Have QE Programs Affected Capital Flows to Emerging Markets?: A Regional Analysis

Claudia Ramírez
Miriam González

Abstract

In the aftermath of the 2008-2009 financial crisis, international capital flows to emerging markets increased substantially and have remained close to all-time highs, although with volatility. The most recent episode of capital inflows has taken place in the context of extremely accommodative monetary policies in advanced economies, characterized by exceptionally low interest rates and the implementation of unconventional monetary policies, which have generated additional reductions in long-term interest rates. This paper presents an empirical analysis of the drivers of international capital flows to emerging economies in the postcrisis period. Using the pull versus push framework, we estimate a panel for 15 emerging economies, and we find that external factors remain the main determinants of capital flows. Within external factors, QE programs implemented in the United States, measured both directly through treasuries purchases and indirectly through the long-term interest rate, had an impact on capital flows. However, the effect was different across regions, playing an important role in Asia and Latin America. Finally, we found that risk aversion seems to be an important driver of these flows for all regions.

1. INTRODUCTION

Capital flows to emerging economies (EME) have increased sharply during the last decade, reaching all-time highs and this trend seems to have strengthened after the financial crisis of 2008. This recent episode of capital inflows was different compared to previous episodes, not only in magnitude but also in the composition of such flows. This situation has been a major challenge for policymakers in emerging economies due to the trade-off between the potential benefits and the risks associated with these episodes of massive capital inflows. On the one hand, the increase in capital flows to emerging economies should be a positive factor for such countries, to the extent that an increase in capital availability can contribute to higher economic growth through *1)* increased investment in those economies, *2)* reducing the cost of capital through a more efficient allocation of resources, *3)* further development of the financial system and, *4)* in the case of foreign direct investment (FDI), contributing to the adoption of more advanced technologies (Prasad et al., 2003). On the other hand, the size and volatility of capital flows can pose risks to financial stability in these countries given: *1)* the possibility of a sudden stop of capital flows, and *2)* the emergence of bubbles in asset prices. Given this trade-off, it is important to understand the factors behind the most recent episode of capital inflows.

The most recent episode of capital inflows has taken place in a context of extremely accommodative monetary policy in advanced economies, characterized by exceptionally low interest rates and the implementation of unconventional monetary policies, which have generated additional reductions in long-term interest rates. In this context, it is worth reviewing the analytical framework of pull versus push factors that has been widely used in the literature on the determinants of capital flows, and thus analyze the causes behind the resurgence of capital flows to emerging economies in the last decade. This paper aims to contribute to this analysis by identifying the factors that have led to the increase of capital

inflows observed since 2005 in the major emerging economies. As Fernández-Arias (1993) noted, to the extent that the increase in capital flows is motivated by internal factors, the risk of a sudden reversal of these capitals is lower.

Our contribution with respect to previous studies on this subject is twofold. First we focus on gross capital inflows to specifically describe the behavior of capital inflows by non-residents, contrasted with net capital flows, which refer to the change in balances of residents and foreign investors. Secondly, we conduct a regional analysis to measure how the drivers of capital flows differ across regions of emerging countries. Additionally, we aim to measure the impact of the USA quantitative easing using two variables, one associated with the USA long-term interest rate, and the second one through treasuries purchased as part of QE programs.

Our analysis suggests that external factors have been among the main drivers of capital flows to EME, and within these factors, QE programs implemented in the United States have been particularly important in the current episode, both through the asset purchases programs and through the impact of the USA long-term interest rate, particularly to Asian and Latin American economies. Finally, we found that risk aversion seems to be an important driver of these flows for all regions. These results are very relevant in view of the current macroeconomic environment, in which the Federal Reserve concluded its last QE program in October 2014. Looking forward, these results are even more pertinent since, after seven years of extraordinarily low interest rates, the United States started the normalization of its monetary policy towards higher interest rates in December 2015.

This paper is organized as follows. In the second section we present a brief review of related literature. In the third section we describe the evolution of capital flows to EME in the recent episode of capital inflows. In the fourth section we summarize the unconventional monetary policies that have been implemented in the USA after the financial crisis of 2008. In the fifth and sixth sections we describe our empirical strategy and summarize our main findings. Lastly, in section 7 we present our conclusions.

2. LITERATURE REVIEW

During the nineties, several studies were published attempting to explain the factors that had triggered the growth of capital flows to emerging economies at the beginning of that decade. One of the most important papers in this field is the one of Calvo, Leiderman, and Reinhart (1993), where the authors analyzed the importance of external factors in the growth of capital flows to Latin America. They noted that while the economic and political reforms implemented in some Latin American countries in the late eighties contributed to the resurgence of capital flows, this reason was not enough to explain why the region in general benefited from greater flows, including countries that had not undergone economic transformations. Therefore, they argued that because there were different macroeconomic policies and important differences in economic performance among countries in the region, external factors must have played a major role in the decisions of investors to bring their resources to Latin America; in particular, the role of low interest rates in the United States is crucial, as well as the economic recession in the USA and the evolution of its balance of payments. With this analysis, the authors developed the analytical framework that divides the determinants of capital flows into domestic factors, also known in the literature as *pull* factors, and external or *push* factors, which has been widely used in subsequent studies on this subject.

Chuhan, Claessens, and Mamingi (1993) also used this approach of pull versus push factors to explain the surge in capital flows to emerging economies. These authors analyzed the flows of debt and equity to Latin American and Asian economies using a panel that included both pull and push factors. This analysis found that debt flows respond strongly to the country's credit rating, which is a variable that reflects the domestic conditions of each economy. However, they also found a high sensitivity of debt and equity flows to USA interest rates. To analyze the relative importance of pull and push factors, the authors calculated the sum of the standardized coefficients for each category, finding that, in Latin America, pull and push factors were equally important in explaining the rise in equity flows, while in Asian economies pull factors were four times more important than external ones.

Another important document that emerged during the nineties, and to some extent contributed to reconciling the results of the two

documents mentioned above, was that of Fernández-Arias (1993). This author used a structural model to explain the dynamics of capital flows to emerging economies. As with Calvo et al. (1993) he found that the surge of private capital flows in that period was mainly due to the fall in interest rates in advanced economies, noting that the behavior capital flows had previously registered would not be sustainable when interest rates in developed countries started to rise. He also analyzed the improvement in credit conditions in emerging economies during that period, and found that this apparent improvement was due to the reduction in funding costs resulting from lower interest rates globally and not, as Chuhan et al. (1993) argued, due to the improvement in macroeconomic conditions in emerging economies.

More recently, the literature on the determinants of capital flows has focused on analyzing the new resurgence of capital flows in the postcrisis period, and has tried to analyze whether the increment of capital flows has been associated with the unconventional monetary policies that have been implemented by advanced economies in recent years. Since the transmission channels of those types of measures differ from the traditional channels, an intense debate has arisen concerning the spillover effects they may have on other economies, particularly on emerging countries. Due to the relevance of this debate for policymakers, many authors have analyzed this topic.

Fratzscher (2011) analyzed the role of different drivers of global capital flows during the crisis and in the subsequent period. Using a factor model coupled with micro level data from EPFR of portfolio capital flows to 50 economies, he found that common factors (*push* factors) were overall the main drivers of capital flows during the crisis, while country-specific determinants (*pull* factors) were dominant in accounting for the dynamics of global capital flows throughout 2009 and 2010, in particular for emerging markets.

Another important document in this regard is Fratzscher et al. (2013) that analyzed the global spillovers of USA QE1 and QE2 programs on 65 foreign financial markets. Specifically, they investigated the impact on capital flows, asset prices and exchange rates. Using EPFR's daily data on portfolio equity and bonds flows from January 2007 to December 2010, they analyzed the response of portfolio decisions to unconventional policy actions, both operations and announcements. They found that the Federal Reserve's QE programs functioned in a procyclical manner for capital flows to EME, with

portfolio rebalancing out of EME under QE1 and in the opposite direction under QE2.

Ahmed and Zlate (2013) analyzed the determinants of net private capital flows to 12 emerging economies from Asia and Latin America over the period 2002 to 2012. The main explanatory variables included in the model were the growth and interest rate differentials between advanced and emerging economies, risk aversion, and accumulation of reserves. To capture the effect of unconventional monetary policy in the United States they used two dichotomous variables: The first one takes the value of one in the quarters in which the Federal Reserve announced or extended QE programs, and the second takes the value of one during the period when these programs were in place. Their results suggest that interest rate differentials and growth are important determinants of capital flows. Regarding the effect of non-conventional monetary policy, they do not find a statistically significant relation in total flows; however, they do find an effect on portfolio flows.

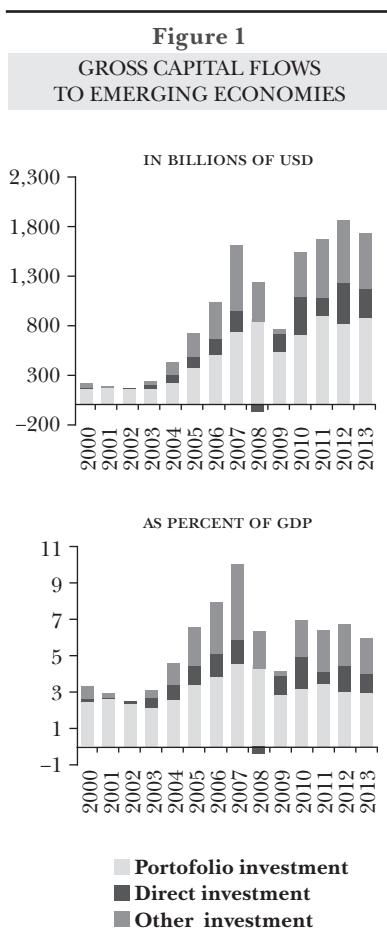## 3. EVOLUTION OF CAPITAL FLOWS TO EMERGING ECONOMIES

Capital flows to EME remained stable at the beginning of the last decade, but since 2004 they have increased substantially, reaching all-time highs (Figure 1). Even after the retrenchment that was observed in the onset of the financial crisis, capital flows recovered very quickly, rebounding to the levels seen prior to the crisis by 2012. Although capital flows as a percentage of GDP have not returned to their precrisis peak, it is worth noting that in recent years they have remained on average around 6%, which represents an increase of 100% from the levels that were seen in 2000.

The recent episode of capital inflows has been characterized by an increase in all types of investment: Direct investment (FDI), portfolio flows, and other investments. Nevertheless, after the financial crisis there was a shift in the composition of capital flows towards greater portfolio investment, which includes debt and equity securities that are more liquid.[1] On the one hand, portfolio flows –and in particular debt securities– have allowed EME to take advantage of the global

---

[1]   *Balance of Payments and International Investment Position Manual,* sixth edition.

low interest rates by issuing debt at lower costs. On the other, the increased share of this kind of investment has been a source of concern among policymakers in EME given the volatility of such capital flows, and the fact that their negotiability allows investors to withdraw their investment readily, raising the risks of abrupt capital outflows. This represents a major challenge for policymakers in all EME, but especially in Latin America, which has been the largest recipient of this kind of investment (Figure 2).

Looking at the composition of portfolio flows in our sample of EMEs, we noted that in the post-crisis period, equity and debt securities increased sharply, albeit with some volatility, but in general debt flows have represented a larger share of portfolio investment. This trend started even before the financial crisis, and has been associated with the expansion and deepening of local currency bond markets in EME, particularly in government bonds. Compared to previous episodes of capital inflows

IN BILLIONS OF USD

AS PERCENT OF GDP

■ **Portofolio investment**
■ **Direct investment**
■ **Other investment**

Source: *Balance of Payments Statistics* and WEO, IMF, and authors' calculations.

in EME, in the recent episode most of the debt investment has been denominated in domestic currency, eliminating the *original sin syndrome* which refers to the propensity of EME to borrow in hard currency, mainly in USA dollars.[2] Although this has been a general trend in EME (probably reflecting the structural changes in financial markets), some countries stand out for the magnitude of debt flows that

---

[2] This term was coined by Eichengreen and Hausmann (1999).

Figure 2

COMPOSITION OF CAPITAL FLOWS
PER REGION

USD billions

LATIN AMERICA

ASIA

EUROPE

■ **Portfolio investment**
■ **Direct investment**
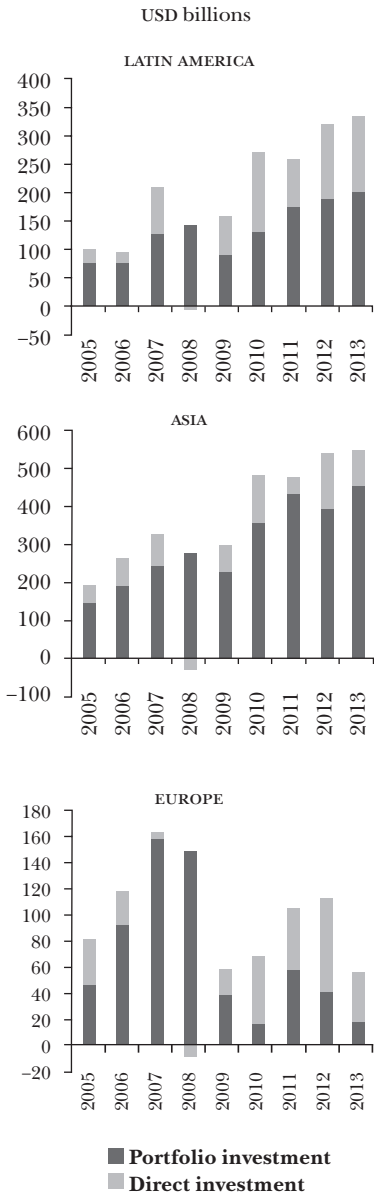
Source: *Balance of Payments Statistics* and IMF.

they have received from non-residents, mainly through government securities. As we show in Figure 3, this is the case for many of the countries in our analysis such as Indonesia, Poland and Mexico, where non-residents' holdings in local currency government debt represent more than 30% of total outstanding debt. We can also observe that the holdings of foreign investors increased more sharply in the post crisis period, which could suggest that this trend is associated with some of the monetary developments that have taken place in the last few years.

Although there must be common factors that have pushed capital flows to EME in the last decade, such as low interest rates in advanced economies or the excess of liquidity generated by QE programs in advanced economies, there must also exist domestic, or pull, factors that explain why some countries have received larger flows than others, and that also account for the difference in the composition of such capital flows among regions. This also suggests that some drivers of capital flows may be more important for certain kinds of investment than for others, or maybe there are different drivers for every type of investment.

Since FDI is associated with a

Figure 3

GOVERNMENT SECURITIES HOLDINGS BY FOREIGN INVESTORS

Percentage of total outstanding amount
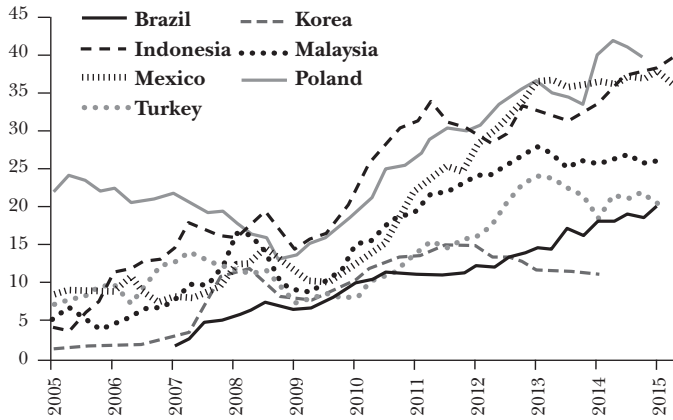
Note: Data up to the 2015Q1 except for Mexico and Indonesia (2015Q2).

Source: Haver Analytics and Banco de México.

long-term horizon, we could think that domestic variables are more important for this type of investment. We showed in Figure 2 that in the most recent episode of capital inflows, Asian economies received a larger share of FDI compared to other emerging regions. Following the previous pull factors that have been cited in the literature, one of the possible explanations for the predominance of FDI in Asia is its economic performance. In Figure 4, we show that the economic growth in Asia has outperformed the one in Latin America, and even in 2009, when most countries registered a contraction in economic activity as a result of the financial crisis, the Asian economies maintained positive growth.

In sum, even though we could attribute the increase of capital flows to external factors –that are common to all EME– it is not straightforward to understand why the composition of portfolio flows has differed among regions, which suggests that we must also take into account domestic variables to try to explain the increase that capital flows have registered in the last decade.

Figure 4

ECONOMIC GROWTH

Percent change

- ▇ Emerging and developing Asia
- ▇ Latin America and the Caribbean
- ▇ United States
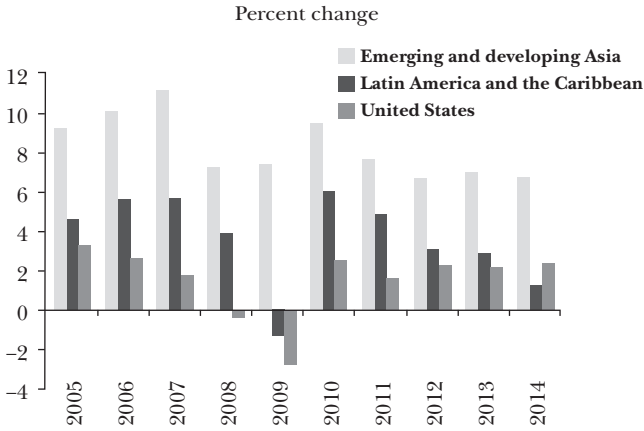
Source: World Economic Outlook, IMF.

4. US UNCONVENTIONAL MONETARY POLICES

Due to the severity of the 2008-2009 financial crisis, the Federal Reserve implemented a set of unorthodox policies. At the beginning of the crisis such policies were aimed at restoring the correct functioning of financial markets and some specific sectors in the economy, but as time passed more policies were implemented in order to boost economic activity and employment. The most important of those policies have been forward guidance and quantitative easing (QE). In our analysis we will focus on the impact of the latter.

Two months after the bankruptcy of Lehman Brothers, and with the federal funds rate close to zero, the Federal Reserve announced on November 25, 2008, that it would buy up to 500 billion dollar in mortgage-backed securities (MBS) and 100 billion dollar in direct obligations of housing-related government-sponsored enterprises (GSEs). This program of asset purchases was denominated QE1. Unlike the subsequent programs, QE1 was implemented at a time when demand for liquidity was particularly high, so the program helped to ease conditions in credit markets; in particular, the objective of this first program was to reduce the cost and increase the availability of credit for the housing sector.

Because conditions in the credit market remained tight, employment continued deteriorating and household wealth declined further, and the Federal Reserve decided at its meeting in March 2009 to increase the amount of assets that it would buy to 750 billion dollar, making total purchases amounting to 1.25 trillion dollar. In addition, the Federal Reserve announced that it would buy up to 300 billion dollars in long-term Treasury bonds in order to help ease conditions in private credit markets. Purchases of treasuries were completed towards the end of that year, while purchases of MBS and agency debt continued until March 2010. The total amount of QE1 was 1,725 billion dollar.

Months after the conclusion of the first purchase program, following weeks of speculation among market participants, the Federal Reserve announced at its November 3, 2010, meeting that it would start a second round of asset purchases (QE2), which would consist of monthly purchases of 75 billion dollar in long term Treasury bonds, for a total of 600 billion dollar. Unlike QE1, this program was implemented when conditions in financial markets had normalized, so its goal was aimed at stimulating economic activity in a context in which inflation was below the Federal Reserve inflation target of 2% and unemployment well above long-term rates. This program ended in June 2011.

After QE2 ended, the Federal Reserve announced the implementation of a program called Operation Twist. This program unlike QE did not imply an increase in the central bank balance sheet, as the Federal Reserve bought long-term assets and sold the same amount of short-term assets, but this program contributed to a further reduction in long-term interest rates. This program was in effect until December 2012.

The third round of asset purchases (QE3) was announced in September 2012. Unlike the first two programs, the Federal Reserve did not determine the total amount of the program; instead, it announced that it would purchase MBS at a pace of 40 billion dollar per month. The implementation of this program was aimed at further reducing interest rates, thus contributing to strengthening the economic recovery.

In December 2012, the Federal Reserve announced that it would also purchase longer-term Treasury securities at a pace of 45 billion dollar per month, making total monthly purchases of 85 billion dollar. It is noteworthy that in the same statement, the Committee added that the exceptionally low interest rates would continue until the unemployment rate was located at 6.5% and inflation expectations for the next two years were no more than 0.5 percentage points above the

Figure 5

10-YEAR INTEREST RATE AND TREASURIES PURCHASES

USD billions

US 10-YEAR ANNUAL INTEREST RATE

QUATERLY CHANGE IN TREASURY
SECURITIES PURCHASES
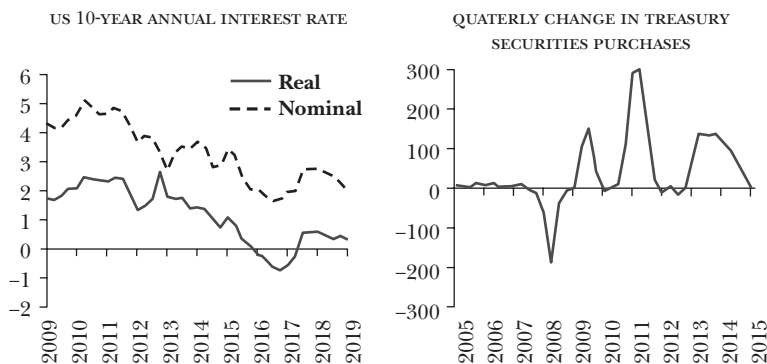
Source: Federal Reserve.

target of 2%. With this change of language, the continuity of asset purchases was linked to economic conditions, particularly labor market conditions, which meant a major shift from previous programs. Given this change in the communication of the Federal Reserve, financial markets became more sensitive to changing economic conditions in the United States, particularly to the evolution of labor conditions.

The third program ended in October 2014; however, the Federal Reserve has maintained its policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities and of rolling over maturing Treasury securities at auction, so the balance sheet of the central bank is still at historically high levels. Furthermore, there is no clear position on what actions the Federal Reserve will take regarding the size of its balance sheet once it starts the cycle of monetary policy tightening.

As described before, the asset purchase programs differed in terms of quantity and type of assets purchased; in this sense the level of treasuries purchased in each phase captures the intensity of each program. Additionally, the long term USA interest rate decreased as a result of these purchases, as has been widely analyzed.[3] For this reason we will

---

[3] See Gagnon et al. (2010); Krishnamurthy and Vissing-Jorgensen (2011);

use these purchases and the 10-year USA interest rate (Figure 5) as variables that capture the effect of unconventional monetary policy on capital flows to emerging economies.

5. EMPIRICAL ANALYSIS

We estimate a panel of 15 emerging economies to analyze the drivers of gross capital inflows using pull and push factors as explanatory variables. Regarding pull factors we include real monetary policy rate and economic growth differentials with respect to the USA. The push factors that are included in this model are: The USA 10-year interest rate, treasuries purchases, and the VIX index, which is used as a proxy for risk aversion in international markets. It is important to highlight that the policy rate differential is used following Ahmed and Zlate's (2013) argument, which assumed that it affects return differentials and this could change investors' decisions. For the USA policy rate we use the shadow interest rate calculated by Wu and Xia (2016) and updated by the Federal Reserve Bank of Atlanta. Moreover, including it balances the model specification, given that we use the long-run USA rate. Importantly, we use real interest rates in order to control for domestic monetary developments.

To measure the impact of USA QE programs on capital flows, we conduct two exercises. In the first exercise, we aim to measure how capital flows were affected in the postcrisis period and the indirect effect of USA monetary policy through the long-term interest rate channel. In the second one, we measure directly the effect of treasuries purchases on capital inflows to EME. Since the first QE program was implemented in the USA, there have been several studies published that try to analyze the impact of those programs on USA interest rates. Although the magnitude of the effect varies among different studies, in general all have found that, in the context of the zero lower bound, QE programs have generated additional reductions in the USA 10-year interest rate.[4] Having this in mind, we also want to analyze whether the effect of the USA interest rate on capital flows has changed with the implementation of QE programs in

---

Hamilton and Wu (2011); and Glick and Leduc (2011).

[4] See Gagnon et al. (2010); Krishnamurthy and Vissing-Jorgensen (2011); Hamilton and Wu (2011); and Glick and Leduc (2011).

the postcrisis period. For this purpose we include a dummy variable equal to one from the fourth quarter of 2008 –when the first QE program began– to the last observation. Even though the last QE program ended on October 2014, the Federal Reserve has continued reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities, therefore we set the dummy variable equal to 1 up to the first quarter of 2015.[5] In addition to the dummy variable that helps us to see how capital flows were affected in the postcrisis period, we include in our model the interaction of the USA 10-year interest rate with the dummy variable. This coefficient helps us capture the indirect effect of long-term interest rates in the postcrisis period.

According to the specification that we mentioned above, we set our regression equation as follows:

1
$$f_{i,t} = \beta_1 f_{i,t-1} + \beta_2 r_t^{US} + \beta_3 s_t + \beta_4 \left(i_{i,t} - i_{i,t}^{US} \right) +$$
$$+ \beta_5 \left(g_{i,t} \quad g_{i,t}^{US} \right) + \beta_6 D_t + \beta_7 \left(r_t^{US} * D_t \right) + \varepsilon_t.$$

Where:

$f_{i,t}$ Capital flow to country i.
r_t^{US} US 10-year real interest rate.
s_t VIX index.
$i_{i,t}$ Real monetary policy rate in country i.
$i_{i,t}^{US}$ Real monetary policy rate in the USA (shadow interest rate).
$g_{i,t}$ Economic growth rate in country i.
$g_{i,t}^{US}$ USA economic growth rate.
D_t Dummy for postcrisis period.

The expected signs of coefficients are positive for β_1, β_4, β_5 and β_6, and negative for β_2, β_3 and β_7. We expect β_1 to be positive reflecting the persistence of capital flows which could indicate that investors are more likely to invest new resources in countries where they already have capital invested. β_4 should be positive to reflect the search for yield phenomenon. We expect β_5 to be positive, reflecting that low growth in advanced economies, USA in this case, tends to support capital flows to EME with higher economic growth. Looking at the behavior of capital flows in the postcrisis period, we expect β_6 to be positive, reflecting that the increase in global liquidity had a positive

---

[5] See Federal Reserve's July 2015 monetary policy press release.

impact on capital flows to EME. In accordance to previous literature,[6] we expect β_2 to be negative, indicating that reductions in the USA interest rates tend to favor capital flows to EMEs and vice versa. For the same reason we expect β_7 to be also negative. β_3 should be negative, reflecting that an increase in risk aversion in financial markets leads to a reduction of capital flows to EME, which is also consistent with what previous studies had found.[7]

In the second exercise, we use the natural logarithm of treasuries purchases in order to see whether the effect of the postcrisis period found before was specifically affected by the treasuries purchases that the Federal Reserve implemented.

2 $$f_{i,t} = \beta_1 f_{i,t-1} + \beta_2 r_t^{US} + \beta_3 s_t + \beta_4 \left(i_{i,t} \quad i_{i,t}^{US} \right) + \beta_5 \left(g_{i,t} - g_{i,t}^{US} \right) + \beta_7 Tre_t + \varepsilon_t.$$

Where:

Tre_t Treasury securities purchased in time t.

We estimate our regressions using the panel general method of moments (GMM), which allows us to control for endogeneity since we are using a number of variables as instruments. In particular, we use current values for exogenous variables, which in the model are the variables common for all EME, and lagged values for domestic variables.[8]

Our sample covers 15 EME: Brazil, Chile, Colombia, Czech Republic, India, Indonesia, Korea, Malaysia, Mexico, Peru, Poland, Philippines, South Africa, Thailand and Turkey.[9] For the dependent variables, we use quarterly gross capital inflows from balance of payments statistics (BOP) over the period 2005Q1 to 2015Q1. Specifically we use FDI, portfolio and other investment liabilities, and we estimate total flows as the sum of those three components. The data is in USA current dollars and we normalized it by the GDP of each country. We use GDP in current dollars from Haver Analytics. Although the data

---

[6]   Calvo et al. (1993), Fernández-Arias (1993), IMF (2011) and IMF (2013).

[7]   IMF (2011), Marcel Fratzscher (2011), M. Fratzscher et al. (2013), IMF (2013) and S. Ahmed and A. Zlate (2013).

[8]   We assumed that the USA 10-year interest rate, QE programs and the VIX index are exogenous variables. Presumed endogenous variables are lagged capital flows, EME's monetary policy rates, inflation, economic growth and real exchange rate depreciation.

[9]   We use this group of emerging countries since we think they are the most representative countries for each region with data availability.

from BOP is not as timely as the one of EPFR, using it allows us to analyze the behavior of all types of capital flows, including FDI.[10] It is also important to highlight that in our analysis we are trying to explain the drivers of foreign capital, and therefore we are using gross capital flows instead of net flows.

The USA 10-year real interest rate is obtained from the Federal Reserve website. We use the quarterly change of the VIX index from Bloomberg. The monetary policy differential is estimated as the difference between the real monetary policy rate and the USA real effective rate from 2005:1Q to 2008:4Q. From 2009:1Q to 2015:1Q, we use the real shadow rate proposed by Wu and Xia (2016), the real monetary policy rate is obtained from Haver Analytics and both of the last two variables are obtained from the Federal Reserve of Atlanta. The growth differential is estimated as the difference between the growth rate of each emerging country and the USA growth rate with information from Haver Analytics. We use quarterly data.

The information regarding the implementation of QE programs in the USA is obtained from FOMC press releases that are available on the Federal Reserve website.

As we saw in the previous section in Figure 2, the behavior of capital flows has been different across regions of EME. Within our sample of 15 EME, there exists a lot of heterogeneity that might affect the average result we obtained in the previous section. Therefore, in this section we analyze whether the impact of QE programs has been differentiated across regions. For this purpose, we conduct the same exercises as before but we divide our sample into three groups: Latin America, Asia and in the third group we include European countries and South Africa, as shown in Table 1.

Table 1		
COUNTRY GROUPS		
Latin America	*Asia*	*Europe & Africa*
Brazil	India	Czech Republic
Chile	Indonesia	Poland
Colombia	Korea	South Africa
Mexico	Malaysia	Turkey
Peru	Philippines	
	Thailand	

---

[10] EPFR data captures only about 5-20% of the market capitalization in equity and in bonds for most countries.

6. RESULTS

6.1 General Results

In this section, we present the results that we obtained from our sample.

In the first exercise, we find that USA monetary policy has a significant impact on capital flows to EME. This effect is captured with the postcrisis dummy and the USA 10-year interest rate. In the first case, we find that for the postcrisis period, portfolio investment and total flows have increased, and it is a significant change, but not for FDI (see Table 2). The effect, as expected, is positive, which means that during the postcrisis period, particularly starting with the implementation of QE programs, capital inflows in EME have increased with respect to the previous episode. According to our analysis, capital flows as a percentage of GDP have increased around 19 percentage points since the first QE program was implemented, and 11 percentage points in terms of portfolio investment.

To measure the impact of the USA interest rate when unconventional monetary policies were in place, we should take into account the effect of this variable plus the interaction term with the postcrisis period. It is worth noting that the coefficient of the USA interest rate – without the interaction term- has a positive sign, contrary to what we might have expected; nevertheless, this is consistent with some literature that has found that in the period prior to the crisis the relation between USA interest rates and capital flows was positive.[11] When we add the interaction term, we find a negative relation between the USA interest rate and capital flows in EME, which means that the decline that the USA 10-year interest rate has registered since the financial crisis has pushed capital flows into EME. Specifically, we find that a 1 percentage point decrease in the USA 10-year interest rate leads, on average, to a 2.16 percentage point increase in total capital flows as a percentage of GDP, and a 0.65 increase in the case of portfolio flows.[12] For FDI, the relation is positive but not statistically significant.

---

[11] See Marcel Fratzscher (2011).

[12] With regards to the real policy rate differential, we do not find it statistically significant for either of the two exercises conducted. It is worth noting that the policy rate for the Czech Republic reached the zero lower bound (ZLB). Nevertheless, there are few observations where the ZLB is registered in this country, thus the results obtained did not change when not considering this episode.

We also find that increases in risk aversion in financial markets are associated with capital outflows from EME. These outflows take place on portfolio and other investments.

Our results suggest that for the pull factors, we only find growth differential to be statistically significant; for every percentage point that growth in EME surpass the USA growth rate, capital flows as a percentage of GDP increase on average 0.65 percentage points. The external or push factors have been important drivers of capital flows in the last decade.

In order to test for other pull factors that might have helped attracting capital flows to emerging economies, in the Annex we include the run of the same regression presented in Table 2 including trade openness, measured as the sum of exports and imports as percentage of GDP. The results do not change in terms of significance and direction, and trade openness is not significant. This is consistent with the fact that the biggest changes in these indicators happened before our sample period started.

In the second exercise, we find that when the natural logarithm of treasuries purchases is the main variable capturing USA unconventional monetary policy, these also have an important and significant effect on capital flows to EME.[13] Our results –reported in Table 3– suggest that a 1% increase in treasuries purchases increases capital flows by 8.84%, whereas the effect for portfolio investment is an increase of around 2.65 percent.

It is also worth noting that for the FDI, the coefficients of treasuries are positive but not significant, whereas the uncertainty in financial markets continues to be an important determinant of capital flows to emerging market economies.

Note that the variation that allows this model to measure the effect of unconventional monetary policy in the USA is captured in the treasuries purchases and not in the long-term interest rate, as in the previous exercise, since the latter is neither statistically significant for portfolio investment nor FDI.

We do not find the policy rate differentials statistically significant, similar to the results found by Ahmed and Zlate (2013), although it has a positive sign for total inflows in both exercises. The lack of significance of policy rate differentials when fixed effects are included

---

[13] This exercise also includes a dummy for the taper talk period as control, which was not statistically significant.

is consistent with the idea that these fixed effects may be partly capturing the long-run interest rate differentials between EME and AE, as Ahmed and Zlate (2013) argue.

Table 2

DETERMINANTS OF CAPITAL FLOWS TO EME: PANEL REGRESSION RESULTS

	Total	*Portfolio Investment*	*FDI*
	(1)	*(2)*	*(3)*
L(−1)	0.103[b]	0.147[c]	0.118[c]
	(0.048)	(0.047)	(0.042)
USA 10-year real interest rate	8.967[c]	5.041[c]	0.406
	(3.324)	(1.957)	(1.036)
VIX	−0.059[c]	−0.042[c]	−0.002
	(0.009)	(0.005)	(0.004)
Policy rate differential	0.014	−0.011	0.053
	(0.170)	(0.106)	(0.067)
Growth differential	0.656[c]	0.214[b]	0.023
	(0.162)	(0.099)	(0.060)
Postcrisis period	19.459[c]	11.792[c]	0.426
	(7.086)	(4.246)	(2.259)
Postcrisis period* USA 10-year real interest rate	−11.122[c]	−5.693[c]	−0.565
	(3.761)	(2.200)	(1.149)
Country fixed effects	Yes	Yes	Yes
J-statistic	1.71	3.58	4.60
P(J-statistic)	0.43	0.31	0.47

Coefficients estimated with GMM. Standard errors are reported in parentheses.
[a], [b], [c] indicates significance at the 90%, 95%, and 99% level, respectively.

**DETERMINANTS OF CAPITAL FLOWS TO EME:
PANEL REGRESSION RESULTS**

	Total	Portfolio investment	FDI
	(1)	(2)	(3)
L(−1)	0.133[b]	0.153[a]	0.120[c]
	(0.059)	(0.062)	(0.045)
USA 10-year real interest rate	4.417[c]	1.008	0.210
	(1.532)	(0.609)	(0.185)
VIX	−0.086[c]	−0.044[c]	−0.003
	(0.016)	(0.007)	(0.004)
Policy rate differential	0.149	−0.357	−0.013
	(0.251)	(0.314)	(0.069)
Growth differential	0.661[c]	0.095	0.024
	(0.225)	(0.179)	(0.064)
Treasuries	8.839[c]	2.653[a]	0.223
	(2.344)	(1.067)	(0.343)
Country fixed effects	Yes	Yes	Yes
J-statistic	3.39	1.13	10.23
P (J-statistic)	0.34	0.57	0.18

Coefficients estimated with GMM. Standard errors are reported in parentheses.
[a], [b], [c] indicates significance at the 90%, 95%, and 99% level, respectively.

6.2 Regional Analysis

In this section, we run the same regressions as before but divide our sample into three regions.[14] For the first exercise, where we include the interaction term of the dummy for the postcrisis period and the USA interest rate, we find that during the postcrisis period, capital

---

[14] Even though South Africa is not related to Europe, we decided to include it in this group of countries because some of the developments observed in that country are similar to Turkey and other EME in the region. Nevertheless, we run the same regressions dropping South Africa and the results presented below did not change.

inflows in Latin America and Asia increased, while we do not find evidence of any effect on Europe and South Africa. As we can see in Table 3, during the postcrisis period flows increased more in Asia and the difference is significant for all types of investment, including FDI. Meanwhile, in Latin America, the evidence suggests that the main effect during the postcrisis period is on portfolio investment.

Regarding the effect of the USA 10-year interest rate, our evidence suggests that it is much stronger for capital flows to Latin America; in particular, we find that a one percentage drop in the USA interest rate leads to an increase of 2.42 percentage points in total flows as a percentage of GDP, whereas in Asia the increase is around 1.42 percentage points.[15] Similarly, a reduction of 100 basis points in the USA interest rate generates an increase of 1.35 percentage points in portfolio inflows in Latin American economies, and of 0.49 percentage points in Asia. These results are consistent with the behavior that we have observed of capital flows in those regions.

The VIX index is statistically significant for the three regions, and in all cases has a negative sign, suggesting that in periods of increased risk aversion, capital moves out of EME. We find that this effect is greater for total flows in Asia, although the effect is very similar for portfolio investment in Asia, Europe, and South Africa. In Latin America the total effect of VIX index is smaller.

In the analysis by region, we find that in the last decade, economic growth has been a driver of total capital flows to emerging Asia. For this region, we find that for every 1 percentage point that the domestic economy outgrows the USA, total flows as a percentage of GDP increase by 0.63 percentage points.

In the second exercise, we measure the impact of Treasury securities purchases directly, and we find that these indeed are associated with more capital flows in both Asia and Latin America. Our evidence suggests that the effect is greater in Asia, although the effect was statistically significant for the total and portfolio flows in Latin America. We find that these programs are associated with an increase of total capital flows in Asia and Latin America. Additionally, our results suggest that economic growth has an impact on total capital flows in EME, in all three regions. These results are summarized in Table 5.

---

[15] The total effect from the USA 10-year interest rate is obtained from the sum of β_2 and β_7.

In this regression, we find that a 1% increase in treasuries purchases is associated with a 7.6% and 12.0% increase of total capital flows in Latin America and Asia, respectively, but with no effect in Europe and Africa. In terms of portfolio investment, the effect of treasuries purchases is higher in Latin America than in Asia, but in the former, FDI is not affected by these programs.

Consistent with our previous results, higher growth differential with respect to the USA is associated with higher capital flows. In the case of Latin America, this is statistically significant for total and portfolio investment, and in the case of Asia, we find evidence for total capital flows. It is also worth noting that uncertainty in financial markets measured by the VIX is an important factor behind capital flows in all regions and for all types of investment.

6.3 Robustness Checks

In order to check the robustness of our results, we test an additional hypothesis.

Since our model is better at explaining total and portfolio flows, we want to rule out other possible explanations of the increase in this kind of investment. In particular, we test whether the inclusion of a country in the Citigroup World Government Bond Index (WGBI) is associated with the observed increase in portfolio investment. In order to measure the impact of the inclusion in the WGBI we decide to use a dummy variable equal to 1 for the countries which bonds are included in this index since the quarter that they were included. To have a better specification of our model, we decide to measure the impact of QE programs by the total purchases of MBS and treasuries. We run this regression for total portfolio investment and for debt flows. The results are reported in Table 6.

Our analysis suggests that the inclusion in the WGBI is not associated with the increase of capital flows that is observed in the last decade, which supports our previous results that QE programs were among the main drivers of portfolio investment in the last years.

Table 4

DETERMINANTS OF CAPITAL FLOWS TO EME: PANEL REGRESSION RESULTS

| | Latin America | | | Asia | | | Europe and Africa | | |
	Total	Portfolio Investment	FDI	Total	Portfolio Investment	FDI	Total	Portfolio Investment	FDI
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
L(−1)	−0.015	0.118	0.026[b]	0.154	0.110[b]	0.164[b]	0.061	0.222[c]	0.141[a]
	(0.092)	(0.083)	(0.080)	(0.079)	(0.082)	(0.070)	(0.085)	(0.086)	(0.076)
US 10-year real interest rate	9.275[a]	3.671[a]	−2.332	10.411[b]	9.297[c]	1.622	5.418	−0.462	0.476
	(5.481)	(2.059)	(1.972)	(4.328)	(3.395)	(1.055)	(4.914)	(2.827)	(1.654)
VIX	−0.029[b]	−0.021[c]	0.009	−0.085[c]	−0.055[c]	−0.005	−0.052[c]	−0.050[c]	−0.010
	(0.015)	(0.007)	(0.007)	(0.014)	(0.010)	(0.004)	(0.015)	(0.009)	(0.007)
Policy rate differential	−0.692[a]	−0.085	0.098	0.293	0.084	−0.027	−0.076	−0.037	0.035
	(0.379)	(0.165)	(0.192)	(0.322)	(0.235)	(0.085)	(0.307)	(0.186)	(0.133)
Growth differential	0.490	0.250	−0.173	0.625[a]	0.280	0.092	0.467	0.175	0.003
	(0.305)	(0.139)	(0.145)	(0.342)	(0.243)	(0.084)	(0.296)	(0.179)	(0.123)
Post-crisis period	21.88[a]	9.901[b]	−4.798	21.272[b]	19.976[c]	3.215	9.509	−0.090	−0.446
	(11.544)	(4.489)	(4.33)	(9.467)	(7.476)	(2.351)	(10.041)	(5.838)	(3.52)
Post-crisis period *USA 10-year real interest rate	−11.69[b]	−5.024[b]	2.151	−11.832[b]	−9.784[c]	−1.959[a]	−7.237	0.519	−0.324
	(5.813)	(2.320)	(2.210)	(5.080)	(3.900)	(1.200)	(5.341)	(3.073)	(1.783)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
J-statistic	0.02	1.95	7.19	3.33	1.17	8.16	1.87	4.04	2.00
P(J-statistic)	0.99	0.58	0.21	0.19	0.76	0.15	0.39	0.26	0.85

Coefficients estimated with GMM. Standard errors are reported in parentheses. [a], [b], [c] indicates significance at the 90%, 95%, and 99% level, respectively.

Have QE Programs Affected Capital Flows to Emerging Markets? **177**

Table 5

DETERMINANTS OF CAPITAL FLOWS TO EME: PANEL REGRESSION RESULTS

	Latin America			Asia			Europe and Africa		
	Total	Portfolio Investment	FDI	Total	Portfolio Investment	FDI	Total	Portfolio Investment	FDI
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
L(−1)	0.019	0.127	0.022	0.166[b]	0.163[b]	0.175[c]	0.162	0.253[c]	0.175[b]
	(0.1)	(0.106)	(0.078)	(0.088)	(0.074)	(0.068)	(0.104)	(0.088)	(0.083)
US 10-year real interest rate	3.171[a]	0.976	−0.453	7.098[b]	3.287[b]	0.406[a]	7.153[a]	2.575	0.518
	(1.697)	(0.968)	(0.380)	(2.892)	(1.580)	(0.214)	(3.845)	(1.918)	(0.413)
VIX	−0.058[b]	−0.029[c]	0.010	−0.113[c]	−0.067[c]	−0.007*	−0.021	−0.50[c]	−0.011
	(0.023)	(0.009)	(0.007)	(0.029)	(0.013)	(0.004)	(0.031)	(0.011)	(0.006)
Policy rate differential	−0.133	−0.142	−0.060	0.435	0.077	−0.019	−0.739	−0.449	−0.031
	(0.425)	(0.207)	(0.190)	(0.431)	(0.298)	(0.298)	(0.468)	(0.236)	(0.114)
Growth differential	0.528[a]	0.157	−0.121	0.853[b]	0.322	0.063	−0.241	−0.320	0.029
	(0.305)	(0.178)	(0.142)	(0.404)	(0.245)	(0.076)	(0.596)	(0.305)	(0.113)

Treasuries	7.587ᶜ	3.034ᵇ	−0.550	12.033ᵇ	5.561ᶜ	0.859ᵇ	10.273ᵇ	2.651	0.108
	(2.798)	(1.576)	(0.748)	(4.445)	(2.149)	(0.432)	(4.983)	(2.147)	(0.622)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
J-statistic	1.03	1.59	11.07	0.99	1.27	11.63	5.92	5.09	5.83
P(J-statistic)	0.80	0.66	0.14	0.91	0.74	0.11	0.12	0.28	0.67

Coefficients estimated with GMM. Standard errors are reported in parentheses. ᵃ, ᵇ, ᶜ indicates significance at the 90%, 95%, and 99% level, respectively.

Table 6

DETERMINANTS OF CAPITAL FLOWS TO EME: PANEL REGRESSION RESULTS

	Total		Latin America		Asia		Europe and Africa	
	Portfolio Investment	Debt	Portfolio Investment	Debt	Portfolio Investment	Debt	Portfolio Investment	Debt
	(2)	(3)	(2)	(3)	(2)	(3)	(2)	(3)
L(−1)	0.186[c]	0.150[c]	0.123	0.079	0.171[c]	0.182[b]	0.212[c]	0.039
	(0.041)	(0.050)	(0.088)	(0.090)	(0.068)	(0.073)	(0.075)	(0.110)
USA 10-year real interest rate	0.329	0.073	−0.385	−0.194	1.341[b]	0.915[a]	−0.035	−0.152
	(0.285)	(0.324)	(0.331)	(0.346)	(0.608)	(0.51)	(0.464)	(0.591)
VIX	−0.043[c]	−0.126[c]	−0.022[c]	−0.021[a]	−0.057[c]	−0.026[c]	−0.048[c]	−0.026[c]
	(0.005)	(0.104)	(0.007)	(0.012)	(0.010)	(0.008)	(0.008)	(0.010)
Policy rate differential	−0.047	−0.024	−0.081	−0.112	0.028	0.115	−0.207	−0.370[a]
	(0.097)	(0.005)	(0.161)	(0.152)	(0.231)	(0.164)	(0.171)	(0.22)

Growth differential	0.174[a] (0.096)	0.116 (0.078)	0.360[b] (0.168)	0.269[a] (0.141)	0.224 (0.225)	0.086 (0.168)	0.032 (0.149)	-0.105 (0.204)
WGBI	0.588 (0.790)	-1.540 (5.072)	-2.845 (3.55)	-1.080 (2.604)	2.281 (1.992)	-0.172 (1.564)	-1.312 (1.149)	-10.746 (7.100)
Treasuries purchases	1.397[c] (0.538)	1.289[c] (0.518)	2.202[b] (0.912)	1.879[b] (0.753)	2.568[b] (1.259)	1.529 (1.029)	0.186 (0.767)	1.686[c] (1.506)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
J-Statistic	4.40	3.74	2.94	1.76	2.19	0.60	8.15	1.55
P (J-statistic)	0.36	0.29	0.57	0.62	0.70	0.74	0.15	0.91

Coefficients estimated with GMM. Standard errors are reported in parentheses. [a], [b], [c] indicates significance at the 90%, 95%, and 99% level, respectively.

7. CONCLUSIONS

With the increase in capital inflows that was observed in EME since 2005 and the deepening of this trend in the years following the 2008 financial crisis, the debate about the potential benefits and risks associated with massive capital inflows has regained importance. On the one hand, capital flows can contribute to further growth in the region –through more investment and lower capital costs–. However, the magnitude and composition of capital flows can pose risks to financial stability in these countries. In this context, it is relevant to understand the factors behind the increase that has been observed in capital flows in recent years.

The empirical evidence suggests that during the postcrisis period there was an increase in capital inflows to EME and that the effect of USA quantitative easing programs, measured both through the long-term USA interest rate and through the treasuries purchases, had an impact on capital flows. However, the effect was different depending on the region and type of investment. In particular, our results suggest that during the postcrisis period, massive capital inflows into Asian and Latin American economies were observed, but there is not a statistically significant effect for emerging Europe and South Africa. We also find that this increase in capital inflows to EME in the postcrisis period is associated with a reallocation of resources across types of investment. In the case of Latin America, a lower USA interest rate generates an increase in portfolio investment, while Asian economies registered an increase in both portfolio and total investment, though FDI is not statistically significant. The results obtained for FDI confirm that this is a long-term process and the analysis of this type of capital flow should be examined more carefully using other methodologies. When we measure the impact of QE through treasuries purchases directly we find that the effect is bigger in Asia for the three types of investment and is significant for Latin America as well.

As previous studies have found, risk aversion seems to have a significant impact on capital flows to EME, particularly on portfolio investment. Our evidence suggests that episodes of increased risk aversion are associated with capital outflows from all EME, although the impact seems to be higher in Asia.

Regarding pull factors, we find that economic growth has played an important role in the increase of capital flows in EME during the

last decade, with respect to the full sample. On the contrary, we do not find evidence to suggest that in our period of analysis the policy rate differential is an important driver of capital flows nor trade openness nor the WGBI.

These results are particularly relevant in the current economic environment, in which the last QE program in the USA has ended and where the Federal Reserve started the normalization of its monetary policy by raising federal funds in December 2015. It is anticipated that the increase of interest rates in the United States will generate a reallocation of resources, encouraging capital flows to the United States. If this process also comes amid greater market volatility, capital outflows from EMs could be exacerbated due to the sensitivity of capital flows to the implied volatility in financial markets. It is also worth noting that the normalization of USA monetary policy will take place in an environment where USA growth is gaining strength, while growth perspectives for EME are less optimistic.

ANNEX

<div align="center">

Table 7

**DETERMINANTS OF CAPITAL FLOWS TO EME:
PANEL REGRESSION RESULTS**

</div>

	Total	Portfolio investment	FDI
	(1)	(2)	(3)
L(−1)	0.092[b]	0.144[c]	0.134[c]
	(0.058)	(0.047)	(0.047)
USA 10-year real interest rate	8.853[b]	5.374[b]	0.461
	(3.359)	(2.319)	(0.32)
VIX	−0.060[c]	−0.041[c]	−0.007
	(0.009)	(0.006)	(0.005)
Policy rate differential	0.123	0.022	0.026
	(0.194)	(0.121)	(0.077)
Growth differential	0.640[c]	0.125[b]	0.053
	(0.206)	(0.159)	(0.085)
Post-crisis period	20.194[c]	13.248[b]	0.771
	(8.322)	(5.553)	(1.053)
Post-crisis period*USA 10-year real interest rate	−10.834[c]	−6.057[b]	−0.576[a]
	(3.754)	(2.578)	(0.299)
Trade openness	0.021	0.023	−0.014
	(0.052)	(0.039)	(0.021)
Country fixed effects	Yes	Yes	Yes
J-Statistic	6.25	2.59	2.66
P(J-statistic)	0.10	0.28	0.62

Coefficients estimated with GMM. Standard errors are reported in parentheses.
[a], [b], [c] indicates significance at the 90%, 95%, and 99% level, respectively.

Table 8

VARIABLES USED

Variable	Description	Source
Capital flows	FDI, portfolio investment, debt and other investment liabilities	Balance of Payments, IMF
GDP	Nominal, in current USAD, quarterly	Haver Analytics
USA 10-year interest rate	Real interest rate, monthly	Federal Reserve
VIX index	The CBOE volatility index, daily	Bloomberg
Monetary policy rate	Percent, monthly	Haver Analytics and Banco de México
Inflation rate	Annual percent change of CPI, monthly	Haver Analytics
Growth rate	Annual percentage change, quarterly	Haver Analytics

References

Ahmed, Shaghil, and Andrei Zlate (2013), *Capital Flows to Emerging Markets Economies: A Brave New World?*, International Finance Discussion Papers, Federal Reserve Board of Governors, No. 1081, June.

Arias, Fernando, Daira Garrido, Daniel Parra-Amado, and Hernán Rincón (2012), *¿Responden los diferentes tipos de flujos de capitales a los mismos fundamentos y en el mismo grado? Evidencia reciente para países emergentes,* Borradores de Economía, Banco de la República (Colombia), No. 717

Broner, Fernando, Tatiana Didier, Aitor Erce, and Sergio L. Schmukler (2013a), "Gross Capital Flows: Dynamics and Crises," *Journal of Monetary Economics,* No. 60, pp. 113-133.

Broner, Fernando, Tatiana Didier, Aitor Erce, and Sergio L. Schmukler (2013b), *International Capital Flows during Crises: Gross Matters*, VoxEU.org, March 28, <http://voxeu.org/article/international-al-capital-flows-during-crises-gross-matters>.

Calvo, Guillemo, Leonardo Leiderman, and Carmen Reinhart (1992), *Capital Inflows to Latin America: The 1970s and 1990s*, International Monetary Fund Working Paper, No. 92/85, October.

Calvo, Guillemo, Leonardo Leiderman, and Carmen Reinhart (1993), "Capital Inflows and Real Exchange Rate Appreciation in Latin America: The Role of External Factors," *International Monetary Fund Staff Papers,* Vol. 40, No. 1, pp. 108-151.

Calvo, Guillemo, Leonardo Leiderman, and Carmen Reinhart (1996), "Inflows of Capital to Developing Countries in the 1990s," *The Journal of Economic Perspectives*, Vol. 10, No. 2, Spring, pp. 123-139.

Carstens C., Agustín (2015), "Challenges for Emerging Economies in the Face of Unconventional Monetary Policies in Advanced Economies," Stavros Niarchos Foundation Lecture, Peterson Institute for International Economics, April.

Chen, Qianying, Andrew Filardo, Dong He, and Feng Zhu (2012), *International Spillovers of Central Bank Balance Sheet Policies*, BIS Working Paper, No. 66.

Chen, Jiaqian, Tommaso Mancini-Griffoli, and Ratna Sahay (2014), *Spillovers from United States Monetary Policy on Emerging Markets: Different This Time?*, International Monetary Fund Working Paper, No. 14/240, December.

Chuhan, Punam, Stijn Claessens, and Nlandu Mamingi (1993), *Equity and Bond Flows to Latin America and Asia: The Role of External and Domestic Factors*, Policy Research Working Papers, World Bank, No. 1160, July.

Eichengreen, Barry, and Ricardo Hausmann (1999), "Exchange Rates and Financial Fragility", in *1999 Jackson Hole Symposium Proceeding. New Challenges for Monetary Policy*, Federal Reserve Bank of Kansas.

Fernández-Arias, Eduardo (1993), *The New Wave of Private Capital Inflows: Push or Pull?*, Policy Research Working Paper, No. 1312, World Bank, November.

Fernández-Arias, Eduardo, and Peter J. Montiel (1996), "The Surge in Capital Inflows to Developing Countries: An Analytical Overview," *The World Bank Economic Review*, Vol. 10, Issue 1, pp. 51-77

Fratzscher, Marcel (2011), *Capital Flows, Push versus Pull Factors and the Global Financial Crisis*, European Central Bank Working Paper, No. 1364.

Fratzscher, Marcel, Marco Lo Duca, and Roland Straub, (2013), *On the International Spillovers of US Quantitative Easing*, European Central Bank Working Paper, No. 1557.

Gagnon, Joseph, Matthew Raskin, Julie Remache, and Brian Sack (2010), *Large-scale Asset Purchase by the Federal Reserve: Did They Work?*, Federal Reserve Bank of New York Staff Reports, No. 441.

Glick, Reuven, and Sylvain Leduc (2011), *Central Bank Announcements of Asset Purchases and the Impact on Global Financial and Commodity Markets*, Federal Reserve Bank of San Francisco Working Paper, No. 2011-30, December.

González, Miriam (2015), *Determinantes de los flujos de capital en América Latina*, college thesis, Instituto Tecnológico Autónomo de México.

Hamilton, James D., and Jing Cynthia Whu (2011), *The Effectiveness of Alternative Monetary Policy Tools in a Zero Lower Bound Environment*, NBER Working Paper, No. 16956.

International Monetary Fund (2011), *Recent Experiences in Managing Capital Inflows-cross Cutting Themes and Possible Framework*, IMF, February.

International Monetary Fund (2013), "Global Capital Flows," at *Spillover Report-Analytical Underpinnings and Other Backgrounds*, Chapter 3, IMF Policy Paper, August.

Institute of International Finance (2013a), *Capital Flows to Emerging Markets*, IIF Research Note, October 7.

Institute of International Finance (2013b), *Quantifying the Fed's Impact on Capital Flows to EMs*, IIF Research Note, December 4.

Koepke, Robin (2015), *What Drives Capital Flows to Emerging Markets? A Survey of the Empirical Literature*, IIF Working Paper, April 23.

Krishnamurthy, Arvind, and Annette Vissing-Jorgensen (2011), *The Effects of Quantitative Easing on Long-term Interest Rates*, Working Paper Northwestern University.

Moore, Jeffrey, Sunwoo Nam, Myeongguk Suh, and Alexander Tepper (2013), *Estimating the Impacts of USA LSAPs on Emerging Markets Economies' Local Currency Bond Markets*, Federal Reserve Bank of New York Staff Report, No. 595.

Neely, Christopher J., (2010), *The Large-scale Asset Purchases Had Large International Effects*, Federal Reserve Bank of St. Louis Working Paper, No. 2010-018C.

Prasad, Eswar, Kenneth Rogoff, Shang-Jin Wei, and M. Ayhan Kose (2003), *Effects of Financial Globalization on Developing Countries: Some Empirical Evidence*, International Monetary Fund, March.

Taylor, Mark P., and Lucio Sarno (1997), "Capital Flows to Developing Countries: Long- and Short-term Determinants," *The World Bank Economic Review*, Vol. 11, No. 3, pp. 451-470, September.

Wu, Jin Cynthia, and Fan Dora Xia (2016), "Measuring the Macroeconomic Impact of Monetary Policy at the Zero Lower Bound," *Journal of Money, Credit, and Banking*, Vol. 48, No. 2-3, March-April.