Uncertainty and Episodes of Extreme Capital Flows in the Euro Area

Torsten Schmidt and Lina Zwick*

Abstract

During the Euro Area crisis huge changes in international capital flows occurred associated with a high level of economic uncertainty. While it is evident that both factors are able to trigger or amplify economic shocks posing a threat for economic activity, it is a natural question whether they are related. The aim of this paper is to analyse the link between different measures of uncertainty and episodes of extreme capital flows for the core Euro Area countries using gross capital flows. We find that country-specific risk factors seem to play an important role in indicating periods of extreme capital flows. Moreover, country-specific uncertainty seems to be more relevant for foreign direct investors.

---

1. Introduction

During the Euro Area crisis huge changes in international capital flows occurred associated with a high level of economic uncertainty. While it is evident that both factors are able to trigger or amplify economic shocks posing a threat for economic activity, it is a natural question whether they are related.

Uncertainty is one striking feature of the recent crisis in the Euro Area but it has several dimensions. First, in the aftermath of the financial crisis and the Great Recession a high degree of uncertainty about future economic prospects emerged. In addition, a lot of uncertainty with respect to the monetary union itself came up. Not only there was a high degree of uncertainty about the state and the sustainability of public finances. But also, institutional uncertainty with regard to the future of the monetary union and the credibility of economic policy emerged, in part created by policy actors themselves.

Such a high degree of uncertainty should have negative effects on private consumption and investment (Bloom 2009, Bachmann and Sims 2012 and Bredin and Fountas 2009); in particular it reduces the benefit of investments for risk-averse investors, and hence has probably negative effects on capital flows. Indeed, several papers find especially global risk to be an important factor related to large changes in capital flows (e.g. Forbes and Warnock (2012) and Fratzscher (2011)).

Although it is no peculiarity that Euro Area countries experienced large contractions in capital inflows and outflows, they differ decisively from other advanced economies. First, due to a common monetary policy member countries cannot use monetary policy instruments or the exchange rate to adjust to external shocks. Hence, especially countries affected by the crisis faced destabilizing effects from contractions in international net capital flows constituting a threat for the existence of the monetary union (Merler and Pisani-Ferry 2012, Lane 2013). Second, the situation of the member countries of the Euro Area was quite challenging during recent years as they have been facing at least three crises that are interrelated, a banking crisis, a sovereign debt crisis and a growth crisis (e.g. Schmidt and Weigert 2012, Shambaugh 2012). And third, these countries have been affected differently with respect to both timing and the extent to which they were affected.

Therefore, we propose to use several measures of country-specific and global economic uncertainty, such as economic sentiment indicators, global and country-specific volatility measures or indicators of political uncertainty as potential predictors of large changes in capital flows. Although there is a large literature on both uncertainty and its effects on the real economy as well as on international capital flows and their determinants[1], this paper is the first, to our knowledge, that analyses the link between international capital flows and uncertainty more deeply.

---

[1] For the analysis of the determinants of international capital flows see Forbes and Warnock (2012), Calderon and Kubota (2013), Milesi-Ferretti and Tille (2011), Mercado, R. and C.-Y. Park (2011), Fratzscher (2011).

As a necessary first step we need to identify periods of extreme capital flows. For this we follow Forbes and Warnock (2012) who used gross capital flows and applied the standard approach developed by Calvo et al. (2004). This allows us to distinguish four distinct extreme periods of capital flows: surge (sharp increase of capital inflows), stop (sharp decrease in capital inflows), retrenchment (sharp decrease of capital outflows) and flight (sharp increase of capital outflows).

Until recently the Calvo-method was primarily applied to net capital flows as the focus of the literature was on emerging economies, in which net capital flows, the difference between capital inflows and outflows, have typically been more volatile than in developed countries (Broner and Rigobon 2005), and hence have been a higher risk factor for the real economy. However, in the recent financial crisis advanced economies have been affected much more, especially due to their higher engagement in the rising international financial market integration during the last two decades (Forster et al. 2011, Milesi-Feretti and Tille 2011). As volatility of gross capital flows in those countries is much higher than volatility of net capital flows, the focus of the literature has shifted to the analysis of gross capital flows. Furthermore, gross capital flows allow us to test whether there are differences between foreign and domestic investors. This is of particular interest for economic policy both in the member countries of the Euro Area and in the Euro Area itself.

We use quarterly balance of payments data provided by the IMF for the core Euro Area countries[2] for the years 1991 to 2012. Besides total flows we analyse portfolio investment flows and foreign direct investment flows separately. For our sample we find in particular stop and retrenchment episodes during the recent crisis, although the timing of those episodes differs between countries.

By linking the identified episodes of extreme capital flows in a binary model with measures of uncertainty, we find that for the Euro Area countries country-specific risk factors are powerful predictors of extreme capital flows. In particular, uncertainty about the future evolution of economic activity and uncertainty about the economic policy in the respective country seems to be important. Moreover these uncertainty measures are especially relevant in stop and retrenchment periods, and hence in periods when investors withdraw money from abroad. As these episodes were particularly observed during the recent crisis, the high uncertainty during recent years was obviously an important factor for the reduced engagement of investors in foreign investments, and hence for an increased home bias.

The outline of the paper is as follows: In section two we explain our approach to identifying extreme periods of capital flows as well as the data used, and present the results of the identification procedure. In the next section we introduce several country-specific uncertainty measures. This is followed in section four by a presentation of our empirical approach and our estimation results from linking the

---

[2] France, Germany, Ireland, Italy, Spain, Greece, Portugal, Finland, Austria, Belgium, Luxembourg and the Netherlands.

economic variables to the capital flow episodes identified, while section five draws some conclusions.

2. Capital Flows in the EMU: Identification and data

In order to construct indicators of extreme periods of capital flows, we use total capital flows[3], portfolio investment flows and foreign direct investment flows in gross terms. Our data is from the balance of payments statistics of the IMF.[4] We use quarterly data from 1991 to 2012 for the core countries of the Euro Area[5].

Until recently, many papers have analysed the behaviour and the determinants of net capital flows, i.e. the difference between capital inflows and outflows (Merler and Pisani-Ferry 2012, Efremidze et al. 2011, Calvo et al. 2004, Agosin and Huaita 2011). Although this variable is of high interest from the macroeconomic perspective, there are several arguments for using gross capital flows[6], i.e. capital inflows and capital outflows separately, in this study.

First, in contrast to net capital flows, gross capital flows allow to differentiate between domestic and foreign investors and hence provide more information concerning their behaviour (Calderon and Kubota 2013). Foreign investors might react differently to an increased uncertainty in the country of investment due to information asymmetry. In addition, the structure of capital flows could be different. In the case of the EMU foreign investors have been more active in portfolio investment in the Euro Area, while investors inside the EMU have been more involved in direct investments abroad (Forster et al. 2011).

Another argument for the use of gross capital flows is that they are more volatile than net capital flows, especially for high-income countries, and that capital outflows and inflows move together (Broner et al. 2013) reducing the volatility of net capital flows. This pattern is illustrated in Figure 1 that shows gross and net capital flows of a sample of four countries of the Euro Area.

---

[3] The sum of portfolio investment flows, foreign direct investment flows and other investment flows.

[4] In summer 2012 the IMF introduced the Balance of Payments Manual 6 (BPM6) in his database. Especially foreign direct investments were affected by the change in the classification. While in BPM5 reverse investments (assets and liabilities between a direct investment enterprise and its direct investor) were reported depending on the location of the direct investment enterprise in BPM6 they are reported depending whether they are assets or claims. Data in BPM6 are available from 2008, in BPM5 until 2008. In order to have the largest sample period possible we use data following the BPM5 classification scheme and from 2008 on we convert the data backwards (from BPM6 to BPM5).

[5] France, Germany, Ireland, Italy, Spain, Greece, Portugal, Finland, Austria, Belgium, Luxembourg and the Netherlands.

[6] Gross capital outflows are net values as well: gross capital outflows are the difference of domestic purchases and sales of foreign investments while gross capital inflows are the difference of foreign purchases and sales of domestic investments.

Figure 1: Gross and net capital flows in selected Euro Area countries

net flows ▬▬ liabilities —— assets - - -
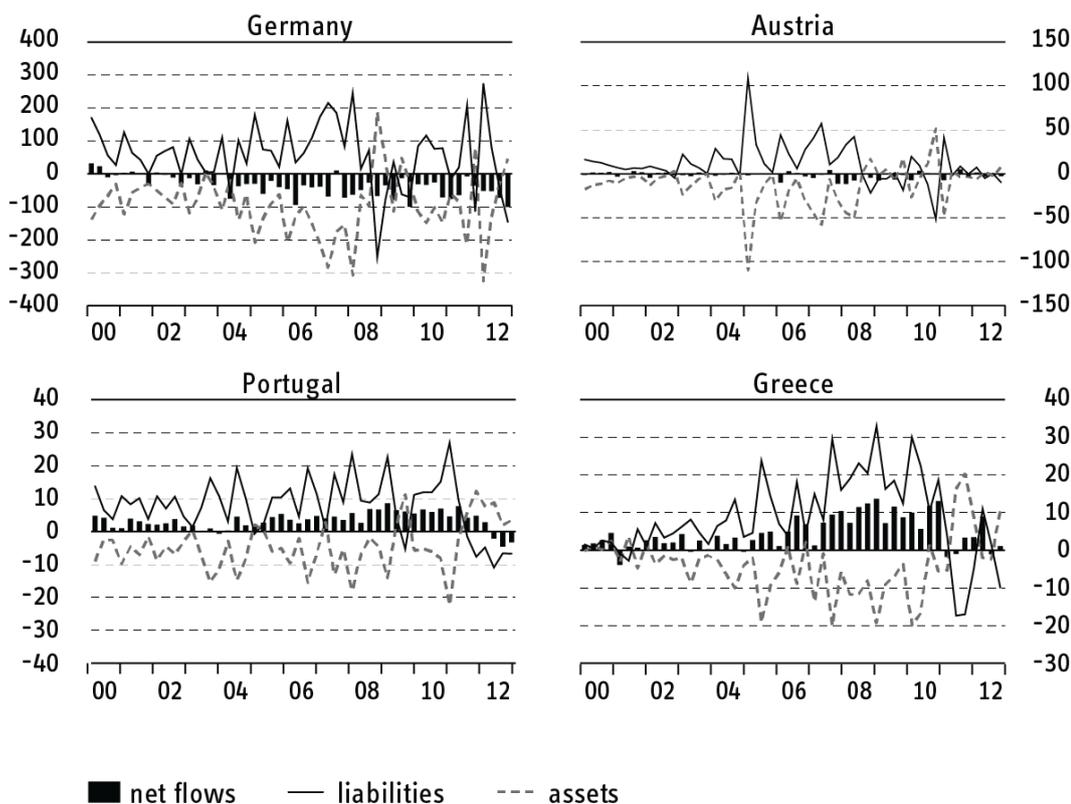
Source: IMF.

Moreover, employing net capital flows might even lead to wrong results in the identification of extreme episodes. Forbes and Warnock (2012) show that during the recent crisis net flows often identify a surge, a sharp increase in capital inflows, while the use of gross capital outflows identifies a period of retrenchment, a sharp decrease in capital outflows. This could be the case, when the decrease in capital outflows[7] is much larger than the increase in capital inflows.

In the literature most studies analyse total capital flows.[8] However, for an analysis of the Euro Area, it is reasonable to also employ the different kinds of capital flows separately as those flows displayed different patterns during the crisis. Especially portfolio investment flows were affected[9]; not only was there a reduction but also a shift in the composition to safer and more liquid assets. Other investments[10] were also affected reflecting deleveraging processes as well as interventions by monetary

---

[7] Capital outflows have a negative sign in terms of Balance of Payments (BOP) accounting.

[8] For example Forbes and Warnock (2012), Broner et al. (2010), Merler and Pisani-Ferry (2012), Rothenberg and Warnock (2006).

[9] When analyzing portfolio investments flows of Belgium, Ireland and Luxembourg one should bear in mind that in these countries a high amount of mutual funds are located that have large scale portfolio investments liabilities and assets. However, for our analysis it should not be problematic as we identify extreme episodes of capital flows qualitatively and not the extent of these episodes.

[10] The category "other investments" is the residual in the BOP statistics and includes in particular loans, currency and deposits and trade credits.

authorities such as extending foreign currency swap lines. In contrast, foreign direct investments were more resilient to the crisis (Forster et al. 2011).

In addition, some of the crises countries of the Euro Area received support by the IMF/EU programme and benefit from an increase in the TARGET2 balances (Sinn and Wollmershäuser 2012) as well as from the ECB's Securities Market Programme during recent years. These policy interventions might lead to biased results when considering only total flows in the analysis as they are classified under the category "other investments".

In order to identify extreme periods of capital flows, we follow Forbes and Warnock (2012) in applying the standard approach of Calvo et al. (2004) to gross capital flows. In this approach extreme capital flow episodes are identified when two conditions are fulfilled: First, the annual change of the moving average of gross capital flows is two standard deviations above or below the historical mean in at least one quarter. The historical mean is calculated as a moving average over the previous five years. And second, the period starts when the annual change differs by more than one standard deviation from the historical mean for this quarter and ends when the deviation is less than one standard deviation. Hence, any such episode comprises at least two quarters. By applying this approach to gross capital flows, four kinds of extreme capital flow episodes are identified: surge (a sharp increase of capital inflows), stop (a sharp decrease in capital inflows), retrenchment (a sharp decrease of capital outflows) and flight (a sharp increase of capital outflows).

Applying this approach to our sample period leads to a considerable problem. In the Great Recession we observe a large increase in the historical mean and the standard deviation of capital flows. This precludes the identification of extreme periods after 2009, due to the calculation of the historical mean as a five year moving average in the approach of Calvo et al. (2004). Therefore, we hold the values of the historical mean and the standard deviation in this paper fixed from the first quarter of 2008 onward.

Figure 2 presents exemplary our results for total flows for Germany, Austria, Greece and Portugal[11]. The periods identified for portfolio and foreign direct investment flows are displayed in Table 1 and 2 of the Appendix. Although differences in the periods identified can be observed between the kinds of capital flows analysed, the rough picture is more or less the same during the crisis. Thus, financial support to crises countries should not bias our results.

The first result that can be drawn from the figure is that most of the time foreign and domestic investors behave in the same way: either they both extend investments abroad, indicated by large increases in capital inflows and outflows (surges and flights), or they both withdraw money from abroad (stops and retrenchments). This finding is in line with that of Broner et al. (2013). In addition,

---

[11] The results for the other member countries are presented in Figure 1 of the Appendix.

investors tend to withdraw money from abroad in times of crisis, such as during the recent financial crisis or for example in Germany during the recession following the dotcom bubble at the beginning of the 21st century. Similarly, investors typically increase their investment abroad in times of expansions as in the years before the financial crisis.

Secondly, there is one decisive difference observed between the Euro Area countries. While all countries, except Greece and Finland, were affected directly by the financial crisis – although the timing varies slightly –, only some of the members of the currency union experienced another withdrawal of capital between 2010 and 2012 indicating the impact of the Euro Area crisis. These countries (Panel b in Figure 2) are Ireland, Portugal, Spain, Greece, Italy – and hence the so-called "crises countries" – as well as France and the Netherlands. Greece, for example, is less involved in the financial markets so that the turbulences in the years 2007/2008 were apparently less harmful. Moreover, the contraction of capital flows starting at the second quarter 2010 was much larger indicating Greece's application for EU assistance. In France the downgrading by Standard & Poor's and Moody's in 2012 has obviously influenced foreign investors leading to another stop period after the financial crisis. In contrast, the other five countries in our sample (Panel a in Figure 2) were more resilient to the Euro Area crisis.

These results are in line with the hypothesis that in times of crisis, and in particular during the recent financial crisis, investors tend to become more risk-averse due to a higher level of uncertainty. In particular, country-specific risk factors seem to play a role as the examples of France and Greece show. Thus, investors revert to domestic investments that can be evaluated at lower costs due to a lower information asymmetry (Giannetti and Laeven 2011). This increases the home bias of investments, i.e. the tendency to hold a large fraction of domestic assets in the investment portfolio.[12] However, another explanation for the increased home bias during the recent crisis could be changes in the portfolio structure in favour of domestic assets by monetary financial institutions due to deleveraging processes (Jochem and Volz 2011).

---

[12] Among others, Forster et al. 2011, Milesi-Feretti and Tille 2011, Broner et al. 2013 also find evidence for an increased home bias.

Figure 2: Periods of extreme capital flows for selected countries

Panel a

Panel b
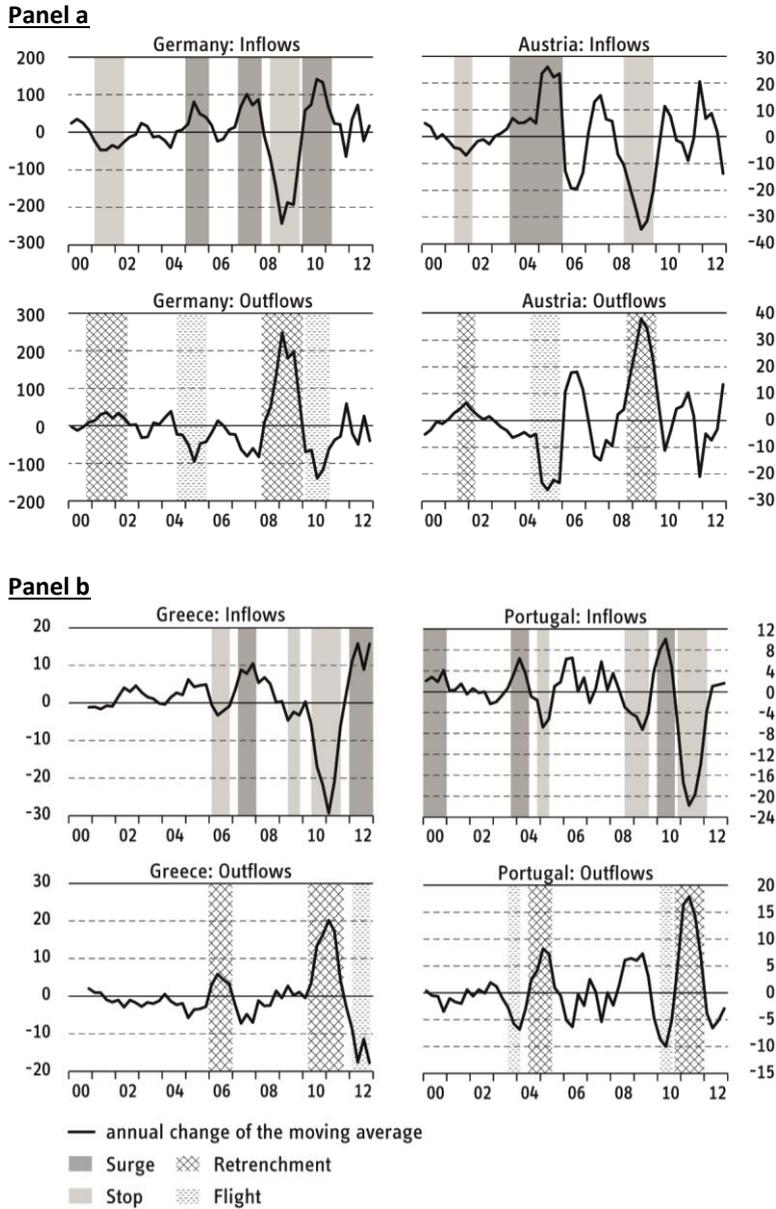
Though the recent crisis is also clearly visible when analysing portfolio investment and foreign direct investment flows separately, some differences in the pattern of capital flow episodes can be observed.[13] First of all, the identification approach reflects the fact that foreign direct investments were less affected by the crisis. For these kinds of flows the extent of contractions of flows is lower and some countries, like Germany, were not affected at all by huge decreases in capital inflows. In addition, in some countries even surges (huge increases in capital inflows) can be observed. In contrast, stop periods for portfolio investment flows were larger and more long-lasting.

---

[13] See Table 1 and 2 of the Appendix.

Secondly, domestic and foreign investors did not behave as similar as in the case of total flows. In fact, the timing and length of periods are more different between inflows and outflows. In particular, domestic investors reduce foreign direct investment abroad more than foreign investors did in the EMU, while for portfolio flows it is the other way around. This result reflects the fact that EMU investors are more active in direct investments abroad while foreign investors invest more in portfolio investments in the EMU.

3. Uncertainty in the Euro Area

A high degree of uncertainty both concerning the future evolution of economic activity and the credibility of economic policy characterizes the recent crisis. The negative effects of higher economic uncertainty on real economic activity and inflation are well established in the literature (e.g. Bloom 2009, Bredin and Fountas 2009, Grier and Perry 2000). In addition, Forbes and Warnock (2012) find that global risk is the primary driving factor of extreme capital flow episodes using a large set of countries.

However, it is argued by Shambaugh (2012) that the member countries of the Euro Area have been facing three crises that are interrelated: a banking crisis, a sovereign debt crisis and a growth crisis. Moreover, in each member country the importance of each of these crises is different. Besides the VIX, a volatility measure of the Chicago Board Options Exchange that is often used in the literature to account for global uncertainty, we propose to include country-specific measures of uncertainty reflecting the concerns that came up in the Euro Area crisis.

To determine whether a specific kind of uncertainty, such as concerns regarding financial markets or inflation, or rather a broader measure of uncertainty is the best predictor of extreme capital flow episodes, we employ different variables measuring uncertainty in our empirical analysis. In general, there are two approaches used in the literature to construct uncertainty measures (Chua et al. 2010): Survey-based measures and time series models. Survey-based measures are an indication of the heterogeneity of beliefs and provide direct measures of expectations of economic agents. Turning to times series models, volatility indices are often constructed using GARCH models, i.e. using heteroskedasticity in the error terms to model and predict the variance of a financial series (Engle 2001). Besides financial time series, these models are also applied to other economic variables, such as those of economic activity or inflation (Bredin and Fountas 2009).

First, we use the economic sentiment indicator of the European Commission as a measure of confidence to analyze the effects of economic uncertainty. While both concepts, confidence and uncertainty, are strongly related, they differ to some extent. The notion of confidence is typically capturing the strength of the expectation that current and future economic developments will turn out to be. It is quite obvious that uncertainty about economic developments will affect confidence negatively. In addition, confidence also captures the emergence of relatively certain

positive or negative economic prospects. Bumgarner and Prime (2000) show that capital flows to and from Hong Kong are affected by investor's confidence.

The economic sentiment indicator is a survey-based measure that includes both firms' and consumers' expectations about the future economic activity as well as their assessment of the current situation.[14] In particular, they are asked mostly qualitatively – besides others – about current and expected production/business activity, employment and orders as well as – in the case of consumers – about their current and expected financial situation, the general economic situation and planned savings/purchases (European Commission 2007). As the economic sentiment indicator is constructed by aggregating five sector confidence indicators (manufacturing industry, construction, retail, services and consumers), it provides a broad range of assessments on economic activity, and thus of the sentiment of different agents in the economy.

To capture uncertainty about economic policy we include the long-term government bond yield spreads vis-à-vis the United States.[15] Although this measure has several interpretations, e.g. the benefits of investing in a certain country compared to the US, especially in the Euro Area crisis these spreads get particular attention as a risk measure reflecting fiscal vulnerabilities of countries as well as general risk perceptions of investors (Barrios et al. 2009, Attinasi et al. 2009, Bernoth et al. 2012, Borgy 2011). Figure 3 shows that while spreads in the Euro Area were close to zero before 2008, financial markets have started to revalue the risk associated with members of the Euro Area in recent years, and hence the spreads for crises countries have increased dramatically.

---

[14] For Ireland this indicator does not exist.

[15] We use 10-years government bond yields provided by Eurostat and the Board of Governors of the Federal System for the calculation of the spreads. While most of the time the spreads are calculated vis-à-vis Germany, we use the government bond yields of the United States as a benchmark to include Germany in the analysis.

Figure 3: Spreads of government bond yields of Euro Area countries vis-à-vis the US
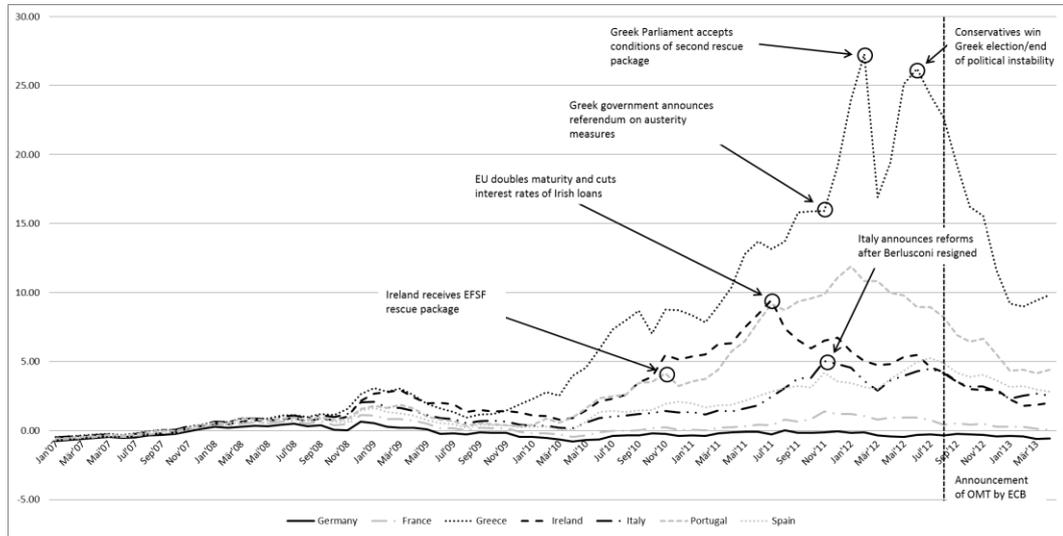
Barrios et al. (2009) find that during periods of high risk aversion macroeconomic fundamentals, such as current account deficits, become more important as predictors of yield spreads. Obviously, investors distinguish stable countries from countries for which a deterioration of public finances is more likely. Indeed, during the recent crisis the yield spreads of those countries in the Euro Area that had poor macroeconomic fundamentals were highly sensible to new information on the national budget or on information about policy reforms regarding the fiscal situation. Therefore, this yield spread seems to be a reasonable proxy to measure uncertainty about economic policy, in particular related to the financial situation of economies.

In addition to these rather broad measures of uncertainty we apply a times series approach to construct specific uncertainty measures. In particular, we estimate country-specific GARCH models for industrial production and for consumer prices. It is therefore possible to test whether real and/or nominal uncertainty is able to predict extreme periods of capital flows after the launch of the Monetary Union.

Besides real and nominal uncertainty, risk factors resulting from the financial markets should be relevant for indicating extreme periods of capital flows. Especially in the recent crisis that had its origin in the global financial distress such factors seem to be necessary to account for in the analysis. Therefore, we expand the analysis by including a volatility index that is constructed by estimating a univariate GARCH model for the MSCI stock market indices of the selected countries[16] to control for uncertainty related to national financial markets.

---

[16] For sure, it is difficult to clearly distinguish developments on national financial markets from those on the global level because financial markets are highly linked. While the country MSCIs and the MSCI World Index show broadly a similar development since 1990, especially since the financial crisis these indices display different developments indicating some local components included in the country indices.

Of course, all these uncertainty measures might influence or even aggravate each other as for example uncertainty about economic policy is likely to affect confidence in economic activity. And indeed, when calculating correlations between the uncertainty measures included, positive correlation are typically found (Figure 4). However, as the highest correlation is around 0.4 we are confident that this will not strongly influence our regression results.

Figure 4: Correlation matrix of uncertainty measures

Correlations between Uncertainty Measures

	VIX	Interest Rate Spread	Economic Sentiment Indicator	GARCH MSCI	GARCH CPI	GARCH IP
VIX	1.000					
Interest Rate Spread	0.111	1.000				
Economic Sentiment Indicator	-0.277	-0.458	1.000			
GARCH MSCI	0.342	0.313	-0.342	1.000		
GARCH CPI	0.093	0.389	-0.221	0.104	1.000	
GARCH IP	0.202	0.141	-0.198	0.122	0.380	1.000

(obs=630)

4. The Nexus between Uncertainty and Capital Flows

Empirical Approach

In order to analyse whether and what kind of uncertainty plays a role in the emergence of episodes of extreme capital flows, we employ a binary model. The outcome variable takes the value one, if an extreme capital flow episode is identified, and zero otherwise. In particular, we use a complementary log-log model that assumes an extreme value distribution of the outcome. This specification reflects the fact that the different extreme capital flow episodes only rarely emerged during the time span analysed.[17] We estimate this model for each kind of capital flow wave identified (stop, surge, flight, retrenchment) separately, including several standard economic variables as well as measures of uncertainty, and taking the complete period of the European Monetary Union (2000q1 to 2012q4) into account.

Besides the different uncertainty measures that are of our main interest and are presented in section 3 we include several variables found in the literature to explain the emergence of extreme capital flow periods. Such variables are often classified in the literature as push and pull factors (see for example Fratzscher 2011, Forbes and Warnock 2012, Mercado and Park 2011). Push factors are external to countries, for instance global effects, while pull factors are country-specific factors. In order to consider global effects we include world GDP growth and the US interest rate as a measure of alternative investment opportunities. As domestic factors we include

---

[17] Estimating a usual logit model does not change the results. As the assumption of an extreme value distribution is more plausible to us than a logistic distribution we prefer using the complementary log-log model.

GDP growth in the respective country as well as the debt-to-GDP ratio to account for the financial situation of countries analysed. This factor has in all likelihood been very important during the recent crisis. And finally, we employ the real effective exchange rate as a measure of price competitiveness of the individual countries.[18]

All variables are included with a lag of one to ensure that the explaining variables are not driven by large changes in capital flows. In addition, we include two dummy variables, one for the financial crisis, namely from the first quarter of 2008 to the last one of 2009, and the other to consider the debt crisis in the Euro Area (2010q1-2012q4).

Results

Tables 1-4 present our estimation results. The various specifications differ in the kind of extreme capital flow episodes considered, both for total flows as well as for portfolio investment and foreign direct investment flows taken separately. The first three columns of the tables document the results of our baseline scenario. This specification includes push and pull factors, and hence variables that are found in the literature to be relevant in predicting episodes of extreme capital flows, as well as the dummy variables for the crises. Columns 4 to 6 include additionally global uncertainty indicated by the VIX. The next three columns display the most important results. These specifications comprise country-specific uncertainty measures. And finally, the last three columns report the results of the specifications including country-specific uncertainty measures but restricted to the sample of crises countries.[19]

---

[18] Detailed data description is presented in the Data Appendix.
[19] Italy, Spain, Greece, Portugal.

Table 1: Estimation results for stop periods

	Baseline scenario			Global Uncertainty			Country specific uncertainty measures[1]			Crisis Countries[2]		
	Total	Portfolio	FDI	Total	Portfolio	FDI	Total	Portfolio	FDI	Total	Portfolio	FDI
Const.	-1.562	-1.366	7.778	-1.717	-0.821	7.075	14.712**	-1.299	6.101	8.815	-17.392*	42.935***
Global												
World GDP Growth	-0.376**	-0.069	-0.134	-0.346*	-0.168	-0.026	-0.550**	-0.139	-0.117	-0.627**	-0.376	0.756
US Interest Rate	0.358**	0.664***	-0.016	0.355*	0.679***	-0.026	1.064***	0.745***	0.419	1.506***	0.527	0.076
VIX				0.005	-0.020	0.018	-0.012	-0.017	0.025	-0.158	-0.005	0.021
Country												
GDP Growth	-0.172	-0.166*	-0.163	-0.169	-0.180*	-0.153	-0.446**	-0.116	0.020	-0.491*	-0.110	-0.695*
Debt to GDP	0.008**	0.004	-0.006	0.008**	0.004	-0.006	0.008*	-0.001	0.004	0.007	0.000	-0.020**
Real Exchange Rate	-0.020	-0.037	-0.093	-0.020	-0.038	-0.090	-0.108	-0.048	-0.045	-0.030	0.090	-0.343***
Interest Rate Spread (IRS)							-0.008	0.129***	-0.187**	-0.036	0.130*	-0.710**
Economic Sentiment (ES)							-0.095***	0.015	-0.059***	-0.128***	0.051	-0.100**
GARCH IP							-0.095***	0.019	0.017	-0.031	0.038	-0.045
GARCH CPI							-0.054	-0.032	-0.067	-0.051	-0.014	-0.232**
GARCH MSCI							-0.028	-0.021	-0.106**	-0.120*	-0.140	0.102
Dummy Great Recession	1.894***	1.832***	0.854**	1.856***	1.996***	0.735**	2.306***	2.015***	1.250***	2.061***	0.733	2.040**
Dummy Euro Area Crisis	1.122***	2.293***	0.445	1.100***	2.379***	0.370	2.016***	2.544***	1.294**	2.259***	2.321***	2.987***
Number of observations	504	504	504	504	504	504	436	436	436	180	180	180

Notes: The outcome variable takes the value one, if an extreme capital flow episode (either stop, surge, flight or retrenchment) is identified, and zero otherwise. The estimates are obtained by using a complementary log-log model that assumes an extreme value distribution of the outcome. The sample period is 2000q1 to 2012q4. * p<.1; ** p<.05; *** p<.01. [1] The number of observations is reduced due to a lack of data for Luxembourg (MSCI is not available) and Ireland (Economic Sentiment Index is not available). [2] Italy, Spain, Portugal, Greece.

Table 2: Estimation results for retrenchment periods

	Baseline scenario			Global Uncertainty			Country specific uncertainty measures[1]			Crisis Countries[2]		
	Total	Portfolio	FDI	Total	Portfolio	FDI	Total	Portfolio	FDI	Total	Portfolio	FDI
Const.	-4.283	3.273	0.190	-4.234	3.293	-0.163	6.713	8.266	0.272	-23.036**	-5.214	47.461***
Global												
World GDP Growth	-0.304*	-0.178	-0.363*	-0.312*	-0.181	-0.306	-0.380*	-0.159	-0.539**	-0.368	-0.653*	0.432
US Interest Rate	0.695***	0.625***	0.475**	0.695***	0.625***	0.469**	1.233***	0.352*	1.064***	2.487***	0.731*	-0.264
VIX				-0.001	-0.001	0.012	-0.020	0.009	0.175	0.018	-0.010	-0.005
Country												
GDP Growth	-0.427***	-0.196*	-0.105	-0.428***	-0.196*	-0.098	-0.515***	-0.281*	-0.001	-0.420*	-0.222	-0.413
Debt to GDP	0.003	0.009**	0.001	0.003	0.009**	0.001	0.006	0.019***	0.002	0.006	0.031***	-0.026***
Real Exchange Rate	-0.005	-0.083**	-0.044	-0.005	-0.083**	-0.043	-0.064	-0.154***	0.007	0.203**	-0.055	-0.391***
Interest Rate Spread							-0.015	-0.110*	-0.077	0.141**	-0.061	-0.364***
Economic Sentiment							-0.067***	0.025	-0.073***	-0.089***	0.044	-0.091*
GARCH IP							-0.031	-0.012	-0.020	-0.056	-0.030	0.013
GARCH CPI							-0.091**	0.022	-0.010	-0.078	0.023	-0.091
GARCH MSCI							0.001	-0.013	-0.119***	-0.191**	-0.103	0.258***
Dummy Great Recession	1.931***	1.924***	1.360***	1.940***	1.929***	1.269***	2.274***	1.683***	1.040**	1.687***	0.973	2.330***
Dummy Euro Area Crisis	1.426***	1.980***	2.003***	1.430***	1.983***	1.957***	2.113***	1.737***	2.376***	2.074***	2.098***	3.599***
Number of observations	504	504	504	504	504	504	436	436	436	180	180	180

Notes: The outcome variable takes the value one, if an extreme capital flow episode (either stop, surge, flight or retrenchment) is identified, and zero otherwise. The estimates are obtained by using a complementary log-log model that assumes an extreme value distribution of the outcome. The sample period is 2000q1 to 2012q4. * $p<.1$; ** $p<.05$; *** $p<.01$. [1] The number of observations is reduced due to a lack of data for Luxembourg (MSCI is not available) and Ireland (Economic Sentiment Index not available). [2] Italy, Spain, Portugal, Greece.

Table 3: Estimation results for surge periods

	Baseline scenario			Global Uncertainty			Country specific uncertainty measures[1]			Crisis Countries[2]		
	Total	Portfolio	FDI	Total	Portfolio	FDI	Total	Portfolio	FDI	Total[3]	Portfolio[3]	FDI
Const.	-7.991*	-1.363	-7.138	-7.370	0.199	-6.596	-1.405	7.936	-0.771	24.110*	2.752	-4.226
Global												
World GDP Growth	1.744***	0.097	0.195	1.758***	-0.138	0.127	1.723***	-0.752**	0.154	2.039**	-1.257**	-0.212
US Interest Rate	-0.012	-0.409	0.478*	-0.001	-0.405	0.486*	-0.072	-1.416***	0.612*	-0.690	-3.518***	0.308
VIX				-0.018	-0.036	-0.012	-0.012	-0.050	-0.012	-0.012	-0.023	0.020
Country												
GDP Growth	0.139	-0.012	0.042	0.125	-0.030	0.033	0.147	0.158	-0.016	-0.117	-0.005	0.375
Debt to GDP	-0.003	-0.005	-0.001	-0.003	-0.005	-0.001	-0.004	0.005	0.012*	0.020	-0.004	0.011
Real Exchange Rate	0.051	0.016	0.032	0.047	0.008	0.029	-0.041	-0.035	-0.049	-0.275***	-0.014	-0.049
Interest Rate Spread							0.099*	-0.571*	0.192***	0.094	0.330	0.198*
Economic Sentiment							0.027	0.015	0.009	0.005	0.157***	0.056
GARCH IP							-0.010	0.043	0.062*	0.099	-0.074	0.012
GARCH CPI							0.103**	-0.174	-0.059	0.018	0.080	0.043
GARCH MSCI							-0.053	-0.071	-0.157*	0.105	-0.535**	-0.327***
Dummy Great Recession	-1.469*	0.097	0.251	-1.305*	0.337	0.344	-1.669	0.478	0.710	--	-1.767	0.152
Dummy Euro Area Crisis	0.271	-1.528**	0.274	0.409	-1.440*	0.343	0.660	-3.708***	-0.142	-2.096	--	0.954
Number of observations	504	504	504	504	504	504	436	436	436	148	140	180

Notes: The outcome variable takes the value one, if an extreme capital flow episode (either stop, surge, flight or retrenchment) is identified, and zero otherwise. The estimates are obtained by using a complementary log-log model that assumes an extreme value distribution of the outcome. The sample period is 2000q1 to 2012q4. * p<.1; ** p<.05; *** p<.01. [1] The number of observations is reduced due to a lack of data for Luxembourg (MSCI is not available) and Ireland (Economic Sentiment Index is not available). [2] Italy, Spain, Portugal, Greece.

Table 4: Estimation results for flight periods

	Baseline scenario			Global Uncertainty			Country specific uncertainty measures[1]			Crisis Countries[2]		
	Total	Portfolio	FDI	Total	Portfolio	FDI	Total	Portfolio	FDI	Total[3]	Portfolio[3]	FDI
Const.	-10.755**	0.454	-7.012	-10.522**	0.585	-5.295	-4.105	12.491*	-18.503*	40.013***	18.189*	-54.949***
Global												
World GDP Growth	1.587***	1.136	-0.046	1.604***	1.127	-0.358	1.402***	1.145	-0.980**	3.336***	0.504	-2.434***
US Interest Rate	-0.148	-0.735***	-0.040	-0.143	-0.709**	0.012	-0.145	-0.311	0.351	0.079	-1.165	0.382
VIX				-0.011	-0.015	-0.054	-0.007	-0.012	-0.083	0.013	-0.019	-0.005
Country												
GDP Growth	0.263*	0.251	0.246	0.256*	0.241	0.209	0.271	0.259	0.449*	-0.173	0.047	1.020**
Debt to GDP	-0.001	0.006	0.008	-0.002	0.006	0.007	-0.001	0.000	0.020**	0.004	-0.005	0.019**
Real Exchange Rate	0.082*	-0.009	0.046	0.082*	-0.008	0.039	0.009	-0.108	0.180	-0.206	-0.053	0.429***
Interest Rate Spread							0.057	0.120***	0.180	0.123*	0.158**	0.321**
Economic Sentiment							0.008	-0.036	-0.011	-0.233***	-0.084*	0.103
GARCH IP							-0.041	-0.007	-0.245***	-0.624***	-0.087	-0.285*
GARCH CPI							0.080	-0.002	0.130**	0.060	0.007	0.182*
GARCH MSCI							-0.034	0.018	-0.416**	0.126	-0.077	-0.765***
Dummy Great Recession	-2.173**	0.026	-0.524	-2.075**	0.176	-0.081	--	0.357	0.829	--	-1.148	--
Dummy Euro Area Crisis	0.253	-0.510	-0.783	0.331	-0.382	-0.535	0.633	0.082	-0.093	-3.020	-3.669*	1.548*
Number of observations	504	504	504	504	504	504	358	436	436	148	180	148

Notes: The outcome variable takes the value one, if an extreme capital flow episode (either stop, surge, flight or retrenchment) is identified, and zero otherwise. The estimates are obtained by using a complementary log-log model that assumes an extreme value distribution of the outcome. The sample period is 2000q1 to 2012q4. * p<.1; ** p<.05; *** p<.01. [1] The number of observations is reduced due to a lack of data for Luxembourg (MSCI is not available) and Ireland (Economic Sentiment Index is not available). [2] Italy, Spain, Portugal, Greece.

First of all, throughout our specifications the results reveal a similar behaviour of foreign and domestic investors during the recent crises: while the included dummy variables for the great recession as well as for the Euro Area crisis are positively significant for stop and retrenchment periods (large decreases in capital inflows and outflows), they are either insignificant or have a negative sign for surge and flight periods (large increases in capital in- and outflows). Thus, the probability of withdrawing money from abroad was higher for both domestic and foreign investors during recent years. These findings confirm our results from the identification approach.

In addition, results from our baseline scenario show that push factors are quite important in predicting extreme periods of capital flows, while pull factors seem to be especially relevant for investors withdrawing money from abroad (stop and retrenchment). Thus, investors' decision to withdraw money from a certain country depends more on specific factors of that country, whereas the decision to invest is rather driven by the overall economic situation.

With respect to the role of uncertainty the results show that country-specific uncertainty measures, which are of main interest in our analysis, indeed play an important role in indicating extreme periods of capital flows. Especially for determining large changes of capital flows undertaken by foreign investors (stop and surge) uncertainty seems to be quite important while for domestic investors increasing their activity abroad (flight) uncertainty is obviously not a relevant factor. In contrast, global uncertainty, measured by the VIX, has no significant effects. However, most of the variation in the VIX during our sample period occurs from 2008 on and it is likely that the effect of the VIX is captured by the dummy variables for the great recession and the Euro Area crisis.[20] Thus, general uncertainty associated with the crises should be reflected in these dummy variables.

These results are true for total flows. When considering portfolio investments and foreign direct investment flows separately the picture is mixed. For portfolio investments, only the interest rate spread vis-à-vis the United States, a broader measure that reflects uncertainty about economic policy, is a quite good predictor for large changes. In contrast, for foreign direct investments not only broader measures but also uncertainty about real economic activity, inflation and the situation on the national financial markets seem to be important indicators. Moreover, country-specific uncertainty measures are good predictors for all kinds of extreme periods of capital flows with respect to foreign direct investments.

The fact that uncertainty measures are more relevant for indicating large changes in capital flows of foreign direct investments is sensible in that those investments are associated with higher sunk costs. Therefore investors have a closer look on country-specific factors, including uncertainty, than portfolio investors when deciding whether to withdraw from / invest in a certain investment or not.

---

[20] This is in contrast to Forbes and Warnock (2012) who find that global risk is an important factor. We also find significant results for the VIX, but only without including the dummy variables for the crises.

The last three columns of Tables 1-4 present the results of restricting the analysis to the crises countries of the Euro Area. It is interesting that country-specific uncertainty measures seem to be more important for domestic investors (retrenchment and flight) in these countries, and especially for total and foreign direct investment flows. Obviously, EMU investors consider the situation in their home country quite intensively when being active on the international financial markets.

In sum, throughout the different specifications, our results show that foreign and domestic investors withdraw money from abroad during times of crises while at the same time country-specific uncertainty is a highly relevant factor for indicating this behaviour. This is reasonable, as in times of higher uncertainty investors become more risk adverse. They prefer domestic investments because costs are lower due to information asymmetry. Hence, they restructure their portfolios by decreasing their foreign engagement in favour of domestic investment. This is called the "Flight Home Effect" which means that the empirically well-established home bias of international capital allocation even tends to be amplified by economic shocks (Giannetti and Laeven 2012). This home bias arises most likely due to an asymmetric distribution of information between domestic and foreign investors (Gordon and Bovenberg 1996).

5. Summary and Conclusion

In this paper we analyse whether the emergence of extreme capital flow episodes are closely related to different types of country-specific uncertainty factors for the core countries of the Euro Area. In particular, in the recent financial crisis a high degree of uncertainty was a characterizing factor in the Euro Area countries. Therefore, not only global but also country-specific uncertainty factors might be important to predict extreme capital flows.

We identify extreme capital flow episodes by applying the standard approach of Calvo et al. (2004) to gross capital flows. For the recent crisis stop and retrenchment periods are identified. This result is confirmed by the estimation approach, as the dummy variables for the crises are positively significant for these two kinds of capital flow waves.

Apparently, foreign and domestic investors withdrew money from the international financial markets and preferred domestic investments during the recent crises. Our estimation results show that one reason for this increased home bias could be the high degree of uncertainty as we find that besides uncertainty associated with the recent crises country-specific uncertainty factors are especially important in indicating stop and retrenchment periods. Obviously, this high degree of uncertainty and a higher risk aversion of investors make domestic investments more interesting as information on domestic investments funds are assumed to be more precise.

In sum, our analysis has shown that a high degree of uncertainty about country-specific economic prospects as well as about the course of economic policy is related to large changes in capital flows that might negatively influence economic activity. Thus, a credible commitment to sound economic policy, in particular, to sustainable public budget and economic growth, seems to be a necessary condition to strengthen investors' confidence.

References

Agosin, M. R. and F. Huaita (2011), Overreaction in Capital Flows to Emerging Markets: Booms and Sudden Stops, Journal of International Money and Finance, doi: 10.1016/j.jimonfin.2011.12.015.

Attinasi, M. G., C. Checherita and C. Nickel (2009), What explains the surge in euro area sovereign spreads during the financial crisis of 2007–09?, ECB Working Paper Series, No. 1131.

Bachmann, R. and E. R. Sims (2012), Confidence and the transmission of government spending shocks, Journal of Monetary Economics 59: 235–249.

Barrios, S., P. Iversen, M. Lewandowska and R. Setzer (2009), Determinants of intra-euro area government bond spreads during the financial crisis, European Commission Economic Papers 388.

Bernoth, K., J. von Hagen and L. Schuknecht (2012), Sovereign risk premiums in the European government bond market, Journal of International Money and Finance 31 (5): 975–995.

Bloom, N. (2009), The Impact of Uncertainty Shocks, Econometrica 77(3): 623–685.

Borgy, V., T. Laubach, J.-S. Mésonnier and J.-P Renne (2011), Fiscal sustainability, default risk and euro area sovereign bond spreads, Banque de France Documents de Travail, No. 350.

Bredin, D. and S. Fountas (2009), Macroeconomic Uncertainty and Performance in the European Union, Journal of International Money and Finance 28(6): 972-986.

Broner, F. and R. Rigobon (2005), Why are capital flows so much more volatile in emerging than in developed countries?, Central Bank of Chile Working Papers No. 328.

Broner, F., T. Didier, A. Erce and S. Schmukler (2010), Financial Crises and International Portfolio Dynamics, Working Paper, online available: http://hdl.handle.net/10230/6358.

Broner, F., T. Didier, A. Erce and S. Schmukler (2013), Gross capital flows: Dynamics and crises, Journal of Monetary Economics 60: 113-133.

Bumgarner, M. K. and P. B. Prime (2000), Capital Mobility and Investors Confidence: The Case of Hong Kong's Reversion to China's Sovereignty, Pacific Economic Review 5(2): 263-278.

Calderon, C. and M. Kubota (2013), Sudden Stops – Are Global and Local Investors Alike?, Journal of International Economics 89(1): 122-142.

Calvo, G.A., A. Izquierdo and L.-F. Mejia (2004), On the Empirics of Sudden Stops: The Relevance of Balance-Sheet Effects, NBER Working Paper Series w10520.

Chua, C., D. Kim and S. Suardi (2011), Are empirical measures of macroeconomic uncertainty alike?, Journal of Economic Surveys 25(4): 801-827.

Efremidze, L., S. M. Schreyer and O. Sula (2011), Sudden Stops and Currency Crises, Journal of Financial Economic Policy 3(4): 304-321.

Engle, R. (2001), GARCH 101: The Use of ARCH/GARCH Models in Applied Econometrics, Journal of Economic Perspectives 15(4): 157-168.

European Commission (2007), The Joint Harmonised EU Programme of Business and Consumer Surveys, User Guide.

Forbes, K. J. and F. E. Warnock (2012), Capital Flow Waves: Surges, Stops, Flight, and Retrenchment, Journal of International Economics, doi:10.1016/j.jinteco.2012.03.006.

Forster, K., M. Vasardani and M. Ca'Zorzi (2011), Euro Area cross-border financial flows and the global financial crisis, European Central Bank, Occasional Paper Series No.126.

Fratzscher, M. (2011), Capital flows, push versus pull factors and the global financial crisis, European Central Bank Working Paper Series No.1364.

Giannetti, M. and L. Laeven (2012), The flight home effect: Evidence from the syndicated loan market during financial crises, Journal of Financial Economics 104(1): 23-43.

Gordon, R. H. and A. L. Bovenberg (1996), Why is Capital so Immobile Internationally? Plausible Explanations and Implications for Capital Income Taxation, American Economic Review 86(5): 1057-1075.

Grier, K. B. and M. J. Perry (2000), The Effects or Real and Nominal Uncertainty on Inflation and Output Growth: Some GARCH-M Evidence, Journal of Applied Econometrics 15: 45-58.

Jochem, A. and U. Volz (2011), Portfolio Holdings in the Euro Area – Home Bias and the Role of International, Domestic and Sector Specific Factors, Deutsche Bundesbank Discussion Paper Series 1: Economic Studies 07.

Lane, Philip R. (2013), Capital Flows in the Euro Area, Economic Papers 497.

Mercado, R. and C.-Y. Park (2011), What drives Different Types of Capital Flows and their Volatilities in Developing Asia?, International Economic Journal 25(4): 655-680.

Merler, S. and J. Pisani-Ferry (2012), Sudden Stops in the Euro Area, Bruegel Policy Contribution 2012/06.

Milesi-Ferretti, G.-M. and C. Tille (2011), The great retrenchment: international capital flows during the global financial crisis, Economic Policy 26(66): 289-346.

Rothenberg, A. D. and F. E. Warnock (2006), Sudden Flight and True Sudden Stops, NBER Working Paper w12726.

Schmidt, C.M. and B. Weigert (2012), A Banking Union for Europe: Part of an Encompassing Long-term Governance Structure, No Short-term Fix. CESifo Forum 13 (4): 3-9.

Shambaugh, J. C. (2012), The Euro's Three Crises, Brookings Papers on Economic Activity: 157-231.

Appendix

Data Appendix

All indicators of extreme capital flow episodes are constructed by using quarterly data from the Balance of Payments Statistics provided by the International Monetary Fund following the BPM5 classification scheme.

For the purpose of this paper, all series on a monthly basis were transformed into quarterly series.

Debt to GDP is the ratio of total gross public debt to nominal GDP on a monthly basis made available by Eurostat.

Economic Sentiment is a monthly survey-based indicator made up of five sectoral confidence indicators with different weights: Industrial confidence, Services confidence, Consumer confidence, Construction confidence and Retail trade confidence, provided by the European Commission.

GDP growth is the quarter to quarter change of real GDP, seasonally adjusted, made available by the respective national statistical office.

Interest spread vis-à-vis the United States is constructed by subtracting the US monthly average of the yield of government bonds (maturity of 10 years) from the respective counterpart of the Euro Area countries. The data is provided by Eurostat and the Board of Governors of the Federal Reserve System.

Real effective exchange rate is a quarterly index provided by Eurostat deflating the exchange rate by the consumer price index.

Industrial production and **Consumer Price Index**, used to construct volatility indices, are quarterly indices provided by Eurostat or the respective national statistical office.

MSCI is a stock market index provided by Morgan Stanley Capital International.

VIX is the S&P 500 share volatility index provided by Standard & Poor's.

Figure 1: Periods of extreme capital flows (total flows)

Finland: Inflows

Luxembourg: Inflows

Finland: Outflows

Luxembourg: Outflows

Belgium: Inflows

France: Inflows

Belgium: Outflows

France: Outflows

— annual change of the moving average

▓ Surge ▩ Retrenchment

░ Stop ⋮ Flight

annual change of the moving average
Surge   Retrenchment
Stop   Flight
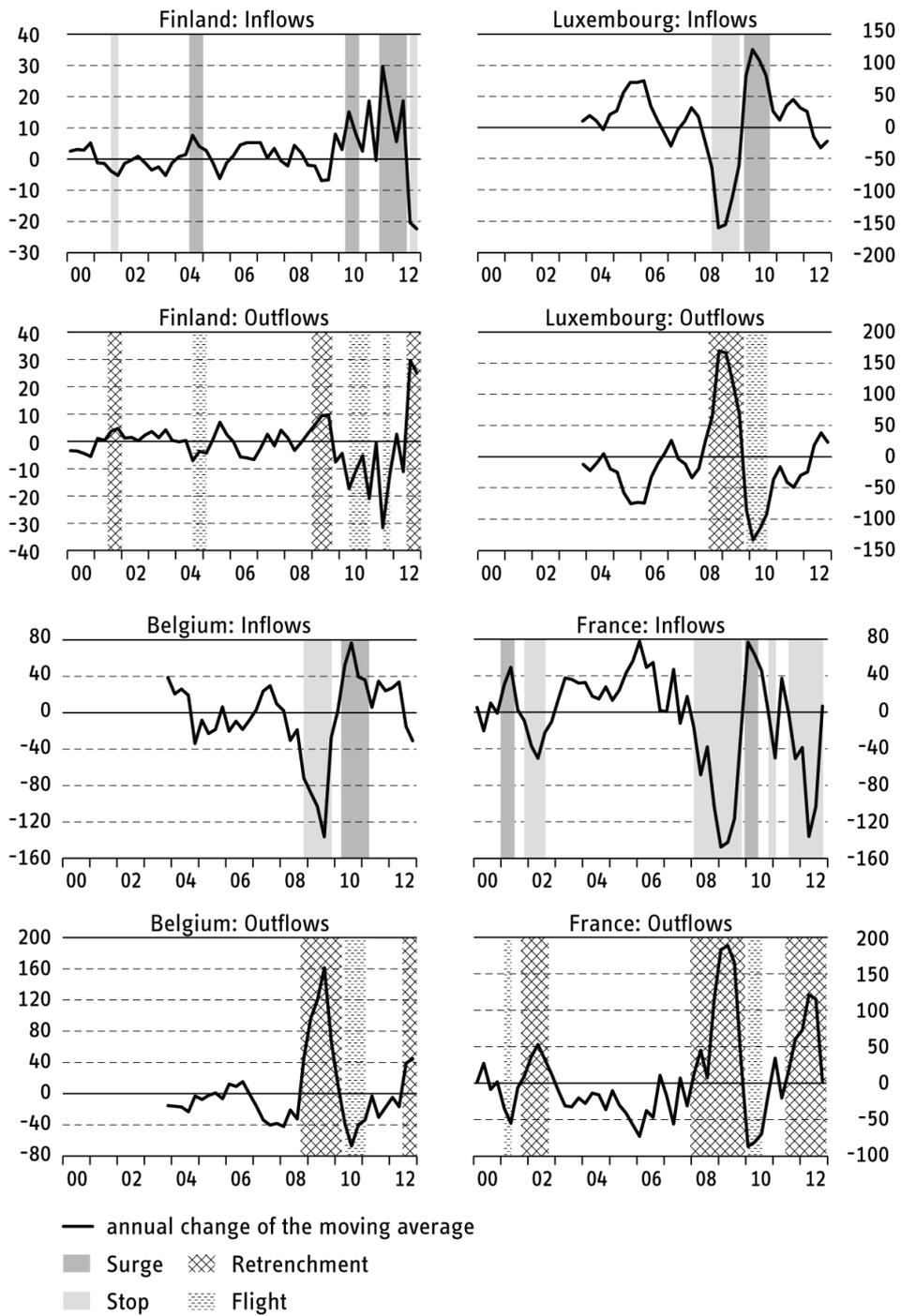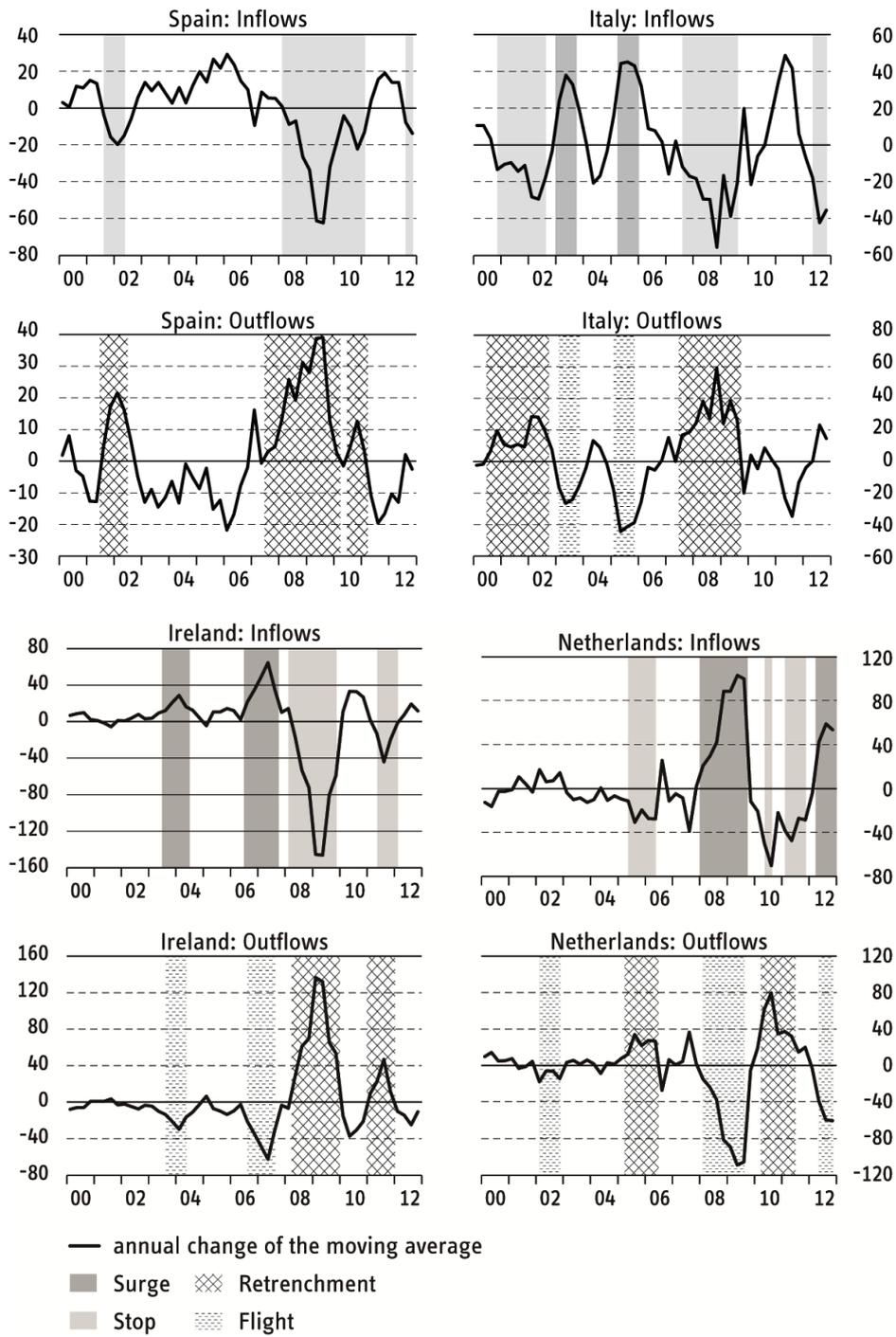
Table 1: Periods of extreme capital flows (Portfolio investments)

Country	Surge	Stop	Retrenchment	Flight
Spain	2004q1-2005q3	2007q3-2008q4	2000q1-2000q3	2003q3-2004q1
		2010q4-2012q3	2006q3-2007q1	2005q3-2006q1
France	2009q1-2010q1	2001q3-2002q4	2007q3-2009q4	2003q2-2004q3
		2007q4-2008q3	2010q3-2012q3	
		2010q3-2011q3		
		2012q2-2012q4		
Germany	2007q2-2008q1	2000q1-2000q4	2000q4-2002q2	2009q4-2010q2
		2006q2-2006q3	2008q1-2009q3	2010q4-2011q3
		2008q2-2009q3	2011q4-2012q3	
Greece		2006q2-2006q4	2006q2-2007q1	2012q1-2012q4
		2008q2-2009q1	2008q3-2009q2	
		2010q2-2011q2	2010q3-2011q1	
		2012q3-2012q4		
Ireland	2003q4-2004q4	2007q4-2009q3	2008q2-2009q4	2003q4-2004q1
	2010q1-2010q3	2011q3-2012q2	2011q1-2011q3	2006q3-2007q2
				2012q1-2012q4
Italy	2003q1-2003q3	2000q3-2001q3	2000q3-2002q2	2005q2-2006q1
	2005q1-2005q4	2006q4-2007q4	2006q4-2008q4	2009q4-2010q3
		2011q4-2012q3	2011q1-2012q3	
Portugal	2000q1	2000q3-2001q1	2000q1-2000q3	2003q2-2004q1
	2007q2-2008q1	2006q2-2006q4	2006q3-2007q2	2009q1-2009q3
	2008q3-2009q2	2010q1-2012q3	2010q3-2011q4	2012q2-2012q4
Austria	2006q4-2007q3	2001q3-2001q4	2001q3-2001q4	2009q4-2010q3
		2008q1-2009q1	2007q4-2008q4	
		2009q4-2010q3	2011q3-2012q2	
		2012q1-2012q4		
Belgium	2012q3-2012q4	2009q4-2011q2	2008q4-2009q4	
Netherlands	2005q3-2006q1	2006q3-2007q1	2006q1-2006q4	
	2008q4-2009q3	2007q4-2008q3	2010q1-2010q4	
		2012q2-2012q3		
Luxembourg	2009q4-2010q3	2008q3-2009q2	2008q3-2009q2	2009q4-2010q2
			2011q3-2012q2	
Finland	2006q1-2006q4	2001q3-2001q4	2007q2-2009q1	2009q4-2010q3
	2009q1-2009q4	2007q4-2008q4	2010q4-2011q2	
		2010q4-2011q2	2011q4-2012q3	

Table 2: Periods of extreme capital flows (Foreign direct investments)

Country	Surge	Stop	Retrenchment	Flight
Spain	2000q1-2001q2 2007q4-2008q3	2001q4-2002q3 2003q4-2004q3 2009q1-2010q3	2001q3-2002q3 2008q4-2010q3 2012q1-2012q4	2000q1 2006q3-2006q4 2011q1-2011q2
France	2000q1-2000q3 2005q3-2006q1	2008q4-2009q4	2001q3-2002q3 2009q1-2010q2 2010q4-2011q3	2000q1 2007q4-2008q3
Germany	2000q1-2000q4	2001q1-2001q4	2000q4-2001q3 2008q3-2009q3 2011q2-2012q1	2005q1-2005q4
Greece	2006q3-2007q2		2008q1-2008q2 2009q2-2009q3	2006q3-2007q2
Ireland	2002q4-2003q2 2006q3-2007q2	2001q2-2002q1 2003q4-2004q4	2008q1-2008q3 2010q3-2012q3	2002q2-2003q1 2004q2-2005q1 2009q2-2009q3
Italy	2000q1-2000q2 2000q4-2001q3 2006q1-2006q4 2011q1-2012q1	2002q2-2002q3 2008q1-2008q4 2010q1-2010q4 2012q3-2012q4	2000q1 2009q2-2010q3 2012q2-2012q4	2001q1-2001q3 2005q4-2006q3 2011q1-2011q3
Portugal	2000q2-2000q4 2003q2-2004q1 2011q4-2012q3	2002q2-2003q1	2002q2-2003q1 2010q3-2011q2	2000q1-2000q2 2011q3-2012q2
Austria	2005q1-2005q4	2006q1-2006q4	2001q4-2002q1 2006q1-2006q4	2005q1-2005q4
Belgium	2008q3-2008q4	2009q3-2010q2 2012q3-2012q4	2009q2-2010q2	2008q3-2008q4
Netherlands	2005q3-2006q2 2007q4-2008q3	2008q4-2009q3	2001q3-2002q3	2005q3-2006q2
Luxembourg	2009q4-2010q1 2011q2-2012q2	2008q4-2009q1 2012q3-2012q4	2008q3-2009q1 2012q3-2012q4	2011q3-2011q4
Finland	2009q2-2009q3	2008q2-2009q1 2011q4-2012q4		