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Capital Flows to Emerging Market and Developing Economies

Global Liquidity and Uncertainty versus Country-Specific Pull Factors

Ansgar Belke
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Abstract

This paper investigates the empirical significance of push- and pull factors of different types of capital flows – FDI, portfolio and “others” (including loans) – to emerging market and developing economies. Based on an extensive quarterly mixed time-series panel dataset for 32 emerging market and developing economies from 2009 to 2017, we rigorously test down broadly specified empirical models for the three types of capital inflows to parsimonious final models in a Hendry-type fashion. Regarding push factors, our study focuses on the relative importance of global liquidity and economic policy uncertainty vis-à-vis country-specific pull factors when assessing the drivers of capital flows to a broad set of emerging market and developing economies. Global liquidity, economic policy uncertainty and other risk factors, such as the US yield spread, turn out to be the most significant drivers of portfolio flows, but are also relevant to the other two categories of flows. Our capital flow-type specific estimation results underscore the need for policymakers to analyse the composition of observed capital inflows to assess vulnerabilities related to external financing and safeguard financial stability.

JEL Classifications: E32; E44; E58; E65

Keywords: Capital flows, push- and pull factors of capital flows, central banking, economic policy uncertainty, emerging market and developing economies, global liquidity, international spillovers

Contents

Tables

Abbreviations

ADF	augmented Dickey-Fuller
AIC	Akaike information criterion
BIS	Bank for International Settlements
EGLS	estimated generalised least squares
EPU	economic policy uncertainty
FD	financial development
FDI	foreign direct investment
GDP	gross domestic product
IMF	International Monetary Fund
OECD	Organisation for Economic Co-operation and Development
PP	Phillips-Perron
SIC	Schwarz information criterion
US	United States
WEO	World Economic Outlook

Variables

ASSET	change in foreign assets
CAPACCOPEN	capital account openness
CENTRALBANKRATE	differential of domestic central bank interest rate vis-à-vis the United States Federal Reserve interest rate
COMMODITYPRICE	development of commodity prices
DIRIN	foreign direct investment
DGDP	real GDP growth vis-à-vis the United States
EPU	global economic policy uncertainty
EXR	exchange rate regime
FD	financial development
GDP	nominal gross domestic product
GLIBIS	Bank for International Settlements' global liquidity indicator
GLIOECD	OECD broad money
INCOMECAPI	income per capita
INSTQUAL	institutional quality
LIAB	domestic resident liabilities
OTHERINV	other investment flows
PORTIN	portfolio flows
RESERVES	foreign exchange reserves as share of gross domestic product
SHADOWFEDERALFUNDSRATE	shadow federal funds rate
TRADEOPEN	trade openness as share of gross domestic product
USCORPSPREAD	US corporate spread
USYIELDGAP	US yield gap
VIX	global risk aversion

Summary

This study empirically analyses the push- and pull factors of capital flows to emerging market and developing economies. We built a comprehensive database of different types of capital flows, including foreign direct investment (FDI), portfolio equity and debt, as well as “other investment”, comprising loans, amongst others. We also take account of institutional and other determinants of capital flows to emerging market and developing economies, such as exchange rate flexibility, capital account management, relative output growth, and various financial variables. As an innovation to this strand of literature, we analyse the role of economic policy uncertainty and global liquidity in driving capital flows within a mixed time-series panel approach. In doing so, the paper contributes to the assessment of financial stability in emerging market and developing economies after the global financial crisis of 2007/2008.

Our panel estimation results confirm that a combination of pull- and push factors are significant drivers of capital flows. Global liquidity, economic policy uncertainty and other global risk factors, such as the US yield spread, turn out to be the most significant drivers of portfolio flows, but are also relevant to the other two categories of flows. The results also show that growth differentials vis-à-vis the US and foreign reserves are important pull factors for capital inflows to emerging market and developing economies.

However, there is considerable variation in the results across the different variants of capital flows to developing and emerging market economies. For FDI inflows, macroeconomic stability (captured by high foreign exchange reserves), relatively stable exchange rates, capital account openness, and high income per capita appear as the most important variables, while higher global economic policy uncertainty clearly has an adverse effect. Variables capturing short-term financial conditions in both source and host countries turn out to be less relevant, which is in line with expectations given that FDI is generally longer-term in nature.

With respect to pull factors, portfolio flows to developing and emerging market economies are affected by the growth differential vis-à-vis the US, trade openness, reserves, and exchange rate stability. The trade openness coefficient is significant and negative mainly because the trade-to-GDP ratio tends to be lower for larger economies. Moreover, the exchange rate coefficient is negative, suggesting that foreign portfolio investors are more inclined to invest when the exchange rate is more stable. Regarding push factors, the estimates for global liquidity are positive and highly significant throughout, indicating the importance of the ease of financing in global financial markets. Moreover, the coefficient estimates of the global economic policy uncertainty variable are negative and highly significant for portfolio flows. The US yield gap turns out to be negative in the case of portfolio flows (but positive for “other” investment, i.e. cross-border credit and loans). In the case of portfolio flows, we thus interpret the US yield gap as an indicator of global risk that negatively impacts capital inflows to emerging market and developing economies.

Other capital flows, including cross-border lending, respond strongly to the growth differential vis-à-vis the US and “monetary” factors, such as foreign exchange reserves, and the US yield gap. Here, in the context of cross-border loans, the US yield gap enters with a positive sign and thus seems to serve as a global liquidity measure rather than a global risk measure.

When controlling for differences amongst country groups, the results we get when including only upper-middle-income and high-income economies, and the results from including only lower-middle income economies, are broadly in line with the results obtained with the full sample, confirming the overall robustness of the analysis.

Our capital flow-type specific estimation results highlight the importance for policymakers in emerging market and developing economies of carefully analysing the composition of observed capital inflows and the factors that drive them. For any meaningful assessment of financial vulnerabilities related to external financing, it is crucial to understand the degree to which the drivers of capital flows are affected by domestic economic policies or international factors beyond the control of national economic policymaking. Examples of factors that are beyond the control of domestic economic policies include, according to our empirical results, the ease of financing in global financial markets (with credit being among the key indicators in major industrialised economies) as well as global policy uncertainty.

As cyclical and structural forces have typically been analysed separately rather than in an integrated empirical framework in the previous literature, there is a risk that the importance of structural forces for capital flows to emerging market and developing economies may be understated in periods like the present one, when interest rates are ultra-low worldwide, global liquidity ("credit ease") has gone down, and policy uncertainty is high. For this reason, an integrated empirical approach that simultaneously embraces structural push factors and external pull factors, such as policy uncertainty and global liquidity, as developed in this study, adds important insights for policy analysis.

1 Introduction

This paper empirically analyses the push- and pull factors of capital flows to emerging market and developing economies. We built a comprehensive database of different types of capital flows, including foreign direct investment (FDI), portfolio equity and debt, as well as other investment. We account for institutional and other determinants of capital flows to emerging market and developing economies, such as exchange rate flexibility, capital account management, relative output growth, and various financial variables. As an innovation to this strand of literature, we analyse the role of economic policy uncertainty and global liquidity (using the Bank for International Settlements (BIS) definition, which is more focused on the global ease of credit than on the sum of the expansion of broad monetary aggregates in leading industrialised economies), in driving capital flows within a mixed time-series panel approach. In doing so, the paper contributes to the assessment of financial stability in emerging market and developing economies after the global financial crisis of 2007/2008.

The paper is structured as follows. Section 2 provides a review of the literature on push- and pull factors of capital flows to emerging market and developing economies. Section 3 outlines our econometric approach and the data that we use. Section 4 explains our estimation procedure and presents our empirical findings and robustness checks. Section 5 concludes.

2 Capital flows to emerging market and developing economies – push- and pull factors, global liquidity and policy uncertainty

Capital flows to emerging market and developing countries: push- and pull factors

The distinction between country-specific "pull" factors and external "push" factors of capital inflows was introduced by the seminal papers of Calvo, Leiderman and Reinhart (1993) and Fernández-Arias (1996). The latter provided what has been the basic analytical framework for the empirical analysis of the drivers of capital inflows to emerging market and developing countries since the mid-1990s. The pre-2007/2008 crisis era was characterised by an – in some cases sharp – increase in capital flows to emerging market and developing economies due to increasing financial integration and strong growth prospects in these economies (Hannan, 2017). The sharp decline in foreign capital flows to emerging market and developing economies during the global financial crisis has been predominantly interpreted in the literature as the effect of a powerful "push shock" in global risk aversion that gave an incentive to global investors to unwind their positions in emerging market and developing economies (Fratzscher, 2012; Lo Duca, 2012; Milesi-Ferretti & Tille, 2011).

Since the crisis, markets have thematised another external factor, namely the impact of *ultra-expansionary monetary policies* in industrialised economies via global liquidity spillovers on emerging market and developing economies' capital flows – the very topic that was at the core of Calvo, Leiderman and Reinhart (1993) and has also been analysed by Fratzscher, Lo Duca and Straub (2013). Since 2009, capital flows to emerging market and developing economies have been characterised by high volatility (Ahmed & Zlate, 2014; IMF, 2016b; see also Appendices 2-7). While FDI still dominates total flows, portfolio and other investment flows have also increased over time, giving policy makers new challenges of how to deal with the higher volatility associated with such flows (Pagliari & Hannan, 2017). Against this backdrop, we analyse all three categories of flows in this paper. However, given that the volatility of capital flows to emerging market and developing economies is generally perceived to reflect the fact that emerging market and developing economies represent a riskier asset class (Bluedorn et al., 2013), we pay particular attention to global factors affecting these flows.

Koepke (2015) summarises the main pattern of the growing empirical literature regarding the drivers of capital flows to emerging market and developing economies. The drivers of capital flows seem to vary over time and across different categories of capital flows. He classifies the drivers referring to the traditional "push vs. pull" framework and makes a distinction between cyclical and structural factors. According to his analysis, push factors are found to matter most for portfolio flows, as corroborated by our study. Pull factors, as in our case, matter for all three components. Finally, his historical review suggests that the recent literature may have overemphasised the importance of cyclical (push) factors at the expense of longer-term structural (pull) factors. However, this is a statement we would like to check explicitly with our broad dataset. As a prior, it cannot be excluded that cyclical impacts of global push factors will have a permanent effect (hysteresis) on capital flows.

Bruno and Shin (2013) investigate global factors such as global liquidity associated with cross-border capital flows. For this purpose, they specify a model of gross capital flows through the international banking system and highlight the leverage cycle of global banks as being a significant driver of the transmission of financial conditions across borders. They then test their model for a panel of 46 countries, comprising also a couple of emerging market and developing economies, and find that global factors dominate local factors as determinants of banking sector capital flows.

In this context, Foerster, Jorra and Tillmann (2014) examine the degree of co-movement of gross capital inflows as a sensitive issue for policy makers. In that respect, they have a different focus than our paper. They estimate a dynamic hierarchical factor model that decomposes capital inflows in a sample of 47 economies into a global factor common to all types of flows and all destination countries, a factor specific to a given type of capital inflows, a regional factor, and a country-specific component. According to their study, the latter (i.e., the pull factors) explains by far the largest fraction of fluctuations in capital inflows, followed by regional factors, which are especially important for emerging markets' FDI, and portfolio inflows, as well as bank lending to Emerging Europe. But their global factor explains only a small share of the overall variation, a result which slightly differs from ours. Their study shows, as does ours, that the global factor mirrors United States (US) "financial" conditions.

Capital inflows to Latin America in the 1990s are said to be influenced by factors originating outside the region, contributing to a higher macroeconomic vulnerability of the region's economies (Calvo et al., 1993; Calvo & Reinhart, 1996; more generally, see Ahmed, Coulibaly, & Zlate, 2015). Lim (2014), who investigates the effect of quantitative easing (QE) on financial flows to emerging market and developing economies, finds evidence for potential transmission of QE to capital flows along observable liquidity, portfolio balancing, and confidence channels.

Transmission channels of global liquidity spillovers to emerging market and developing economies

In general, an accommodative monetary policy stance by major central banks mainly includes large-scale asset purchases, long-term refinancing operations, low or negative nominal interest rates, and communication efforts in the shape of forward guidance. Such non-standard monetary policies may affect financial asset prices as well as demand-supply conditions in goods and services markets within emerging market and developing economies through *three* interrelated *transmission channels*.[1]

The first transmission channel is the *portfolio-balance channel* through which especially large-scale asset purchases may affect financial asset prices, meaning that central banks perturb the portfolios of financial investors by purchasing financial assets from the private sector. Presuming imperfect substitutability of financial assets, a *local-supply effect* may occur when a central bank purchases specific financial asset classes, thereby restricting the specific relative supply; further, large-scale asset purchases may have a *duration effect* concerning the effect on the term structure of portfolios as a whole (D'Amico & King, 2013).

For example, when central banks purchase large amounts of government debt with long-term maturities, the adjusted financial investor portfolios may become less exposed to interest rate risks. As a consequence, financial investors may, first, alter the composition of their portfolio to match (e.g., their preferred maturity structure) and, second, financial investors may re-assess the expected risk-adjusted returns on investment of the entire portfolio. In this respect, a relatively low-risk-profit profile of portfolios prompted by central banks' large-scale asset purchases within major-currency economies gives rise to a change in the interest rate differential vis-à-vis developing and emerging market economies. As a result, financial investors may be directed towards the latter economies, meaning that global liquidity spillovers can be attributed to the portfolio-balance channel.

A second transmission channel is the *signalling channel*. Here, central banks seek to manage expectations of economic agents, in particular, of financial investors, concerning economic key variables and the future course of monetary policy via communication. Respective statements may help steer financial investors in a way that changes liquidity premiums within the financial sector. As a consequence, portfolio-rebalancing may take place involving the economic adjustments discussed in the preceding paragraphs.

Third, central banks may directly affect liquidity within the financial sector via the *liquidity channel* that primarily operates in times of financial distress. In such occasions, financial investors may require relatively high returns on holding financial assets as compensation for the risk that one may have difficulties in engaging in bilateral contracts, which eventually allow such economic agents to dispose of the real goods and services to which one attributes value. In addition, liquidity risks may arise in the form of coordination costs pertaining to the search and matching processes involved in scheduling and carrying out bilateral contracts. In this respect, central banks may attempt to bring down liquidity risk premiums by providing, for instance, long-term refinancing operations as well as low or negative nominal interest rates, such that the overall volume in trading increases. Changes in the liquidity premium may in turn prompt the afore-mentioned duration- and local-supply-effects resulting in readjustments of financial investor portfolios.

Regarding empirical evidence, Bauer and Neely (2014), for example, estimate dynamic term structure models to reveal to what extent the signalling and the portfolio balance channel contribute to global liquidity spillovers in terms of affecting bond yields in emerging market and developing economies (see also Belke, Dubova, & Volz, 2017).

1 See, for example, Neely (2015) and Belke, Gros and Osowski (2017) for an extensive presentation and explanation of these channels.

Bowman, Londono and Sapriza (2015) evaluate the effects on other financial asset prices in a similar way and stress the importance of country-specific idiosyncrasies within small open emerging market and developing economies. Interestingly, McCauley, McGuire and Sushko (2015) provide empirical evidence that non-standard monetary policies within the US have shifted the international transmission of US monetary policy from internationally active commercial banks extending credit denominated in US-dollar to purchases of higher yielding financial assets denominated in US-dollar by non-US issuers. Finally, Burger, Warnock and Cacdac Warnock (2017) show that emerging market and developing countries issued more sovereign and private-sector local currency bonds and more private-sector foreign currency bonds when US long-term interest rates were low.

Furthermore, cross-border financial flows to emerging market and developing economies stemming from financial investor portfolio rebalancing and tracing back to a lax monetary policy stance within major-currency economies may also bear on exchange rate and trade relations (Lavigne, Sarker, & Vasishtha, 2014). Accordingly, global liquidity spillovers may prompt nominal revaluations within recipient economies. However, the possibly increasing external demand within major-currency economies for production manufactured within emerging market and developing economies may offset the incipient revaluation. Obviously, assessing the *magnitude of the overall effect of global liquidity spillovers* on economic dynamics within developing and emerging market economies is an *empirical matter*. The sign and the size of the effects of global liquidity spillovers tracing back to non-standard monetary policies within major-currency economies involves taking account of the propagation of such financial shocks within small open emerging market and developing economies.[2]

On the sign of uncertainty impacts on macroeconomic variables

As far as the effect of uncertainty on the real and the financial sector is concerned, the transmission channels of uncertainty and the magnitude and sign of the uncertainty impacts are of interest (Belke & Goecke, 2005; Bloom, 2013). In this study, we also deal with investment-type decisions under (policy) uncertainty, namely capital flows to emerging market and developing economies. We have models in mind that were originally proposed by Dixit (1989) and Pindyck (1991) and serve as the basis to develop an option value of waiting with investment-type decisions under uncertainty. In this context, investment-type decisions involve fixed sunk (i.e., irreversible) hiring and firing costs (Caballero, 1991; Darby et al., 1999). The main implication of these kind of models is that the sign of the uncertainty effect on investment-type decisions tends to be ambiguous. In the case of general investment, the sign of the estimated uncertainty coefficient may be *positive* since it is beneficial for an investor to be capable of reacting properly to different states of the economy in the future (Bloom, 2013; Caballero, 1991). In the case of specific "investment", however, the generally expected sign of the uncertainty coefficient is *negative*. This mirrors the "option value of waiting under uncertainty" (Leduc & Zheng, 2016). This option is valuable because it enables the investor to cut off the negative part of the distribution of returns from this investment. These *real options effects* act to make firms more cautious about hiring and investing (in a foreign country), thus leading to lower growth there (Caggiano, Castelnuovo, & Pellegrino, 2017).

2 For a more comprehensive presentation and explanation of the impact of global liquidity on capital inflows to emerging market and developing economies see Belke (2017).

An alternative scenario is that uncertainty does not affect a specific variable directly but has an impact *on the relationship* between the variables of interest. This is because uncertainty enlarges a "band of inaction", which can be traced back to hiring and firing costs, due to the option value effects described above (Belke & Goecke, 2005). This is valid even under risk neutrality of the investor. Consequently, the sign of the estimated uncertainty coefficient on the investment-type variable is *ambiguous*. In other words, more uncertainty hampers investment and de-investment.[3]

In this context it is important to note that models relying on *risk aversion* usually imply *negative* uncertainty effects. In this case, *risk-premia* emerge, which enhance the cost of finance (Bloom, 2013) and, through this mechanism, dampen asset prices as well. Economic policy uncertainty is shown to have a negative impact on future stock market returns at various horizons, which in turn may negatively affect portfolio investments in emerging market and developing economies (Chen, Jiang, & Tong, 2016). For instance, it can be shown that monetary policy uncertainty causes a risk premium in the US Treasury bond market (Jiang & Tong, 2016). This insight may well extend to emerging market and developing countries.

As a stylised fact gained from empirical studies, uncertainty has a negative impact on growth (Ramey & Ramey, 1995; Engle & Rangel, 2008) and credit (Bordo et al., 2016) and, as a consequence, also on (foreign) investment and output (Aastveit, Natvik, & Sola, 2013; Bloom, 2009; Bloom et al., 2013).[4,] According to several empirical studies, the effect of uncertainty *on monetary policy* (which in one or the other specification plays a larger role in the literature about push factors of capital flows) is best matched by the notion of a "wait-and-see" monetary policy (Lei & Tseng, 2016). Under uncertainty, the impact of monetary policy is thus lower (Aastveit, Natvik, & Sola, 2013) and sometimes some non-linearity becomes relevant (Pellegrino, 2018). Furthermore, it is possible that the uncertainty effect on investment-type variables such as FDI interacts with the monetary policy stance. If the economy is, as in the sample period considered here, close to the zero lower bound, the uncertainty effect is supposed to be even larger (Caggiano, Castelnuovo, & Pellegrino, 2017).[5] This has not been investigated more deeply for capital flows to emerging market and developing economies and again underlines the importance and timeliness of our study.

Finally, policy uncertainty tends to let the domestic currency depreciate and to trigger exchange rate volatility.[6] This may well be especially valid for emerging market and developing economies (Jongwanich & Kohpaiboon, 2013). More specifically, in our context, a less forecastable global political environment has the potential to lower the prospects of global growth, thus diminishing the attractiveness of investing in a specific country (Baker et al., 2013; Gauvin, McLoughlin, & Reinhardt, 2014; Fernández-Villaverde et al., 2011). At the same time, an increase in global policy uncertainty will tend to lower the overall size of investors' positions in relatively more risky countries, and advanced-economy investors' preparedness to take risk. This in turn may lead to safe haven flows out

3 Aastveit, Natvik and Sola (2013) estimate that investment reacts two to five times weaker when uncertainty is in its upper instead of its lower decile.

4 For a comprehensive survey, see IMF (2016a). For a survey, see Bloom (2013).

5 See Caggiano, Castelnuovo and Pellegrino (2017) and Basu and Bundick (2017).

6 See http://www.euroexchangeratenews.co.uk/eur-usd-exchange-rate-skyrockets-us-political-uncertainty-weighs-us-dollar-21586.

of emerging market and developing economies that are often considered less safe (Gauvin, McLoughlin & Reinhardt, 2014).

All these considerations are applicable to the relationship between (policy/political) uncertainty and foreign direct (and also other categories of) investment into emerging market and developing economies.[7] Hence, we believe it is important to include policy uncertainty in our empirical model to check for the push- and pull factors of capital flows to emerging market and developing economies, especially FDI due to its higher degree of irreversibilities (sunk costs) than pure portfolio investments.

3 Data and empirical model

We compile a comprehensive database on different types of capital flows to emerging market and developing economies, including FDI, portfolio capital flows as well as other investment, sourced from the International Monetary Fund's (IMF) Financial Flow Analytics Database. The three types of flows are: (1) *FDI*, "a category of cross-border investments associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise that is resident in another economy"; (2) *portfolio flows*, "defined as cross-border transactions and positions involving debt or equity securities, other than those included in direct investment or reserve assets"; and (3) *other investment flows*, "a residual category that includes positions and transactions other than those included in direct investment, portfolio investment, financial derivatives and employee stock options, and reserve assets", classified in government-related flows and private flows (bank and non-bank flows).[8] *Other investment flows* comprises other equity, currency and deposits, loans, insurance, pension, and standardised guarantees schemes, trade credits and advances, other accounts receivable/payable and special drawing rights. Loans comprise assets/liabilities created through the direct lending of funds by the creditor to the debtor. These include financial leases, repurchase agreements, borrowing from the IMF and loans to finance trade and all other loans (including mortgages) (IMF, 2015).

In accordance with the literature (IMF, 2016b; Koepke, 2015), we group the drivers of capital flows into "push" and "pull" factors. We start with a general empirical panel model (see, for instance, Clark et al., 2016) to assess the empirical significance of a variety of determinants of capital flows:

$$\boldsymbol{y_{i,t} = \alpha_0 + \textstyle\sum_{i=1}^{n-1} \alpha_i D_i + \beta_0 External_t + \beta_1 Domestic_{i,t} + \varepsilon_{i,t}}$$

where $y_{i,t}$ stands for the ratio of capital flows – either FDI (DIRIN), portfolio flows (PORTIN), or other investment flows (OTHERINV) – to country i during time period t, modelled as a fraction of the country's nominal gross domestic product (GDP). As our final empirical models, we selected those that employ *gross* inflows (i.e., the change in domestic resident liabilities (LIAB) to foreigners) as the dependent variable. However, we also experimented with *net* inflows, defined as gross inflows (change in domestic resident liabilities to foreigners) minus gross outflows (change in foreign assets (ASSET) owned by domestic

7 See, for instance, Chen and Funke (2003) and Chen et al. (2016).

8 For these definitions, see IMF (2013).

residents).[9] However, the latter specifications in the end turned out to be inferior according to the usual goodness-of-fit criteria.

Thus, our dependent variables are:

- DIRINVLIAB?, PORTINVLIAB?, OTHERINVLIAB?
- DIRINVASSET?, PORTINVASSET?, OTHERINVASSET?

We model both net capital flows and gross capital inflows as a share of GDP as a function of fixed effects (D_i =1, if an observation belongs to country *i*, 0 otherwise); a vector of variables representing *external conditions* or *push* factors; and a vector of variables representing *domestic* conditions or *pull* factors.[10] Net inflows and gross inflows are both employed as separate dependent variables for both total and private flows and we work with a variety of types of investment flows, among them *FDI, portfolio investment* and *other investment flows*.[11]

Our *independent* variables include the push- and pull factors generally considered in the literature plus *policy/political uncertainty* and *global liquidity*.

Pull factors include mainly domestic structural variables – trade openness (TRADEOPEN) measured as total trade as share of GDP; foreign exchange reserves as share of GDP (RESERVES); exchange rate regime (EXR); institutional quality (INSTQUAL); income per capita (INCOMECAPI); capital account openness (CAPACCOPEN); and financial development (FD) –, but also drivers implemented as differentials vis-à-vis the US, namely interest rate (CENTRALBANKRATE) and growth differentials (Ahmed & Zlate, 2014; Herrmann & Mihaljek, 2013).[12,13] Checking for the impact of the growth differential vis-à-vis the US (DGDP?) – that is, real GDP growth of the country in question minus real GDP growth in the US – allows us to test the prediction of the textbook neoclassical growth model that countries with faster growth should invest more and attract more foreign capital, that is, the notion that international capital is flowing "uphill". Empirical analysis by Gourinchas and Jeanne (2013) suggests that the allocation of capital flows across emerging market and developing countries turns out to be the opposite of this prediction: capital does not flow more to emerging market and developing economies that invest and grow more. They call this the "allocation puzzle".

According to available meta-studies, pull factors should, as our prior, matter for all three components (FDI, portfolio and other), but matter most for banking flows, which are included in *other flows* (Foerster, Jorra, & Tillmann, 2014; Koepke, 2015).

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9 This is consistent with the IMF's Financial Flows Analytics (FFA) database.

10 We employ fixed effects redundancy F-tests to check whether a fixed or a random effects model should be applied in the context of this study. The test results point at the adequacy of the fixed effects specification.

11 In line with Forbes and Warnock (2012), we model both gross inflows and net inflows (inflows minus outflows). However, in the end, we come up with final estimations based on gross inflows which have a much better empirical fit.

12 See, for instance, Shah and Ahmed (2003) for country-specific pull factors such as magnitude of the domestic market and the quality of institutions, for FDI flows to Pakistan. See Ahlquist (2006) for institutional quality and political decision-making in the recipient countries for emerging market and developing economies.

13 As robustness checks, we alternatively use growth and interest rate differentials vis-à-vis another advanced economy, the euro area. However, the results, which are available on request, do not differ much.

The list of pull factors (with the expected sign of the estimated coefficient in brackets) looks as follows:

- DGDP? +
- CENTRALBANKRATE? +[14]
- TRADEOPEN? +/-[15]
- RESERVES? +
- EXR? +/-
- INSTQUAL? +
- INCOMECAPI? +
- CAPACCOPEN? +
- FD? +

Among the push factors, the most commonly identified are indicators of global risk appetite and US monetary policy. In our analysis, we focus in particular on global liquidity and global uncertainty as global factors. The variables we include as *push factors* comprise global economic policy uncertainty (EPU), global risk aversion (VIX), development of commodity prices (COMMODITYPRICE), and – in accordance with IMF (2016b) – the US corporate spread (USCORPSPREAD), the US yield gap (USYIELDGAP), and global liquidity. For the latter, we use two measures: (i) the BIS global liquidity indicator (GLIBIS), defined as cross-border lending and local lending denominated in foreign currencies for all instruments and for all sectors (BIS, 2017), and (ii) total Organisation for Economic Co-operation and Development (OECD) broad money (GLIOECD). As an auxiliary measure of global liquidity, we also experimented with the US monetary policy stance as measured by the shadow federal funds rate (SHADOWFEDERALFUNDSRATE).[16]

For the *uncertainty* variable we use the economic policy uncertainty index developed by Baker, Bloom and Davis (2015). The economic policy uncertainty variable measures policy-related economic uncertainty and has three underlying components. One component quantifies newspaper coverage of policy-related economic uncertainty by searching for certain keywords in the media. Since this index is only available for very few of the developing and emerging market economies in our sample, we use the global policy uncertainty index in our study.

With an eye on the "option value of waiting under uncertainty" approach, we expect a higher impact of policy uncertainty on FDI, due to its higher irreversibilities, than on portfolio flows or other flows. Our prior is that push factors may matter most for portfolio flows, somewhat less for banking flows, and least for FDI (see, for instance, Koepke, 2015).

14 We also experimented with the difference between an emerging market economy's policy rate and the US policy rate. Expressed equivalently, we can list the US policy rate as a pull factor further below.

15 One would expect that an economy that is more open to trade, and thereby integrated into the global economy, would receive more capital inflows. However, the trade-to-GDP ratio tends to be lower for larger economies. Hence, according to our prior, the expected sign of the trade openness variable in our capital inflow regressions is +/-.

16 In an environment in which the policy interest rates are constrained downwards by the zero lower bound and major central banks have implemented unconventional measures, the US policy rate no longer represents a complete and coherent measure of monetary policy. Hence, as in Belke, Dubova and Volz (2017), we substituted the US policy interest rate with the US shadow rate (Krippner, 2015; Wu & Xia, 2016).

The higher the *US corporate spread* (i.e., US BAA corporate bond spreads over treasury), the greater is the yield on equity compared with government bonds, and equity is under-priced. A positive corporate spread indicates more opportunities to buy in the equity markets. Thus, a widening gap between equity and bond yields indicates a new growth cycle and more business optimism around the world.

The *US yield gap*, defined as the gap between longer-dated and shorter-dated US Treasury yields, usually shrinks if, for instance, surprisingly strong data on retail sales support the view the Federal Reserve would raise interest rates further to keep the economy from overheating. If, on the contrary, the gap is still large, no interest rate increases loom at the short- to medium run horizon and business sentiments are very positive. This leaves open two interpretations for our empirical analysis.

The first interpretation would run as follows. If a shrinking yield gap suggests a weaker growth outlook in the US, we would expect a lower yield gap to be a push factor for capital flows into developing and emerging economies, whose relative growth performance will look better compared with the US (corresponding with a *negative* sign of the yield gap variable in our capital inflow regressions). However, an alternative exegesis would be that a weaker growth outlook for the US would be seen by investors as a signal of a cooling down of the world economy, that is, a global risk factor. In that case a lower US yield gap would lead to less capital inflow to emerging market and developing economies (implying a *positive* sign of the yield gap coefficient). Hence, we do not have a prior about the sign of the US yield gap in our capital inflow regression equations and we leave it to our empirical estimations.

This is all the more valid with an eye on the fact that a shrinking yield gap could also be caused by the efforts of the US Federal Reserve to lower long-term rates given zero short-term rates, that is, to smooth the yield curve by its unconventional monetary policy measures over the sample period considered here (Belke, Gros, & Osowski, 2017). According to this view, the US yield gap would represent a (reverse) indicator of global liquidity instead of a global risk measure.

The list of push factors (with our prior regarding the expected sign of the estimated coefficient in brackets) therefore looks as follows:

- D(EPU) -
- VIX -
- COMMODITYPRICE -
- GLIBIS +
- GLIOECD +
- USYIELDGAP +/-
- D(SHADOWFEDERALFUNDSRATE) -
- CENTRALBANKRATE_US –

Research focused on extreme capital flow episodes – sudden stops and surges – seems to conclude that push factors determine whether inflow surges occur and affect the riskiness of flows, while pull factors affect the direction and magnitude of such surges (Ghosh et al., 2014). Other research indicates that some types of flows tend to be more sensitive with respect to changes in push- and pull factors during such episodes (Calvo, 1998; Forbes & Warnock, 2012; Hannan, 2017).

Hence, in a much longer-term oriented analysis of capital flows covering several decades of data, it may be necessary to separate periods of extreme capital flows from those which appear "normal". However, this is not the case in our analysis, which we intentionally limit to the period after the financial crisis. The six variants of capital flow series we investigate do not display systematic structural breaks reflecting periods of extreme capital flows (see Appendices 2 to 7).[17] Moreover, our unit roots tests conducted in Section 4.1 show that our time-series are clearly stationary, indicating the absence of periods of extreme capital flows.

Furthermore, push- and pull factors may be interrelated. In this context, for instance, Fernández-Arias (1996) empirically assessed the boost to emerging market and developing economies borrowers' creditworthiness initiated by a decline in US interest rates. These interrelations may lead to multicollinearity in our estimated empirical models and in some cases to the appearance of one or the other factor (pull or push) in the final regression specifications. We leave this task of variable selection to our empirical analysis in the following sections.

The specification of the variables and the related data sources used are listed in the necessary detail in Appendix 1. Taking logarithms was not possible in some cases due to negative empirical realisations of some variables in our sample. This, in turn, results in a quite huge dimension of estimated regression coefficients. However, not taking logs does not matter much for the qualitative and quantitative interpretation of our results. However, it prevents us from interpreting the estimated coefficients as elasticities.

We perform our regression analysis employing a panel framework comprising 32 emerging market and developing economies (Albania, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, Ecuador, Egypt, El Salvador, Guatemala, Hungary, India, Indonesia, Jordan, Kazakhstan, FYR Macedonia, Malaysia, Mexico, Paraguay, Peru, Philippines, Poland, Russia, Saudi Arabia, South Africa, Sri Lanka, Thailand, Turkey, Ukraine and Uruguay).[18] We follow the IMF's definition of emerging market and developing economies used in its annual World Economic Outlook (WEO) and include as many economies as data availability allows.[19] Our estimation period is based on quarterly data and ranges from the 1st quarter of 2009 to the 3rd quarter of 2017 in order to exclude movements in capital flows that are extraordinary and exceptional.[20] Our sample period is in a few cases limited upwards, for

17 Hence, we do not see the need to check for significant sample splits in an additional robustness check section.

18 In very few cases, a country, such as Ecuador, Malaysia, or Paraguay drops out if no observations of a certain variable are available. These cases are indicated explicitly in the results tables.

19 The IMF (2018, p. 218) describes its approach as follows: "The country classification in the WEO divides the world into two major groups: advanced economies and emerging market and developing economies. This classification is not based on strict criteria, economic or otherwise, and it has evolved over time. The objective is to facilitate analysis by providing a reasonably meaningful method of organizing data." Some of the countries that fall under the IMF's classification of emerging market and developing economies are classified by the World Bank as high-income economies (as of July 2018). In our sample, these are Chile, Croatia, Hungary, Poland, Saudi Arabia and Uruguay. Seven countries in our sample – Egypt, El Salvador, India, Indonesia, the Philippines, Sri Lanka and Ukraine – are classified by the World Bank as lower-middle income economies. The remaining economies are classified by the World Bank as upper-middle income economies.

20 We have chosen 2009 as the starting year of our estimation period to start with the quarter by which flows had recovered from the crisis (Hannan, 2017; Ahmed & Zlate, 2014) and to capture post-crisis capital flow determinants in our study. The third quarter of 2009 corresponds with the first quarter after the US business cycle trough according to the National Bureau of Economic Research (NBER) (see http://www.nber.org/cycles.html). As the initial quarter of our sample period we have thus chosen the first

instance due to the limited availability of the Chinn-Ito index measuring capital account openness or the Svirydzenka index of financial development (for details, see Appendix 1, which displays all time-series considered, i.e., also those which are not available over the complete sample period). A graphical depiction of all variables can be found in the Appendix.

4 Empirical results

As a first step, we conduct panel unit root tests according to Levin, Lin and Chu (2002), Breitung (2000), Im, Pesaran and Shin (2003), and Fisher-type tests using augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests (Choi, 2001; Maddala & Wu, 1999). Hence, in order to be able to estimate a *stationary panel*, we took first differences of the variables that were I(1) and the first differences turned out to be stationary.

As a second step, we apply pooled least squares and panel estimated generalised least squares (EGLS) with cross-section weights estimations of a mixed time-series/cross-section model based on stationary time-series with White cross-section standard errors (to allow for general contemporaneous correlation between the branch-specific residuals) and White covariance (MacKinnon & White, 1985; White, 1980). Non-zero covariances are allowed across cross-sections (degree-of-freedom corrected). The estimator we employ in this study is thus robust to cross-equation (contemporaneous) correlation and heteroskedasticity. Beforehand, we tested for the joint significance of the fixed effects estimates. For this purpose, we test the hypothesis that the estimated fixed effects are jointly significant using an F- and an LR-test. This estimation procedure is highly recommended in a scenario like ours where the time dimension is rather short. For instance, we could not apply an Arellano-Bond dynamic panel estimation procedure in our context (Arellano & Bond, 1991), although it would be interesting to assess the impact of push- and pull factors for capital flows to *individual* emerging market and developing economies separately, for instance through country-specific slope coefficients. By this, we could test the homogeneity assumption regarding the impact of the push- and pull factors on capital flows to the group of the emerging market and developing economies that we investigate.

In the following, we display the results of our econometric analysis of financial and capital flows to emerging and developing countries and the role of domestic and international factors (push- and pull factors), especially global liquidity and global uncertainty and risk factors.

4.1 Tests for stationarity

We conduct unit root tests of the dependent, pull- and push factor variables to be employed in our empirical mixed time-series panel models of capital inflows to emerging market and developing economies. The results of our single time-series unit root tests (for global push factors) are displayed in Table 1, and those of our panel unit root tests (country-specific dependent variables and pull factors) are conveyed in Table 2. In most cases, the results of our unit root tests indicate that our variables do not have to be differenced in order to be

quarter of 2009 in order to allow for a few lags in our regression equation specifications without unnecessarily losing additional degrees of freedom.

stationary. What is more, many of the pull factors we selected are “institutional” variables and must therefore be treated as “breaks in the constant” of the regression, that is, variables that are stationary by definition (Belke, 2000).

Table 1: Single time-series unit root tests (test statistics and probabilities)

EPU – Levels
Null hypothesis: EPU has a unit root
Exogenous: Constant
Lag length: 0 (automatic – based on Akaike information criterion (AIC), maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.240534	0.1964
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

EPU – First differences
Null hypothesis: D(EPU) has a unit root
Exogenous: Constant
Lag length: 0 (automatic – based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.893712	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

VIX – Levels
Null hypothesis: VIX has a unit root
Exogenous: Constant
Lag length: 0 (automatic – based on AIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.302869	0.1810
Test critical values:	1% level	-3.831511	
	5% level	-3.029970	
	10% level	-2.655194	

*MacKinnon (1996) one-sided p-values.

COMMODITYPRICE – Levels
Null hypothesis: COMMODITYPRICE has a unit root
Exogenous: Constant, linear trend
Lag length: 8 (automatic – based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.672809	0.7331
Test critical values:	1% level	-4.374307	
	5% level	-3.603202	
	10% level	-3.238054	

*MacKinnon (1996) one-sided p-values.

GLIBIS – Levels
Null hypothesis: GLIBIS has a unit root
Exogenous: Constant
Lag length: 0 (automatic – based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.390261	0.1521
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

GLIOECD – Levels
Null hypothesis: GLIOECD has a unit root
Exogenous: Constant
Lag length: 0 (automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		5.300690	1.0000
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

USCORPSPREAD – Levels
Null hypothesis: USCORPSPREAD has a unit root
Exogenous: Constant
Lag length: 0 (automatic – based on AIC, maxlag=4)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.345155	0.5863

USCORPSPREAD – First differences
Null hypothesis: D(USCORPSPREAD) has a unit root
Exogenous: Constant
Lag length: 0 (automatic – based on AIC, maxlag=4)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.503517	0.0204

Test critical values:	1% level	-3.831511
	5% level	-3.029970
	10% level	-2.655194

*MacKinnon (1996) one-sided p-values.

Test critical values:	1% level	-3.857386
	5% level	-3.040391
	10% level	-2.660551

*MacKinnon (1996) one-sided p-values.

USYIELDGAP – Levels

Null hypothesis: USYIELDGAP has a unit root

Exogenous: Constant

Lag length: 1 (automatic – based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.665578	0.0095
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

CENTRALBANKRATE_US – Levels

Null hypothesis: CENTRALBANKRATE_US has a unit root

Exogenous: Constant

Lag length: 0 (automatic – based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		5.631250	1.0000
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

DGDP_US – Levels

Null hypothesis: DGDP_US has a unit root

Exogenous: Constant

Lag length: 4 (automatic – based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.694013	0.0868
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

SHADOWFEDERALFUNDSRATE – Levels

Null hypothesis: SHADOWFEDERALFUNDSRATE has a unit root

Exogenous: Constant

Lag length: 1 (automatic – based on AIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.584618	0.4759
Test critical values:	1% level	-3.711457	
	5% level	-2.981038	
	10% level	-2.629906	

*MacKinnon (1996) one-sided p-values.

SHADOWFEDERALFUNDSRATE – First differences

Null hypothesis: D(SHADOWFEDERALFUNDSRATE) has a unit root

Exogenous: Constant, linear trend

Lag length: 0 (automatic – based on AIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.848836	0.6515
Test critical values:	1% level	-4.356068	
	5% level	-3.595026	
	10% level	-3.233456	

*MacKinnon (1996) one-sided p-values.

Table 2: Panel unit root tests (test statistics and probabilities)

1. Dependent variable

DIRINVASSET? – Levels

Sample: 2009Q1 2017Q3

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on Schwarz information criterion (SIC): 0 to 6

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-20.6215	0.0000	31	996
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-20.7769	0.0000	31	996
ADF - Fisher Chi-square	506.073	0.0000	31	996
PP - Fisher Chi-square	542.772	0.0000	31	1009

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

31 cross-sections, because time-series for Ecuador is not available.

DIRINVLIAB? – Levels

Sample: 2009Q1 2017Q3

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 6

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-43.5645	0.0000	32	1008
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-22.7550	0.0000	32	1008
ADF - Fisher Chi-square	437.784	0.0000	32	1008
PP - Fisher Chi-square	479.563	0.0000	32	1042

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

PORTINVASSET? – Levels

Sample: 2009Q1 2017Q3

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 6

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-21.4338	0.0000	31	999
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-22.3170	0.0000	31	999
ADF – Fisher Chi-square	525.049	0.0000	31	999
PP – Fisher Chi-square	562.570	0.0000	31	1002

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

31 cross-sections, because time-series for Paraguay is not available.

PORTINVLIAB? – Levels

Sample: 2009Q1 2017Q3

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 7

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-17.7539	0.0000	31	990
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-17.7656	0.0000	31	990
ADF – Fisher Chi-square	423.364	0.0000	31	990
PP – Fisher Chi-square	553.377	0.0000	31	1009

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

31 cross-sections, because time-series for Paraguay is not available

OTHERINVASSET? – Levels

Sample: 2009Q1 2017Q3

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 5

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs

OTHERINVLIAB? – Levels

Sample: 2009Q1 2017Q3

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 7

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-19.9844	0.0000	32	987
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-23.6474	0.0000	31	984
ADF - Fisher Chi-square	570.905	0.0000	32	987
PP - Fisher Chi-square	688.113	0.0000	32	1013

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

31 cross-sections, because time-series for Malaysia is not available

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-22.7917	0.0000	32	1007
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-22.8468	0.0000	31	1004
ADF - Fisher Chi-square	534.502	0.0000	32	1007
PP - Fisher Chi-square	582.170	0.0000	32	1013

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

31 cross-sections, because time-series for Malaysia is not available

2. Pull factors

Reserves? – Levels

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 6
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-18.6905	0.0000	32	1037
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-19.2097	0.0000	32	1037
ADF - Fisher Chi-square	454.110	0.0000	32	1037
PP - Fisher Chi-square	511.940	0.0000	32	1042

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

INCOME_CAPI? – Levels

Sample: 2009Q1 2017Q3
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.55113	0.0002	32	936
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.59924	0.0549	32	936
ADF - Fisher Chi-square	63.1275	0.5074	32	936
PP - Fisher Chi-square	119.818	0.0000	32	992

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

DGDP? – Levels

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 7
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-5.01091	0.0000	32	1035
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.99858	0.0228	32	1035
ADF – Fisher Chi-square	71.5150	0.2425	32	1035
PP – Fisher Chi-square	106.424	0.0007	32	1085

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

CENTRALBANKRATE? – Levels

Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-9.36613	0.0000	32	1000
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-7.49575	0.0000	32	1000
ADF – Fisher Chi-square	158.455	0.0000	32	1000
PP – Fisher Chi-square	161.962	0.0000	32	1028

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Note: Variable appendix "?" refers to cross-sections. Tables display empirical realisations of Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003), Fisher-type tests using ADF and PP tests (Choi, 2001; Maddala & Wu, 1999).

Moreover, interest rates may also be considered stationary by definition (Thornton, 2014a; Thornton, 2014b). We thus take into account that the stochastic properties of interest rates (and differences of interest rates such as spreads) are always an issue. Some may argue that interest rates are I(0), no matter what formal tests may show. This could possibly be the case in the low-interest rate environment that we have faced for several years now and is part of our estimation period.

Authors like Thornton (2014a; 2014b) argue that interest rates are extremely persistent, but they are not unit root processes. We know this for two reasons. If they were truly I(1) processes they would have wandered off long ago, but that is not the case. Moreover, economic theory shows that the real rate is bound and neither the US nor the economies included in our sample have experienced hyper-inflation during the period of study. Even if they had, these markets would have closed so the rates would not wander off. In cases of doubt, however, we rely on the results of our unit root tests as a sample property, which anyway in most of the cases coincide with this I(0) assessment. Taking the unit root tests conducted in this section as a point of reference, we use these stationary variables in our panel estimations of capital inflows to a wide array of emerging market and developing countries.

4.2 Estimation results

In the following, we present our panel estimation results, structured according to the three specific kinds of capital inflow considered here, that is FDI, portfolio and others (here, especially loans). The final selection is based on a comparison of the model-specific R-squared and the other goodness-of-fit indicators mentioned in the result tables. In a few cases, variables are still part of the final empirical model if they are only marginally significant at the 10 per cent level but decisively contribute to the goodness-of-fit of the model. All models pass our redundant fixed effects test. Even in the final specifications, the R-squared is not extremely high, which is rather typical of capital flow regressions ("fickle investment", IMF, 2011; Bluedorn et. al., 2013). We would like to stress again that the selected models are the "result" of a comparison of a multitude of regressions comprising *all* the variables listed in Appendix 1 and a systematic and rigorous Hendry-type selection process (Hendry, 1995). Hence, it does not come as a surprise that some of the variables are missing in the final specifications.

Overall, we find interesting and significant results in accordance with theory. The "best" specifications overall result for gross (instead of net) capital flows and for absolute capital flow values (i.e., not for capital flows expressed as shares of GDP).[21] Evidence for portfolio capital flows appears to be the broadest, that is, available for the largest set of model specifications based on our pull- and push factor distinction.

We start with the presentation of our final results for FDI inflows (Table 3).[22] As in the other result tables, the corresponding fixed effects redundancy tests precedes the main table containing the regression results. The estimates are all (highly) significant and the coefficients have the expected sign. The reserves coefficient is positive, suggesting that macroeconomic stability is conducive to attracting FDI.

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21 However, the results for the latter are available on request.

22 Please note again that "?" represents an index of the cross-sections, here: countries.

Table 3: Foreign direct investment inflows to emerging market and developing economies – determinants according to an EGLS panel model

Dependent variable: DIRINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2010Q2 2015Q4
Included observations: 23 after adjustments
Cross-sections included: 32
Total pool (unbalanced) observations: 729
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 15 total coef iterations

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	4.04E+09	2.72E+08	14.86847	0.0000
RESERVES?	0.028184	0.008885	3.172237	0.0016
EXR?	-1.08E+08	34083689	-3.181425	0.0015
CAPACCOPEN?	3.12E+08	1.40E+08	2.229252	0.0261
INCOMECAPI?	113447.0	29137.01	3.893572	0.0001
D(EPU)	-468527.3	151781.1	-3.086861	0.0021
AR(4)	0.167412	0.043007	3.892653	0.0001
Fixed effects (cross)	not listed			

Effects specification

Cross-section fixed (dummy variables)

Weighted statistics

R-squared	0.846561	Mean dependent var	5.98E+09
Adjusted R-squared	0.838345	S.D. dependent var	5.42E+09
S.E. of regression	2.94E+09	Sum squared resid	5.96E+21
F-statistic	103.0386	Durbin-Watson stat	1.910083
Prob. (F-statistic)	0.000000		

Unweighted statistics

R-squared	0.923322	Mean dependent var	4.93E+09
Sum squared resid	8.54E+21	Durbin-Watson stat	2.126364

The exchange rates coefficient is negative, which means that economies with less flexible exchange rates attract more FDI. Given that nowadays FDI is often related to regional or global value chains, a fixed or managed exchange rate may facilitate cross-border trade in intermediate goods. The East Asian trade-production network, which developed under a relatively high degree of intra-regional exchange rate stability, is a case in point (Volz, 2010; Volz, 2015).

Also, as expected, the capital account openness coefficient is positive, as is income per capita. Last but not least, the estimates suggest that higher global economic policy uncertainty has negative effects on FDI flows to developing and emerging economies. The policy uncertainty coefficient is highly significant at the one per cent level. It should be noted that variables pertaining to short-term financial conditions in both source and host countries did not appear to be significant, which is in line with expectations, since FDI is generally more long-term in nature and therefore less affected by short-term variables.

Table 4 shows the results for portfolio capital flows. The coefficient estimate for one of the most often stressed pull factors, the growth differential vis-à-vis the United States, is positive throughout, as expected, and significant at the 10 per cent level.[23] The trade openness coefficient turns out to be significant and negative in Models 1 and 2. However, it is not contained in Model 3. At first glance, this comes as a surprise because one would expect that an economy that is more open to trade, and thereby integrated into the global economy, would receive more capital inflows and the sign would be positive. However, as argued in Section 3, the trade-to-GDP ratio tends to be lower for larger economies. Hence, the sign of the trade openness variable in our capital inflow regression may well be negative.

The estimated coefficient of reserves comes out as positive again (a pattern which proved to be very robust over all the specifications and estimations employed for this study), while the exchange rate coefficient is negative, suggesting that foreign portfolio investors are more inclined to invest when the exchange rate tends to be more stable.

And once more, the estimate for global liquidity is positive and (highly) significant in Models 1 and 2 (and numerous specifications not displayed here because the goodness-of-fit is slightly worse). It does not enter Model 3 which is characterised by a significantly shortened sample period due to the inclusion of the financial development variable. As in all other specifications (and in those not presented here as the final ones), the global liquidity variable constructed by the Bank for International Settlements beats the alternative OECD global liquidity specification (total OECD "broad money aggregate") that we also implemented and tested. Recall that we use the BIS variable to indicate the ease of financing in global financial markets with credit being among the key indicators of global liquidity. We corroborate this concept empirically for portfolio capital inflows to emerging market and developing economies. This strongly corresponds with our priors because portfolio flows are obviously more closely connected with speculative capital flows than physical foreign investment or "other" investment, to include cross-border loans, which are among the most discussed side effects of global liquidity (Belke & Verheyen, 2014).

In the context of our main research question it is important to note that the coefficient of the Baker-Bloom-Davis economic policy *uncertainty* variable is *negative* according to theory and *highly significant* in all three models. In other words, it has clearly beaten the VIX which does not enter any final model as an indicator of global uncertainty.

The estimated coefficient of the US yield gap turns out to be negative and highly significant in Model 1.[24] This corresponds with our prior that a lower yield gap can be considered a push factor for capital flows into developing and emerging economies, whose relative growth performance will then look better compared with the US. According to this view, our estimation results confirm the role of the US yield gap as an indicator of global risk that negatively impacts capital inflows to emerging market and developing economies.

23 The relatively low significance of the growth differential in our sample period ranging (only) from 2009 to 2017 has become something like a stylised fact in the relevant literature. See, for instance, Hannan (2017) and IMF (2016b). In accordance with our results, Hannan (2017) finds that growth and interest rate differentials are not statistically significant for net FDI flows, but matter for portfolio and other investment flows to emerging markets.

24 However, the yield gap does not enter Model 2, where the whole global liquidity and global risk impact is covered by the BIS global liquidity variable and the Baker-Bloom-Davis economic policy uncertainty index, nor Model 3, whose sample period is severely cut down due to the inclusion of the financial development variable.

Moreover, the negative sign of the US yield gap is compatible with the view described in Section 3 that this variable may also represent a (reverse) indicator of global liquidity instead of a global risk measure. The estimate for financial development turns out to be positive but only borderline significant.[25] However, the inclusion of financial development comes at the cost of shortening the sample (from 30 to 22 observations).

Table 4: Portfolio capital inflows to emerging market and developing economies – determinants according to EGLS panel models

Model 1

Redundant fixed effects tests

Test cross-section fixed effects

Effects test	Statistic	d.f.	Prob.
Cross-section F	10.577272	(30,856)	0.0000

Dependent variable: PORTINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2009Q3 2016Q4
Included observations: 30 after adjustments
Cross-sections included: 31
Total pool (unbalanced) observations: 895
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 18 total coef iterations

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	6.68E+08	1.05E+09	0.639159	0.5229
DGDP?(-1)-DGDP_US(-1)	79771.53	53482.46	1.491546	0.1362
TRADEOPEN?	-13354585	5567886.	-2.398502	0.0167
RESERVES?	0.091467	0.018777	4.871236	0.0000
EXR?	-2.64E+08	96653802	-2.730865	0.0064
GLIBIS	95.65684	34.42670	2.778566	0.0056
D(EPU)	-3762771.	1076965.	-3.493866	0.0005
USYIELDGAP	-76837970	28907576	-2.658057	0.0080
AR(1)	0.131678	0.034788	3.785148	0.0002
Fixed effects (cross)	not listed			

Effects specification

Cross-section fixed (dummy variables)

Weighted statistics

R-squared	0.431786	Mean dependent var	1.95E+09
Adjusted R-squared	0.406562	S.D. dependent var	3.80E+09
S.E. of regression	3.20E+09	Sum squared resid	8.74E+21
F-statistic	17.11776	Durbin-Watson stat	2.006946
Prob. (F-statistic)	0.000000		

Unweighted statistics

R-squared	0.389864	Mean dependent var	2.01E+09
Sum squared resid	1.34E+22	Durbin-Watson stat	1.553726

25 It is contained only in Model 3 because its inclusion necessitates a significant shortening of the sample period.

Model 2

Redundant fixed effects tests
Test cross-section fixed effects

Effects test	Statistic	d.f.	Prob.
Cross-section F	10.055021	(30,857)	0.0000

Dependent variable: PORTINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2009Q3 2016Q4
Included observations: 30 after adjustments
Cross-sections included: 31
Total pool (unbalanced) observations: 895
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 16 total coef iterations

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	6.39E+08	1.00E+09	0.637999	0.5236
DGDP?(-1)-DGDP_US(-1)	87608.20	54330.01	1.612519	0.1072
TRADEOPEN?	-10499183	5719890.	-1.835557	0.0668
RESERVES?	0.093772	0.018780	4.993058	0.0000
EXR?	-2.70E+08	96434957	-2.799559	0.0052
GLIBIS	77.49797	30.52355	2.538956	0.0113
D(EPU)	-4318630.	1233559.	-3.500952	0.0005
AR(1)	0.138438	0.033785	4.097588	0.0000
Fixed effects (cross)	not listed			

Effects specification

Cross-section fixed (dummy variables)

Weighted statistics

R-squared	0.423245	Mean dependent var	1.95E+09
Adjusted R-squared	0.398344	S.D. dependent var	3.80E+09
S.E. of regression	3.21E+09	Sum squared resid	8.83E+21
F-statistic	16.99727	Durbin-Watson stat	2.016800
Prob. (F-statistic)	0.000000		

Unweighted statistics

R-squared	0.387560	Mean dependent var	2.01E+09
Sum squared resid	1.35E+22	Durbin-Watson stat	1.558830

Model 3

Redundant fixed effects tests
Test cross-section fixed effects

Effects test	Statistic	d.f	Prob.
Cross-section F	8.794579	(30,638)	0.0000

Dependent variable: PORTINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2009Q3 2014Q4
Included observations: 22 after adjustments

Cross-sections included: 31
Total pool (unbalanced) observations: 675
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 16 total coef iterations

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	1.22E+09	8.88E+08	1.377902	0.1687
DGDP?(-1)-DGDP_US(-1)	86079.20	52235.45	1.647908	0.0999
RESERVES?	0.051328	0.015387	3.335778	0.0009
EXR?	-2.09E+08	1.20E+08	-1.742708	0.0819
FD?	3.55E+09	1.89E+09	1.880838	0.0604
D(EPU)	-2794202.	742096.5	-3.765281	0.0002
AR(1)	0.085266	0.035931	2.373015	0.0179
Fixed effects (cross)	not listed			

Effects specification

Cross-section fixed (dummy variables)

Weighted statistics

R-squared	0.505984	Mean dependent var	2.26E+09
Adjusted R-squared	0.478108	S.D. dependent var	3.54E+09
S.E. of regression	2.92E+09	Sum squared resid	5.46E+21
F-statistic	18.15155	Durbin-Watson stat	2.029362
Prob. (F-statistic)	0.000000		

Unweighted statistics

R-squared	0.521079	Mean dependent var	2.42E+09
Sum squared resid	7.83E+21	Durbin-Watson stat	1.739841

Finally, Table 5 displays the results for “other” capital flows, which, as mentioned, prominently include cross-border lending. As expected, the coefficient estimate for the growth differential vis-à-vis the US is positive and highly significant. The estimate for the reserves is again positive and highly significant. This time, in the context of “other” investment (mainly cross-border credits and loans) the US yield gap coefficient turns out to be positive, suggesting that a stable macro outlook in the host country and favourable growth outlook compared with the US will drive “other” flows into developing and emerging market economies.[26] According to our main argument in Section 3, a weaker growth outlook for the US would be seen by investors as a signal of a cooling down of the world economy, that is, a global risk factor. In that case, a lower US yield gap would lead to less capital inflow to emerging market and developing economies (implying a positive sign of the yield gap coefficient). Thus, seen on the whole, “monetary” factors, such as reserves and the US yield gap, dominate the other push- and pull factors in the case of “other” investment flows. This confirms expectations since one important element of “other” investment are cross-border credit and loans.[27]

26 This does not constitute a contradiction of our finding of a negative sign of the yield gap variable for portfolio investment, i.e., in the context of more speculative capital flows rather than “other” investment (cross-border credits, loans). Remember also that the expected sign of the US yield gap in Section 3 was “+/-”.

27 This is also systematically valid in those empirically inferior models that are not displayed here.

Table 5: Other capital inflows to emerging market and developing economies – determinants according to an EGLS panel model

Redundant fixed effects tests
Test cross-section fixed effects

Effects test	Statistic	d.f.	Prob.
Cross-section F	-2.077715	(31,912)	1.0000

Dependent variable: OTHERINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2009Q4 2017Q3
Included observations: 32 after adjustments
Cross-sections included: 32
Total pool (unbalanced) observations: 949
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 17 total coef iterations

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	1.21E+09	64592641	18.80802	0.0000
DGDP?-DGDP_US	198621.3	23923.39	8.302390	0.0000
RESERVES?	0.229797	0.019769	11.62381	0.0000
USYIELDGAP	19880802	8699427.	2.285300	0.0225
AR(1)	0.106320	0.033863	3.139682	0.0017
AR(3)	0.104686	0.036489	2.868962	0.0042
Fixed effects (cross)	not listed			

Effects specification

Cross-section fixed (dummy variables)

Weighted statistics

R-squared	0.416924	Mean dependent var	-4.11E+11
Adjusted R-squared	0.393908	S.D. dependent var	1.27E+13
S.E. of regression	6.84E+09	Sum squared resid	4.27E+22
F-statistic	18.11439	Durbin-Watson stat	2.057792
Prob. (F-statistic)	0.000000		

Unweighted statistics

R-squared	0.479240	Mean dependent var	1.71E+09
Sum squared resid	6.78E+22	Durbin-Watson stat	1.265043

A final striking observation is that almost no institutional pull factor variables enter the final model specifications. This is most probably due to the fact that institutional variables often move slowly and thus, may not show a significant impact over the relatively small estimation period considered here. They thus also tend to interact strongly with fixed effects and hence rarely appear in the "best" specifications displayed above. Finally, it is well-known that fixed effects absorb most of the explanatory power of institutional variables and estimates of these variables become inefficient, although coefficients are provided for variables that hardly change over time (Pluemper & Troeger, 2007).

What is more, the pull factor “central bank rate (relative to the US rate)” is not included among the variables of the final best-performing models, regardless of the category of capital flows used as the independent variable.

As expected, growth differentials of the emerging market and developing economies vis-à-vis the US are robust entries in all specifications except for FDI, where per capita income substitutes for the growth differential. However, as in IMF (2016b) and Hannan (2017), significance turned out to be comparatively weak (i.e., at the 10 per cent level throughout).

Furthermore, it turned out that cyclical push factors, like global risk aversion (the economic policy uncertainty variable EPU appears in all but one of the best specifications tabulated above) and global liquidity measures (as defined by the BIS)[28], are most important for portfolio capital inflows to emerging market and developing economies. In this respect, we come up with larger and more systematic effects of global variables than Foerster, Jorra and Tillmann (2014) who show empirically in dynamic panel and time-series regressions that their global factor, reflecting US financial conditions, explains only a small share of the overall variation of capital flows to emerging market and developing economies.

As expected, policy uncertainty was, combined with a couple of country-specific factors like real GDP growth, more important in our estimations for FDI in emerging market and developing economies. We now turn to some robustness checks, especially with respect to the heterogeneity of countries in our sample.

4.3 Robustness checks

To check for robustness of our results, we conduct two variants of robustness checks. First, we confine our cross-sections to the upper-middle-income and high-income economies (according to the latest World Bank classification) in our sample and estimate the specifications identified in Section 4.2 anew. And second, we estimate our specifications for the different categories of capital flows for only lower-middle-income economies.[29] Panel unit root tests have been conducted for each of the two different scenarios with similar results as for the entire sample. They are available on request.

4.3.1 Estimations for upper-middle-income and high-income economies

We start with our robustness checks for our FDI equations in Table 6. The results reveal that both the exchange rate regime and capital account openness variables become insignificant once our country sample is restricted to upper-middle-income and higher-income economies (Model 1). However, the remaining variables, among them policy uncertainty, stay highly significant. What is more, the signs of the estimated coefficients stay the same. If we delete the insignificant variables from the approach, the final specification, shown as Model 2 in Table 6, emerges. Economic policy uncertainty remains significant (at the five per cent level). Thus, seen on the whole, the empirical model of FDI

28 The BIS global liquidity indicator worked much better in our estimations than our OECD definition of global liquidity.

29 As mentioned before, low-income economies are not included in our sample due to a lack of data.

flows stays remarkably unchanged if lower-middle-income economies are excluded from our panel – both with respect to the magnitude of the estimated coefficients and their signs.

Table 6: Foreign direct investment inflows to upper-middle-income and high-income economies – determinants according to an EGLS panel model

Model 1
Redundant fixed effects tests
Test cross-section fixed effects

Effects test	Statistic	d.f.	Prob.
Cross-section F	83.100501	(24,544)	0.0000

Dependent variable: DIRINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2010Q2 2015Q4
Included observations: 23 after adjustments
Cross-sections included: 25
Total pool (balanced) observations: 575
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 13 total coef iterations

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	4.96E+09	4.70E+08	10.55254	0.0000
RESERVES?	0.035135	0.010042	3.498597	0.0005
EXR?	-1.23E+08	1.31E+08	-0.938453	0.3484
CAPACCOPEN?	2.69E+08	2.20E+08	1.225293	0.2210
INCOMECAPI?	69536.30	27935.04	2.489214	0.0131
D(EPU)	-867621.0	198210.0	-4.377282	0.0000
AR(4)	0.132989	0.050784	2.618739	0.0091
Fixed effects (cross)	Not listed			

Effects specification

Cross-section fixed (dummy variables)

Weighted statistics

R-squared	0.835884	Mean dependent var	6.22E+09
Adjusted R-squared	0.826833	S.D. dependent var	6.05E+09
S.E. of regression	3.23E+09	Sum squared resid	5.66E+21
F-statistic	92.35755	Durbin-Watson stat	1.931174
Prob. (F-statistic)	0.000000		

Unweighted statistics

R-squared	0.922874	Mean dependent var	5.58E+09
Sum squared resid	8.38E+21	Durbin-Watson stat	2.161119

Model 2
Redundant fixed effects tests
Test cross-section fixed effects

Effects test	Statistic	d.f.	Prob.
Cross-section F	60.272436	(24,646)	0.0000

Dependent variable: DIRINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2010Q2 2016Q4
Included observations: 27 after adjustments
Cross-sections included: 25
Total pool (balanced) observations: 675

Iterate coefficients after one-step weighting matrix White cross-section standard errors & covariance (d.f. corrected) Convergence achieved after 15 total coef iterations				
Variable	Coefficient	Std. error	t-Statistic	Prob.
C	5.05E+09	1.76E+08	28.64018	0.0000
RESERVES?	0.037018	0.010724	3.451912	0.0006
INCOMECAPI?	43665.01	19633.95	2.223954	0.0265
D(EPU)	-429531.4	217646.3	-1.973529	0.0489
AR(4)	0.129526	0.041157	3.147096	0.0017
Fixed effects (cross)	not listed			
	Effects specification			
Cross-section fixed (dummy variables)				
	Weighted statistics			
R-squared	0.811201	Mean dependent var		8.29E+09
Adjusted R-squared	0.803018	S.D. dependent var		7.04E+09
S.E. of regression	4.29E+09	Sum squared resid		1.19E+22
F-statistic	99.12975	Durbin-Watson stat		1.816003
Prob. (F-statistic)	0.000000			
	Unweighted statistics			
R-squared	0.864609	Mean dependent var		5.49E+09
Sum squared resid	1.67E+22	Durbin-Watson stat		1.649265

Table 7 displays the results of our *portfolio* capital inflow estimations when we restrict our sample to upper-middle-income and high-income economies. The significance of the growth differential clearly increases in all models. In addition, financial development now enters Model 3 significantly. Policy uncertainty (in Models 1 and 2, but not in Model 3) becomes slightly less significant (at the 10 and five per cent levels instead of the one per cent level). The same is true for global liquidity, which nonetheless remains significant at the one per cent level (Model 1) and two per cent level (Model 2). Importantly, the signs of the estimated coefficients stay unchanged vis-à-vis our basic specification including all countries.

Table 7: Portfolio capital inflows to upper-middle-income and high-income– determinants according to EGLS panel models

Model 1
Redundant fixed effects tests
Pool: DIE_PORTFOLIO
Test cross-section fixed effects

Effects test	Statistic	d.f.	Prob.
Cross-section F	9.111688	(23,639)	0.0000

Dependent variable: PORTINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2010Q1 2016Q4
Included observations: 28 after adjustments
Cross-sections included: 24
Total pool (balanced) observations: 672
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 18 total coef iterations
Cross-sections without valid observations dropped

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	1.21E+09	1.18E+09	1.027515	0.3046
DGDP?(-1)-DGDP_US(-1)	101067.6	20956.11	4.822819	0.0000
TRADEOPEN?	-15545305	7973086.	-1.949723	0.0516
RESERVES?	0.078139	0.021169	3.691101	0.0002
EXR?	-3.06E+08	93972047	-3.253040	0.0012
GLIBIS	94.39884	38.49047	2.452525	0.0145
D(EPU)	-2307356.	1389868.	-1.660126	0.0974
USYIELDGAP	-90399153	40386377	-2.238358	0.0255
AR(1)	0.103892	0.047288	2.196991	0.0284
AR(3)	0.104174	0.034597	3.011071	0.0027
Fixed effects (cross)	not listed			

Effects specification

Cross-section fixed (dummy variables)

Weighted statistics

R-squared	0.422472	Mean dependent var	2.09E+09
Adjusted R-squared	0.393550	S.D. dependent var	4.03E+09
S.E. of regression	3.40E+09	Sum squared resid	7.40E+21
F-statistic	14.60748	Durbin-Watson stat	1.984146
Prob. (F-statistic)	0.000000		

Unweighted statistics

R-squared	0.401446	Mean dependent var	2.08E+09
Sum squared resid	1.11E+22	Durbin-Watson stat	1.594512

Model 2
Redundant fixed effects tests
Pool: DIE_PORTFOLIO
Test cross-section fixed effects

Effects test	Statistic	d.f.	Prob.
Cross-section F	8.887239	(23,640)	0.0000

Dependent variable: PORTINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2010Q1 2016Q4
Included observations: 28 after adjustments
Cross-sections included: 24
Total pool (balanced) observations: 672

Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 16 total coef iterations
Cross-sections without valid observations dropped

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	9.81E+08	1.12E+09	0.872098	0.3835
DGDP?(-1)-DGDP_US(-1)	97466.80	20918.97	4.659254	0.0000
TRADEOPEN?	-14007425	7987010.	-1.753776	0.0799
RESERVES?	0.081108	0.021159	3.833333	0.0001
EXR?	-2.95E+08	92466106	-3.190346	0.0015
GLIBIS	82.11938	34.26174	2.396825	0.0168
D(EPU)	-3009404.	1538065.	-1.956617	0.0508
AR(1)	0.108625	0.045790	2.372278	0.0180
AR(3)	0.103772	0.035534	2.920379	0.0036
Fixed effects (cross)	not listed			

Effects specification

Cross-section fixed (dummy variables)

Weighted statistics

R-squared	0.418489	Mean dependent var	2.10E+09
Adjusted R-squared	0.390322	S.D. dependent var	4.03E+09
S.E. of regression	3.43E+09	Sum squared resid	7.51E+21
F-statistic	14.85747	Durbin-Watson stat	1.988068
Prob. (F-statistic)	0.000000		

Unweighted statistics

R-squared	0.398046	Mean dependent var	2.08E+09
Sum squared resid	1.11E+22	Durbin-Watson stat	1.592389

Model 3
Redundant Fixed Effects Tests
Pool: DIE_PORTFOLIO
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	9.368617	(24,468)	0.0000

Dependent variable: PORTINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2010Q1 2014Q4
Included observations: 20 after adjustments
Cross-sections included: 25
Total pool (balanced) observations: 500
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 16 total coef iterations

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	6.73E+08	1.05E+09	0.641134	0.5217
DGDP?(-1)-DGDP_US(-1)	95560.79	21102.52	4.528408	0.0000
RESERVES?	0.042072	0.016523	2.546241	0.0112
EXR?	-2.55E+08	1.02E+08	-2.512788	0.0123
FD?	5.24E+09	2.36E+09	2.224981	0.0266
D(EPU)	-2245051.	719552.0	-3.120068	0.0019
AR(1)	0.032551	0.053734	0.605781	0.5450
AR(3)	0.074167	0.050776	1.460674	0.1448
Fixed effects (cross)	not listed			

Effects specification

Cross-section fixed (dummy variables)

Weighted statistics			
R-squared	0.524914	Mean dependent var	2.46E+09
Adjusted R-squared	0.493444	S.D. dependent var	3.71E+09
S.E. of regression	3.04E+09	Sum squared resid	4.33E+21
F-statistic	16.68014	Durbin-Watson stat	1.983428
Prob. (F-statistic)	0.000000		
Unweighted statistics			
R-squared	0.532859	Mean dependent var	2.54E+09
Sum squared resid	6.28E+21	Durbin-Watson stat	1.705624

For other capital flows (Table 8), the US yield gap remains positive but becomes insignificant once our country panel is limited to the upper-middle-income and higher-income countries. The coefficient estimate for the growth differential vis-à-vis the US becomes insignificant and is thus left out of our specification. The estimate for the reserves is again positive and highly significant.

Table 8: Other capital inflows to upper-middle-income and high-income economies – determinants according to an EGLS panel model

Redundant fixed effects tests
Pool: DIE_OTHERS
Test cross-section fixed effects

Effects test	Statistic	d.f.	Prob.
Cross-section F	-0.491272	(24,713)	1.0000

Dependent variable: OTHERINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2009Q4 2017Q3
Included observations: 32 after adjustments
Cross-sections included: 25
Total pool (unbalanced) observations: 742
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 17 total coef iterations

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	9.38E+08	74606591	12.57056	0.0000
RESERVES?	0.227925	0.026999	8.441946	0.0000
USYIELDGAP	12142545	9367865.	1.296191	0.1953
AR(1)	0.122034	0.036018	3.388100	0.0007
AR(3)	0.091544	0.038270	2.392093	0.0170
Fixed effects (cross)	not listed			

Effects specification			
Cross-section fixed (dummy variables)			
Weighted statistics			
R-squared	0.360768	Mean dependent var	-6.75E+10
Adjusted R-squared	0.335665	S.D. dependent var	1.89E+12
S.E. of regression	7.45E+09	Sum squared resid	3.96E+22
F-statistic	14.37149	Durbin-Watson stat	2.042872
Prob. (F-statistic)	0.000000		
Unweighted statistics			
R-squared	0.466743	Mean dependent var	1.44E+09
Sum squared resid	6.50E+22	Durbin-Watson stat	1.252361

To summarise, replicating the estimations with data for only upper-middle-income and high-income economies, the empirical models stay largely unchanged – both with respect to the magnitude of the estimated coefficients and their signs. In particular, we find that the coefficient estimates for global liquidity and policy uncertainty remain highly significant in those specifications in which they were previously significant.

4.3.2 Separate estimations for lower-middle-income economies

Finally, we present the results of our estimations of capital inflows to lower-middle-income economies. As can be seen in the results for FDI in Model 1 in Table 9, the reserves variable becomes insignificant and the exchange rate regime variable turns out to be less significant (at 10 per cent instead of one per cent), but capital account openness matters more (one instead of five per cent) for FDI flows. Most importantly, with an eye on our main research question, policy uncertainty becomes insignificant as a driver of FDI in lower-middle-income economies (Table 9, Model 1). If we delete the remaining insignificant variable, Model 2 results.

Table 9: Foreign direct investment inflows to lower-middle-income economies – determinants according to an EGLS panel model

Model 1
Redundant fixed effects tests
Test cross-section fixed effects

Effects test	Statistic	d.f.	Prob.
Cross-section F	17.739037	(6,141)	0.0000

Dependent variable: DIRINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2010Q2 2015Q4
Included observations: 23 after adjustments
Cross-sections included: 7
Total pool (unbalanced) observations: 154
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 14 total coef iterations

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	1.68E+09	5.83E+08	2.879641	0.0046
RESERVES?	0.018273	0.014724	1.240990	0.2167
EXR?	-1.49E+08	87009105	-1.709945	0.0895
CAPACCOPEN?	5.65E+08	2.30E+08	2.454187	0.0153
INCOMECAPI?	330615.4	131967.1	2.505285	0.0134
D(EPU)	161072.2	353585.8	0.455539	0.6494
AR(4)	0.250706	0.081111	3.090917	0.0024
Fixed effects (Cross)	not listed			

Effects specification

Cross-section fixed (dummy variables)

Weighted statistics

R-squared	0.871535	Mean dependent var	2.39E+09
Adjusted R-squared	0.860601	S.D. dependent var	1.66E+09
S.E. of regression	1.01E+09	Sum squared resid	1.45E+20
F-statistic	79.71439	Durbin-Watson stat	1.884945
Prob. (F-statistic)	0.000000		

Unweighted statistics				
R-squared	0.883174	Mean dependent var		2.50E+09
Sum squared resid	1.75E+20	Durbin-Watson stat		1.580328
Model 2 Redundant fixed effects tests Pool: DIE_FDI Test cross-section fixed effects				
Effects test	Statistic	d.f.		Prob.
Cross-section F	13.236856	(6,149)		0.0000
Dependent variable: DIRINVLIAB? Method: Pooled EGLS (cross-section weights) Sample (adjusted): 2010Q1 2015Q4 Included observations: 24 after adjustments Cross-sections included: 7 Total pool (unbalanced) observations: 160 Iterate coefficients after one-step weighting matrix White cross-section standard errors & covariance (d.f. corrected) Convergence achieved after 12 total coef iterations				
Variable	Coefficient	Std. error	t-Statistic	Prob.
C	1.82E+09	4.84E+08	3.759891	0.0002
EXR?	-1.69E+08	76130456	-2.218762	0.0280
CAPACCOPEN?	4.55E+08	1.97E+08	2.304596	0.0226
INCOMECAPI?	310566.6	111348.6	2.789139	0.0060
AR(4)	0.249543	0.069928	3.568571	0.0005
Fixed effects (cross)	not listed			
Effects specification				
Cross-section fixed (dummy variables)				
Weighted statistics				
R-squared	0.857585	Mean dependent var		2.48E+09
Adjusted R-squared	0.848027	S.D. dependent var		1.64E+09
S.E. of regression	1.07E+09	Sum squared resid		1.72E+20
F-statistic	89.72386	Durbin-Watson stat		1.913182
Prob. (F-statistic)	0.000000			
Unweighted statistics				
R-squared	0.879046	Mean dependent var		2.48E+09
Sum squared resid	1.85E+20	Durbin-Watson stat		1.498657

We now check whether limiting our focus to lower-middle-income economies alters our empirical results for *portfolio* capital flows too (Table 10). The trade openness variable becomes insignificant while the global liquidity and the US yield gap variables become slightly less significant as drivers of portfolio capital flows (Model 1). However, policy uncertainty remains highly significant. In Model 2, trade openness becomes insignificant again and both the exchange rate regime and the global liquidity variable become slightly less significant. What is more, as in Model 1, the growth differential appears to be less important than in the case of the complete country sample. However, policy uncertainty remains highly significant. As far as Model 3 is concerned, the exchange rate regime becomes a bit more significant, but financial development remains insignificant. In all other respects, the main empirical pattern of the model stays more or less the same. Above all, policy uncertainty remains highly significant. If we eliminate the insignificant financial development variable, Model 4 emerges as our final model specification.

Table 10: Portfolio capital inflows to lower-middle-income economies – determinants according to EGLS panel models

Model 1
Redundant fixed effects tests
Pool: DIE_PORTFOLIO
Test cross-section fixed effects

Effects test	Statistic	d.f.	Prob.
Cross-section F	-0.062195	(6,188)	1.0000

Dependent variable: PORTINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2009Q3 2016Q4
Included observations: 30 after adjustments
Cross-sections included: 7
Total pool (unbalanced) observations: 203
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 17 total coef iterations

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	-8.16E+08	1.36E+09	-0.601645	0.5481
DGDP?(-1)-DGDP_US(-1)	55058.38	47809.83	1.151612	0.2509
TRADEOPEN?	582539.1	17177950	0.033912	0.9730
RESERVES?	0.313747	0.031039	10.10804	0.0000
EXR?	-2.59E+08	1.07E+08	-2.406719	0.0171
GLIBIS	85.58358	40.96307	2.089286	0.0380
D(EPU)	-6955256.	1174891.	-5.919916	0.0000
USYIELDGAP	-68200480	31701886	-2.151307	0.0327
AR(1)	0.088766	0.059558	1.490409	0.1378
Fixed effects (cross)	not listed			

Effects specification

Cross-section fixed (dummy variables)

Weighted statistics

R-squared	0.536079	Mean dependent var	1.24E+09
Adjusted R-squared	0.501532	S.D. dependent var	2.88E+09
S.E. of regression	2.15E+09	Sum squared resid	8.69E+20
F-statistic	15.51727	Durbin-Watson stat	1.977501
Prob. (F-statistic)	0.000000		

Unweighted statistics

R-squared	0.400777	Mean dependent var	1.39E+09
Sum squared resid	1.40E+21	Durbin-Watson stat	1.686182

Model 2
Redundant fixed effects tests
Pool: DIE_PORTFOLIO
Test cross-section fixed effects

Effects test	Statistic	d.f.	Prob.
Cross-section F	-0.188897	(6,189)	1.0000

Dependent variable: PORTINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2009Q3 2016Q4
Included observations: 30 after adjustments
Cross-sections included: 7
Total pool (unbalanced) observations: 203
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 17 total coef iterations

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	-8.62E+08	1.31E+09	-0.656300	0.5124
DGDP?(-1)-DGDP_US(-1)	61936.10	49093.62	1.261592	0.2087
TRADEOPEN?	1411365.	17584646	0.080261	0.9361
RESERVES?	0.315270	0.030569	10.31335	0.0000
EXR?	-2.47E+08	1.11E+08	-2.227564	0.0271
GLIBIS	73.14237	42.80851	1.708594	0.0892
D(EPU)	-7514721.	1180053.	-6.368123	0.0000
AR(1)	0.092136	0.060449	1.524200	0.1291
Fixed effects (cross)	not listed			

Effects specification

Cross-section fixed (dummy variables)

Weighted statistics

R-squared	0.533147	Mean dependent var	1.24E+09
Adjusted R-squared	0.501035	S.D. dependent var	2.88E+09
S.E. of regression	2.15E+09	Sum squared resid	8.74E+20
F-statistic	16.60294	Durbin-Watson stat	1.981026
Prob. (F-statistic)	0.000000		

Unweighted statistics

R-squared	0.401597	Mean dependent var	1.39E+09
Sum squared resid	1.40E+21	Durbin-Watson stat	1.694093

Model 3
Redundant fixed effects tests
Test cross-section fixed effects

Effects test	Statistic	d.f.	Prob.
Cross-section F	1.183356	(6,134)	0.3189

Dependent variable: PORTINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2009Q3 2014Q4
Included observations: 22 after adjustments
Cross-sections included: 7
Total pool (unbalanced) observations: 147
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 13 total coef iterations

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	5.92E+08	2.19E+09	0.270539	0.7872
DGDP?(-1)-DGDP_US(-1)	68463.05	49553.58	1.381596	0.1694
RESERVES?	0.308494	0.040114	7.690473	0.0000
EXR?	-2.59E+08	1.05E+08	-2.468311	0.0148
FD?	4.39E+09	7.01E+09	0.626485	0.5321
D(EPU)	-6240578.	1497676.	-4.166841	0.0001
AR(1)	0.069625	0.067422	1.032678	0.3036
Fixed effects (cross)	not listed			

Effects specification

Cross-section fixed (dummy variables)

Weighted statistics

R-squared	0.581702	Mean dependent var	1.49E+09
Adjusted R-squared	0.544243	S.D. dependent var	2.98E+09
S.E. of regression	2.18E+09	Sum squared resid	6.38E+20
F-statistic	15.52884	Durbin-Watson stat	1.993288
Prob. (F-statistic)	0.000000		

Unweighted statistics

R-squared	0.468446	Mean dependent var	1.65E+09
Sum squared resid	9.15E+20	Durbin-Watson stat	1.982117

Model 4
Redundant fixed effects tests
Pool: DIE_PORTFOLIO
Test cross-section fixed effects

Effects test	Statistic	d.f.	Prob.
Cross-section F	-0.342723	(6,202)	1.0000

Dependent variable: PORTINVLIAB?
Method: Pooled EGLS (cross-section weights)
Date: 07/10/18 Time: 10:50
Sample (adjusted): 2009Q3 2017Q2
Included observations: 32 after adjustments
Cross-sections included: 7
Total pool (unbalanced) observations: 215
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 11 total coef iterations

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	-1.45E+09	1.39E+09	-1.042693	0.2983
RESERVES?	0.348657	0.043290	8.053904	0.0000
EXR?	-2.22E+08	1.04E+08	-2.139744	0.0336
GLIBIS	107.0535	40.05656	2.672559	0.0081
D(EPU)	-6566847.	1054873.	-6.225252	0.0000
USYIELDGAP	-78901392	33865517	-2.329845	0.0208
AR(1)	0.151739	0.094202	1.610778	0.1088
Fixed effects (cross)	not listed			

Effects specification

Cross-section fixed (dummy variables)

Weighted statistics

R-squared	0.503830	Mean dependent var	1.41E+09
Adjusted R-squared	0.474354	S.D. dependent var	3.03E+09
S.E. of regression	2.34E+09	Sum squared resid	1.10E+21
F-statistic	17.09320	Durbin-Watson stat	1.953456
Prob. (F-statistic)	0.000000		

Unweighted statistics			
R-squared	0.406032	Mean dependent var	1.50E+09
Sum squared resid	1.55E+21	Durbin-Watson stat	1.974359

Finally, we check whether and how our empirical results for *other investment* capital inflows change, once we focus only on lower-middle-income countries (Table 11). Overall, the specification very much resembles that gained for the full country sample, except for the US yield gap, which even increases in significance.

Table 11: Other capital inflows to lower-middle-income economies – determinants according to an EGLS panel model

Model 1
Redundant fixed effects tests
Test cross-section fixed effects

Effects test	Statistic	d.f.	Prob.
Cross-section F	6.741688	(6,195)	0.0000

Dependent variable: OTHERINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2009Q4 2017Q2
Included observations: 31 after adjustments
Cross-sections included: 7
Total pool (unbalanced) observations: 207
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 16 total coef iterations

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	2.20E+09	1.12E+08	19.67850	0.0000
DGDP?-DGDP_US	172067.4	28432.60	6.051767	0.0000
RESERVES?	0.234355	0.045006	5.207173	0.0000
USYIELDGAP	53378854	20481747	2.606167	0.0099
AR(1)	0.014367	0.071700	0.200379	0.8414
AR(3)	0.174398	0.058970	2.957405	0.0035
Fixed effects (cross)	not listed			

Effects specification			
Cross-section fixed (dummy variables)			
Weighted statistics			
R-squared	0.487896	Mean dependent var	2.01E+09
Adjusted R-squared	0.459009	S.D. dependent var	3.87E+09
S.E. of regression	3.13E+09	Sum squared resid	1.91E+21
F-statistic	16.88930	Durbin-Watson stat	2.117192
Prob. (F-statistic)	0.000000		
Unweighted statistics			
R-squared	0.715158	Mean dependent var	2.68E+09
Sum squared resid	2.28E+21	Durbin-Watson stat	2.294681

Model 2 Redundant fixed effects tests Test cross-section fixed effects				
Effects test		Statistic	d.f.	Prob.
Cross-section F		8.675212	(6,196)	0.0000

Dependent variable: OTHERINVLIAB?
Method: Pooled EGLS (cross-section weights)
Sample (adjusted): 2009Q4 2017Q2
Included observations: 31 after adjustments
Cross-sections included: 7
Total pool (unbalanced) observations: 207
Iterate coefficients after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
Convergence achieved after 16 total coef iterations

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	2.20E+09	1.12E+08	19.66612	0.0000
DGDP?-DGDP_US	167646.1	22168.95	7.562205	0.0000
RESERVES?	0.234208	0.044104	5.310310	0.0000
USYIELDGAP	54008987	20627009	2.618363	0.0095
AR(3)	0.179588	0.059693	3.008549	0.0030
Fixed effects (cross)	not listed			

Effects specification			
Cross-section fixed (dummy variables)			
Weighted statistics			
R-squared	0.482044	Mean dependent var	2.03E+09
Adjusted R-squared	0.455618	S.D. dependent var	3.91E+09
S.E. of regression	3.17E+09	Sum squared resid	1.97E+21
F-statistic	18.24108	Durbin-Watson stat	2.078355
Prob. (F-statistic)	0.000000		
Unweighted statistics			
R-squared	0.715656	Mean dependent var	2.68E+09
Sum squared resid	2.28E+21	Durbin-Watson stat	2.265708

Having compared the results of our two variants of robustness checks with those based on our basic (full-sample) specifications (Tables 3-5), we now compare the results for upper-middle-income and high-income countries (Tables 6-8) vis-à-vis those for lower-middle-income countries (Tables 9-11).

For FDI flows, the exchange rate regime and capital account openness appear to matter more, in terms of significance, for capital flows to the lower-middle-income economies than for those to the upper-middle-income and high-income economies. The growth differential is much more significant for portfolio capital flows to the upper-middle-income and high-income economies than for the lower-middle-income economies.[30] Except FDI flows, *policy uncertainty* matters much more for capital flows to lower-middle-income economies than for flows to the upper-middle-income and high-income economies. Global liquidity turns out to be significant in explaining portfolio capital flows for both sub-groups but even

30 For the category "other flows", however, the growth differential becomes insignificant in the case of the upper-middle-income and high-income economies.

more significant for the upper-middle-income and high-income economies (Table 7, Model 2, vs. Table 10, Model 2)

For portfolio capital flows, the trade openness variable is highly significant for the upper-middle-income and high-income economies but becomes insignificant in the case of lower-middle-income countries (Table 7, Models 1 and 2, vs. Table 10, Models 1 and 2). In the same category of capital flows, financial developments is significant at the five per cent level for upper-middle-income and high-income economies but insignificant for lower-middle-income economies (Table 7, Model 3, vs. Table 10, Model 3).

For other capital flows, the US yield gap is slightly insignificant for the upper-middle-income and high-income economies but turns out to be significant at the one per cent level in the case of the lower-middle-income economies. In all other respects, the estimation results are generally comparable among both country samples. Overall, splitting the sample into two sub-groups yields relatively similar results to those obtained when using the entire sample, hence confirming the robustness of the analysis.

5 Conclusions and outlook

Our panel estimation results confirm that a combination of pull- and push factors are significant drivers of capital flows. The coefficient estimate for one of the most often stressed pull factors, the growth differential vis-à-vis the US, turns out to be positive, as expected, and significant at the 10 per cent level for nearly all of our final model specifications. In addition, all our final empirical models reveal the *robust role of foreign reserves as a pull factor* for capital inflows to emerging market and developing economies. In this sense, improving macroeconomic fundamentals and thus lowering sovereign risk premia would help emerging market and developing economies with higher external financing needs to receive higher equity inflows in times of rising policy uncertainty (Gauvin, McLoughlin, & Reinhardt, 2014). Both characteristics are textbook-style and underline the plausibility and consistency of our final empirical models.

However, there is considerable variation in the results across the different variants of capital flows (FDI, portfolio capital flows, "other" investment) to developing and emerging market economies. Overall, according to our results, the "push- and pull factor" model of capital inflows receives the *broadest empirical support in the case of portfolio flows*.

For FDI, macroeconomic stability (captured by high foreign exchange reserves), relatively stable exchange rates, capital account openness, and high income per capita appear as the most important variables contributing to FDI inflows, while higher global economic policy uncertainty clearly has an adverse effect. Variables capturing short-term financial conditions in both source and host countries turn out to be less relevant (i.e., they do not enter the final best model specifications), which is in line with expectations given that FDI is generally longer-term in nature.

Portfolio flows to developing and emerging market economies are affected by the growth differential vis-à-vis the US (except in one case where the effect is substituted by the effect of per capita income), trade openness, reserves, and exchange rate stability. The trade openness coefficient turns out to be significant and negative mainly because the trade-to-GDP ratio tends to be lower for larger economies. The estimated coefficient of reserves comes out as positive again, a pattern that proved to be very robust over all the specifications and estimations employed for our whole study. Moreover, the exchange rate coefficient turns out to be negative, suggesting that foreign portfolio investors are more inclined to invest when the exchange rate tends to be more stable. While investors holding foreign equities are inevitably exposed to exchange rate fluctuations and hence sensitive to exchange rate changes, local currency bond markets have been growing rapidly across emerging market and developing economies (Berensmann, Dafe, & Volz, 2015; Dafe, Essers, & Volz, 2018), making fixed income investors in these markets more sensitive to exchange rate swings.

And once more, the estimates for global liquidity are positive and highly significant throughout. In this context it is important to note that the global liquidity variable constructed by the BIS beats the alternative OECD global liquidity measure ("broad money aggregate") in all specifications. This variable indicates the importance of the ease of financing in global financial markets, with credit being among the key indicators of global liquidity for portfolio capital inflows to emerging market and developing economies. Overall, this appears plausible since portfolio flows are obviously more closely connected to speculative capital flows than physical foreign investment or "other" investment. The latter includes cross-border loans, which are among the most discussed side effects of global liquidity.

In the context of our main research question it is also important to note that the coefficient estimates of the Baker-Bloom-Davis global economic policy *uncertainty* variable are *negative*, in line with theoretical expectations, and *highly significant* in all three final models for portfolio flows (as well as in the final model for FDI flows). In many cases, it enters simultaneously with our BIS global liquidity indicator.

The US yield gap turns out to be negative in the case of portfolio flows (but positive for "other" investment, i.e., cross-border credit and loans). In the case of portfolio flows, we thus interpret the US yield gap as an indicator of global risk that negatively impacts capital inflows to emerging market and developing economies.

Other capital flows, including cross-border lending, respond strongly to the growth differential vis-à-vis the US and "monetary" factors, such as foreign exchange reserves, and the US yield gap. Here, in the context of cross-border loans, the US yield gap enters with a positive sign and thus seems to serve as a sign of global liquidity rather than global risk.

When controlling for differences amongst country groups, the results we get when including only upper-middle-income and high-income economies, and lower-middle income economies, respectively, are broadly in line with the results obtained with the full sample, confirming the overall robustness of the analysis.

Overall, we corroborate the earlier Bruno and Shin (2013) result that global (push) factors dominate local (pull) factors as determinants of capital inflows to emerging market and developing economies. We support the findings of Foerster, Jorra and Tillmann (2014) in the sense that they also find a consistent and robust impact of global push factors but are not able to support their finding of a dominance of country-specific pull factors over global push factors.

To conclude, our estimation results imply that the slowdown and (to a certain extent) the higher variability of portfolio flows to emerging market and developing economies in recent years (as visible in Appendix 5) may be due to lower growth prospects of the recipient countries, worse global risk sentiment and lower global liquidity (as evidenced in Appendix 16), combined with higher policy uncertainty (as displayed in Appendix 12). Higher policy uncertainty appears to have led to an option value of waiting under uncertainty with foreign direct and portfolio investment in emerging market and developing economies. This is not least because the US acts as the safe haven for international capital flows in times of high policy uncertainty (Gauvin, McLoughlin, and Reinhardt, 2014), making it very difficult for emerging market and developing economies to attract foreign capital in periods of higher uncertainty. Another central result of our paper is that it is mainly *economic policy* uncertainty that hampers capital flows to the emerging market and developing economies, since we have shown that the Baker-Bloom-Davis policy uncertainty index clearly beats the broader VIX index in terms of all statistical goodness-of-fit criteria.

With an eye on our capital flow-type specific estimation results, it is apparent that policymakers in emerging market and developing economies ought to carefully analyse the *composition of observed capital inflows* and the factors that drive them. Indeed, for any serious assessment of financial vulnerabilities related to external financing it is crucial to understand the degree to which the drivers of capital flows are under or beyond the control of domestic economic policy (Koepke, 2015). Examples of factors that are beyond the control of domestic economic policies include, according to our empirical results, the ease of financing in global financial markets (with credit being among the key indicators in major industrialised economies) as well as global policy uncertainty.

Since in the previous literature cyclical and structural forces have typically been analysed separately rather than in an integrated empirical framework, there is a risk that the importance of structural forces for capital flows to emerging market and developing economies may be understated in periods like the present one, when interest rates are ultra-low worldwide, global liquidity in the BIS definition ("credit ease") has gone down and policy uncertainty is high (cf. Koepke, 2015). This is exactly the reason why we developed an integrated empirical approach that simultaneously embraces structural push factors and external pull factors, such as policy uncertainty and global liquidity.

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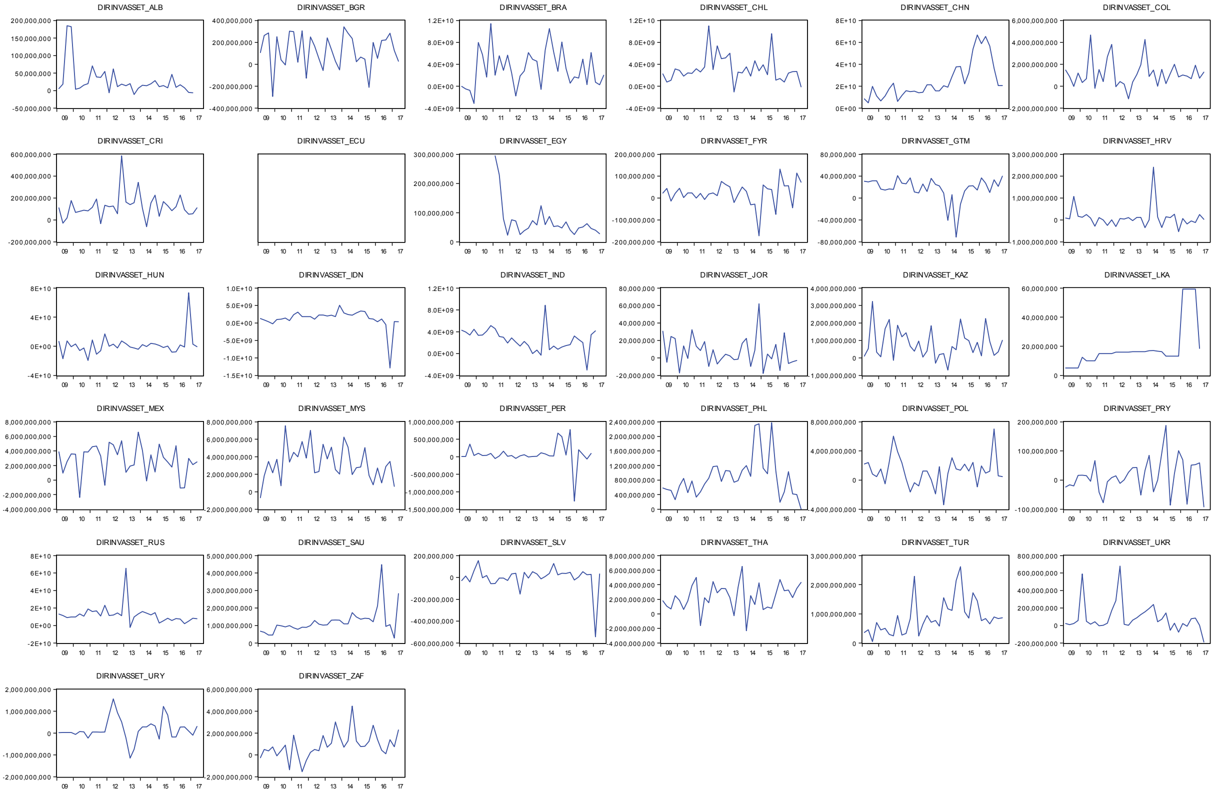
Appendix

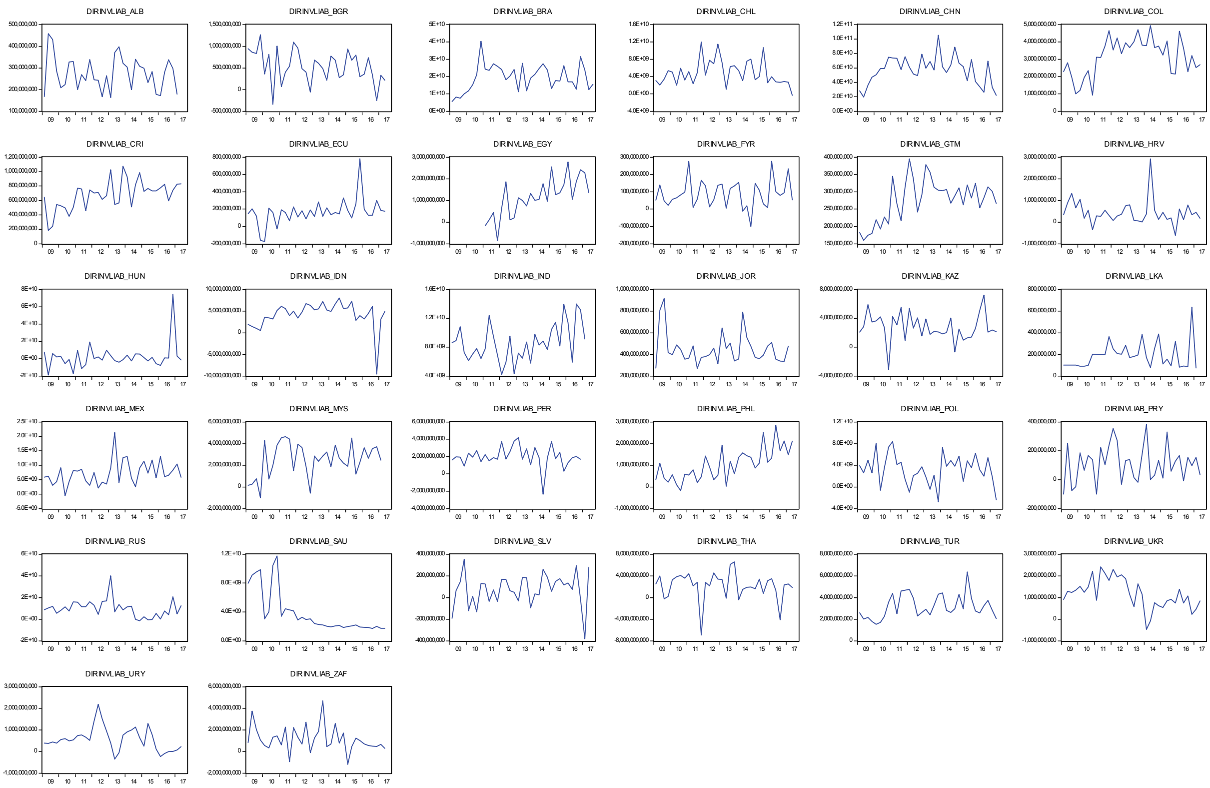
Appendix 1: Overview of variables

Variables	Sources
Dependent variables	
DIRINVLIAB, PORTINVLIAB, OTHERINVLIAB, DIRINVASSET PORTINVASSET, OTHERINVASSET with DIRINV = FDI inflow PORTINV = portfolio capital inflow OTHER = other capital inflows, esp. loans LIAB = change in domestic resident liabilities to foreigners ASSET = change in domestic resident liabilities to foreigners	Financial Flow Analytics Database compiled from the IMF's Balance of Payments Statistics, International Financial Statistics, and World Economic Outlook databases, World Bank's World Development Indicators database, Haver Analytics, China Economic and Industry (CEIC) Asia database, and CEIC China database
Pull factors	
Real GDP growth (DGDP), interest rate (CENTRALBANKRATE), trade openness (TRADEOPEN), reserves (RESERVES), income per capita (INCOMECAPI)	IMF WEO database, International Financial Statistics (IFS), national sources
Exchange rate regime (EXR) (1 to 5, the higher, the more flexible)	IMF Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) and Coarse Classification Exchange Rate Regime Ilzetzki, Reinhart, and Rogoff Classification Web: http://www.carmenreinhart.com/data/browse-by-topic/topics/11/
Institutional quality (INSTQUAL)	Rule of law measure from World Bank's Worldwide Governance Indicators
Capital account openness (CAPACCOPEN)	Chinn and Ito (2006), updated version of the database Web: http://web.pdx.edu/~ito/Chinn-Ito_website.htm
Financial development (FD)	Svirydzenka (2016)
Push factors	
Global risk aversion (VIX)	Chicago Board Options Exchange (CBOE) Market Volatility Index (VIX), Haver Analytics
Economic policy uncertainty (EPU)	Baker, Bloom and Davis' (2015) economic policy uncertainty index: http://www.policyuncertainty.com/
US yield gap (USYIELDGAP) = Gap between long- and short-maturity bond yields in the United States (IMF, 2016) 10-year minus 3-year bond yields.	Federal Reserve (FRED)
US corporate spreads (USCORPSPREAD) =US BAA corporate bond spreads over treasury	FRED
Global liquidity a) BIS global liquidity indicator (GLIBIS) = cross-border lending and local lending denominated in foreign currencies, all instruments and for all sectors (Q:TO1:5J:A:B:I:A:USD) b) Global liquidity OECD (GLIOECD) = Broad money for all OECD countries	Bank for International Settlements Global Liquidity Indicators (BIS, 2017): https://www.bis.org/statistics/gli.htm OECD
US shadow rate (SHADOWFEDERALFUNDSRATE)	Wu-Xia Shadow Federal Funds Rate from Federal Reserve Bank of Atlanta, downloaded from Haver Analytics, Wu and Xia (2016)
Commodity prices world (COMMODITYPRICE)	International Monetary Fund

Appendix 2: Variable plots – foreign direct investment – gross outflows (change in foreign assets owned by domestic residents)

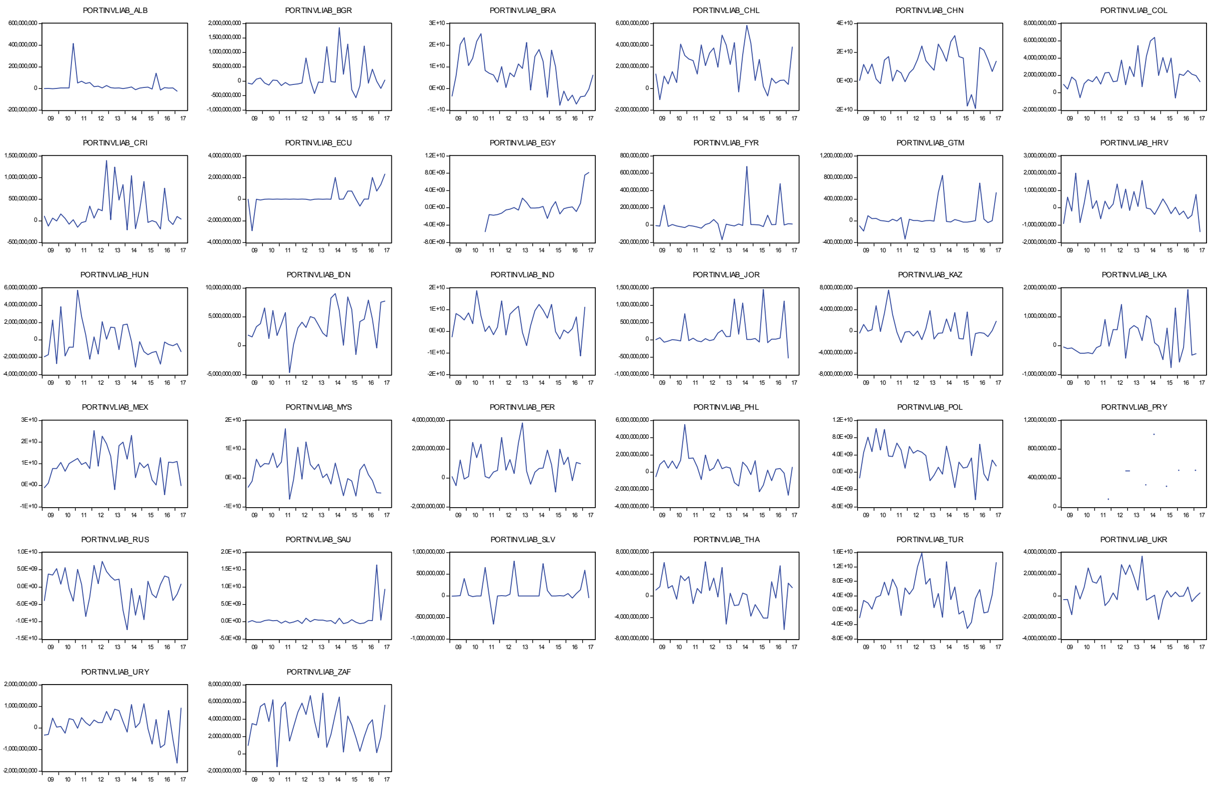


Appendix 3: Variable plots – foreign direct investment – gross inflows (change in domestic resident liabilities to foreigners)

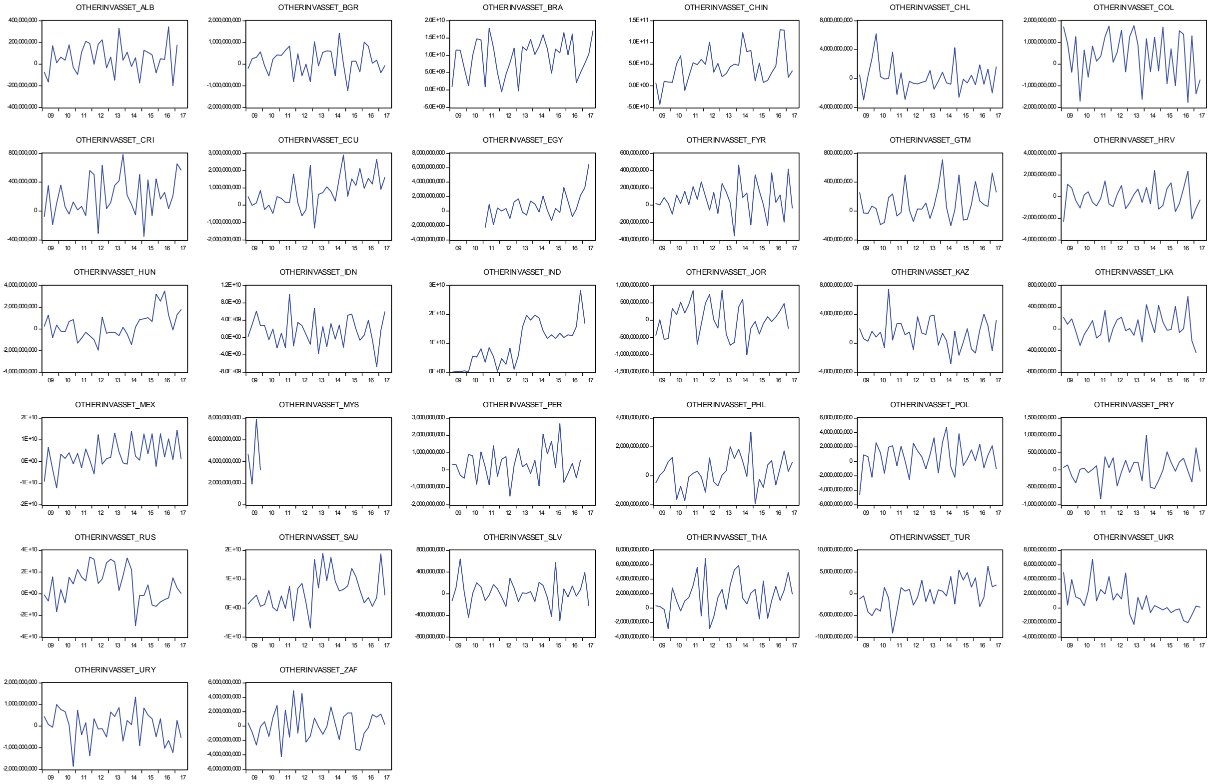


Appendix 4: Variable plots – foreign portfolio investment – gross outflows (change in foreign assets owned by domestic residents)

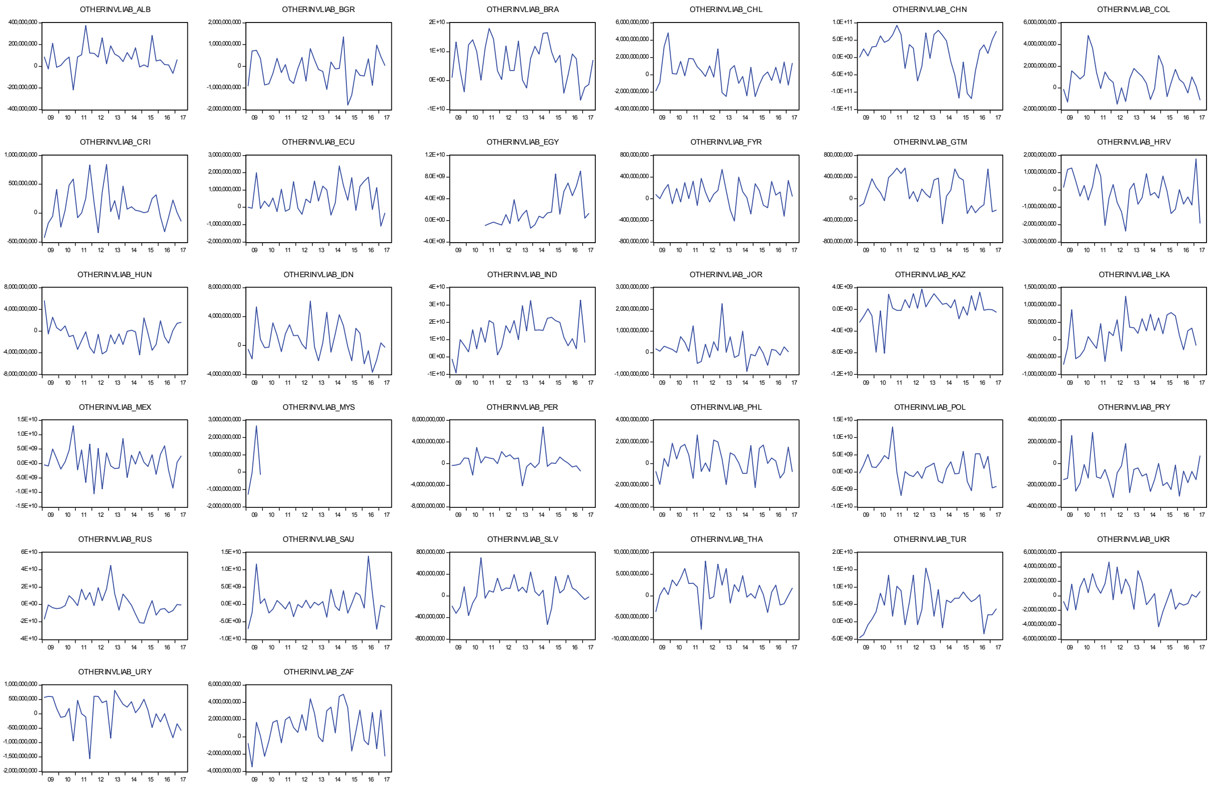
Appendix 5: Variable plots – foreign portfolio investment – gross inflows (change in domestic resident liabilities to foreigners)



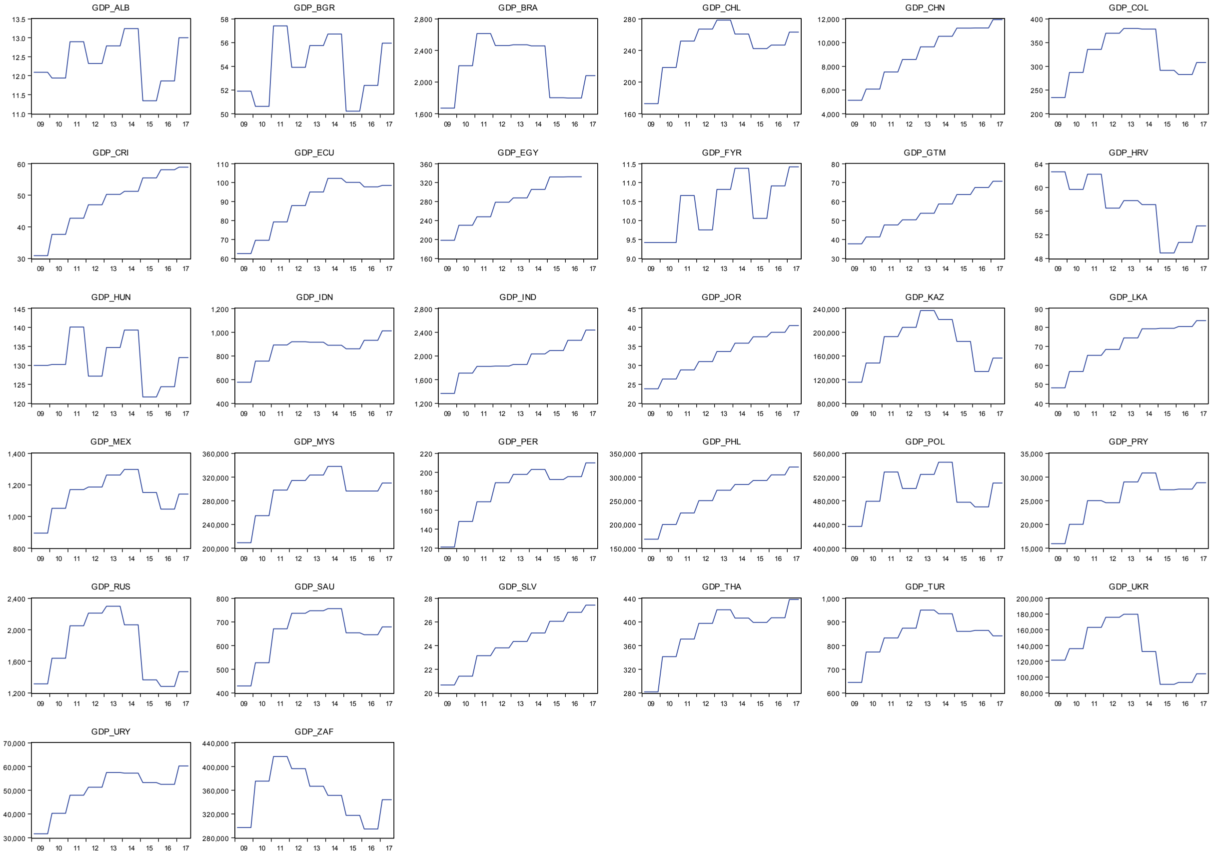
Appendix 6: Variable plots – other investment – gross outflows (change in foreign assets owned by domestic residents)



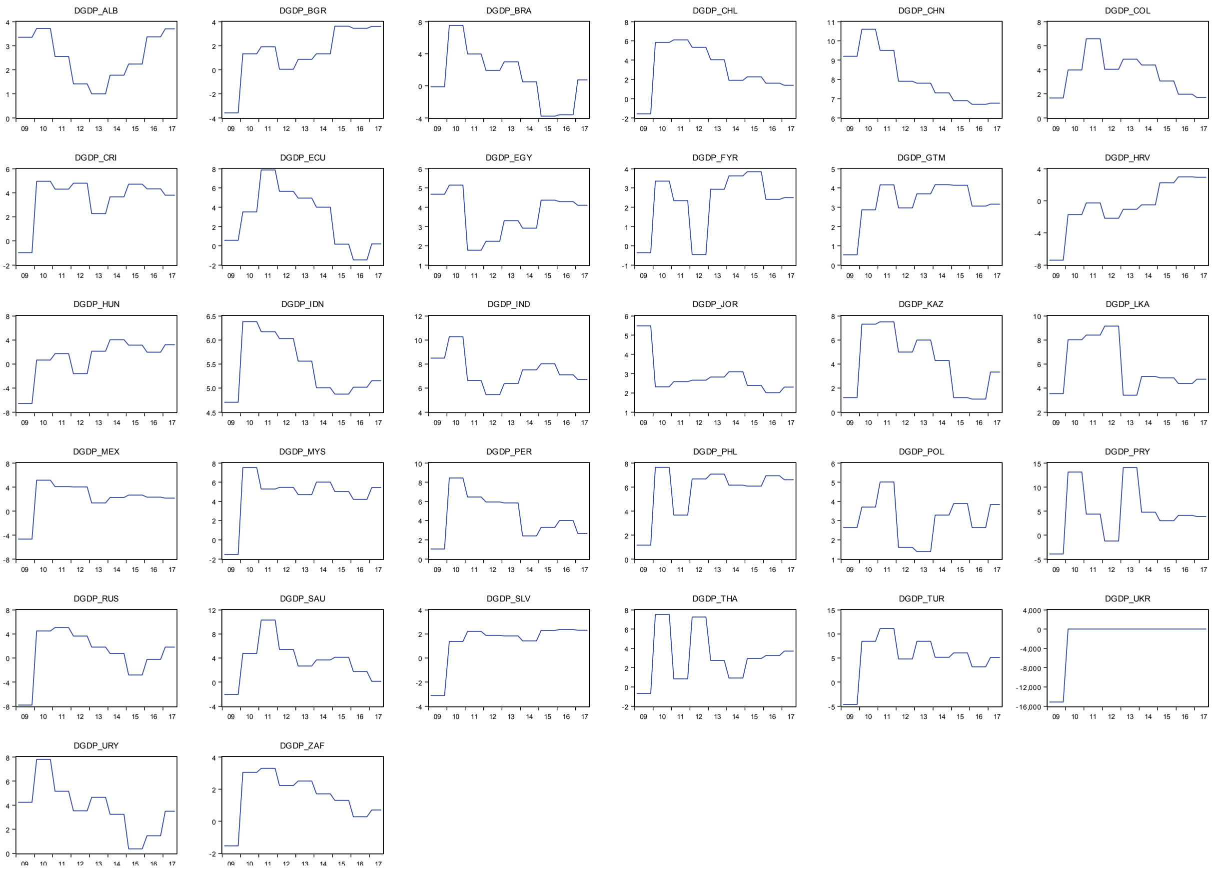
Appendix 7: Variable plots – other investment – gross inflows (change in domestic resident liabilities to foreigners)



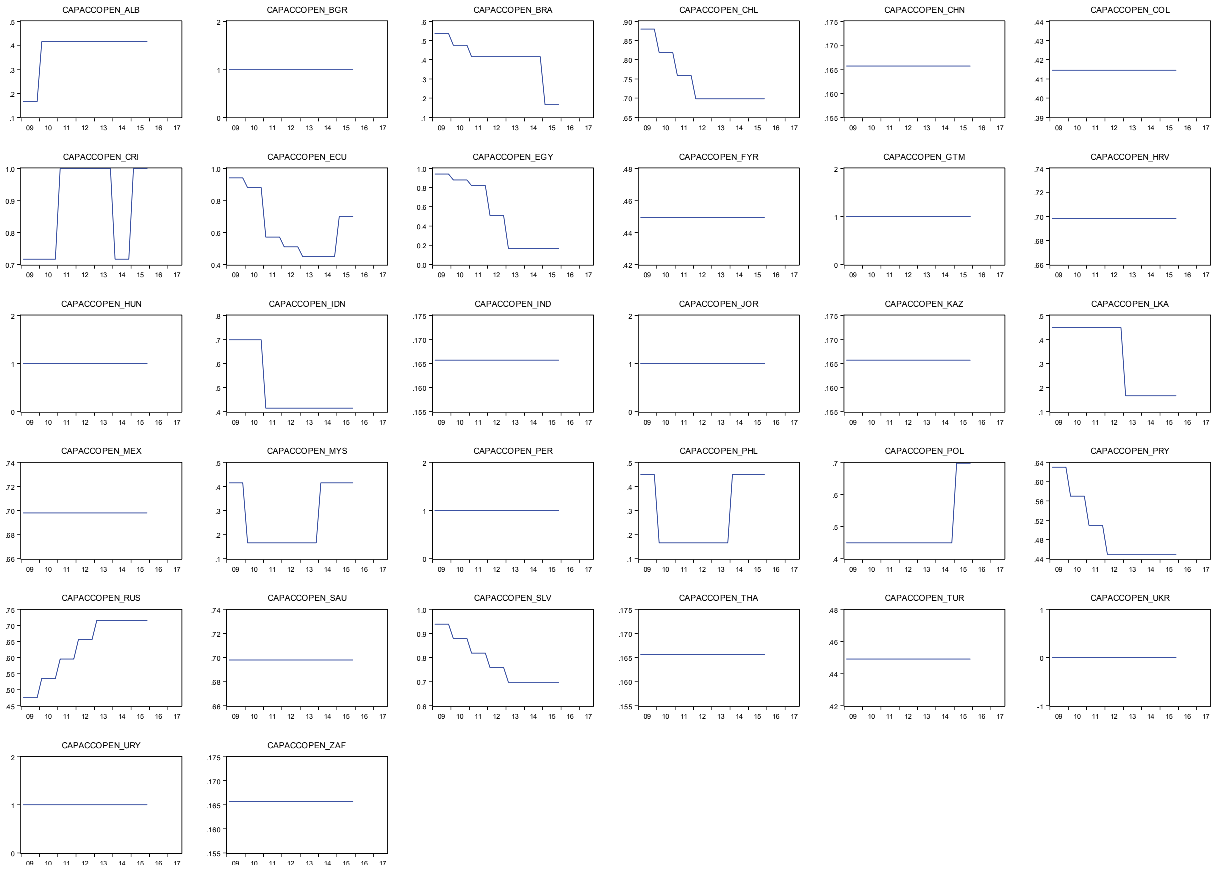
Appendix 8: Variable plots – GDP (in Dollar)



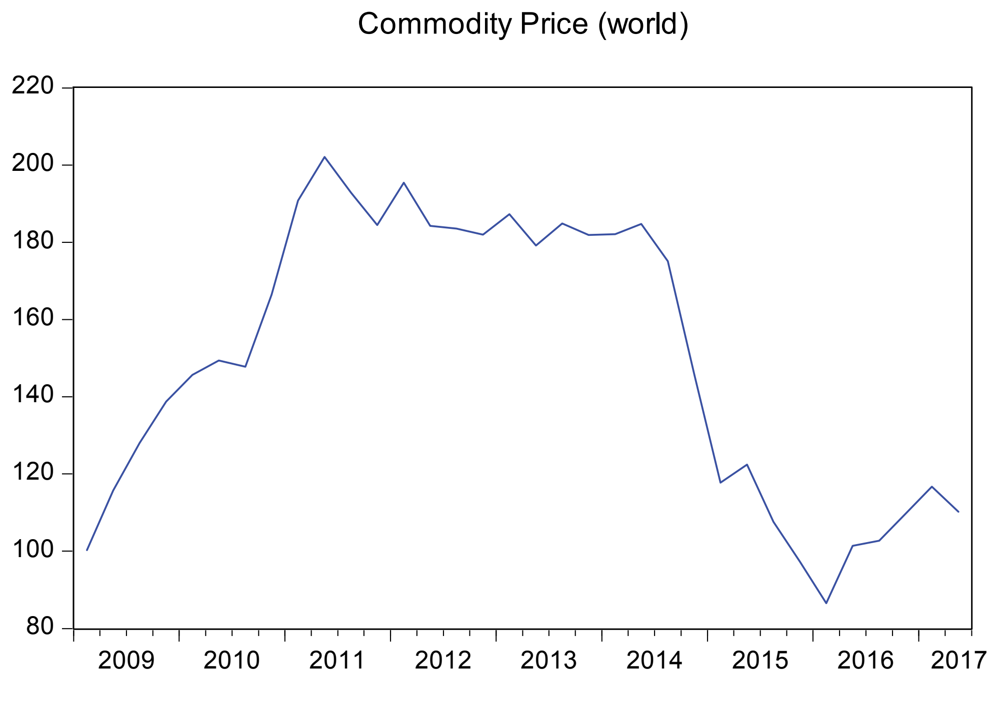
Appendix 9: Variable plots – real GDP growth rates



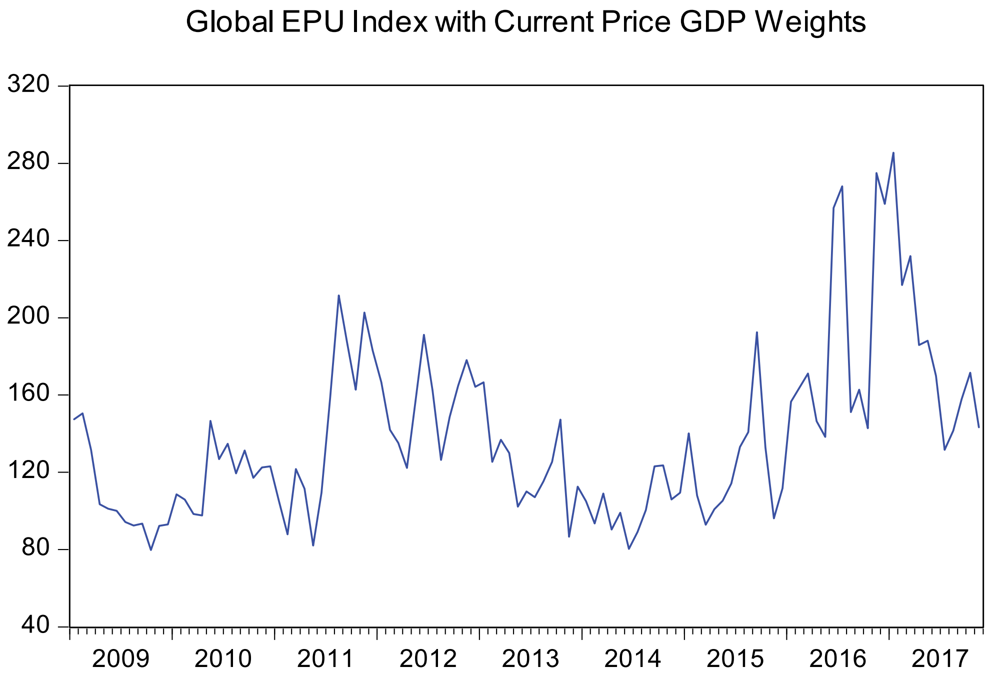
Appendix 10: Variable plots – capital account openness



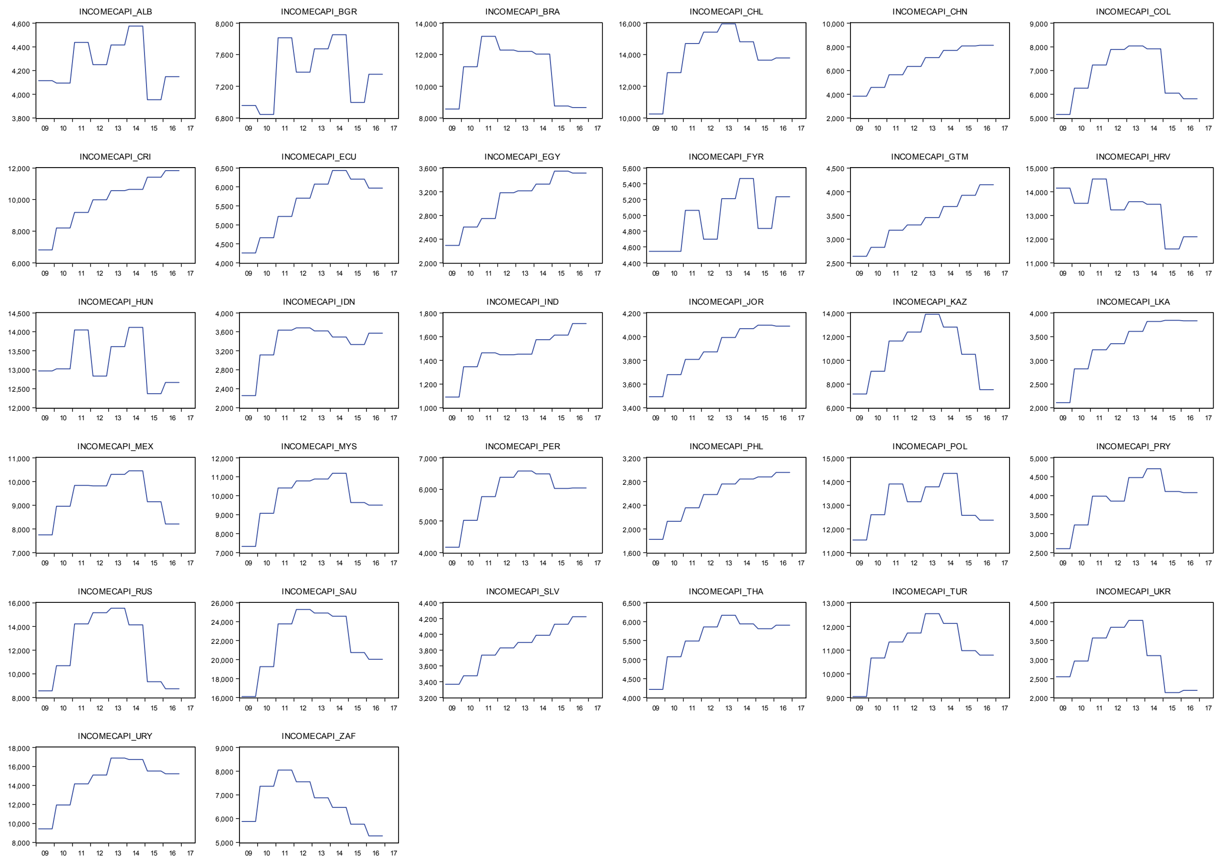
Appendix 11: Variable plots – commodity price



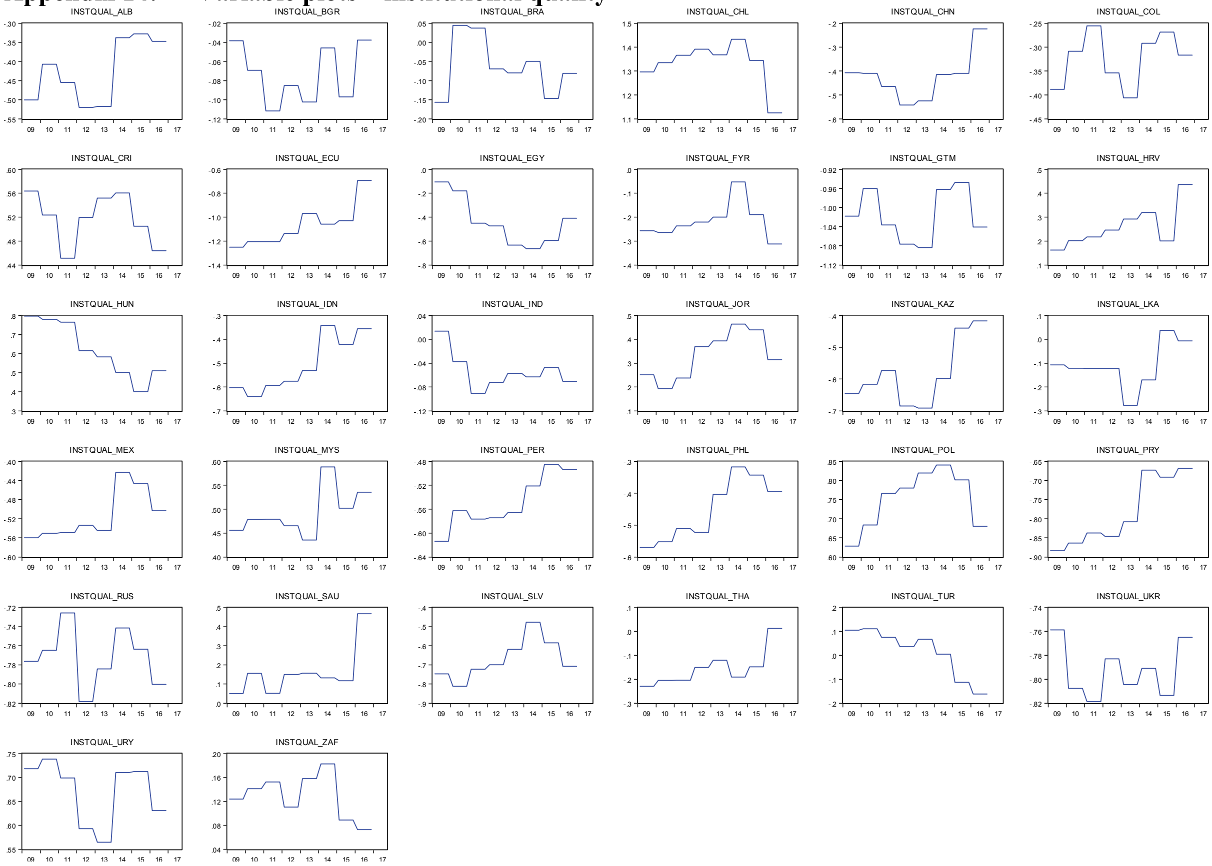
Appendix 12: Variable plots – global economic policy uncertainty



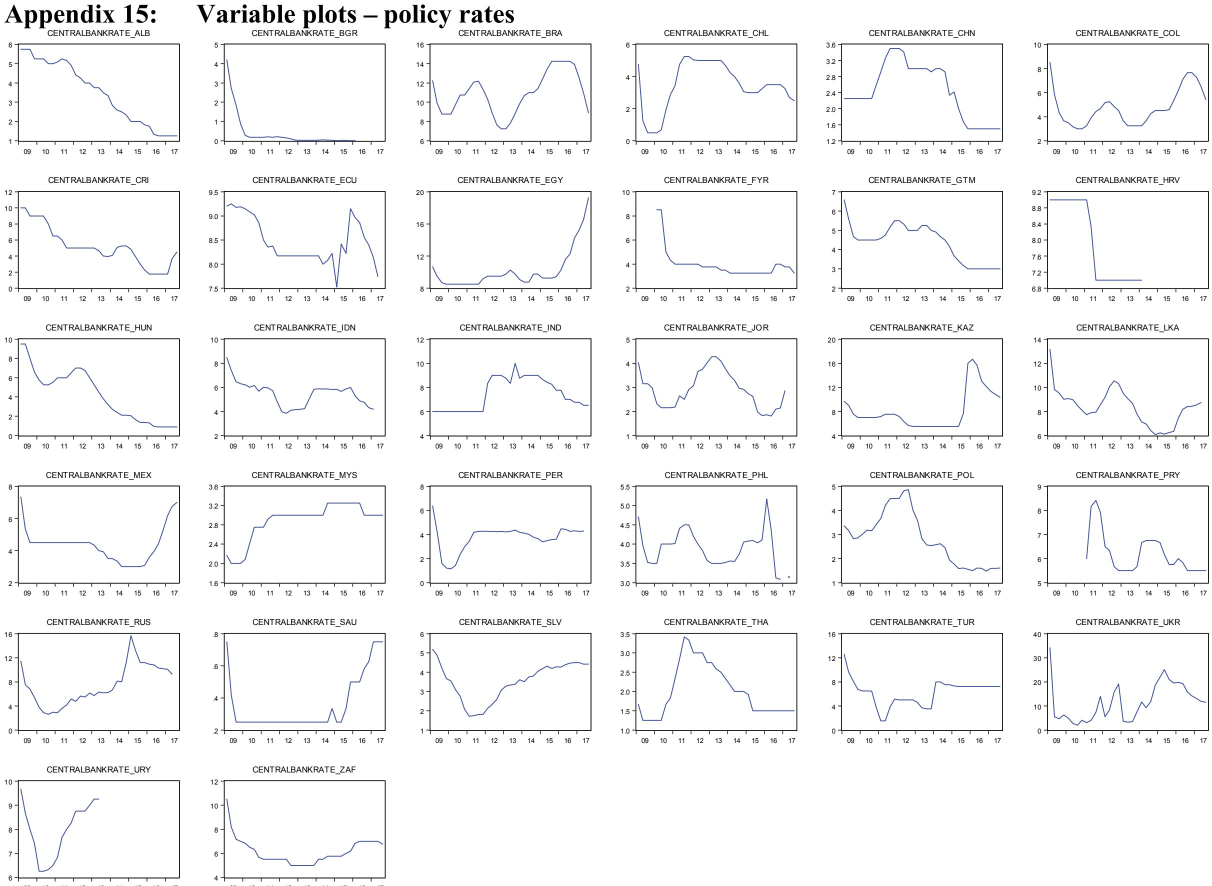
Appendix 13: Variable plots – income per capita



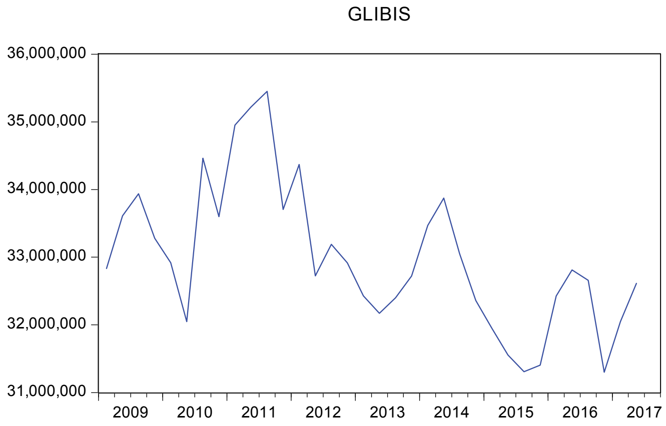
Appendix 14: Variable plots – institutional quality

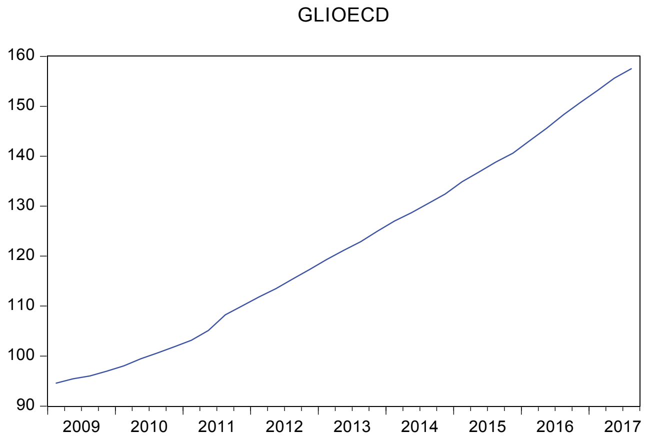


Appendix 15: Variable plots – policy rates

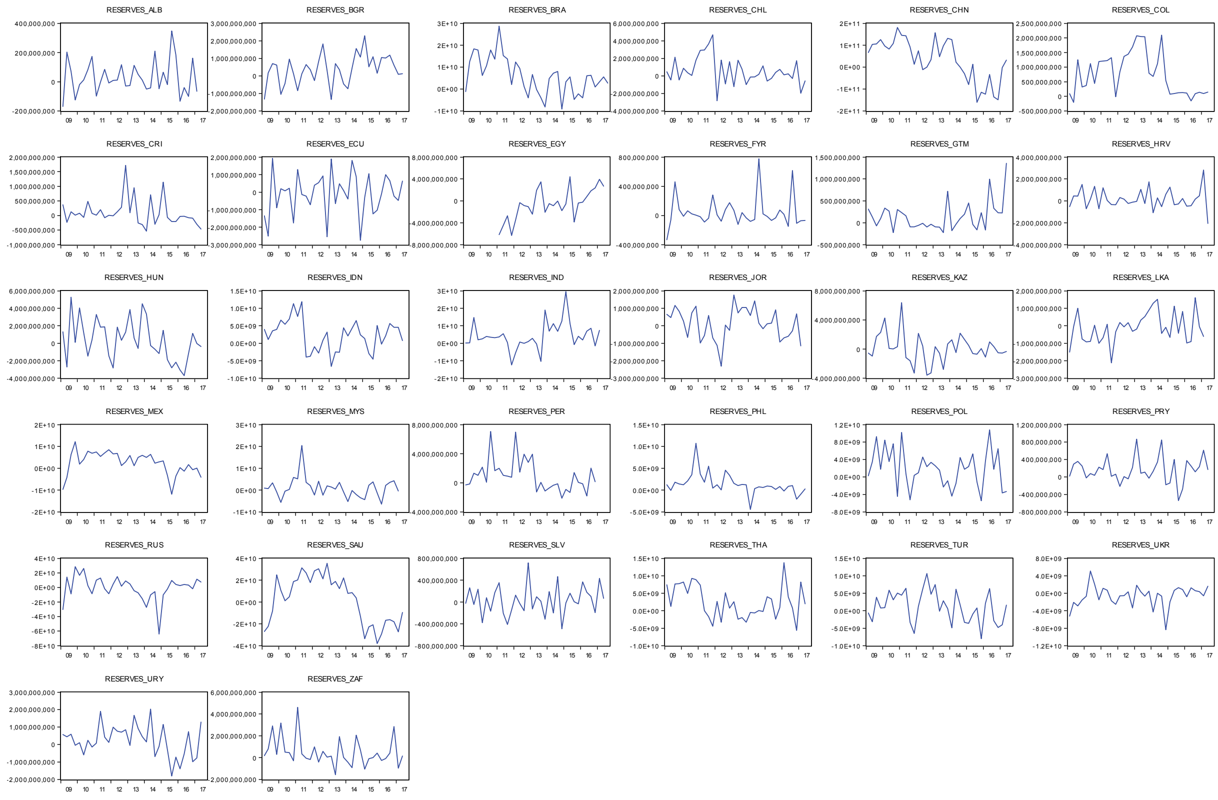


Appendix 16: Variable plots – global liquidity

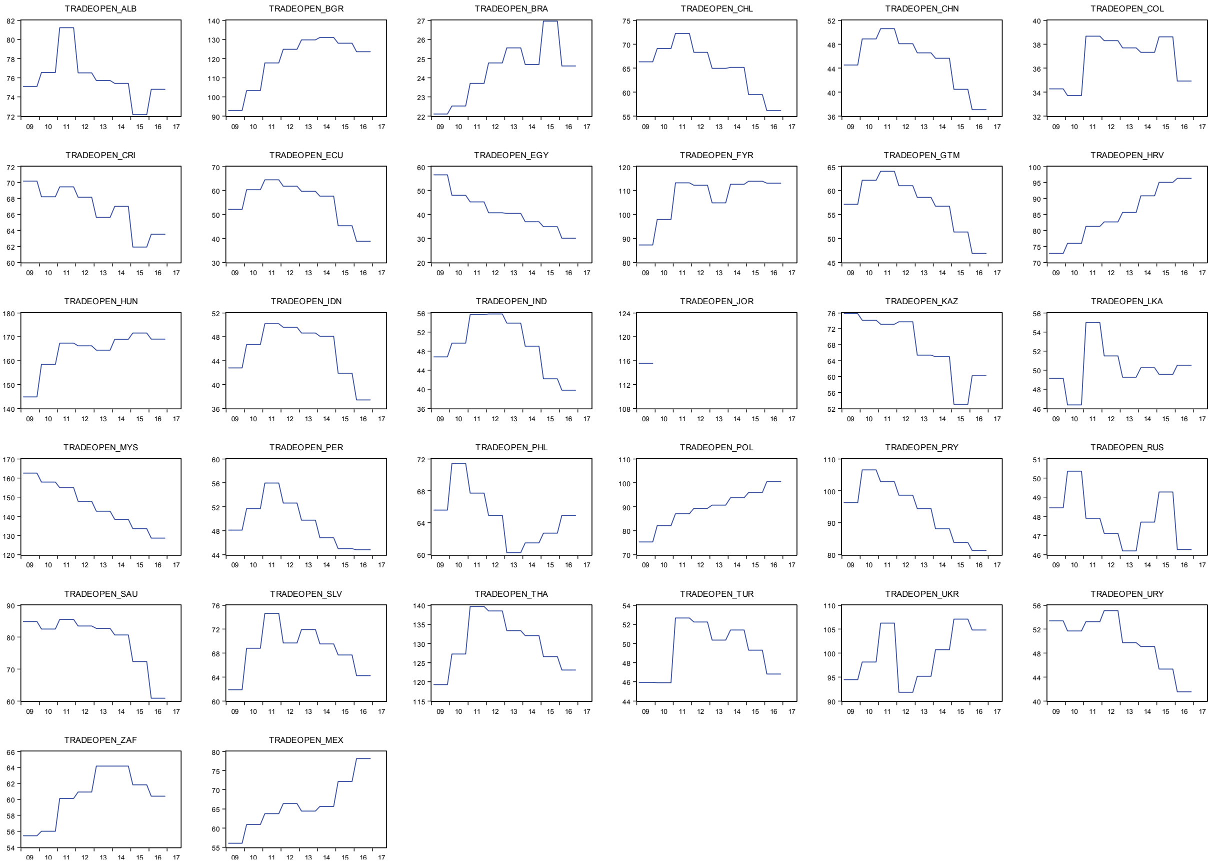




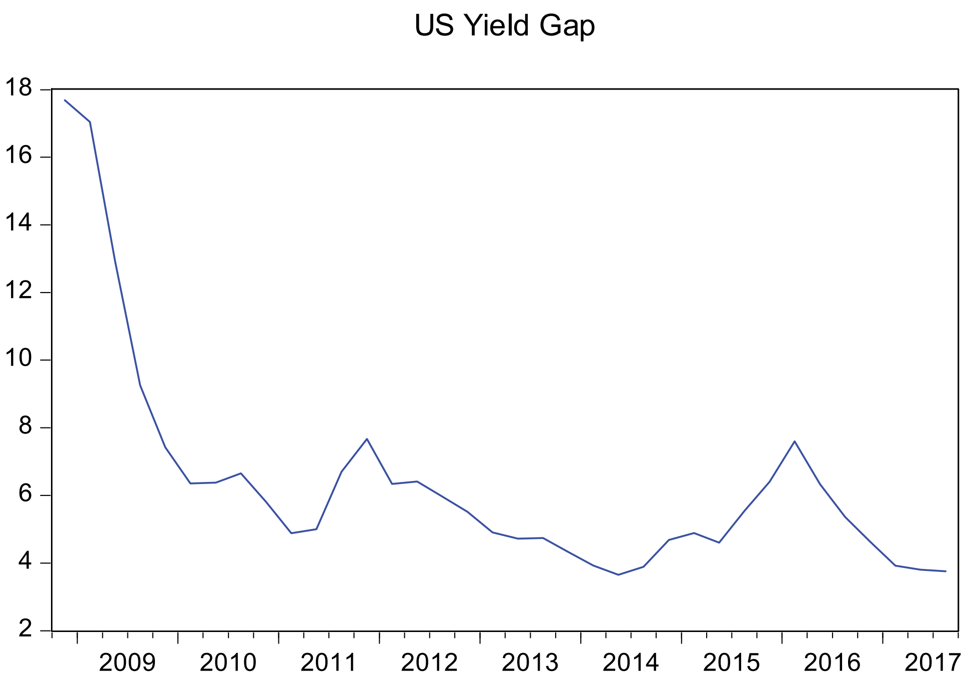
Appendix 17: Variable plots – reserves



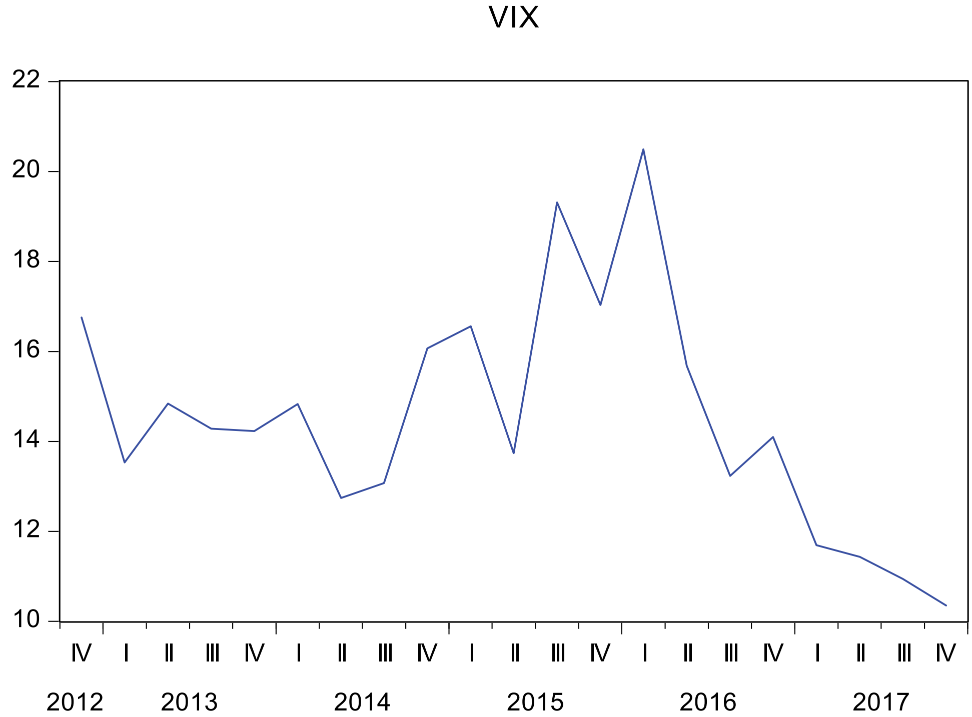
Appendix 18: Variable plots – trade openness



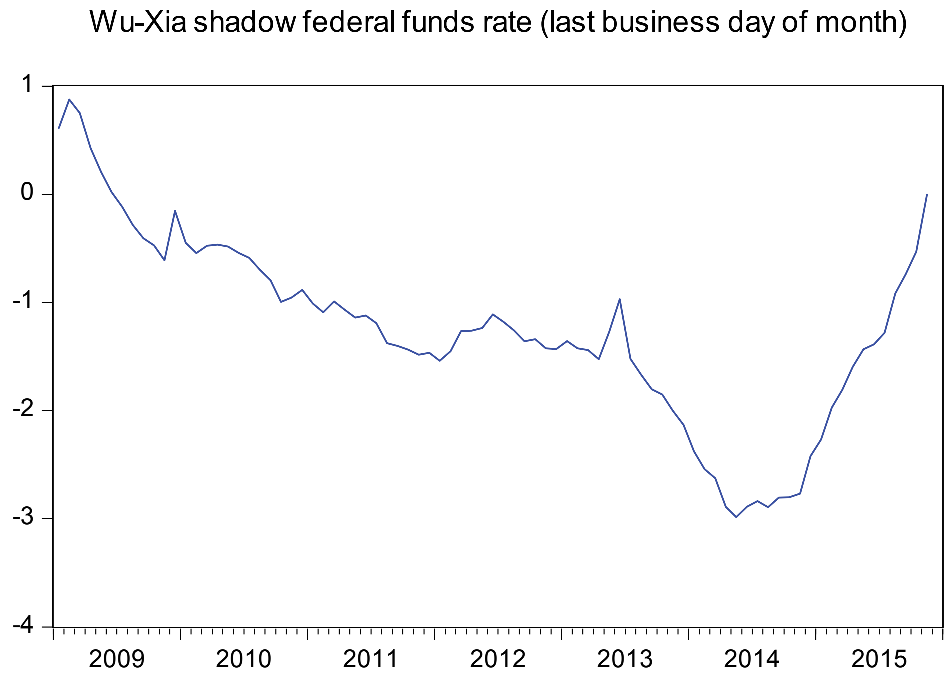
Appendix 19: Variable plots – US yield gap



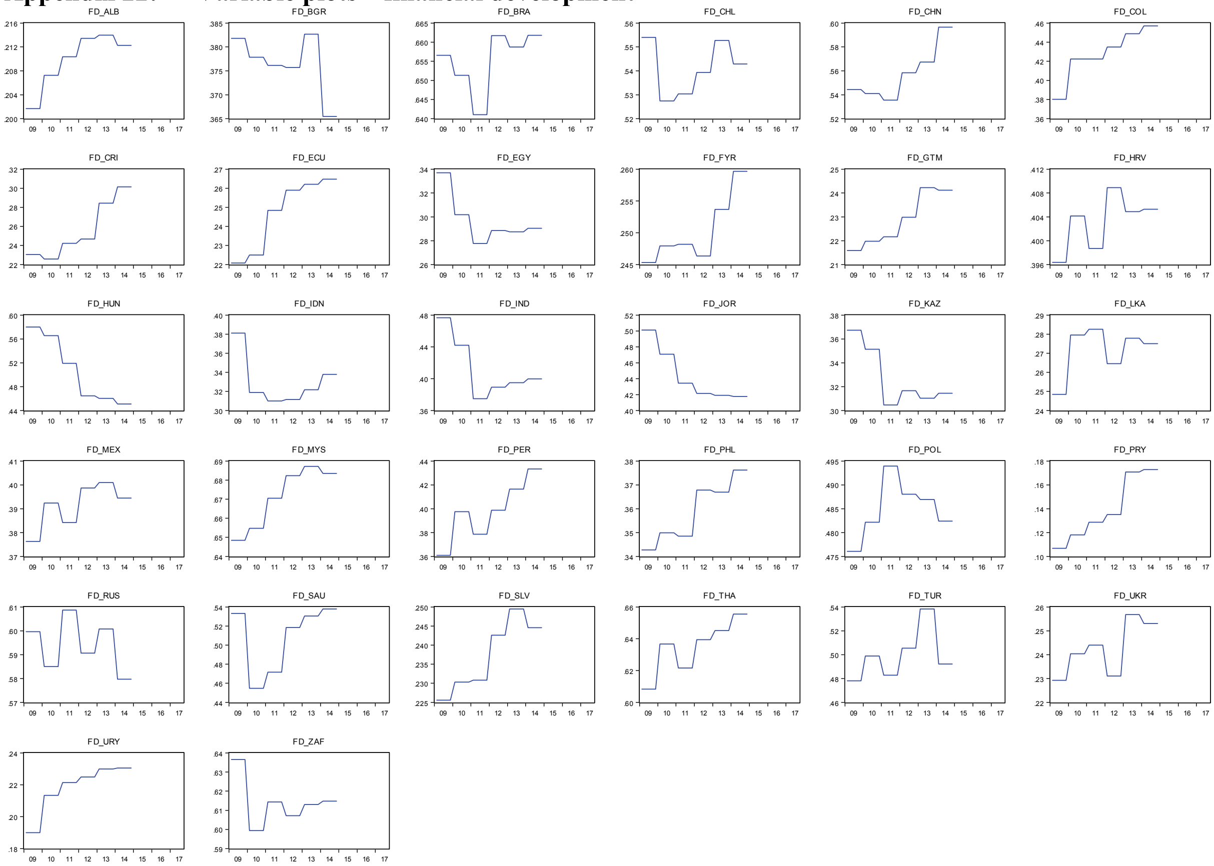
Appendix 20: Variable plots – VIX



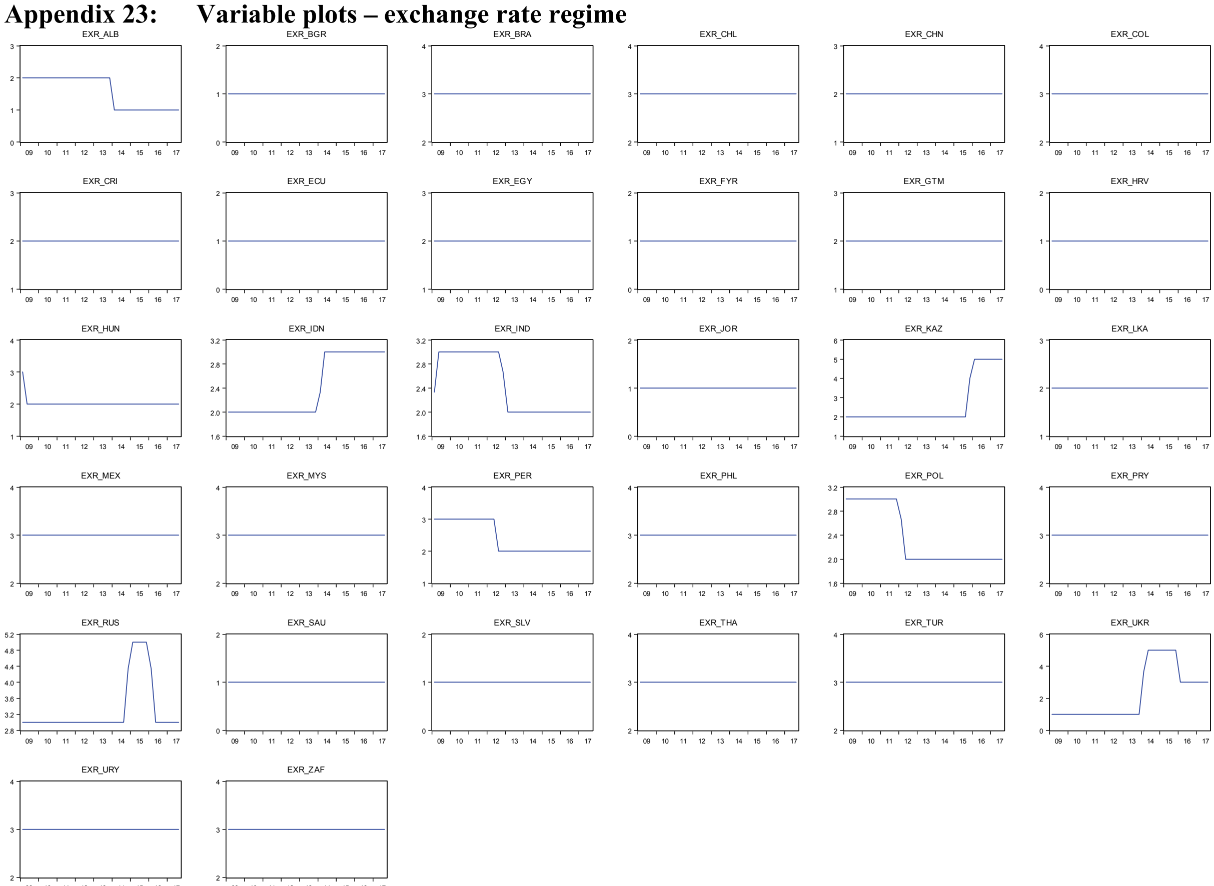
Appendix 21: Variable plots – US shadow rate



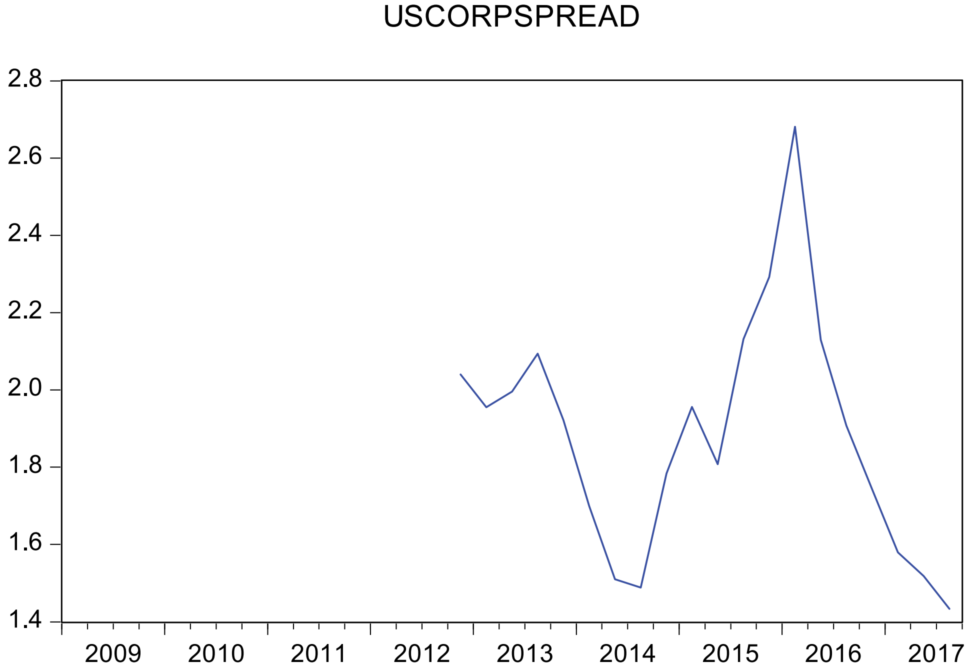
Appendix 22: Variable plots – financial development



Appendix 23: Variable plots – exchange rate regime



Appendix 24: Variable plots – US corporate spread



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