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Portfolio Inflows and Real Effective Exchange Rates: Does the Sectorization Matter?

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Portfolio Inflows and Real Effective Exchange Rates: Does the Sectorization Matter?

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Abstract

It has been well-established in the literature that portfolio inflows appreciate the real effective exchange rate. However, the literature lacks a systematic empirical analysis of the impact of portfolio inflows by institutional sector or borrower type. This paper fills this gap by exploring the impact of the inflows of portfolio capital into three institutional sectors (government, banks and corporates) on the real effective exchange rate. Using a large sample of 73 countries, it shows that the effect of portfolio inflows on the real effective exchange rate depends on the sector the investment flows in. The findings are robust to different econometric methods, additional variables in the model, and various indicators of real effective exchange rates.

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Contents

I. INTRODUCTION

International capital inflows have been both beneficial and problematic posing serious concerns among policymakers because of their potential effects on macroeconomic stability, the competitiveness of the export sector, and the external viability of the recipient countries (Lartey 2008). Some economists praised the effectiveness of foreign direct investment and more generally long-term flows more than short-term capital such as portfolio inflows (Edwards, 1998; Agenor, 1998; Lartey, 2008; Bakardzhieva, Naceur and Kamar, 2010; Combes, Kinda and Plane, 2012; Combes and others, 2016). Generally, portfolio inflows have bad effects on the economies in one hand but on the other hand the inflows of portfolio capital are an imperative source of financing for companies and governments. Indeed, portfolio flows, as a key element of the globalization and of the world economy, plays the critical roles of filling the development of foreign exchange markets, investment and employment. However, hot money flows can be destabilizing as they could appreciate the real exchange rate. A rapid rise in the currency can harm a country exports and thereby reducing its competitiveness. The real exchange rate, defined as the price level of the home country relative to the foreign country and adjusted by the nominal exchange rate, is a key variable in international macroeconomics.

There is a very extensive strand of literature that shows that portfolio inflows lead to an appreciation of the real exchange rate. Portfolio inflows sharply increased these recent years. Between 2000 and 2015, total portfolio inflows to the sample of countries of this study increased almost fourteen-fold (Figure 1), with much of the increase taking place in the period 2000. In the previous literature, there has been considerable effort made to more fully understand the contribution of the inflows of portfolio capital to the fluctuations of the exchange rates. Quite a large number of studies find that portfolio inflows appreciate the real exchange rate (Athukorala and Rajapatirana, 2003; Bakardzhieva, Naceur and Kamar, 2010; Saborowski, 2010; Combes, Kinda and Plane, 2012; Jongwanich and Kohpaiboon, 2013). Traditionally, the literature has compared the effect of portfolio inflows with those of foreign direct investment, foreign aid, and remittances. The general picture that emerges from these works is that portfolio inflows lead to greater appreciation of the real exchange rate than the other capital inflows (Syden, 2007; Ibarra, 2011; Combes, Kinda and Plane, 2012; Jongwanich and Kohpaiboon, 2013).

This paper aims to contribute to the literature by exploring the empirical impact of portfolio inflows on the real exchange rate by taking into account the sector the investment flows in. The main purpose of this study is to investigate whether the sectorization of portfolio inflows matters. In this paper, we distinguish three institutional sectors or borrower types: government, banks and corporates[2]. A point justifying such an endeavor is that the capital into the three sectors is used differently depending on the role of each sector in the economy and the patterns

[2] We adopt the terminology used in Avdjiev et. (2017). Government stands for general government; Banks are deposit-taking corporations and corporates represent the remaining sectors.

and incentives of portfolio inflows into the three sectors are also different (Avdjiev et al., 2017). Pritchett (2000) argued that the separation between the sectors is warranted and deserves attention because of the difference in returns and patterns. Avdjiev et al. (2017) concluded that it is important to decompose portfolio inflows into borrower types, given the different incentives of each borrower, the particular properties of each asset class, and the different systemic risk implications that arise depending on whether the borrowing is done by banks, corporates, or sovereigns.

This paper differs from previous studies in several respects. First, we provide evidence of the effect of portfolio inflows on the real exchange rate by borrower type. Second, the relationship is investigated by using two-stage least squares framework, which helps dealing with the problem of reverse causality, measurement errors and omitted variables. We instrument portfolio inflows by the economic and equity-market uncertainties in the United States. In addition, we use panel dynamic GMM method to check the robustness of our findings. Third, we use various indicators of real effective exchange rates, including some based on different group of items.

Using a large sample of 73 advanced, emerging and developing countries over the period 1980–2015, we find clear and compelling evidence that the impact of portfolio inflows on the real exchange rate depends on the sector the investment flows in. Our findings suggest that portfolio inflows into the three sectors cause appreciation of the real exchange rate but government borrowing has the greatest impact. Moreover, we find debt securities cause appreciation of the real exchange rate regardless of the sector the investment flows in, contrary to equity and investment fund shares. We also find that the impact of portfolio inflows on the real exchange rate is higher in emerging countries than in advanced countries. Our results underscore strong implications for the future direction of monetary and macroprudential policies to combat the overheating of the national currency. The main lesson is that sector-specific policies would be a better tool to deal with exchange rate pressures.

The rest of the paper is structured as follows. The next section (Section II) presents the review of literature and motivates the sectorization of portfolio inflows. Section III discusses the methodology and presents the data and some stylized facts. Section IV analyzes the baseline results, while Section V presents a tale of robustness exercises. Finally, Section VI concludes with some policy recommendations.

II. Brief Review of Literature and the Sectorization of Portfolio Inflows

A. Brief Review of Literature

The literature on the effect of capital flows on the real exchange rate is vast and not clear cut (see for review Edwards, 1998; Agenor, 1998; Lartey, 2008). The inflows of capital tend to appreciate the recipient country's currency in real terms, eroding profitability in the tradable

sector, and thus favoring a boom in consumption rather than investment (Ibarra 2011). Several studies shown that the composition of capital flows matters (Athukorala and Rajapatirana, 2003; Bakardzhieva, Naceur and Kamar, 2010; Saborowski, 2010; Jongwanich and Kohpaiboon, 2013; Combes, Kinda, Ouedraogo and Plane, 2016). Using a sample of 57 countries over the period 1980-2007, Bakardzhieval, Naceur, and Kamar (2010) found that portfolio investments, foreign borrowing, aid, and income lead to real exchange rate appreciation, while remittances have disparate effects across regions. They employed panel system-GMM technique. Contrary to Bakardzhieval, Naceur, and Kamar (2010), Combes, Kinda, Ouedraogo and Plane (2016) found that remittances have a strong impact on the real exchange rate, while FDI and foreign aid appreciate moderately the real exchange rate. They also shown that portfolio investments appreciate the real exchange rate.

Moreover, it appears that portfolio investment brings in a faster REER appreciation than the other capital flows (Lartey, 2008; Combes, Kinda and Plane, 2012; Jongwanich and Kohpaiboon, 2013; Combes, Kinda, Ouedraogo and Plane, 2016)**.** Combes, Kinda and Plane (2012) revealed that among private inflows, portfolio investment has the biggest impact on appreciation, almost seven times that of foreign direct investment or bank loans while private inflows have the smallest effect. They worked on a sample of 42 developing countries for 1980–2006, and applied a pooled mean group estimation technique that allowed short-run heterogeneity while imposing long-run homogeneity on the real exchange rate determination across countries. Using a sample of 16 countries over the period 1980–2000, Lartey (2008) found that the appreciation of the real exchange rate due to portfolio inflows is more than appreciation due to FDI inflows. He explained this differential effect by the fact that portfolio inflows do not necessarily increase productive capacity. Likewise, Jongwanich and Kohpaiboon (2013) shown that the speed of REER appreciation associated with portfolio inflows is higher than the one of FDI. The author employed dynamic panel technique on a sample of 9 emerging Asian countries over the period 2000–2009.

In the same vein, some studies used time series data to illustrate the biggest effect of portfolio inflows on the real exchange rate. Through co-integration and vector error correction modelling techniques applied to South African data between 1990 and 2010, Syden (2007) found out that foreign portfolio investment exerts the greatest appreciation effect on the South African real exchange rate. Ibarra (2011) studied the effect of the different types of capital flows on the real exchange rate in Mexico over the period 1988Q1–2008Q2. Using ARDL models, the author showed that the main factor behind the appreciation of the real exchange rate was portfolio inflows. By splitting the sample period into two episodes (1988Q1–1993Q4 and 1995Q1–2008Q2), Ibarra (2011) found that the portfolio investment's real exchange rate effect was significantly stronger during the first episode than in the rest of the estimation period. Brooks, *et al* (2004) analyzing the relationship between exchange rates and portfolio flows suggested that, in the case of the euro area, there was a strong relationship between exchange rate movements and portfolio inflows.

However, to the best of our knowledge, the literature on the effect of portfolio inflows on the REER by institutional sector is non-existent. This paper attempts to fill this gap by exploring the effect of portfolio inflows on the REER by borrower type: government, banks and corporates. Different types of sectors/borrowers may exert different effects to the real exchange rate. Therefore, it is imperative to analyze portfolio inflows in their disaggregated sectoral form.

B. Why the Sectorization Matters?

The impact of portfolio capital inflows on the real exchange rate depends on how they are used (Combes, Kinda, and Plane, 2012). There is one channel through which the effect of portfolio inflows into the different sectors could produce the same effects. This is the case of the issuance of bonds. When a particular sector sells bonds, it obtains the price paid for the bond as a kind of loan. Foreigners who want to purchase the bonds or assets must typically pay for them with the national currency. This, in turn, could result in an increase of the demand for and the price of the national currency and thereby appreciates the real exchange rate. However, several factors could lead to the differential effects of portfolio inflows into the three sectors on the real exchange rate. Avdjiev et al. (2017) found that portfolio inflows into banks and corporates are negatively correlated with global risk appetite, contrary to borrowing by governments. They also shown that Banks' and corporates' borrowing, both in emerging markets and in advanced economies are procyclical, whereas emerging market's sovereigns exhibit counter-cyclical borrowing. Alongside the differences in patterns, the specificities of each sector could play a big role.

Government

The impact of portfolio inflows into the general government sector is unclear. A government may issue new bonds when it needs to fund its operations (expansionary fiscal policy) or to close budget deficits. The simplest *Mundell-Fleming* model predicts that expansionary fiscal policy leads to an appreciation of the exchange rate. The key insight behind this result is that increased government consumption spending raises demand for domestic output which, in turn, induces a currency appreciation. Moreover, an increase in demand could exert upward pressure on interest rates which may lead to capital inflows and a stronger currency. However, the government could also issue new bonds to pay back its old debt. Such operation may be associated with negative sentiments about the exchange rate as it implies lower national savings in the longer-run. This negative sentiment could depreciate the exchange rate (Tarditi 1996), as well as if the government is spending more on imported goods.

Banks

Portfolio inflows into the banking system may have an ambiguous effect on the real exchange rate. On the one hand, the financial sector plays as a channel between savers and consumers, as well as between residents and foreigners, on the other hand. The banking sector could also invest in the host economy or abroad, thereby rendering difficult the tracks of the operations. On the other hand, banks' complexity and size have increased considerably in recent years

(Hryckiewicz and Kozlowski, 2017). Borio and Drehmann (2009) and Song, Thakor (2010) argued that banks have become more closely connected to capital markets and the performances of the two sectors are mutually connected with one another. In some countries (e.g., Belgium, the Netherlands, and Switzerland), the size of the banks has exceeded the size of the country in terms of GDP (Hryckiewicz and Kozlowski, 2017). The main feature of the banking sector compared to the two other sectors is that it encompasses the foreign exchange market which buys and sells currencies needed by the economy.

Corporates

The effect of portfolio inflows into the corporate sector on the real exchange rate depends on several factors. Indeed, the move in the exchange rate might be dictated by the underlying factors that explain the investment of multinational firms in a given sub-sector since the corporate sector includes several sub-sectors such as the mining, the manufacture or services. Dunning (1993) describes four main types of motives for the investment from the perspective of the investing firm: (i) resource seeking to obtain raw materials, natural resources, or physical infrastructure resources; (ii) market seeking to access the host-country domestic market. This type of investment aims to serve the local and regional markets. (iii) efficiency seeking to take advantage of lower costs and (iv) strategic-asset seeking to access to research and development, innovation and advanced technology. Thus, the effect of portfolio flows into the corporate sector on the real exchange rate will depend on the dominating motive(s). The resource-seeking and market-seeking motives are more likely to cause an appreciation of the REER as they involve more investment or consumption in the host country. Indeed, in these two cases, investments by foreigners may increase the demand for and the price of nontradable goods and thereby appreciate the real exchange rate. This syndrome has come to be known as "Dutch disease". On the other hand, the effect of the strategic-asset seeking motive is unclear as it may lead to both an appreciation or a depreciation of the REER. As outlined by Edwards (1989), the impact of the technology on the real exchange rate is ambiguous as it creates two opposite effects: the income effect that appreciates the currency and the productivity effect that depreciates the exchange rate.

III. Data, Stylized Facts and Methodology

A. Data

The sample consists of a panel dataset that comprises 73 counties, 26 advanced countries and 47 emerging and developing countries, from 1980–2015. The sample includes only countries where the breakdown of portfolio inflows data by institutional sector is available. We divided the total period into five non-overlapping time periods in order to reduce the short-term shocks. The data come from several databases. We extracted portfolio inflows data from the IMF's Balance of Payments database and then reclassified them by institutional sector. We retained the three main sectors classified in the Balance of Payments manual, namely government,

banks and corporates[3]. The data on the real effective exchange rate are from IMF's International Financial Statistics and CERDI's databases. The variable is defined as the ratio of prices in the country to prices in the main trade partners adjusted for variations in nominal effective exchange rate. In this paper, we used the real effective exchange rate for all items imported and exported (from IMF's IFS), and all items excluding oil (from CERDI's databases). This decomposition is important because oil represents a great part of total trade for several countries.

Regarding the main independent variables, we included trade openness, the Balassa index and terms of trade. Trade openness is measured as the sum of imports and exports over GDP. It comes from the World Development Indicators of the World Bank. The *Balassa Index* is extracted from CERDI database and defined as the ratio between the country's real per capita GDP, and the weighted mean of the same variable for the trading partners considered for the REER. This variable captures the impact of the increasing price of non-tradable goods over the development process within a sample for which per capita GDP levels are quite heterogeneous. The terms of trade index is from the IMF's World Economic Outlook. It is defined as a ratio of weighted export prices to weighted import prices.

Finally, we extracted the economic and equity-market uncertainty indices from Baker, Bloom, and Davis (2016) databases[4] to build up the two instruments used in the two-stage least squares estimates. In addition, the data on the share of trade with the USA are from the IMF's Direction of Trade (DOT), while the data on the share of United States assets vis-à-vis of the sample of this paper are extracted from the IMF's Coordinated Portfolio Investment Survey (CPIS).

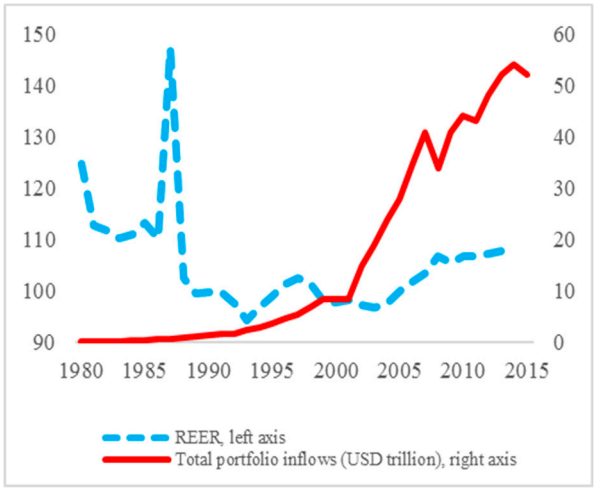
B. Stylized facts

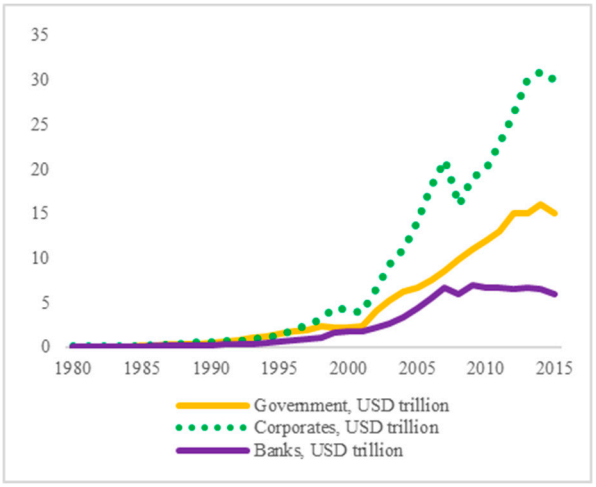
Portfolio inflows experienced an increasing trend over time. In terms of the amount in U.S. dollars, aggregate portfolio inflows to the sample of 73 countries rose steadily from 1980 to 2015. The surge started only in 2000. Portfolio inflows increased by fourteen times, from $8.5 trillion in 2000 to $52 trillion in 2015. However, it is worth noting that this explosive growth has been experiencing some slowness related to some particular events. In fact, portfolio inflows declined in 2001 due to the 09/11 attack and in 2008 because of the financial crisis. Despite all that, the recovery has always been rapid.

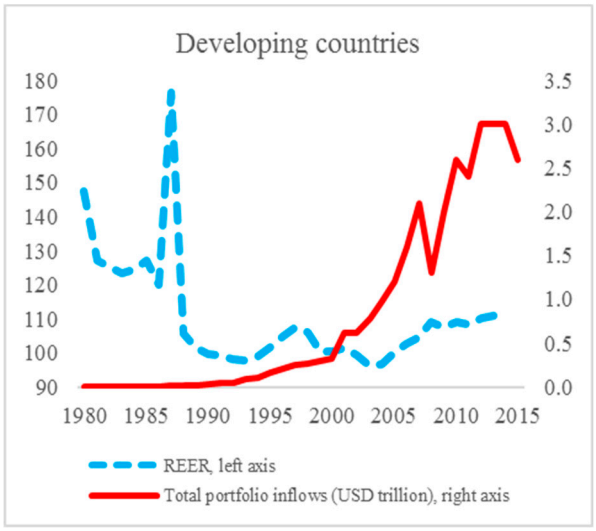
[3] We do not do a further breakdown of corporates as data are missing for several countries. This would significantly reduce the sample size.

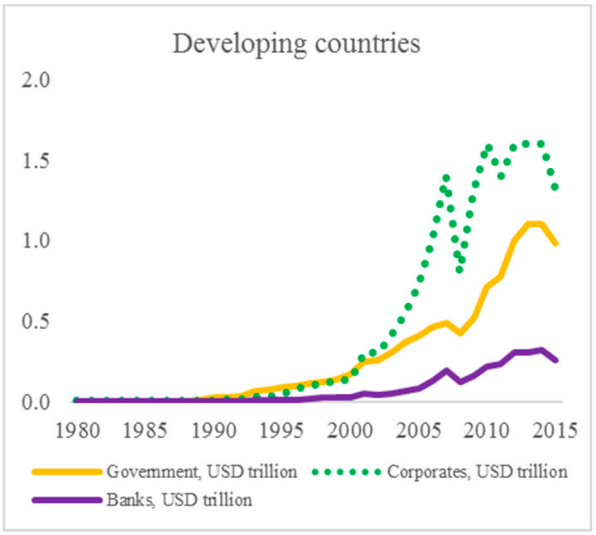
[4] http://www.policyuncertainty.com/index.html. Accessed on 01/31/2017. We computed the standard deviation of the two indices used in this paper.

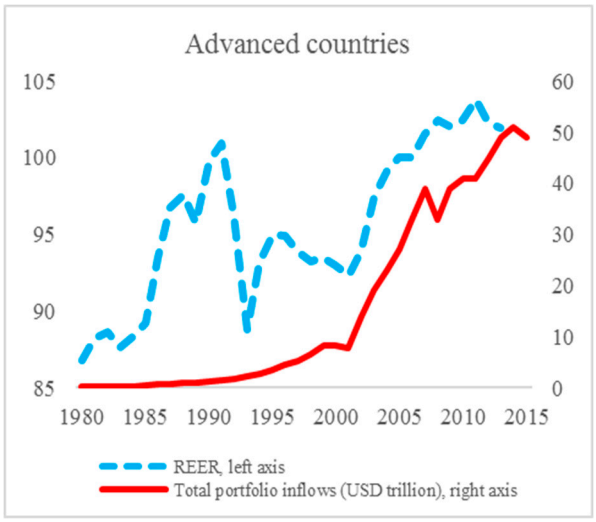
Figure 1: Portfolio Inflows and Real Exchange Rate

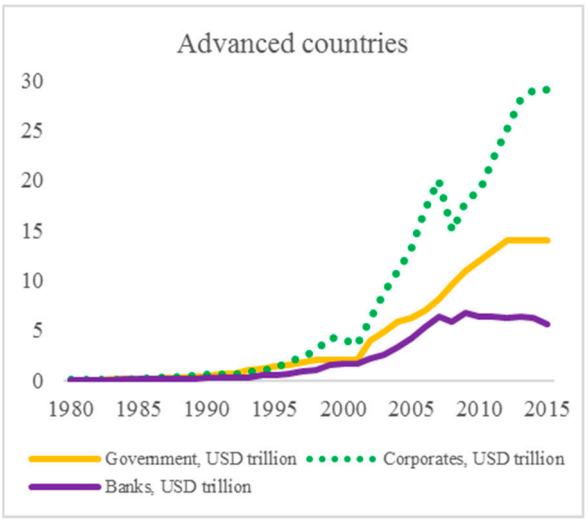












Source: Source: IMF's Balance of Payments and author's calculations

While the inflows of portfolio capital into the three sectors were moving closely and tightly before 2001, there appeared considerable divergences among these three sectors afterwards. Portfolio inflows into the government and the corporate sector sharply increased by almost six-fold and height-fold between 2001 and 2015, respectively. During the same period, the inflows of portfolio capital into the financial sector rose only by three-fold between. Another divergence to highlight is that the inflows of portfolio capital into the financial system has remained stable since the 2008 financial crisis, contrary to the two other sectors. Portfolio inflows into the banking sector increased by only 8 percent between 2007 and 2015, against 51 percent and 87 percent for the government and the corporate sector.

With regard to the REER, Figure 1 shows that it followed the same trend as that of portfolio inflows between 2000 and 2013. During this period, the real exchange rate appreciated by 10 percent. Prior to 2000, the real exchange rate has been highly volatile despite the relatively small amounts of portfolio inflows. While the surge of portfolio inflows has mostly benefited the advanced countries, that of the real exchange rate is driven by developing countries. The real exchange rate appreciated by 11 percent in developing world, against only 2 percent in advanced countries between 2005 and 2013.

Figure 2 shows the share of portfolio inflows for each type of sector and portfolio inflows into the three sectors in percentage of GDP. The share of portfolio inflows into the corporate sector structurally increased over time, while the shares associated with portfolio inflows into banks and government declined. Moreover, Figure 2 highlights that government borrowing sharply increased in the 90's, and declined in the subsequent decade 2000–2009. However, government borrowing increased again during the period 2010–2015, driven by fiscal stimulus implemented by several governments to tackle the financial crisis. Portfolio inflows into the banking sector declined during the period 2010–2015 due to the troubles in the financial system caused by the crisis. In terms of income groups, advanced countries received more portfolio capital than emerging countries. Splitting total portfolio inflows into debt securities and equity and investment fund shares, we see that debt securities represent the majority of portfolio inflows, while equity and investment fund shares are mostly concentrated in the corporate sector.

Figure 2: Share of Portfolio Inflows by Sector and in Percentage of GDP

Source: IMF's Balance of Payments and author's calculations

C. Methodology

In this section, we briefly set out the regression model to be estimated by two-step least squares. The equation we wish to estimate has the following form:

$$REER_{i,t} = \propto + \beta Portfolio_{i,t} + \theta X'_{i,t} + v_i + \varphi_t + \varepsilon_{i,t}$$

Where $REER$ is real effective exchange rate over a five-year period, and $Portfolio$ is portfolio inflows. X is a vector of independent variables. v represents the unobserved country-specific effects, reflecting the differences in the initial level of efficiency. φ stands for the period-specific intercepts, capturing the changes or shocks that are common to all countries. Country effects and time effects may also reflect country-specific and period-specific components of measurement errors.

The empirical model may suffer from endogeneity because of the issues of reverse causality, measurement error and omitted variables. Indeed, the direction of causality is a major concern as the real exchange rate could also affect the inflows of portfolio capital. Several studies have shown that the fluctuations of the exchange rate have an impact on the inflows of capital (Servén, 1999; Choi et al., 2012; Caporale et al., 2013; Ng'ambi, 2015). For example, current exchange rates and exchange rate expectations are no doubt major determinants in the calculations of internationally-operating investors and are therefore reflected in the flows of capital**.** In addition, the data may suffer from measurement errors since portfolio inflows are estimates based on specific survey techniques to each country. In each of these three cases outlined, OLS estimates are not consistent and will lead to biased results. We propose to address the endogeneity issue by instrumenting the portfolio-to-GDP ratio with the economic and equity-index uncertainty in the United States. Expressly, we construct two instruments by the following formula:

$$Equity_{i,t} = Equity_{usa,t} * Assets_{i,usa,t}$$

Where $Equity_{i,t}$ is defined as the equity-market uncertainty index in the country i at time t. $Assets_{i,usa,t}$ is the share of portfolio investment of the United States in the country i. $Equity_{usa,t}$ is the equity-market uncertainty index in the United States.

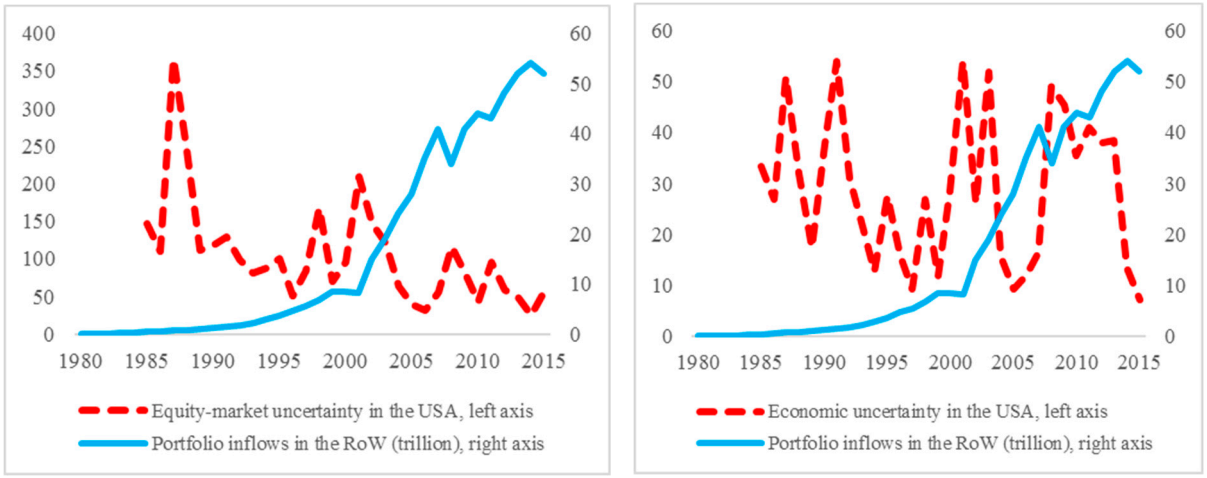
$$Economic_{i,t} = Economic_{usa,t} * Trade_{i,usa,t}$$

Where $Economic_{i,t}$ is defined as the economic uncertainty index in the country i at time t. $Trade_{i,usa,t}$ is the share of trade between the country i and the United States. $Economic_{usa,t}$ is the economic uncertainty index in the United States.

In order to use these two variables as instruments, two conditions should be met: (a) each variable needs to be relevant (i.e., it needs to be correlated with portfolio inflows) and (b) exogenous (i.e., it should be uncorrelated with the real exchange rate). Focusing first on relevance, it appears to be guaranteed by the fact that the economic conditions in the United States affect all the world depending on the trade and economic relations of each country with the United States. Equity and bond markets in the rest of the world will be reacting to uncertainty in the United States. Previous literature on the contagion effects and market transmission from US markets shows that what happens in US markets affect the equity and bond markets in other countries (Bekaert et al., 2011; Samitas and Ioannis Tsakalos 2013). The concept of *Taper Tantrum* has been developed to materialize the reaction of emerging markets caused by the uncertainty in the United States. Figure 3 (see below) shows that the economic and equity index uncertainties in the United States is negatively correlated with the inflows of portfolio capital in the rest of the world. This said, the increase in the uncertainty in the United States (for instance the 09/11 attacks and the financial crisis in 2009) leads to a decline in portfolio inflows in the rest of the world. With respect to exogeneity, as we estimate two-step method with endogenous regressor (portfolio inflows), we will test the null hypothesis of exogeneity by using the F-test. Prior to this test, we do not believe that the uncertainty in the

United States affects directly the real exchange rate of other countries outside the trade, economic and portfolio inflows channels.

Figure 3: Economic and Equity-Market Uncertainty in the USA and Portfolio Inflows in the Rest of the World



Source: Authors' calculations

Following the literature on the determinants of the REER, we include the three most important variables: the Balassa index, trade openness and terms of trade.

- Balassa index: one of the key determinants of the real exchange rate is the productivity or technology effect, also popularly called the Balassa-Samuelson effect. According to Balassa (1964) and Samuelson (1964), the change in productivity differential in the traded and non-traded good sectors could alter the relative price of non-traded goods and thereby the equilibrium real exchange rate. It is worth noting that the overall effect of the productivity/technology is ambiguous. As Edwards (1989) outlined, if the technology-induced higher productivity increases factor availability and therefore reduces the cost and price of tradables, then the REER will depreciate. However, the technological improvement could raise the income of the country, which in turn would increase the demand for and price of nontradables, and thereby lead to an appreciation of the real exchange rate.

- Trade openness: Trade openness also affects the evolution of the real exchange rate. According to previous literature, the effect depends on the policies in place (Edwards, 1989; Warr, 1986). Indeed, trade restrictions in the form of tariffs that lead to the worsening of the current account position and the increase of the demand for and price of nontradables will appreciate the real exchange rate. In addition, trade restrictions in the form of quantitative quota (for instance import quota), then the demand for import substitutes will increase and thereby leads to an appreciation of the real exchange rate. On the other hand, if trade restrictions lead to a worsening of the current account deficit and reduce the demand for and the price of nontradables, then there will be real

exchange rate depreciation. Lartley (2008) showed that trade openness and real exchange rate are positively associated, while Combes, Kinda and Plane (2012) found that trade openness depreciates the real exchange rate.

- Terms of trade (ToT): The effect of terms of trade fluctuations on the real exchange rate are ambiguous. Indeed, the fluctuations in terms of trade induce two opposite effects: the income effect and the substitution effect. The income effect occurs when the increase in export prices, or a fall in import prices, raises the income of an economy and thereby leads to an increase in the demand for nontradables. This, in turn, tends to reduce the relative price of tradables to nontradables and causes the REER to appreciate. However, the overall impact will depend on whether the improvement in the TOT is caused by an increase in export prices alone or a decline in import prices alone because of the potential substitution between nontradable and tradable goods. If the improvement in TOT is due to an increase in export prices alone, the REER will depreciate for given levels of nominal exchange rate and nontradable prices. On the contrary, if the improvement in TOT is caused by a decline in the price of imports alone, then the improvement in the current account balance would raise income and the aggregate price of nontradables and thereby leads to an appreciation of the REER. Combes, Kinda and Plane (2012), have shown that terms of trade fluctuations lead to an appreciation of the real exchange rate, while Ibarra (2011) found that they depreciate the real exchange rate.

IV. RESULTS

The baseline results are reported in Table 1. Statistical tests do not invalidate the econometric method. At the bottom of the table is a F-test of the exogeneity of the instrumented variables. We reject the null hypothesis of no endogeneity. In addition, the null hypothesis of the *Hansen* test is not rejected, meaning that our instruments are valid (See in appendix the results of the first stage estimates).

Portfolio inflows appreciate the real effective exchange rates. The coefficients associated with total portfolio inflows are positive and strongly significant at 1 percent in columns (1) and (5). Table 1 shows that an increase of portfolio inflows by 1 percent of GDP results in an appreciation of the real exchange rate by 0.36 units (Table 1, Column 1). This finding is consistent with previous studies (Lartey, 2008; Combes, Kinda and Plane, 2012; Jongwanich and Kohpaiboon, 2013; Combes, Kinda, Ouedraogo and Plane, 2016). In addition, the coefficient associated with total portfolio inflows is slightly constant regardless of the coverage of trade data (all items or excluding oil). This finding means that the inflows of portfolio inflows appreciate the real exchange rates irrespective of the groups of products.

Table 1: Baseline Results

Dependent variable: real effective exchange rate								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All items				All items excluding oil			
VARIABLES	Total	Banks	Government	Corporates	Total	Banks	Government	Corporates
Portfolio inflows	0.358***	1.173**	2.665**	0.629**	0.360***	1.183**	2.683**	0.634**
	(0.123)	(0.463)	(1.259)	(0.311)	(0.124)	(0.468)	(1.271)	(0.313)
Terms of Trade	-0.302	-0.0763	0.0645	-0.383	-0.301	-0.0746	0.0674	-0.383
	(0.348)	(0.397)	(0.433)	(0.383)	(0.346)	(0.399)	(0.433)	(0.380)
Trade openness	-0.311	0.00425	-0.548*	-0.417	-0.315	0.000834	-0.553*	-0.424
	(0.216)	(0.171)	(0.302)	(0.389)	(0.217)	(0.173)	(0.305)	(0.392)
Balassa index	0.468***	0.301**	0.564***	0.490**	0.481***	0.315**	0.578***	0.505***
	(0.146)	(0.140)	(0.213)	(0.193)	(0.146)	(0.140)	(0.215)	(0.193)
Observations	286	274	282	277	286	274	282	277
Number of countries	73	71	72	71	73	71	72	71
Hansen p-val.	0.642	0.889	0.651	0.367	0.635	0.886	0.652	0.363
Cragg-Donald F statistic	8.810	3.093	3.870	3.030	8.810	3.093	3.870	3.030
Anderson LR statistic p-val.	0.002	0.044	0.020	0.047	0.002	0.044	0.020	0.047
F-test, p-val.	0.006	0.053	0.080	0.041	0.005	0.047	0.073	0.035

Robust standard errors in parentheses; *** p<0.01, significant at 1%; ** p<0.05, significant at 5%; * p<0.1 significant at 10%
All tiems mean that the computation of the real exchange rate is based on all imported and exported items

Most importantly, the effect of portfolio inflows on the real exchange rate depends on the sector the investment flows in. In fact, the coefficients associated with portfolio inflows into the three sectors are positive and statistically significant at 5 percent in all columns but the size of the impact differs across sectors. Government borrowing has the biggest impact on REER appreciation, almost two times that of banks and four times that of corporates. An increase of government borrowing by 1 percent of GDP results in an appreciation of the real effective exchange rate by 2.65 units (Table 1, column 3), against 1.17 for banks and 0.63 for corporates. Government borrowing is more likely to increase the demand for and the price of non-tradable goods and thereby cause an appreciation of the real exchange rate

Regarding the control variables, we found that only the Balassa index is significant. The coefficient associated with the Balassa index is positive and strongly significant in all columns. The rise of the productivity index by 1 unit will lead to an increase of the real exchange rate by 0.47 unit (Table 1, column 1). On the other hand, the coefficients associated with the other control variables are not statistically significant, except trade openness which is slightly significant in columns (3) and (7).

The effects of portfolio inflows differ across income groups. Table 2 presents the results for advanced countries and emerging countries. Regarding total portfolio inflows, we observe that they appreciate the real exchange rate only in emerging countries. The growth of the inflows of portfolio capital by 1 percent of GDP leads to an increase of the real exchange rate by 2.85 units. Looking at the composition by institutional sector, the results show that the inflows of portfolio capital into the banking system appreciate the real exchange rate both in advanced

and emerging countries. However, the appreciation rate is twenty-two times higher in emerging countries than in advanced countries. An increase of portfolio inflows into the banking sector by 1 percent of GDP results in a rise of the real exchange rate by 13.4 units in emerging countries, against only 0.6 units in advanced countries. Table 2 also shows that in emerging countries, portfolio inflows into corporates cause REER appreciation, contrary to advanced countries.

Table 2: Baseline Results, by Income Groups

Dependent variable: real effective exchange rate																
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Emerging countries								Advanced countries							
	All items				All items excluding oil				All items				All items excluding oil			
VARIABLES	Total	Banks	Government	Corporates	Total	Banks	Government	Corporates	Total	Banks	Government	Corporates	Total	Banks	Government	Corporates
Portfolio inflows	2.849*	13.42**	-11.04	3.277**	2.862*	13.63**	-11.37	3.310**	0.324	0.606*	1.590	1.915	0.331	0.621*	1.636	1.926
	(1.442)	(5.549)	(22.56)	(1.360)	(1.430)	(5.557)	(23.21)	(1.358)	(0.200)	(0.351)	(1.007)	(8.600)	(0.203)	(0.357)	(1.025)	(8.645)
Terms of Trade	-0.216	-0.0110	-1.607	-0.332	-0.180	0.0240	-1.615	-0.298	0.857	1.359	1.990	0.625	0.907	1.432	2.089	0.650
	(1.077)	(0.899)	(3.503)	(0.719)	(1.067)	(0.876)	(3.599)	(0.707)	(2.071)	(2.595)	(2.131)	(8.147)	(2.108)	(2.672)	(2.159)	(8.192)
Trade openness	-0.497	-0.753*	0.969	-0.343	-0.516	-0.779**	0.982	-0.362	-0.315	0.232	-0.264	-2.404	-0.330	0.229	-0.282	-2.421
	(0.329)	(0.378)	(2.600)	(0.244)	(0.329)	(0.379)	(2.676)	(0.246)	(0.441)	(0.147)	(0.351)	(12.60)	(0.449)	(0.150)	(0.358)	(12.66)
Balassa index	0.802*	0.440	-0.865	0.480**	0.836**	0.471	-0.872	0.512**	0.702*	0.333	0.463	2.004	0.703*	0.328	0.462	2.005
	(0.417)	(0.301)	(2.934)	(0.239)	(0.415)	(0.301)	(3.019)	(0.237)	(0.388)	(0.219)	(0.286)	(8.123)	(0.394)	(0.223)	(0.292)	(8.166)
Observations	74	72	73	74	74	72	73	74	122	119	121	120	122	119	121	120
Number of countries	19	19	19	19	19	19	19	19	26	26	26	26	26	26	26	26
Hansen p-val.	0.948	0.721	0.638	0.609	0.903	0.777	0.659	0.675	0.629	0.961	0.741	0.728	0.598	0.927	0.768	0.718
Cragg-Donald F statistic	2.433	3.973	0.132	12.653	2.433	3.973	0.132	12.653	1.918	1.329	1.644	0.027	1.918	1.329	1.644	0.027
Anderson LR statistic p-val.	0.078	0.017	0.865	0.000	0.078	0.017	0.865	0.000	0.138	0.251	0.182	0.972	0.138	0.251	0.182	0.972
F-test, p-val.	0.138	0.049	0.954	0.016	0.111	0.036	0.952	0.011	0.131	0.058	0.115	0.953	0.142	0.062	0.128	0.956

Robust standard errors in parentheses; *** p<0.01, significant at 1%; ** p<0.05, significant at 5%; * p<0.1 significant at 10%

All tiems means that the computation of the real exchange rate is based on all imported and exported items

The findings also vary in function of the type of instrument. We further disaggregate portfolio inflows by type of instrument, namely debt securities and equity and investment fund shares.[5] Results reported in Table 3 show that the type of instrument matters. Indeed, only the coefficients associated with portfolio investment in form of debt securities appear positive and strongly significant at 1 percent in all columns. An increase of debt securities by 1 percent of GDP results in an appreciation of the real exchange rate by 0.55 units (Table 3, column 1). In addition, we find that the results differ across debt securities breakdown by institutional sector. In fact, debt securities cause REER appreciation of the real exchange rate regardless of the sector the investment flows in. The coefficients associated with debt securities of banks, corporates and governments are all positive and significant at 5 percent level. However, it is worth noting that government debt securities have the biggest impact on the real effective exchange rate, which is quite consistent with Table 1. Moreover, the coefficient associated with equity and investment fund shares into the corporate sector appreciate the real effective exchange rate.

[5] The disaggregation follows the Balance of Payments 6 manual.

Table 3: Disaggregation by Instruments and Institutional Sectors

Dependent variable: real effective exchange rate														
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	All items							All items excluding oil						
VARIABLES	Total	Banks	Government	Corporates	Total	Banks	Corporates	Total	Banks	Government	Corporates	Total	Banks	Corporates
Debt securities	0.551***	1.303**	2.372**	1.038**				0.554***	1.307**	2.396**	1.069**			
	(0.186)	(0.561)	(1.141)	(0.478)				(0.187)	(0.567)	(1.152)	(0.489)			
Equity					1.296	-3.759	0.793**					1.294	-3.785	0.794**
					(0.897)	(6.574)	(0.371)					(0.895)	(6.606)	(0.371)
Terms of Trade	-0.237	-0.225	0.502	-0.489	-0.346	-0.150	-0.178	-0.233	-0.190	0.555	-0.462	-0.336	-0.148	-0.161
	(0.352)	(0.483)	(0.555)	(0.537)	(0.493)	(0.449)	(0.419)	(0.351)	(0.486)	(0.552)	(0.546)	(0.487)	(0.454)	(0.418)
Trade openness	-0.260	-0.0909	-0.401	-0.218	-0.587	-0.0455	-0.0205	-0.264	-0.0936	-0.410	-0.232	-0.584	-0.0486	-0.0203
	(0.188)	(0.177)	(0.282)	(0.319)	(0.745)	(0.320)	(0.176)	(0.190)	(0.179)	(0.285)	(0.327)	(0.744)	(0.322)	(0.176)
Balassa index	0.403***	0.399**	0.761***	0.257	0.708*	0.226	0.441**	0.414***	0.414**	0.776***	0.265	0.717*	0.233	0.452**
	(0.136)	(0.176)	(0.217)	(0.166)	(0.416)	(0.182)	(0.184)	(0.137)	(0.176)	(0.219)	(0.168)	(0.414)	(0.183)	(0.184)
Observations	285	210	254	220	256	173	239	285	210	254	220	256	173	239
Number of countries	73	57	67	58	66	46	63	73	57	67	58	66	46	63
Hansen p-val.	0.817	0.506	0.591	0.874	0.269	0.008	0.364	0.818	0.504	0.599	0.859	0.260	0.009	0.365
Cragg-Donald F statistic	8.154	3.169	3.760	1.712	1.319	0.286	7.764	8.154	3.169	3.760	1.712	1.319	0.286	7.764
Anderson LR statistic p-val.	0.000	0.040	0.023	0.174	0.261	0.743	0.001	0.000	0.040	0.023	0.174	0.261	0.743	0.001
F-test, p-val.	0.008	0.147	0.010	0.142	0.077	0.563	0.018	0.006	0.134	0.010	0.141	0.070	0.553	0.016

Robust standard errors in parentheses; *** p<0.01, significant at 1%; ** p<0.05, significant at 5%; * p<0.1 significant at 10%. Equity represents equity and investment fund shares

All tiems means that the computation of the real exchange rate is based on all imported and exported items

V. ROBUSTNESS CHECKS

In this section, we check the robustness of our findings trough four exercises. More precisely, we will explore the following techniques:

A. Additional Variables

We first check the robustness of our findings by adding more variables in the model. To this end, we include government total expenditures over GDP, total debt over GDP and real interest rate. Government expenditures is a fundamental variable that affects the real exchange rate. An increase in government expenditures will raise the demand for nontradables if the major portion of the money is spent on nontradable goods and services. This rise in demand will systematically increase the price of nontradable goods and thereby cause an appreciation of the real exchange rate. Yet, the real exchange will depreciate if the bulk of government expenditures is spent on the tradable sector rather than on consumption of nontradables. Thus, the sign of government expenditures on the real exchange rate is ambiguous.

Regarding government debt, several studies have showed that it affects the real exchange rate (Lin, 1994; Asonuma, 2016). Lin (1994) highlighted that an increase in government debt depreciates the real exchange rate of the country with relatively higher capital elasticity of output, while it appreciates the real exchange rate of the country with relatively lower capital elasticity of output. Finally, we include real interest rate in the model to control for the broad role of monetary policy and the fact that portfolio inflows maybe due to high interest rates in the economy.

Results reported in Table 4 shows that our previous findings remain valid even by including these three additional variables. However, the coefficient associated with portfolio inflows become higher than in Table 1. In addition, the coefficient associated with government expenditures is insignificant, while the one associated with total debt is negative and statistically significant and that of real interest rate is positive and significant.

Table 4: Robustness Check: Additional Variables

Dependent variable: real effective exchange rate								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All items				All items excluding oil			
VARIABLES	Total	Banks	Government	Corporates	Total	Banks	Government	Corporates
Portfolio inflows	0.306***	1.439*	3.682*	0.450**	0.305***	1.443*	3.720*	0.445**
	(0.115)	(0.788)	(1.928)	(0.201)	(0.115)	(0.794)	(1.949)	(0.199)
Terms of Trade	-0.669*	-0.288	-0.0207	-0.692*	-0.649*	-0.269	0.00732	-0.675*
	(0.350)	(0.558)	(0.731)	(0.366)	(0.360)	(0.567)	(0.739)	(0.373)
Trade openness	-0.118	-0.0543	-0.392	-0.105	-0.111	-0.0502	-0.392	-0.0970
	(0.165)	(0.180)	(0.329)	(0.204)	(0.164)	(0.182)	(0.333)	(0.201)
Balassa index	0.500***	0.550**	0.610**	0.458***	0.494***	0.546**	0.608**	0.451***
	(0.149)	(0.237)	(0.247)	(0.164)	(0.149)	(0.239)	(0.249)	(0.163)
Expenditures	0.694	0.423	1.268	0.595	0.721	0.444	1.304	0.615
	(0.508)	(0.842)	(0.842)	(0.525)	(0.511)	(0.848)	(0.851)	(0.522)
Debt	-0.367***	0.00359	-1.015**	-0.400**	-0.378***	-0.00601	-1.035**	-0.409***
	(0.121)	(0.181)	(0.441)	(0.156)	(0.122)	(0.181)	(0.445)	(0.156)
Real interest rates	0.878**	0.351	1.795*	1.231*	0.865**	0.330	1.800*	1.199*
	(0.429)	(0.639)	(0.935)	(0.637)	(0.432)	(0.645)	(0.946)	(0.644)
Observations	215	209	213	210	215	209	213	210
Number of countries	66	64	65	64	66	64	65	64
Hansen p-val.	0.325	0.959	0.653	0.104	0.288	0.997	0.689	0.089
Cragg-Donald F statistic	7.323	1.528	2.243	4.097	7.323	1.528	2.243	4.097
Anderson LR statistic p-val.	0.001	0.202	0.097	0.015	0.001	0.202	0.097	0.015
F-test, p-val.	0.000	0.293	0.076	0.000	0.000	0.278	0.076	0.000

Robust standard errors in parentheses; *** p<0.01, significant at 1%; ** p<0.05, significant at 5%; * p<0.1 significant at 10%
All tiems mean that the computation of the real exchange rate is based on all imported and exported items

B. Using De-trended REER Series

We then use an alternative dependent variable by de-trending the real exchange rate variables. To this end, we use the residuals obtained from a liner regression of real exchange rate on its lags. The goal is to eliminate the long term component of the variable and look at whether the results hold even when we focus on the cyclical component or the residuals. Results are reports in Table 5.

Table 5: Robustness Check: De-trending REER Series

Dependent variable: real effective exchange rate																
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Using residuals								Using HP filter							
	All items				All items excluding oil				All items				All items excluding oil			
VARIABLES	Total	Banks	Government	Corporates	Total	Banks	Government	Corporates	Total	Banks	Government	Corporates	Total	Banks	Government	Corporates
Portfolio inflows	0.291***	0.947**	2.149**	0.514**	0.293***	0.954**	2.163**	0.517**	0.164***	0.481**	1.008*	0.326**	0.160***	0.470**	0.974*	0.321**
	(0.0994)	(0.369)	(1.015)	(0.253)	(0.0998)	(0.373)	(1.023)	(0.254)	(0.0586)	(0.190)	(0.528)	(0.159)	(0.0571)	(0.185)	(0.512)	(0.155)
Terms of Trade	-0.221	-0.0394	0.0738	-0.287	-0.220	-0.0384	0.0758	-0.287	0.221	0.303	0.347	0.179	0.206	0.285	0.328	0.164
	(0.283)	(0.322)	(0.352)	(0.311)	(0.281)	(0.324)	(0.352)	(0.308)	(0.194)	(0.207)	(0.222)	(0.215)	(0.191)	(0.205)	(0.218)	(0.211)
Trade openness	-0.250	0.00850	-0.437*	-0.338	-0.253	0.00602	-0.441*	-0.343	-0.338***	-0.175**	-0.377***	-0.427**	-0.332***	-0.174***	-0.367***	-0.422**
	(0.172)	(0.136)	(0.240)	(0.315)	(0.173)	(0.137)	(0.243)	(0.317)	(0.0956)	(0.0681)	(0.128)	(0.192)	(0.0934)	(0.0667)	(0.124)	(0.188)
Balassa index	0.395***	0.259**	0.472***	0.414***	0.405***	0.269**	0.482***	0.425***	0.131*	0.0510	0.159	0.152	0.130*	0.0520	0.157	0.152
	(0.120)	(0.115)	(0.175)	(0.158)	(0.120)	(0.115)	(0.175)	(0.158)	(0.0704)	(0.0601)	(0.0970)	(0.0997)	(0.0695)	(0.0592)	(0.0954)	(0.0984)
Observations	286	274	282	277	286	274	282	277	286	274	282	277	286	274	282	277
Number of countries	73	71	72	71	73	71	72	71	73	71	72	71	73	71	72	71
Hansen p-val.	0.729	0.814	0.595	0.421	0.126	0.813	0.595	0.415	0.151	0.078	0.077	0.421	0.125	0.062	0.065	0.376
Cragg-Donald F statistic	8.810	3.093	3.870	3.030	8.810	3.093	3.870	3.030	8.810	3.093	3.870	3.030	8.810	3.093	3.870	3.030
Anderson LR statistic p-val.	0.000	0.044	0.020	0.047	0.000	0.044	0.020	0.047	0.000	0.044	0.020	0.047	0.002	0.044	0.020	0.047
F-test, p-val.	0.006	0.045	0.075	0.036	0.005	0.039	0.068	0.030	0.007	0.016	0.010	0.150	0.007	0.017	0.011	0.158

Robust standard errors in parentheses; *** p<0.01, significant at 1%; ** p<0.05, significant at 5%; * p<0.1 significant at 10%

All tiems mean that the computation of the real exchange rate is based on all imported and exported items

Another method to de-trend the series is to use the standard Hodrick-Prescott (HP) filter. The cyclical components are computed by subtracting the HP-trended value from total capital inflows in each period t. The smoothness parameter of the filter is set to 6.25 as suggested by Ravn and Uhlig (2002) for annual data. Results are reported in Table 5. They are consistent with our findings in Table 1. Moreover, the coefficients associated with portfolio inflows in Table 5 are lower than those of Table 1.

C. Alternative Econometric Method

Up to now, we have employed the two-stage least stage method by instrumenting the portfolio inflows variables with the economic and equity-market uncertainties in the USA. Here, we aim to use another econometric technique to investigate whether the previous findings are robust to using alternative estimation method. Thus, we employ the system-GMM estimator. Indeed, in some countries, the real exchange rate could have a certain inertia in their evolution and may not vary so much from year to year. In order to take into account this characteristic we use a dynamic model in which the lagged values of the real exchange rate are included in the set of control variables. The equation is:

$$REER_{i,t} = \propto + \theta REER_{i,t-1} + \beta Portfolio_{i,t} + \theta X'_{i,t} + v_i + \varphi_t + \varepsilon_{i,t}$$

This empirical model may suffer from endogeneity because of the lagged dependent variable, some unobservable variables and the reverse causality of all right-hand variables (Aggarval, Demirgüç-Kunt, and Martínez Pería 2010). The system-GMM helps dealing with this issue by using the lagged differences and lagged levels of the explanatory variables as instruments (Blundell and Bond, 1998). Moreover, we limit the instrument set to one lag in order to avoid the well-known problems associated with too many instruments (Roodman, 2009). The results reported in Table 6 are strongly consistent with our previous findings in Table 1, except that the coefficient associated with portfolio inflows into the corporate sector is no longer significant.

Table 6: Robustness Check: Alternative Econometric Method

Dependent variable: real effective exchante rate								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All items				All items excluding oil			
VARIABLES	Total	Banks	Government	Corporates	Total	Banks	Government	Corporates
Dep. Variable (-1)	0.473***	0.742***	0.683***	0.532***	0.466***	0.744***	0.711***	0.538***
	(0.109)	(0.102)	(0.116)	(0.173)	(0.113)	(0.107)	(0.116)	(0.180)
Portfolio inflows	0.202**	0.474*	0.802**	0.220	0.174**	0.491*	0.668**	0.186
	(0.081)	(0.244)	(0.331)	(0.161)	(0.078)	(0.248)	(0.321)	(0.141)
Terms of Trade	0.615**	0.657**	0.888***	0.590**	0.518**	0.613**	0.749***	0.521**
	(0.264)	(0.280)	(0.291)	(0.267)	(0.254)	(0.280)	(0.278)	(0.254)
Trade openness	-0.183***	-0.017	-0.016	-0.139	-0.172**	-0.021	-0.009	-0.126
	(0.069)	(0.042)	(0.031)	(0.086)	(0.066)	(0.043)	(0.029)	(0.083)
Balassa index	0.212**	0.043	0.122	0.156	0.208**	0.046	0.089	0.148
	(0.091)	(0.077)	(0.090)	(0.152)	(0.091)	(0.079)	(0.086)	(0.152)
Constant	37.694***	19.798*	11.977	38.288**	39.028***	19.451*	13.641	38.221**
	(12.378)	(10.466)	(11.790)	(17.174)	(12.167)	(10.607)	(11.676)	(16.978)
Observations	286	274	282	277	286	274	282	277
Number of countries	73	71	72	71	73	71	72	71
Hansen test p-value	0.146	0.0210	0.0268	0.0167	0.0971	0.0296	0.0208	0.0132
AR(1)	0.842	0.0593	0.166	0.730	0.766	0.0629	0.162	0.630
AR(2)	0.921	0.996	0.572	0.949	0.989	0.924	0.663	0.928
Instruments	11	11	11	11	11	11	11	11

Robust standard errors in parentheses; *** p<0.01, significant at 1%; ** p<0.05, significant at 5%; * p<0.1 significant at 10%
All tiems mean that the computation of the real exchange rate is based on all imported and exported items

D. Alternative Trade Coverage: Separating Imports and Exports

Finally, we use an alternative trade coverage. So far, the REER indices cover either all items or excluding oil. Now, we separate imports and exports and focus on the indices computed using exclusively imports or exports. Thus, the real exchange rate is calculated by retaining the countries of origin of imports, on the one hand, and the countries of destination of exports, on the other hand. This split is important as the fluctuations in the exchange rates affect differently imports and exports, and some countries are structurally net importers or net exporters. Results are reported in Table 7. They are consistent with our previous findings. In other words, the inflows of portfolio capital appreciate the real effective exchange rate against both exporters and importers.

Table 7: Robustness Check: Alternative Trade Coverage: Separating Imports and Exports

Dependent variable: real effective exchange rate								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Exports				Imports			
VARIABLES	Total	Banks	Government	Corporates	Total	Banks	Government	Corporates
Portfolio inflows	0.355***	1.177**	2.635**	0.615**	0.360***	1.170**	2.695**	0.633**
	(0.125)	(0.477)	(1.289)	(0.308)	(0.124)	(0.461)	(1.243)	(0.316)
Terms of Trade	-0.274	-0.0486	0.0906	-0.352	-0.327	-0.100	0.0425	-0.411
	(0.339)	(0.393)	(0.425)	(0.371)	(0.346)	(0.393)	(0.431)	(0.384)
Trade openness	-0.314	0.000542	-0.546*	-0.407	-0.315	0.00149	-0.557*	-0.422
	(0.217)	(0.173)	(0.310)	(0.385)	(0.217)	(0.171)	(0.299)	(0.393)
Balassa index	0.493***	0.324**	0.589***	0.507***	0.453***	0.288**	0.551**	0.476**
	(0.148)	(0.143)	(0.216)	(0.192)	(0.145)	(0.139)	(0.213)	(0.194)
Observations	286	274	282	277	286	274	282	277
Number of countries	73	71	72	71	73	71	72	71
Hansen p-val.	0.705	0.840	0.624	0.408	0.575	0.953	0.688	0.325
Cragg-Donald F statistic	8.810	3.093	3.870	3.030	8.810	3.093	3.870	3.030
Anderson LR statistic p-val.	0.000	0.044	0.020	0.047	0.000	0.044	0.020	0.047
F-test, p-val.	0.006	0.051	0.077	0.037	0.007	0.058	0.083	0.047

Robust standard errors in parentheses; *** p<0.01, significant at 1%; ** p<0.05, significant at 5%; * p<0.1 significant at 10%
All tiems mean that the computation of the real exchange rate is based on all imported and exported items

VI. CONCLUSION

This paper examines the empirical effect of portfolio inflows on real exchange rate on a sample of 73 advanced, emerging and developing countries over the period 1980–2015. It employs the two-stage least squares approach, which is statistically appropriate for dealing with the issue of potential endogeneity of regressors. First of its kind, this paper has provided a comprehensive investigation of the impact of portfolio capital into different sectors, including government, banks and corporates on real exchange rate. The results show that the impact of portfolio inflows on the real exchange rate differs across sector. We find that portfolio inflows into the three sectors cause appreciation of the real exchange rate but government borrowing has the greatest impact. Moreover, we find that the impact depends on the type of instruments and income groups. Indeed, portfolio inflows bring in a faster real exchange rate appreciation in emerging countries than in advanced countries. Our findings also show that debt securities into the three sectors appreciate the real exchange rate, contrary to equity and investment fund shares.

The paper shows clearly that the management of portfolio inflows should involve a distinction between sectors and instruments. An appropriate policy response would thus depend on the knowledge of the potential impact of portfolio inflows on the real exchange rate depending on

the sector the investment flows in. In addition, our findings have strong implications for the future direction of capital controls and macro-prudential policies to combat the overheating of the national currency. In fact, sector-specific macroprudential policies would be a better tool to deal with exchange rate pressures than changing policy rates (i.e., which would affect all sectors alike).

Appendix Tables

Table A 1. Sample

Albania	Costa Rica	Israel	Russian federation
Argentina	Croatia	Italy	Senegal
Armenia	Cyprus	Kazakhstan	Slovak Republic
Australia	Czech Republic	Kuwait	Slovenia
Austria	Denmark	Lithuania	South Africa
Bahrain	Dominican Republic	Mali	Spain
Bangladesh	Ecuador	Malta	Sweden
Barbados	Egypt	Mauritius	Switzerland
Belarus	El Salvador	Mexico	Tanzania
Belgium	Estonia	Moldova	Thailand
Benin	Finland	Morocco	Turkey
Bolivia	France	Netherlands	Uganda
Bosnia	Georgia	Nicaragua	Ukraine
Brazil	Germany	Nigeria	United Kingdom
Bulgaria	Greece	Pakistan	Uruguay
Burkina Faso	Guatemala	Panama	Zambia
Canada	Hungary	Peru	
Chile	Iceland	Poland	
Colombia	India	Portugal	

Table A 2. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Total portfolio inflows (% of GDP)	361	4.2	34.8	-175.5	195.6
Other sectors (% of GDP)	306	1.1	7.0	-68.4	46.3
Deposit-taking corporations (% of GDP)	235	1.3	8.5	-34.7	73.1
General government (% of GDP)	332	2.2	24.2	-159.9	128.8
REER (all items)	536	104.2	44.3	27.1	777.3
REER (all items, excluding oil)	536	104.3	43.6	27.0	767.8
REER (exports only)	536	105.2	43.7	26.7	767.8
REER (imports only)	536	102.7	42.7	27.4	781.7
Terms of trade	527	0.9	5.8	-23.3	63.8
Trade (% of GDP)	552	74.8	40.5	13.0	356.3
Balassa index	467	106.4	26.3	26.3	369.3
Expenditures (% of GDP)	384	34.1	12.8	11.0	101.4
Debt (% of GDP)	377	49.7	30.5	0.0	237.8
Inflation (%)	413	6.3	20.0	-86.5	351.7

Table A 3. Results for First Stage Estimates

VARIABLES	(1) Total	(2) Banks	(3) Government	(4) Corporates
Equity market uncertainty	-0.352***	-0.111***	-0.047***	-0.197**
	(0.081)	(0.035)	(0.017)	(0.082)
Econimic uncertainty	0.733**	0.318**	0.158	0.301
	(0.331)	(0.146)	(0.096)	(0.259)
Terms of Trade	-0.096	-0.24	-0.156	0.079
	(0.530)	(0.281)	(0.113)	(0.371)
Trade openness	0.793***	-0.05	0.183***	0.632*
	(0.283)	(0.136)	(0.042)	(0.322)
Balassa index	-0.599***	-0.064	-0.122***	-0.374***
	(0.138)	(0.063)	(0.046)	(0.128)
Observations	286	274	282	277
Number of countries	73	71	72	71
R-square	0.244	0.038	0.213	0.146
F-test, p-val.	0.000	0.000	0.000	0.000

Robust standard errors in parentheses; *** p<0.01, significant at 1%;
** p<0.05, significant at 5%; * p<0.1 significant at 10%

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