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Cyclical Behavior of International Fund Flows

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Highlights

- We investigate the cyclicality of international fund flows using data for almost 70 countries between 1996 and 2013.
- Contemporaneously international fund flows are counter-cyclical: fund flows are above trend when output is below trend.
- Bond flows are more counter-cyclical than equity flows.
- Counter-cyclical behavior of fund flows has become more pronounced after the global financial crisis.
- Fund flows into non-OECD countries are mainly driven by global factors; fund flows into OECD countries are more influenced by country-specific factors.

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Abstract

We investigate the cyclicality of international fund flows employing correlation and regression analysis using monthly data for almost 70 countries between 1996 and 2013. International fund flows are cross-border investments by global funds. Our results suggest that contemporaneously international fund flows are counter-cyclical: fund flows are above trend when output is below trend. Bond flows are more counter-cyclical than equity flows. Furthermore, the counter-cyclical behavior of fund flows has become more pronounced after the global financial crisis. Fund flows into non-OECD countries are mainly driven by global factors while fund flows into OECD countries are more

influenced by country-specific factors.

Keywords: international fund flows, cyclicality, equity flows, bond flows, push and pull factors
JEL classification: E32, F30, F32, G15, G23

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1. Introduction

The cyclical behavior of capital flows has received much attention in recent years (Kaminsky et al., 2005; Levy Yeyati et al., 2007; Smith and Valderrama, 2009; Broner et al., 2013; Contessi et al., 2013). The standard endowment model of a small open economy suggests that capital flows should be counter-cyclical because a country would like to borrow abroad to sustain the permanent level of consumption during recessions. But most empirical studies find that capital flows are pro-cyclical, especially in developing countries (Kaminsky et al., 2005; Broner et al., 2013).

As the behavior of different types of capital flows is likely to be driven by different factors (Forbes and Warnock, 2012), several recent studies do not employ net capital flows but focus on the cyclical properties of gross capital flows (Broner et al., 2013) or on specific capital flows, such as foreign direct investments and portfolio investments (Levy Yeyati et al., 2007; Smith and Valderrama, 2009; Contessi et al., 2013). This sometimes leads to different outcomes concerning the cyclicality of capital flows. For instance, Smith and Valderrama (2009) conclude that bond and equity flows tend to be pro-cyclical with domestic investment while FDI tends to be counter-cyclical, while Contessi et al. (2013) find that total inward capital flows are pro-cyclical with respect to output, but net outflows are counter-cyclical with respect to output.

So far, the cyclicality of one type of capital flows, namely international fund flows, has received scant attention. International fund flows are cross-border investments in bond and equity markets by global funds, such as mutual funds, exchange traded funds (ETFs), closed-end funds and hedge funds. Figure 1 shows that total net assets under management by international funds (covered by Emerging Portfolio Fund Research (EPFR) Global) increased dramatically since 1990s, especially after 2004. While assets under management reverted during the global financial crisis, especially for equity funds, they reached unprecedented heights after the crisis. Compared with equity funds, bond funds have fewer assets under management. As noted by Gelos (2013), fund flows are more volatile than most other types of capital flows. In addition, they play an increasingly important role in international financial markets and the transmission of shocks (Gelos, 2013; Raddatz and Schmukler, 2012). Hence, investigating the cyclicality of international fund flows is of great importance.

< Insert Figure 1 here >

The cyclicality of fund flows depends, inter alia, on their investment strategy. Under a positive-feedback trading strategy (Bohn and Tesar, 1996; Froot et al., 2001), equity investments tend to flow into the country with higher equity returns. If equity returns are related to domestic output growth, such an investment strategy may cause fund flows to be pro-cyclical. However, under a portfolio-rebalancing strategy (Hau and Rey, 2006), higher domestic equity returns enable investors to reduce equity holdings in this country to diminish their FX risks. In that case fund flows are more likely to behave in a counter-cyclical fashion.

Two previous studies have examined the behavior of international fund flows. Raddatz and Schmukler (2012) analyze the behavior of investors in and managers of mutual funds. They find that investors react to shocks by redeeming from funds investing in countries that are in crisis and by increasing investments in funds investing in countries where conditions improve. Fund managers behave in a similar fashion. They tend to move capital out of crisis countries. Puy (2016) defines periods of at least two consecutive monthly fund inflows or outflows as "surge phase" or "retrenchment phase", respectively. Using a diffusion index to measure the share of countries experiencing the same phase he concludes that international portfolio flows co-move across countries. Although these studies are related to our work, Raddatz and Schmukler (2012) and Puy (2016) do not investigate the relationship between country-level fund flows and domestic business cycles, which is the focus of our research.

Kaminsky et al. (2005) were among the first to address the cyclicality of capital flows. They consider capital flows as counter-cyclical if the correlation between the cyclical component of capital inflows and the cyclical component of output is negative. Based on this idea and following related research (e.g. Alper, 2002; Contessi et al., 2013), we employ the cyclical component of international fund flows and the cyclical component of industrial production to investigate the cyclicality of fund flows. We address several issues. Firstly, are international fund flows pro-cyclical or counter-cyclical from the perspective of the receiving country? Following previous studies, we employ a correlation-based approach (Alper, 2002; Kaminsky et al., 2005; Smith and Valderrama, 2009; Contessi et al., 2013) and a panel data regression approach (Broner et al., 2013) to examine this issue. Secondly, are fund flows driven by pull or push factors? To address this issue, we add push and pull factors in our regression model to examine whether fund flows are driven by global factors or domestic macroeconomic conditions. Thirdly, do fund flows into OECD and non-OECD countries behave differently? And finally: is there a change in fund flow patterns since the global financial crisis? To address the last two questions, we estimate separate models for OECD and non-OECD countries and for samples before and after the financial crisis in 2007.

Our results suggest that contemporaneously international fund flows tend to be counter-cyclical, i.e. fund flows are above trend when output is below trend. Bond flows are more counter-cyclical than

equity flows. Furthermore, the counter-cyclical behavior of fund flows has become more pronounced after the global financial crisis. Our results suggest that funds' portfolio-rebalance strategy cannot explain the counter-cyclicality of fund flows as fund flows are positively related with domestic stock returns. A possible explanation for their counter-cyclical nature is that fund flows tend to be positively related with the performance of domestic financial markets (e.g. domestic stock market returns) and that financial market factors are leading indicators of the real economy (Stock and Watson, 2003). This implies that fund flows should be pro-cyclical ahead of the business cycle for which we find strong evidence both for equity and bond flows. Our results also suggest that fund flows into non-OECD countries are mainly driven by global factors while fund flows into OECD countries are more influenced by country-specific factors.

The paper proceeds as follows. Section 2 describes the methods employed, while section 3 presents detailed information about the data employed. Section 4 offers the main results and section 5 concludes.

2. Methodology

We employ a monthly database on fund flows, obtained from EPFR Global.[1] Equity flows and bond flows are analyzed separately. Our data cover the period from January 1996 to June 2013 for equity flows and January 2004 to June 2013 for bond flows, as data for bond flows are only available from January 2004 onwards. As GDP is not available on a monthly basis, we use industrial production as a proxy for aggregate economic activity (see also Alper, 1998; Ilzetzki and Végh, 2008). To examine the cyclicality of international fund flows, we use a correlation-based and a regression-based approach.

2.1 Correlation-based approach

Following Kaminsky et al. (2005) capital flows are considered pro-cyclical if the correlation between the cyclical component of capital inflows and output is positive. We calculate the correlation between the cyclical components of international fund flows and domestic industrial production to investigate the cyclical behavior of fund flows (scaled by assets under management). To identify the cyclical components of fund flows and output, we detrend the data by employing the Hodrick-Prescot filter with lambda=14,400. To exclude seasonal patterns in the data, we use the Census X-12 additive method.

Whereas most studies investigate the contemporaneous relationship between capital flows and output, Alper (2002), Smith and Valderrama (2009) and Contessi et al. (2013) also examine the time variation of the correlation of the cyclical components of capital flows and output. Similarly, we calculate the correlation of the cyclical component of fund flows for the window [t-12, t+12] and the

[1] Several studies have used this database to analyze the behavior of (mutual) funds (Kaminsky et al., 2001; Borensztein and Gelos, 2003; Fratzscher, 2012; Jotikasthira et al., 2012; Raddatz and Schmukler, 2012; Puy, 2016).

cyclical part of industrial production at t=0.

2.2 Regression-based approach

We employ two regression models to test the cyclical behavior of fund flows. In model 1, the cyclical component of output is regressed on the cyclical component of fund flows. A positive coefficient of the cyclical component of output indicates pro-cyclical behavior, while a negative coefficient suggests counter-cyclical behavior. To test whether our findings are robust, we add push and pull factors as control variables (model 2). A dynamic panel data model with the one-month lagged independent variable is employed, because the lagged fund flows are significant and the AIC and BIC criteria drop significantly when the lagged independent variable is added. According to Kiviet (1995), if the T of panel data is large enough ($T > 30$), the Least-Squares Dummy Variable (LSDV) estimator is valid and more efficient than other estimators. Therefore, the LSDV method is employed to estimate all models.

Model 1 reads as follows:

$$y_{i,t} = \alpha y_{i,t-1} + \beta x_{i,t} + \mu_i + \varepsilon_{i,t} \quad (1)$$

where $y_{i,t}$ is the cyclical component of fund flows; $x_{i,t}$ represents the cyclical component of industrial production; u_i is a country fixed effect and $\varepsilon_{i,t} \sim N(0, \sigma_\varepsilon^2)$. Subscripts *i* and *t* denote country *i* and time *t*, respectively. Whereas most studies tend to focus on the contemporaneous cyclicality of capital flows, we also want to know how fund flows behave when we account for leads and lags of the business cycle. Hence, the 3-months-lagged industrial production index and the 6-months-lagged industrial production are also included separately in model 1.

To examine the robustness of our results, we also estimate model 2:

$$y_{i,t} = \alpha y_{i,t-1} + \beta x_{i,t} + \gamma Z_{i,t} + \mu_i + \varepsilon_{i,t} \quad (2)$$

Model 2 includes control variables that can influence the behavior of fund flows, denoted by $Z_{i,t} = [Z_{i,t}^D, Z_t^G]$ consisting of country-specific Gvariables that attract fund flows $Z_{i,t}^D$ ("pull" factors) and global common shocks Z_t^G ("push" factors).[2]

Pull factors included are: domestic equity returns (cf. Chuhan et al., 1998; Fratzscher, 2012), nominal interest rates, CPI inflation (cf. Calderón and Kubota, 2014), the undervaluation of the real effective exchange (cf. Falcetti and Tudela, 2008; Ghosh et al., 2014; Calderón and Kubota, 2014), and trade openness (cf. Faria et al., 2007; Calderón and Kubota, 2014; Puy, 2016). Push factors included are the TED spread to proxy liquidity (cf. Fratzscher, 2012)[3], the CBOE Volatility Index (VIX)[4] as

[2] Calderón and Kubota (2014) find that domestic and external factors have significant explanatory power for advanced countries while domestic factors play a larger role for developing countries. Ghosh et al. (2014) find that global factors determine when surges to emerging markets occur while the magnitude of surges depends largely on domestic factors. Fratzscher (2012) concludes that push factors are the main drivers during crises, while pull factors drive the behavior of fund flows in 2009 and 2010, especially for emerging markets.

[3] The TED spread is the difference between the interest rates on interbank loans (LIBOR) and on short-term U.S.

proxy for risk (cf. Fratzscher, 2012; Ghosh et al., 2014; Burger and Ianchovichina, 2014), and, following Fratzscher (2012) and Puy (2016), world equity returns as proxy for the international stock market (calculated as the average of equity returns in US, UK and Japan stock markets). Appendix 1 provides details of the control variables and their sources. Following Fratzscher (2012), we orthogonalize world equity returns by regressing world equity returns on domestic stock market returns and using the residual as measure for world equity returns. Similarly, the nominal interest rate is regressed on inflation and the residual is used as a measure for the interest rate. The correlation matrix shown in Appendix 2 suggests that the correlations of the explanatory variables are generally low.

We estimate model (2) with only push factors, with only pull factors, and with all control variables. We also estimate the models for OECD and non-OECD countries separately and for the periods before and after the global financial crisis.

3. Data

To analyze the cyclical behavior of fund flows we employ the EPFR Global database, which contains 33,735 equity funds and 21,716 bond funds (as of February 2014).[5] EPFR Global tracks funds registered in most major advanced markets, which allocate their assets globally, including mutual funds, exchange traded funds (ETFs), closed-end funds and hedge funds. The data used in this study is fund flows into or out of a specific country. There are two kinds of data employed to calculate country flows. "Fund flows" provided by EPFR Global track the amount of capital flowing into and out of investment funds while "country weightings" track fund managers' portfolio allocation decisions across countries. Therefore, country flows are calculated using the fund flows and their country allocations by EPFR Global. The country flows are scaled by assets under management (cf. Fratzscher, 2012; Puy, 2016), which reports the total assets invested in the receiving country by all funds.

Our monthly data cover the period from January 1996 to June 2013 for equity flows and January 2004 to June 2013 for bond flows. The data have been cleaned as follows. First, we exclude countries with less than 24 observations. Second, we match equity flows with each country's stock market indices and exclude countries without corresponding stock market indices. Third, we exclude countries without macroeconomic data. Finally, we have winsorized all variables at the lower 1% level and upper 99% level.

Appendix 3 shows the countries in our sample. We have 68 countries for equity flows and 65 countries for bond flows.[6] Table 1 presents descriptive statistics. In total, we have 11,896 observations

government debt ("T-bills"). An increase in the TED spread indicates increasing counterparty risk.

[4] The Chicago Board Options Exchange Volatility Index (VIX) is constructed using the implied volatilities of a wide range of S&P 500 index options.

[5] The database tracks around 98% of emerging market equity funds, over 95% of ETF assets globally, around 90% of funds in the US, 85%-90% of Canadian mutual funds, and 70%-75% of funds in developed European markets.

[6] In the correlation model for bond flows, we delete 8 countries (or regions) because of lack of data. These

for equity flows and 6,468 observations for bond flows.

<Insert Table 1 here>

4. Cyclical behavior of fund flows

4.1 Cyclical behavior of fund flows for all countries

4.1.1 Correlation-based approach

Figure 2 shows for, illustrative purposes, the cyclical parts of industrial production and fund flows for Austria. Figure 2 indicates that when Austrian industrial production is above trend, fund flows into Austria are below trend; when industrial production is below trend fund flows are above trend. The contemporaneous correlation between cyclical fund flows and cyclical output is -0.4722. The contemporaneous correlation for most other countries in our sample is also negative, except for a few emerging countries (see Appendix 4 for details). This suggests that fund flows are counter-cyclical.

< Insert Figure 2 here >

Figure 3 shows the average correlation coefficient of the cyclical component of fund flows for t= -12…+12 and the cyclical component of industrial production at t=0 for all countries in our sample. Contemporaneous fund flows are counter-cyclical both for equity flows and bond flows as the correlation coefficients of the cyclical part of fund flows and output (both measured at t=0) are negative. Although most studies find that contemporaneous aggregate capital flows are pro-cyclical (Kaminsky et al., 2005; Broner et al., 2013; Contessi et al., 2013), our results suggest that international fund flows behave differently.

As also shown in Figure 3, the correlation is positive (above 0.2) for equity flows 8 to 12 months ahead of t=0 and negative (below -0.2) for equity flows 1 to 10 months after t=0, which indicates that equity inflows are pro-cyclical ahead of the business cycle and counter-cyclical after the business cycle. The pattern for bond flows is similar to that of equity flows. However, bonds flows tend to be more cyclical. Appendix 4 describes the same pattern in more detail for the individual countries in our sample.

< Insert Figure 3 here >

As to the difference among different income groups[7], we find that the cyclicality of international

countries (or regions) are: Kuwait, Lithuania, Morocco, Portugal, Saudi Arabia, Slovakia, Sri Lanka, and Taiwan.

[7] Countries are classified based on their 2012 GNI per capita, calculated using the World Bank Atlas method.

equity flows into high-income and upper-higher income countries is higher than that of equity flows into lower-middle and low-income countries (see panel A of Figure 4). For bond flows, contemporaneous bond flows are counter-cyclical in high-income countries, but tend to be slightly pro-cyclical in lower-middle-income countries (see panel B of Figure 4).

< Insert Figure 4 here >

4.1.2 Regression-based approach

As shown in Table 2, the coefficients of industrial production in model 1 for equity flows are all significantly negative, which confirms that equity flows are counter-cyclical contemporaneously; also the coefficients of the 3 and 6 months lag of the business cycle proxy are significantly negative. The coefficient of 9 month-lagged industrial production is not significant. The results for bond flows are very similar to those for equity flows. However, the coefficient of industrial production is much larger than in the model for equity flows.

< Insert Table 2 here >

Next, we estimate three versions of model 2: the first version only includes push factors, the second only takes up pull factors and the third includes all control variables. On the basis of the regression results shown in Table 3, we draw the following conclusions. First, the coefficient of industrial production is also significantly negative when control variables are added to the model. Both equity flows and bond flows are counter-cyclical contemporaneously, and bond flows are more counter-cyclical than equity flows.

Second, all push factors included are significant. Equity flows are negatively related to the TED-spread and positively related to world stock market returns. The coefficient of VIX is significantly positive, which means that fund flows will increase when global risk increases. This may be due to the fact that investors tend to invest more in international funds to diversify risk during periods with adverse shocks or crises.

Third, as to pull factors, domestic stock market returns are positively related with equity flows, which is consistent with the findings of previous studies (Warther, 1995; Bohn and Tesar, 1996; Choe et al., 1999; Froot et al., 2001). Trade openness has a significantly negative effect on equity flows. The coefficients of the nominal interest rate and inflation are significantly positive and negative, respectively. The outcomes for bond and equity flows are very similar. We also find that bond flows are more sensitive to country-specific factors than equity flows, which is consistent with the findings of Chuhan et al. (1998).

Details are available on request.

<Insert Table 3 here >

4.2 OECD versus non-OECD countries

We run the regressions separately for OECD countries and non-OECD countries to examine whether the cyclical behavior of fund flows differs across these subsamples.[8] Table 4 presents the results for model 2. We perform a two-sample t-test to test for the significance of any differences.[9] Appendix 5 shows the outcomes of these t-tests. The following conclusions can be drawn: First, the coefficient of industrial production is higher and more significant for OECD countries than for non-OECD countries, which indicates that contemporaneous equity flows in OECD countries tend to be more counter-cyclical. Similar results are found for bond flows. Second, fund flows into non-OECD countries are more influenced by global factors (push factors), whereas fund flows into OECD countries are more influenced by country-specific factors (pull factors). As shown in Table 4, the coefficients of push factors are higher and more significant for non-OECD countries. Fund flows in emerging countries are primarily determined by global factors; these results are in line with the findings of Puy (2016).

< Insert Table 4 here >

4.3 Before and after the global financial crisis

Fratzscher (2012) concludes that capital flows followed different patterns before and during the global financial crisis. In his model, the signs of the parameters change during the crisis episode. For instance, while an increase in risk before the crisis was associated with capital flowing out of advanced economies and into emerging market economies, this effect reversed during the crisis. In this section we therefore examine whether the cyclical behavior of fund flows is different before and after the crisis. Following Fratzscher (2012), we consider the start of the liquidity crunch on 7 August 2007, when markets first experienced serious liquidity problems, as the start of the financial crisis. We estimate model 2 separately for the samples before and after the global financial crisis. Table 5 shows the results. We also perform a two-sample t-test for the significance of differences (see Appendix 5 for

[8] We have also performed an analysis of correlations. The results (available on request) are similar to those of the regression approach.

[9] To be precise:

$$t = \frac{\delta_1 - \delta_2}{S_{\delta_1 - \delta_2}} \quad \text{where } S_{\delta_1 - \delta_2} = \sqrt{(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2})} \quad ,$$

∂ is the regression coefficient. s_1^2 and s_2^2 are the coefficients' variance. n_1 and n_2 are the number of observations for two samples. The degrees of freedom (v) is determined by:

$v = (s_1^2/n_1 + s_2^2/n_2)^2 / \{(s_1^2/n_1)^2/(n_1-1) + (s_2^2/n_2)^2/(n_2-1)\}$

the results). These estimations suggest that the coefficients of industrial production and lagged industrial production are larger and more significant for the sample after the crisis, which indicates that the counter-cyclical behavior of equity flows becomes even more significant after the global financial crisis, both for equity and bond flows. In addition, we find that more push and pull variables become significant after the crisis.

< Insert Table 5 here >

4.4 Robustness check with the level of international fund flows

To check the robustness of our results, we also employ the level of international fund flows (scaled by asset under management) instead of its cyclical component to detect their cyclicality. We calculate the averages of fund flows when industrial production is above its trend and when industrial production is below its trend separately. The results shown in Table 6 suggest that the volume of net fund flows is much higher (lower) when industrial production is below (above) trend. This result is consistent with our previous results confirming that fund flows behave counter-cyclical contemporaneously.

< Insert Table 6 here >

Several factors may explain why fund flows tend to be pro-cyclical ahead of the business cycle. Firstly, if funds have a positive-feedback trading strategy (Bohn and Tesar, 1996; Froot et al., 2001), equity investments tend to flow into the country with higher equity returns. If equity returns are related to domestic output growth, such an investment strategy may cause fund flows to be pro-cyclical. However, our results do not support this explanation as fund flows are positively related with domestic stock returns.[10] Secondly, fund flows tend to be positively related with the performance of domestic financial markets. As financial market factors are leading indicators of the real economy (Stock and Watson, 2003), fund flows should be counter-cyclical contemporenously and pro-cyclical ahead of the business cycle. Our evidence is consistent with this explanation.

5. Conclusions

We investigate the cyclicality of international equity and bond fund flows and examine whether investor behavior changed during the global financial crisis. Cyclical components of international fund flows and industrial production are employed to test cyclicality. Our analysis leads to the following conclusions. The correlation-based approach and the regression-based approach suggest that contemporaneously fund flows are counter-cyclical. Fund flows tend to be pro-cyclical ahead of the

[10] This finding is in line with results reported by Warther, 1995; Bohn and Tesar, 1996; Choe et al., 1999; Froot et al., 2001; Lizardo and Mollick, 2009; and Tsai, 2009.

business cycle and counter-cyclical after the business cycle. The cyclical behavior of equity flows and bond flows are highly similar although bond flows appear to behave in a somewhat more cyclical manner. In addition, the counter-cyclical behavior of fund flows becomes even more significant after the global financial crisis. As to the driving factors, we find that global factors dominate the behavior of international fund flows, especially for equity flows, while bond flows are also influenced by pull factors. Funds flowing into non-OECD countries are more pro-cyclical before the business cycle, while funds flowing into OECD countries are more counter-cyclical after the business cycle. Fund flows in non-OECD countries are more affected by global factors and fund flows in OECD countries are more influenced by country-specific factors. One possible explanation for the counter-cyclicality of international find flows is that financial factors are leading indicators of the real economy (Stock and Watson, 2003). As fund flows tend to be positively related with the performance of domestic financial markets, this implies that fund flows should be pro-cyclical ahead of business cycle for which we find strong evidence.

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Warther, V.A., 1995. Aggregate mutual fund flows and security returns. Journal of Financial Economics, 39(2), 209-235.

Figure 1. Total net assets of funds (US $ million)

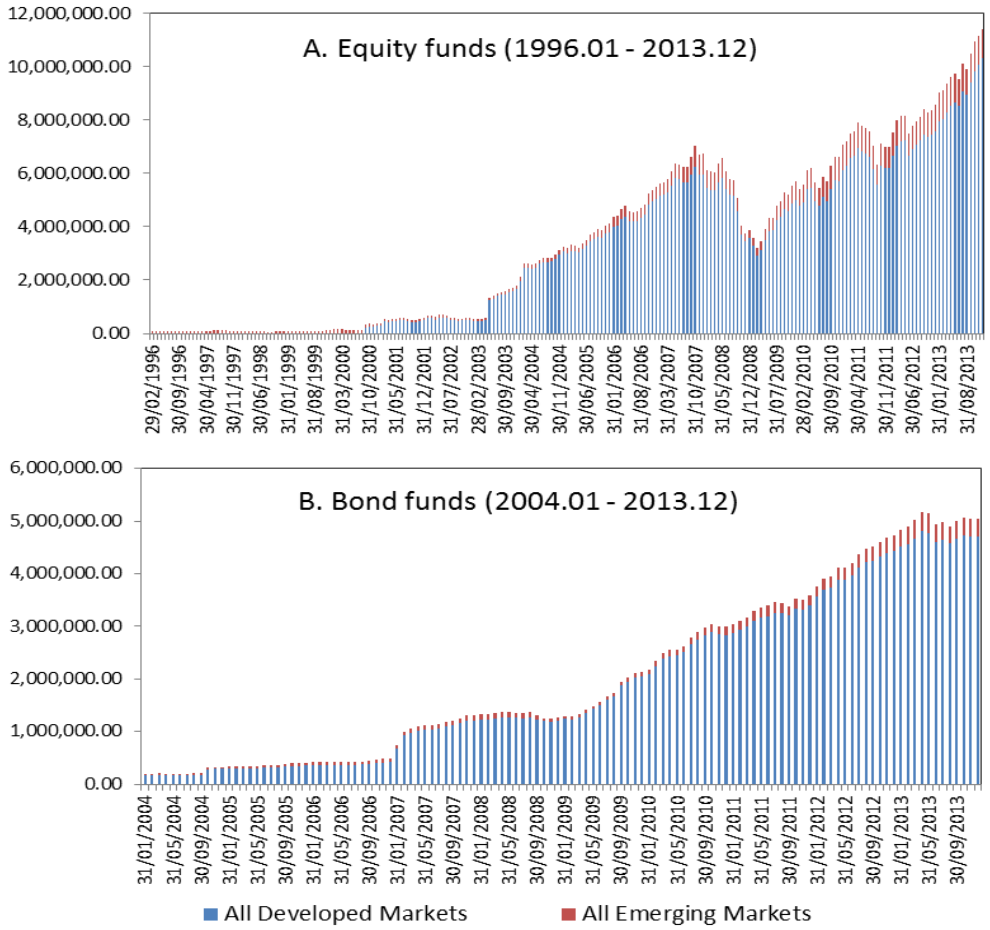


Figure 2. The counter-cyclicality of fund flows: Austria

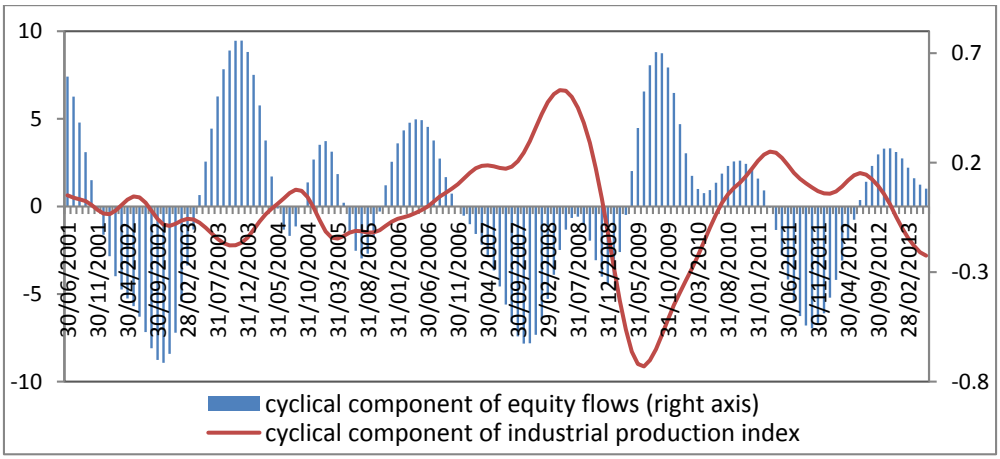


Figure 3. Average correlation of cyclical fund flows (for t= -12, 12) and cyclical industrial production (at t=0)

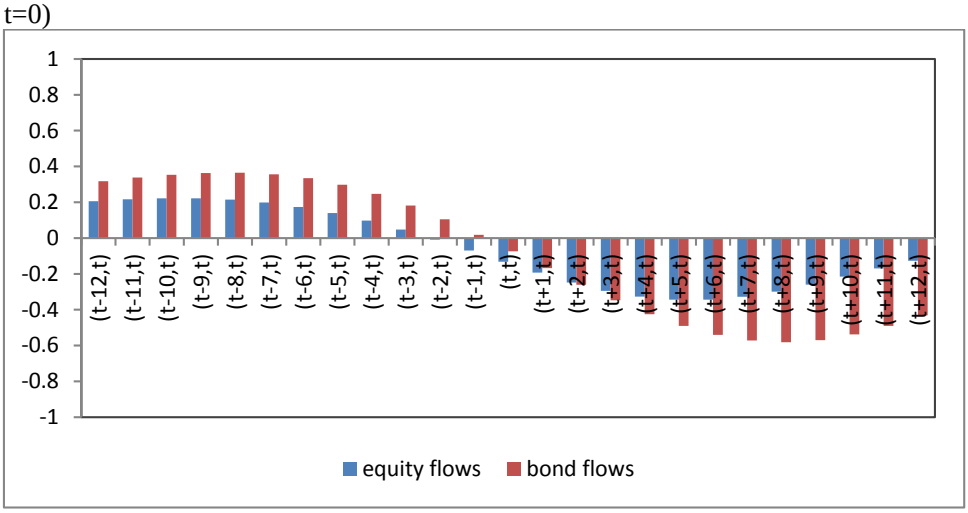
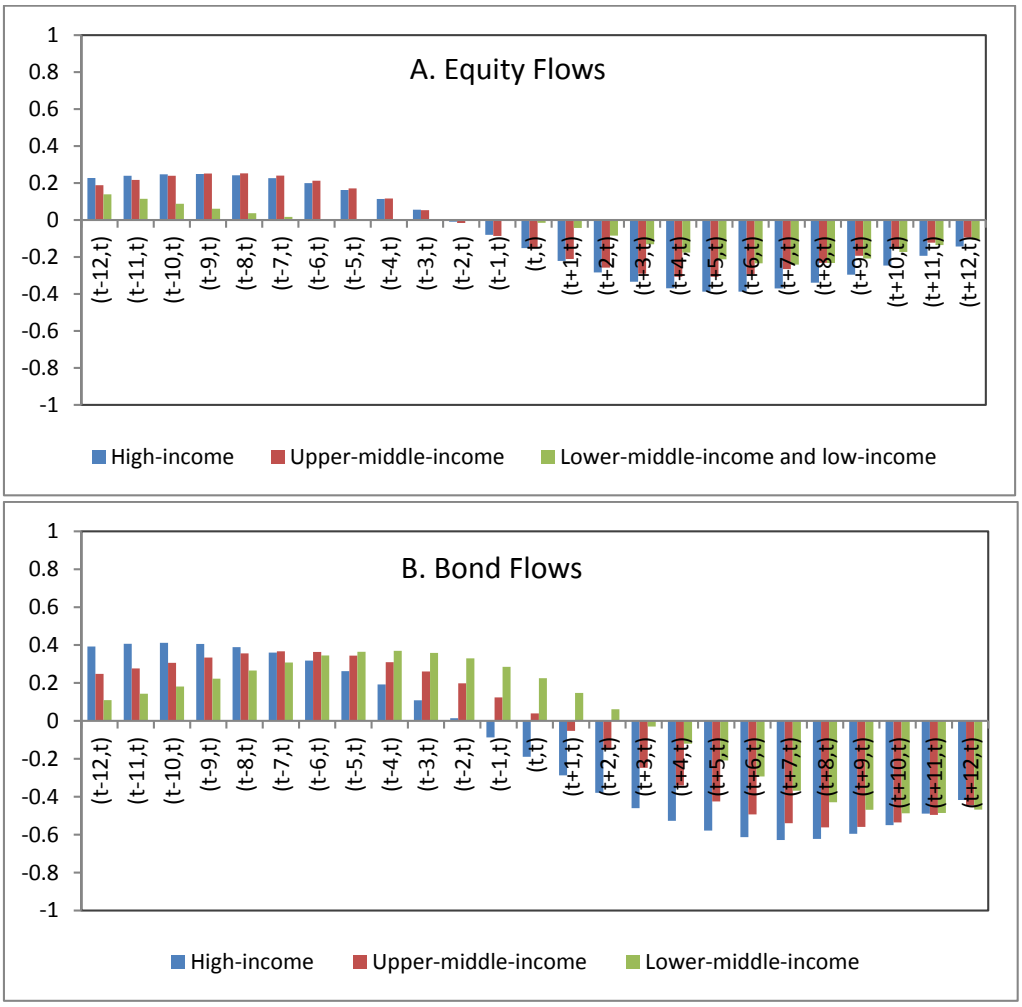
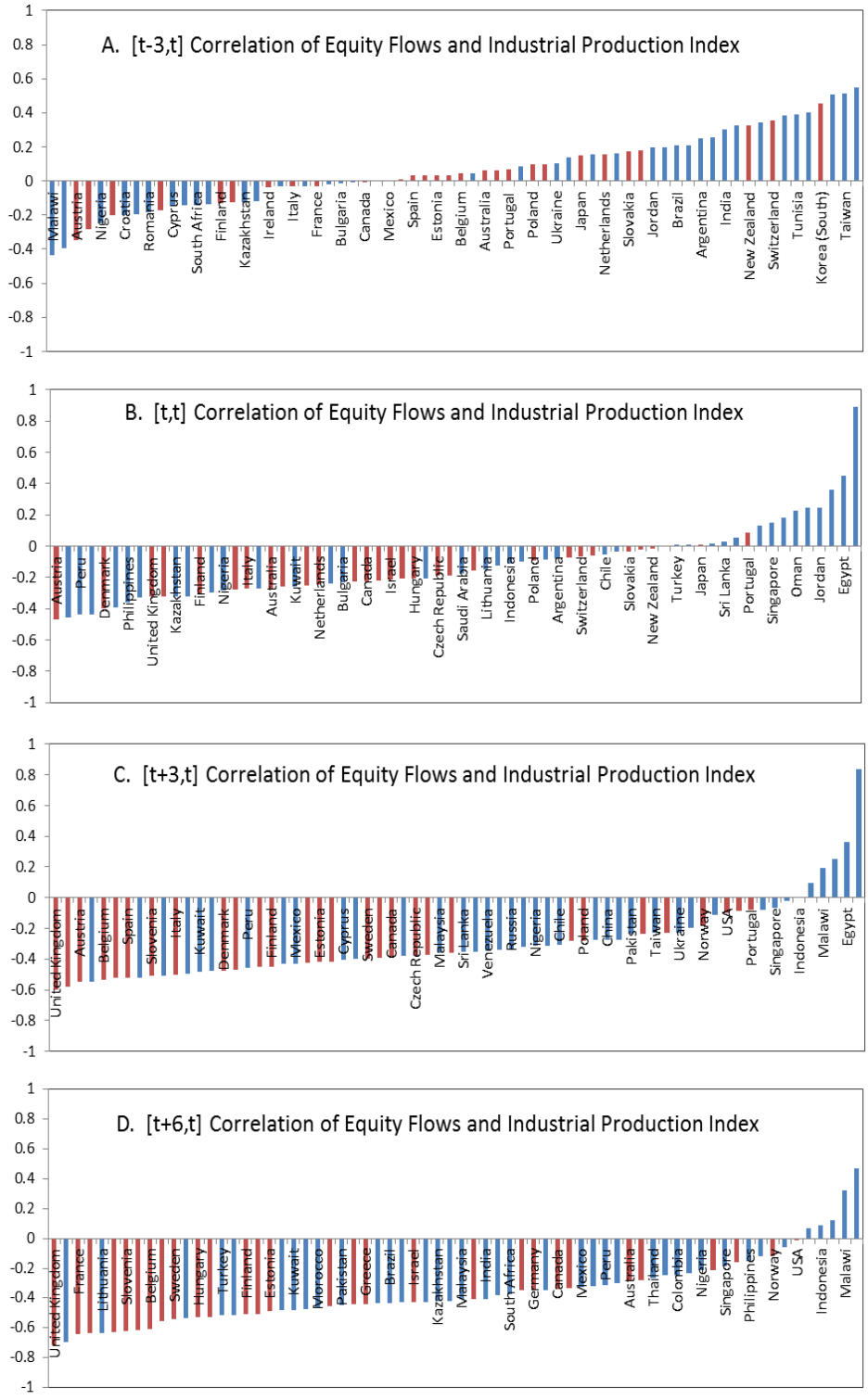


Figure 4. Average correlation of fund flows and industrial production per income group

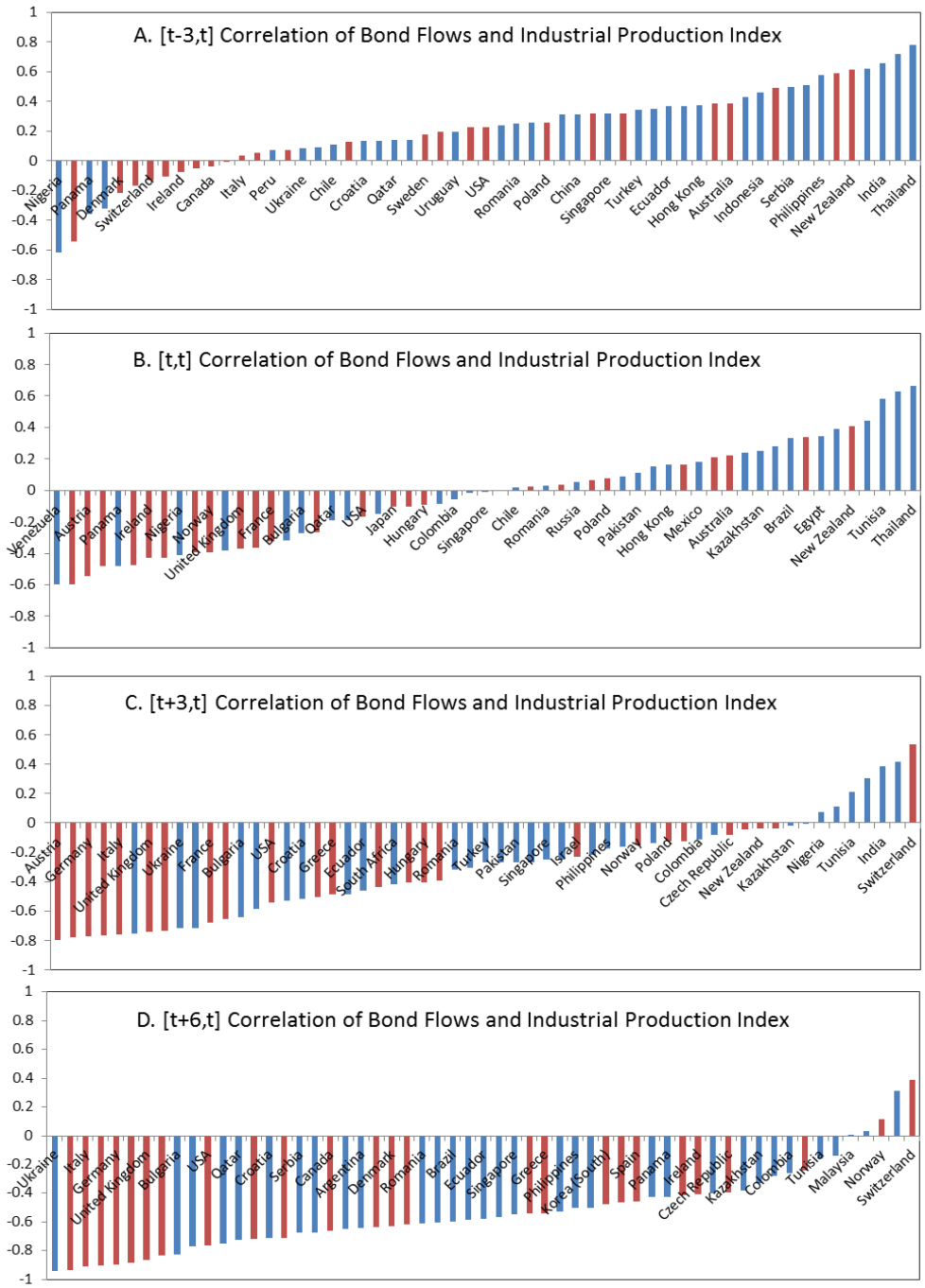


Note: Countries are classified based on their 2012 GNI per capita, calculated using the World Bank Atlas method.

Appendix 4A. Correlation of equity flows and industrial production



Appendix 4B. Correlation of bond flows and industrial production



Notes: OECD countries in red and non-OECD countries in blue.

Table 1. Descriptive statistics

Variable	n	Mean	S.D.	Quantiles				
				Min	0.25	Median	0.75	Max
Panel A: Equity flows								
Equity flows	11896	0	1.27	-17.63	-0.37	-0.01	0.37	29.38
Industrial production	13056	0.01	3.36	-25.66	-1.35	0.01	1.54	30.05
TED spread	14280	1.59	1.15	-0.04	0.63	1.2	2.5	4.65
VIX	14280	21.78	7.53	11.1	16.3	21.09	25.25	46.35
World stock market returns	14212	0	4.09	-12.34	-1.84	0.64	3.36	7.59
Domestic stock market returns	12200	31.95	7.54	-100	-2.81	0.99	4.71	54.15
Nominal interest rate	11141	6.01	8	-0.19	2.15	4.24	7.03	146.07
CPI inflation	11256	4.5	6.65	-5.99	1.6	2.9	5.3	120.68
Trade openness	11980	0.72	0.54	0.09	0.41	0.58	0.86	3.99
Undervaluation of REER	12985	0	4.75	-40.84	-1.71	-0.08	1.58	43.67
Panel B: Bond flows								
Bond flows	6468	0.03	1.29	-4.49	-0.68	0.08	0.87	3.86
Industrial production	7261	0.09	3.72	-25.66	-1.47	0.17	0.97	16.14
TED spread	7410	1.48	1.31	-0.04	0.54	0.89	2.44	4.65
VIX	7410	20.3	8.58	11.1	14.28	17.53	23.95	46.35
World stock market returns	7410	0.43	4.17	-12.34	-1.69	0.71	3.21	7.59
Domestic stock market returns	7079	0.89	7.13	-100	-2.55	1.12	4.45	47.26
Nominal interest rate	7050	4.78	4.11	-0.19	1.83	3.85	6.78	43.19
CPI inflation	6667	4.19	4.07	-5.99	1.81	3.13	5.41	39.62
Trade openness	7125	0.73	0.57	0.09	0.42	0.58	0.8	3.99
Undervaluation of REER	7012	-0.04	4.03	-35.65	-1.62	-0.08	1.51	43.67

Table 2. Cyclicality of equity flows and bond flows: Model 1:

	(1) Equity flows	(2) Bond flows	(3) Equity flows	(4) Bond flows	(5) Equity flows	(6) Bond flows	(7) Equity flows	(8) Bond flows
Flows (-1)	0.963***	0.963***	0.961***	0.942***	0.961***	0.926***	0.964***	0.953***
	(185.41)	(282.08)	(138.90)	(202.90)	(173.35)	(193.60)	(284.00)	(146.41)
Industrial production (IP)	-0.011***	-0.026***						
	(-3.74)	(-9.21)						
IP (-3)			-0.012***	-0.033***				
			(-5.18)	(-11.79)				
IP (-6)					-0.006**	-0.028***		
					(-2.28)	(-10.42)		
IP (-9)							0.001	-0.007*
							(0.40)	(-1.74)
Constant	-0.002***	0.005***	-0.002***	0.004***	-0.002***	0.006***	-0.002***	-0.002**
	(-43.32)	(12.70)	(-213.38)	(8.74)	(-32.16)	(10.02)	(-13.06)	(-2.47)
N	11127	6316	11120	6336	11012	6247	10901	6136

Notes: Table 2 examines the cyclicality of equity flows and bond flows. Models are estimated with country fixed effects and without time fixed effects. Standard errors are clustered by country. T-statistics in parentheses, *, ** and *** indicate significant at respectively 10%, 5% and 1% level.

Table 3. Cyclicality of equity flows and bond flows: Model 2

	(1) Equity flows	(2) Bond flows	(3) Equity flows	(4) Bond flows	(5) Equity flows	(6) Bond flows
Flows (-1)	0.962***	0.944***	0.944***	0.946***	0.946***	0.940***
	(160.70)	(319.26)	(148.99)	(198.45)	(155.62)	(236.63)
Industrial production	-0.008***	-0.020***	-0.009***	-0.020***	-0.006	-0.016***
	(-2.68)	(-6.61)	(-2.69)	(-5.70)	(-1.59)	(-4.72)
VIX	0.003**	0.002***			0.004***	0.002**
	(2.47)	(3.02)			(4.87)	(2.44)
TED spread	-0.08	-0.027***			-0.011*	-0.024***
	(-1.35)	(-4.44)			(-1.95)	(-3.53)
World stock market returns	0.012***	0.017***			0.008***	0.009***
	(9.26)	(16.90)			(3.99)	(3.78)
Domestic stock market returns			0.006***	0.009***	0.007***	0.009***
			(7.64)	(4.50)	(8.18)	(5.33)
Nominal interest rate			0.004*	0.006**	0.005**	0.010***
			(1.96)	(2.02)	(2.22)	(2.71)
CPI inflation			-0.002	-0.020***	-0.002	-0.015**
			(-0.87)	(-3.32)	(-0.60)	(-2.61)
Trade openness			-0.132**	-0.256***	-0.110*	-0.237***
			(-2.13)	(-4.64)	(-1.82)	(-4.63)
Undervaluation of REER			-0.002	-0.003	-0.002	-0.003
			(-0.93)	(-0.75)	(-0.99)	(-0.79)
Constant	-0.050***	-0.009	0.106**	0.277***	0.020	0.233***
	(-3.23)	(-0.83)	(2.02)	(5.92)	(0.43)	(5.54)
N	11127	6316	7372	5107	7372	5107

Notes: Table 3 examines the cyclicality of equity flows and bond flows including control variables. Models estimated with country fixed effects and without time fixed effects. Standard errors are clustered by country. T-statistics in parentheses, *, ** and ***indicate significance at respectively 10%, 5% and 1% level.

Table 4. OECD versus non-OECD countries: Model 2

Panel A: Equity flows						
	(1) OECD	(2) Non OECD	(3) OECD	(4) Non OECD	(5) OECD	(6) Non OECD
Equity flows (-1)	0.940***	0.964***	0.930***	0.947***	0.931***	0.949***
	(257.50)	(178.16)	(222.06)	(136.10)	(191.15)	(137.59)
Industrial production	-0.011***	-0.006	-0.009***	-0.008	-0.009***	-0.004
	(-9.30)	(-1.49)	(-7.16)	(-1.48)	(-8.17)	(-0.67)
VIX	0.001**	0.004*			0.001*	0.007***
	(2.32)	(1.93)			(1.79)	(5.21)
TED spread	0.001	-0.014			0.006	-0.024**
	(0.22)	(-1.49)			(1.70)	(-2.53)
World stock market returns	0.009***	0.015***			0.007***	0.011***
	(8.68)	(7.35)			(5.80)	(3.21)
Domestic stock market returns			0.005***	0.007***	0.005***	0.007***
			(7.32)	(5.52)	(7.05)	(6.28)
Nominal interest rate			-0.005**	0.006**	-0.005**	0.006**
			(-2.71)	(2.32)	(-2.21)	(2.34)
CPI inflation			-0.005*	-0.002	-0.005*	-0.001
			(-1.98)	(-0.60)	(-2.03)	(-0.27)
Trade openness			-0.083***	-0.175*	-0.068***	-0.106
			(-3.39)	(-1.87)	(-3.19)	(-1.28)
Undervaluation of REER			-0.004**	-0.001	-0.004**	-0.002
			(-2.11)	(-0.39)	(-2.33)	(-0.69)
Constant	-0.017**	-0.066**	0.066***	0.149*	0.030	-0.024
	(-2.48)	(-2.24)	(3.40)	(1.77)	(1.41)	(-0.35)
N	4629	6498	3834	3538	3834	3538
Panel B: Bond flows						
	(1) OECD	(2) Non OECD	(3) OECD	(4) Non OECD	(5) OECD	(6) Non OECD
Bond flows (-1)	0.942***	0.940***	0.934***	0.952***	0.938***	0.939***
	(169.64)	(281.02)	(103.97)	(175.46)	(99.46)	(213.39)
Industrial production	-0.025***	-0.017***	-0.023***	-0.017***	-0.021***	-0.014***
	(-7.33)	(-4.77)	(-5.02)	(-3.79)	(-4.70)	(-3.37)
VIX	0.003***	0.001			0.003***	-0.000
	(3.11)	(0.92)			(3.10)	(-0.32)
TED spread	-0.019**	-0.032***			-0.015*	-0.030***
	(-2.32)	(-4.25)			(-1.76)	(-3.06)
World stock market returns	0.013***	0.019***			0.002	0.012***
	(10.24)	(14.69)			(1.50)	(4.24)
Domestic stock market returns			0.010***	0.009***	0.011***	0.008***
			(8.10)	(3.01)	(7.98)	(3.90)
Nominal interest rate			-0.006	0.011***	0.001	0.014***
			(-1.28)	(2.89)	(0.14)	(2.98)
CPI inflation			-0.017	-0.021***	-0.011	-0.015**
			(-1.13)	(-2.91)	(-0.74)	(-2.06)
Trade openness			-0.246***	-0.278***	-0.240**	-0.259***
			(-2.84)	(-4.20)	(-2.68)	(-4.23)
Undervaluation of REER			-0.009***	-0.000	-0.009***	0.000
			(-3.00)	(-0.01)	(-3.18)	(0.00)
Constant	-0.042***	0.029***	0.207**	0.353***	0.148*	0.348***
	(-2.82)	(2.84)	(2.55)	(5.50)	(1.74)	(5.81)
N	2534	3782	2471	2636	2471	2636

Notes: Table 4 examines differences in fund flows between OECD countries and non-OECD countries including control variables. Models estimated with country fixed effects and without time fixed effects. Standard errors are clustered by country. T-statistics in parentheses, *, ** and *** indicate significance at respectively 10%, 5% and 1% level.

Table 5. Before versus after the global financial crisis: Model 2

Panel A: Equity flows	(1) before crisis	(2) after crisis	(3) before crisis	(4) after crisis	(5) before crisis	(6) after crisis
Equity flows (-1)	0.946***	0.955***	0.950***	0.940***	0.948***	0.945***
	(176.37)	(485.89)	(113.48)	(145.68)	(109.1)	(160.6)
Industrial production	-0.008**	-0.003	-0.003	-0.008	-0.001	-0.002
	(-3.40)	(-0.77)	(-0.47)	(-1.93)	(-0.21)	(-0.33)
VIX	-0.001	0.006			-0.001	0.007***
	(-1.59)	(1.67)			(-0.82)	(4.5)
TED spread	0.009	-0.037*			0.020*	-0.056***
	(1.87)	(-2.30)			(2.35)	(-4.51)
World stock market returns	0.011***	0.012***			0.010***	0.007**
	(10.19)	(5.98)			(4.18)	(2.85)
Domestic stock market returns			0.007***	0.006***	0.006***	0.007***
			(6.23)	(6.81)	(5.58)	(8.09)
Nominal interest rate			0.000	0.011	0.001	0.021**
			(0.11)	(1.93)	(0.42)	(3.05)
CPI inflation			-0.001	-0.004	-0.000	0.007
			(-0.33)	(-0.87)	(-0.02)	(1.37)
Trade openness			-0.033	-0.328*	0.001	-0.203
			(-0.56)	(-2.26)	(0.02)	(-1.86)
Undervaluation of REER			-0.003	-0.002	-0.003	-0.001
			(-1.45)	(-0.55)	(-1.42)	(-0.48)
Constant	-0.006	-0.111	0.021	0.263*	-0.029	0.027
	(-0.63)	(-1.52)	(0.52)	(2.24)	(-0.68)	(0.34)
N	6474	4588	3308	4014	3308	4014
Panel B: Bond flows	(1) before crisis	(2) after crisis	(3) before crisis	(4) after crisis	(5) before crisis	(6) after crisis
Bond flows (-1)	0.906***	0.952***	0.910***	0.951***	0.913***	0.945***
	(107.8)	(311.17)	(68.82)	(170.6)	(82.05)	(240.87)
Industrial production	-0.000	-0.015***	-0.002	-0.020***	0.003	-0.014***
	(-0.01)	(-4.95)	(-0.25)	(-5.37)	(0.49)	(-3.89)
VIX	-0.012***	0.008***			-0.012***	0.005***
	(-5.60)	(9.25)			(-4.12)	(5.04)
TED spread	0.065***	-0.063***			0.073***	-0.051***
	(6.04)	(-11.03)			(5.62)	(-6.83)
World stock market returns	0.023***	0.016***			0.019***	0.008**
	(6.49)	(18.8)			(3.83)	(3.23)
Domestic stock market returns			0.006	0.009***	0.005*	0.009***
			(1.91)	(5.16)	(2.37)	(6.51)
Nominal interest rate			0.011	0.004	0.008	0.012*
			(1.9)	(0.71)	(1.27)	(2.12)
CPI inflation			0.005	-0.022**	0.000	-0.014*
			(0.29)	(-3.28)	(0.02)	(-2.12)
Trade openness			-0.342	-0.352***	-0.173	-0.255***
			(-1.80)	(-4.05)	(-0.91)	(-3.55)
Undervaluation of REER			-0.005	-0.002	-0.001	-0.002
			(-0.75)	(-0.53)	(-0.23)	(-0.50)
Constant	0.116**	-0.113***	0.297	0.347***	0.260	0.190**
	(2.94)	(-6.55)	(1.92)	(4.9)	(1.47)	(3.13)
N	1938	4320	1312	3750	1312	3750

Notes: Table 5 explains differences in cyclicality of fund flows before and after the global financial crisis, including all the push and pull variables. Models are estimated with country fixed effects and without time fixed effects. Standard errors are clustered by country. T-statistics in parentheses, *, ** and *** indicate significance at respectively 10%, 5% and 1% level.

Table 6. Average of fund flows when industrial production is above or below trend

	Equity flows	Cyclical Equity Flows	Bond flows	Cyclical Bond Flows
Above trend	0.138	0.049	0.808	-0.068
Below trend	0.324	-0.061	1.198	0.184

Appendix 1. Variables: description and source

Variable	Definition	Source of data
Equity flows	Cyclical component of equity flows scaled by asset under management determined by HP filter (lambda=14,400)	EPFR Global
Bond flows	Cyclical component of bond flows scaled by asset under management determined by HP filter (lambda=14,400)	EPFR Global
Industrial production index	Cyclical component of IP determined by HP filter (lambda=14,400)	CEIC; Datastream
TED spread	Difference between the three-month LIBOR and the three-month T-bill interest rate	CEIC database
VIX: CBOE Volatility Index	Implied volatility of S&P 500 index options over the next 30 day period	Thomson Reuters
World stock market returns	Non-weighted average of equity returns in US, UK, and Japan, monthly % returns	CEIC database
Domestic stock market returns	Monthly % returns	CEIC database
Undervaluation of REER	Undervaluation: difference between real exchange rate series from corresponding HP trend	CEIC database
Trade openness	Sum of imports and exports over GDP	CEIC database
Nominal interest rate	Long-term interest rate	CEIC database
CPI inflation	Inflation based on consumer price index	CEIC database

Appendix 2. Correlation matrix

Correlation (after orthogonalization)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TED spread (1)	1							
VIX (2)	0.258	1						
World stock market returns (3)	-0.210	-0.380	1					
Domestic stock market returns (4)	-0.177	-0.278	0.177	1				
Nominal interest rate (5)	0.094	0.070	-0.028	0.017	1			
CPI inflation (6)	0.102	0.067	-0.056	0.005	-0.054	1		
Trade openness (7)	0.009	-0.034	-0.015	-0.026	-0.014	-0.159	1	
Undervaluation of REER (8)	0.047	0.023	0.008	-0.027	0.035	0.044	-0.012	1

Appendix 3. List of countries in our sample

Panel A: equity flows			*Panel B: bond flows*		
68 Countries, 1996.01 -- 2013.06			65 Countries, 2004.01-2013.06		
Argentina	Israel	Romania	Argentina	Israel	Saudi Arabia
Australia	Italy	Russia	Australia	Italy	Singapore
Austria	Japan	Saudi Arabia	Austria	Japan	Slovakia
Belgium	Jordan	Singapore	Belgium	Kazakhstan	South Africa
Brazil	Kazakhstan	Slovakia	Brazil	Korea (South)	Spain
Bulgaria	Korea	Slovenia	Bulgaria	Kuwait	Sri Lanka
Canada	Kuwait	South Africa	Canada	Lithuania	Sweden
Chile	Lithuania	Spain	Chile	Malaysia	Switzerland
China	Malaysia	Sri Lanka	China	Mexico	Taiwan
Colombia	Mexico	Sweden	Colombia	Morocco	Thailand
Croatia	Morocco	Switzerland	Croatia	Netherlands	Tunisia
Czech Republic	Netherlands	Taiwan	Czech Republic	New Zealand	Turkey
Denmark	New Zealand	Thailand	Denmark	Nigeria	Ukraine
Egypt	Nigeria	Tunisia	Egypt	Norway	United Kingdom
Finland	Norway	Turkey	Finland	Pakistan	USA
France	Oman	Ukraine	France	Panama	Venezuela
Germany	Pakistan	United Kingdom	Germany	Peru	Ecuador
Greece	Panama	United States	Greece	Philippines	Serbia
Hong Kong	Peru	Venezuela	Hong Kong	Poland	Uruguay
Hungary	Philippines	Cyprus	Hungary	Portugal	
India	Poland	Estonia	India	Qatar	
Indonesia	Portugal	Malawi	Indonesia	Romania	
Ireland	Qatar		Ireland	Russia	

Appendix 5. Outcomes of two-samples t-test

Hypotheses:	**T-statistic**
Panel A: OECD versus non-OECD countries: model 2	
1) Coefficient of IP for equity flows is the same in OECD and non-OECD countries, model 2 with only push factors	-98.44
2) Coefficient of IP for equity flows is the same in OECD and non-OECD countries, model 2 with only pull factors	-19.18
3) Coefficient of IP for equity flows is the same in OECD and non-OECD countries, model 2 with push and pull factors	-59.91
4) Coefficient of IP for bond flows is the same in OECD and non-OECD countries, model 2 with only push factors	-94.12
5) Coefficient of IP for bond flows is the same in OECD and non-OECD countries, model 2 with only pull factors	-52.54
6) Coefficient of IP for bond flows is the same in OECD and non-OECD countries, model 2 with push and pull factors	-50.81
Panel B: before crisis versus after crisis: model 1	
1) Coefficient of IP for equity flows is the same before financial crisis and after financial crisis, model 1	40.83
2) Coefficient of IP (-3) for equity flows is the same before financial crisis and after financial crisis, model 1	83.57
3) Coefficient of IP (-6) for equity flows is the same before financial crisis and after financial crisis, model 1	108.50
4) Coefficient of IP for bond flows is the same before financial crisis and after financial crisis, model 1	221.73
5) Coefficient of IP (-3) for bond flows is the same before financial crisis and after financial crisis, model 1	304.39
6) Coefficient of IP (-6) for bond flows is the same before financial crisis and after financial crisis, model 1	304.38
Panel C: before crisis versus after crisis: model 2	
1) Coefficient of IP for equity flows is the same before financial crisis and after financial crisis, model 2 with only push factors	-67.49
2) Coefficient of IP for equity flows is the same before financial crisis and after financial crisis, model 2 with only pull factors	47.24
3) Coefficient of IP for equity flows is the same before financial crisis and after financial crisis, model 2 with push and pull factors	2.50
4) Coefficient of IP for bond flows is the same before financial crisis and after financial crisis, model 2 with only push factors	130.15
5) Coefficient of IP for bond flows is the same before financial crisis and after financial crisis, model 2 with only pull factors	102.16
6) Coefficient of IP for bond flows is the same before financial crisis and after financial crisis, model 2 with push and pull factors	90.85

Notes: $t_{0.05/2}(\infty) = 1.96,\ t_{0.01/2}(\infty) = 2.58,\ t_{0.001/2}(\infty) = 3.29$