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Policy uncertainty spillovers to emerging markets — evidence from capital flows

Ludovic Gauvin, Cameron McLoughlin and Dennis Reinhardt

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Ludovic Gauvin,[1] Cameron McLoughlin[2] and Dennis Reinhardt[3]

Abstract

We examine the extent to which uncertainty with regard to macroeconomic policies in advanced countries spills over to emerging market economies (EMEs) via gross portfolio bond and equity flows. We find that the impact of fluctuations in policy uncertainty on portfolio equity flows differs markedly depending on whether changes in policy uncertainty originate from the Untied States or the European Union (EU). Increases in US policy uncertainty reduce both bond and equity inflows into EMEs. Conversely, increases in EU policy uncertainty decrease bond inflows, but *increase* equity inflows. The size and direction of these spillover effects depends on the level of global risk, with increased European policy uncertainty only having a negative impact on bond inflows into EMEs when global risk is high. For equity inflows, the level of country-specific sovereign default risk also matters for non-linearities: increased EU policy uncertainty pushes portfolio equity inflows into EMEs even if global risk is high, but only into countries with low sovereign default risk.

Key words: Policy uncertainty, portfolio capital flows, EMEs, non-linearities.

JEL classification: F21, F32, F42.

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(1) EconomiX-CNRS and Banque de France. Email: ludovic.gauvin@gmail.com
(2) Graduate Institute, Geneva. Email: cameron.mcloughlin@gmail.com
(3) Bank of England. Email: dennis.reinhardt@bankofengland.co.uk

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Publications Team, Bank of England, Threadneedle Street, London, EC2R 8AH
Telephone +44 (0)20 7601 4030 Fax +44 (0)20 7601 3298 email publications@bankofengland.co.uk

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Summary

Since the end of the 'Great Moderation' and the global financial crisis, policymakers have discussed 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. At the same time, concerns regarding the impact of domestic policies on other economies - ie 'spillover effects' - feature prominently in the international policy debate. In particular, attention has focused on the spillover impacts of capital control policies, as well as the external impact of monetary policy settings in advanced countries. More recently, these two debates have been drawn together to analyse the spillover effects of advanced country policy uncertainty to investment and output in the rest of the world.

In this paper, we examine whether such policy uncertainty spillovers have been transmitted via cross-border capital flows. Specifically, we examine whether macroeconomic policy uncertainty in the United States or the European Union (EU) spilled over to emerging market economies (EMEs) via gross portfolio equity or bond inflows.

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 would tend to hinder domestic growth prospects, decreasing the attractiveness of investing in a given country (recent evidence points to effects of policy uncertainty on domestic output and investment). Based on this we would - *ceteris paribus* - expect investors to shift more of their investment abroad given the declined attractiveness of investing in the United States or the European Union. On the other hand, higher policy uncertainty may decrease the overall size of investors' positions in relatively more risky investment funds. Since there is a strong relationship between macroeconomic policy uncertainty and the US equity risk premium, higher policy uncertainty may impact advanced economy investor's willingness to take risk and lead to safe-haven flows (consistent with outflows out of EMEs that are often perceived as less 'safe'). In response to an investor funding shock, funds considerably change their allocations to emerging markets. Our paper can be interpreted as assessing the relative strength of these competing hypotheses for policy uncertainty shocks originating from two distinct regions and distinguishing between bond and equity inflows.

We find - using first a linear regression framework - that increases in policy uncertainty in the United States tend to significantly reduce both bond and equity inflows into EMEs. Conversely, increases in EU policy uncertainty tend to have different effects on equity versus bond flows into EMEs: bond inflows into EMEs decrease, but equity flows to EMEs increase in response to increased EU policy uncertainty. This is consistent with the hypothesis that shocks to US policy uncertainty are associated with safe-haven equity flows out of EMEs whereas the reduced attractiveness of investing in the EU following shocks to EU policy uncertainty appear to outweigh any safe-haven equity flows out of EMEs.

Non-linearities play, however, an important role in the size and direction of spillover effects. First, we provide evidence for two structural breaks in the relationship between changes in policy uncertainty and capital flows. The first break coincides with the first large increases in the cost of insuring against mortgages of lower credit ratings (BBB- and BBB) in the United States, providing evidence that the impact of the coming financial crisis was felt in portfolio flows slightly before the onset of funding illiquidity in the interbank market. The second break occurs in November/December 2010, coinciding with a significant expansion of QE2 by the US Federal Reserve in November 2010.

The level of global risk performs best in explaining non-linearities. Increases in EU policy uncertainty have a significantly negative impact on bond inflows only in the high global risk regime and, pointing into the same direction, the spillover impact of EU policy uncertainty on equity inflows is less positive in the high global risk regime than the low global risk regime. Global risk (proxied by the VIX index in our baseline) appears therefore not only as an important determinant of capital flows on its own, but it also determines how other push/pull factors (including policy uncertainty) impact portfolio flows. Turning to domestic factors, we find that the impact of policy uncertainty on bond inflows does not depend on domestic variables: changes to policy uncertainty have for example the same impact on bond inflows independent of a country's level of sovereign risk or equity market returns. Conversely, the level of country-specific sovereign risk (as proxied by credit default swap spreads) does determine the magnitude of policy uncertainty spillovers via equity flows. Increased EU policy uncertainty pushes portfolio equity inflows into EMEs even if global risk is high, but only into countries with low sovereign default risk.

Portfolio flows from funds based in the United States may show different reactions to EU policy uncertainty shocks than portfolio flows from funds based in the EU itself. The degree of home bias may play a crucial role. And to the extent that policy uncertainty with regard to macroeconomic policies impacts variables such as investors' wage income risk, it may also affect fund investors' willingness to buy risky assets, including assets held in EMEs. Accounting for the domicile of funds does, however, not change the finding on the positive spillover impact of EU policy uncertainty on equity flows to EMEs: we observe positive spillover effects in both the low and high global risk regime even for equity flows originating from funds domiciled in the European Union. These spillover effects are stronger for equity flows originating from funds domiciled in the United States: in the high global risk regime, flows into EMEs from US-domiciled funds increase even into EMEs with high sovereign default risk, whereas, mirroring our aggregate results, flows from Europe-domiciled funds increase only into EMEs with low sovereign default risk.

1 Introduction

Since the end of the 'Great Moderation' and the global financial crisis, policy makers have discussed 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. In particular, attention has focused on the spillover impacts of capital control policies, as well as the external impact of monetary policy settings in advanced countries. More recently, these two debates have been drawn together to analyse the spillover effects of advanced country policy uncertainty to investment and output in the rest of the world (IMF, 2013).[2]

In this paper, we examine whether such policy uncertainty spillovers have been transmitted via cross-border capital flows. Specifically, we examine whether macroeconomic policy uncertainty in the US *or* the EU spilled over to EMEs via gross portfolio equity *or* bond inflows.

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 would tend to hinder domestic growth prospects, decreasing the attractiveness of investing in a given country (recent evidence points to effects of policy uncertainty on domestic output and investment, see Baker, Bloom, and Davis 2013, Bloom 2009 and Fernández-Villaverde, Guerrón-Quintana, Kuester, and Rubio-Ramírez 2011). 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.[3] On the other hand, higher policy uncertainty may decrease the overall size of investors' positions in relatively more risky investment funds. Since there is a strong relationship between macroeconomic policy uncertainty and the US equity risk premium (see Pastor and Veronesi 2013), higher policy uncertainty may impact advanced economy investor's willingness to take risk and lead to safe-haven flows (consistent with outflows out of EMEs that are often perceived as less 'safe'). As shown by Jotikasthira, Lundblad, and Ramadorai (2012), in response to an investor funding shock, funds

[1] See for example Baker and Bloom (2012) and IMF (2012).

[2] See IMF (2013, chapter 2).

[3] 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).

considerably change their allocations to emerging markets. 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 inflows.

We find - using first a linear regression framework - that increases in policy uncertainty in the US tend to significantly reduce both bond and equity inflows into EMEs. Conversely, increases in EU policy uncertainty tend to have different effects on equity vs bond flows into EMEs: bond inflows into EMEs decrease, but equity flows to EMEs *increase* in response to increased EU policy uncertainty. This is consistent with the hypothesis that shocks to US policy uncertainty are associated with safe-haven equity flows out of EMEs whereas the reduced attractiveness of investing in the EU following shocks to EU policy uncertainty appear to outweigh any safe-haven equity flows out of EMEs.

Nonlinearities play, however, an important role in the size and direction of spillover effects. First, we provide evidence for two breaks in the relationship between changes in policy uncertainty and capital flows. The first break coincides with the first large increases in the cost of insuring against mortgages of lower credit ratings (BBB- and BBB) in the US, providing evidence that the impact of the coming financial crisis was felt in portfolio flows slightly before the onset of funding illiquidity in the interbank market (see Brunnermeier 2009 or Fratzscher 2012). The second break occurs in November/December 2010, coinciding with a significant expansion of QE2 by the US FED in November 2010.[4]

The level of global risk performs best in explaining nonlinearities. Increases in EU policy uncertainty have a significantly negative impact on bond inflows only in the high global risk regime and, pointing into the same direction, the spillover impact of EU policy uncertainty on equity inflows is less positive in the high global risk regime than the low global risk regime. Global risk (proxied by the VIX index in our baseline) appears therefore not only as an important determinant of capital flows on its own (as in Fratzscher 2012 or Forbes and Warnock 2012a), but it also determines how other push/pull factors (including policy uncertainty) impact portfolio flows. Turning to domestic factors, we find that the impact of policy uncertainty on *bond* inflows does not depend on domestic variables: changes to policy uncertainty have for example the same impact on bond inflows independent of a country's level of sovereign risk or equity market returns. Conversely, the

[4]See Fratzscher, Lo Duca, and Straub (2013) for an examination of the impact of QE on capital flows.

level of country specific sovereign risk (as proxied by CDS spreads) does determine the magnitude of policy uncertainty spillovers via equity flows. Increased EU policy uncertainty pushes portfolio equity inflows into EMEs even if global risk is high, but only into countries with low sovereign default risk.[5]

Accounting for the domicile of funds does not change the finding on the positive spillover impact of EU policy uncertainty on equity flows to EMEs: we observe positive spillover effects in both the low and high global risk regime even for equity flows originating from funds domiciled in the EU. These spillover effects are, however, stronger for equity flows originating from funds domiciled in the US: in the high global risk regime, flows into EMEs from US-domiciled funds increase even into EMEs with high sovereign default risk, whereas, mirroring our aggregate results, flows from Europe-domiciled funds increase only into EMEs with low sovereign default risk.

This paper proceeds as follows. Section 2 discusses the literature related to our study. Section 3 presents the data and variable definitions. Section 4 discusses the linear and nonlinear empirical methodologies. Section 5 presents our empirical results and section 6 discusses their robustness. Section 7 concludes.

2 Related Literature

The paper is related to various strands of the literature. Most broadly, it relates to the literature on the determinants of capital flows. Calvo, Leiderman, and Reinhart (1996) first characterised the lessons for macroeconomic management emerging from the surge of capital inflows to Asia and Latin America in the first half of the 1990s. The literature has also 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 portfolio flows across borders. Recently, there has been some focus in this literature on the determinants of 'extreme events' in gross capital flows (Forbes and Warnock, 2012a). Relatedly, Forbes and Warnock (2012b) examine extreme episodes in debt and equity flows.[6] We do not focus on extreme events, but share with these contributions the

[5]Notably, neither the level of capital account openness, nor the level of foreign exchange reserves to GDP, reduces the size of portfolio (both equity and bonds) spillovers from shocks to policy uncertainty.

[6]Other contributions in this area also relate to individual types of 'extreme capital flow events' include Ghosh, Qureshi, Kim, and Zalduendo (2012), which focuses on the factors underlying surges to emerging market countries

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.

The paper also relates 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 and Schneider 2007, Rudebusch and Swanson 2008, and Campbell, Sunderam, and Viceira 2009).[7] This may in turn affect investor's allocation between domestic and foreign asset holdings. Chan-Lau and 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 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, Zakrajsek, and Gilchrist 2010 and Fernández-Villaverde, Guerrón-Quintana, Kuester, and Rubio-Ramírez 2011). Recently, Carrière-Swallow and Céspedes (2013) examined the impact of uncertainty shocks in the US on economic activity in EMEs. They found that in EMEs with less developed financial markets, the credit channel is key to understanding the increased fall in investment in EMEs generated by uncertainty shocks. 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 and Sbracia, 2010).

Some studies have specifically examined the economic impact economic *policy* uncertainty. Pastor and Veronesi (2013) 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

and the determinants of the allocation of capital across countries during such episodes. In a similar vein, Dell'Erba and Reinhardt (2013) examine surges in gross FDI flows at the sectoral level. Other papers studying individual types of extreme capital flow events include Calvo, Izquierdo, and Mejía (2004) (sudden stops and balance sheet effects), Mendoza (2006) (debt deflation theory of sudden stops), Dooley (1988) (capital flight), Lensink, Hermes, and Murinde (2000) and Le and Zak (2006) (both regarding political risk and capital flight), and Hermes and 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.

uncertainty on domestic economic outcomes - including for example the welfare reducing effects of uncertainty regarding transfer payments (Gomes, Kotlikoff, and Viceira, 2012). It has been found that outward FDI flows from US companies to foreign 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 and Youngsuk, 2013). Gelos and Wei (2005) show that the dispersion of forecaster beliefs about future inflation is an important aspect of macroeconomic policy opacity in destination investment markets (i.e policy uncertainty in the economies that receive net portfolio inflows). Indeed, the authors find that domestic macroeconomic policy opacity significantly reduces fund level international portfolio investment into EMEs. Relatedly, Bussière and Mulder (1999) show that including political vulnerability variables into economic models improves their power to explain and predict economic crises. 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, Fratzscher, Kostka, and Straub (2012) and Lambert, Ramos-Tallada, and Rebillard (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, Lo Duca, and Straub (2013) 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 portfolio flows.

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 sometimes differential impacts of advanced country policy uncertainty on bond vs equity flows are suggestive of rebalancing effects in the management of investment fund portfolios. For example, Hau and Rey (2008) find 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. Theoretical modelling the portfolio balance effects of policy uncertainty shocks is outside the scope of our empirical study but subject to future research.

Our focus on nonlinearities is supported by recent theoretical work on multiple equilibria, or 'risk panics', in investor behaviour (see Bacchetta, Tille, and van Wincoop 2012 and Bacchetta and van Wincoop 2013). 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 1), while since then these two measures tracked each other more closely (0.51 from 2008 onwards).

Finally, the measure of policy uncertainty used in this study, taken from Baker, Bloom, and Davis (2013), builds on those studies which consider the best way to measure economic uncertainty. A number of studies have found a high correlation between professional forecaster disagreement on future economic outcomes such as inflation and measures of uncertainty (for example Zarnowitz and Lambros 1987, Giordani and Soderlind 2003 and Boero, Smith, and Wallis 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, Breedon, and Buraschi 2010, Harris and Raviv 1993, Xiong and 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, Ghysels, and Juergens, 2005) and variables such as inflation (Wright, 2011) although the strength of the link between forecaster disagreement and uncertainty about future outcomes is not without criticism (Rich and Tracy, 2010). Notably, such inflation forecast disagreement measures are a key component of the policy uncertainty measure used by our study.

3 Data

3.1 Data Sources and Variable Definition

We construct a dataset containing information on monthly portfolio equity and bond flows and their determinants for 20 emerging market economies (EMEs) over the period January 2004 to December 2011.[8] 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.

We use monthly data on portfolio bond and equity investment flows compiled by EPFR Global (EPFR thereafter). EPFR aggregates data on fund level flows by country of destination and constitutes a representative sample of more than 30,000 equity funds and 20,000 bond funds for each investment destination. Roughly 10,000 of equity funds are global funds, 2,000 emerging market funds and another 4,500 EME funds with a regional or country-specific focus. The remainder of the funds have a mandate to invest in advanced economies but have nonetheless often positive (and non-trivial) allocations to EMEs. The picture is similar for bond funds. EPFR data capture 5-20% of the market capitalisation in equity and in bonds for most countries. We use EPFR data rather than balance-of-payments (BOP) data as the latter are only available at a quarterly frequency and would be, as such, too coarse to identify the impact of policy uncertainty shocks measured at a monthly frequency. Jotikasthira et al. (2012) show that EPFR portfolio flows and BOP data match closely.[9]

Most of the funds covered by EPFR are domiciled in advanced countries. US domiciled equity funds account for 36% of the number and 68% of total assests under management (AUM) of equity funds in the EPFR dataset whereas equity funds domiciled in Europe account for 49% in terms of number but only 18% of AUM.[10] In our sample of 20 EMEs, funds domiciled in Europe play a larger role: at the end of 2011, funds domiciled in Europe held almost 60% of bonds AUM and

[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]Our own analysis indicates that the match between EPFR and BOP data is generally better for EMEs than advanced economies. In the 2013 US QE tapering episode, the correlation between EPFR flows and BOP flows has been, however, weaker than before for some of the EMEs; this episode is, however, not included in our sample which ends in 2011 (results available on request).

[10]As noted by Lo Duca (2012), due to legal restrictions, most fund investors are domiciled in the same location as the fund itself.

around 40% of equity AUM allocated to EMEs.

Flows in EPFR are net of valuation changes (hence *net* flows) and defined as the change in AUM due to investors' active increases or reductions. EPFR also contains information on AUM at the end of each period for each of the different funds.

To derive our dependent variable, we aggregate, over all funds, these estimates of net flows and AUM into individual emerging markets across the whole range of equity or bond funds which have positive allocations. Our dependent variable is then the monthly portfolio bond or equity investment net flows divided by the total estimated allocation of assets of all bond or equity funds to a given EME, in other words the monthly percent change in assets under management excluding valuation changes in relation to a specific EME. In the robustness section, we also aggregate net flows and AUM for US and Europe-domiciled funds separately.

Aggregating across the whole range of equity or bond funds entails of course the assumption there are no potentially offsetting differences in behaviour between different *types* of funds in the face of changes to policy uncertainty. Indeed, it is unlikely that portfolio flows originating from global funds behave exactly in the same way as flows originating from funds with a mandate to invest in EMEs only. As described well in Gelos (2011), the compensation of mutual fund managers is typically linked to the performance of their portfolios relative to benchmark indices, such as the Morgan Stanley Capital International (MSCI) indices for equities in emerging markets, indicating that incentives for fund managers in global funds are likely to deviate from incentives of general investors in these funds. For example, in case an increase in advanced economy policy uncertainty causes outflows of portfolio capital flows from EMEs, an individual fund manager investing in EMEs may have no incentive to reduce his portfolio as long as she beats the index. But, while we acknowledge that differing incentives can weaken the average spillover effects in a sample that contains all types of funds, it is unlikely that the direction of spillovers changes. In addition, over longer frequencies (likely already at the monthly frequency), it is likely that fund managers overseeing the total performance of a global fund will behave in a similar fashion to general investors in an EME-focused fund. Hence, they would re-allocate funds from EMEs to AEs in case a shock makes investment in riskier EME assets less attractive.

One caveat to comparing allocations and net flows originating from equity funds to those from bond funds is highlighted by Fratzscher et al. (2013). Each category, bonds and equities, comprises different types of financial assets. Bond funds include for example investments in a broad array of corporate bonds as well as treasury securities. The proceeding analysis should be hence seen as comparing the average effect across different bond and equity asset classes.

We adjust the EPFR data in three 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 discussion in Fratzscher 2012). Third, 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 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). IMF (2013) discuss some potential caveats with regard to the other two components of the index. 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 show in the robustness

[11]For the US, the economic policy 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.

section that results are robust to relying only on the news-based measure of policy uncertainty. Baker et al. (2013) show that their overall measure of policy uncertainty is highly correlated with alternative measures of policy uncertainty (by Fernández-Villaverde et al. 2011, Born and Pfeifer 2011).

We proxy for global risk using the VIX index from the Chicago Board Options Exchange (CBOE). The VIX index is a measure of US stock market volatility, compiled from the prices of short-dated options on the S&P 500 index, and is often considered in academic and policy circles as an empirical proxy for global risk aversion but can be decomposed in risk aversion and expected stock market volatility.[12]

Data sources for portfolio flows, uncertainty and all remaining variables are given in Table 1, summary statistics are provided in Table 2 and the correlations in Table 3. To limit the effect of large observations, the portfolio flows (in % of assets under management) and domestic control variables are winsorised at the 1% percentile.

3.2 A first look at the data

Since the Global Financial Crisis, the economic environment has been characterised by heightened levels of macroeconomic policy uncertainty. Figure 2 shows the evolution of a our measures of US and European policy uncertainty taken from Baker et al. (2013) over our sample period 2004-2011. 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. 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. This high correlation in the level of the indices may not be surprising given the tight economic integration of the two economic areas. However, *changes* in US and EU policy uncertainty are much more weakly correlated (0.31 over the sample period). To illustrate, in both the US and the EU policy uncertainty moderated somewhat after the crisis but policy uncertainty in the US moved above European levels with the 2010 Midterm elections and then sharply so as the dispute about the US debt ceiling reached its climax in August 2011. But in the final three months of 2011 EU Policy Uncertainty moved above

[12] See Bekaert, Hoerova, and Lo Duca (2013) for a recent discussion

US levels driven by a cut in Italy's sovereign rating and the call for a referendum in Greece.[13] More generally, large changes in the rolling correlation over time confirm that policy uncertainty in the US and EU diverged at times considerably (see Figure 3). Such variation in policy uncertainty changes across the two regions is crucial for our analysis as it allows us to estimate the differential impact of shocks in US vs EU policy uncertainty on portfolio flows into EMEs. Over the whole of our sample, shocks to US policy uncertainty are larger than their EU counterpart and are also more variable.[14]

In Figure 4, we plot the median of the rolling 12-monthly correlation between changes in US and European policy uncertainty and aggregate fund level portfolio flows across our sample of EMEs (blue and red lines respectively) together with a measure of global risk aversion (the VIX index, yellow dashed line). Notably, the correlation between portfolio inflows and policy uncertainty turned negative as risk aversion started to rise in early 2007 indicating possible nonlinearities in the relation between policy uncertainty and portfolio inflows into EMEs.

In Figures 5a and 5b, we calculate the median of the inflows-uncertainty correlations at low, medium or high levels of the VIX index. Unconditional on other determinants of portfolio inflows, we find that increases in EU policy uncertainty are associated with increased bond and equity inflows in periods when the VIX is low. But the push effect of increased EU policy uncertainty on portfolio inflows disappears for medium or high levels of VIX when the median correlation between changes in EU policy uncertainty and portfolio inflows turns negative. For US policy uncertainty, we also observe falling correlations between inflows and changes in policy uncertainty for bond inflows; the relation is less clear-cut for equity inflows.

4 Empirical Methodology

We follow a two pronged strategy in order to uncover potential capital flow 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 to other global and country-specific variables that the previous literature has found to be

[13] See Baker et al. (2013) for further discussion of events driving the evolution of the policy uncertainty indices

[14] Means of 0.98 and 0.80 and standard deviation of 20.69 and 15.31 respectively. See Table 2.

important in explaining capital flows. Secondly, we move to a nonlinear regression framework to examine the extent to which the impact of shocks to policy uncertainty depends on the time period and global economic conditions and/or domestic fundamentals.

4.1 Linear Method

We estimate the following model:

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

where $y_{i,t}$ is the measure of capital flows, specifically gross bond and equity flows into EMEs as a percentage of assets under management. ΔPU_t 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.[15]

There is a well documented potential bias inherent in dynamic panel data regressions with country-specific fixed effects. Studies have shown that in samples of similar size to ours, the bias on the exogeneous regressors of interest is small (see Bruno 2005, and Judson and Owen 1999).[16]

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 (measured using the VIX index), liquidity risk (proxied by the TED spread), US equity returns, global liquidity (measured as the monthly growth in M2 in the US, Japan and the Euro Area), US money market rates, oil 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, domestic equity returns and domestic interest rates (IFS).[17]

[15] The number of lags was chosen to minimse information criteria (AIC and BIC), with the maximum number of lags set at 4 so as not to overparameterise the model. By inspection of the relevant kernel density estimates, the regression residuals are normal.

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

[17] The Appendix contains the data sources and precise definitions. In the robustness section, we check whether

The exogeneity of changes in policy uncertainty to gross capital inflows is an important assumption for the validity (and interpretation) of our empirical results. Generally, we believe it to hold given our focus on EMEs and the time period in question. Policy uncertainty in EMEs and associated capital flows are unlikely to be a determinant of policy uncertainty in large advanced economies like the US or the EU. The Russian crisis preceding the LTCM crisis in 1998 may be one example that violates this assumption but is not in our sample. Supporting this view, the IMF (2013) notes that spikes in US or EU policy uncertainty are usually associated with identifiable domestic economic or political/geopolitical events that can be considered exogenous to most individual countries.

For similar reasons, we think it unlikely that shocks in financial risks are driving shocks in policy uncertainty in advanced countries. This seems to be especially the case within our framework of studying changes in policy uncertainty and variables that capture (global) financial risk at the monthly frequency; i.e. our coefficients on changes in policy uncertainty do not directly capture the salient increase in policy uncertainty following the onset of the global financial crisis but rather idiosyncratic political events. However, a few of the spikes in policy uncertainty have been associated with financial events such as the collapse of Lehman brothers which underscores the importance of controlling for changes in variables that capture the risk in the financial system, such as the VIX. We think this approach as providing the most conservative estimates of the effect of policy uncertainty because some of the effect of policy uncertainty on capital flows may be mediated by our control variables for financial risk. 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).

Furthermore, the nonlinear analysis in this paper is useful for shedding more light on the relation between policy uncertainty and financial risks. Specifically, it allows to examine how the impact of changes in policy uncertainty on portfolio flows depends on the *level* of global financial risk.

our results are robust to alternative measures of global risk.

4.2 Nonlinear Method

Simple linear regressions may be insufficient to adequately capture the relationship between shocks to policy uncertainty and portfolio capital inflows into EMEs for several reasons. 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 and multiple equilibria.

The second facet of our empirical methodology involves therefore an assessment of whether there are breaks in the relationship between (changes in) advanced country policy uncertainty, (changes) in other push/pull factors, and capital flows. We also examine the factors underlying these changes. To achieve this, we use the Panel Smooth Transition Regression (PSTR) technique of González, Teräsvirta, and van Dijk (2005). Such techniques have been widely used in a variety of applications to model nonlinearities in the data. For example Mody and Murshid (2011) used Panel Transition Regression (PTR) to show that the impact of the current account on economic growth depends on growth volatility. Fouquau, Hurlin, and Rabaud (2008) found that saving retention coefficients (the Feldstein-Horioka puzzle) depend on the degree of openness, the size of the country and the ratio of current account to GDP. Coudert and Mignon (2013) showed that the "Fama regression" linking exchange rate changes to the interest rate differential depends on the level of financial volatility.[18] The technique allows us to assess (i) whether there are breaks in the relation between policy uncertainty on capital flows 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 (such as country default risk or equity market volatility)?[19]

By assessing whether there are breaks in the regression coefficients, our approach is complementary to that of Lo Duca (2012), who assumes that the regression coefficients follow a random walk. Indeed, visual inspection of figures 11 and 12 in Lo Duca (2012) suggests that some coefficients in the capital flows regression change abruptly in time. This suggests an empirical methodology

[18] See also Delatte, Gex, and López-Villavicencio (2012) who used the PST-ECM methodology developed by Béreau, Villavicencio, and Mignon (2010) to study the mutual relationship between the CDS market and the corresponding bond market.

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

such as ours that identifies when these changes occur. Moreover, identifying breaks also has the advantage of eventually linking these to the global and domestic conditions underlying changes in the capital flows regression relationship.

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).[20] By endogenously determining break dates in the relationship between fund level portfolio flows and our explanatory variables in this manner, we 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:

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

where the matrix $Z = [\Delta PUX]$ 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'.[21] 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 particular 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 breaks, imposing neither the transition speed nor the direction of change (increase or decrease in coefficients) on either break.[22]

[20] 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 22).

[21] 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.

[22] Firstly, if one suspects the presence of only one 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. 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

In a second step, 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 of global and domestic transition variables is chosen by standard information criteria (AIC and BIC).[23]

The model that we estimate in the case of both a global and domestic transition variable is given by:[24]

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

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 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), equity market volatility (as proxied by the coefficient of variation of

away from) the second threshold. We limit the number of regimes to three, due largely 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 breaks (3 regimes) in the model.

[23]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.

[24]For tractability reasons, we limit the model to 2 transition functions. See also footnote 22.

domestic equity returns), capital account openness (as measured by the Chinn - Ito Index) and the level of foreign exchange reserves to GDP. The latter two variables are of particular interest, given the policy debates surrounding the implementation of capital controls and accumulation of foreign exchange reserves by emerging market economies.[25]

5 Results

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 panel (equation 1). Second, we examine, using the PSTR framework (González et al., 2005), whether there are breaks in the impact of changes in policy uncertainty and other push/pull factors on portfolio flows into EMEs over time (equation 2). Third, we assess how the nonlinear impact of changes in policy uncertainty on portfolio flows depends on global and domestic factors (equation 3).

5.1 Linear Regression Results

Table 4 contains our baseline results for the linear specification. Focusing first on bond inflows (columns 1-3), we find that policy uncertainty in both the US and Europe is associated with a decrease in bond inflows to EMEs. Turning to equity inflows, columns 4-6 show that the impact of policy uncertainty on equity inflows depends on the geographic origin of the former. Whereas an increase in US policy uncertainty reduces equity inflows into EMEs, an increase in European policy uncertainty leads to stronger equity inflows into EMEs. Following our discussion on the potential channels through which policy uncertainty could impact portfolio flows, this indicates that measured European policy uncertainty either weighted more heavily on the region's attractiveness to equity investors or that increased US policy uncertainty triggered greater safe haven flows than increases in European policy uncertainty. The effects are economically sizable. According to the estimates in Table 4 (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 debt ceiling spiked) decreased equity inflows into EMEs on average by 0.376 pp of equity assets

[25] As in the PSTR literature, for example Coudert and Mignon (2013), the transition variable need not be a factor that is explicitly modeled as a regressor. In our model, the variation in, rather than the level of, equity returns is more relevant as a potential transition variable. This is due to the potential link between equity market risk and multiple investor equilibria (Allen and Gale, 1994), as well as the link between equity market risk and investor behaviour (Pagano 1989 and Chang, Cheng, and Khorana 2000).

under management. This translates into a decrease of monthly equity inflows of 4.4 billion USD for a country like Brazil.[26]

Next, in Table 5, we take a first pass at assessing eventual nonlinearities in the regression relationship by splitting our sample into a pre-crisis and during/post-crisis period. We use August 2007 as the cut-off point in line with the onset of funding illiquidity in the interbank market (see Brunnermeier 2009 or Fratzscher 2012 for details). The split clearly mattered, with evidence pointing overall to more negative effects of increases in policy uncertainty on portfolio equity inflows after the onset of the crisis. With regard to bond flows (columns 2 and 3), a negative effect of European uncertainty shocks on flows to EMEs appears during the second subsample, consistent with previous literature that found a higher sensitivity of bond inflows into EMEs to changes in global risk in the post 2007:8 crisis sample (see Fratzscher 2012). The coefficient on US policy uncertainty drops however in size though remains strongly significant in the (post)-crisis period. During and after the crisis, the positive impact of increases in EU policy uncertainty on equity inflows is far weaker than previously (but still significant at the 10% level). Pointing into the same direction, for increases 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.

5.2 Nonlinear Regression Results

Above we offered some evidence that the relationship between portfolio flows and policy uncertainty changed with the onset of the recent financial crisis. In this section we use the PSTR framework of González et al. (2005) to examine these potential nonlinearities more rigorously.

Turning first to an examination of whether there are breaks in the impact of changes in policy uncertainty and other push/pull factors on portfolio flows into EMEs over time. We find strong evidence for this hypothesis. The relief of the acute phase of the crisis did indeed induce changes in the regression model for both bond and equity flows. This is highlighted by evidence of 2 breaks (3 regimes), see Table A.1. Table 6 shows the results of the PSTR model (2 breaks) with time as the transition variable for both bond and equity flows (coefficient values under different regimes and model diagnostics are shown in the upper and the lower panels of the table respectively).[27]

[26]This is calculated by 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 authors' calculations).

[27]In keeping with the PSTR literature, we report the parameter values when the transition functions are equal

For both bond and equity flows, we estimate the first change in the effect of policy uncertainty and other push / pull factors as occurring in March / April 2007.[28] This period saw the first major increases in the cost of insuring against mortages with lower credit ratings (BBB- and BBB) in the US, which was the trigger for the subsequent liquidity crisis (see Brunnermeier 2009 for further details). Investors in emerging markets were easily spooked by these events, as indicated by the sudden change in the estimated regression relationship ('high transition speed'). During the crisis phase, both US and EU policy uncertainty shocks reduced bond and equity flows into EMEs (Table 6, columns 3 and 8).

In November / December 2010, coinciding with a statement by the Federal Open Market Committee of the US Federal Reserve regarding a significant expansion of its Long Term Asset Program (otherwise known as QE2, see Fratzscher et al. 2013 for a discussion of the impact of QE on portfolio flows), a second change in the estimated regression relationship occurred.[29] The effect of increases in US and EU policy uncertainty on portfolio flows to EMEs remained negative in this later period (Table 6, columns 5 and 10).[30]

In the next step, we examine how this nonlinear impact of changes in policy uncertainty on portfolio flows depends on global and domestic factors, identifying thresholds in these factors at which the spillover impact of changes in policy uncertainty on portfolio flows changes. According to the tests presented in Table A.2 and Table A.4, global risk (VIX) is the most relevant global transition variable for both bond and equity inflows.

In Table 7, we show that global risk (as proxied by the VIX) alters the impact of changes in policy uncertainty on both bond and equity flows. The estimated thresholds for the VIX are consistent with the previous literature, eg. Coudert and Mignon (2013). Analysing the mean of the VIX in the three identified regimes (dashed line in Figure 6), is suggestive of its large role in determining the magnitude of policy uncertainty spillovers. In mean, the VIX did not revert to

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.

[28](T=39.494 and T=40.371 for bond and equity flows respectively. T=40 corresponds to April 2007 (40 corresponds to the number of months since the beginning of the sample).

[29]T=82.966 and T=83.961 for bond and equity flows respectively. T=83 corresponds to November 2010.

[30]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 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.

its pre-crisis level by the end of the sample period. The VIX is therefore not only an important determinant of capital flows on its own (as in Fratzscher 2012 or Forbes and Warnock 2012a), it also determines how other push/pull factors (including policy uncertainty) impact portfolio flows, consistent with the notion of the VIX as measure of the availability of funds for investment in risky assets (Matsumoto 2011). The importance of global risk in altering investor behaviour relates to theoretical models of 'investor risk panics' and multiple equilibria as in Bacchetta and van Wincoop (2013). Specifically, we find that increases in EU policy uncertainty have a significantly negative impact on bond inflows only in the high global risk regime (adding the coefficient on EU policy uncertainty in the low risk regime, β_0, to the coefficient on the global transition function, β_1, as in column 3 of the table). Pointing in the same direction, the spillover impact of EU policy uncertainty on equity inflows is less strong in the high global risk regime. Increases in US policy uncertainty have a negative spillover impact on bond inflows in both the low and high global risk regime (albeit smaller in the latter); they have a negative impact on equity inflows only in the high global risk regime.

Turning to domestic factors, the tests presented in Table A.3 and Table A.4 show that domestic sovereign default risk is the most relevant domestic transmission variable for equity inflows. Conversely, the impact of policy uncertainty on bond inflows does not depend on domestic variables: changes to policy uncertainty have for example the same impact on bond inflows independent of a country's sovereign risk or equity market returns.[31] Furthermore, we find that neither the level of capital account openness, nor the level of foreign exchange reserves to GDP, play a role in determining the differing magnitudes of the spillover of advanced country policy uncertainty.

Table 7 shows the extent to which the level of country-specific sovereign risk (as proxied by CDS spreads) does determine the magnitude of policy uncertainty related spillovers via portfolio equity flows: increased EU policy uncertainty pushes equity inflows only into EMEs with a low level of sovereign default risk (as measured by 5-year CDS spreads). During times of low global risk it is relatively easier for EMEs to obtain funds, investors tend to be risk inelastic, not discriminating between risky and non-risky countries when they increase their portfolio allocation towards emerging markets in response to an increase in policy uncertainty in the EU. When global risk

[31] A principal component analysis reveals that for bond flows, the first principal component explains 93 percent of the variance in flows, as against 80 percent for equity flows. This emphasises that a single global factor is more important in determining the behaviour of bond flows. For equity flows, other factors in addition to the single global factor, also play a role.

is high, the push effect of increases in EU uncertainty is apparent only for those countries with lower sovereign spreads and hence a reduced risk premium. This indicates that domestic country characteristics tend to play a greater role in the allocation decisions of equity fund investors. For bond investors, their investment decisions appear to be more driven to a greater extent by global conditions. In contrast, when US policy uncertainty increases, investors tend not to distinguish across countries on the basis of risk when pulling funds out of EMEs (compare columns 4 and 8 or 6 and 9 in Table 7).

Figure 7 visualises the differing effects of increases in US/EU policy uncertainty on equity flows at different levels of the transition variables (VIX and CDS). 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. Before the crisis, the impact of increases in US policy uncertainty was negative, yet relatively mild (note the cluster of green points at low combinations of VIX and CDS spreads). As the crisis phase commenced and the VIX climbed, the retrenchment effect of increases in US policy uncertainty on equity flows intensified - the more so for countries with higher sovereign spreads. With the abatement of the acute phase of the crisis and the relative calming of global investor risk aversion after 2010, riskier countries still experienced significant retrenchment effects in response to increases in US policy uncertainty, while for others the effect diminished somewhat. A similar pattern obtains for the positive effects of EU policy uncertainty shocks on equity flows at different combinations of global investor risk aversion and sovereign spreads

6 Robustness

6.1 Domicile of Funds

So far we have abstracted from the domicile of the funds in our data set. Yet, portfolio flows from funds based in the US may show different reactions to EU policy uncertainty shocks than portfolio flows from funds based in the EU itself. The degree of home bias may play a crucial role. And to the extent that policy uncertainty with regard to macroeconomic policies impacts variables such as investors' wage income risk, it may also affect fund investors' willingness to buy risky assets, including assets held in EMEs. EU-specific policy uncertainty could then have different external spillover effects than US-specific policy uncertainty due to the domicile of the funds rather than a genuine different in shock transmission. This would be especially a possibility in a sample dominate by say US-domiciled fund but in the data section we have shown that the sample contains sizable numbers and AUM of both US and EU domiciled funds.

We repeat - in Tables 8 and 9 - our analysis by distinguishing between flows to EMEs from funds domiciled in the US and funds domiciled in the EU. We find first that the positive spillover impact of EU policy uncertainty on equity flows to EMEs is robust to the domicile of funds: we observe positive spillover effects in both the low and high global risk regime even for equity flows originating from funds domiciled in the EU. These spillover effects are, however, stronger for equity flows originating from funds domiciled in the US: in the high global risk regime, flows into EMEs from US-domiciled funds increase even into EMEs with high sovereign default risk, whereas, mirroring our aggregate results, flows from Europe-domiciled funds increase only into EMEs with low sovereign default risk. The positive spillover effects of increases in EU policy uncertainty appears therefore somewhat stronger for US-domiciled funds, which are the source of stronger gross inflows into riskier EMEs following shocks to EU policy uncertainty.

Turning to US policy uncertainty, we find that the negative spillover effects of US policy uncertainty on equity inflows into EMEs are stronger for US-domiciled funds than EU-domiciled funds: increases in US policy uncertainty reduces equity inflows into EMEs in both the high and low global risk regime. With regard to bond inflows, European policy uncertainty remains to have a negative impact on bond inflows into EMEs when global risk is high regardless of where funds are domiciled.

6.2 Measures of global risk

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.

6.3 Measures of policy uncertainty

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 in part 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.

6.4 Sample

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.[32]

7 Conclusion

Our study of the extent to which uncertainty in advanced country macroeconomic policy spills over to emerging markets via portfolio flows complements previous studies that examined the role of other global factors in determining capital flows, those that traced the impact of uncertainty on financial variables, and yet others that examined the causes of capital flow retrenchments at the time of the global financial crisis.

We find that increases in US policy uncertainty reduces portfolio bond and equity flows to EMEs. This is consistent with the hypothesis that US macroeconomic policy uncertainty acts as a common funding shock to investors who are domiciled in advanced countries, which in turn impacts flows to EMEs. But increases in *EU* policy uncertainty tend to push more portfolio equity inflows towards EMEs suggesting that the origin of policy uncertainty matters. While we have shown that these results hold for both funds domiciled in the US and funds domiciled in Europe, one avenue for future research would be to shed more light on the different reaction of equity inflows to policy uncertainty shocks in the US and EU by studying for example whether information asymmetries (see Portes and Rey 2005) in conjunction with the different location of investors had a stronger impact on the pattern of equity than bond inflows following increases in policy uncertainty.

[32] All results available upon request.

Nonlinearities in the relation between portfolio inflows into EMEs, policy uncertainty, and other push/pull factors are important. The role of global risk aversion in determining the magnitude of policy uncertainty spillovers to bond and equity inflows into EMEs is complemented by the role of country-specific sovereign risk in changing the impact of EU policy uncertainty on portfolio equity inflows. While policies such as capital account openness and foreign exchange reserves accumulation tend not to mitigate the impact of policy uncertainty on portfolio inflows into EMEs, improving macroeconomic fundamentals and hence reducing sovereign risk premia would help EMEs with high external financing needs to benefit from more equity flows in case policy uncertainty was to rise again.

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Figures

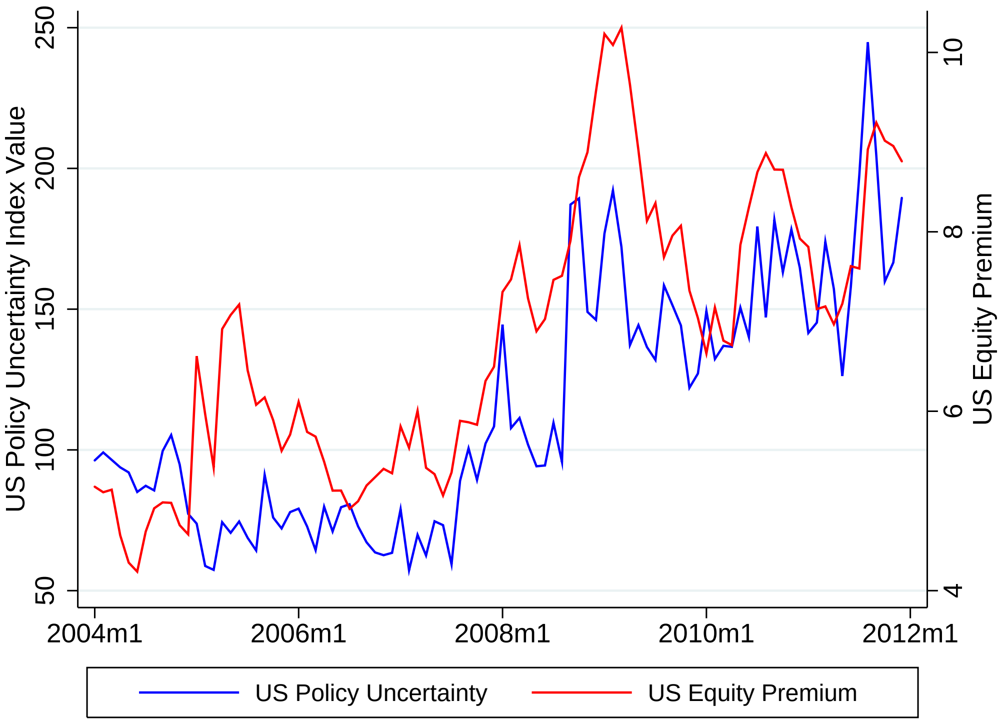


Figure 1: US Policy Uncertainty and US Equity Risk premium. See Table 1 for sources and definitions of variables.

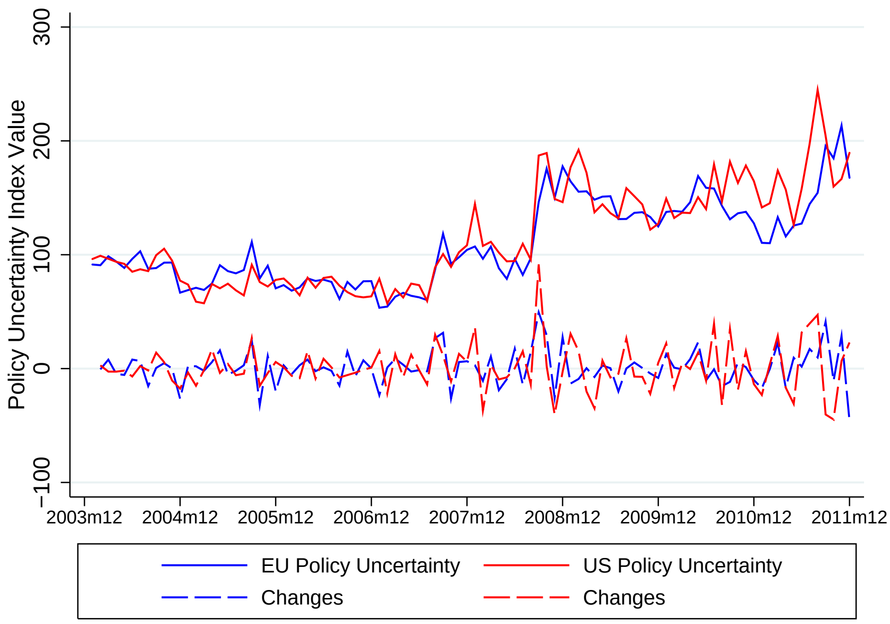


Figure 2: Policy uncertainty in the US and Europe. Source: Baker et al. (2013)

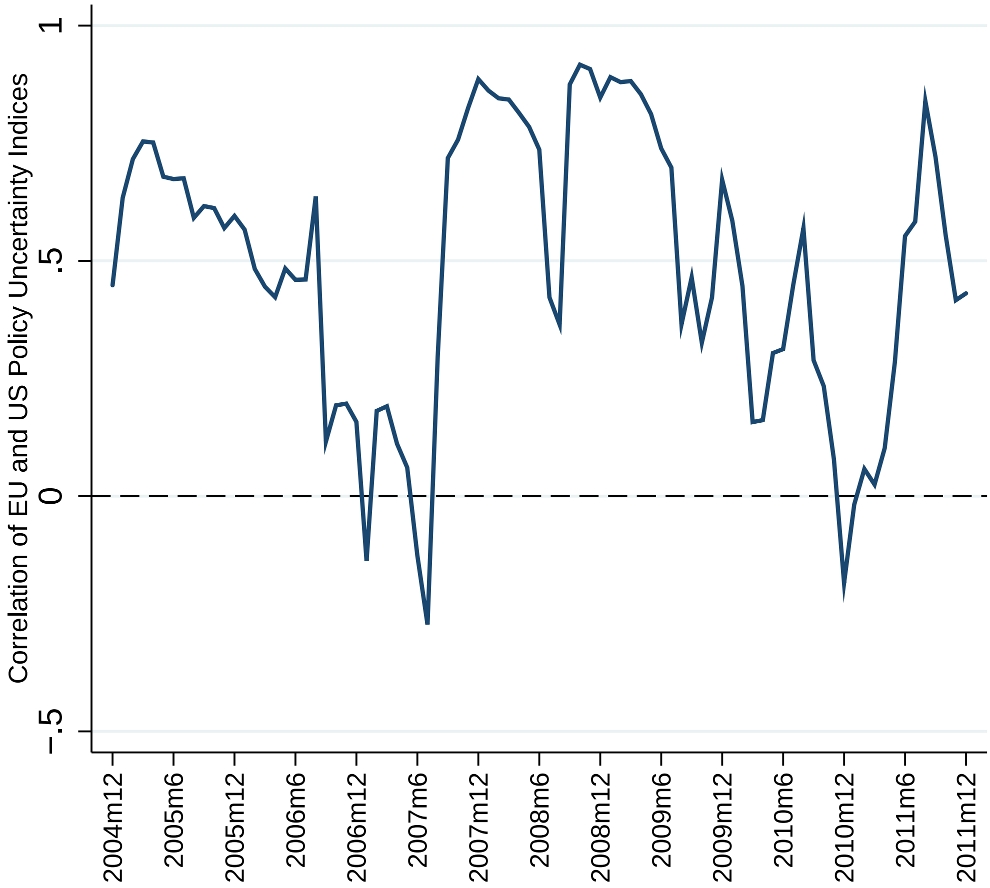


Figure 3: Rolling correlation over 1 year between US and EU Policy Uncertainty indexes. Source: Baker et al. (2013)

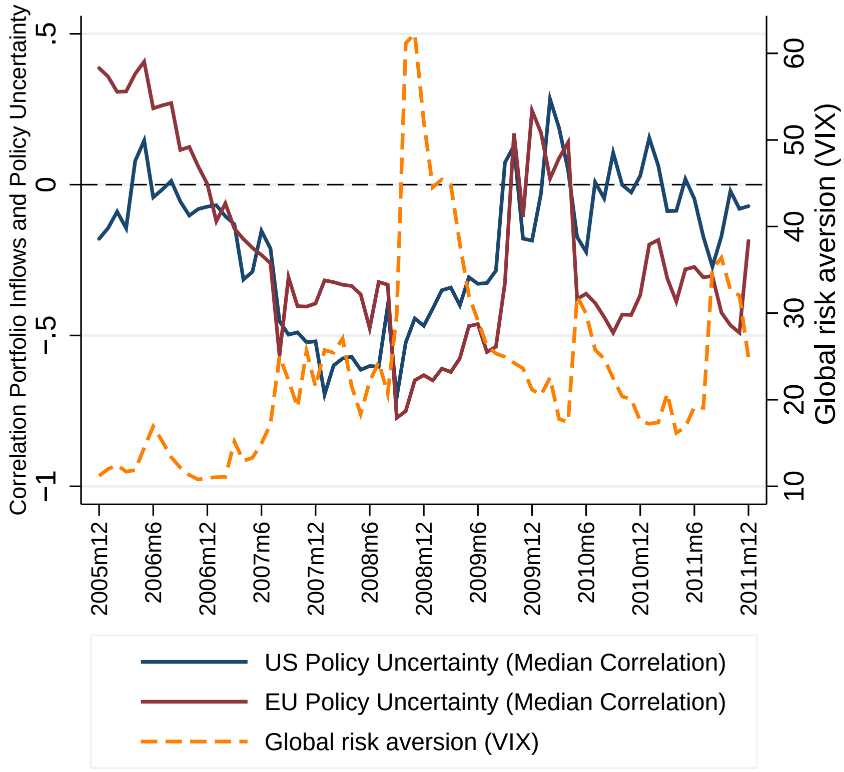
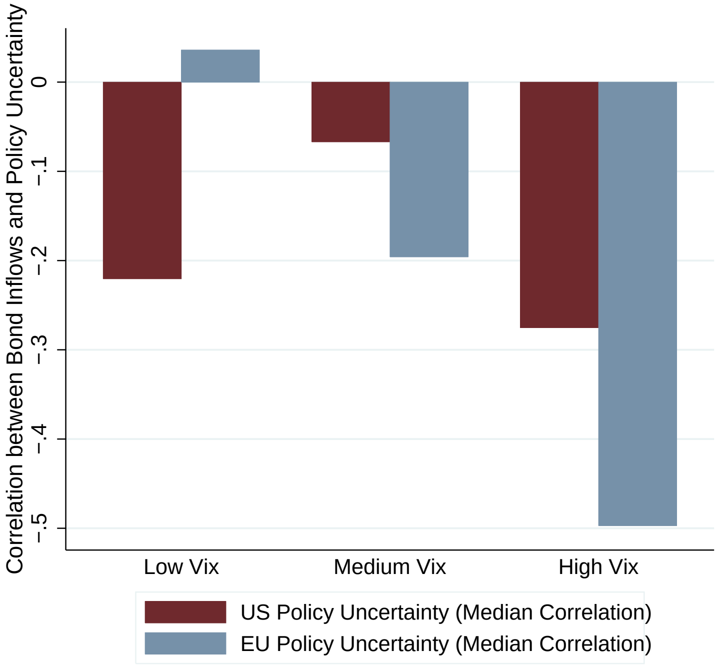
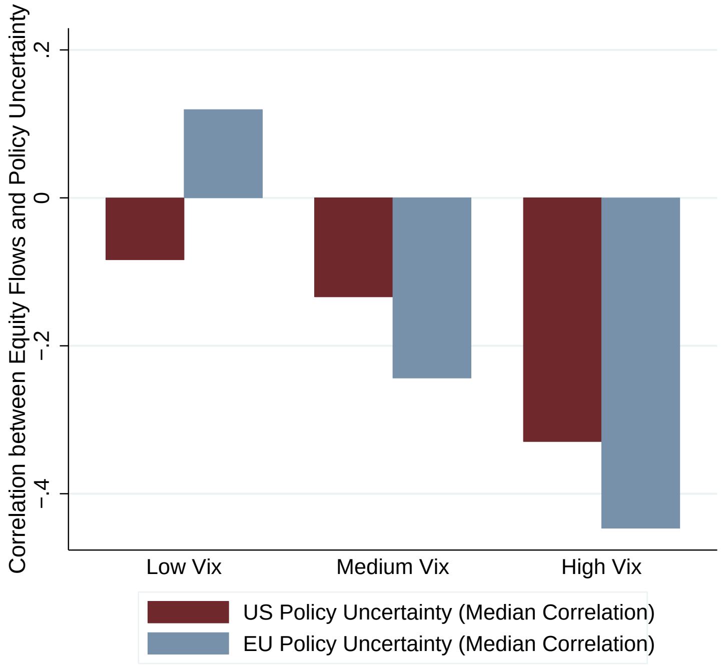


Figure 4: Rolling correlations between portfolio inflows and policy uncertainty Sample median of 12-monthly rolling correlation (backward looking) between aggregate portfolio flows and changes in US and EU policy uncertainty.



(a) Bond Inflows



(b) Equity Inflows

Figure 5: Rolling correlations between portfolio inflows and policy uncertainty. Figure (a) shows the median 12-monthly correlation between bond inflows and changes in US or EU policy uncertainty across 20 emerging market banking systems at low level of the VIX index (below the 20^{th} percentile), at a medium level (between the 20^{th} and 80^{th} percentiles), or at a high level (above the 80^{th} percentile). Figure (b) shows the same statistics for median correlation between equity inflows and changes in policy uncertainty.

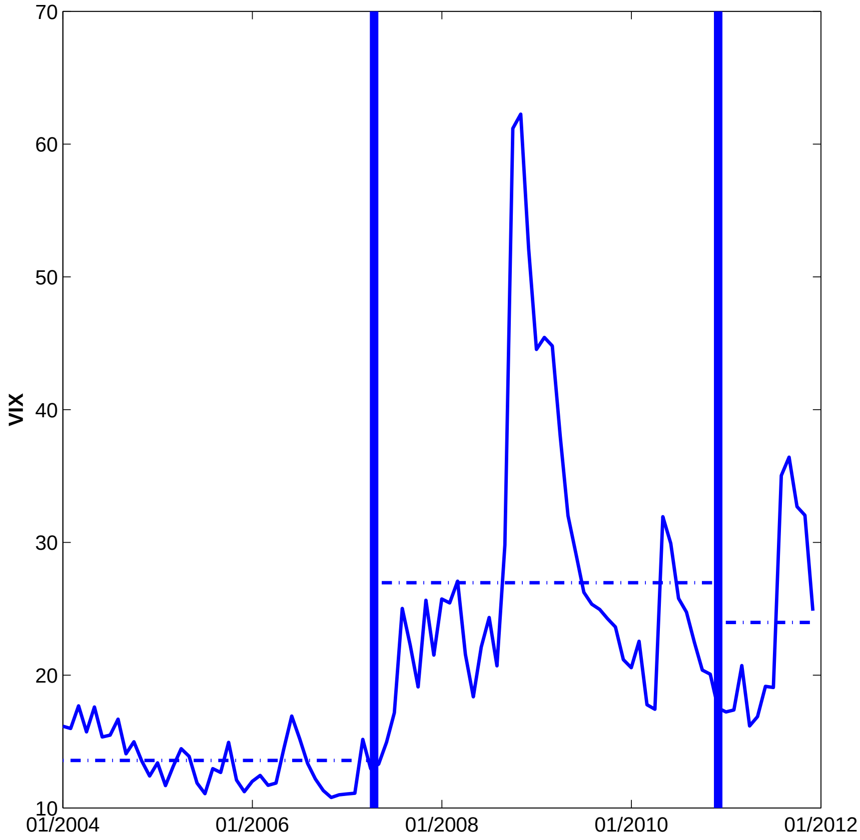


Figure 6: Global risk (VIX) and estimated structural breaks.

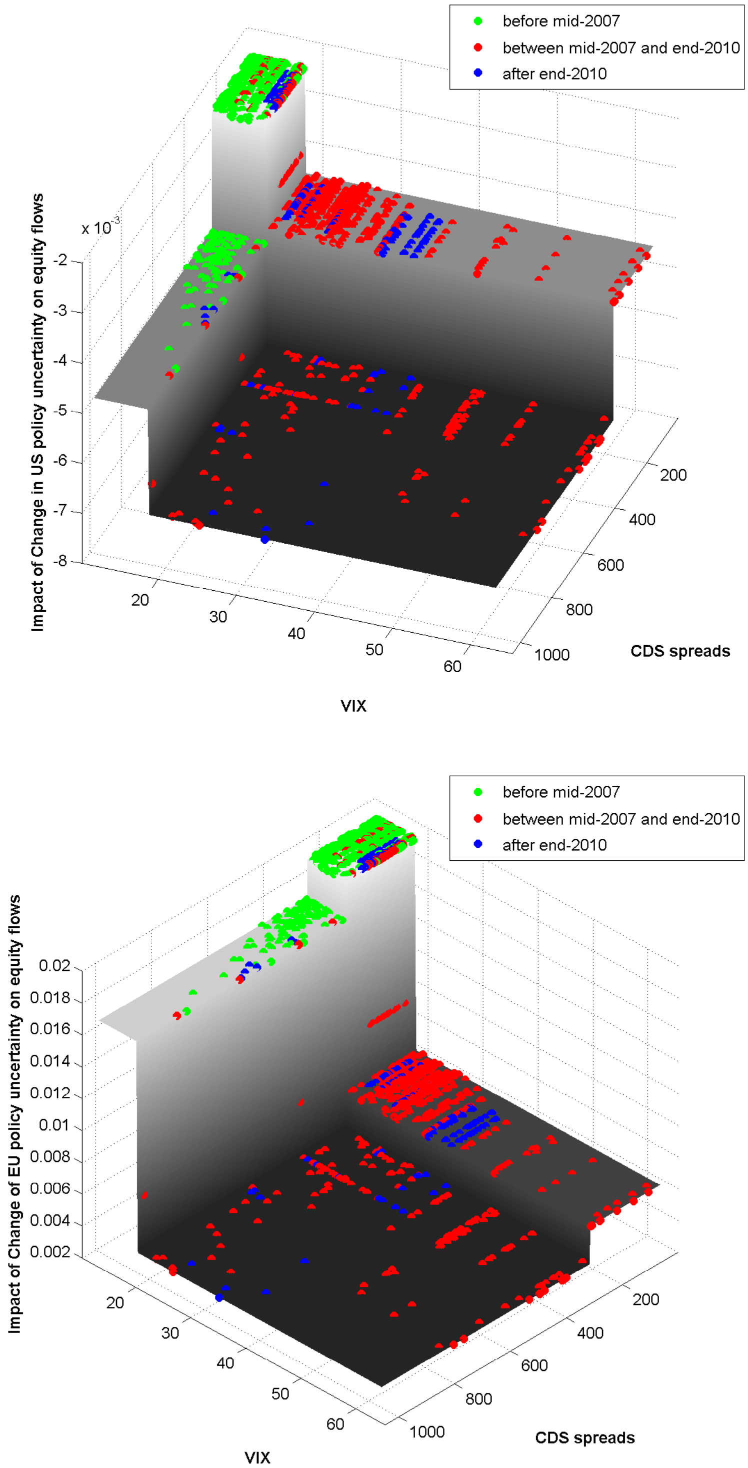


Figure 7: Effect of Policy Uncertainty on Equity Flows

Note: The figure reports the impact of changes in Policy Uncertainty on Equity Flows based on the PSTR method of González et al. (2005). Underlying regressions results are in Table 7. See Subsection 4.2 for a description of the methodology.

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	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 1: Data Sources

Note: See Subsection 3.1 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 (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 2: Summary Statistics

Note: 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 (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 3: Correlation table

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

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 (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 4: Linear regressions results

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 (included in parentheses) 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 (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 5: 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 (included in parentheses) are clustered at the country level. We split the sample into Before August 2007 and After August 2007 subsamples.

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 Uncertainty	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 (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		Mar 2007		Nov 2010			Apr 2007		Dec 2010	
Slope		60.776		36.573			77.426		34.582	
Obs	1764					1764				
Countries	20					20				
AIC	457					-376				
BIC	895					61				

Table 6: Capital Flows to EMEs - Time as the transition variable

Note: In the first / last five columns, the dependent variable is respectively 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 Subsection 4.2 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.

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 Uncertainty	-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 (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					
Countries	20			20					
AIC	595			-381					
BIC	748			56					

Table 7: Nonlinear regressions - Explaining Structural Breaks

Note: In the first three / 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 Subsection 4.2 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.

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	-0.044***	0.043***	-0.001	-0.005**	0.001	-0.004**	-0.004	-0.008**	-0.008***
	(-10.931)	(9.754)	(-0.356)	(-2.046)	(0.209)	(-2.173)	(-1.245)	(2.432)	(-2.918)
EU Policy Uncertainty	-0.004	-0.011*	-0.014***	0.018***	-0.013***	0.005**	0.003	0.021***	0.008***
	(-0.632)	(-1.744)	(-5.660)	(6.989)	(-3.652)	(2.074)	(0.789)	(5.372)	(2.534)
Global risk (VIX)	0.071**	-0.011	0.060***	-0.146***	0.125***	-0.022*	0.007	-0.140***	-0.146
	(1.991)	(-0.294)	(7.286)	(-5.836)	(4.567)	(-1.822)	(0.397)	(-4.848)	(-1.069)
Liquidity risk (TED)	0.019***	-0.031***	-0.013***	-0.030***	0.034***	0.003**	0.005*	-0.026***	0.008***
	(3.687)	(-5.818)	(-8.263)	(-8.719)	(9.149)	(2.295)	(1.955)	(-6.527)	(3.941)
US equity returns	0.249***	-0.206***	0.044**	0.071***	-0.022	0.050***	-0.17	0.054**	0.032*
	(8.862)	(-6.677)	(3.684)	(4.183)	(-1.094)	(4.336)	(-0.932)	(2.344)	(1.921)
Global liquidity	-0.338***	0.519***	0.181***	-0.018	0.041	0.023	-0.042	-0.060*	-0.018
	(-9.095)	(11.621)	(7.530)	(-0.889)	(1.442)	(1.004)	(-1.176)	(-1.698)	(-0.535)
Oil Prices (Growth Rate)	-0.002	-0.010	-0.013	-0.009**	0.012*	0.003	-0.007	-0.016**	-0.004
	(-0.377)	(-0.937)	(-1.557)	(-2.168)	(1.656)	(0.422)	(-0.958)	(-2.476)	(-0.521)
Non Oil Commodity Prices (Growth Rate)	-0.028	0.138***	0.109***	0.060***	-0.016	0.044***	0.032	0.092***	0.076***
	(-1.469)	(5.209)	(5.859)	(4.041)	(-0.894)	(3.158)	(1.426)	(3.827)	(3.302)
US interest rate	-0.261	1.257**	0.995***	2.150***	-2.700***	-0.547**	-0.840***	1.312***	-1.388***
	(-0.645)	(2.337)	(3.741)	(7.629)	(-7.575)	(-2.548)	(-2.692)	(3.683)	(-4.718)
CDS spreads	-0.005**	0.001	-0.003***	-0.009***	-0.000	-0.009***	0.005**	-0.004***	-0.004***
	(-2.048)	(0.635)	(-2.873)	(-4.320)	(-0.287)	(-5.038)	(2.557)	(-2.605)	(-4.291)
Domestic equity returns	0.037***	-0.039***	0.002	0.062***	-0.016**	0.047***	-0.042***	0.020**	0.005
	(4.309)	(-3.574)	(-0.272)	(11.369)	(-2.068)	(7.648)	(-5.324)	(2.437)	(0.690)
Domestic interest rate	-0.080	0.235***	0.156***	-0.050	0.035	-0.015	0.067	0.016	0.052
	(-1.099)	(2.586)	(2.813)	(-1.332)	(0.567)	(-0.259)	(1.095)	(0.265)	(1.086)
Transition variable		VIX			VIX		CDS		
Threshold		18.37			20.57		254		
Slope		102			216		103		
Obs	1731			1764					
Countries	20			20					
AIC	690			394					
BIC	843			832					

Table 8: US-Domiciled Funds

Note: In the first three / 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 Subsection 4.2 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.

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	-0.007	-0.000	-0.007***	-0.004	-0.002	-0.006***	0.004	0.000	-0.002
	(-1.385)	(-0.066)	(-3.803)	(-1.135)	(-0.567)	(-3.904)	(1.490)	(0.078)	(-0.731)
EU Policy Uncertainty	0.001	-0.026***	-0.025***	0.012***	-0.007*	0.005**	-0.001	0.011**	0.004
	(0.153)	(-3.7541)	(-7.434)	(3.038)	(-1.705)	(2.282)	(-0.386)	(2.575)	(1.210)
Global risk (VIX)	-0.201***	0.159***	-0.042***	-0.459***	0.353***	-0.106***	0.039**	-0.419***	-0.066***
	(-5.080)	(3.742)	(-2.927)	(-14.135)	(10.846)	(-9.853)	(2.364)	(-12.295)	(-4.839)
Liquidity risk (TED)	-0.044***	0.039***	-0.006***	-0.047***	0.054***	0.007***	-0.01***	-0.058***	0.004**
	(-5.784)	(4.867)	(-3.559)	(-7.260)	(8.223)	(3.738)	(-4.079)	(-8.766)	(2.096)
US equity returns	0.119***	-0.083**	0.036**	-0.003	0.066**	0.063***	0.018	0.015	0.081***
	(3.405)	(-2.194)	(2.455)	(-0.122)	(2.566)	(5.787)	(1.061)	(0.556)	(5.785)
Global liquidity	-0.158***	0.403***	0.246***	-0.066	0.019	-0.047**	0.035	-0.030	-0.012
	(-2.901)	(6.362)	(8.046)	(-1.600)	(0.416)	(-2.165)	(0.996)	(-0.622)	(-0.401)
Oil Prices (Growth Rate)	0.017*	-0.050***	-0.033***	0.037***	-0.044***	-0.006	-0.002	0.035***	-0.009
	(1.873)	(-4.331)	(-4.922)	(4.919)	(-4.557)	(-0.981)	(-0.262)	(3.449)	(-1.202)
Non Oil Commodity Prices (Growth Rate)	-0.080***	0.135***	0.055***	-0.04**	0.052**	0.012	-0.031	-0.072***	-0.019
	(-2.987)	(4.423)	(3.185)	(-2.067)	(2.411)	(0.849)	(-1.428)	(-2.705)	(-0.968)
US interest rate	0.584	0.551	1.134***	2.119***	-2.908***	-0.789***	-0.675**	1.439***	-1.468***
	(0.941)	(0.763)	(4.878)	(5.527)	(-6.673)	(-3.746)	(-2.287)	(3.377)	(-5.901)
CDS spreads	-0.015***	0.010***	-0.006***	-0.016***	0.001	-0.015***	0.013***	-0.003	-0.002**
	(-5.358)	(3.091)	(-4.228)	(-5.196)	(0.214)	(-5.845)	(4.762)	(-1.056)	(-2.185)
Domestic equity returns	0.033***	-0.013	0.019***	0.092***	-0.049***	0.043***	-0.016*	0.076***	0.027***
	(3.199)	(-1.077)	(2.941)	(10.385)	(-4.795)	(6.458)	(-1.783)	(6.621)	(4.022)
Domestic interest rate	-0.068	0.143	0.074	-0.108*	0.022	-0.086	0.034	-0.073	-0.051
	(-0.975)	(1.418)	(1.017)	(-1.769)	(0.291)	(-1.306)	(0.455)	(-0.914)	(-1.070)
Transition variable		VIX			VIX		CDS		
Threshold		18.09			17.69		202.79		
Slope		108			357		205		
Obs	1760			1764					
Countries	20			20					
AIC	1287			394					
BIC	1440			832					

Table 9: EU-Domiciled Funds

Note: In the first three / 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 Subsection 4.2 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.

Appendix

A Supplementary Tables

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 A.1: Non-Crisis and Crisis Period

Note: The above table presents nonlinearity 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.

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 A.2: Linearity test with global variables 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 bond flows. 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**
		H_0:EUPU alone H_1:EUPU and KA open	**0.521**	**0.902**
		H_0:EUPU alone H_1:EUPU and FX Res. / GDP	**0.347**	**0.980**
	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**
		H_0:USPU alone H_1:USPU and KA open	**0.420**	**0.957**
		H_0:USPU alone H_1:USPU and FX Res. / GDP	**0.310**	**0.988**
	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
		H_0:TED alone H_1:TED and KA open	**0.329**	**0.984**
		H_0:TED alone H_1:TED and FX Res. / GDP	**0.554**	**0.880**
	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**
		H_0:VIX alone H_1:VIX and KA open	**0.420**	**0.956**
		H_0:VIX alone H_1:VIX and FX Res. / GDP	**0.463**	**0.936**
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**
		H_0:EUPU alone H_1:EUPU and KA open	**1.581**	**0.090**
		H_0:EUPU alone H_1:EUPU and FX Res. / GDP	**0.520**	**0.903**
	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
		H_0:USPU alone H_1:USPU and KA open	**1.277**	**0.225**
		H_0:USPU alone H_1:USPU and FX Res. / GDP	**0.563**	**0.873**
	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
		H_0:TED alone H_1:TED and KA open	**0.958**	**0.488**
		H_0:TED alone H_1:TED and FX Res. / GDP	**0.700**	**0.752**
	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
		H_0:VIX alone H_1:VIX and KA open	**0.962**	**0.483**
		H_0:VIX alone H_1:VIX and FX Res. / GDP	**0.539**	**0.890**

Table A.3: Non-remaining non linearity test if Coefficient of Variation (CV), CDS spreads, capital account openness (KA open) or foreign exchange reserves / GDP are potential domestic transition variables

Note: Once we estimated equation (3) without the domestic transition 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 is not estimated since the second transition variable (Dom_t: CV, CDS, KA open, or foreign reserves / GDP) is not relevant for explaining the nonlinearity.

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 A.4: AIC and BIC

Note: We compare estimated models with information criteria (AIC and BIC) in order to choose the best models for bond and equity flows. Gray cells correspond to models which were not estimated due to previous test results (see Table A.3).