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Policy Uncertainty Spillovers to Emerging Markets - Evidence from Capital Flows*

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Résumé

Nous étudions dans quelle mesure l'incertitude politique des pays avancés influence les flux de capitaux vers les pays émergents (PE). Nous trouvons qu'une augmentation de l'incertitude politique aux États-Unis réduit significativement les flux obligataires et actions vers les PE. Inversement, une augmentation de l'incertitude politique Européenne a des effets différents entre flux obligataires et actions : les flux actions augmentent alors que les flux obligataires diminuent. L'effet de l'incertitude politique sur les flux de capitaux varie dans le temps et dépend des conditions globales et domestiques. Après le début de la crise financière, une plus grande partie de l'effet de l'incertitude politique sur les flux de capitaux fut transmise via l'incertitude financière globale. Nous trouvons de plus des changements structurels dans l'impact des déterminants de flux de capitaux au cours du 2nd semestre 2007 puis fin 2010. Pour les deux types de flux, le niveau de l'incertitude financière globale explique ces non linéarités. Enfin, le niveau de risque de défaut de chaque pays explique aussi les non linéarités pour les flux actions.

Mots-clés: Incertitude Politique, Flux de Portefeuille, Économies Émergentes, Non linéarités

Codes classification JEL: F21, F32, F42

Abstract

We study the extent to which uncertainty in advanced country macroeconomic policy spills over to emerging markets via portfolio bond and equity flows. We find that increases in US policy uncertainty significantly reduce portfolio bond and equity flows into EMEs. Conversely, increases in EU policy uncertainty have different effects on equity vs. bond flows into EMEs: equity inflows increase, but bond inflows decrease. The spillover effect of policy uncertainty on capital flows depends on the time period as well as on global and domestic economic conditions. After the financial crisis more of the effect of policy uncertainty on capital flows was transmitted via overall financial market uncertainty than previously. We also find evidence for a structural break in the direction and explanatory power of portfolio flow determinants including policy uncertainty in Q2 2007 at the onset of the financial crisis, and again in Q4 2010. For both bond and equity flows, the level of global financial market uncertainty is the chief driver of the nonlinearities, while in addition to the global factor the level of country specific default risk matters for equity flows only.

Keywords: Policy Uncertainty, Portfolio Capital Flows, Emerging Market Economies, Nonlinearity

JEL Classification: F21, F32, F42

1 Introduction

Since the end of the 'Great Moderation' and the global financial crisis, policy makers have struggled to find the appropriate policy mix for returning to sustainable growth. A marked feature of this discussion has been the effects of macroeconomic policy uncertainty on domestic investment decisions by firms, especially in the light of the uncertain US fiscal outlook and the ongoing Euro Area crisis.[1] At the same time, concerns regarding the impact of domestic policies on other economies - i.e. 'spillover effects' - feature prominently in the international policy debate. Attention has also focused on the spillover impacts of capital control policies as well as of monetary policy in advanced countries. More recently, policymakers have drawn these two debates together to analyse the 'spillover effects' of advanced country policy uncertainty to investment and output in the rest of the world (IMF, 2013).[2]

The goal of this paper is to examine whether changes in macroeconomic policy uncertainty in the US and EU spilled over to EMEs via portfolio capital flows.

We offer two main findings. First, we find that increases in policy uncertainty in the US tend to reduce both bond and equity flows to EMEs, potentially driven by safe haven flows. Conversely, increases in EU policy uncertainty tend to have different effects on equity vs bond flows into EMEs: equity inflows tend to increase, but bond inflows tend to decrease. Furthermore, after the outbreak of the financial crisis in August 2007, more of the spillover effect of policy uncertainty on capital flows was transmitted via general financial market uncertainty than previously.

Second, we find that the impact of policy uncertainty depends on global and domestic conditions. We also find the existence of a structural break in the effect of changes in policy uncertainty on capital flows, in Q2 2007 as the first signs of investor unease related to the financial crisis emerged. A second structural break occurred in Q4 2010 for bond and equity flows. Bond flows to EMEs in particular were particularly negatively impacted by changes in European uncertainty during the crisis period regime. Furthermore, we identify global and domestic triggers for changes in the effect of changes in policy uncertainty - and other determinants of portfolio flows - on capital flows. For equity flows, the level of global financial market uncertainty and country specific sovereign risk are respectively the chief global and domestic catalysts for the changing effects of US and EU policy uncertainty (and other push / pull factors) on capital flows. For bond flows, only when global financial market uncertainty is high does the relationship between policy uncertainty and flows alter.

Recent times have seen heightened levels of macroeconomic policy uncertainty. Figure A.1 shows the

[1] See for example Baker & Bloom (2012), "Falling policy uncertainty is igniting the US recovery", VoxEU.org, and IMF (2012), "Coping with high debt and sluggish growth".

[2] See IMF (2013, chap. 2, p 77), 'Spillover Feature: Spillovers from Policy Uncertainty in the United States and Europe'.

evolution of a recent measure of policy uncertainty taken from Baker et al. (2013).[3] Following a bout of policy uncertainty in the early 2000s, the index had been lower in the period of the 'Great Moderation', before increasing markedly in the wake of the global financial crisis. Recent times have seen a retreat in policy uncertainty in both the US and Europe from previous peaks but it remains at elevated levels. Moreover, while movements in US and European policy uncertainty levels have generally been correlated they have also diverged at times.[4]

How could policy uncertainty impact portfolio capital flows into EMEs? In principle, policy uncertainty could lead to an increase or decrease in portfolio inflows to EMEs. On the one hand, a less predictable political environment hinders domestic growth prospects decreasing the attractiveness of investing in a given country. Based on this we would - ceteris paribus - expect investors to shift more of their investment abroad given the declined attractiveness of investing in the US or the EU.[5] On the other hand, higher policy uncertainty may impact advanced economy investor's willingness to take risk and lead to safe-haven flows (i.e. increase portfolio flows into countries perceived as safe). Greater uncertainty may then have a similar impact on portfolio flows as measures of risk appetite. The data also highlight a strong relationship between macroeconomic policy uncertainty and a common measure of investment risk in the US, the US equity risk premium (Figure A.3). Our paper can be interpreted as assessing the relative strength of these competing hypothesis for policy uncertainty shocks originating from two distinct regions and distinguishing between bond and equity flows.

Our empirical approach takes into account nonlinearities. One reason is that in periods when the equity risk premium is high, investors are more risk averse (eg. see Kocherlakota 1996). This means that portfolio flows are likely to be more sensitive to adverse shocks to news and growth expectations (as well as other factors). This leads to 'risk - on, risk - off' behaviour from investors, who shift risk as a function of news / uncertainty shocks (Goldman Sachs, 2012). Prior to 2008, the correlation between the risk premium and policy uncertainty was negative (-0.16 in Figure A.3), while since then these two measures tracked each other more closely (0.51 from 2008 onwards).

This paper proceeds as follows. Section 2 examines the literature related to our study. Section 3 presents the data and methodology that we use for our study. Section 4 presents our empirical results regarding the spillover effects of advanced country policy uncertainty on capital flows to EMEs. Section 5 concludes.

[3] It is based on a newspaper search component, as well as professional forecaster disagreement regarding future inflation (monetary policy uncertainty), future budget balances (fiscal policy uncertainty) and also tax code expiration data (for US). See the Section 3 for more details about data.

[4] The two measures of policy uncertainty are highly correlated - from the beginning of the sample (January 2004) until August 2007, the correlation between European and US policy uncertainty was 0.66, increasing to 0.71 in the second part of the sample. Furthermore, sharp decreases in the rolling correlation suggest that policy uncertainty indexes diverged at times (see Figure A.2).

[5] Within the country experiencing the increase in policy uncertainty, it is possible that investors allocate more investment from equity to bond funds, but this may in turn depend on the sources of uncertainty (higher inflation uncertainty may favour bonds, higher budget uncertainty may favour equity investments).

2 Literature review

The paper is related to various strands of the literature. Most broadly, it relates to the literature on the determinants of capital flows. This has distinguished between 'push' and 'pull' factors. Fratzscher (2012) shows that global factors such as investor risk aversion and world interest rates, as well as domestic economic attributes such as country specific sovereign risk, play a critical role in determining flows of cross border capital. Recently, there has been some focus in this literature on the determinants of 'extreme capital events' (Forbes & Warnock, 2012a). Forbes & Warnock (2012b) examine extreme episodes in debt and equity portfolio flows.[6] We do not focus on extreme events, but share with these contributions the focus on *gross* capital flows, while examining the impact of a global factor - policy uncertainty - that has (to our knowledge) not yet been analysed by this literature.

Secondly, we relate to a broad and diverse literature that examines the impact of economic uncertainty on financial and real variables. Wright (2011) finds a positive correlation of inflation uncertainty (as proxied by forecaster disagreement) with domestic bond risk premia. He notes that this is supportive of the view that bond risk premia mainly reflect uncertainty about future inflation (see amongst others Piazzesi & Schneider 2007, Rudebusch & Swanson 2008, and Campbell et al. 2009).[7] Such a phenomenon may also in turn affect investor's allocation between domestic and foreign asset holdings. Chan-Lau & Clark (2006) show that exogenous uncertainty shocks that are due mainly to factors affecting the foreign cost of capital may affect the cross country interest rate spread (domestic - foreign cost of capital) and hence reduce capital flows. Bernanke (1983) notes the adverse effects of uncertainty on investment and employment decisions in the face of investment cancellation and hiring/finance costs, while others have noted the increases in the costs of finance (Sim et al. 2010, Fernández-Villaverde et al. 2011 Pastor & Veronesi 2011).

Some studies have looked specifically at the impact of uncertainty with regard to economic policy. Pastor & Veronesi (2011) find that political news shocks that are orthogonal to economic shocks tend to cause an increase in the equity risk premium as they lead investors to revise their beliefs about the likelihood of various policy choices being adopted. Others have examined the effects of policy uncertainty on domestic economic outcomes - including for example the welfare reducing effects of uncertainty regarding transfer payments (Gomes et al., 2012). It has been found that outward FDI flows from US companies to foreign

[6] Other contributions in this area also relate to individual types of 'extreme capital flow events' include Ghosh et al. (2012), which focuses on the factors underlying surges to emerging market countries and the determinants of the allocation of capital across countries during such episodes. In a similar vein, Dell'Erba & Reinhardt (2011) extent the field of enquiry to the determinants of surges in gross FDI flows at the sectoral level. Other papers studying individual types of extreme capital flow events include Calvo et al. (2004) (sudden stops and balance sheet effects), Mendoza (2006) (debt deflation theory of sudden stops), Dooley (1988) (capital flight), Lensink et al. (2000) and Le & Zak (2006) (both regarding political risk and capital flight), and Hermes & Lensink (2001) (capital flight and the uncertainty of government policies).

[7] As explained by Wright (2011), the hypothesis is that inflation erodes the value of a nominal bond in those states of the world in which investors' marginal utility is high. In such models, reducing inflation uncertainty ought then to lower risk premia.

affiliates drop significantly during election periods in destination countries. This effect - due to the irreversibility of investment decisions - is more apparent for flows to high and low income countries with a higher propensity for policy reversals (Julio & Youngsuk, 2012). Evidence also exists of a non-monotonic effect of forecast uncertainty on speculative currency crises - as information about good fundamentals becomes less reliable; speculators lose confidence in the good state of the economy and augment exchange rate pressures. When fundamentals are bad, speculative pressures are eased (Prati & Sbracia, 2010). Gelos & Wei (2005) show that the dispersion of forecaster beliefs about future inflation is an important aspect of macroeconomic policy opacity in destination investment markets. Indeed, Gelos & Wei (2005) find that domestic macroeconomic policy opacity significantly reduces fund level international portfolio investment into EMEs. To the extent that all of these factors affect the attractiveness of investing domestically versus investing in foreign assets, they may affect cross border capital flows. We complement these studies by looking at the impact of policy uncertainty in capital flow source countries on portfolio flows to EMEs.

Our paper is also related to the literature on the 'spillover' impact of domestic economic policies on other economies. Forbes et al. (2012) and Lambert et al. (2011) document evidence of spillovers of the imposition of capital controls in Brazil to portfolio flows. Forbes et al. (2012) highlight how (policy) uncertainty with regard to whether countries would follow Brazil in introducing controls has impacted negatively portfolio capital inflows. Furthermore, Fratzscher et al. (2012) highlights the global spillover effects of quantitative easing, noting that US monetary policy entailed significant spillovers to global capital flows and portfolio allocations. The present study adds to the spillovers literature by showing that policy uncertainty in advanced countries spills over to emerging markets via capital flows. After the financial crisis, more of this spillover effect on capital flows to EMEs was mediated by general financial market uncertainty than in previous tranquil times.

A related literature examines contagion in the cross - country transmission of shocks. These studies have sought chiefly to understand the nature of real and financial cross country inter-linkages underlying the simultaneous impact of financial crises (Fratzscher, 2003). Recent work has also highlighted the key role of financial channels in transmitting shocks across countries (Forbes 2012, Fratzscher 2003).

Furthermore, our findings of differential impacts of advanced country policy uncertainty on bond vs equity flows also add to the evidence regarding rebalancing effects in the management of investment fund portfolios. For example, Hau & Rey (2008) find - using fund level data similar to that used by the present study - that in addition to rebalancing foreign portfolio shares, equity fund managers tend to rebalance their portfolios with the aim of stabilising exchange rate risk and equity risk exposure around desired levels.

Finally, the measure of policy uncertainty used in this study, taken from Baker et al. (2013), builds on those studies which consider the optimal way to measure economic uncertainty. A number of studies have found a high correlation between professional forecaster disagreement on future outcomes such as inflation and measures of uncertainty (for example Zarnowitz & Lambros 1987, Giordani & Soderlind 2003 and Boero et al. 2008). The literature has also documented that heterogeneity in agent belief systems is strongly connected to heterogeneity in asset pricing, through their effects on the stochastic discount factor (Beber et al. 2010, Harris & Raviv 1993, Xiong & Yan 2010 amongst others). Such differences in agent belief systems are usually proxied by forecaster disagreement over variables of interest, for example financial analyst forecasts of asset prices (Anderson et al., 2005) and variables such as inflation (Wright (2011)). Notably, such inflation forecast disagreement measures are a key component of the policy uncertainty measure used by our study. Despite this, others have criticized the interpretation and strength of the link between forecaster disagreement and uncertainty about future outcomes (Rich & Tracy, 2010).

3 Data and methodology

3.1 Data

We construct a dataset containing information on monthly portfolio equity and bond flows and their determinants for 36 emerging market economies (EMEs) for the period January 2004 to December 2011.[8] Most of our analysis is performed on a sample of 20 EMEs for which data for our baseline domestic controls are available.[9] Data sources are given in Table B.1, summary statistics are provided in Table B.2 and the correlations in Table B.3.

Our dependent variable is monthly portfolio bond and equity capital inflows expressed as the percentage of the total estimated allocation of assets to a given country taken from EPFR Global (EPFR thereafter). EPFR aggregates data on fund level flows by country of destination and constitutes a representative sample of equity and bond investment funds for each investment destination. EPFR data capture 5-20% od the market capitalization in equity and in bonds for most countries. Jotikasthira et al. (2012) show that EPFR portfolio flows and balance-of-payments data match closely. Most of the funds covered by EPFR are domiciled in advanced countries.[10] The EPFR data is adjusted in four ways. First, in order to focus on emerging markets with sizable bond or equity markets, we exclude from our dataset all countries with an estimated allocation of bonds or equity investments of less than 100 million USD. Second, we choose January 2004 as the starting point of our sample in order to have a more stable sample of funds (see

[8] We exclude industrial countries based on the World Bank's definition of regions. While our sample - see below - includes the financial centres of Hong Kong and Singapore, our results are robust to their exclusion.

[9] These countries are Argentina, Brazil, Chile, Colombia, Czech Republic, Hong Kong, Indonesia, India, South Korea, Mexico, Malaysia, Pakistan, Poland, Peru, Philippines, Russia, Singapore, Thailand, Turkey and South Africa.

[10] As noted by Lo Duca 2012, US domiciled equity funds account for more than 80% of the number of funds in the EPFR dataset. Jotikasthira et al. (2012) also suggests that the investor base of funds in the EPFR dataset is predominantly located in advanced countries. Due to legal restrictions, most fund investors are domiciled in the same location as the fund itself.

discussion in Fratzscher 2012). Third, to limit the effect of large observations, the portfolio flows (in % of assets under management) are winsorised at the 1% percentile. Finally, to exclude sample effects from our comparison of bond with equity flows, we focus on a sample for which both bond and equity inflows are available.

The measure of policy uncertainty for both the US and EU is taken from Baker et al. (2013) and is based on three underlying components. The first component quantifies newspaper coverage of policy-related economic uncertainty (specifically, the index of search results for articles containing terms related to economic policy uncertainty). A second US-specific component reflects the number and size of federal tax code provisions set to expire in future years. The third component measures fiscal and monetary policy uncertainty. Specifically, the authors use forecaster disagreement over federal and state/local government purchases is employed as the measure of fiscal policy uncertainty, while forecast disagreement over future inflation is used as the proxy for monetary policy uncertainty.[11] The European uncertainty measure is based on data for Germany, the UK, France, Italy and Spain. In order to show that the news component is a valid measure of policy uncertainty, Baker et al. (2013) demonstrate that a similar news-based measure for financial uncertainty (constructed using the same search algorithm but using 'stock market' instead of 'policy') tracks closely the Chicago Board Options Exchange Market Volatility Index (VIX). They also show that their measure of policy uncertainty is highly correlated with alternative measures of policy uncertainty (by Fernández-Villaverde et al. 2011, Born & Pfeifer 2011). We acknowledge however that there may be more significant caveats to the other two components of the index (see IMF 2013 for a discussion). Specifically, some of the expiring tax code provisions are renewed regularly and may hence not contribute to policy uncertainty. Furthermore, forecast dispersion components may arise due to other factors, e.g. inflation forecasts could become more dispersed because of uncertainty regarding oil and food prices, rather than due to uncertainty regarding monetary policy. We check below whether results are robust to relying only on the news-based measure of policy uncertainty.

One important issue is the exogeneity of changes in policy uncertainty on gross portfolio capital inflows into EMEs. Generally, we believe this assumption to hold given our focus on EMEs and the time period in question. IMF (2013) illustrates that spikes in US or EU policy uncertainty are usually associated with identifiable domestic economic or political events or geopolitical events that can be considered exogenous to most individual countries. One example that may violate this assumption - i.e. the Russian crisis preceding the LTCM crisis in 1998 - is not in our sample.

[11]For the US, the economic uncertainty measures are based on the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters. For each of these variables, the measure is based on quarterly forecasts for one year into the future. The European uncertainty measure is based on similar data for Germany, the UK, France, Italy and Spain. The authors use the Consensus Economics forecast database to derive measures of fiscal and monetary uncertainty analogous to the US measures. See Baker et al. (2013) for further details. Data on both the overall and individual subcomponents of economic policy uncertainty are available at www.policyuncertainty.com

3.2 Methodology

We follow a two pronged strategy in order to uncover potential spillovers from policy uncertainty in advanced countries to emerging market countries. First, we estimate the average relationship between changes/shocks in policy uncertainty and gross portfolio capital flows in a standard panel linear regression framework that includes fixed effects and also controls for shocks in other global and country specific variables that the previous literature has found to be important in explaining capital flows. Secondly, we move to a non-linear regression framework to examine the extent to which the impact of shocks to policy uncertainty depends on the time period and global or domestic conditions.

3.2.1 Linear Method

We estimate the following equation:

$$y_{i,t} = \sum_{z=1}^{p} \alpha_z y_{i,t-z} + \beta_0 + \beta_1' \Delta PU_t + \beta_2' X_{i,t} + \delta_i + \epsilon_{i,t}, \tag{1}$$

where $y_{i,t}$ is the measure of capital flows, specifically aggregate, bond and equity flows as a percentage of assets under management. A key innovation in our study relative to the previous literature on capital flows is the inclusion of the term ΔPU_t, which is a vector composed of the changes in the indices of policy uncertainty in the US and EU.

In order to control for slow-moving heterogeneity between sample countries that is unobserved yet may nevertheless influence capital flows, we include country specific fixed effects, δ_i, while $\epsilon_{i,t}$ is the regression residual. In all regressions, standard errors are clustered at the country level. Finally, to account for persistence in capital flows, we include 4 lags of the dependent variable.[12]

We are well aware of the literature regarding the potential bias inherent in dynamic panel data regressions with country specific fixed effects. These concerns apply however to the 'small T, large N' case common in microeconometric applications, rather than the current 'large T, large N' case. Studies have shown that in samples of similar size to ours, the bias on the regressors of interest is negligible (see Bruno 2005, and Judson & Owen 1999).[13]

With regard to the control variables $X_{i,t}$, we follow Fratzscher (2012) and include a number of global and domestic 'shocks' that may affect portfolio flows. Specifically, we control for changes in various other global variables such as global risk aversion (VIX), liquidity risk (TED spread), US equity returns, global liquidity (measured as the growth in M2 in the US, Japan and the euro area), US money market rates, oil

[12]By inspection of the relevant kernel density estimates, the regression residuals are normal.

[13]For asymptotic results in the case of unbalanced panels such as ours, we refer the interested reader to Bruno (2005) for further information.

and non-oil commodity prices, and, in addition for changes in domestic factors that may influence portfolio flows such as sovereign 5-year CDS spreads (Bloomberg), equity returns (from MSCI) and domestic interest rates (IFS).[14] The Appendix contains the data sources and precise definitions.

3.2.2 Nonlinear Method

There are however good reasons to believe that simple linear regressions may be insufficient to adequately capture the relationship between shocks in policy uncertainty and portfolio capital inflows into EMEs. Previous literature has found a substantial change in the estimated drivers of capital flows over time (see Lo Duca 2012). Moreover, our sample period (from 2004:1 to 2011:12) covers both 'tranquil' and 'crisis' states of the world, raising the possibility of nonlinearity in the model. The second facet of our empirical methodology involves an assessment of whether there are structural breaks in the relationship between (changes in) advanced country policy uncertainty (and changes in other push/pull factors) and capital flows, and an examination of the factors underlying these changes.

To achieve this, we use the Panel Smooth Transition Regression (PSTR) technique of González et al. (2005). This technique has been widely used in a variety of applications to model nonlinearities in the data. For example Mody & Murshid (2011) used Panel Transition Regression (PTR) to show that the impact of the current account on economic growth depends on growth volatility.Fouquau et al. (2008) found that saving retention coefficients (Feldstein-Horioka puzzle) depend on the degree of openness, the size of the country and the ratio of current account to GDP. Coudert & Mignon (2013) showed that the "Fama regression" linking exchange rate changes to the interest rate differential depends on the level of financial volatility.[15] This technique allows us to assess how the effect of shocks in policy uncertainty (i) change over time and (ii) how this nonlinearity depends on global factors (such as global investor risk aversion, liquidity risk or policy uncertainty) or factors that are heterogeneous across countries heterogeneity (such as country default risk or equity market volatility)?[16]

The first step in assessing how the effects of changes in policy uncertainty-and other push/pull factors - on capital flows change over time, is to test the null hypothesis of linearity in the model over time using a straightforward F-test proposed by González et al. (2005).[17] By endogenously determining break dates in the relationship between fund level portfolio flows and our explanatory variables in this manner, we

[14] In the robustness section we check whether our results are robust using VSTOXX instead of VIX.

[15] See also Delatte et al. (2012) who used the PST-ECM methodology developed by Béreau et al. (2010) to study the mutual relationship between the CDS market and the corresponding bond market.

[16] The key difference with previous regime change methodologies (Hansen, 1999) is that González et al. (2005) does not enforce the structural break(s) to occur suddenly.

[17] The procedure is to examine linearity in a model with one regime. If the null hypothesis of linearity (H0: model is linear, H1: the model is nonlinear) is rejected, we can test for non-remaining nonlinearity in a model with two regimes, and so on until we reach a model with 'no remaining nonlinearity' (or we hit the upper bound on the number of regimes, see footnote 19).

therefore identify time periods - 'regimes' - in which our regressors including changes in policy uncertainty have a different impact on portfolio capital flows.

Specifically, we estimate:

$$y_{i,t} = \sum_{z=1}^{p} \alpha_z y_{i,t-z} + \beta_0' Z_{i,t} + \beta_1' g(t;\gamma_1, c_1) Z_{i,t} + \beta_2' g(t;\gamma_2, c_2) Z_{i,t} + \delta_i + \epsilon_{i,t}, \tag{2}$$

where the matrix $Z = [\Delta PU X]$ and with ΔPU and X are defined as above. δ_i is a country specific fixed effect, $y_{i,t-z}$ is the lagged dependent variable. Further $g(t;\gamma_x, c_x)_(x = 1, 2)$ is the 'transition function', which governs how the impact of the model regressors varies in magnitude and sign according to the level of a 'transition variable'.[18] The arguments of the transition function are as follows: γ_x refers to whether the regression relationship tends to change abruptly or smoothly when the level of the threshold variable is attained (i.e. the 'speed of transition' between regimes) in the respective transition functions; c_x is a vector of thresholds of size m (where m is the order of the transition function); while t refers to the level of the transition variable (defined in this particular case as 'time'). We estimate the model with 2 transition functions (3 regimes). This less restrictive approach permits the model to endogenously find 2 structural breaks, imposing neither the transition speed nor the direction of change (increase or decrease in coefficients) on either break.[19]

Furthermore, we assess in detail how the nonlinear impacts of changes in policy uncertainty depend on global factors and/or the domestic features of the macroeconomic environment. Specifically, we identify the levels of particular variables at which the spillover impact of changes in policy uncertainty on capital flows (and the impact of other determinants) to EMEs changes. The procedure is as follows. Firstly, we use an F - test to test the null of linearity versus the alternative of a nonlinear model, where the nonlinearity is explained by a global transition variable. If the null is rejected, we estimate the nonlinear model with the global transition variable, using a second F-test to test the null of whether the nonlinearity is explained solely by the global variable, against the alternative hypothesis that nonlinearity is explained by a global transition and a domestic transition variable. In the case that this second null hypothesis is rejected, we then estimate the model using both global and domestic transition variables. If we fail to reject the second null, then we stop and adopt the model with the global transition variable only. The optimal combination

[18] More specifically, it is a continuous function of an observable transition variable that is normalised to be between 0 and 1, parameterised as a logistic function.

[19] Firstly, if one suspects the presence of only one structural break, one would use one threshold (m = 1) and one transition function (r =1). However, if one accepts that the global financial turmoil has to some extent subsided in recent times, then one may employ 2 thresholds (m=2) with one transition function. However, this latter strategy imposes the same transition speed on the first and second thresholds, constraining the regression coefficients to increase (resp. decrease) when time approaches the first threshold and then decrease (resp. increase) when it approaches (moves away from) the second threshold. We limit the number of regimes to three, due partly to our sample size (T=96), in order to limit the number of regressors and also to ensure model convergence. In all cases we find the presence of two structural breaks (3 regimes) in the model.

of global and domestic transition variables is chosen by standard information criteria (AIC and BIC).[20]

The model that we estimate in the case of both a global and domestic transition variable is given by:[21]

$$y_{i,t} = \sum_{z=1}^{p} \alpha_z y_{i,t-z} + \beta_0' Z_{i,t} + \beta_1' g(Global_t; \gamma_1, c_1) Z_{i,t} + \beta_2' g(Dom_t; \gamma_2, c_2) Z_{i,t} + \delta_i + \epsilon_{i,t}, \tag{3}$$

where $\beta_2' = 0$ if we reject the relevance of domestic transition variables. The difference between this equation (2) and equation (3) above is that we now pin down the transition variables to global and domestic variables, rather than just focusing on the location of structural breaks in the time dimension.

In the context of our model of global capital flows, we consider the VIX, TED, US and EU policy uncertainty as relevant global risk / uncertainty factors that may account for nonlinearity in the model. As potential domestic transition variables, we consider country specific sovereign risk (as proxied by CDS spreads) and equity market volatility (as proxied by the coefficient of variation of domestic equity returns).

4 Spillovers of Advanced Country Policy Uncertainty and to EME Portfolio Inflows

This section presents our empirical results. We first examine the impact of shocks in policy uncertainty on portfolio capital flows into EMEs in the linear model 1. Next, we examine, using the PSTR framework (González et al., 2005), whether there are structural breaks in policy uncertainty and other capital flow determinants. Finally, we ask - evaluating model 2 - what specific variables can explain the heterogeneous responses of portfolio flows into EMEs to changes in policy uncertainty and other determinants of capital flows.

4.1 Linear Regression Results

In Table B.4, we find that changes in policy uncertainty in the US are (strongly) significantly associated with aggregate (bond plus equity) portfolio flows, when controlling for changes in other standard determinants of capital flows such as global investor risk aversion (VIX) and liquidity risk (TED). The significant and negative coefficient on US policy uncertainty in all specifications (Table B.4) indicates that increases in policy uncertainty in the US decreased aggregate portfolio flows (measured as a % of assets under management) to EMEs, highlighting potential safe haven effects. Conversely, increases in European policy

[20] Note that global transition variables - that are common to all countries in the sample - cause all countries in the sample to switch between regimes at the same time. Domestic country specific transition variables permit a degree of heterogeneity by allowing countries to switch regimes on an individual basis according to the particular value of the country specific variable.

[21] For tractability reasons, we limit the model to 2 transition functions. See also footnote 19.

uncertainty appear to have not affected aggregate (bond + equity) portfolio flows (cols. 2-3,5). We find however a positive and weakly significant coefficient in the smaller sample including domestic factors such as CDS spreads and domestic money market rates when we control for policy uncertainty in the US (col. 6).

Secondly, we turn, in Table B.5, to whether the impact of increases in policy uncertainty differs between bond and equity flows to EMEs. While policy uncertainty in both the US and Europe is associated with a decrease in bond inflows to EMEs, uncertainty in relation to European macroeconomic policy is a global push factor for equity flows, showing that investors tend to move towards higher yielding EME assets as the European policy outlook becomes more unclear. The effects are economically sizable. According to the estimates in Table B.5 (column 6), we find that a change in the index of US policy uncertainty of 47 (equivalent to the increase experienced in August 2011 as concerns over the US fiscal cliff spiked) decreased equity inflows into EMEs on average by 0.376 pp of equity assets under management, which translates into 4.4 billion USD for Brazil.[22]

Table B.6 explores how the results differ across regions. The answer is remarkably little. Increases in European policy uncertainty are a push factor for portfolio equity inflows into Latin America, Central and Eastern Europe and South and South East Asia.[23]

Next, we take a first pass at assessing eventual nonlinearities in the regression relationship by splitting our sample into a pre and post crisis period (using August 2007 as the cut-off point - see Table B.7). The changes in sign and significance of the policy uncertainty variables across the two sub periods underscores that the split clearly matters, with evidence pointing overall to stronger safe-haven effects during and after the crisis (Table B.7). With regard first to bond flows (columns 2 and 3), a negative effect of European uncertainty shocks on flows to EMEs appears during the second subsample, after the onset of the subprime crisis. During and after the crisis, the positive impact of increases in EU policy uncertainty on equity inflows is far weaker than previously (essentially zero). For changes in US uncertainty, we find an insignificant impact on equity inflows into EMEs before the crisis but a strongly negative impact during and after the crisis. Whilst this evidence points to the presence of highly nonlinear effects in our model, section 4.2 below contains a far more elegant approach to this question.

The coefficient on policy uncertainty can be interpreted in two ways. The first possibility is that additional control variables - for example general financial market uncertainty - affect both policy uncertainty and portfolio flows to other countries. In this case, the additional controls improve the estimated effect of advanced country policy uncertainty on portfolio flows. At the same time it is important to control for

[22] This is multiplying 0.00376 with equity assets under management given by EPFR (151bnUSD) and taking into account that EPFR data capture only 13% of total stock market capitalisation in Brazil (DataStream and author's calculations).

[23] Results are robust to using the larger sample of 36 EMEs with 9 instead of 4 countries in the CEEC region.

common shocks: given that we look at the monthly frequency, it is likely that shocks in policy uncertainty and other variables such as global risk appetite have occurred in parallel during the period of the global financial crisis although not being related economically. Whilst it is therefore important to control for same time shocks, a second possibility is that the additional control is a 'mediating' variable through which the effects of policy uncertainty on portfolio flows are conveyed. For example, higher policy uncertainty could increase economic uncertainty, which in turn affects portfolio flows. In this case, adding the control variable nets out any effect of policy uncertainty conveyed by the mediating variable, resulting in an underestimation of the effects of policy uncertainty on capital flows (see also discussion in IMF 2013). The role of the VIX as a potential mediating variable is examined in Table B.8. As discussed before, shocks to policy uncertainty may affect the risk premium which in turn implies an increase in investor risk aversion (as proxied by VIX). To shed light on the extent to which changes in policy uncertainty are transmitted through changes in global risk, we split the sample again into the pre- and post-crisis period for which we previously found the impact of shocks to policy uncertainty to differ. Comparing columns (1) and (2) as well as (3) and (4) reveals hardly any effect of the inclusion of changes in VIX on the estimated coefficient of changes in policy uncertainty in the pre-crisis period. Policy uncertainty in the EU remains a global push factor with regard to portfolio capital flows into EMEs. Conversely, we find that more of the effect of US and EU policy uncertainty on bond / equity flows appears to have been transmitted via an increase in global risk aversion in the post 2007:8 sample. This is indicated by the reduction in the magnitude of the coefficient on both policy uncertainty indices when controlling for the VIX. To the extent that many shocks in global risk aversion are unlikely to have been caused by policy uncertainty but have occurred in parallel with policy uncertainty (or may have even caused increases in policy uncertainty in some cases), the true coefficient on increases in policy uncertainty is likely to be closer to the coefficient conditional on risk aversion (and other controls).[24]

4.2 Nonlinear Regression Results

In the previous section, we showed that the relationship between portfolio flows and their determinants has changed with the subprime crisis. However, although the break date may capture the onset of the recent period of financial turmoil, the impact of policy uncertainty on portfolio capital flows may have changed at other times or may have depended on the level of other variables. Below we therefore identify structural breaks in the relationship between portfolio flows and changes in policy uncertainty using an endogenous panel smooth transition approach (PSTR). To summarise, we find evidence of multiple investor equilibria for both bond and equity specifications. For both bond and equity flows, a first structural break occurred in April 2007, as the first signs of the oncoming financial crisis emerged. For bond (equity) flows, a second

[24] The results are robust to the more limited sample of 20 EMEs, and available on request.

structural break occurred in November (December) 2010. We also find that for bond flows, the level of global risk appetite (VIX) is the chief determinant of changes in how policy uncertainty (and other factors) affects capital flows. For equity flows, both the level of global risk appetite and sovereign default risk are found to affect this relationship.

4.2.1 When Do Structural Breaks In The Capital Flows Relationship Occur?

Table B.9 strongly suggests the presence of 2 structural breaks (3 regimes) in the regression model for both bond and equity flows. The results of the PSTR model (2 structural breaks) with time as the transition variable for both bond and equity flows (see Table B.10, where coefficient values under different regimes and model diagnostics are shown in the upper and the lower panels of the table respectively) are as follows.[25]

Bond Flows (Table B.10, left hand side): Here we estimate the first structural break as occurring in T=39.494 (T=40 corresponds to April 2007), as the first signs of the financial crisis and associated investor worries emerged. This first structural break is an abrupt rupture in the regression relationship (high transition speed). This implies that as the first signs of the financial crisis came into bloom, the effect of push / pull factors on capital flows changed abruptly. The second, much smoother (lower transition speed) break arose in T=82.966 (T=83 corresponds to November 2010), coinciding with a fresh round of quantitative easing by the Fed.[26]

Figure A.4 compares the estimated results from the PSTR analysis with the linear structural break analysis undertaken previously, that assumed an *a priori* break date. In most cases, the 'naive' linear approach approximates well the first break date, missing however the second structural break of course. The linear break approach clearly tends to understate the magnitude of the coefficient value in each case.

It is also remarkable that in April 2007, the negative effect of changes in EU (US) policy uncertainty on capital flows becoming more (less) pronounced (Figure A.4). In November 2010, the coefficient values of changes in US and EU policy uncertainty again moved in opposite directions (the coefficients became more / less negative respectively). As we will see, this results is consistent with finding of the subsection 4.2.2.

[25] In keeping with the PSTR literature, we report the parameter values when the transition functions are equal to either 1 or 0. Hence, the third column ($\beta_0 + \beta_1$) summarises parameter values when the first transition function is equal to 1 and the second is equal to 0. The fifth column ($\sum \beta_i = \beta_0 + \beta_1 + \beta_2$) indicates parameter value when both transition functions are equal to 1.

[26] A key difference between traditional regime change methodologies and the PSTR procedure we employ is that the latter assumes that the transition variable is continuous, rather than constraining the threshold to be a particular value under the former approach. Regarding the accuracy of the estimated structural break, optimality of the break is implied by the use of AIC and BIC information criteria. Given the necessary computing requirements, it is technically infeasible to calculate confidence intervals for thresholds and transition speed values.

Equity flows (Table B.10, right hand side): For equity flows, the structural breaks in the model coincide with those identified above for bonds flows - the first in April 2007 and the second in December 2010, with a more sudden rupture in the regression relationship in the first instance.

In the case of equity flows to EMEs, it is evident that changes in US policy uncertainty had no significant effect in the period prior to DEcember 2010, with a negative influence from this date onwards (Figure A.5).

Consistent with risk on / risk off behaviour of equity investors, EMEs experienced equity inflows as a result of European policy uncertainty shocks in the more tranquil times before the financial crisis. Since mid-2007 however, the relationship turned negative, a pattern that is again consistent with risk on / risk off behaviour of equity investors (see for example McCauley 2012).

4.2.2 Why Does the Effect of Changes in Policy Uncertainty on Capital Flows Change Over Time?

We now turn to the identification of the features of the global and domestic macroeconomic environment that lead to the nonlinearity in the relationship between changes in policy uncertainty (and other global / domestic factors) and capital flows. To summarise, we confirm the role of global investor risk aversion in transmitting the effects of changes in policy uncertainty to capital flows. We find on the one hand for bond flows that the nonlinearity in the capital flows model is explained by the level of the VIX. On the other hand, for equity flows, we find that not only does the level of the VIX matter, but cross country heterogeneity in risk (CDS spreads) is to a lesser extent also a factor at play in this regard.[27]

Bonds Flows (Table B.14, left hand side): the results presented here for bond flows show that during times of elevated global investor uncertainty (as proxied by the VIX), much of the effect of changes in US and EU policy uncertainty on capital flows is transmitted via the VIX (top line, columns 1 and 3). Witness the reduction in coefficient on US policy uncertainty for the high VIX regime. In contrast, it is evident that heightened levels of global financial market uncertainty magnify the effect of EU policy uncertainty on bond flows).

This confirms earlier finding that after from 2007 onwards (when the VIX was high, see Figure A.6 above), much of the effect of US policy uncertainty on capital flows was transmitted via general financial market uncertainty. Analysing the mean of the VIX before mid-2007, between mid-2007 and end-2010 and after end-2010 (Figure A.6), the results are consistent with the structural break analysis. In mean, the VIX did not revert to its pre-crisis level at the by the end of the sample period; similarly the effects of US/EU changes in policy uncertainty on bond flows did not come back to their pre-crisis level.

[27] Thresholds found for the VIX are consistent with the findings of Coudert & Mignon (2013).

Equity Flows (Table B.14, right hand side): as in the case of bond flows, when global financial uncertainty is high, much of the effect of changes in EU policy uncertainty on capital flows is transmitted through the VIX (in this case, the sign of the effect is positive though). There is no effect of shocks to EU policy uncertainty on flows to risky countries (last column) when the VIX is high. Heightened global uncertainty tends also to magnify the effect of US policy uncertainty on equity flows (compare columns 1 and 3), although these effects do not differ across risky and non - risky countries (compare columns 3 and 6). During more tranquil times when the VIX is low, there is no difference between the effect of EU policy uncertainty on flows to risky vs non - risky countries.

Figure A.8 above visualises the differing effects of changes in US/EU policy uncertainty on equity flows at different levels of the transition variables (VIX and CDS). Furthermore, we add points corresponding to the 3 periods identified in the structural breaks section. More precisely, green points refer to the period before April 2007, red points to the period from April 2007 to December 2010 and the blue points to the period after December 2010. Most of the green points are represented in the part corresponding to low VIX and to low CDS spreads. This confirms that the VIX is a main driver of changes in investor behaviour and that during the pre-crisis period most countries were considered as less risky. Obviously, since the level of global financial uncertainty dramatically increased since mid-2007, the red points are almost all above the VIX threshold. Interestingly, we see that the blue points are more homogeneously represented on the surface, which emphasises the fact that the post-2010 period is still a period of ongoing uncertainty.

4.3 Robustness

An important concern in the above analysis has been the relative role of general financial market uncertainty and global risk versus the role of policy uncertainty in driving capital flows to EMEs. Our results above are based on using the VIX (the implied volatility of the S&P 500), which is a well known measure of global risk appetite. In order to test the sensitivity of our results the measure of risk, we redo all the regressions using the VSTOXX, which reflects the implied volatility of the EURO STOXX 50 index. We find that our main results are robust to using this alternative measure. Next, we explore robustness with regard to alternative measures of policy uncertainty. As discussed in the data section, the forecast and tax components of our policy uncertainty index may be related to other factors than genuine uncertainty about economic policy. Therefore, we re-ran our regressions using solely the news component and find that the key results are robust.

Finally, we included the financial centres Hong Kong and Singapore in our original sample of EMEs. It may however be conceivable that portfolio flows into these economies react differently to shocks in policy uncertainty. Results are however robust to their exclusion.[28]

5 Conclusion

In this paper, we study the extent to which uncertainty in advanced country macroeconomic policy spills over to emerging markets via portfolio bond and equity flows. It complements previous studies that have looked at the role of other global factors in determining capital flows and studies tracing the impact of uncertainty on financial variables. We find that increases in US policy uncertainty reduces portfolio bond and equity flows to EMEs in an economically significant manner. This signals possible safe haven effects. In more tranquil times, changes in policy uncertainty in the EU tend to push portfolio equity investors towards EMEs. After the global financial crisis, much of the spillover effect of advanced country policy uncertainty on capital flows to EMEs was transmitted via general financial market uncertainty. Moreover, we also use a nonlinear empirical methodology to endogenously identify a structural break in the effect of these shocks on capital flows, in Q2 2007 at the onset of the financial crisis, and again in Q4 2010. We find that for bond flows, the level of the VIX is the chief driver of these nonlinearities, while for equity flows both the VIX and cross country heterogeneity in sovereign default risk come into play.

To further clarify the nature of potential safe haven effects, future research in this area could attempt to quantify the spillover effects of advanced country policy uncertainty on other advanced economies, accounting for the potential endogeneity of uncertainty and the determinants of capital flows. As our paper informs the ongoing debate regarding appropriate EME policy responses to advanced country policy spillovers, further research may also explore how features such as capital account openness in destination countries affect the impact of advanced country policy uncertainty on EME portfolio flows.

[28] All results available upon request.

Bibliography

Anderson, E. W., Ghysels, E., & Juergens, J. L. (2005). Do heterogeneous beliefs matter for asset pricing? *Review of Financial Studies*, 18(3), 875–924.

Baker, S. & Bloom, N. (2012). Falling policy uncertainty is igniting the us recovery.

Baker, S. R., Bloom, N., & Davis, S. J. (2013). *Measuring Economic Policy Uncertainty*. Working paper, Stanford University.

Beber, A., Breedon, F., & Buraschi, A. (2010). Differences in beliefs and currency risk premiums. *Journal of Financial Economics*, 98(3), 415–438.

Bernanke, B. S. (1983). Irreversibility, uncertainty, and cyclical investment. *The Quarterly Journal of Economics*, 98(1), 85–106.

Boero, G., Smith, J., & Wallis, K. (2008). Uncertainty and disagreement in economic prediction: The bank of england survey of external forecasters. *Economic Journal*, 118(530), 1107–1127.

Born, B. & Pfeifer, J. (2011). *Policy Risk and the Business Cycle*. Bonn Econ Discussion Papers 06/2011, University of Bonn, Germany.

Béreau, S., Villavicencio, A. L., & Mignon, V. (2010). Nonlinear adjustment of the real exchange rate towards its equilibrium value: A panel smooth transition error correction modelling. *Economic Modelling*, 27(1), 404 – 416.

Bruno, G. S. (2005). Approximating the bias of the lsdv estimator for dynamic unbalanced panel data models. *Economics Letters*, 87(3), 361 – 366.

Calvo, G. A., Izquierdo, A., & Mejía, L.-F. (2004). On the empirics of sudden stops: the relevance of balance-sheet effects. *Proceedings*, (Jun).

Campbell, J. Y., Sunderam, A., & Viceira, L. M. (2009). *Inflation Bets or Deflation Hedges? The Changing Risks of Nominal Bonds*. NBER Working Papers 14701, National Bureau of Economic Research, Inc.

Chan-Lau, J. A. & Clark, P. (2006). Fixed investments and capital flows: A real options approach. *Journal of Economic Integration*, 21, 816–836.

Coudert, V. & Mignon, V. (2013). The "forward premium puzzle" and the sovereign default risk. *Journal of International Money and Finance*, 32(C), 491–511.

Delatte, A.-L., Gex, M., & López-Villavicencio, A. (2012). Has the cds market influenced the borrowing cost of european countries during the sovereign crisis? *Journal of International Money and Finance*, 31(3), 481–497.

Dell'Erba, S. & Reinhardt, D. (2011). *Surfing the Capital Waves: A sector-level examination of surges in FDI inflows*. Working Papers 11.07, Swiss National Bank, Study Center Gerzensee.

Dooley, M. P. (1988). Capital flight: A response to differences in financial risks. *IMF Staff Papers*, 35(3), 422–436.

Fernández-Villaverde, J., Guerrón-Quintana, P. A., Kuester, K., & Rubio-Ramírez, J. (2011). *Fiscal Volatility Shocks and Economic Activity*. NBER Working Papers 17317, National Bureau of Economic Research, Inc.

Forbes, K. (2012). *The 'Big C': Identifying Contagion*. NBER Working Papers 18465, National Bureau of Economic Research, Inc.

Forbes, K., Fratzscher, M., Kostka, T., & Straub, R. (2012). *Bubble thy neighbor: portfolio effects and externalities from capital controls*. Working Paper Series 1456, European Central Bank.

Forbes, K. J. & Warnock, F. E. (2012a). Capital flow waves: Surges, stops, flight, and retrenchment. *Journal of International Economics*, 88(2), 235–251.

Forbes, K. J. & Warnock, F. E. (2012b). *Debt- and Equity-Led Capital Flow Episodes.* NBER Working Papers 18329, National Bureau of Economic Research, Inc.

Fouquau, J., Hurlin, C., & Rabaud, I. (2008). The feldstein-horioka puzzle: A panel smooth transition regression approach. *Economic Modelling*, 25(2), 284–299.

Fratzscher, M. (2003). On currency crises and contagion. *International Journal of Finance & Economics*, 8(2), 109–129.

Fratzscher, M. (2012). Capital flows, push versus pull factors and the global financial crisis. *Journal of International Economics*, 88(2), 341–356.

Fratzscher, M., Lo Duca, M., & Straub, R. (2012). *A global monetary tsunami? On the spillovers of US Quantitative Easing.* CEPR Discussion Papers 9195, C.E.P.R. Discussion Papers.

Gelos, R. G. & Wei, S.-J. (2005). Transparency and international portfolio holdings. *Journal of Finance*, 60(6), 2987–3020.

Ghosh, A. R., , Qureshi, M. S., Kim, J. I., & Zalduendo, J. (2012). *Surges.* IMF Working Papers 12/22, International Monetary Fund.

Giordani, P. & Soderlind, P. (2003). Inflation forecast uncertainty. *European Economic Review*, 47(6), 1037–1059.

GoldmanSachs (2012). *Correlation Dislocation; Drivers and Implications.* GOAL - Global Strategy Paper 5, Goldman Sachs.

Gomes, F. J., Kotlikoff, L. J., & Viceira, L. M. (2012). The excess burden of government indecision. In *Tax Policy and the Economy, Volume 26*, NBER Chapters (pp. 125–163). National Bureau of Economic Research, Inc.

González, A., Teräsvirta, T., & van Dijk, D. (2005). *Panel Smooth Transition Regression Models.* Working Paper Series in Economics and Finance 604, Stockholm School of Economics.

Hansen, B. E. (1999). Threshold effects in non-dynamic panels: Estimation, testing, and inference. *Journal of Econometrics*, 93(2), 345–368.

Harris, M. & Raviv, A. (1993). Differences of opinion make a horse race. *Review of Financial Studies*, 6(3), 473–506.

Hau, H. & Rey, H. (2008). *Global Portfolio Rebalancing Under the Microscope.* CEPR Discussion Papers 6901, C.E.P.R. Discussion Papers.

Hermes, N. & Lensink, R. (2001). Capital flight and the uncertainty of government policies. *Economics Letters*, 71(3), 377–381.

IMF (2012). Coping with high debt and sluggish growth. In *World Economic Outlook*. IMF.

IMF (2013). Hopes, realities, and risks. In *World Economic Outlook*. IMF.

Jotikasthira, C., Lundblad, C., & Ramadorai, T. (2012). Asset fire sales and purchases and the international transmission of funding shocks. *The Journal of Finance*, 67(6), 2015–2050.

Judson, R. A. & Owen, A. L. (1999). Estimating dynamic panel data models: a guide for macroeconomists. *Economics Letters*, 65(1), 9 – 15.

Julio, B. & Youngsuk, Y. (2012). Policy uncertainty, irreversibility, and cross-border flows of capital.

Lambert, F., Ramos-Tallada, J., & Rebillard, C. (2011). *Capital controls and spillover effects: evidence from Latin-American countries.* Working papers 357, Banque de France.

Le, Q. V. & Zak, P. J. (2006). Political risk and capital flight. *Journal of International Money and Finance*, 25(2), 308–329.

Lensink, R., Hermes, N., & Murinde, V. (2000). Capital flight and political risk. *Journal of International Money and Finance*, 19(1), 73–92.

Lo Duca, M. (2012). *Modelling the time varying determinants of portfolio flows to emerging markets.* Working Paper Series 1468, European Central Bank.

McCauley, R. N. (2012). *Risk-on/risk-off, capital flows, leverage and safe assets.* BIS Working Papers 382, Bank for International Settlements.

Mendoza, E. G. (2006). *Endogenous Sudden Stops in a Business Cycle Model with Collateral Constraints:A Fisherian Deflation of Tobin's Q.* NBER Working Papers 12564, National Bureau of Economic Research, Inc.

Mody, A. & Murshid, A. P. (2011). *Growth from International Capital Flows: The Role of Volatility Regimes.* IMF Working Papers 11/90.

Pastor, L. & Veronesi, P. (2011). *Political Uncertainty and Risk Premia.* NBER Working Papers 17464, National Bureau of Economic Research, Inc.

Piazzesi, M. & Schneider, M. (2007). Equilibrium yield curves. In *NBER Macroeconomics Annual 2006, Volume 21*, NBER Chapters (pp. 389–472). National Bureau of Economic Research, Inc.

Prati, A. & Sbracia, M. (2010). Uncertainty and currency crises: Evidence from survey data. *Journal of Monetary Economics*, 57(6), 668–681.

Rich, R. & Tracy, J. (2010). The relationships among expected inflation, disagreement, and uncertainty: Evidence from matched point and density forecasts. *The Review of Economics and Statistics*, 92(1), 200–207.

Rudebusch, G. D. & Swanson, E. T. (2008). Examining the bond premium puzzle with a dsge model. *Journal of Monetary Economics*, 55(Supplemen), S111–S126.

Sim, J., Zakrajsek, E., & Gilchrist, S. (2010). *Uncertainty, Financial Frictions, and Investment Dynamics.* 2010 Meeting Papers 1285, Society for Economic Dynamics.

Wright, J. H. (2011). Term premia and inflation uncertainty: Empirical evidence from an international panel dataset. *American Economic Review*, 101(4), 1514–34.

Xiong, W. & Yan, H. (2010). Heterogeneous expectations and bond markets. *Review of Financial Studies*, 23(4), 1433–1466.

Zarnowitz, V. & Lambros, L. A. (1987). Consensus and uncertainty in economic prediction. *Journal of Political Economy*, 95(3), 591–621.

Appendix

A Figures

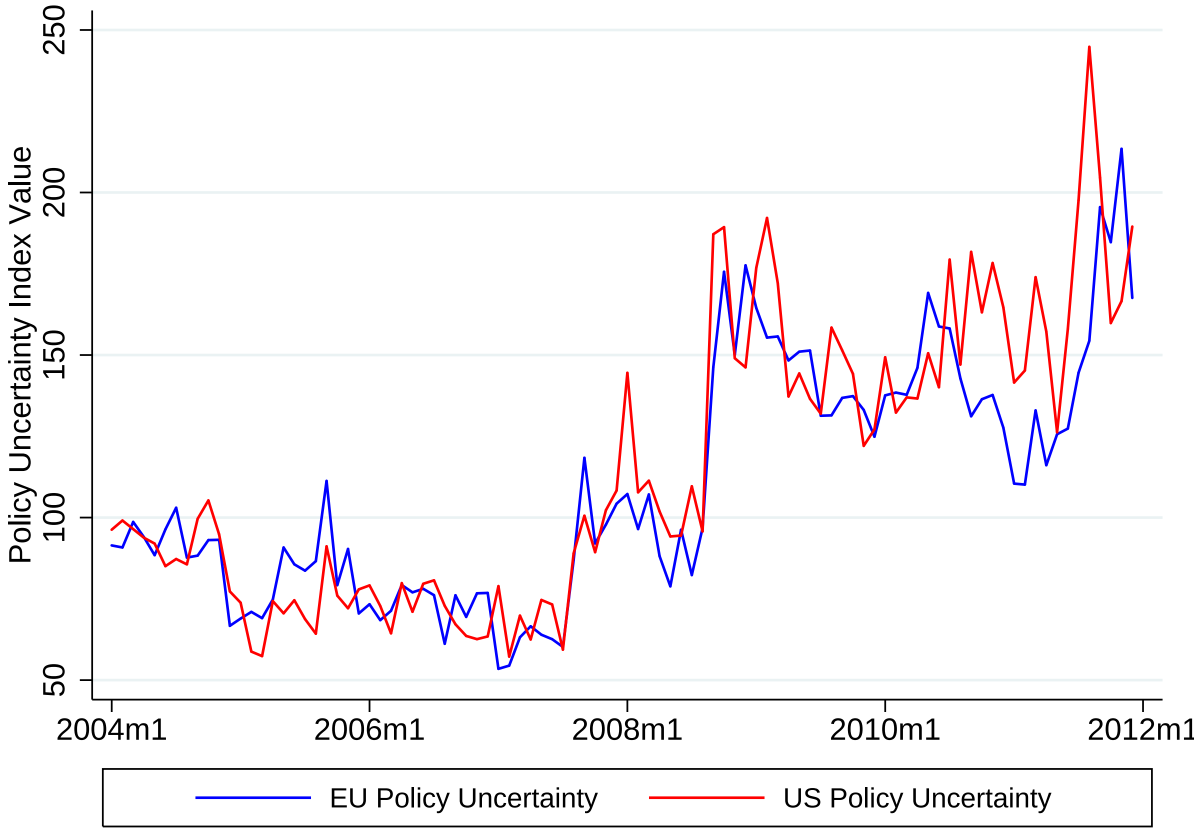


Figure A.1: Policy uncertainty in the US and Europe. Source: Baker et al. (2013)

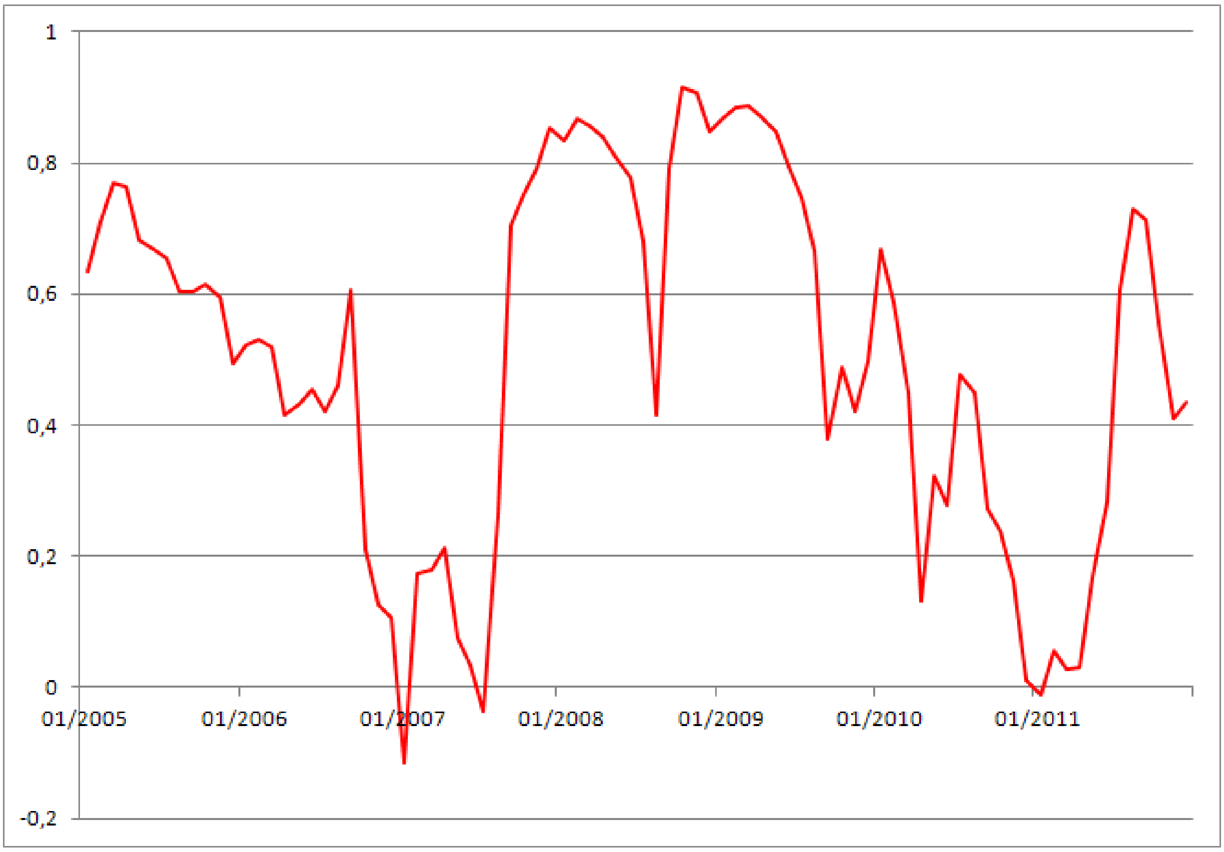


Figure A.2: Rolling correlation over 1 year between US and EU Policy Uncertainty indexes. Source: Baker et al. (2013)

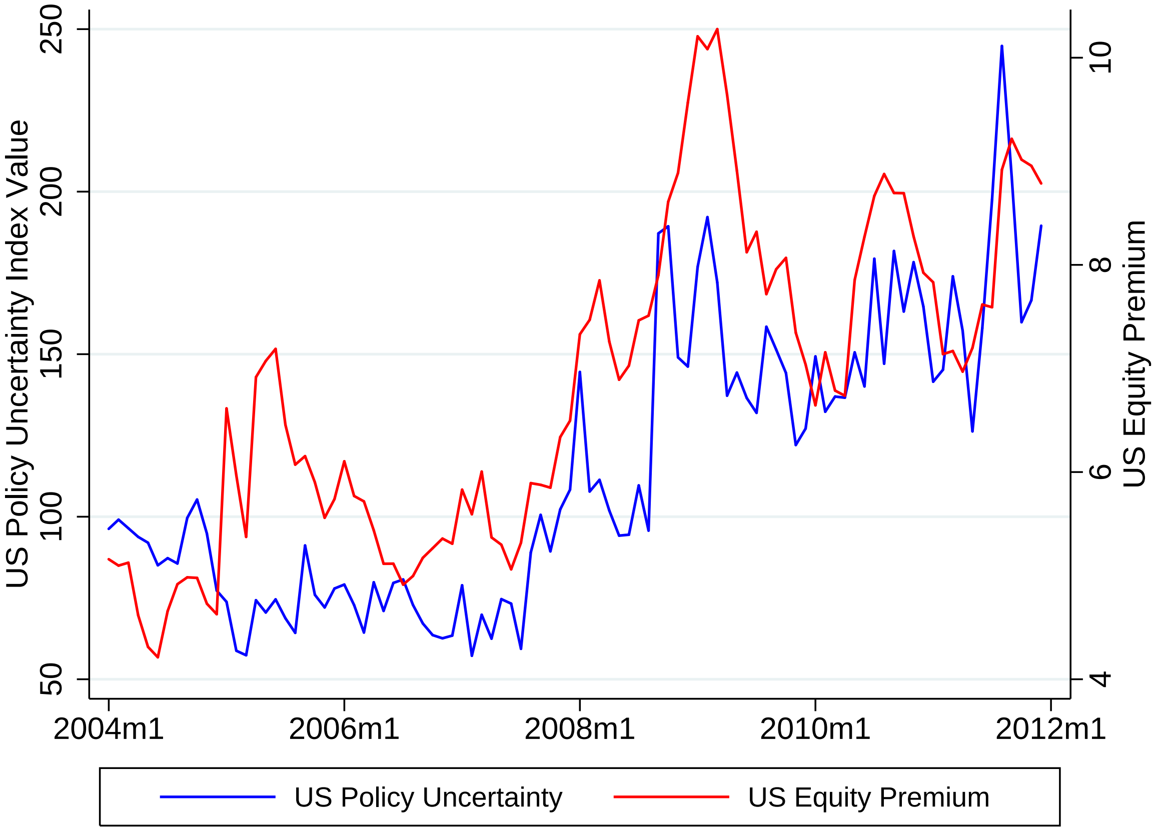


Figure A.3: US Policy Uncertainty and US Equity Risk premium. See the Appendix for sources and definitions of variables.

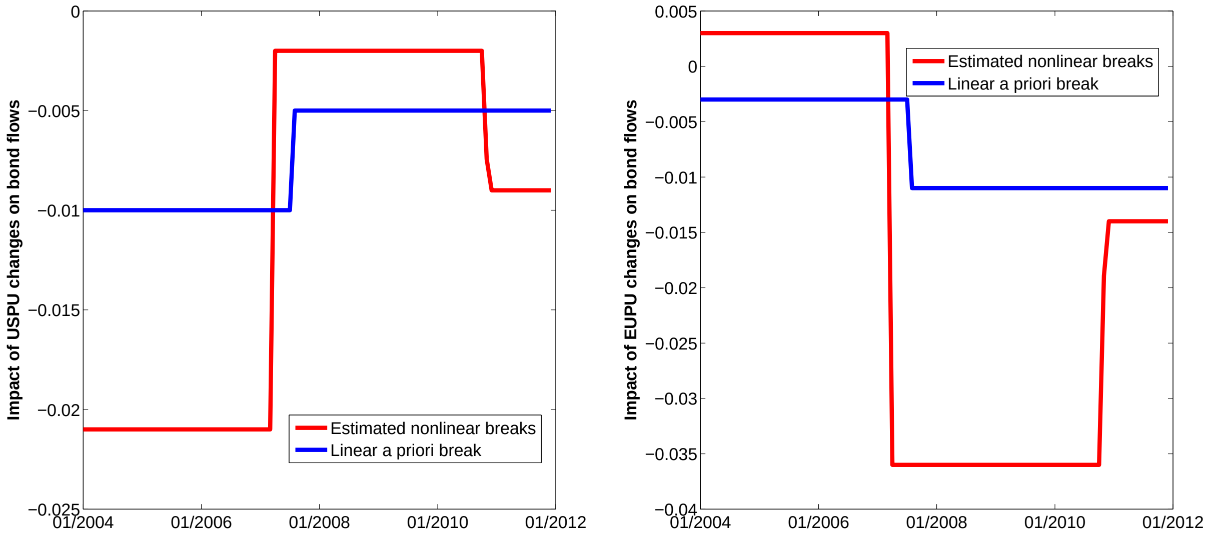


Figure A.4: The figure reports the impact of changes in US and EU Policy Uncertainty on bond flows over time based on the PSTR method by González et al. (2005). Underlying regressions results are in Table B.10. See section 3 for a description of the methodology.

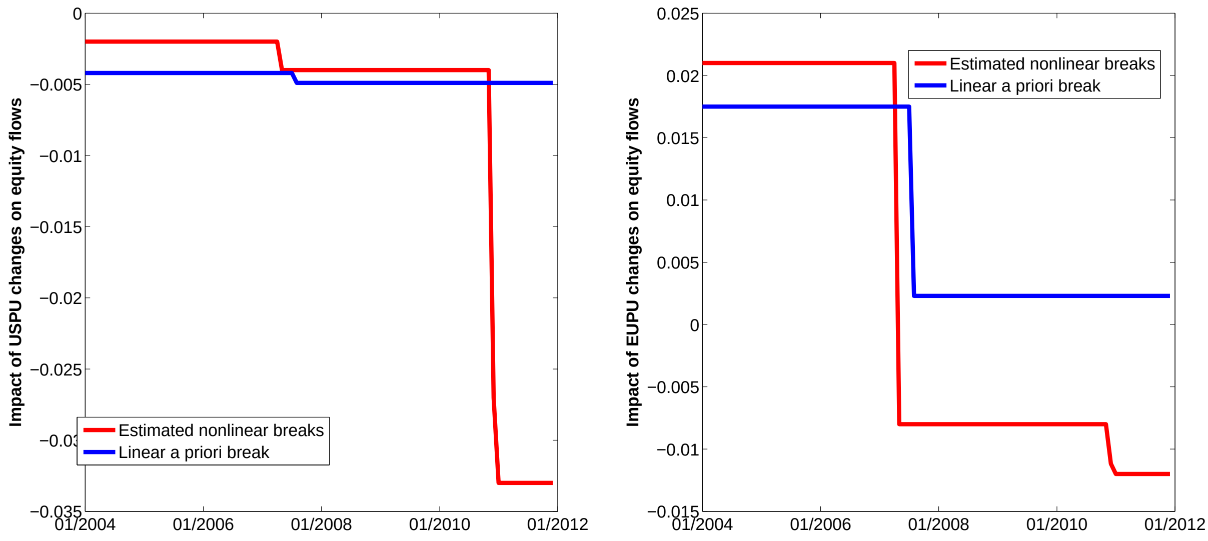


Figure A.5: The figure reports the impact of changes in US and EU Policy Uncertainty on equity flows over time based on the PSTR method by González et al. (2005). Underlying regressions results are in Table B.10. See section 3 for a description of the methodology.

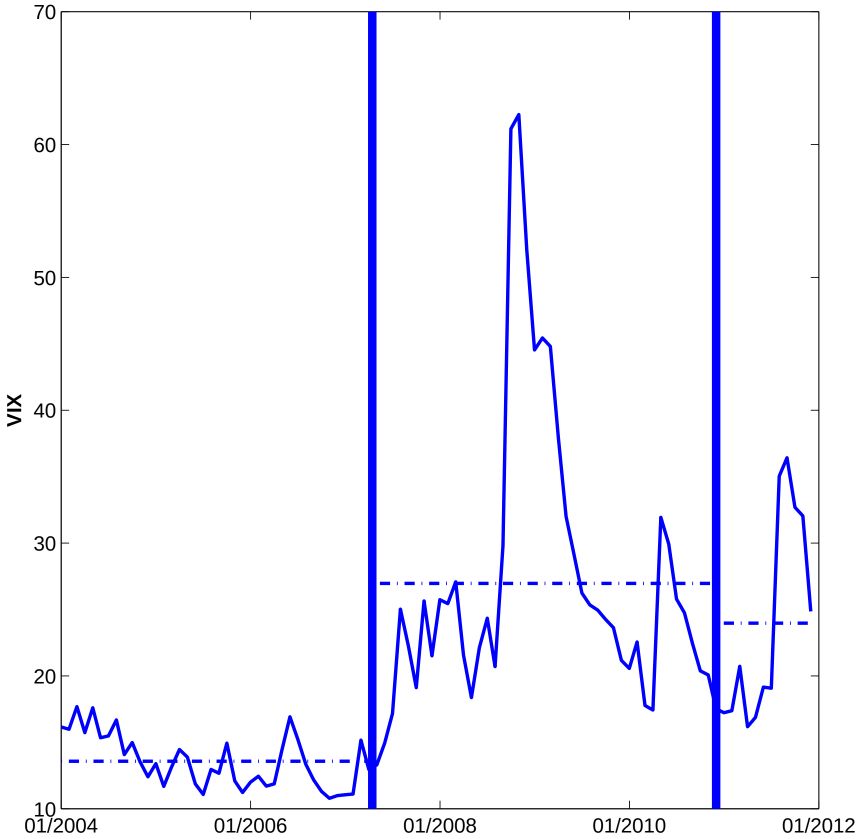
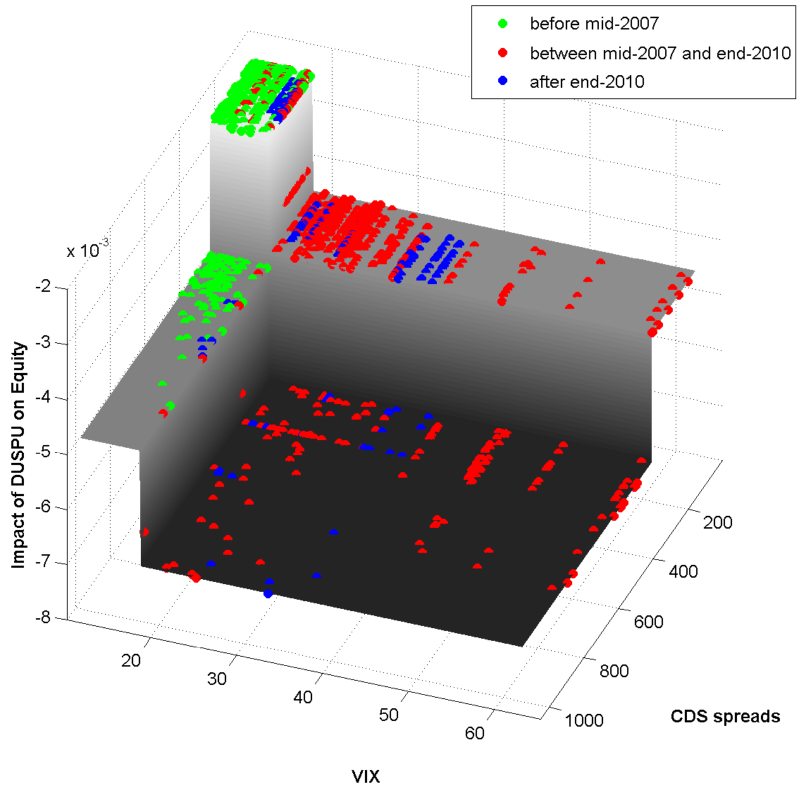


Figure A.6: Global risk aversion (VIX) and estimated structural breaks.



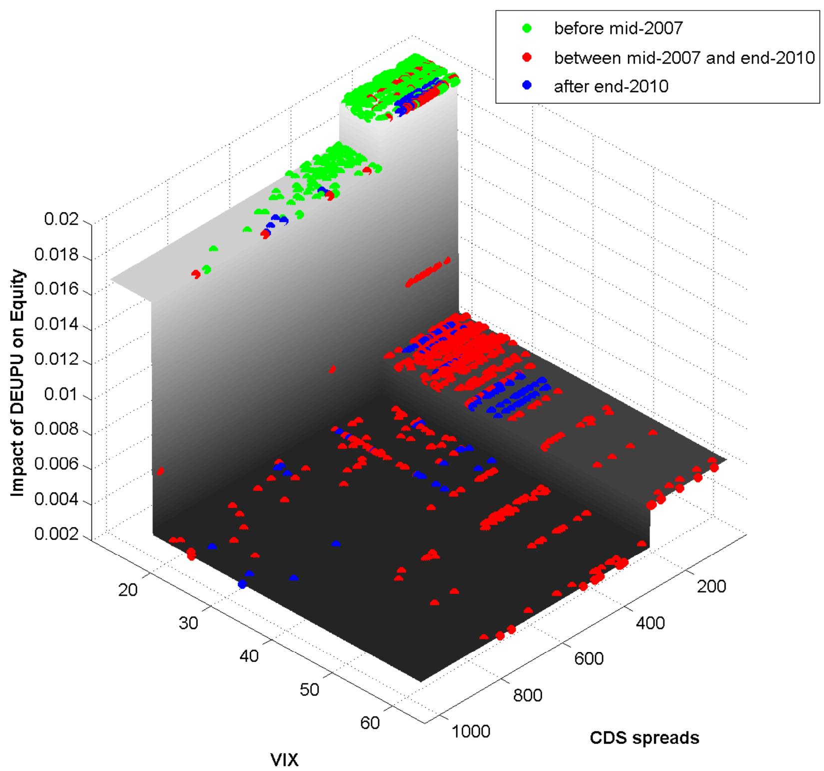


Figure A.7: Effect of Policy Uncertainty on Equity Flows

Figure A.8: The figure reports the impact of changes in Policy Uncertainty on Equity Flows based on the PSTR method by González et al. (2005). Underlying regressions results are in Table B.14. See section 3 for a description of the methodology.

B Tables

Variable	Description	Sources
Portfolio Capital Inflows		
Bond/Equity Portfolio Inflows	Fund-level portfolio bond/equity inflows. In % of bond/equity assets allocated to a given country	EPFR Global
Policy Uncertainty		
US/EU Policy Uncertainty	Weighted index value of news related to economic uncertainty, expiring tax code provisions (US index only), and forecast dispersion components	Baker et al. (2013)
Global Factors		
Global risk aversion	VIX. Change in monthly averages.	Bloomberg, authors' calculations
Liquidity Risk	TED spread. Change in monthly averages.	Bloomberg, authors' calculations
US equity returns	MSCI total returns index for US (end period). Monthly % returns.	MSCI
Global liquidity	Aggregated M2 in the US, Japan and the Euro Area. MoM growth rate, in %	IFS, authors' calculations
Oil prices	MoM growth rate, in %	IFS, authors' calculations
Non-Oil Commodity Prices	MoM growth rate, in %.	IFS, authors' calculations
US interest rates	US money market rates. In %.	IFS
US Equity Risk Premium	Monthly averages.	Bloomberg
Domestic Factors		
CDS Spreads	5 Year sovereign CDS Spreads. Change in monthly averages of index value.	Bloomberg
Domestic equity returns	MSCI total returns index (end period). Monthly % returns.	MSCI
Domestic interest rates	Domestic money market rates. In %.	IFS

Table B.1: Data Sources

Note: See section 3 for a description of the policy uncertainty and capital flows data.

Variable	Mean	Std.dev.	Min	Max	Obs.
Equity Portfolio Inflows	0.388	1.613	-3.771	5.424	3,184
Bond Portfolio Inflows	1.035	2.401	-6.773	6.785	3,184
US Policy Uncertainty	0.982	20.581	-44.679	91.433	3,420
EU Policy Uncertainty	0.801	15.234	-45.879	49.451	3,420
Global risk aversion (VIX)	0.092	4.938	-10.153	31.375	3,420
Liquidity risk (TED)	0.334	29.939	-133.912	142.409	3,420
US equity returns	0.398	4.490	-17.102	10.987	3,420
Global liquidity	0.538	1.697	-3.812	6.198	3,420
Oil Prices (growth rate)	1.728	8.730	-27.130	19.267	3,420
Non Oil Commodity Prices (growth rate)	0.683	3.645	-15.338	8.403	3,420
US interest rate	-0.010	0.192	-0.960	0.250	3,420
CDS spreads	0.986	36.264	-124.545	185.851	2,920
Domestic equity returns	0.447	6.766	-16.062	17.496	2,470
Domestic interest rate	-0.018	0.901	-4.399	3.745	2,559

Table B.2: Summary Statistics

Note: AUM stands for assets under management allocated to the respective country. Policy uncertainty VIX, TED, interest rates and CDS spreads are expressed in first differences.

Variables	US PU	EU PU	VIX	TED	US returns	Global liqu.	Oil Prices	Comm. Prices	US IR	CDS spreads	Dom. returns	Dom. IR
US Policy Uncertainty	1.000											
EU Policy Uncertainty	0.324	1.000										
Global risk aversion (VIX)	0.262	0.381	1.000									
Liquidity risk (TED)	0.282	0.449	0.537	1.000								
US equity returns	-0.227	-0.273	-0.615	-0.146	1.000							
Global liquidity	-0.032	-0.006	-0.102	-0.096	0.281	1.000						
Oil Prices (Growth Rate)	-0.020	-0.125	-0.282	-0.097	0.243	0.108	1.000					
Non Oil Commodity Prices (Growth Rate)	-0.050	-0.275	-0.428	-0.301	0.318	0.172	0.627	1.000				
US interest rate	0.065	-0.064	-0.296	-0.090	0.310	-0.151	0.272	0.252	1.000			
CDS spreads	0.105	0.217	0.510	0.307	-0.443	-0.065	-0.305	-0.394	-0.302	1.000		
Domestic equity returns	-0.021	-0.061	-0.127	-0.183	-0.013	0.151	0.135	0.120	0.051	-0.279	1.000	
Domestic interest rate	0.037	0.058	0.138	0.109	-0.085	-0.054	-0.040	-0.091	-0.031	0.169	-0.038	1.000

Table B.3: Correlation table

Note: Policy uncertainty VIX, TED, interest rates and CDS spreads are expressed in first differences.

	(1)	(2)	(3)	(4)	(5)	(6)
US Policy Uncertainty	-0.0066***		-0.0069***	-0.0069***		-0.0073***
	(0.000)		(0.000)	(0.001)		(0.001)
EU Policy Uncertainty		0.0003	0.0023**		0.0005	0.0027*
		(0.001)	(0.001)		(0.001)	(0.001)
Global risk aversion (VIX)	-0.0708***	-0.0734***	-0.0709***	-0.0601***	-0.0632***	-0.0600***
	(0.005)	(0.005)	(0.005)	(0.007)	(0.007)	(0.007)
Liquidity risk (TED)	-0.0034***	-0.0047***	-0.0038***	-0.0011	-0.0025***	-0.0016*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
US equity returns	0.0502***	0.0580***	0.0517***	0.0520***	0.0604***	0.0539***
	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)
Global liquidity	0.0539***	0.0468***	0.0515***	0.0176	0.0101	0.0147
	(0.007)	(0.008)	(0.008)	(0.011)	(0.011)	(0.011)
Oil Prices	0.0075**	0.0082**	0.0074**	-0.0014	-0.0007	-0.0015
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Non Oil Commodity Prices	0.0007	-0.0036	0.0022	-0.0003	-0.0049	0.0015
	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)	(0.011)
US interest rate	0.0732	-0.0740	0.0581	-0.1237	-0.2750***	-0.1412
	(0.081)	(0.082)	(0.081)	(0.099)	(0.094)	(0.095)
CDS spreads				-0.0052***	-0.0050***	-0.0052***
				(0.001)	(0.001)	(0.001)
Domestic equity returns				0.0490***	0.0491***	0.0490***
				(0.005)	(0.005)	(0.005)
Domestic interest rate				0.0003	-0.0010	-0.0004
				(0.040)	(0.040)	(0.040)
Constant	0.1284***	0.1171***	0.1272***	0.1367***	0.1245***	0.1352***
	(0.019)	(0.018)	(0.019)	(0.020)	(0.020)	(0.020)
Lags of Dependent Variable	4	4	4	4	4	4
Observations	3,003	3,003	3,003	1,764	1,764	1,764
R-squared	0.545	0.539	0.545	0.610	0.602	0.610
Countries	36	36	36	20	20	20

Table B.4: **Policy Uncertainty and Aggregate Portfolio flows**

Note: The dependent variable is total (bond+equity) gross portfolio inflows in percent of assets allocated to a given country. Policy uncertainty, VIX, TED, interest rates and CDS spreads are expressed in first differences; commodity prices in growth rates. See section 3 and the appendix for sources and a definition of the variables. The regression includes country fixed effects and standard errors are clustered at the country level.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
		Bonds			Equity	
US Policy Uncertainty	-0.0042***		-0.0026**	-0.0071***		-0.0080***
	(0.001)		(0.001)	(0.001)		(0.001)
EU Policy Uncertainty		-0.0126***	-0.0118***		0.0049***	0.0072***
		(0.001)	(0.001)		(0.001)	(0.001)
Global risk aversion (VIX)	-0.0231**	-0.0241**	-0.0231**	-0.0472***	-0.0508***	-0.0474***
	(0.011)	(0.011)	(0.011)	(0.008)	(0.008)	(0.008)
Liquidity risk (TED)	-0.0107***	-0.0089***	-0.0086***	0.0037***	0.0015	0.0025**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
US equity returns	0.0828***	0.0770***	0.0747***	0.0590***	0.0717***	0.0640***
	(0.011)	(0.009)	(0.010)	(0.006)	(0.006)	(0.006)
Global liquidity	0.0629***	0.0735***	0.0755***	0.0024	-0.0117	-0.0060
	(0.010)	(0.010)	(0.009)	(0.012)	(0.011)	(0.012)
Oil Prices	-0.0192***	-0.0178***	-0.0181***	0.0036	0.0040	0.0032
	(0.005)	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)
Non Oil Commodity Prices	0.0287**	0.0172	0.0192*	0.0132	0.0104	0.0177
	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
US interest rate	0.0243	0.0186	0.0689	-0.1683	-0.3752***	-0.2227*
	(0.052)	(0.053)	(0.051)	(0.122)	(0.116)	(0.118)
CDS spreads	-0.0065***	-0.0065***	-0.0066***	-0.0033**	-0.0030*	-0.0032**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Domestic equity returns	0.0283***	0.0283***	0.0283***	0.0602***	0.0604***	0.0603***
	(0.004)	(0.003)	(0.004)	(0.006)	(0.006)	(0.006)
Domestic interest rate	0.0206	0.0244	0.0247	-0.0293	-0.0295	-0.0315
	(0.046)	(0.047)	(0.046)	(0.036)	(0.036)	(0.035)
Constant	0.1545***	0.1518***	0.1563***	0.1873***	0.1712***	0.1817***
	(0.012)	(0.011)	(0.012)	(0.012)	(0.013)	(0.013)
Lags of Dependent Variable	4	4	4	4	4	4
Observations	1,764	1,764	1,764	1,764	1,764	1,764
R-squared	0.704	0.708	0.709	0.472	0.464	0.476
Countries	20	20	20	20	20	20

Table B.5: **Splitting into Bonds and Equity**

Note: In columns (1) to (3), the dependent variable is gross bond portfolio inflows in percent of bond assets allocated to a given country. In columns (4) to (6), the dependent variable is gross equity portfolio inflows in percent of equity assets allocated to a given country. Policy uncertainty, VIX, TED, interest rates and CDS spreads are expressed in first differences; commodity prices in growth rates. The regression includes country fixed effects and standard errors are clustered at the country level.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES		Bonds			Equity	
REGION	Latin America	CEEC	Asia	Latin America	CEEC	Asia
US Policy Uncertainty	-0.0068***	-0.0054***	0.0022	-0.0088***	-0.0071***	-0.0082***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
EU Policy Uncertainty	-0.0063***	-0.0103***	-0.0181***	0.0083**	0.0128**	0.0045**
	(0.001)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)
Global risk aversion (VIX)	-0.0507***	-0.0373**	0.0082	-0.0690***	-0.0827***	-0.0179*
	(0.007)	(0.010)	(0.018)	(0.010)	(0.012)	(0.009)
Liquidity risk (TED)	-0.0082***	-0.0104***	-0.0089***	0.0059**	-0.0001	0.0013
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)
US equity returns	0.0528***	0.0501***	0.1046***	0.0713***	0.0465**	0.0690***
	(0.007)	(0.008)	(0.016)	(0.012)	(0.010)	(0.007)
Global liquidity	0.0720**	0.0587	0.0897***	-0.0199	-0.0288	0.0129
	(0.018)	(0.039)	(0.013)	(0.018)	(0.061)	(0.013)
Oil Prices	-0.0098*	-0.0001	-0.0318***	0.0022	0.0122	-0.0010
	(0.004)	(0.013)	(0.003)	(0.005)	(0.011)	(0.003)
Non Oil Commodity Prices	-0.0042	-0.0216	0.0499**	0.0268**	-0.0307	0.0394***
	(0.011)	(0.015)	(0.017)	(0.007)	(0.031)	(0.011)
US interest rate	0.0517	0.3262	-0.0016	-0.4476**	-0.1991	-0.1252
	(0.066)	(0.224)	(0.068)	(0.163)	(0.179)	(0.187)
CDS spreads	-0.0073***	-0.0062**	-0.0055**	-0.0021	-0.0005	-0.0060***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Domestic equity returns	0.0302**	0.0320**	0.0283***	0.0658***	0.0825***	0.0425***
	(0.008)	(0.008)	(0.004)	(0.012)	(0.007)	(0.007)
Domestic interest rate	0.2149*	0.0174	-0.0063	-0.0106	-0.1088	0.0080
	(0.087)	(0.147)	(0.059)	(0.067)	(0.080)	(0.026)
Constant	0.1801***	0.1452**	0.1389***	0.3020***	0.0992*	0.1701***
	(0.007)	(0.045)	(0.010)	(0.025)	(0.039)	(0.011)
Lags of Dependent Variable	4	4	4	4	4	4
Observations	538	362	772	538	362	772
R-squared	0.745	0.654	0.729	0.479	0.503	0.516
Countries	6	4	9	6	4	9

Table B.6: **Splitting into different regions**

Note: In columns (1) to (3), the dependent variable is gross bond portfolio inflows in percent of bond assets allocated to a given country. In columns (4) to (6), the dependent variable is gross equity portfolio inflows in percent of equity assets allocated to a given country. Policy uncertainty, VIX, TED, interest rates and CDS spreads are expressed in first differences; commodity prices in growth rates. The regression includes country fixed effects and standard errors are clustered at the country level.

VARIABLES	Bonds		Equity	
PERIOD	Before 2007:8	After 2007:8	Before 2007:8	After 2007:8
	(1)	(2)	(3)	(4)
US Policy Uncertainty	-0.0100***	-0.0050***	-0.0042	-0.0049***
	(0.001)	(0.001)	(0.003)	(0.001)
EU Policy Uncertainty	-0.0030	-0.0110***	0.0175***	0.0023*
	(0.004)	(0.001)	(0.003)	(0.001)
Global risk aversion (VIX)	-0.0292	-0.0431***	-0.2850***	-0.0556***
	(0.017)	(0.015)	(0.037)	(0.008)
Liquidity risk (TED)	-0.0270***	-0.0086***	-0.0474***	0.0040***
	(0.009)	(0.001)	(0.005)	(0.001)
US equity returns	0.2178***	0.0302*	0.1167***	0.0584***
	(0.014)	(0.016)	(0.018)	(0.008)
Global liquidity	0.0011	0.1626***	-0.0842***	-0.0112
	(0.062)	(0.013)	(0.024)	(0.012)
Oil Prices	0.0117*	-0.0301***	0.0257***	0.0047**
	(0.006)	(0.004)	(0.005)	(0.002)
Non Oil Commodity Prices	-0.0467***	0.0569***	0.0461**	0.0095
	(0.008)	(0.014)	(0.018)	(0.007)
US interest rate	0.2235	0.3760***	1.2739***	-1.0554***
	(0.276)	(0.081)	(0.405)	(0.117)
CDS spreads	-0.0096***	-0.0063***	-0.0045*	-0.0035**
	(0.002)	(0.001)	(0.002)	(0.001)
Domestic equity returns	0.0217**	0.0175***	0.0693***	0.0418***
	(0.009)	(0.005)	(0.009)	(0.005)
Domestic interest rate	-0.0726	0.0655	-0.0696	-0.0096
	(0.044)	(0.057)	(0.079)	(0.025)
Constant	0.1730**	0.1296***	-0.0275	0.0409***
	(0.080)	(0.018)	(0.034)	(0.014)
Lags of Dependent Variable	4	4	4	4
Observations	706	1,058	706	1,058
R-squared	0.500	0.814	0.570	0.584
Countries	20	20	20	20

Table B.7: **Non-Crisis and Crisis Period**

Note: In columns (1) to (2)/(3) to (4), the dependent variable is gross bond/equity portfolio inflows in percent of bond/equity assets allocated to a given country. Policy uncertainty, VIX, TED, interest rates and CDS spreads are expressed in first differences; commodity prices in growth rates. The regression includes country fixed effects and standard errors are clustered at the country level. We split the sample in pre and post August 2007.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Bonds				Equity			
PERIOD	Before 2007:8	Before 2007:8	After 2007:8	After 2007:8	Before 2007:8	Before 2007:8	After 2007:8	After 2007:8
US Policy Uncertainty	-0.0178***	-0.0124***	-0.0095***	-0.0048***	-0.0172***	-0.0074***	-0.0098***	-0.0066***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.001)	(0.001)
EU Policy Uncertainty	0.0044	-0.0005	-0.0348***	-0.0183***	0.0277***	0.0205***	-0.0115***	0.0003
	(0.003)	(0.003)	(0.001)	(0.001)	(0.003)	(0.003)	(0.002)	(0.001)
Global risk aversion (VIX)		-0.2284***		-0.1164***		-0.4076***		-0.0856***
		(0.013)		(0.004)		(0.026)		(0.005)
Constant	0.6955***	0.6199***	0.1864***	0.1409***	0.4767***	0.4084***	0.1035***	0.0814***
	(0.044)	(0.031)	(0.004)	(0.005)	(0.015)	(0.014)	(0.011)	(0.012)
Lags of Dependent Variable	4	4	4	4	4	4	4	4
Observations	1,195	1,195	1,808	1,808	1,195	1,195	1,808	1,808
R-squared	0.349	0.386	0.700	0.757	0.160	0.307	0.327	0.431
Countries	35	35	36	36	35	35	36	36

Table B.8: **Transmission of Policy Uncertainty**

Note: In columns (1) to (4), the dependent variable is gross bond portfolio inflows in percent of bond assets allocated to a given country. In columns (5) to (8), the dependent variable is gross equity portfolio inflows in percent of equity assets allocated to a given country. Policy uncertainty and VIX are expressed in first differences. The regression includes country fixed effects and standard errors are clustered at the country level.

Hypothesis	Bond Flows		Equity Flows	
	F-test	p-value	F-test	p-value
H_0:$r = 0$ against H_1:$r = 1$	5.259	0.000	28.429	0.000
H_0:$r = 1$ against H_1:$r = 2$	9.378	0.000	8.112	0.000

Table B.9: **Non-Crisis and Crisis Period**

Note: The above table presents non linearity and non-remaining nonlinearity tests with time as transition variable using González et al. (2005). r is the number of transition functions such that $r = 0$ corresponds to the linear model. The null is rejected if p-values are under the rejection threshold. Here, we strongly reject H_0 for all tests.

VARIABLES	Bonds					Equity				
	β_0	β_1	$\beta_0+\beta_1$	β_2	$\sum\beta_i$	β_0	β_1	$\beta_0+\beta_1$	β_2	$\sum\beta_i$
US Policy Uncertainty	-0.021***	0.019***	-0.007**	-0.002	-0.009***	-0.002	-0.002	-0.003**	-0.029***	-0.032***
	(-3.871)	(3.388)	(-0.951)	(-2.246)	(-3.225)	(-0.433)	(-0.384)	(-2.148)	(-8.460)	(-10.543)
EU Policy Uncertaintyl	0.003	-0.039***	-0.036***	0.022***	-0.014***	0.021***	-0.029***	-0.0076**	-0.004	-0.012***
	(0.473)	(-5.701)	(-9.876)	(4.207)	(-3.907)	(6.265)	(-6.346)	(-2.548)	(-0.973)	(-3.835)
Global risk aversion (VIX)	-0.092***	0.063*	-0.029**	-0.122***	-0.151***	-0.340***	0.277***	-0.063***	-0.158***	-0.220***
	(-2.721)	(1.773)	(2.401)	(-5.578)	(-7.597)	(-10.821)	(8.613)	(-7.224)	(-7.198)	(-10.817)
Liquidity risk (TED)	-0.054***	0.053***	-0.000	-0.218***	-0.219***	-0.058***	0.063***	0.0054***	-0.048***	-0.043***
	(-6.531)	(6.348)	(-0.244)	(-13.271)	(-13.495)	(-10.628)	(11.449)	(4.157)	(-3.577)	(-3.242)
US equity returns	0.063*	-0.001	0.0623***	-0.274***	-0.212***	0.095***	-0.039*	0.056***	-0.378***	-0.322***
	(1.745)	(-0.023)	(5.147)	(9.724)	(-8.186)	(4.436)	(-1.712)	(6.969)	(-11.274)	(-9.740)
Global liquidity	0.089*	-0.049	0.040	0.710***	0.750***	-0.090**	0.104***	0.014	0.812***	0.825***
	(1.816)	(-0.872)	(1.555)	(11.407)	(14.125)	(-2.550)	(2.686)	(0.868)	(10.096)	(10.362)
Oil Prices (Growth Rate)	0.000	-0.050***	-0.050***	0.100***	0.050**	0.025***	-0.018**	0.006	0.151***	0.157***
	(0.060)	(-5.692)	(-9.396)	(4.793)	(2.489)	(4.224)	(-2.337)	(1.398)	(6.999)	(7.578)
Non Oil Commodity Prices (Growth Rate)	-0.136***	0.270***	0.134***	-0.422***	-0.288***	0.044**	-0.056***	-0.013	-0.243***	-0.256***
	(-6.372)	(10.276)	(8.523)	(-15.269)	(-11.424)	(2.224)	(-2.604)	(-1.136)	(-8.062)	(-8.856)
US interest rate	-0.584	1.184**	0.600	25.073***	25.595***	1.308***	-2.375***	-1.067***	53.863***	52.693***
	(-1.305)	(2.220)	(3.135)	(3.965)	(4.025)	(4.335)	(-6.605)	(-7.091)	(8.394)	(8.209)
CDS spreads	-0.010***	0.007**	-0.003***	-0.010***	-0.014***	-0.004*	0.001	-0.003***	0.000	-0.003
	(-3.887)	(2.449)	(-3.064)	(-3.458)	(-4.742)	(-1.815)	(0.232)	(-3.912)	(0.009)	(-1.185)
Domestic equity returns	0.037***	-0.028***	0.008	-0.024**	-0.016*	0.055***	-0.015	0.041***	0.000	0.041***
	(4.145)	(-2.727)	(1.600)	(-2.351)	(-1.789)	(7.184)	(-1.606)	(8.248)	(0.037)	(5.084)
Domestic interest rate	-0.033	0.012	-0.021	0.101	0.079	-0.073	0.101	0.029	-0.105	-0.076
	(-0.595)	(0.166)	(-0.446)	(1.199)	(1.1669)	(-1.493)	(1.598)	(0.716)	(-1.230)	(-1.031)
Transition variable			Time					Time		
Threshold		39.494		82.966			40.371		83.961	
Slope		60.776		36.573			77.426		34.582	
Obs	1764					1764				
Indiv	20					20				
AIC	457					-376				
BIC	895					61				

Table B.10: **Capital Flows to EMEs - Time as the transition variable**

Note: In the first five columns/last five columns, the dependent variable is gross bond/equity portfolio inflows in percent of bond/equity assets allocated to a given country. Using the PSTR methodology by González et al. (2005), we estimate how the effects of changes in advanced country policy uncertainty and other determinants of capital flows to EMEs differ depending on the time period. See section 3 for a description of the methodology. Policy uncertainty, VIX, TED, interest rates and CDS spreads are expressed in first differences; commodity prices in growth rates. All specifications include country level fixed effects. T statistics are included in parentheses. Since β_0, β_1 and β_2 are correlated, we calculate $\beta_0+\beta_1$ and $\beta_0+\beta_1+\beta_2$ with 10000 draws and test for normality with Jarque-Bera test. $\beta_0+\beta_1$ correspond to the impact of the regressor when the first transition function is equal to 1 and the second equal to 0. $\beta_0+\beta_1+\beta_2$ correspond to the impact of the same regressor when both transition functions are equal to one.

Dependent variable	Hypothesis	F-test	p-value
Bonds	H_0:Linear H_1:EUPU transition variable	6.545	0.000
	H_0:Linear H_1:USPU transition variable	7.660	0.000
	H_0:Linear H_1:TED transition variable	14.830	0.000
	H_0:Linear H_1:VIX transition variable	16.687	0.000
Equity	H_0:Linear H_1:EUPU transition variable	40.84	0.000
	H_0:Linear H_1:USPU transition variable	32.102	0.000
	H_0:Linear H_1:TED transition variable	24.043	0.000
	H_0:Linear H_1:VIX transition variable	32.436	0.000

Table B.11: **Linearity test with global variable as potential transition variables**

Note: Test (Fisher test) of linearity proposed by González et al. (2005) based on Taylor expansion of equation (3) (without the domestic transition variable part) around $\gamma_1 = 0$. If the p-value is lower than the rejection threshold we reject H_0 of linearity. Here, we strongly reject H_0 of linearity for all transition variables and for both equity and bonds. Then, we estimate equation (3) (without the domestic transition variable part) for each global transition variable.

Dependent variable	Global transition variable	Hypothesis	F-test	p-value
Bonds	EUPU	H_0:EUPU alone H_1:EUPU and CV	4.592	0.000
		H_0:EUPU alone H_1:EUPU and CDS	**0.8719**	**0.576**
	USPU	H_0:USPU alone H_1:USPU and CV	5.468	0.000
		H_0:USPU alone H_1:USPU and CDS	**1.540**	**0.103**
	TED	H_0:TED alone H_1:TED and CV	5.395	0.000
		H_0:TED alone H_1:TED and CDS	2.156	0.000
	VIX	H_0:VIX alone H_1:VIX and CV	4.863	0.000
		H_0:VIX alone H_1:VIX and CDS	**1.630**	**0.077**
Equity	EUPU	H_0:EUPU alone H_1:EUPU and CV	2.713	0.0109
		H_0:EUPU alone H_1:EUPU and CDS	**1.622**	**0.079**
	USPU	H_0:USPU alone H_1:USPU and CV	9.315	0.000
		H_0:USPU alone H_1:USPU and CDS	4.080	0.000
	TED	H_0:TED alone H_1:TED and CV	7.091	0.000
		H_0:TED alone H_1:TED and CDS	3.333	0.000
	VIX	H_0:VIX alone H_1:VIX and CV	10.353	0.000
		H_0:VIX alone H_1:VIX and CDS	4.731	0.000

Table B.12: **Non-remaining non linearity test if Coefficient of Variation (CV) or CDS spreads are potential domestic transition variables**

Note: Once we estimated equations (3) without the domestic part we test for non-remaning nonlinearity following González et al. (2005) methodology. If the p-value is lower than the rejection threshold we reject H_0 and estimate equation (3) with 2 transition variables. Bold p-values correspond to tests for which we did not reject H_0. In those cases, equation (3) with 2 transition variables are not estimated since the second transition variable (Dom_t: CV or CDS) is not relevant for explaining the non linearity.

Model	Bonds		Equity	
	AIC	BIC	AIC	BIC
EUPU alone	647	800	-334	80
EUPU & CV	688	1126	-266	171
USPU alone	603	756		
USPU & CDS			-367	80
USPU & CV	631	1070	-374	63
TED & CDS	623	1061	-181	256
TED & CV	608	1046	-194	243
VIX alone	595	748		
VIX & CDS			-381	56
VIX & CV	630	1068	-377	60

Table B.13: **AIC and BIC**

Note: We compare estimated models with information criterion (AIC and BIC) in order to choose the best models for bonds and equity. Gray cells correspond to models which have not been estimated because of the test results (see Table B.12).

VARIABLES	Bonds			Equity					
	β_0	β_1	$\beta_0+\beta_1$	β_0	β_1	$\beta_0+\beta_1$	β_2	$\beta_0+\beta_2$	$\sum\beta_i$
US Policy Uncertainty	-0.016***	0.012***	-0.005***	-0.003	-0.002	-0.005***	-0.002	-0.005	-0.007***
	(-4.219)	(2.767)	(-3.398)	(-0.899)	(-0.685)	(-3.423)	(-0.932)	(-1.397)	(-3.196)
EU Policy Uncertaintyl	-0.002	-0.020***	-0.022***	0.019***	-0.013***	0.006***	-0.002	0.016***	0.003
	(-0.326)	(-3.590)	(-8.172)	(6.183)	(-3.884)	(2.784)	(-0.734)	(4.519)	(1.116)
Global risk aversion (VIX)	-0.110***	0.095***	-0.015	-0.313***	0.252***	-0.061***	0.023	-0.290***	-0.038***
	(-3.505)	(2.877)	(-1.418)	(-11.540)	(9.089)	(-6.564)	(1.546)	(9.826)	(-3.092)
Liquidity risk (TED)	-0.028***	0.022***	-0.006***	-0.047***	0.049***	0.002**	0.001	-0.045***	0.004**
	(-4.120)	(3.143)	(-5.058)	(-9.117)	(9.543)	(2.030)	(0.504)	(-8.587)	(2.032)
US equity returns	0.151***	-0.119***	0.033***	0.039**	0.013	0.052***	0.003	0.042*	0.055***
	(5.269)	(-3.801)	(2.888)	(2.064)	(0.630)	(5.592)	(0.194)	(1.920)	(4.240)
Global liquidity	-0.173***	0.390***	0.217***	-0.058**	0.067**	0.009	-0.038	-0.097***	-0.029
	(-4.003)	(7.665)	(9.141)	(-1.972)	(2.026)	(0.500)	(-1.314)	(-2.674)	(-1.105)
Oil Prices (Growth Rate)	0.008	-0.034***	-0.026***	0.021***	-0.019***	0.002	-0.013*	0.008	-0.010
	(1.200)	(-3.890)	(-4.983)	(3.792)	(-2.662)	(0.502)	(-1.947)	(1.241)	(-1.627)
Non Oil Commodity Prices (Growth Rate)	-0.062***	0.131***	0.069***	0.004	0.007	0.010	0.029*	0.033	0.040**
	(-3.007)	(5.473)	(5.234)	(0.244)	(0.399)	(1.020)	(1.653)	(1.540)	(2.260)
US interest rate	0.248	0.732	0.980***	1.848***	-2.680***	-0.835***	-0.475*	1.372***	-1.310***
	(0.487)	(1.234)	(5.288)	(6.272)	(-7.851)	(-5.153)	(-1.845)	(4.148)	(-5.290)
CDS spreads	-0.012***	0.007***	-0.004***	-0.013***	0.001	-0.013***	0.010***	-0.003*	-0.003***
	(-5.494)	(3.112)	(-4.798)	(-6.234)	(0.267)	(-7.368)	(5.297)	(-1.840)	(-3.754)
Domestic equity returns	0.033***	-0.020**	0.013***	0.081***	-0.036***	0.045***	-0.035***	0.046***	0.010*
	(4.102)	(-2.070)	(2.590)	(11.886)	(-4.520)	(8.802)	(-4.832)	(5.277)	(1.849)
Domestic interest rate	-0.052	0.126*	0.073	-0.079*	0.021	-0.058	0.070	-0.010	0.012
	(-1.021)	(1.701)	(1.370)	(-1.791)	(0.360)	(-1.201)	(1.254)	(-0.159)	(0.308)
Transition variable		VIX			VIX		CDS		
Threshold		18.05			17.74		253.79		
Slope		138			172		9935		
Obs	1764			1764					
Indiv	20			20					
AIC	595			-381					
BIC	748			56					

Table B.14: **Nonlinear regressions - Explaining Structural Breaks**

Note: In the first three columns/last six columns, the dependent variable is gross bond/equity portfolio inflows in percent of bond/equity assets allocated to a given country. Using the PSTR methodology (González et al. (2005)), we estimate how the effects of changes in advanced country policy uncertainty and other determinants of capital flows to EMEs differ according to the level of a feature(s) of the economic environment (the 'transition variable(s)'). See section 3 for a description of the methodology. Policy uncertainty, VIX, TED, interest rates and CDS spreads are expressed in first differences; commodity prices in growth rates. All specifications include country level fixed effects. T statistics are included in parentheses. Since β_0, β_1 and β_2 are correlated, we calculate $\beta_0+\beta_1$, $\beta_0+\beta_2$ and $\beta_0+\beta_1+\beta_2$ with 10000 draws and test for normality using the Jarque-Bera test.

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