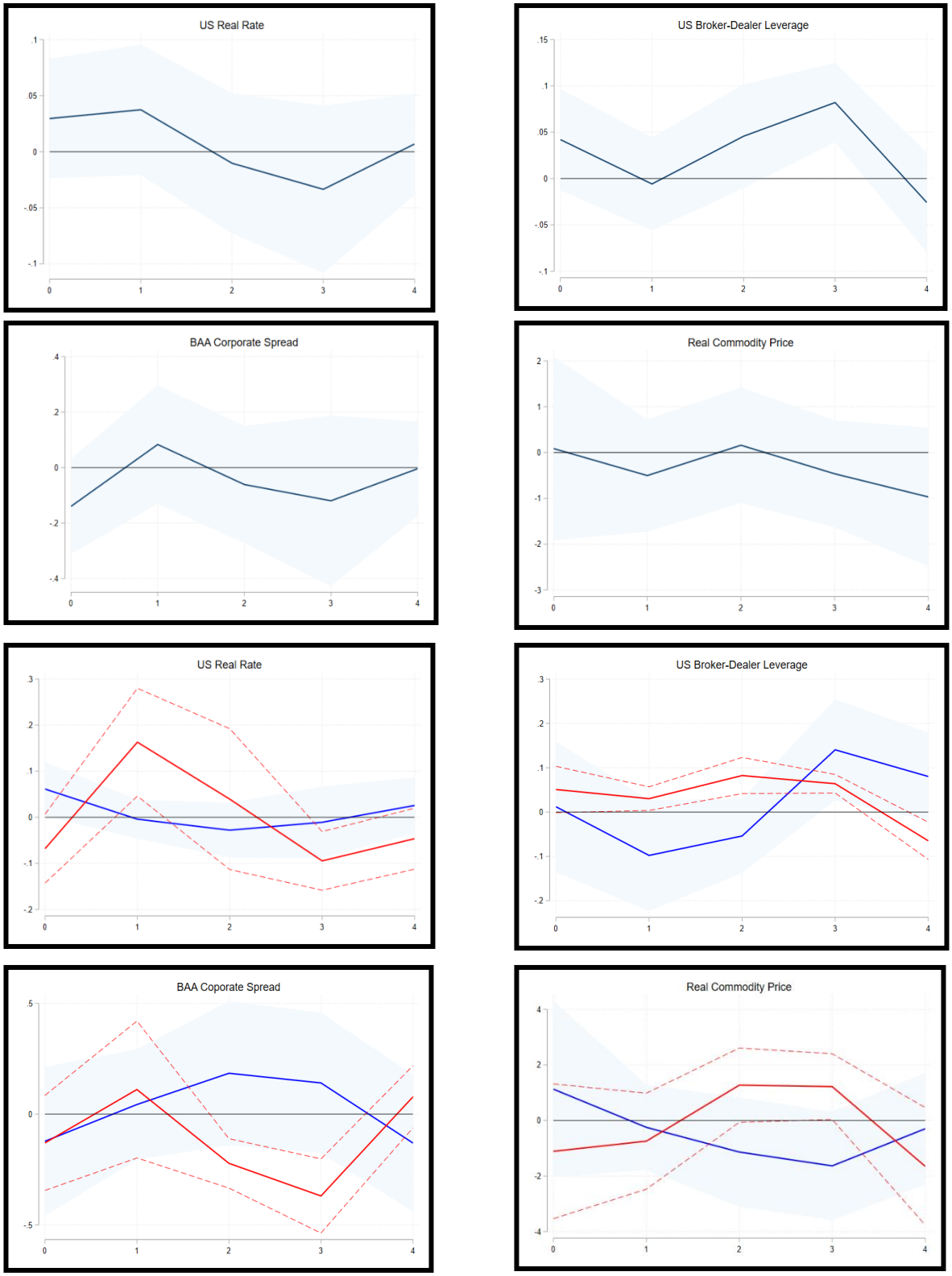
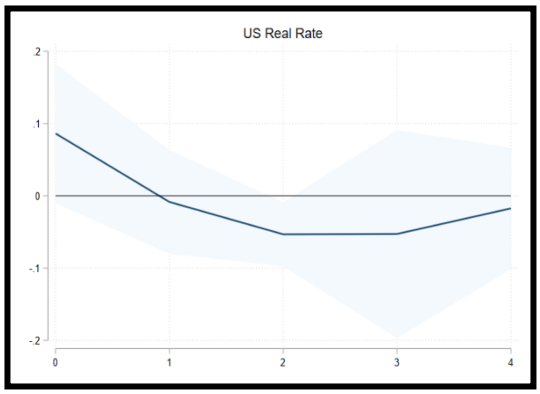


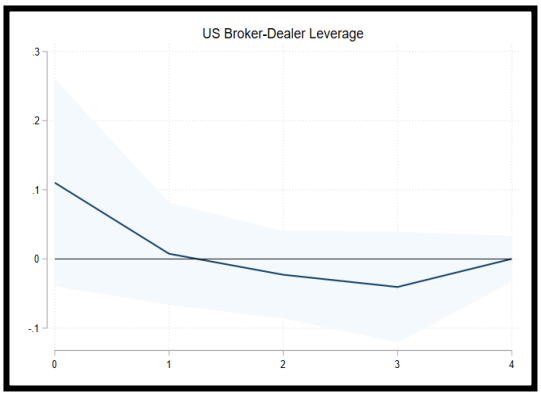
Figure 6: Impulse Responses of Local Projections

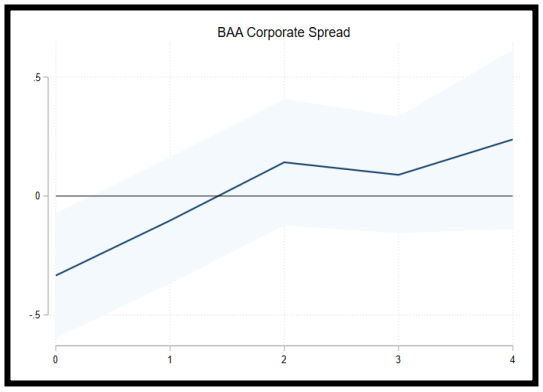
Global Factor

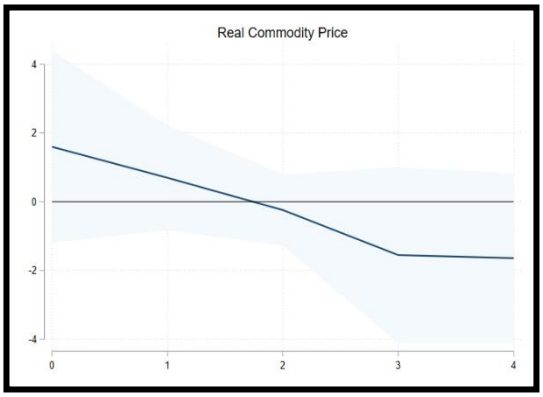


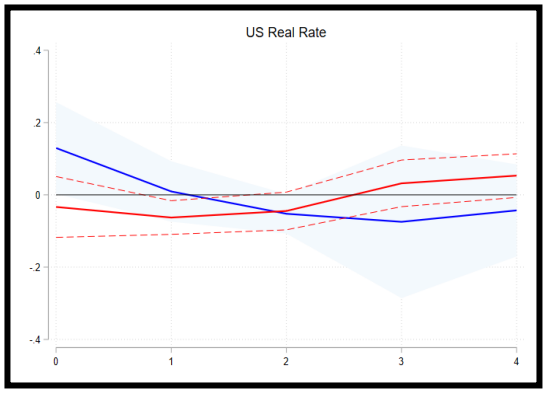
Asian Factor

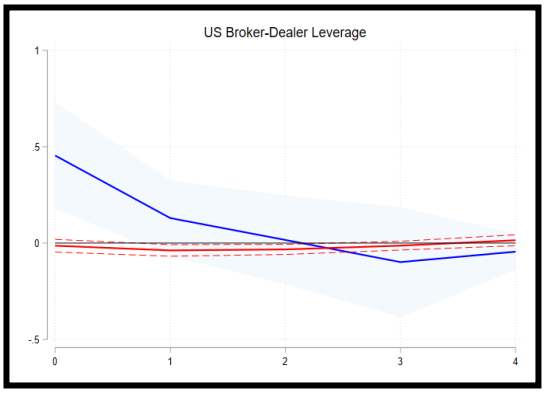


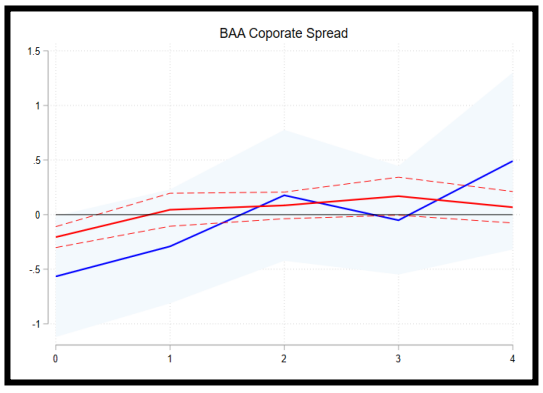


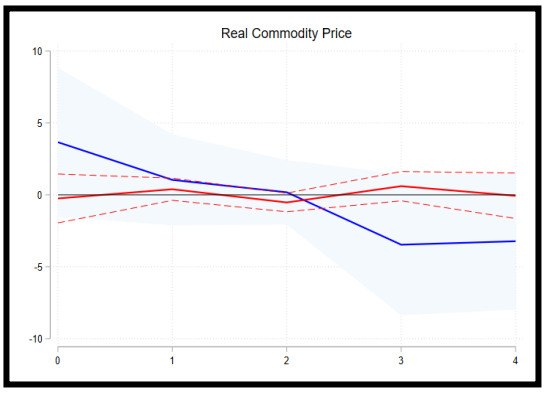




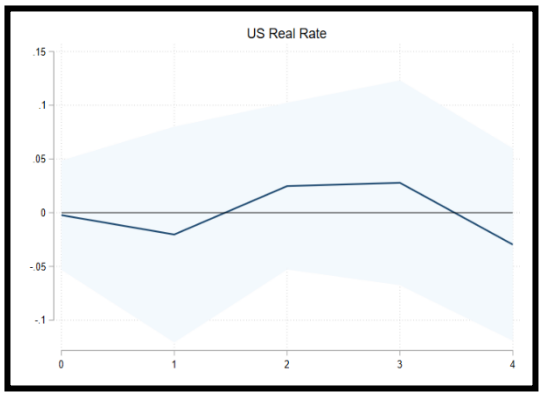


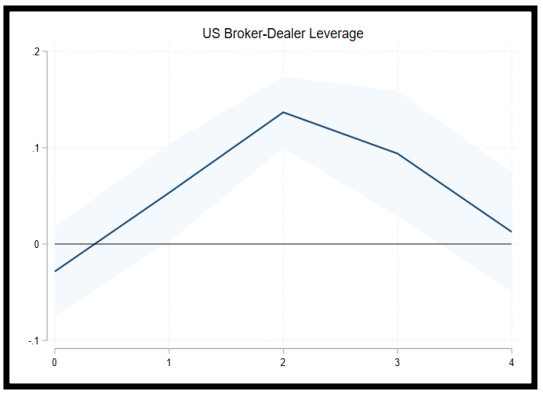


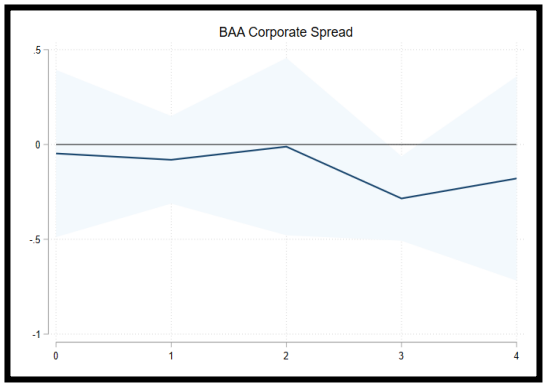


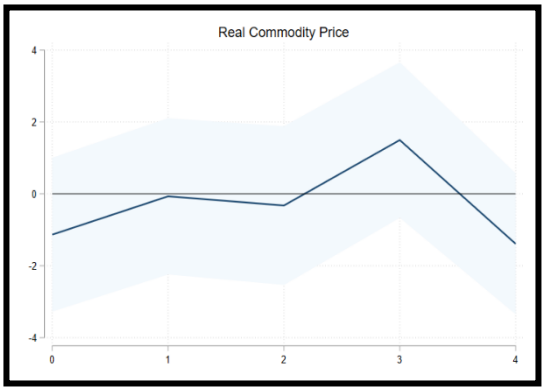


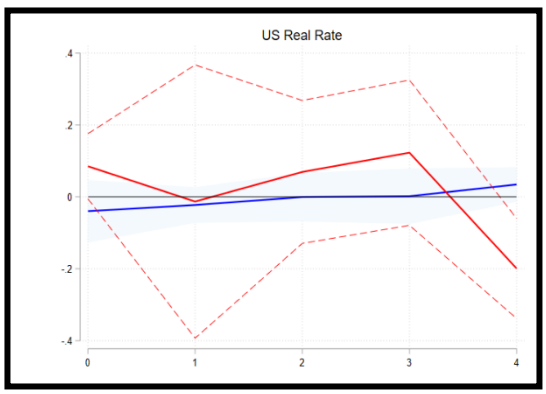
European Factor

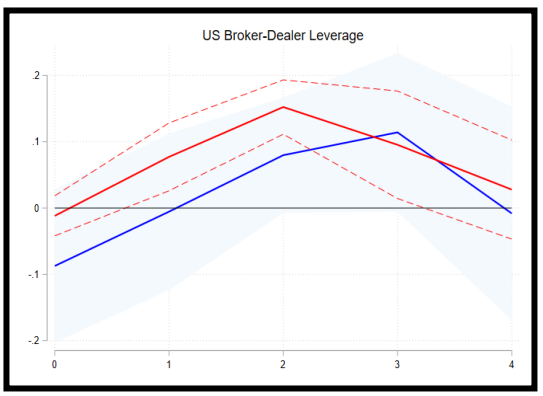


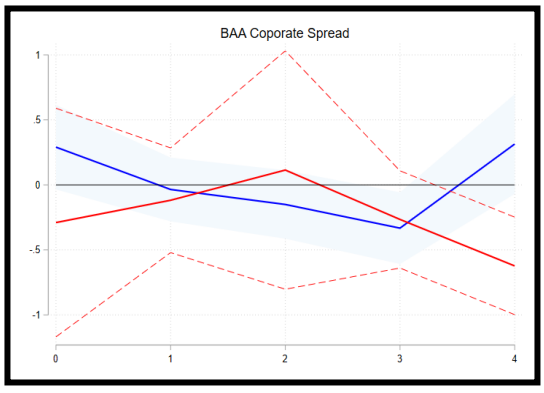


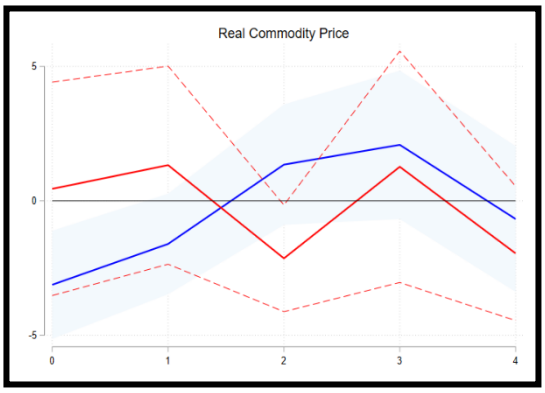
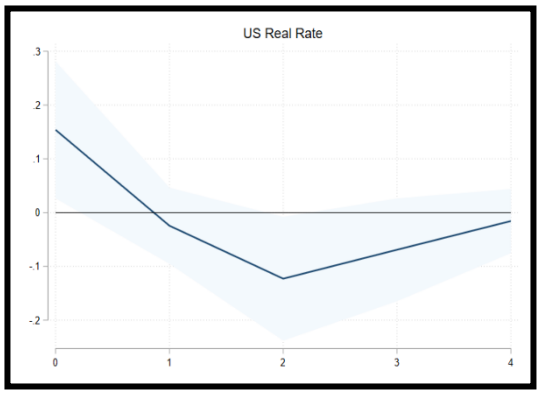
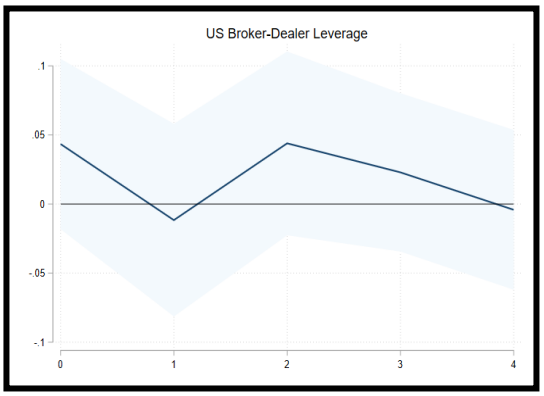
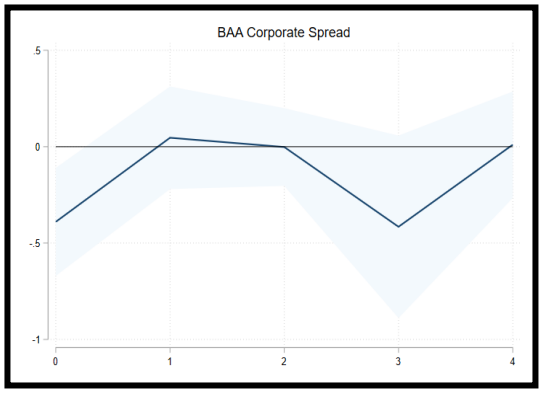
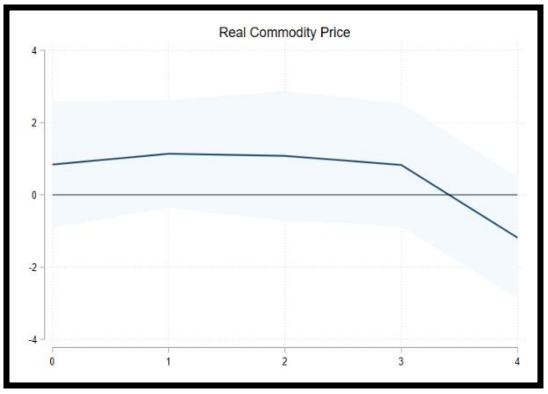
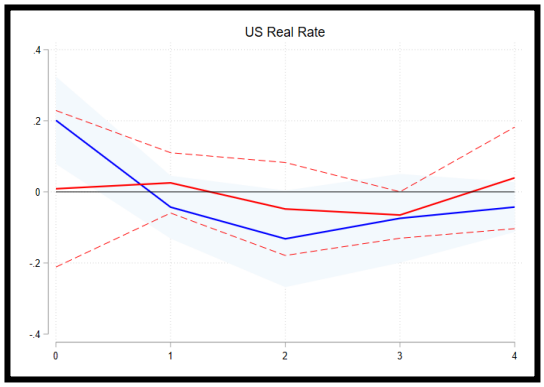
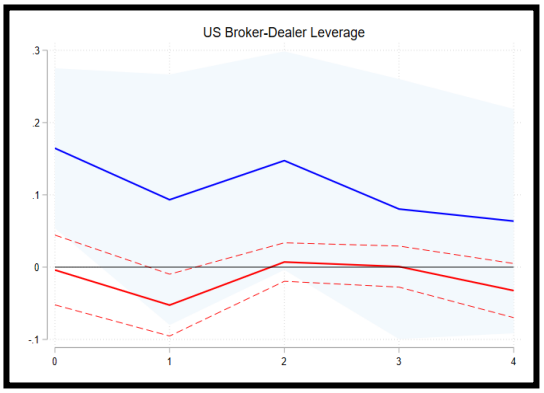
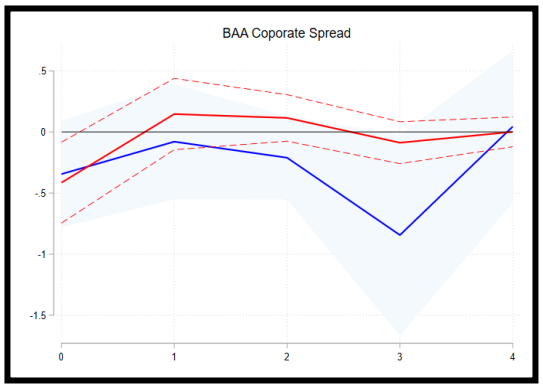
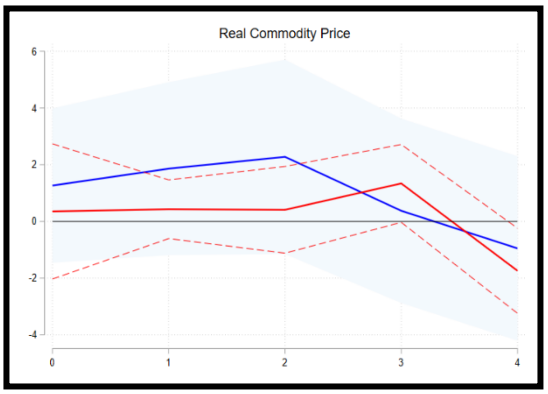












Latin American Factor