



# The Global Financial Cycle and the Effects of Fed Unconventional Monetary Policies on Foreign Portfolio Flows in Colombia

NATHALI CARDOZO-ALVARADO<sup>+</sup> DAVID CASTAÑEDA-ARÉVALO<sup>♦</sup>  
FREDY GAMBOA-ESTRADA<sup>†</sup> JAVIER MIGUÉLEZ-MÁRQUEZ<sup>§</sup>

The opinions contained in this document are the sole responsibility of the authors and do not commit Banco de la República nor its Board of Directors.

## Abstract

Assessing the effects of U.S. monetary policies on portfolio flows is important for policymakers as they could pose risks to the effectiveness of domestic monetary policy. This paper analyzes the effects of the Global Financial Cycle (GFC) and Federal Reserve (Fed) unconventional monetary policy announcements on foreign portfolio investment flows in Colombia between 2010 and 2018. Using an ordinary least squares model with corrected serial correlation, we find that Fed unconventional monetary policy announcements affected portfolio flows in Colombia, especially those related to Tapering, Operation Twist and Forward Guidance. These announcements reinforced the effects of the GFC during the period analyzed. The results by type of flow indicate that public bonds flows are more sensitive to Fed announcements than private bond and equity flows.

**JEL Classification:** C22, E52, F3.

**Keywords:** Foreign investors, Federal Reserve, global financial cycle, unconventional monetary policies, Colombian portfolio flows.

---

<sup>+</sup> Head of Liquidity Support and Risk Control, Banco de la República. E-mail: [ncardoal@banrep.gov.co](mailto:ncardoal@banrep.gov.co).

<sup>♦</sup> Professional, Banco Popular. E-mail: [jesus\\_castaneda@bancopopular.com.co](mailto:jesus_castaneda@bancopopular.com.co).

<sup>†</sup> Researcher, Monetary and International Investment Division, Banco de la República. E-mail: [fgamboes@banrep.gov.co](mailto:fgamboes@banrep.gov.co). <http://orcid.org/0000-0003-4430-7920>. Correspondent author at Carrera 7 # 14-78, Bogotá, Colombia, Tel.+57 601 3430756.

<sup>§</sup> Leader Professional, Financial Infrastructure Oversight Department, Banco de la República. E-mail: [jmiguema@banrep.gov.co](mailto:jmiguema@banrep.gov.co).

# **El ciclo financiero global y los efectos de la política monetaria no convencional de la Fed sobre los flujos internacionales de portafolio en Colombia**

**NATHALI CARDOZO-ALVARADO DAVID CASTAÑEDA-ARÉVALO  
FREDY GAMBOA-ESTRADA JAVIER MIGUÉLEZ-MÁRQUEZ**

Las opiniones contenidas en el presente documento son responsabilidad exclusiva de los autores y no comprometen al Banco de la Republica ni a su Junta Directiva

## **Resumen**

Evaluar los efectos de la política monetaria de EE. UU. en los flujos de portafolio es importante para los hacedores de política, ya que podría afectar la eficacia de la política monetaria local. Este artículo analiza los efectos del Ciclo Financiero Global (CFG) y los anuncios de política monetaria no convencional de la Reserva Federal (Fed) sobre los flujos de inversión extranjera de portafolio en Colombia entre 2010 y 2018. Usando un modelo de mínimos cuadrados ordinarios con correlación serial corregida, encontramos que los anuncios de política monetaria no convencional de la Fed afectaron los flujos de portafolio en Colombia, especialmente los relacionados con Tapering, Operación Twist y Forward Guidance. Estos anuncios reforzaron los efectos del CFG durante el período analizado. Los resultados por tipo de flujo indican que los flujos de deuda soberana son más sensibles a los anuncios de la Fed que los flujos de bonos y acciones privados.

**Clasificación JEL:** C22, E52, F3.

**Palabras clave:** Inversionistas extranjeros, Reserva Federal, ciclo financiero global, política monetaria no convencional, flujos de portafolio en Colombia

## 1. Introduction

There is a rich strand of literature that finds evidence of the global spillovers -particularly in portfolio rebalancing towards emerging markets- of unconventional monetary policy measures implemented by major central banks in advanced economies in response to the Global Financial Crisis. In fact, Lim and Mohapatra (2016) argued that, in the context of near-zero returns in the U.S. and other high-income countries, investors began to seek alternative sources of yield, finding in Emerging Market Economies (EMEs) the ideal investment alternative given their heady growth rates.

Changes in the Fed monetary policy stance can accentuate the GFC and therefore affect the dynamics of capital flows (Bekaert et al., 2013; Miranda-Agrippino and Rey, 2020, among others). For example, Miranda-Agrippino and Rey (2020) analyzed the relationship between the Fed monetary policy and the GFC. The authors explain that, since the U.S. dollar is the most traded currency in the international financial system, U.S. monetary policy can influence the GFC, altering banks' funding costs. Monetary policy also affects asset prices, both in the United States and in other economies, and it is also transmitted to capital flows. For example, a contractionary monetary policy by the Fed causes asset prices to fall and global risk aversion to rise. Likewise, a contractionary monetary policy shock in the United States reduces capital flows worldwide.

According to the literature, there are three non-exclusive transmission channels that can be used to summarize how unconventional policies may affect capital flows in EMEs. (Chen et al., 2012; Lim and Mohapatra, 2016; Park and Um, 2016; Anaya et al., 2017; Gagnon et al., 2017; Fratzscher et al., 2018). First, the portfolio balancing channel implies that the purchase of long-term securities (including mortgage-backed securities) by central banks reduces the supply of these assets to private investors, and increases the demand for substitutes assets, including those in EMEs. Second, the signaling channel implies that unconventional monetary policies implemented in developed countries are perceived as central banks' commitments to maintain an accommodative monetary policy stance over a prolonged period (forward guidance). If that commitment is credible, the term premia of long-term bond yields in advanced economies falls, boosting capital flows to EMEs as the interest rate differential rises (*search-for-yield*). Third, the liquidity channel suggests that asset purchases by central banks in advanced economies increase reserves on private banks balance sheets. With more funds, previously liquidity-constrained banks are more willing to extend credit to investors. It results in lower funding costs (i.e., borrowing costs and bond yields) and a credit expansion in EMEs.

U.S. monetary policy decisions have significant implications for EMEs. As they could affect capital flows, they could bring economic benefits to these economies, but adverse effects such increasing exchange rate volatility and overheating the economy. This poses significant challenges for economies such as Colombia, where U.S. monetary policies adopted by the Fed may be important drivers of portfolio inflows.

The objective of this work is to assess the effects of the GFC and the Fed's unconventional monetary policies announcements on foreign portfolio investment in equity and bonds in Colombia. The contribution is twofold. First, we use a novel daily data set from the

Colombian Securities Exchange (BVC) and the Central Securities Depository (DCV) that allow us to analyze the effects of U.S. unconventional monetary policy on different types of portfolio investment such as equities and bonds. Second, this is the first document to our knowledge that examines the effects of these policies on portfolio flows in Colombia, as well as whether they exacerbated the impact of the global financial cycle on these flows during the period under consideration.

Using an ordinary least squares model with serial correlation corrected by the Bayesian information criterion, we find that Fed's unconventional monetary policy announcements affected portfolio flows in Colombia, particularly those related to Tapering, Operation Twist and Forward Guidance. The results by type of flow indicate that bonds flows, especially into local debt bonds are more sensitive to Fed announcements than equity flows. Given the importance of the global financial cycle in driving capital flows, we find that unconventional monetary policies reinforced its effect on portfolio flows in Colombia. This is important for policy makers and academics as understanding the transmission channels of the U.S. monetary policy on portfolio flows in Colombia allow to identify what policies could mitigate the possible macroeconomic and financial imbalances that it can cause in the domestic economy.

This document consists of five sections aside from the introduction. The second section contains a review of the literature on the effects of the GFC and the transmission channels of unconventional monetary policies on capital flows. The third section describes stylized facts about the evolution of portfolio flows and their relationship with unconventional policies over the course of the sample under consideration and the data set. The fourth section explains the methodology and then presents and analyzes the results. The last section summarizes the conclusions and discusses policy implications.

## **2. Literature Review**

The transmission of the GFC and unconventional monetary policy has been extensively studied. For instance, Galesi and Déés (2018) found that an expansionary shock in the Fed monetary policy contributed to the emergence of the GFC, which in turn stimulated global economic activity. The degree of global financial integration and the United States' position in the global economy amplified this effect. Andreou et al., (2021) analyzed the impact of the world's three main central banks' unconventional monetary policy (Fed, ECB, and BoJ) on global funds' investments on developing markets equity. The authors emphasized that the GFC has been an important factor influencing capital flows to EMEs and the U.S. monetary policy had a significant effect on the GFC. Moreover, they demonstrated that the unconventional monetary policy implemented by the major central banks during the global financial crisis was transferred to capital flows, particularly in EMEs with higher returns to foreign investors.

The effects of unconventional policies in developed economies on international capital flows have been examined by Chen et al. (2012), Aizenman et al. (2014), Eichengreen and

Gupta (2015), Lim and Mohapatra (2016), Anaya et al. (2017), Varghese and Zhang (2018), Davis and Zlate (2019), Gamboa-Estrada (2020), and Bhattarai et al. (2021).

According to Chen et al. (2012) the cumulative effects of the Fed's QE policies reduced emerging Asian bond yields, increased equity prices, and put upward pressure on exchange rates against the U.S. dollar and commodity prices. They also found that QE1 had a significantly greater impact than QE2, which they attributed to the Fed making clear the extent of its willingness to support the US private sector.

The influence of Fed tapering "news" releases on financial markets in EMEs was examined by Aizenman et al. (2014) and Eichengreen and Gupta (2015). Their research revealed that economies with deeper and more liquid markets, as well as higher capital inflows in prior years, experienced greater pressure on their exchange rates, foreign reserves, and stock prices. The authors concluded that when the target country's financial market is large and liquid, investors can rebalance their portfolios more easily.

According to Lim and Mohapatra (2016), when QE was implemented, gross financial inflows to EMEs increased by about 5 percent. The magnitude of the effects decreased between the first and second rounds, becoming insignificant in the third. Anaya et al. (2017), found that the U.S. unconventional monetary policy announcements (UMP) shocks increased portfolio flows from the U.S. to EMEs (higher in bonds than stocks), as well as real and financial variables in EMEs for nearly two quarters. Varghese and Zhang (2018) examined the consequences of the European Central Bank's (ECB) UMPs. They found that the signaling channel was dominant prior QE, while the portfolio rebalancing channel became more prominent after UMPs were implemented. Davis and Zlate (2019) investigated the impact of monetary policy normalization in five developed economies on investment flows in fifty-four countries between 2013 and 2015. They found that a monetary contraction appeared to be associated with capital outflows, particularly in economies with open capital accounts and fixed exchange rate regimes.

Gamboa (2020) analyzed the impact of UMP on gross capital inflows in EMEs. Using a dynamic panel data approach with country fixed effects, the author found that UMP was a significant factor in driving capital flows. The magnitude of these effects is determined by the type of measure used, the type of flow and the size of each country's direct financial exposure to the U.S. Furthermore, he found evidence that liquidity measures slowed down the volume of capital inflows into EMEs, while purchases of long-term treasury bonds and long-term mortgage-backed securities increased capital inflows into these economies. Bhattarai et al. (2021) estimated the international spillover effects of U.S. QE on developing economies. They showed that an expansionary US QE shock caused EMEs' currency rates to appreciate, long-term bond yields to decline, stock markets to soar, and capital inflows to rise.

The literature has also analyzed how capital flows in specific emerging countries have changed because of the implementation of UMP in developed economies. Park and Um (2016), as well as Hernández (2017) addressed the effects of these policies in South Korea and Mexico, respectively.

Park and Um (2016) examined the impact of the U.S. UMP on the Korean bond market and capital flows. They concluded that, while QE2 and QE3 had no effect on yields, they

increased net foreign investment (in line with the portfolio balance channel). Both, operation twist and tapering announcements had a negative impact on net foreign investment, whereas the effect of forward guidance was statistically insignificant. Hernández (2017) investigated how foreign portfolio investments in debt and equity in Mexico were affected by Fed unconventional monetary policy announcements. The results suggested that: i) both equity and debt flows appeared to react instantly to unexpected U.S. monetary policy announcements when these were bad news, and ii) investors who allocate their resources in equity reacted more quickly to these announcements than investors interested in fixed income instruments.

Our paper is based on the approach used by Park and Um (2016) and Hernández (2017). In contrast to their analysis, our study examines whether the Fed's unconventional monetary policies have an amplifying impact on the GFC's effects on portfolio flows in Colombia. This is an important contribution to the literature, as we analyze the role of the GFC and the U.S. monetary policy in capital flows for a specific economy rather than from a global perspective, as most of the literature does.

### **3. Data description and stylized facts about capital flows in Colombia**

We use daily data of foreign net holdings of portfolio flows from the Colombian Securities Exchange (BVC) and the Central Securities Depository (DCV) from January 8, 2010, to December 28, 2018. The data provided by the DCV is related to transactions in Colombian government bonds (TES) and other public debt, and the one provided by the BVC, to private debt and equities. Compared to the foreign exchange balance and balance of payments data, our daily database has some benefits. It is more suitable to analyze the immediate response of portfolio flows during different periods as it is available without a significant delay. In Figure 1, we observe that data on foreign net portfolio flows from the foreign exchange balance is quite close to the accumulated monthly data used in this paper. The correlation between these two series is 79 percent indicating that our data accurately represents net portfolio flows reported in the foreign exchange balance.

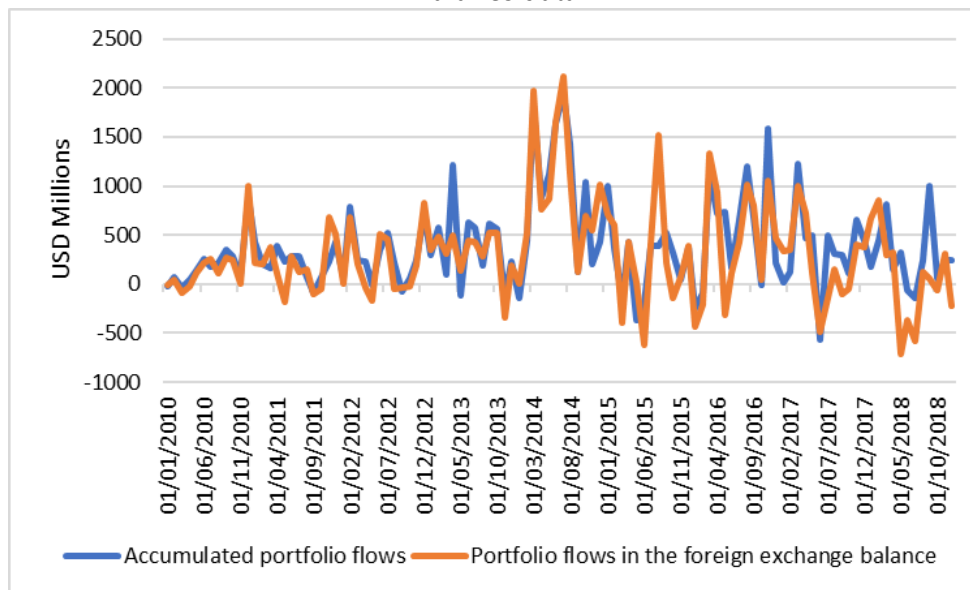
We follow Park and Um (2016), Fratzscher et al. (2018), and the Federal Market Committee minutes (FOMC) to choose the dates of unconventional monetary policy announcements. Following this literature and the studies mentioned in Section 2, the sample covers the period in which the Fed conducted the following unconventional monetary policy announcements (see Appendix A for a detailed description of the announcements and the dates included in the estimations):

- Quantitative easing II - QE2: In August 2010, the FOMC decided to reinvest principal payments of agency securities and mortgage-backed securities in longer term Treasury securities. In November 2010, the Fed decided to purchase an additional 600 billion of dollars of long-term Treasury securities by the end of the second quarter of 2011, a pace of about \$75 billion per month.



- Quantitative easing III- QE3: On September 13, 2012, the FOMC agreed to increase policy accommodation by purchasing additional agency mortgage-backed securities at a monthly pace of \$40 billion.
- Operation Twist: In September 2011, the FOMC decided to increase the average maturity of its securities holdings. The Committee planned to buy \$400 billion in Treasury securities with remaining maturities of 6 to 30 years by the end of June 2012 and sell an equal amount of Treasury securities with remaining maturities of 3 years or less. This program sought to put downward pressure on longer-term interest rates and ease financial conditions.
- Tapering: On May 22, 2013, and June 19, 2013, the Fed suggested that it would scale back its asset purchases program.
- Forward guidance: refers to the communication about the likely future course of monetary policy. Our choice of forward guidance dates between August 2011 and September 2018 do not include any dates that coincide with large-scale asset purchases as Park and Um (2016) have indicated. Between August 2011 and October 2015, the Fed stated that the future path of the federal funds rate would be determined by changes in future economic conditions. However, in December 2015, the Committee decided to increase the policy rate for the first time since the financial crisis indicating that economic conditions would evolve in such a way that only gradual increases in interest rates would be warranted.

**Figure 1.** Colombia net portfolio flows from the BVC and the DCV vs Foreign Exchange Balance data



Source: Colombian Securities Exchange (BVC), Central Securities Depository (DCV), Banco de la República.

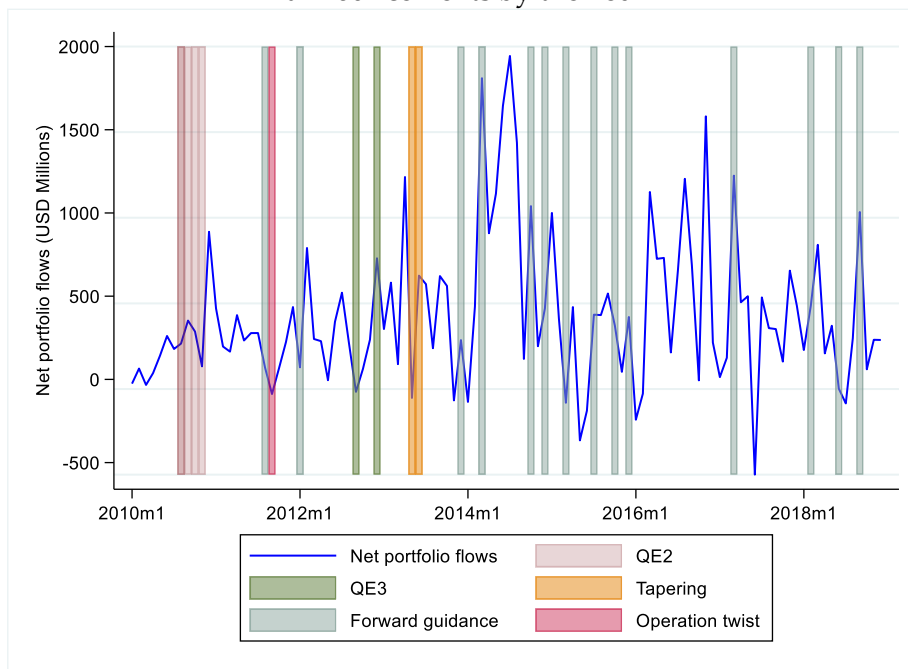


We analyze three categories of investments:

- Public debt: includes Colombian government bonds (TES) and other public debt bonds.
- Private debt: includes corporate bonds, commercial papers, asset-backed securities, and term deposit certificates (CDTs).
- Equities.

Figures 2 to 5 provides some insights about the relationship between net portfolio flows in Colombia and Fed unconventional monetary policy announcements between 2010 and 2018. Figure 2 indicates that portfolio inflows increased in response to QE2 announcements and decreased in response to Operation Twist and tapering announcements, which is consistent with the evidence presented in other EMEs (Aizenman et al., 2016, Anaya et al., 2017). On the other hand, forward guidance announcements do not show a clear pattern.

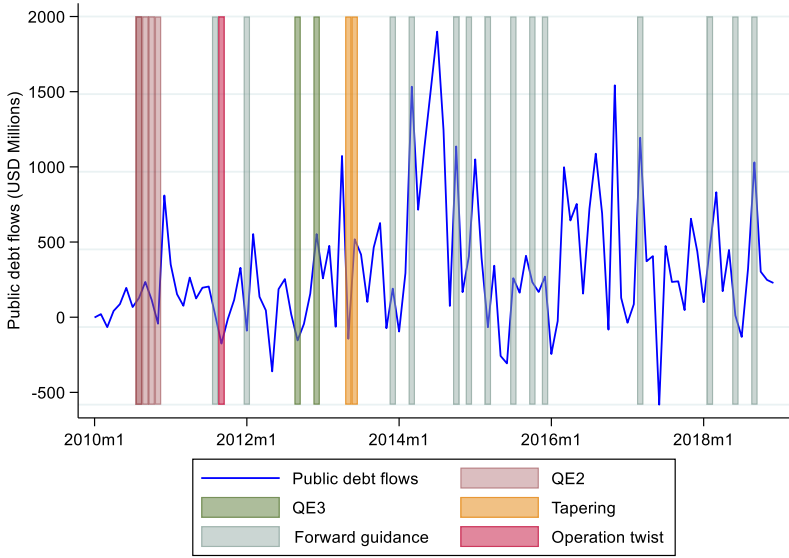
**Figure 2.** Net portfolio flows in Colombia and unconventional monetary policy announcements by the Fed



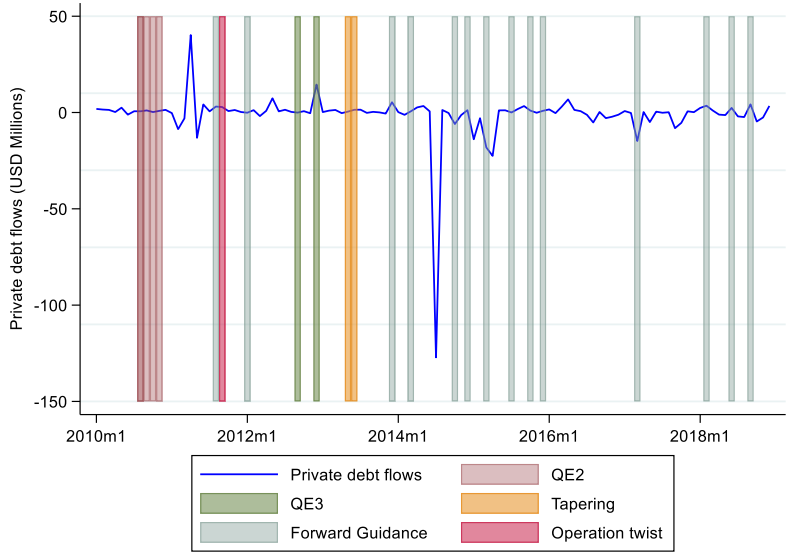
Notes: QE2 refers to quantitative easing implemented at the end of 2010; QE3 corresponds to quantitative easing implemented between September and December 2012; Tapering refers to the announcements made in 2013 regarding the normalization of monetary policy; Operation twist is the purchase of long-term treasury bonds while simultaneously selling short-term bonds; Forward guidance are communications made by the Fed about the state of the economy and the future stance of monetary policy. Source: Authors calculations with data from the Colombian Securities Exchange (BVC), the Central Securities Depository (DCV), and announcements from Park y Um (2016), Fratzscher et al. (2018), and the Federal Market Committee minutes (FOMC) from, <https://www.federalreserve.gov/monetarypolicy/timeline-balance-sheet-policies.htm>, <https://www.federalreserve.gov/monetarypolicy/timeline-forward-guidance-about-the-federal-funds-rate.htm>.

Figures 3 to 5 evidence that foreign investors have a significant participation in the public debt market in Colombia, followed by the stock market, and with a modest share in the private debt segment. Although we do not study the role of each type of investor for each market segment, these stylized facts may indicate that different types of investors participate in the public and private markets, and that they have different investment horizons according to their objectives of portfolio management which determines the evolution of portfolio flows in Colombia.

**Figure 3.** Public debt flows in Colombia and unconventional monetary policy announcements by the Fed



**Figure 4.** Private debt flows in Colombia and unconventional monetary policy announcements by the Fed



**Figure 5.** Equity shares flows in Colombia and unconventional monetary policy announcements by the Fed



#### 4. Modelling portfolio flows

##### a. Econometric approach

The hypothesis to be tested is whether foreign investors in fixed and variable income instruments in Colombia react to the Fed’s unconventional monetary policy announcements, and whether these announcements reinforce the effects of the GFC on portfolio flows.

The model captures the three channels described in the introduction: i) portfolio balancing, ii) signaling, and iii) liquidity. These channels reflect the impact of monetary policy on investors’ risk appetite, particularly the effects of the Fed’s unconventional monetary policy since 2008 (Bekaert et al., 2013; Fratzscher, et al., 2018), which affects capital flows dynamics. As these channels may work simultaneously (Fratzcher, et al., 2018; Gamboa-Estrada, 2020), we only analyze the overall impact of unconventional monetary policies on capital flows, and do not study which channels are driving the results.

We estimate the following specification:

$$Y_t = \alpha + \sum_{i=0}^l \rho_i Y_{t-i} + \beta US\_MP\_Announcement_{t+1} + \theta GFC_t + \varepsilon_t \quad (1)$$

where  $Y_t$  represents the net purchases (in USD million) of foreign investors’ portfolio investments in Colombia on day  $t$ . The variable  $US\_MP\_Announcement$  corresponds to the Fed’s unconventional monetary policy announcements, which are identified by dummy

variables equal to one the day after the announcement, and zero otherwise.<sup>1</sup> The variable GFC represents different measures of the global financial cycle. The GFC is a common movement of a set of financial variables in various countries and financial markets, with implications for systemic risk, economic activity, and monetary and macroprudential policies (Sarmiento et al., 2023). Rey (2016) and Miranda-Agrippino and Rey (2012), (2015), (2020) and (2021) estimated the GFC through a common factor and highlighted its inverse correlation with the VIX. As we use daily data, we use the common factor estimated with stock prices in Sarmiento et al. (2023). Additionally, we use the VIX as proxy for the GFC. The VIX is an index that represents stock market's volatility expectations based on S&P 500 index options. Investors use this index to measure the level of global risk and its importance for capital flows was established by Forbes and Warnock (2012). Appendix B contains descriptive summary statistics on aggregate net portfolio flows and the measures used as GFC proxies.<sup>2</sup>

As in Enders (2004), equation (1) is estimated using the OLS method with robust errors and lags of the dependent variable. The methodology follows the approach used by Hernández (2018) and Park and Yong (2016). For the estimation, we carry out a study of high-frequency events using ordinary least squares (OLS) regressions. To correct for serial correlation in the residuals, we use the Bayesian information criterion to include the lags of the dependent variable as an explanatory variable, and we use Newey-West standard errors.

Given that Fed's monetary policy influences the GFC and has an impact on capital flows and agents' risk appetite, we estimate three specifications. In the first, we only include unconventional monetary policy announcements, in the second, we only include the GFC (measured by the common factor and the VIX), and in the third, we include both, the measures of unconventional monetary policy and the GFC. In the final specification, we intend to assess whether there is any relationship between the GFC and monetary policy, or if, on the contrary, the proxies used to measure the GFC are exogenous to monetary policy.

According to the different channels of transmission of unconventional monetary policies on portfolio inflows, the prior for the signs of  $\beta$  depend on the type of measure adopted by the Fed. For instance, Large Scale Asset Purchases that includes purchases of long-term securities such as mortgage-backed securities (MBS) and long-term Treasury bonds, were intended to reduce mortgage interest rates and lowering long term interest rates,

---

<sup>1</sup> The dummy variable takes the value of one the day after the announcement given that the agents incorporate this information into their investment decisions the following day. This methodology is based on the work of Hernández (2018) for the case of Mexico. Exercises were also carried out with the accumulated impact on portfolio flows up to 15 days before and after the announcement. No specific weight or weighting was assigned to the announcements, and there is not distinction (ex-ante) between an announcement of greater or lesser effect. The magnitude (significance) of the announcement on the market is represented by the respective coefficients. We exclude actual interventions because some announcements such as tapering and forward guidance are oral announcements that may change market expectations but do not imply any direct intervention, such as Large-Scale Asset Purchases of long-term securities.

<sup>2</sup> In Appendix C we report unit root tests to assess stationarity. Oil prices and the exchange rate are included in the regressions as the first difference of the logarithm. The local interest rate is included as the first difference.

respectively. These operations were part of the QE2 and QE3 program included in our analysis. Therefore, we expect that the coefficients of QE2 and QE3 to be positive, as lower long-term interest rates could increase liquidity in the U.S. economy, increasing investors' willingness to invest these resources in different types of assets in EMEs (Gamboa-Estrada, 2020). However, as purchases of MBS were intended to improve the functioning of the U.S. housing market, this may reduce capital inflows to these economies.

Regarding Operation Twist, as the objective of this program was to increase the average maturity of Treasury securities, we expect a negative coefficient as short-term interest rates increased, and the Fed put downward pressure on long-term interest rates with this mechanism. Therefore, we expect a decrease in capital inflows into EMEs.

The Tapering was related to the normalization of the U.S. monetary policy after interest rates were close to the zero-lower bound. Then, we expect the coefficient on this variable to be negative as investors prefer assets in the U.S. with higher yields than in EMEs.

During the period analyzed, Forward Guidance announcements included both hawkish and dovish statements. In our estimations, a hawkish announcement would imply a negative coefficient, whereas a dovish announcement would imply a positive coefficient. The prior for the sign of Forward Guidance announcements is unclear because we do not differentiate these announcements between Fed's statements on tight or easy monetary policy. However, we anticipate that these announcements will have a positive impact on portfolio flows as most of them indicated an expansionary monetary policy stance.

We expect that an increase in the common factor will result in larger portfolio inflows due to increased global risk appetite, while an increase in global risk as measured by the VIX will result in lower capital inflows to EMEs.<sup>3</sup>

## **b. Empirical results**

The results for aggregate portfolio flows (domestic public bonds, private bonds, and equity) are presented in Table 1. Column (1) depicts the benchmark model, which includes the Fed unconventional monetary policy announcements. We find that QE2 announcements had no impact on portfolio flows in Colombia. QE3 announcements (expansionary) did not have the expected effect on portfolio flows in Colombia, as they fell by USD 30 million on average the day after the announcement, indicating a portfolio rebalancing among investors in EMEs.<sup>4</sup> The announcement of the tapering (contractionary) was associated with net securities sales of around USD 68 million on average, which was consistent with what was observed in other emerging economies. Forward Guidance announcements (mostly

---

<sup>3</sup> The results are robust to other GFC measures, such as risk aversion, which captures the risk premium demanded by investors.

<sup>4</sup> As QE3 implied purchases of mortgage-backed securities, this could improve housing market functioning while reducing capital flows to EMEs. Another possible explanation may be associated with the characteristics of the QE3. As mentioned by Sun and Dispas (2015), QE3 was an open-ended program for which, unlike previous rounds of QE (i.e., QE1 and QE2), no end date was announced. To this extent the market expected that the Fed chairman would gradually slow down the purchasing program in 2013.

expansionary) increased portfolio flows by USD 40 million, confirming that foreign investors expand their portfolios in Colombia in response to the Fed's expansionary announcements. On the other hand, Operation Twist announcements (i.e., contractionary in the short part of the yield curve) are associated with net portfolio sales of USD 37 million, implying that these announcements reduced portfolio inflows to Colombia.

**Table 1.** The effects of unconventional monetary policy announcements of the Federal Reserve on foreign portfolio flows in Colombia.

	(1)	(2)	(3)	(4)	(5)
QE2	-1.888 [-0.19]			1.753 [0.19]	-0.129 [-0.01]
QE3	<b>-29.845 **</b> [-2.46]			<b>-30.831 **</b> [-2.42]	<b>-32.565 **</b> [-2.21]
Tapering	<b>-68.046 **</b> [-2.49]			<b>-67.829 ***</b> [-2.69]	<b>-59.134 **</b> [-2.26]
Forward Guidance	<b>39.636 *</b> [1.63]			<b>39.303 *</b> [1.62]	<b>38.408 *</b> [1.61]
Operation Twist	<b>-36.873 ***</b> [-18.21]			<b>-21.106 ***</b> [-5.21]	<b>-19.81 ***</b> [-3.14]
VIX		<b>-0.663 ***</b> [-4.12]		<b>-0.653 ***</b> [-4.03]	
Common Factor			<b>3.137 ***</b> [3.10]		<b>2.889 ***</b> [2.89]
Constant	10.492 *** [7.81]	22.302 *** [6.40]	10.652 *** [7.98]	21.997 *** [6.27]	10.501 *** [7.85]
Observations	2126	2126	2126	2126	2126
R-squared	0.107	0.106	0.105	0.110	0.109
Autocorrelation tests					
Durbin-Watson test	2.009	1.997	2.003	2.007	2.011
p-value alternative test of Durbin	0.251	0.162	0.280	0.252	0.149

t-statistics reported in parenthesis.  
Lags of the dependent variable are included according to the BIC criteria to eliminate autocorrelation.  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Column 2 presents the results using the VIX as a proxy for the GFC. We find evidence that the VIX has a statistical significance effect on portfolio flows behavior. An increase of one standard deviation in the VIX<sup>5</sup> (6 points for the sample studied) is associated with sales of approximately USD 0.7 million. Column 3 examines the influence of the GFC (as measured by the common factor) on portfolio flows. The results indicate that an increase of one standard deviation in the common factor (about 1.1 points) is related to an increase in portfolio flows of USD 3.1 million. These findings imply that negative GFC shocks reduce portfolio flows to Colombia. In columns 4 and 5, we find that the coefficients on QE3, Tapering and Forward Guidance are robust to the inclusion of GFC measures indicating

<sup>5</sup> The VIX is reported as an annualized figure in terms of one standard deviation.

that the Fed’s unconventional monetary policy announcements amplify the effect of the GFC on portfolio flows.<sup>6</sup>

The effects of Fed unconventional monetary policy announcements on portfolio flows are statistically significant and higher for public debt flows compared to other types of flows such as private debt and equity shares (see Appendix D). Operation twist and forward guidance announcements are significant and with the expected sign for equity share flows, while it seems that Fed's announcements do not have any impact on private debt flows.

### c. Robustness tests

As in Hernandez (2018) we include other control variables in Equation (1):

$$Y_t = \alpha + \sum_{i=0}^l \rho_i Y_{t-i} + \beta US\_MP\_Announcement_{t+1} + \theta GFC_t + \eta X_{t-1} + \varepsilon_t \quad (2)$$

The vector  $X_{t-1}$  includes regional risk indicators (EMBI Latam) and global benchmark indices (JPMorgan GBI index for Colombia) as portfolio capital flows to emerging economies are sensitive to these types of measures (Arslanalp and Tsuda, 2015; Gamboa-Estrada and Sánchez-Jabba, 2022). We also include local variables as controls such as Colombian exchange rate returns (TRM), oil price returns (Brent) as Colombia is an oil dependent country, and the interbank interest rate (TIB) as proxy for the short-term interest rate in the Colombian interbank market. By including these variables, we can control for central bank monetary policy, exchange rate behavior, and the terms of trade. To avoid endogeneity issues, control variables are lagged one period.

Table 2 presents the results with additional control variables. The results are robust to those obtained in the benchmark specification as the effects of the Fed’s unconventional monetary policy announcements and the GFC on portfolio flows are similar to those reported in Table 1. Regarding the additional explanatory variables, an increase in the weight of Colombia in the JP Morgan GBI<sup>7</sup> index had a positive impact on portfolio flows by foreign investors, while an increase in the EMBI decreased portfolio flows during the analyzed period. Although the coefficients on exchange rate and oil price returns, and the interbank interest rate result as expected, they are not statistically significant in all specifications. These results are consistent with the evidence found by Gamboa-Estrada and Sánchez-Jabba (2022) as foreign investors that assign their portfolio in public debt markets, usually react to global shocks rather than to local variables such as the local interest rate because they are benchmark-driven investors.

---

<sup>6</sup> Interactions between GFC measures and Fed announcements were excluded, as they could be correlated and, as a result, it is not appropriate to interact them in the same regression. As Fed's announcements are robust to the inclusion of GFC measures, this indicates that Fed's announcements provide additional information to that contained in the GFC measures that affects the dynamics of capital flows in Colombia.

<sup>7</sup> The JP Morgan variable corresponds to a dummy variable equal to 1 after March 19<sup>th</sup>, 2014, date when JP Morgan increased the weight of Colombia in the index.



**Table 2.** The effects of unconventional monetary policy announcements of the Federal Reserve on foreign portfolio flows in Colombia (with additional controls).

	(1)	(2)	(3)	(4)	(5)
QE2	-0.967 [-0.10]			0.856 [0.09]	0.889 [0.09]
QE3	<b>-29.334 **</b> [-2.34]			<b>-29.986 **</b> [-2.31]	<b>-32.352 **</b> [-2.11]
Tapering	<b>-67.028 ***</b> [-2.73]			<b>-67.765 ***</b> [-2.88]	<b>-57.251 **</b> [-2.46]
Forward Guidance	<b>38.294 *</b> [1.63]			<b>38.651 *</b> [1.63]	<b>36.946 *</b> [1.61]
Operation Twist	<b>-24.621 ***</b> [-6.99]			<b>-14.896 ***</b> [-3.29]	<b>-5.864</b> [-0.84]
VIX		<b>-0.526 **</b> [-2.53]		<b>-0.534 **</b> [-2.55]	
Common Factor			<b>3.359 ***</b> [3.37]		<b>3.151 ***</b> [3.19]
$\Delta$ Brent(-1)	-0.512 [-0.73]	-0.579 [-0.83]	-0.565 [-0.80]	-0.611 [-0.87]	-0.59 [-0.84]
$\Delta$ TRM(-1)	-2.576 [-1.46]	-2.588 [-1.45]	-2.792 [-1.58]	-2.420 [-1.37]	-2.645 [-1.50]
$\Delta$ TIB(-1)	13.526 [0.51]	14.767 [0.56]	15.058 [0.56]	14.838 [0.56]	15.051 [0.56]
EMBI (-1)	<b>-0.059 **</b> [-2.12]	-0.030 [-0.94]	<b>-0.060 **</b> [-2.17]	-0.032 [-0.98]	<b>-0.062 **</b> [-2.22]
JPMorgan	<b>7.799 ***</b> [2.62]	4.370 [1.19]	<b>8.301 ***</b> [2.79]	3.936 [1.08]	<b>7.956 ***</b> [2.67]
Constant	19.157 *** [3.87]	24.455 *** [4.74]	19.139 *** [3.93]	24.913 *** [4.81]	19.483 *** [3.97]
Observations	2128	2128	2128	2128	2128
R-squared	0.107	0.104	0.106	0.108	0.110
Autocorrelation tests					
Durbin-Watson test	2.009	2.000	2.004	2.009	2.012
p-value alternative test of Durbin	0.117	0.535	0.429	0.160	0.076

t-statistics reported in parenthesis.  
Lags of the dependent variable are included according to the BIC criteria to eliminate autocorrelation.  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 5. Conclusions

The adoption of unconventional monetary policies by advanced economies after the global financial crisis led to a significant increase in portfolio flows to EMEs. However, events such as the tapering in 2013 caused significant reversals in these flows, potentially jeopardizing the stability of emerging economies such as Colombia.

In this document, we study the effects of the Fed's unconventional monetary policies on portfolio flows in Colombia. We distinguish between public and private debt flows, as well as equity shares. The results indicate that Fed unconventional monetary policy

announcements, particularly those related to Tapering and Operation Twist, affected portfolio flows in Colombia between 2010 and 2018. The impact of these announcements was significant for public debt flows but had little effect on private flows. One interpretation of these findings is that foreign investors concentrate their investments in public debt flows such as TES (government debt flows) and are more sensitive to external factors related to U.S. financial conditions (Gamboa-Estrada and Sánchez-Jabba, 2022). Furthermore, we find evidence that the GFC had a significant influence on portfolio flows behavior in Colombia, and that the Fed's unconventional monetary policy announcements exacerbated this effect on portfolio flows.

From a policy standpoint, the possibility to identify the impact of U.S. monetary policy on portfolio flows could be a useful tool for policy makers to implement appropriate policies in response to its effects, particularly during stressed episodes. Future areas of research should explore the role of different types of investors in each type of flow.

## References

- Aizenman, J., Binici, M., & Hutchison, M. M. (2014). *The transmission of Federal Reserve tapering news to emerging financial markets* (No. w19980). National Bureau of Economic Research.
- Anaya, P., Hachula, M., & Offermanns, C. J. (2017). Spillovers of US unconventional monetary policy to emerging markets: The role of capital flows. *Journal of International Money and Finance*, 73, 275-295.
- Andreou, C. K., Dimic, N., Piljak, V., & Savvides, A. (2022). Unconventional monetary policy and international equity capital flows to emerging markets. *European Financial Management*, 28(2), 482-509.
- Arslanalp, M. S., & Tsuda, M. T. (2015). *Emerging market portfolio flows: The role of benchmark-driven investors*. International Monetary Fund.
- Bekaert, G., Hoerova, M., & Duca, M. L. (2013). Risk, uncertainty and monetary policy. *Journal of Monetary Economics*, 60(7), 771-788.
- Bhattarai, S., Chatterjee, A., & Park, W. Y. (2021). Effects of US quantitative easing on emerging market economies. *Journal of Economic Dynamics and Control*, 122, 104031.
- Chen, Q., Filardo, A. J., He, D., & Zhu, F. (2012). International spillovers of central bank balance sheet policies. *BIS Paper*, (66p).
- Davis, J. S., & Zlate, A. (2019). Monetary policy divergence and net capital flows: Accounting for endogenous policy responses. *Journal of International Money and Finance*, 94, 15-31.
- Eichengreen, B., & Gupta, P. (2015). Tapering talk: The impact of expectations of reduced Federal Reserve security purchases on emerging markets. *Emerging Markets Review*, 25, 1-15.
- Enders, W. (2004). *Applied time series econometrics*. Hoboken: John Wiley and Sons.
- Forbes, K. J., & Warnock, F. E. (2012). Capital flow waves: Surges, stops, flight, and retrenchment. *Journal of international economics*, 88(2), 235-251.
- Fratzscher, M., Lo Duca, M., & Straub, R. (2018). On the international spillovers of US quantitative easing. *The Economic Journal*, 128(608), 330-377.
- Gagnon, J., Bayoumi, T., Londono, J. M., Saborowski, C., & Sapriza, H. (2017). Unconventional monetary and exchange rate policies. *International Finance Discussion Paper*, (1194).
- Galesi, A., & Déés, S. (2018). The Policy Trilemma and the Global Financial Cycle: Evidence from the International Transmission of Unconventional Monetary Policy.
- Gamboa-Estrada, F. (2020). The determinants of private capital flows in emerging economies: The role of the Fed's unconventional monetary policy. *Contemporary Economic Policy*, 38(4), 694-710.
- Gamboa-Estrada, F., & Sánchez-Jabba, A. M. (2022). The Effects of Foreign Investor Composition on Colombia's Sovereign Debt Flows. *Borradores de Economía*; No. 1222.
- Hernández-Vega, M. A. (2017). *Portfolio Investment Response to US Monetary Policy Announcements: An Event Study Analysis Using High Frequency Data from Mexico*. Working Papers 2017-02, Banco de México.
- Lim, J. J., & Mohapatra, S. (2016). Quantitative easing and the post-crisis surge in financial flows to developing countries. *Journal of International Money and Finance*, 68, 331-357.

- Miranda Agrippino, S., & Rey, H. (2012, February). World Asset Markets and Global Risk Aversion. In *Joint ECB-BIS workshop 'Global Liquidity and its International Repercussions'*, Frankfurt (pp. 6-7).
- Miranda-Agrippino, S., & Rey, H. (2015). World asset markets and the global financial cycle.
- Miranda-Agrippino, S., & Rey, H. (2020). US monetary policy and the global financial cycle. *The Review of Economic Studies*, 87(6), 2754-2776.
- Miranda-Agrippino, S., & Rey, H. (2021). *The global financial cycle* (No. w29327). National Bureau of Economic Research.
- Park, K. Y., & Um, J. Y. (2016). Spillover effects of United States' unconventional monetary policy on Korean bond markets: evidence from high-frequency data. *The Developing Economies*, 54(1), 27-58.
- Rey, H. (2016). International channels of transmission of monetary policy and the Mundellian trilemma. *IMF Economic Review*, 64(1), 6-35.
- Sarmiento, M., Cardozo, N., Gamboa-Estrada, F., Gómez, J., León, C., Miguélez, J., & Ojeda, J. (2023). Ciclo Financiero Global, flujos de capital y respuesta de política. *Revista Ensayos Sobre Política Económica*, mimeo.
- Sun, G., & Dispas, C. (2015). Spillover effect of US quantitative easing from the emerging markets perspective. *School of Management*, 1-128.
- Varghese, R., & Zhang, Y. S. (2018). *A new wave of ECB's unconventional monetary policies: Domestic impact and spillovers*. International Monetary Fund.

## Appendix A. List of Federal Reserve Unconventional Monetary Policy Announcements

Type of announcement	Date	Description of the event
Quantitative Easing II (QE2)	10/08/2010	"To help support the economic recovery in a context of price stability, the Committee will keep constant the Federal Reserve's holdings of securities at their current level by reinvesting principal payments from agency debt and agency mortgage-backed securities in longer-term Treasury securities"
	27/08/2010	Bernanke's speech at Jackson Hole: "The Committee is prepared to provide additional monetary accommodation through unconventional measures if it proves necessary, especially if the outlook were to deteriorate significantly"
	21/09/2010	The FOMC statement indicated that the Committee would maintain its existing policy of reinvesting principal payments from its securities holdings. The Committee emphasized in its statement that is "prepared to provide additional accommodation if needed to support the economic recovery and to return inflation, over time, to levels consistent with its mandate".
	15/10/2010	Bernanke's speech at Boston Fed: "there would appear—all else being equal—to be a case for further action."
	03/11/2010	QE2 announced. "The Committee intends to purchase a further \$600 billion of longer-term Treasury securities by the end of the second quarter of 2011, a pace of about \$75 billion per month."
Quantitative Easing III (QE3)	31/08/2012	QE3 hinted: "The Federal Reserve will provide additional policy accommodation as needed to promote a stronger economic recovery and sustained improvement in labor market conditions in a context of price stability."
	13/09/2012	QE3 announced: "If the outlook for the labor market does not improve substantially, the Committee will continue its purchases of agency mortgage-backed securities, undertake additional asset purchases, and employ its other policy tools as appropriate." The Committee also anticipates that will continue to maintain interest rates "exceptionally low at least through mid-2015."
	12/12/2012	The FOMC announces that "it will purchase longer-term Treasury securities at a pace of \$45 billion per month, thereby continuing to purchase longer term securities at a pace of about \$85 Billion per month." To support continued progress toward maximum employment and price stability, the Committee expects that a highly accommodative stance of monetary policy will remain appropriate for a considerable time after the asset purchase program ends and the economic recovery strengthens."
Tapering	22/05/2013	Bernanke's testimony to congress (known as taper tantrum): "In the next few meetings, we could take a step down in our pace purchase."
	19/06/2013	Bernanke's press conference: "If we see continued improvement and we have confidence that that is going to be sustained, then in the next few meetings, we could take a step down in our pace of purchases."
Operation Twist	21/09/2011	Operation Twist: "To support a stronger economic recovery and to help ensure that inflation, over time, is at levels consistent with the dual mandate, the Committee decided today to extend the average maturity of its holdings of securities. The Committee intends to purchase, by the end of June 2012, \$400 billion of Treasury securities with remaining maturities of 6–30 years and to sell an equal amount of Treasury securities with remaining maturities

		of 3 years or less." Debt principal payments of MBS and agency debt were not reinvested in Treasuries, but instead in MBS.
Forward Guidance	09/08/2011	"Economic conditions...are likely to warrant exceptionally low levels for the federal funds rate at least through mid-2013."
	25/01/2012	"Economic conditions . . . are likely to warrant exceptionally low levels for the federal funds rate at least through late 2014."
	18/12/2013	The FOMC announces it "likely will be appropriate to maintain the current target range for the federal funds rate well past the time that the unemployment rate declines below 6-1/2 percent, especially if projected inflation continues to run below the Committee's 2 percent longer-run goal."
	19/03/2014	The FOMC replaces its threshold-based forward guidance with the statement that it expects it likely will be appropriate to maintain the current target range for the federal funds rate for "a considerable time after the asset purchase program ends, especially if projected inflation continues to run below the Committee's 2 percent longer-run goal and provided that longer-term inflation expectations remain well anchored." The FOMC also states its anticipation that, "even after employment and inflation are near mandate-consistent levels, economic conditions may, for some time, warrant keeping the target federal funds rate below levels the Committee views as normal in the longer run."
	29/10/2014	The FOMC states that "it likely will be appropriate to maintain the 0 to 1/4 percent target range for the federal funds rate for a considerable time following the end of its asset purchase program this month, especially if projected inflation continues to run below the Committee's 2 percent longer-run goal and provided that longer-term inflation expectations remain well anchored." The conditional nature of this period is emphasized: "However, if incoming information indicates faster progress toward the Committee's employment and inflation objectives than the Committee now expects, then increases in the target range for the federal funds rate are likely to occur sooner than currently anticipated. Conversely, if progress proves slower than expected, then increases in the target range are likely to occur later than currently anticipated."
	17/12/2014	The FOMC announces that "it can be patient in beginning to normalize the stance of monetary policy." The Committee also states that "even after employment and inflation are near mandate-consistent levels, economic conditions may, for some time, warrant keeping the target federal funds rate below levels the Committee views as normal in the longer run".
	18/03/2015	The FOMC replaces the indication that "it can be patient" with the indication that an increase in the target range "remains unlikely at the April FOMC meeting" and that such an increase will be appropriate when the FOMC "has seen further improvement in the labor market and is reasonably confident that inflation will move back to its 2 percent objective over the medium term." The FOMC further indicates that this change in the forward guidance "does not indicate that the Committee has decided on the timing of the initial increase in the target range." The Committee also anticipates that "even after employment and inflation are near mandate-consistent levels, economic conditions may, for some time, warrant keeping the target federal funds rate below levels the Committee views as normal in the longer run."
	29/07/2015	The FOMC alters the guidance referring to "further improvement" in the labor market to "some further improvement." The FOMC also states its anticipation that "even after employment and inflation are near mandate-consistent

		levels, economic conditions may, for some time, warrant keeping the target federal funds rate below levels the Committee views as normal in the longer run."
	28/10/2015	The FOMC replaces the clause "how long it will be appropriate to maintain [the target range]" with "whether it will be appropriate to raise the target range at its next meeting." The FOMC states that "it will be appropriate to raise the target range for the federal funds rate when it has seen further improvement in the labor market and is reasonably confident that inflation will move back to its 2 percent objective over the medium term." The Committee also anticipates that "even after employment and inflation are near mandate-consistent levels, economic conditions may, for some time, warrant keeping the target federal funds rate below levels the Committee views as normal in the longer run."
	16/12/2015	The FOMC raises the target range for the first time since before the financial crisis. The FOMC indicates that "the stance of monetary policy remains accommodative after this increase." The FOMC expects that "economic conditions will evolve in a manner that will warrant only gradual increases in the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run." The FOMC also states that it anticipates that it would maintain its reinvestment policy "until normalization of the level of the federal funds rate is well under way."
	15/03/2017	The Committee decided to raise the target range for the federal funds rate to 3/4 to 1 percent. The mention of "only gradual increases" in the future path of the federal funds rate is changed to "gradual increases." Also, the statement now emphasizes the Committee's "symmetric inflation goal" instead of its "inflation goal." The FOMC expects that "the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run."
	31/01/2018	The expression "gradual increases" is changed to "further gradual increases." "The Committee expects that economic conditions will evolve in a manner that will warrant further gradual increases in the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run".
	13/06/2018	The Committee decided to raise the target range for the federal funds rate to 1-3/4 to 2 percent. The FOMC drops the sentence indicating that the federal funds rate is "likely to remain, for some time, below levels that are expected to prevail in the longer run." The FOMC also states that "further gradual increases in the target range for the federal funds rate will be consistent with sustained expansion of economic activity, strong labor market conditions, and inflation near the Committee's symmetric 2 percent objective over the medium term."
	26/09/2018	The Committee decided to raise the target range for the federal funds rate to 2 to 2-1/4 percent. The FOMC also drops the sentence indicating that "the stance of monetary policy remains accommodative," which had been in place since December 2015.

Source: Park y Um (2016), Fratzscher et al. (2018), and the Federal Market Committee minutes (FOMC) from <https://www.federalreserve.gov/monetarypolicy/timeline-balance-sheet-policies.htm>, <https://www.federalreserve.gov/monetarypolicy/timeline-forward-guidance-about-the-federal-funds-rate.htm>



## Appendix B. Summary statistics of aggregate portfolio flows and measures of the GFC

Variable	Mean	Standard Deviation	Min	Max
Aggregate portfolio flows	19.5	60.1	-274.9	562.7
Public debt flows	16.4	58.8	-268.6	559.0
Private debt flows	-0.1	2.1	-50.8	48.5
Equity shares	3.2	11.9	-118.7	202.9
VIX	17.0	5.9	9.1	48.0
Common factor	0.0	1.1	-7.4	84.8

Notes: Aggregate portfolio flows correspond to data from the Colombian Securities Exchange (BVC) and the Central Securities Depository of Colombia (DCV) on daily purchases and sales of foreigners in TES in pesos, TES UVR, private debt bonds, certificates of deposits (CDTs), other public debt bonds and equity shares. Public debt flows are the sum of TES in pesos, TES UVR, and other public debt bonds. Private debt flows are the sum of private debt bonds and CDTs. The sample includes 13,158 observations for the period 2010-2018. The VIX and the common factor are GFC measures described in section 4.

## Appendix C. Unit root tests

Variable	ADF		PP	
	test	p-value	test	p-value
Aggregate portfolio flows	-20.104 ***	0.000	-38.300 ***	0.000
Public debt flows	-20.151 ***	0.000	-37.750 ***	0.000
Private debt flows	-20.952 ***	0.000	-44.710 ***	0.000
Equity shares	-21.567 ***	0.000	-43.227 ***	0.000
VIX	-6.093 ***	0.000	-5.827 ***	0.000
Common factor	-44.233 ***	0.000	-44.277 ***	0.000
log(brent)	-0.944	0.775	-1.037	0.742
log(tm)	-0.170	0.940	-0.156	0.941
TIB	-1.089	0.722	-1.087	0.723
EMBI	-2.992 *	0.036	-2.689 *	0.076

Note: the null hypothesis for the ADF and PP tests is non-stationarity. \*, \*\*, \*\*\* represent significance at 10%, 5% and 1% level, respectively.

## Appendix D

**Table D.1.** The effects of unconventional monetary policy announcements of the Federal Reserve on public debt flows in Colombia

	(1)	(2)	(3)	(4)	(5)
QE2	-2,642 [-0.26]			0.996 [0.11]	-1.131 [-0.12]
QE3	<b>-29.852 ***</b> [-3.20]			<b>-30.964 ***</b> [-3.09]	<b>-32.22 ***</b> [-2.78]
Tapering	<b>-67.054 **</b> [-2.54]			<b>-66.813 ***</b> [-2.75]	<b>-59.342 **</b> [-2.33]
Forward Guidance	36.837 [1.56]			36.556 [1.54]	35.812 [1.54]
Operation Twist	<b>-32.801 ***</b> [-16.45]			<b>-16.752 ***</b> [-4.26]	<b>-18.026 ***</b> [-2.95]
VIX		<b>-0.676 ***</b> [-4.32]		<b>-0.668 ***</b> [-4.24]	
Common Factor			<b>2.737 ***</b> [2.80]		<b>2.499 **</b> [2.59]
Constant	8.895 *** [7.07]	20.866 *** [6.17]	9.024 *** [7.22]	20.605 *** [6.06]	8.899 *** [7.09]
Observations	2126	2126	2126	2126	2126
R-squared	0.110	0.110	0.109	0.114	0.112
Autocorrelation tests					
Durbin-Watson test	2.008	1.997	2.002	2.006	2.009
p-value alternative test of Durbin	0.432	0.309	0.368	0.473	0.307

t-statistics reported in parenthesis.

Lags of the dependent variable are included according to the BIC criteria to eliminate autocorrelation.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table D.2.** The effects of unconventional monetary policy announcements of the Federal Reserve on private debt flows in Colombia

	(1)	(2)	(3)	(4)	(5)
QE2	-0.037 [-0.53]			-0.098 [-1.33]	-0.044 [-0.61]
QE3	-0.085 [-0.99]			-0.069 [-0.84]	-0.073 [-0.90]
Tapering	-0.002 [-0.05]			-0.005 [-0.08]	-0.039 [-0.61]
Forward Guidance	-0.392 [-1.02]			-0.386 [-1.00]	-0.386 [-1.00]
Operation Twist	-0.040 [-0.87]			<b>-0.297</b> *** [-3.84]	-0.111 [-1.14]
VIX		<b>0.010</b> *** [2.76]		<b>0.011</b> *** [2.76]	
Common Factor			-0.013 [-0.73]		-0.012 [-0.68]
Constant	-0.035 [-0.90]	-0.216 ** [-2.38]	-0.037 [-0.98]	-0.215 ** [-2.35]	-0.035 [-0.89]
Observations	2127	2127	2127	2127	2127
R-squared	0.153	0.154	0.153	0.154	0.153
Autocorrelation tests					
Durbin-Watson test	1.997	1.998	1.998	1.997	1.997
p-value alternative test of Durbin	0.301	0.309	0.254	0.309	0.253
t-statistics reported in parenthesis.					
Lags of the dependent variable are included according to the BIC criteria to eliminate autocorrelation.					
*** p<0.01, ** p<0.05, * p<0.1					

**Table D.3.** The effects of unconventional monetary policy announcements of the Federal Reserve on equity shares flows in Colombia

	(1)	(2)	(3)	(4)	(5)
QE2	1.180 [1.02]			1.193 [1.02]	1.388 [1.23]
QE3	0.653 [0.22]			0.650 [0.22]	0.338 [0.10]
Tapering	0.278 [0.73]			0.279 [0.73]	<b>1.282</b> * [1.90]
Forward Guidance	<b>1.924</b> * [1.79]			<b>1.923</b> * [1.79]	<b>1.781</b> * [1.69]
Operation Twist	<b>-4.755</b> *** [-13.67]			<b>-4.702</b> *** [-4.91]	<b>-2.791</b> ** [-2.41]
VIX		-0.004 [-0.10]		-0.002 [-0.06]	
Common Factor			<b>0.338</b> * [1.81]		<b>0.332</b> * [1.74]
Constant	1.991 *** [6.98]	2.007 *** [3.11]	2.007 *** [7.11]	2.029 *** [3.02]	1.990 *** [6.97]
Observations	2126	2126	2126	2126	2126
R-squared	0.053	0.053	0.054	0.053	0.054
Autocorrelation tests					
Durbin-Watson test	2.008	2.008	2.009	2.008	2.009
p-value alternative test of Durbin	0.001	0.000	0.000	0.000	0.000
t-statistics reported in parenthesis.					
Lags of the dependent variable are included according to the BIC criteria to eliminate autocorrelation.					
*** p<0.01, ** p<0.05, * p<0.1					

