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U.S. (Un)Conventional Monetary Policy and Portfolio Flows to Emerging Market Economies

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U.S. (UN)CONVENTIONAL MONETARY POLICY AND PORTFOLIO FLOWS TO EMERGING MARKET ECONOMIES

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Abstract

Since the great financial crisis, conventional and unconventional tools have merged within the policy toolkit of central banks, resulting in more frequent instances of their combined application. Capital flows, while promoting growth, can cause distortions during times of high volatility, and the U.S. monetary policy is known to notably affect these flows. This study disentangles the effects of both conventional and unconventional policies on capital flows to Emerging Market Economies (EMEs) and draws comparisons. An econometric analysis with a fixed effect model is conducted using a panel dataset of EME portfolio inflows. The innovation in this analysis comes from the monetary policy measure by De Rezende and Ristiniemi (2023), which enables the differentiation and comparison of different monetary policy types stemming from the same event. The findings suggest that conventional policies generally wield more influence than unconventional ones, which appear to have limited impact on portfolio inflows to EMEs. Spillover effects vary by country, attributed partly to country characteristics one of the most important being institutional quality. Consequently, policymakers should be particularly aware of conventional monetary policy announcements due to their pronounced impact on portfolio inflows. Improving country fundamentals, particularly institutional quality, offers a pathway for mitigating monetary policy shocks and protecting countries from the adverse repercussions of capital flow volatility.

JEL codes: E52, F32, F42

Keywords: Capital Flows; U.S. Monetary Policy; Emerging Market Economies

Resumo

Desde a grande crise financeira, ferramentas de política monetária convencionais e não convencionais têm vindo a fundir-se no conjunto de instrumentos de política dos bancos centrais, dando origem a situações cada vez mais frequentes da sua aplicação conjunta. Os fluxos de capital, embora promovam o crescimento, podem causar distorções durante períodos de alta volatilidade, e é sabido que a política monetária dos Estados Unidos afeta notavelmente esses fluxos. Este estudo analisa os efeitos das políticas convencionais e não convencionais sobre os fluxos de capital para Economias de Mercados Emergentes (EMEs) e compara os seus efeitos. Para tal, é realizada uma análise econométrica com um modelo de efeitos fixos utilizando um conjunto de dados em painel de investimentos em carteira nas EMEs. A inovação nesta análise advém da medida da política monetária de De Rezende e Ristiniemi (2023), que permite a diferenciação e comparação de diferentes tipos de política monetária decorrentes do mesmo evento. Os resultados sugerem que as políticas convencionais geralmente exercem mais influência do que as não convencionais, que parecem ter um impacto limitado nos investimentos em carteira nas EMEs. Os efeitos de contágio variam de acordo com o país, diferença que é em parte atribuída às características do país, sendo uma das mais importantes a qualidade institucional. Consequentemente, os decisores políticos devem estar especialmente atentos aos anúncios de política monetária convencional devido ao seu impacto pronunciado nos investimentos de carteira. Melhorar os fundamentos do país, particularmente a qualidade institucional, oferece um caminho para mitigar os choques da política monetária e proteger os países das repercussões adversas da volatilidade dos fluxos de capital.

Códigos JEL: E52, F32, F42

Palavras-Chave: Fluxos de Capital; Política Monetária dos Estados Unidos; Economias de Mercados Emergentes

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Abbreviations

CMP: Conventional Monetary Policy

EMEs: Emerging Market Economies

ERR: Exchange Rate Regime

FED: Federal Reserve

FF5: Five-year Treasury Futures

FMOC: Federal Open Market Committee

IIF: Institute of International Finance

REERO: Real Effective Exchange Rate Overvaluation

U.S.: United States

UMP: Unconventional Monetary Policy

1. Introduction

Following the global financial crisis, central banks encountered constraints imposed by traditional policy rates, compelling them to resort to unconventional measures during deteriorating economic conditions. Over time, these unconventional tools have integrated into the standard policy toolkit alongside traditional approaches. This convergence has led to more frequent scenarios involving the simultaneous utilization of both types of policy instruments. Noteworthy instances, particularly within the context of the United States (U.S.) monetary policy, include the initial Federal Reserve normalization period, the response to the COVID-19 crisis, and the recent efforts to address a significant surge in inflation through the second normalization.

In the first normalization period of the Federal Reserve (FED), Emerging Market Economies (EMEs) were highly affected via capital flows (Cerutti et al., 2019). However, at first sight, some EMEs are coping much better with this normalization program than expected, since EMEs such as Brazil and Indonesia, did not suffer large depreciations.[1] This difference could be due to the country's characteristics, however, this second normalization period is also different from the first one, with interest rates increasing much faster, and to much higher values due to the high inflation (FED, 2022).[2] Thus, this difference could also be due to differences in the tools adopted by the FED. This dissertation tries to access what are the impacts of conventional and unconventional tools on capital flows to EMEs and compare them.

The literature has already identified the potential impacts that different policy actions, like raising interest rates, or quantitative easing measures, can present on capital flows to EMEs (e.g. Ahmed & Zlate, 2014; Fratzscher et al., 2012), however, this may not be the best approach if investors have already anticipated these actions (Koepke, 2018). To avoid these problems the literature has already studied the impacts of monetary policy surprises throughout different periods characterized by specific policies, to assess the impacts of different monetary policies on capital flows to EMEs (e.g. Chari et al., 2020; Chen et al., 2014). However, periods in which both types of policies are at play at the same time make

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[1] During 2013, when the first normalization period was announced, the Brazilian real and the Indonesian rupiah depreciated by around 15% and 25% against the dollar, respectively. During 2022, the real has appreciated by 5%, and the rupiah has depreciated by only 9%. Data retrieved from Thomson Datastream.

[2] Board of Governors of the Federal Reserve System (US). *Federal Funds Effective Rate*. Retrieved from Federal Reserve Bank of St. Louis. https://fred.stlouisfed.org/series/FEDFUNDS. Access on January 17, 2023.

it more difficult to access the monetary policy impacts and understand the impacts of the different policies.

Hence, the main objective of this dissertation is to disentangle the different impacts of conventional and unconventional monetary policies on capital flows to EMEs and compare them. Moreover, I will also analyze whether country characteristics influence the way the different policy shocks are transmitted to EMEs. Such disentanglement can provide valuable insights for policymakers and contribute to a deeper comprehension of the spillover effects of monetary policy.

To assess this, I use a panel dataset of portfolio inflows to EMEs between 2000 and 2022 and conduct an econometric analysis with a fixed effect model, including as independent variables the monetary policy surprise measures and other determinants of capital flows. The innovation in this analysis comes from the monetary policy measure introduced by De Rezende and Ristiniemi (2023) that allows the separation in different types of monetary policy from the same monetary policy event and compare them.

This study highlights that conventional policies present a positive relationship with portfolio inflows to EMEs, while I do not find significant results for unconventional policies, suggesting that unconventional policies do not transfer as well to international portfolio flows. The primary driver of conventional spillovers seems to be the confidence channel, revealing the importance of the information conveyed by Federal Open Market Committee (FMOC) announcements about the state of the economy. Moreover, the influence of country characteristics on spillover effects is substantial, with institutional quality being the most important factor. Comparatively, conventional spillovers are more influenced by these country-specific characteristics than unconventional spillovers, suggesting once again the potential limitations in the international transmission of unconventional policies.

These findings offer insightful implications for both the Federal Reserve (FED) and policymakers. For the FED, the significance of the confidence channel in FMOC announcements underscores their pivotal role in shaping market investor decisions. Policymakers, on the other hand, should focus on conventional monetary policy announcements, which exhibit more pronounced impacts on portfolio inflows. Notably, improving institutional quality can help mitigate spillover effects and dampen the impact of conventional shocks on debt inflows.

This dissertation is structured as follows. Section 2 presents the literature review, Section 3 outlines the methodology, Section 4 describes the data used, Section 5 presents the results, Section 6 discusses robustness tests, and Section 7 presents the conclusions.

2. Literature Review

Monetary policy measures are designed to influence domestic economies, however, they may also present several international spillovers. The literature has already identified several determinants that may explain capital movements from one country to another, where the U.S. monetary policy is referred to as an important determinant of capital flows to EMEs (e.g. Ahmed & Zlate, 2014; Chari et al., 2020; Fratzscher, 2012).

This section reviews the literature on external monetary policy and capital flows and is divided into three subsections. Subsection 2.1. presents the definitions of the main concepts. Subsection 2.2. reviews the main determinants of capital flows, and finally subsection 2.3. is dedicated to external monetary policy spillovers. In this subsection, I present the main channels through which external monetary policy affects capital flows and present the main empirical results.

2.1. Definitions

This dissertation has three key concepts: Capital Flows, Conventional Monetary Policy, and Unconventional Monetary Policy. First, according to Calvo et al. (1993), capital flows are international transactions with assets such as money, government bonds, stocks, companies, and others. These flows are divided into three main categories: foreign direct investment, portfolio investment, and other capital, which are recorded in the financial account of a country's balance of payments. According to the literature (e.g. Ahmed & Zlate, 2014; IMF, 2022; Sarno et al., 2016), capital flows can pose several benefits for the economies, such as promoting economic growth and a more efficient resource allocation. However, they can also pose several risks, given their potential to create higher vulnerability to crises and financial instability. This vulnerability arises from the volatility of capital flows, which can lead to episodes of surges and sudden stops. Surge episodes can pose significant challenges, including asset price bubbles, inefficient resource allocation, and detrimental currency appreciation affecting exports. Sudden stops can result in sharp asset price drops, currency depreciation, and subsequent issues like inflation and foreign debt repayment challenges (Forbes & Warnock, 2021).

Second, the traditional way through which central banks pursue their goals is known as Conventional Monetary Policy (CMP). This type of monetary policy operates mainly through the banking sector and implies mostly the set of the overnight interest rate in the interbank money market, and the control of the money supply through open market operations by central banks (FED, 2021; Smaghi, 2009).

Third, Unconventional Monetary Policy (UMP) has been used when the economy faces severe disruptions and the channels of CMP lose efficiency. These measures include, among others, large purchases of assets, such as long-term government bonds and mortgage-backed securities, a measure also known as quantitative easing. The main objective of these measures is to provide additional liquidity to the market and influence long-term interest rates, and through these measures affect financing conditions and increase investment and consumption to stabilize prices (FED, 2021; Smaghi, 2009).

2.2. Determinants of Capital Flows

The literature on capital flows has identified the main determinants that may explain capital movements, contributing to understanding capital flows and identifying the best policy actions authorities can take to minimize the risks they impose. The literature divides them between push and pull factors (e.g. Forbes & Warnock, 2012; Fratzscher, 2012; Ghosh et al., 2014). On the one hand, push factors account for external factors common to all countries that may drive capital flows (e.g. external interest rates, in particular the U.S. interest rates, external output growth, and global risk aversion). On the other hand, pull factors account for country-specific determinants based on their characteristics (e.g. the quality of institutions and domestic output growth).

Regarding the push and pull framework first introduced by Calvo et al. (1993) there is a large debate in the literature concerning the significance of each of these determinants. The more recent literature tends to agree that push factors are the main drivers of capital flows to EMEs (e.g. Ahmed & Zlate, 2014; Fratzscher, 2012; Sarno et al., 2016). Despite that, there still is a lack of consensus on the role of the pull factors. For example, Forbes and Warnock (2012) and Sarno et al. (2016) argue that these factors play little role in explaining capital flows movements, while De Vita and Kyaw (2008) and Hannan (2017) conclude that both push and pull factors are important determinants of capital flows. Moreover, since not all countries are affected the same way by external global shocks, some studies argue that the heterogeneity of impacts on capital flows may be due to pull factors (e.g. Cerutti et al., 2019; Fratzscher, 2012; Ghosh et al., 2014).

Other variables that can be considered when assessing the main determinants of capital flows, but do not fall on the push and pull framework, are the contagion variables. In general, contagion refers to the spread of market shocks from one country to another and is usually observed through the co-movements of exchange rates, stock prices, and capital flows across markets in comparison to their co-movement during normal times (Claessens et al., 2001). The literature finds that the contagion effects mainly happen due to trade channels, financial channels, and country similarities, which represent fundamentals-based contagion, and due to investors' herd behavior (Claessens et al., 2001; Forbes & Warnock, 2012). In the empirical literature on contagion, authors find that contagion is one important driver explaining the movements of capital flows towards EMEs (Forbes & Warnock, 2012; Hernández et al., 2001).

2.2.1. Pull Factors

Now focusing on the main determinants inside the push-pull framework, starting with the pull factors. The most frequently referred pull factors in the literature are the domestic output growth, along with other macroeconomic variables, and the quality of institutions (e.g. Alfaro et al., 2008; Cerutti et al., 2019; Fratzscher, 2012). For these factors, the empirical studies find that countries with better institutional or macroeconomic fundamentals tend to receive more capital inflows. This occurs because investors may feel more confident investing in countries that present higher institutional quality, and because the potential productivity gains and corresponding returns that come with a higher output growth may attract more investors (Alfaro et al., 2008; Fratzscher, 2012; Ghosh et al., 2014).

Inside the pull factors other variables that the literature analyses are the policy actions, EMEs can take to protect themselves from the volatility of capital flows, which can also help to explain the heterogeneity of impacts that global shocks have on EMEs (e.g. Ahmed & Zlate, 2014; Cerdeiro & Komaromi, 2021; Ghosh et al., 2014). Some of these measures are exchange rate regimes and capital controls. Measures of capital controls may help to promote more stability since countries with a higher degree of capital account openness may be more exposed to external shocks (Cerdeiro & Komaromi, 2021). For the exchange rate regimes, on the one hand, according to the classic Mundell-Fleming "trilemma," opting for more floating regimes could potentially help countries mitigate the volatility of capital flows. Since they permit an autonomous domestic monetary policy, enabling adjustment to external shocks (Kalemli-Ozcan, 2019). On the other hand, opting for more fixed exchange regimes might enhance investor confidence in these nations, promoting more inflows. Moreover, these regimes could shield countries from deteriorating global conditions, as uncertain times often lead investors to seek safer investments. Consequently, the assurance of exchange rate stability may also safeguard countries against significant outflows (Özmen & Taşdemir, 2023). However, the empirical literature finds mixed evidence of the effectiveness of these measures. Some authors like Ahmed and Zlate (2014), Cerdeiro and Komaromi (2021), and Ghosh et al. (2014) find that these measures do help to reduce capital flows volatility, while other authors like Forbes et al. (2015) and Eichengreen and Gupta (2016), find that these measures do not help to insulate countries from large movements of capital flows.

2.2.2. Push Factors

In terms of push factors, the main factors identified by the empirical literature are external output growth, global risk aversion, and external interest rates, in particular the U.S. interest rates (Ahmed & Zlate, 2014; Forbes & Warnock, 2012; Rey, 2015).

Starting with the external output growth, in general, studies find that an increase in foreign output growth leads to outflows from EMEs (e.g. Ahmed & Zlate, 2014; De Vita & Kyaw, 2008; Hannan, 2017). The reason for this is similar to the pull factor of domestic output growth. Forbes and Warnock (2021), studying large movements of capital flows find that an increase in global output growth is associated with an increased probability of surges to EMEs. However, they argue that these results are counterintuitive.

Next global risk aversion represents the level of risk aversion of different investors and a large literature developed around this concept and its explanatory power (e.g. Bruno & Shin, 2015; Forbes & Warnock, 2012; Fratzscher, 2012; Rey, 2015). In general, the literature agrees that the higher the global risk aversion the lower the capital flows to EMEs are. Since the relationship between global risk and capital flows appears to work through changes in economic uncertainty, changes in the level of uncertainty can trigger a flight to safety behavior, normally leading capital flows from EMEs to more advanced economies since they are traditionally considered to be safe havens in times of increased uncertainty (Forbes & Warnock, 2012; Fratzscher, 2012; Rey, 2015). Therefore, the movements of capital flows may be influenced by the way investors perceive the different countries.

Finally, for the external interest rate several studies conclude that an increase in the U.S. interest rate decreases the amount of capital that EMEs receive since capital flows from countries with a low return to those with a higher return (e.g. Ahmed & Zlate, 2014; Bruno & Shin, 2015; Ghosh et al., 2014; Hannan, 2017). Moreover, Rey (2015) develops the Global Financial Cycle hypothesis, where the author argues that changes in U.S. interest rates lead to changes in global risk aversion, that ultimately influence the movements of capital flows. Thus, a reduction in U.S. interest rates, leads to a decrease in risk aversion, which leads to an increase in banking leverage, gross flows, and asset prices. However, some authors like Forbes and Warnock (2021) find a positive relationship between U.S. interest rates and the occurrence of episodes of surge, although they say it is a counterintuitive result. Jeanneau and Micu (2002) also find a positive relationship but according to them, higher interest rates may reflect better economic conditions which improve the confidence of banking lenders and may increase banking flows.

2.3. Monetary Policy and Capital Flows

The main focus of this dissertation is to assess the effects that external monetary policy presents on the capital flows of EMEs. As has been presented above, external monetary policy is a push factor, and there is a complete literature that tries to access the theoretical connection of external monetary policy and capital flows, as well as empirical literature that examines its impacts. In this section, I present the main conclusions and findings of the literature on monetary policy international spillovers.[3]

2.3.1. Theoretical Literature

The literature has identified several channels through which monetary policy can affect the behavior of capital flows (Chari et al., 2020; Rey, 2016). Here, I will present the main channels that the literature refers to, starting with those most commonly associated with CMP and then moving on to the main channels for UMP.[4] Is important to emphasize that

[3] It is important to note that these articles do not focus exclusively on the impact that monetary policies present on capital flows, however for the objective of this dissertation I will only focus on the impacts related to capital flows.

[4] More exhaustive analyses can be found, for example, in Krishnamurthy and Vissing-Jorgensen (2011) and Mishkin (1996).

these channels are not mutually exclusive but rather can work simultaneously (Fratzscher et al., 2017; Rey, 2016).

However, before delving into the various channels, it is important to understand what leads investors to adjust their investment allocations. According to the existing literature, investors tend to exhibit a return-oriented behavior. Thus, their investment decisions are primarily guided by the expected returns they anticipate to achieve (e.g. Bohn & Tesar, 1996; Curcuru et al., 2011; Kroencke et al., 2015). Bohn and Tesar (1996) suggest that these decisions may be influenced by past returns, whereas Curcuru et al. (2011) argue that investors base their choices on anticipating future returns. More recently Kroencke et al. (2015) have also noted that besides being return-oriented at least for institutional investors they also present a search for yield behavior.

The CMP operates mainly through banks, and according to the literature, there are two main international channels through which CMP may affect capital flows (e.g. Bruno & Shin, 2015; Reinhart & Reinhart, 2008; Rey, 2016). First, and the most traditional channel is related to changes in interest rates, which are also related to the interest rate parity theory. When the interest rate of one major country falls, EMEs tend to receive more capital inflows due to differentials in interest rates that encourage investors to look for alternatives with higher returns. According to the interest rate parity theory, the interest rate differential and the exchange rate forward premium determines the movements of capital flows (Reinhart & Reinhart, 2008).

Second, the risk-taking channel refers to the mechanism where a monetary policy shock may lead to changes in the risk aversion of market participants. This can occur because such a shock can influence for example valuations of assets and incomes, the perception of target rates returns, future expected policy decision and bank spreads on foreign economies. Influencing, in turn, the investment decisions that market participants make, and by these, capital flows to EMEs (Borio & Zhu, 2012). In general, a decrease in interest rates in a center economy (e.g. the U.S.) is associated with a decrease in risk aversion. Since a decrease in rates can lead investors to look for higher returns taking more risk, or increase the spread of banks on foreign economies, which will encourage them to take more risk and increase their leverage, creating more permissive credit conditions in the foreign economy. All of these lead to an increase in capital inflows to EMEs (Borio & Zhu, 2012; Bruno & Shin, 2015; Rey, 2016).

Turning to the channels of UMP, the literature refers to three main channels through which UMP can affect capital flows (e.g. Chari et al., 2020; Fratzscher et al., 2012; Lim et al., 2014). As UMP mainly affects yields, the literature decomposes them, following the asset pricing literature, into expected short-term rates and the term premium to understand better the impact of UMP (Chari et al., 2020).

First, the Portfolio Balance Channel suggests an inverse correlation between monetary policy actions and capital flows to EMEs (Chari et al., 2020). When a large asset purchase program is implemented, it reduces the supply of assets, leading to an increase in asset prices and a reduction in the term premium demanded by investors, which translates into a reduction in yields (Gagnon et al., 2011).[5] This process may lead investors to invest in other countries in search of higher yields to replace those assets (Chari et al., 2020; Fratzscher et al., 2012; Lim et al., 2014).

Second, the Signaling Channel also suggests an inverse correlation between monetary policy actions and capital flows to EMEs (Chari et al., 2020). For example, with large-scale asset purchases, central banks signal low future interest rates even after the economic recovery, because if they were to raise them, it would mean a loss in the value of the assets they hold. From the investors' perspective, this creates a credible commitment to keep future interest rates low (Clouse et al., 2003). If monetary policy actions are understood by investors as signaling persistent interest rate differentials in the long run, it may alter expected short-term interest rates in the future and thus country asset returns. These differentials may cause investors to shift their investments in search of higher returns (Chari et al., 2020; Fratzscher et al., 2012; Krishnamurthy & Vissing-Jorgensen, 2011).

Third, the Confidence Channel, which is also related to investors' risk appetite, suggests a positive correlation between monetary policy actions and capital flows to EMEs (Chari et al., 2020). When investors interpret monetary policy actions as informative of the current economic conditions, they influence investors' risk appetite and by that their portfolio decisions (Fratzscher et al., 2012). Thus, contractionary monetary policy may signal a recovery in the economy, thereby reducing investors' risk aversion, who are willing to take more risks and invest in higher-yielding emerging market assets (Chari et al., 2020).

[5] This channel is normally associated with the preferred habitat theory, which postulates that investors prefer assets with one maturity length over another, which explains why assets are not perfect substitutes of one another and may explain why purchase actions by central banks can influence yields (Joyce et al. 2011, Fratzcher et al, 2012).

Conversely, and expansionary monetary policy may trigger a flight-to-safety behavior (Neely, 2010).

2.3.2. Empirical Literature

To access the international spillover effects of monetary policy on capital flows, the empirical literature has primarily focused on the actions of the FED, given the central role of the U.S. dollar as the main currency for international transactions and as a reserve currency (Rey, 2015). Moreover, in general, monetary policies implemented by the FED tend to have more significant impacts worldwide than those of other major central banks (e.g. Andreou et al., 2022; Miranda-Agrippino & Nenova, 2022; Miranda-Agrippino & Rey, 2021).

Focusing on the FED monetary policy decisions, the empirical literature has observed that U.S. monetary policy has a significant impact on capital flows to EMEs, with monetary policy easing normally leading to an increase in capital inflows to EMEs and monetary policy tightening leading to a decrease (e.g. Chari et al., 2020; Chen et al., 2014; Koepke, 2018). However, Ciminelli et al. (2022) also find that besides the negative relationship monetary policy surprises can also present positive relationships with capital flows through the information effects that announcements convey about the economic outlook, a result that may be explained by the confidence channel.

For the CMP periods, the literature generally finds that an increase in the federal funds rate, or the expected increase in the federal funds rate, leads to a decrease in capital inflows to EMEs while a decrease leads to an increase in capital inflows (e.g. Calvo et al., 1993; Dahlhaus & Vasishtha, 2020; Rey, 2015). These findings are in line with what is expected from the theoretical literature, and the main channels referred to through which these policies affect capital flows are interest rate differentials and risk-taking channels (e.g. Bruno & Shin, 2015; Kalemli-Ozcan, 2019). Nevertheless, Ciminelli et al. (2022) find that besides the negative relationship, an unexpected increase in interest rates can also lead to an increase in capital flows to EMEs if it is due for example to central banks' expectations of higher growth.

During UMP periods, the literature tends to find that quantitative easing policies presented positive impacts on capital flows to EMEs (e.g. Fratzscher et al., 2012, 2017; Kiendrebeogo, 2016; Koepke, 2018) and authors like Chen et al. (2014) find that they presented larger spillover effects than previous CMPs. However, in their research, Chari et al. (2020) find that quantitative easing policies did not have the "tsunami effect" of capital inflows referred to by policymakers from EMEs, and that the impact was mainly on prices rather than physical flows. For these flows, the empirical literature more often refers to the presence of the portfolio rebalancing channel (e.g. Chari et al., 2020; Fratzscher et al., 2017; Lim et al., 2014). Conversely, UMP can also negatively affect these flows, as investors link the innovation of these policies to increased monetary policy uncertainty and a worse economic outlook, leading them to reduced capital flows due to heightened risk aversion (Andreou et al., 2022; Neely, 2010).

Still, not all countries are affected in the same ways by these shocks. Regarding the heterogeneity of impacts that these policies present among EMEs, the literature analyses several country characteristics, that account for pull factors, to determine if such characteristics may help to protect countries from international spillovers. In general, the empirical studies find that countries with better quality institutions and macroeconomic fundamentals suffer less from international spillovers of monetary policies, since these factors influence agents' risk perceptions about different countries and thus may help to better insulate countries from flight to safety behaviors (e.g. Chen et al., 2014; Dahlhaus & Vasishtha, 2020; Fratzscher et al., 2012; Kalemli-Ozcan, 2019). Additionally, the literature often analyses the financial openness degree, since more financially opened and interconnected economies may be more exposed to spillovers from international shocks, and, the diverse exchange rate regimes, which can directly impact investor returns and, consequently, their decisions, as well as help countries to protect themselves from the volatility of these flows. Regarding these variables, certain authors, such as Anaya et al. (2017), Dahlhaus and Vasishtha (2020), and Fratzscher et al. (2012) do not find evidence to suggest that these measures safeguard countries from spillover effects. In contrast, Kalemli-Ozcan (2019) argues that for EMEs, embracing more floating exchange rate regimes can help to protect these countries from major monetary policy spillovers. Lakdawala et al. (2021) and, to a lesser extent, Ahmed et al. (2017) find that capital account openness plays an important role in the heterogeneous impacts that international shocks present on EMEs.

All these studies investigate the impacts of monetary policies, either by examining the effects of specific actions, although I will demonstrate in the following section that this might not be the most optimal approach, or by evaluating the consequences of monetary policy surprises during specific periods when these policies were implemented. However, such approaches leave periods where both UMP and CMP were combined with a lack of a comprehensive understanding of the individual impacts of each action, for example, during normalization periods. This is important considering, for instance, the first normalization period, in 2013, where there were major outflows from EMEs (e.g. Chari et al., 2020; Chen et al., 2014; Mishra et al., 2014), in contrast with the effects of the current normalization in 2022, that appear to differ at least for some countries.[6] This discrepancy could be attributed to countries enhancing their economic fundamentals and being better prepared to manage external shocks. However, variations between the present normalization and the initial one, such as the notably higher interest rates (FED, 2022), might also contribute to the disparity. Therefore, untangling the distinct impacts of conventional and unconventional monetary policy actions offers substantial advantages. Such disentanglement can provide valuable insights for policymakers and contribute to a deeper comprehension of the spillover effects of monetary policy.

[6] During the first normalization Mishra et al. (2014) find that Brazil, India, Indonesia, Turkey, and South Africa suffered the most. They experienced major reversals in capital flows, currency depreciations, an increase in external financing premia, and a decline in equity prices. Despite that, in this new normalization context, the Brazilian real appreciated as well as the Indonesian rupiah.

3. Methodology

In this section, I describe the methodological approach used to analyze the impact of external monetary policy on capital flows to EMEs. Since the relationship between these two variables is central to my study, I will first describe the approach used for the monetary policy shock and then proceed with the baseline regression and a heterogeneity analysis.

For the monetary policy variable, I measure monetary policy surprises. Monetary policy spillovers to financial markets occur mainly through the expectations of market participants, and market participants tend to respond immediately to any shock that changes their expectations, since they act in anticipation of changes in monetary policy stances. Thus, to measure the impacts of monetary policy on international portfolio flows it is important to measure the surprise or unexpected component of monetary policy announcements (Koepke, 2018; Kuttner, 2001). If we measure monetary policy using, for example, policy rate changes, it might create the impression that monetary policy has limited impact, since some of these changes have already been anticipated and therefore already had their impacts in the past (Kuttner, 2001). Moreover, monetary policy surprises have the additional advantage of being exogenous to global financial conditions, something that for example policy rates are not (Bauer & Swanson, 2023). Another form of measuring monetary policy is using for example dummy variables for the announcement days like Fratzscher et al. (2012), however, once again this could give the illusion that monetary policy has no impacts if changes are already expected and reflected in the markets. Or even counterintuitive impacts if agents for example had anticipated a larger tightening shock, an announcement tightening the monetary policy stance, could result in a loosening shock (Chen et al., 2014; Koepke, 2018).

To measure the surprise element of monetary policy, the literature mainly relies on changes in prices of future contracts around announcement days, utilizing short-term periods. This includes examining daily changes, and, more recently intra-daily changes, to ensure that these variations were only caused by the announcement and thus capture the surprise element of monetary policy (Gürkaynak et al., 2005a). Some measures are more short-term measures like 30-day federal fund futures contracts (Kuttner, 2001), and 2-month future contracts that already capture changes in market expectations over longer horizons (Gürkaynak et al., 2005b, 2007). However, the caveat of these measures is the zero lower bound period where there was almost no variation in the target federal funds rate. To pass this caveat authors had to use more long-term futures, such as five-year treasure futures (FF5) that allow them to overcome this issue (e.g. Chari et al., 2020; Koepke, 2018).

Another possibility to overcome the problems with the zero lower bound period is the shadow rate. Originally introduced by Black (1995), the shadow rate refers to the unobserved short-term interest rate consistent with the longer-term rate that would have prevailed if there had been no lower bound. Thus, when the short rate is greater than the lower bound the shadow rate is equal to the short rate, however, when the lower bound is binding the shadow can capture more information than the short rate since it captures movements of the whole yield curve not being constrained by the lower bound (De Rezende & Ristiniemi, 2023; Wu & Xia, 2016). In this sense, De Rezende and Ristiniemi (2023) present a new measure of shadow rate that incorporates a component of monetary policy surprises. This new measure of shadow rate allows us to measure the overall monetary policy stance at any point in time, with and without the zero lower bond constraints. Moreover, this new shadow rate differs from previous shadow rates, such as Wu and Xia (2016), as it may be applied to any term structure model and does not require any assumptions regarding the zero lower bond values, that created divergencies in estimations in the past (De Rezende & Ristiniemi, 2023). I use this new measure to obtain the monetary policy surprise shocks, since not only does it account for the zero lower bound issues, but it distinguishes itself from the standard future contracts measures by enabling the separation and comparison of conventional monetary policy surprises from unconventional ones.

Thus, following De Rezende and Ristiniemi (2023), I first start with their shadow rate measure for the U.S. (s_t) which gives me the stance of monetary policy of the FED. I also identify the announcements days from FOMC meetings and conference calls from the Federal Reserve Board website. Additionally, I use dates from De Rezende and Ristiniemi (2023) that are not official meetings but present important announcements such as the "Taper Tantrum" episode of May 22, 2013.[7] Next, I retrieve the conventional monetary policy surprise (Δr_t), this is calculated using the intra-daily interest rate changes for the front contract of the one-month federal funds future on the announcement days, using a

[7] A complete list of the monetary policy announcement dates and their sources can be found in Table A2 in the Annexes.

window of ten minutes before and twenty minutes after each monetary policy announcement, as referred by De Rezende and Ristiniemi (2023) following Kuttner (2001) and Gürkaynak et al. (2005a).

Nevertheless, first, it is important to notice that federal funds futures derive their values from the average federal funds rate that prevails during the designated calendar month outlined in the contract. Hence, in the scenario where an FOMC announcement is set for day $d1$ of the month t, the implied rate from the current-month federal funds futures contract $(ff1)$ preceding the announcement, encompasses a weighted combination of the federal funds rate that has been effective in the month up to that point and the rate that is expected to prevail for the remaining duration of the month. Additionally, there is a risk premium component. Thus, after retrieving the one-month federal funds future contracts and determining the intra-daily changes on announcement days, it is necessary to introduce a scale factor, since the surprise factor only holds for the remaining part of the month. Thus, conventional monetary policy surprises are given by:

$$\Delta r_t = \left(ff1_{t,d1} - ff1_{t,d1-1}\right) * \frac{D1}{D1-d1} \qquad (3.1)$$

where $D1$ represents the number of days in month t. Additionally, when FOMC meetings are scheduled for the final seven days of the month the surprise is calculated utilizing the unscaled change in the subsequent-month contract of federal funds futures, to prevent the amplification of changes through the multiplication of a potentially substantial scale factor (Gürkaynak et al., 2005a; Kuttner, 2001).[8]

To access the unconventional monetary policy surprise (Δump_t) I use an event study regression on the announcement days and subtract the conventional monetary policy surprises from the shadow rate following De Rezende and Ristiniemi (2023):

$$\Delta ump_t = \Delta s_t - \Delta r_t \qquad (3.2)$$

This is feasible because as stated by the authors it is possible to decompose shadow rate changes into two components, conventional monetary policy surprises observed on the given day, and prediction errors, which may be related to the unexpected nature of

[8] Due to the unavailability of intra-daily data, I was unable to directly retrieve the federal funds future contracts and calculate the conventional surprises. Nevertheless, I am grateful to Rafael De Rezende and Annukka Ristiniemi for granting me access to their data on conventional surprises, as well as their most recent shadow rate data.

unconventional monetary policies announced that day. Lastly, the different monetary policy shocks are aggregated monthly by summing all the daily surprises. So, months without a monetary policy meeting receive a value of zero, whereas months with several monetary policy announcements constitute the sum of all surprises within those months.

With this methodology, a positive surprise represents a tighter monetary policy than expected, which could be due to either an unexpected tightening of the monetary policy or a smaller easing than what was expected. While a negative surprise on the other hand represents a more loosening monetary policy than expected.

In terms of the econometric model used, both the literature on determinants of capital flows (e.g. Ahmed & Zlate, 2014; Cerdeiro & Komaromi, 2021; Hannan, 2017) and the literature on monetary policy international spillovers (e.g. Chari et al., 2020; Chen et al., 2014; Koepke, 2018) often use fixed effects models, and following their work I also use a fixed effects model. This model suits well the research question at hand since I am working with a large monthly panel data with 22 EMEs, covering the period from 2000 to 2022, and thus this model allows me to solve the unobserved heterogeneity issue that causes endogeneity problems in panel data. This analysis follows mainly the work of Chari et al. (2020) and Chen et al. (2014).

The baseline regression is the following:

$$Flows_{i,t} = \rho_0 + \sum_{l=1}^{K} \rho_l Flows_{i,t-l} + \beta_1 CMP_t + \beta_2 UMP_t + \delta Push_t + \theta Pull_{i,t-1} + $$

$$+ \alpha_i + \varepsilon_{i,t} \qquad (3.3)$$

where $Flows_{i,t}$ is the equity or debt inflows to the country i in time t, this variable is scaled by country GDP to facilitate cross-country comparisons. I include lags of the dependent variable, $Flows_{i,t-l}$, to account for autocorrelation given the dynamics of capital flows and thus to prevent potential endogeneity concerns (Chari et al., 2020; Kiendrebeogo, 2016; Koepke, 2018).[9] The number of lags of the dependent variable for

[9] By incorporating the lagged dependent variable, the model transitions into a dynamic framework. There is a possibility that the estimates for fixed effects might be inconsistent due to the potential correlation between the lagged dependent variable and the error term, which could lead to Nickell's bias. However, this concern is mitigated by the extensive time coverage of my sample, as the estimation bias is effectively negligible (approximately $\frac{1}{T}$) (Lim et al., 2014). This reassures the viability of utilizing the fixed effects model, in line

each regression was determined in an agnostic form minimizing the Akaike Information Criterion (AIC). CMP_t and UMP_t account for the monthly conventional and unconventional monetary policy surprises of the FED.[10] Next, $Push_t$ and $Pull_{i,t-1}$ account for the control variables of the push and pull factors most used by the literature (push factors: measure of liquidity (TED spread), market risk (VIX), and world GDP growth; pull factors: capital controls, exchange rate regime (ERR), real GDP growth, inflation, institutional quality, domestic interest rate, public debt, real effective exchange rate overvaluation (REERO), stock index return and trade openness); pull factors are introduced with a lag to rule out simultaneity and thus prevent potential endogeneity problems (Andreou et al., 2022; Chari et al., 2020; Fratzscher et al., 2017).[11] Finally, α_i represent the country-specific fixed effects to control the unobserved time-invariant country characteristics, and $\varepsilon_{i,t}$ is the error term. The coefficients β_1 and β_2 show the impact of the different monetary policy surprises on portfolio inflows and are the main coefficients of interest in this regression. δ and θ represent vectors of coefficients that capture the impacts of the different push and pull factors on the dependent variable respectively. This regression is analyzed for the full period and divided into two subperiods: the precrisis (January 2000 – July 2008) and the after-crisis period (January 2009 – December 2022), since unconventional policies only were introduced after the great financial crisis. Moreover, the literature has already point out that after the great financial crisis there has been a structural change both in the composition of capital flows, with the structure of global liquidity changing from banking flows towards international bonds, and in the way these flows respond to external monetary policy and other drivers (e.g. Avdjiev et al., 2020; CGFS, 2021; Forbes & Warnock, 2021).

Furthermore, I also examined the potential explanatory power that pull factors may present for the heterogeneity of impacts across different countries to the same global shock, in this case, external monetary policy shocks. This approach is similar to the study by Chen et al. (2014), however it extends the analysis to examine the potential explanatory power that pull factors may present for the two types of monetary policy surprises, conventional and unconventional. To do so, following Chen et al. (2014) I introduce in regression (3.3) pull

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with previous studies (e.g., Chari et al., 2020; Lim et al., 2014).

[10] I also studied the impact of the ECB monetary policy however the results obtained are not significant. Thus, for the sake of the presentation, they will no longer appear either on the regressions or on the data. Results are available upon request.

[11] A full description of the variables used, and their sources can be found in Table 3 in the Appendix.

factors as interaction terms of the monetary policy surprises, and obtain the following regression:

$$Flows_{i,t} = \rho_0 + \sum_{l=1}^{K} \rho_l Flows_{i,t-l} + \beta_1 CMP_t + \beta_2 UMP_t + \delta Push_t + \theta Pull_{i,t-1} +$$

$$+ \sigma_1 CMP_t \times Pull_{i,t-1} + \sigma_2 UMP_t \times Pull_{i,t-1} + \alpha_i + \varepsilon_{i,t} \qquad (3.4)$$

These interaction terms allow me to assess if certain country characteristics may help to mitigate or amplify the effects that an external monetary policy shock can have on the portfolio inflows of one country related to another, depending on their characteristics. The key coefficients of interest are β_1, β_2, σ_1, and σ_2. Here, σ_1 and σ_2 represent vectors of coefficients that measure the potential amplification or dampening effect of pull factors on the transmission of external conventional and unconventional monetary policy shocks when compared to the respective monetary policy surprise coefficients β_1 and β_2. For instance, if a σ_1 coefficient has the opposite sign of β_1, it indicates that the country characteristic dampens the shock's impact. Conversely, if the signs align, it suggests that country characteristic amplify the shock's impact.[12]

[12] To comprehend which pull factors have substantial impacts and contribute to understanding the heterogeneity of impacts, I initiated the analysis by considering all the selected pull factors. Subsequently, I systematically eliminated these factors one by one, beginning with the least significant, until only the interaction terms that retained significance remained.

4. Data

The dataset consists of monthly data for 22 EMEs covering the period from 2000 to 2022. [13] This timeframe enables me to examine both pre-unconventional and unconventional monetary policy periods, including also both normalization periods similar to Chari et al. (2020). The dataset is formed by data on portfolio flows, external monetary policy surprises, and push and pull factors.[14]

In this study, the dependent variable, namely capital flows to EMEs, is measured using a monthly dataset from the Institute of International Finance (IIF) spanning the period from 2000 to 2022. The dataset captures gross portfolio inflows consistent with the balance of payments definition, which represents the nonresident's purchases of domestic debt or equity securities net of their sales. A positive sign indicates an increase in liabilities and capital inflows, while a negative sign signifies a reduction in liabilities and thus capital outflows.

Considering our focus on analyzing the impact of external monetary policy decisions on capital flows using high-frequency data for measuring monetary policy surprises, it is important to analyze capital flows at a higher frequency level as well. Similarly, to previous studies that analyzed the relationship between external monetary policy and capital flows, I will be using the higher frequency data available, in this case, monthly frequency (e.g. Chari et al., 2020; Dahlhaus & Vasishtha, 2020; Koepke, 2018). Since lower frequency data carries higher risks of capturing capital flow movements being influenced by shocks other than monetary policy announcements (Chari et al., 2020). Moreover, quarterly data is not adequate for this analysis as market participants are likely to adjust their investment positions more frequently in response to changes in global and domestic conditions, as highlighted by Cerdeiro and Komaromi (2021).

Thus, I analyze portfolio inflows since monthly data is only available for this component, as other capital flow components lack higher frequency datasets (Koepke & Paetzold, 2022). Moreover, portfolio inflows have been gaining importance as a source of alternative financing since the global financial crisis, particularly debt flows, and have been the most

[13] The countries included are Brazil, Bulgaria, Chile, Czech Republic, Estonia, Hungary, India, Indonesia, Korea, Latvia, Lithuania, Malaysia, Mexico, Philippines, Poland, Romania, Russia, South Africa, Slovenia, Taiwan, Thailand, and Turkey.

14 A description of each variable and its source can be found in Table 3 in the Appendix, and a set of summary statistics in Table A1 in the Annexes.

volatile component of capital flows (e.g. Chari, 2023; Forbes & Warnock, 2021; Koepke & Paetzold, 2022). Since they are closely tied to fluctuations in asset prices and exchange rates, that makes them highly relevant for central bank policy decisions (Koepke & Paetzold, 2022) and thus for policymakers in EMEs.

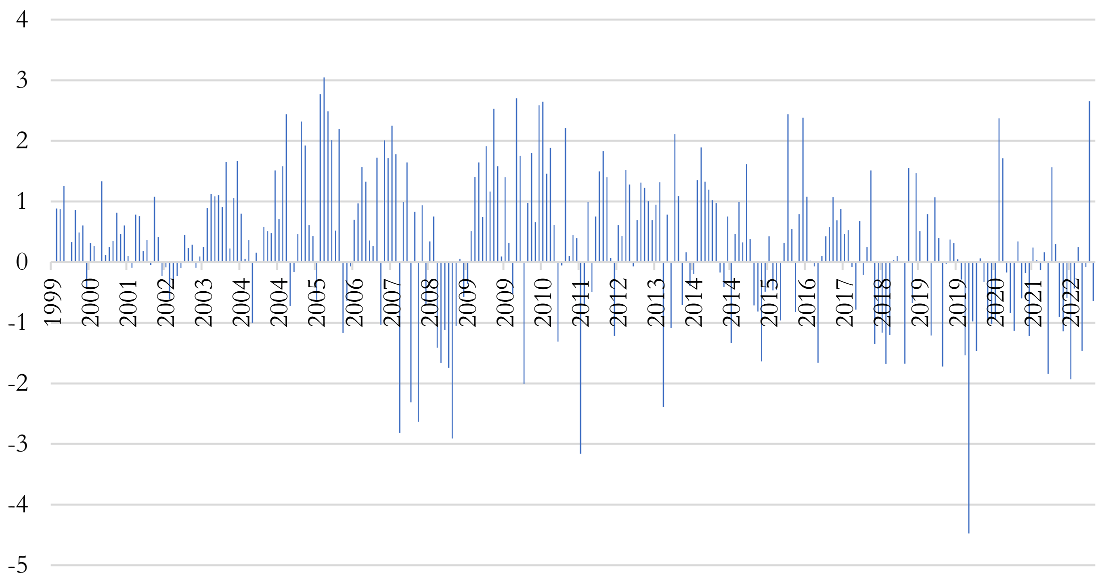
Regarding the choice of a dataset, it is important to note the limited availability of high-frequency data concerning capital flows to EMEs. Among these flows, portfolio flows tend to have more high-frequency data, varying from monthly and weekly to daily updates. However, it is worth mentioning that as the frequency increases, the number of countries with available information decreases. When focusing on the analysis of portfolio inflows with high-frequency data, four datasets come into consideration: the EPFR dataset, though not accessible freely, the TIC dataset, covering only U.S. investors, the IIF dataset, and the KP dataset, which was established when the IIF dataset was not freely available (Koepke & Paetzold, 2022). For this analysis, I opted to use the IIF dataset.[15] The selection of the IIF dataset aligns with the studies conducted by Koepke (2018) and Cerdeiro and Komaromi (2021). It is important to note that while the EPFR dataset is widely used as the preferred dataset for high-frequency capital flows data (e.g. Chen et al., 2014; Dahlhaus & Vasishtha, 2020; Fratzscher et al., 2017), Koepke and Paetzold (2022) argue, through a comparative analysis of different capital flow datasets, that while the EPFR data suits finance professionals for portfolio allocation decisions, the IIF data is better suited for macroeconomic analysis of portfolio flows. This distinction arises from the fact that the EPFR dataset provides detailed high-frequency data on fund flows categorized by fund types. However, it is important to note that it does not cover all types of emerging market investors. In contrast, the IIF dataset reports higher frequency data on portfolio flows, aligning more closely with balance of payments accounting principles. This alignment with the balance of payments data is particularly relevant, given my objective of comprehending the effects of external monetary policy on capital flows (Cerdeiro & Komaromi, 2021; Koepke & Paetzold, 2022).

[15] The IIF (Institute of International Finance) is a global association comprising 400 members from more than 60 countries in the financial industry. Its members comprise various entities like banks, asset managers, insurance companies, and central banks. The dataset on portfolio inflows, a component of their Capital Flows Tracker, comprises data for approximately 30 EMEs. This data is sourced from national central banks and stock exchanges of their members.
Institute of International Finance. https://www.iif.com/. Access on June 6, 2023.

Next, I present the chronological progression of portfolio inflows and external monetary policy surprises. This initial overview serves to provide a comprehensive understanding of the data's evolution during the analyzed period, as these variables represent the primary focus of interest in my analysis.

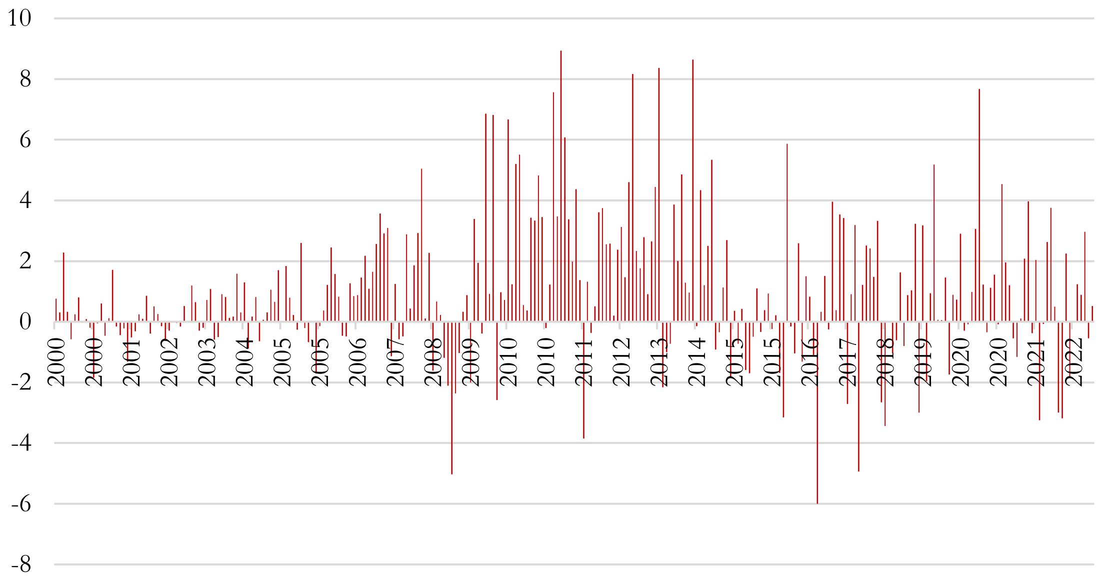
Figures 1 and 2 represent the equity and debt inflows to EMEs through the period in analysis. In general, we can observe that debt inflows present more extreme values than equity inflows. Moreover, since the start of the unconventional monetary policy period, we see an increase in the amount of debt inflows to EMEs, consistent with the change in the financing structure. In more recent years, equity inflows presented more reductions than debt inflows. Furthermore, the pics and busts tend to correspond to major external shocks following fluctuations, with the great financial crises, the tapering announcement in 2013, and the COVID-19 pandemic signaling periods of major outflows.

Figure 1: Aggregated Equity Inflows



This figure illustrates the monthly equity inflows aggregated for the 22 EMEs in analysis. The values are expressed in percentage points.

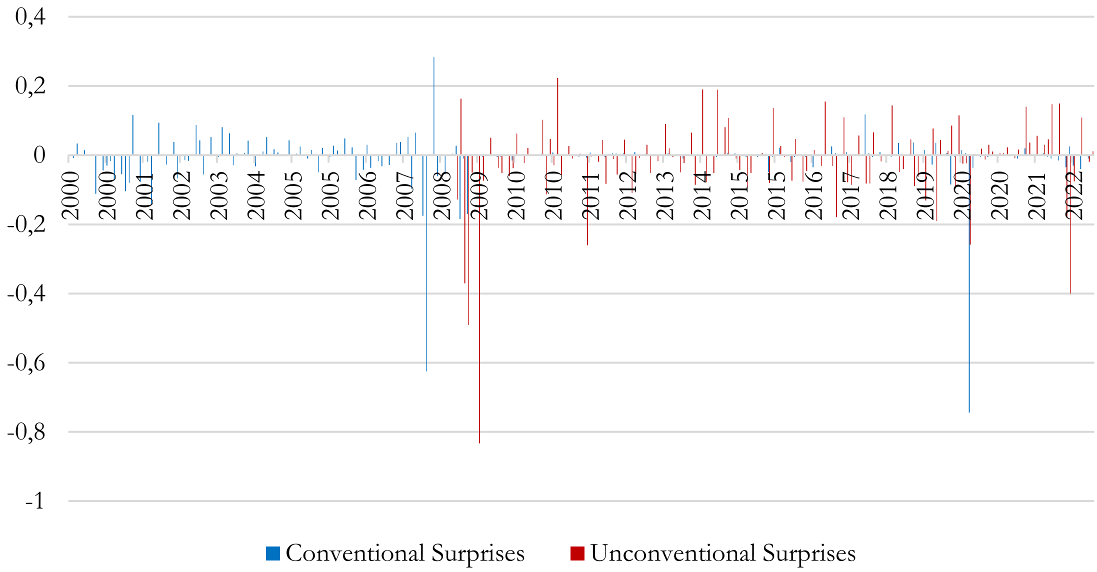
Figure 2: Aggregated Debt Inflows



This figure illustrates the monthly debt inflows aggregated for the 22 EMEs in analysis. The values are expressed in percentage points.

For the monetary policy surprises, in Figure 3, we can see the evolution of the conventional and unconventional surprises. During the zero lower bound period there are almost no conventional surprises, and we can observe large pics of surprises around the dates of the start of the great financial crises, the introduction of quantitative easing measures, and the COVID-19 pandemic.

Figure 3: FED Monetary Policy Surprises



This figure illustrates monetary policy surprises of the FED that are calculated following equations (3.1) and (3.2), and then aggregated on a monthly basis by summing.

5. Results

This section presents the main findings of my empirical analysis, building upon the preceding sections. It is structured into two subsections, namely 5.1 and 5.2. In the first subsection, I examine the effects of the different types of U.S. monetary policy surprises on portfolio inflows. In subsection 5.2, I examine the country characteristics that could elucidate the heterogeneity of impacts that the same monetary policy shock may exhibit across EMEs.

5.1. The effects of U.S. monetary policy surprises on portfolio flows

Table 1 examines the impacts of U.S. monetary policy surprises on portfolio inflows across the full period and two subperiods: the precrisis and the after-crisis period. This table presents the results from equation (3.3) with columns (1), (3), and (5) giving the results for equity flows in the full period, the pre-crisis period, and the after-crisis period respectively, and columns (2), (4) and (6) giving the results for debt inflows.

First of all, most of the lagged dependent variables exhibit a positive and statistically significant relationship. This indicates that a portion of the portfolio inflows occurring in a particular month can be attributed to previous inflows in the preceding months and will impact the inflows in the subsequent months. This finding aligns with existing literature, which commonly identifies a positive autocorrelation in capital flow behavior (e.g. Andreou et al., 2022; Koepke, 2018; Lim et al., 2014). This autocorrelation could be explained, at least to some extent, by a return-chasing behavior (Bohn & Tesar, 1996) where investors tend to allocate their investments based on past returns as referred by Koepke (2018), consequently, previous inflows that have performed well can contribute to further inflows. This autocorrelation also implies that a shock from one determinant of capital flows will influence movements of capital flows in that month and also in the next months (Koepke, 2018). Thus, the coefficients presented in the tables reflect the immediate impact on portfolio inflows from one monetary policy shock but there is also a more medium-term impact that will depend on the degree of autocorrelation.

Table 1 - Baseline Regression

Periods	Full period		Precrisis		After crisis	
Dependent Variable	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Dependent	0.2501***	0.0625	0.1864***	0.1484***	0.2444***	0.0542
Variable$_{t-1}$	(0.0349)	(0.0427)	(0.0475)	(0.0414)	(0.0357)	(0.0434)
Dependent	0.0537**	0.0466	0.0747*		0.0498**	0.0414
Variable$_{t-2}$	(0.0220)	(0.0297)	(0.0396)		(0.0223)	(0.0309)
Dependent	0.0966***	0.1002	0.0500*		0.0962***	0.0984
Variable$_{t-3}$	(0.0199)	(0.0584)	(0.0260)		(0.0190)	(0.0588)
Dependent		0.0030	-0.0192			0.0033
Variable$_{t-4}$		(0.0417)	(0.0270)			(0.0388)
Dependent		-0.0121				-0.0110
Variable$_{t-5}$		(0.0266)				(0.0270)
Dependent		0.1332***				0.1374***
Variable$_{t-6}$		(0.0455)				(0.0458)
Conventional	0.0439**	0.1453**	0.0597*	-0.0776*	0.0425**	0.1203*
Surprise	(0.0192)	(0.0648)	(0.0285)	(0.0435)	(0.0196)	(0.0679)
Unconventional	-0.0143	-0.0082			-0.0059	-0.0080
Surprise	(0.0097)	(0.0247)			(0.0196)	(0.0297)
Constant	0.0172	-0.0493	0.1008	-0.0317	0.0271	-0.0466
	(0.0372)	(0.0870)	(0.0780)	(0.1735)	(0.0410)	(0.0861)

(continues)

Table 1 – Baseline Regression (Continued)

Periods	Full period		Precrisis		After crisis	
Dependent Variable	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Lag Push Factors	NO	NO	NO	NO	NO	NO
Lag Pull Factors	YES	YES	YES	YES	YES	YES
Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	3269	3462	1099	1145	3205	3395
No. Countries	20	21	16	17	20	21

Table 1 presents the impacts of FED monetary policy shocks on EMEs portfolio inflows, following regression (3.3). The dependent variables are equity and debt inflows, all inflows are scaled by countries' GDP of the last twelve months. The number of lags of the dependent variable for each regression was determined in an agnostic form minimizing the Akaike Information Criterion (AIC). Monetary policy surprise shocks are obtained following equations (3.1) and (3.2), all the surprises are aggregated monthly by summing. The different periods are: Precrisis: January 2000 – July 2008; After Crisis: January 2009 – December 2022. The dependent variables and pull factors were winsorized at the 5th and 95th percentiles to control for outlier values. The control variable descriptions can be found in Table 3 in the Appendix. Standard errors are robust to heteroscedasticity and are shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Focusing on equity inflows (columns 1, 3, and 5) for conventional monetary policy surprises, I find that these shocks present a positive relationship with equity inflows for both the full period and the two subperiods. This means that when the FED announces an unexpected increase in interest rates, which represents a positive conventional surprise, equity inflows to EMEs increase. The literature tends to find that policy rate changes (e.g. Ahmed & Zlate, 2014; Ghosh et al., 2014; Hannan, 2017) and monetary policy surprises (e.g. Chari et al., 2020; Dahlhaus & Vasishtha, 2020; Koepke, 2018) present a negative relationship with capital flows to EMEs. However, Forbes and Warnock (2021) also find this counterintuitive result for the U.S. interest rates, where an increase in the shadow rate led to an increase in the possibility of a surge. This result could in part be explained by the presence of the confidence channel where an increase in rates could be seen by investors as a signal of better economic conditions and improve investors' confidence moving them to take more risk. For unconventional surprises, I do not find statistically significant results.

Shifting the focus to debt inflows (columns 2, 4, and 6) under conventional surprises, a positive relationship emerges for the full period. However, segmenting the analysis into pre-crisis and post-crisis periods uncovers a significant shift. The pre-crisis era exhibits a negative coefficient, while the post-crisis period showcases a positive coefficient, suggesting a structural change. Before the global financial crisis, a negative conventional surprise resulted in increased portfolio inflows to EMEs. However, after the crisis, an easing surprise now triggers a decrease in portfolio inflows to EMEs. This finding aligns with existing literature that underscores a structural transformation in both the composition of capital flows and their response to external monetary policy and other factors (e.g. Avdjiev et al., 2020; CGFS, 2021; Forbes & Warnock, 2021). One plausible explanation for this structural change could be a shift in investors' risk aversion response to monetary policy surprises. Before the global financial crisis, a negative conventional surprise boosted debt inflows to EMEs, possibly due to portfolio rebalancing in search of higher yields or a reduction in risk aversion driven by easing surprises, encouraging investors to take more risk (e.g. Bruno & Shin, 2015; Chari et al., 2020). In the aftermath of the financial crisis, with interest rates reaching the zero lower bound and the need for unconventional monetary policies, debt inflows to EMEs initially experienced a substantial drop that could be due to an increase in investors risk aversion, that triggered a flight to safe behavior (Erduman & Kaya, 2016; Miranda-Agrippino & Rey, 2020; Neely, 2010). It is conceivable that these events reshaped investor perceptions, associating an unexpected rate decrease with worse-than-expected economic conditions. This perception could erode investor confidence, prompting a shift towards less risky investments and reduced investments in EMEs, reflecting the confidence channel. This perspective aligns with findings from Miranda-Agrippino and Rey (2020), who find that post-crisis monetary policy easing reduced investor risk aversion, possibly due to the information conveyed about the economic outlook. It also resonates with Ciminelli et al. (2022), who observed that higher interest rates, driven by improved economic conditions, may increase allocations to certain types of fund flows to EMEs. As for unconventional surprises, I also do not uncover significant results regarding their impact on debt inflows.

Since I do not find significant results for unconventional monetary policy surprises on portfolio inflows, this suggests that pure unconventional monetary policy surprises did not transfer so well to portfolio inflows as conventional surprises. It may seem unexpected since the literature generally finds that after unconventional measures were adopted several EMEs' capital flows increased (e.g. Chen et al., 2014; Fratzscher et al., 2017; Kiendrebeogo, 2016). This divergence might arise from the novel monetary policy metric. It is worth noting, that De Rezende and Ristiniemi (2023) using their new measure of monetary policy study the impact of each type of policy on exchange rates and find results that go in line with the previous literature, validating the metric. Nevertheless, this result goes in line with Chari et al. (2020) that finds no significant impact from monetary policy surprises on portfolio flows to EMEs during the quantitative easing period.

Something also interesting to notice is that debt inflows suffer higher impacts than equity inflows, since the same shock presents higher absolute values for their coefficients. This finding aligns with previous literature, which also finds that debt flows are more sensitive to the U.S. monetary policy than equity flows (e.g. Dahlhaus & Vasishtha, 2020; Koepke, 2018; Lim et al., 2014; Taylor & Sarno, 1997). This could be due to the stronger linkage between bond prices and interest rates compared to equity prices (Koepke, 2018).

In summary, I find that U.S. conventional surprises present a large impact on portfolio inflows to EMEs. In general, the relationship is positive except for debt inflows before the crisis that present a negative relationship, suggesting that the confidence channel performs an important role in determining portfolio inflow movements. For the unconventional surprises, I do not find significant results, which suggests that unconventional policies may have not transferred as well to EMEs as it was thought, and that conventional present more impacts on these variables.

5.2. Cross Country Heterogeneity

Table 2 examines the potential role that country characteristics may play to explain the cross-country heterogeneity of impacts that monetary policy surprises can have on portfolio inflows, following equation (3.4). Furthermore, owing to the findings from the preceding table concerning the separation in two time periods, this table presents the outcomes based on these designated phases and drops the full period analysis. As a result, columns (1) and (3) present the results for equity inflows during the pre-crisis and post-crisis periods, respectively, while columns (2) and (4) present the results for debt inflows.

For equity inflows (columns 1 and 3), first I observe that neither conventional nor unconventional policies present significant betas, thus I am not able to analyze whether country characteristics amplify or dampen the impacts of monetary policy surprises like Chen et al. (2014) suggests. However, when we observe the interaction terms, we find some interesting results that may help to understand the heterogeneity of impacts of these surprises across countries.

Table 2 – Heterogenous Effects

Periods	Precrisis		After crisis	
Dependent Variable	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**
Variables	**(1)**	**(2)**	**(3)**	**(4)**
Dependent Variable$_{t-1}$	0.2015***	0.1456***	0.2443***	0.0534
	(0.0601)	(0.0409)	(0.0357)	(0.0431)
Dependent Variable$_{t-2}$			0.0518**	0.0408
			(0.0229)	(0.0289)
Dependent Variable$_{t-3}$			0.0955***	0.0988
			(0.0193)	(0.0580)
Dependent Variable$_{t-4}$				0.0025
				(0.0392)
Dependent Variable$_{t-5}$				-0.0107
				(0.0265)
Dependent Variable$_{t-6}$				0.1371***
				(0.0449)
Conventional Surprise	0.0496	0.0244	-0.0528	0.8696***
	(0.0375)	(0.0561)	(0.0373)	(0.1831)
Unconventional Surprise			-0.0369	-0.0185
			(0.0349)	(0.0301)
Capital Controls$_{t-1}$ *CMP-S	-0.0527***		-0.0385***	
	(0.0165)		(0.009)	
ERR - Fixed Exchange Rate$_{t-1}$			-0.1212***	-0.4713***
*CMP-S			(0.0226)	(0.1271)
ERR - Crawling Peg$_{t-1}$		-0.0704**	-0.0430***	
*CMP-S		(0.0265)	(0.0104)	
ERR - Crawling Bands$_{t-1}$		-0.0598*		
*CMP-S		(0.0288)		

(continues)

Table 2 – Heterogeneous Effects (Continued)

Periods	Precrisis		After crisis	
Dependent Variable	Equity Inflows	Debt Inflows	Equity Inflows	Debt Inflows
Variables	(1)	(2)	(3)	(4)
ERR - Freely Floating$_{t-1}$ *CMP-S			-0.0127***	
			(0.0043)	
ERR - Freely Falling$_{t-1}$ *CMP-S				0.0187**
				(0.0078)
Institutional Quality$_{t-1}$ *CMP-S			0.3937***	-1.1044***
			(0.0658)	(0.3239)
REERO$_{t-1}$ *CMP-S			-0.0070**	
			(0.0030)	
Stock Return Index$_{t-1}$ *CMP-S	0.0021*			-0.0067**
	(0.0012)			(0.0026)
Trade Openness$_{t-1}$ *CMP-S			-0.0007***	
			(0.0002)	
ERR - Fixed Exchange Rate$_{t-1}$ *UMP-S			0.1021***	
			(0.0272)	
ERR - Crawling Peg$_{t-1}$ *UMP-S			0.0615***	
			(0.0141)	
ERR - Crawling Bands$_{t-1}$ *UMP-S			0.0346***	
			(0.0095)	
ERR - Freely Floating$_{t-1}$ *UMP-S			0.0219***	
			(0.0068)	
Institutional Quality$_{t-1}$ *UMP-S			-0.2053***	
			(0.0563)	
REERO$_{t-1}$ *UMP-S				-0.0116***
				(0.0037)

(continues)

Table 2 – Heterogeneous Effects (Continued)

Periods	**Precrisis**		**After crisis**	
Dependent Variable	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**
Variables	**(1)**	**(2)**	**(3)**	**(4)**
Stock Return Index$_{t-1}$ *UMP-S			0.0015**	
			(0.0006)	
Trade Openness$_{t-1}$ *UMP-S			0.0009***	
			(0.0002)	
Lag Push Factors	NO	NO	NO	NO
Lag Pull Factors	YES	YES	YES	YES
Fixed Effects	YES	YES	YES	YES
Observations	1138	1145	3205	3395
No. Countries	16	17	20	21

Table 2 presents the impact of FED monetary policy shocks on EMEs portfolio inflows and the importance of the different pull factors, following regression (3.4). The dependent variables are equity and debt inflows, all inflows are scaled by countries' GDP of the last twelve months. The number of lags of the dependent variable for each regression was determined in an agnostic form minimizing the Akaike Information Criterion (AIC). Monetary policy shocks are obtained following equations (3.1) and (3.2), all the surprises are aggregated monthly by summing. The different periods are: Precrisis: January 2000 – July 2008; After Crisis: January 2009 – December 2022. The dependent variables and pull factors were winsorized at the 5th and 95th percentiles to control for outlier values. Pull factors are multiplied by both conventional monetary policy surprises (CMP-S) and unconventional monetary policy surprises (UMP-S), all factors were included in the regression at first and then removed one by one until the remaining results were all significant. The control variable description can be found in Table 3 in the Appendix. Standard errors are robust to heteroscedasticity and are shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Starting with column (1), I find that only capital controls and the stock return index influence the way countries are affected by conventional surprises in the pre-crisis period. Capital controls represent the degree of capital account openness, with higher values representing a more open economy and thus with fewer capital controls (Chinn & Ito, 2008). For this interaction term, I find a negative relationship, thus a tightening conventional surprise in the U.S. monetary policy leads to a reduction in equity inflows to EMEs for countries with lower capital controls. The same shock leads to an increase in inflows in countries with higher capital controls. These findings are in line with previous literature that finds that capital control measures influence the way countries experience movements in capital flows, since these measures directly impact the degree of financial openness, and thus capital flows movements (e.g. Ahmed & Zlate, 2014; Cerdeiro & Komaromi, 2021; Lakdawala et al., 2021). Next for stock return, I find that countries with positive returns in their stock market, present a positive relationship between equity inflows and conventional monetary policy surprises, while countries with losses in their stock market present a negative relationship. Thus, when there is a tightening surprise, it seems that equity investors are running away from countries whose stock markets perform poorly to countries where the returns on the financial markets are higher. The higher the stock returns the higher the increase of equity inflows when there is a tightening surprise. This could be justified by the idea of investors' nature being return-oriented (Kroencke et al., 2015).

Turning to equity inflows during the after-crisis period (column 3), I find more significant country characteristics than in the pre-crisis period. These findings align with the findings of Chen et al. (2014), that also find more results for the unconventional period than in the conventional period of their analysis. This suggests that the transmission of the U.S. monetary policy shocks became more asymmetric and dependent on the country's characteristics after the great financial crisis. Starting with conventional surprises, I find that a tightening surprise leads to a reduction of equity inflows in countries with fewer capital controls, and more fixed exchange rate regimes, with their currencies overvalued, and a higher degree of trade openness. On the contrary, in countries with more capital controls, higher institutional quality, and undervalued currencies a tightening conventional surprise leads to an increase in equity inflows. One interesting result comes from the REERO since I find that a tightening surprise presents a negative relationship for countries that have their currencies overvalued and a positive one for countries with undervalued currencies. It seems that there is a diversion of equity inflows from countries with their currencies overvalued to the ones that are undervalued, it could be the case that a tightening shock is giving the opportunity to investors to rebalance their portfolio once again in search for better returns, this time due to the greater appreciation prospects (Ghosh et al., 2014; Kroencke et al., 2015).

For unconventional surprises, I find that a tightening surprise leads to a decrease in equity inflows the better the institutional quality of the country, and for countries with losses on their stock market. The same tightening surprise leads to an increase in equity inflows of countries the lower degree of flexibility in their exchange rate regimes, countries with positive returns on their stock market, and the higher the degree of trade openness. These are essentially the same characteristics that help to explain the heterogeneity of impacts for the CMP surprises. Once again, it seems that UMP, like CMP, provides the opportunity for investors to rebalance their portfolios in search of better returns on stock markets. In addition to this, exchange rate regimes, institutional quality, and trade openness are significant characteristics that previous literature has also referred to as influencing the movements of capital flows (e.g. Cerutti et al., 2019; Fratzscher, 2012; Ghosh et al., 2014). Exchange rate regimes can influence investors' returns and their confidence in investing. For instance, the assurance of exchange rate stability can improve investors' confidence to invest and to also maintain their investments. On the other hand, institutional quality's impact is directly related to the way investors perceive countries and their associated risks. Finally, a country's trade openness is important, as more open the economies are more exposed to international shocks.

Now looking for debt inflows, starting with the pre-crisis period (column 2), once again conventional monetary policy surprises do not have a significant coefficient so I cannot infer that either these pull factors dampen or amplify the shocks. Despite that, in this period I only find exchange rate regimes to be significant. For these variables, it is important to notice that, since they represent dummy variables of the exchange rate regime they are analyzed together and not individually. For these variables I find a negative relationship, similar to equity inflows, thus a tightening conventional surprise leads to a reduction in debt inflows, this reduction is more significant in countries with more fixed exchange regimes.

For the after-crisis period (column 4), as for equity inflows, I find more significant results in this period. Moreover, for these results, conventional monetary policy presents a positive and significant coefficient which goes in line with the findings of the previous table. Thus, if an interaction term presents a positive coefficient, it amplifies the shock, while if it has a negative coefficient, it dampens the shock. For the conventional surprises fixed exchange rate regimes dampen the impacts of these surprises on debt inflows, while a more free regime amplifies it. Institutional quality also dampens the shock, in fact, everything else held constant leads to a reduction in equity inflows instead of an increase. Finally, stock returns, in countries that present gains dampen the effect of conventional surprises, while they amplify the impacts on countries with losses. For the unconventional surprises, I only find significant results for the REERO, with a result similar to the one I find for conventional surprises on equity inflows.

In general, these results are in line with previous literature (e.g. Cerutti et al., 2019; Chen et al., 2014; Fratzscher, 2012) that finds that country characteristics play an important role in determining the cross-country heterogeneity effects that we see after a global shock as can be a U.S. monetary policy surprise.

From all the interaction terms the country characteristic that stands out being the most important is the institutional quality. This seems to suggest that invertors' perception of the country and thus their aversion to risk play a major role in determining cross-country heterogeneity, since investors may feel more confident to invest in countries with better institutions as suggested by Alfaro et al. (2008). Once again this seems to establish a connection between conventional monetary policy surprises and portfolio inflows through investor's perception of risk.

In resume, I find that when it comes to U.S. monetary policy surprises, institutional quality is a country characteristic that largely influences the way countries are affected, and better institutions may help countries to dampen the impacts of conventional shocks at least on debt inflows. Characteristics like the stock market returns, the REERO, or trade openness present significant impacts on the way countries are affected by these surprises, moreover, market returns, for countries with positive returns help dampen the effects of conventional surprises while losses have an amplifying effect at least for debt inflows. Finally, policy decisions like the use of capital controls or the exchange rate regime adopted also influence the way countries are affected by these policies. For debt inflows more fixed exchange rate regimes seem to dampen the effects of conventional surprises.

Finally, when comparing the interaction terms for the conventional and the unconventional surprises we can observe that conventional surprises present more significant interaction terms than unconventional surprises, suggesting once again that maybe unconventional surprises did not transfer as well to EMEs capital flows as the literature thought, and as conventional surprises do. Moreover, this also suggests that UMP shocks are less differentiated and thus more general while CMP are more influenced by country characteristics and thus easier to predict.

6. Robustness

To assess the robustness of my findings, I conduct a few alternative exercises, which I present in Tables A3 to A6 in the Annexes. First, to test the measure of UMP, I employ an alternative method to calculate unconventional surprises, I present the results in Table A3. Instead of calculating the difference between the shadow rate and the conventional surprises, I use the residuals from the shadow rate orthogonalized by the conventional surprises. In general, I observe qualitatively similar results, which further support the notion that UMP shocks do not transmit as effectively as CMP shocks.

To further scrutinize the results regarding monetary policy surprises, particularly the positive relationship that I find, I employ another commonly used measure from the literature, the FF5 contracts (e.g. Chari et al., 2020; Rogers et al., 2014). To do so I calculate the daily changes in the implied yield of the FF5 on FOMC announcement days and aggregated all these surprises on a monthly basis. The results can be found in Table A4. With this measure, I find a negative relationship between monetary policy surprises and portfolio inflows in the full period, aligning with the findings of Chari et al. (2020). Notably, since all the variables remained constant except for the monetary policy measure, the similarity of results to those of Chari et al. (2020), reinforces the confidence in the quality of data collection and treatment for this analysis. Furthermore, since the only change has been on the monetary policy surprise measure, this suggests that either the monetary policy measure proposed by De Rezende and Ristiniemi (2023) is not a suitable indicator for measuring monetary policy surprises related to capital flow movements, or, the FF5 may not accurately capture monetary policy surprises, and thus, the results obtained by Chari et al. (2020) come at the expense of a measure that may not accurately reflect what they are trying to measure. However, additional investigation would be necessary to confirm these results.

Finally, I also test the results by altering some of the push and pull factors, following the control factors employed by Chari et al. (2020).[16] Additionally, I employ a random effects estimation method instead of fixed effects. The results are presented in Tables A5 and A6,

[16] For this analysis, I remove the world GDP, capital controls, ERR, and trade openness variables and add current account and fiscal balance variables. A description of each variable and its sources is available in Table 3 in the Appendix.

respectively. The results presented in these tables remain qualitatively similar, suggesting that the results are robust and not contingent on the specific push and pull factors utilized.

7. Conclusion

This study examined and compared the spillover effects that conventional and unconventional monetary policies by the FED present on portfolio inflows of EMEs. For this, I used a new monetary policy measure introduced by De Rezende and Ristiniemi (2023), that allows the separation in different types of monetary policy from the same monetary policy event and compare them. For portfolio inflows, I used data from the International Institute of Finance and conducted an econometric analysis with a fixed effect model to determine the relationship between these variables.

With this study, I suggest that CMP presents more impact than UMP on portfolio inflows to EMEs. Moreover, the main channel driving CMP spillovers is the confidence channel, suggesting that the information effect that the FMOC announcements convey might be more important than what was thought.

On the other hand, regarding the heterogeneity of impacts country characteristics seem to play an important role in determining the spillover effects for each country. In particular, institutional quality is shown to be the most important factor that influences the way countries are affected by both types of shocks. Other characteristics are the degree of trade openness, the stock market returns, and the REERO that also influence the way countries are affected. When comparing CMP and UMP, I find that CMP spillovers are more affected by country characteristics, suggesting once again, that maybe UMP did not transfer as well to the international portfolio inflows as it was thought.

For the FED, these results could convey interesting insights since, given the importance of the confidence channel, they suggest that FMOC announcements present important impacts on the way market expectations about the state of the economy are formed, and thus, on the way their policies will affect investors' decisions.

For policymakers, given that I find that CMP announcements present higher impacts on portfolio inflows to their countries, they should pay particularly closer attention to that type of monetary announcement compared to UMP announcements. As a result, policymakers should closely track the state of inflation, unemployment, and the overall economic conditions in the U.S., as these factors predominantly influence CMP decisions. Nevertheless, a positive aspect of CMP spillovers is that they are more influenced by country characteristics. This provides an opportunity for policymakers to better predict and shield themselves from these spillovers. Regarding CMP spillovers, institutional quality, and stock market returns are important characteristics that policymakers should seek to improve. These characteristics significantly influence how their countries are affected. Additionally, at least for debt inflows, they help dampen the effects of CMP shocks. Another approach to dampen the effects of CMP could be the adoption of more fixed exchange rate regimes. However, since there are other determining pull factors that are more important in assessing the impacts of monetary policy spillovers, such as institutional quality, policymakers should prioritize improving these factors before recurring to more intrusive measures, as the latter might lead to other distortions. Hence, above all other characteristics, policymakers should strive to improve their institutional quality. By doing so, they can influence how investors perceive their country, attracting more stable portfolio inflows, and reducing the volatility of these inflows when a shock in monetary policy occurs in a central economy that changes risk sentiment.

A major limitation of this work is the fact that I did not have access to other data on portfolio inflows at higher frequencies, to test the robustness of the results I obtained with the IIF data. Thus, it would be interesting to repeat this analysis using a different dataset to test these results. Furthermore, additional research will be required to assess the outcomes of the De Rezende and Ristiniemi (2023) monetary policy measures. This will help confirm the findings that UMP did not transmit as effectively as CMP to portfolio inflows of EMEs. Finally, it would be interesting to further investigate the role of the confidence channel in determining the spillovers of the U.S. monetary policy, particularly what happened after the great financial crisis, given the structural break that I find.

Appendix A: Variable's data sources and definitions

Table 3 - Variable's Data Source and Description

Variable	Units	Definition	Source	References
Capital Flows				
Equity Flows	%GDP	Nonresident's purchases of domestic equity securities net of their sales as % GDP	Institute of International Finance - Monthly EM Portfolio Flows Dataset	
Debt Flows	%GDP	Nonresident's purchases of domestic debt securities net of their sales as % GDP	Institute of International Finance - Monthly EM Portfolio Flows Dataset	
Monetary Policy Surprises				
Conventional Surprises	Percentage points	Intra-daily interest rate changes for the front contract of the one-month federal funds future	De Rezende and Ristiniemi	De Rezende and Ristiniemi (2023)
Unconventional Surprises	Percentage points	Difference between U.S. shadow rate changes and the FED conventional surprises	De Rezende and Ristiniemi and Author calculations	De Rezende and Ristiniemi (2023)
Push Factors				
TED Spread (A measure of liquidity)	%	US Treasury Eurodollar Spread	Refinitiv	Chari et al. (2020) Fratzscher (2012) Sarno et al. (2016)

(continues)

Table 3 - Variable's Data Source and Description (Continued)

Variable	Units	Definition	Source	References
Push Factors				
VIX (A measure of market risk)	%	Index of implied volatility of S&P 500 index Orthogonalized to Ted to reduce potential correlation problems	Datastream	Ahmed and Zlate (2014) Forbes and Warnock (2012) Fratzscher (2012)
World GDP	y-o-y growth rate, in %	Global GDP growth rate	Datastream - Oxford Economics	Ahmed and Zlate (2014) Forbes and Warnock (2012) Fratzscher (2012)
Pull Factors				
Capital Controls	Index from -2 to 2	Inverse measure of restrictions on capital account This index takes on higher values the more open the country is to cross-border capital transactions	Chinn and Ito (2008) KAOPEN Index	Ahmed and Zlate (2014) Forbes and Warnock (2012) Fratzscher (2012)
Current Account	%GDP	Ratio of current account position to GDP	Datastream	Chari et al. (2020) Fratzscher (2012) Ghosh et al. (2014)
Exchange Rate Regime (ERR)	Index from 1 to 6	Higher values indicate more floating regimes	Ilzetzki et al. (2022) – updated version	Cerutti et al. (2019) Ghosh et al. (2014) Hannan (2017)
Fiscal Balance	%GDP	Ratio of fiscal balance to GDP	Datastream	Chari et al. (2020) Fratzscher (2012)

(continues)

Table 3 - Variable's Data Source and Description (Continued)

Variable	Units	Definition	Source	References
Pull Factors				
GDP Growth	y-o-y growth rate, in %	Real GDP growth rate	Bank for International Settlements	Ahmed and Zlate (2014) Cerutti et al. (2019) Fratzscher (2012)
Inflation	%	CPI inflation rate	Datastream	Chari et al. (2020) Fratzscher (2012) Hernandez-Vega (2019)
Institutional Quality	Index from 0 to 1	The mean value of the ICRG variables 'Corruption', 'Law and Order', and 'Bureaucracy Quality', scaled from 0 to 1 - Higher values indicate higher quality of government.	International Country Risk Guide (ICRG)	Cerutti et al. (2019) Fratzscher (2012) Ghosh et al. (2014)
Interest Rate	%	3 Months Money market interest rate	International Financial Statistics	Ahmed and Zlate (2014) Byrne and Fiess (2016) Fratzscher (2012)
Public Debt	%GDP	Total government debt to GDP	Datastream	Cerutti et al. (2019) Forbes and Warnock (2012) Fratzscher (2012)

(continues)

Table 3 - Variable's Data Source and Description (Continued)

Variable	Units	Definition	Source	References
Pull Factors				
Real Effective Exchange Rate Overvaluation (REERO)	%	Real Broad Effective Exchange Rate Index Log difference between the actual real effective exchange rate and its long-term trend	Bank for International Settlements	Chari et al. (2020) Ghosh et al. (2014) Hernandez-Vega (2019)
Stock Index Return Growth	y-o-y growth rate, in %	MSCI - Total Return Index	Datastream – MSCI	Cerutti et al. (2019) Chari et al. (2020) Sarno et al. (2016)
Trade Openness	%GDP	The ratio of exports plus imports to GDP	Datastream	Cerutti et al. (2019) Fratzscher (2012) Hannan (2017)

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Annexes

Table A1 – Descriptive Statistics

Variable	Obs	Mean	Std dev	Min	Max
Portfolio Inflows					
Equity Inflows	4795	0.02	0.17	-2.41	2.01
Debt Inflows	4777	0.06	0.46	-5.53	7.99
Monetary Policy Surprises					
Conventional Surprises	6348	-0.01	0.08	-0.78	0.34
Unconventional Surprises	6348	-0.01	0.09	-0.82	0.32
Push Factors					
TED Spread	6371	39.61	34.47	-18.40	254.55
VIX	6371	0.01	7.81	-11.19	32.77
World GDP	6371	5.20	5.71	-8.10	16.72
Pull Factors					
Capital Controls	6094	0.61	1.14	-2.00	2.31
Exchange Rate Regime	6081	2.46	0.99	1.00	5.00
Inflation	6358	4.78	6.73	-4.36	85.52
Institutional Quality	6364	0.55	0.12	0.31	0.94
Interest Rate	6228	5.41	8.79	-0.68	435.99
Public Debt	6326	37.92	18.19	1.62	87.57
Real GDP	6193	3.48	3.51	-16.52	12.87
REERO	6358	-0.09	4.05	-38.50	21.40
Stock Index Return	6318	9.71	27.69	-139.14	188.31
Trade Openness	6212	58.39	38.20	5.55	224.75

Table A1 presents the descriptive statistics of the main variables used in the analysis performed in this dissertation.

Table A2 – Monetary policy announcements by the FED

Monetary policy announcements by the FED - Dates					
2000-02-02	2004-06-30	2008-08-05	2012-03-13	2016-03-16	2020-02-13
2000-03-21	2004-08-10	2008-09-15	2012-04-25	2016-04-27	2020-03-03
2000-05-16	2004-09-21	2008-09-16	2012-06-20	2016-06-15	2020-03-09
2000-06-28	2004-11-10	2008-10-08	2012-08-01	2016-07-27	2020-03-11
2000-08-22	2004-12-14	2008-10-29	2012-08-31	2016-09-21	2020-03-12
2000-10-03	2005-02-02	2008-11-25	2012-09-13	2016-11-02	2020-03-15
2000-11-15	2005-03-22	2008-12-01	2012-10-24	2016-12-14	2020-03-16
2000-12-19	2005-05-03	2008-12-16	2012-12-12	2017-02-01	2020-03-17
2001-01-03	2005-06-30	2009-01-28	2013-01-30	2017-03-15	2020-03-18
2001-01-31	2005-08-09	2009-03-18	2013-03-20	2017-05-03	2020-03-19
2001-03-20	2005-09-20	2009-04-29	2013-05-01	2017-06-14	2020-03-23
2001-04-18	2005-11-01	2009-06-24	2013-05-22	2017-07-26	2020-03-31
2001-05-15	2005-12-13	2009-08-12	2013-06-19	2017-09-20	2020-04-09
2001-06-27	2006-01-31	2009-09-23	2013-07-11	2017-11-01	2020-04-29
2001-08-21	2006-03-28	2009-11-04	2013-07-31	2017-12-13	2020-06-10
2001-10-02	2006-05-10	2009-12-16	2013-09-18	2018-01-31	2020-07-29
2001-11-06	2006-06-29	2010-01-27	2013-10-16	2018-03-21	2020-08-27
2001-12-11	2006-08-08	2010-03-16	2013-10-30	2018-05-02	2020-09-16
2002-01-30	2006-09-20	2010-04-28	2013-12-18	2018-06-13	2020-11-05
2002-03-19	2006-10-25	2010-06-23	2014-01-29	2018-08-01	2020-12-16
2002-05-07	2006-12-12	2010-08-10	2014-03-04	2018-09-26	2021-01-27
2002-06-26	2007-01-31	2010-08-27	2014-03-19	2018-11-08	2021-03-17
2002-08-13	2007-03-21	2010-09-21	2014-04-30	2018-12-19	2021-04-28
2002-09-24	2007-05-09	2010-10-15	2014-06-18	2019-01-30	2021-06-16
2002-11-06	2007-06-28	2010-11-03	2014-07-30	2019-03-20	2021-07-28
2002-12-10	2007-08-07	2010-12-14	2014-09-17	2019-05-01	2021-09-22
2003-01-29	2007-08-10	2011-01-26	2014-10-29	2019-06-19	2021-11-03
2003-03-18	2007-08-17	2011-03-15	2014-12-17	2019-07-31	2021-12-15
2003-05-06	2007-09-18	2011-04-27	2015-01-28	2019-09-18	2022-01-26
2003-06-25	2007-10-31	2011-06-22	2015-03-18	2019-10-04	2022-03-16
2003-08-12	2007-12-11	2011-08-01	2015-04-29	2019-10-11	2022-05-04
2003-09-16	2008-01-22	2011-08-09	2015-06-17	2019-10-23	2022-06-15
2003-10-28	2008-01-30	2011-09-21	2015-07-29	2019-10-30	2022-07-27
2003-12-09	2008-03-11	2011-11-02	2015-09-17	2019-11-14	2022-09-21
2004-01-28	2008-03-18	2011-11-28	2015-10-28	2019-12-11	2022-11-02
2004-03-16	2008-04-30	2011-12-13	2015-12-16	2019-12-12	2022-12-14
2004-05-04	2008-06-25	2012-01-25	2016-01-27	2020-01-29	

Table A2 comprises the dates of the monetary policy announcements made by the FED.
Dates were retrieved from the FED website: Board of Governors of the Federal Reserve System (US). *Federal Open Market Committee - Historical Materials by Year.* https://www.federalreserve.gov/monetarypolicy/fomc_historical_year.htm. Access on June 6, 2023.
Board of Governors of the Federal Reserve System (US). *Federal Open Market Committee - Meeting calendars, statements, and minutes (2018-2023).* https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm. Access on June 6, 2023.
Additional dates were retrieved from De Rezende and Ristiniemi (2023). They are not official meetings but present important announcements such as the "Taper Tantrum" episode of May 22, 2013.

Table A3 – Baseline Regression with a different measure for the UMP

Periods	Full period		Precrisis		After crisis	
Dependent Variable	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Dependent Variable$_{t-1}$	0.2849***	0.0904**	0.1864***	0.1484***	0.2444***	0.0542
	(0.0308)	(0.0426)	(0.0475)	(0.0414)	(0.0357)	(0.0434)
Dependent Variable$_{t-2}$		0.0450*	0.0747*		0.0498**	0.0414
		(0.0244)	(0.0396)		(0.0223)	(0.0309)
Dependent Variable$_{t-3}$		0.1049*	0.0500*		0.0962***	0.0984
		(0.0512)	(0.0260)		(0.0190)	(0.0588)
Dependent Variable$_{t-4}$		0.0013	-0.0192			0.0033
		(0.0340)	(0.0270)			(0.0388)
Dependent Variable$_{t-5}$		-0.0061				-0.0110
		(0.0120)				(0.0270)
Dependent Variable$_{t-6}$		0.1211***				0.1374***
		(0.0398)				(0.0458)
Conventional Surprise	0.0442**	0.0367	0.0597*	-0.0776*	0.0417**	0.1191*
	(0.0179)	(0.0395)	(0.0285)	(0.0435)	(0.0189)	(0.0676)
Unconventional Surprise	-0.0178*	-0.0077			-0.0070	-0.0084
	(0.0091)	(0.0237)			(0.0095)	(0.0297)
Constant	0.0026	-0.0241	0.1008	-0.0317	0.0272	-0.0465
	(0.0332)	(0.0723)	(0.0780)	(0.1735)	(0.0410)	(0.0860)

(continues)

Table A3 – Baseline Regression with a different measure for the UMP (Continued)

Periods	Full period		Precrisis		After crisis	
Dependent Variable	Equity Inflows	Debt Inflows	Equity Inflows	Debt Inflows	Equity Inflows	Debt Inflows
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Lag Push Factors	NO	NO	NO	NO	NO	NO
Lag Pull Factors	YES	YES	YES	YES	YES	YES
Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	4431	4561	1099	1145	3205	3395
No. Countries	20	21	16	17	20	21

Table A3 presents the impacts of FED monetary policy shocks on EMEs portfolio inflows following regression (3.3) however with a different measure for the unconventional monetary policy surprise. The dependent variables are equity and debt inflows, all inflows are scaled by countries' GDP of the last twelve months. The number of lags of the dependent variable for each regression was determined in an agnostic form minimizing the Akaike Information Criterion (AIC). Conventional monetary policy surprise shocks are obtained following equation (3.1) and unconventional surprise shocks are obtained using the residuals from the shadow rate of De Rezende and Ristiniemi (2023) orthogonalized by the conventional surprises. All the surprises are aggregated monthly by summing. The different periods are: Precrisis: January 2000 – July 2008; After Crisis: January 2009 – December 2022. The dependent variables and pull factors were winsorized at the 5th and 95th percentiles to control for outlier values. The control variable descriptions can be found in Table 3 in the Appendix. Standard errors are robust to heteroscedasticity and are shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table A4 – Baseline Regression with FF5 measure

Periods	**Full period**		**Precrisis**		**After crisis**	
Dependent Variable	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Dependent Variable$_{t-1}$	0.2877*** (-0.0310)	0.0909** (0.0426)	0.2126*** (0.0603)	0.1493*** (0.0411)	0.2460*** (0.0358)	0.0546 (0.0434)
Dependent Variable$_{t-2}$		0.0450* (0.0242)			0.0497** (0.0223)	0.0409 (0.0304)
Dependent Variable$_{t-3}$		0.1051* (0.0510)			0.0963*** (0.0191)	0.0988 (0.0584)
Dependent Variable$_{t-4}$		0.0012 (0.0339)				0.0023 (0.0384)
Dependent Variable$_{t-5}$		-0.0057 (0.0199)				-0.0106 (0.0267)
Dependent Variable$_{t-6}$		0.1212*** (0.0397)				0.1370*** (0.0454)
FF5	-0.0348*** (0.0120)	-0.0475* (0.0261)	-0.0280 (0.0276)	-0.0655 (0.0672)	-0.0255 (0.0187)	-0.0371 (0.0357)
Constant	0.0018 (0.0335)	-0.0249 (0.0722)	0.0983 (0.0736)	-0.0430 (0.1785)	0.0247 (0.0418)	-0.0509 (0.0863)

(continues)

Table A4 – Baseline Regression with FF5 measure (Continued)

Periods	**Full period**		**Precrisis**		**After crisis**	
Dependent Variable	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Lag Push Factors	NO	NO	NO	NO	NO	NO
Lag Pull Factors	YES	YES	YES	YES	YES	YES
Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	4431	4561	1138	1145	3205	3395
No. Countries	20	21	16	17	20	21

Table A4 presents the impacts of FED monetary policy shocks on EMEs portfolio inflows following regression (3.3) however with a different measure for the monetary policy surprise following Chari et al. (2020). The dependent variables are equity and debt inflows, all inflows are scaled by countries' GDP of the last twelve months. The number of lags of the dependent variable for each regression was determined in an agnostic form minimizing the Akaike Information Criterion (AIC). Monetary policy surprise shocks are the daily changes in the implied yield from five-year Treasury futures contracts (FF5) on FOMC announcement days, all the surprises are aggregated monthly by summing. The different periods are: Precrisis: January 2000 – July 2008; After Crisis: January 2009 – December 2022. The dependent variables and pull factors were winsorized at the 5th and 95th percentiles to control for outlier values. The control variable descriptions can be found in Table 3 in the Appendix. Standard errors are robust to heteroscedasticity and are shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table A5 – Baseline Regression with pull and push factors following Chari et al. (2020)

Periods	**Full period**		**Precrisis**		**After crisis**	
Dependent Variable	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Dependent $Variable_{t-1}$	0.2281*** (0.0388)	0.0597 (0.0442)	0.1902*** (0.0478)	0.1485*** (0.0435)	0.2190*** (0.0416)	0.0533 (0.0450)
Dependent $Variable_{t-2}$	0.0381* (0.0214)	0.0468 (0.0298)			0.0446** (0.0188)	0.0426 (0.0308)
Dependent $Variable_{t-3}$	0.1166*** (0.0187)	0.1013* (0.0588)			0.1128*** (0.0140)	0.0999 (0.0591)
Dependent $Variable_{t-4}$	-0.0454** (0.0212)	0.0018 (0.0422)				0.0023 (0.0394)
Dependent $Variable_{t-5}$	0.0841*** (0.0219)	-0.0118 (0.0278)				-0.0104 (0.0280)
Dependent $Variable_{t-6}$		0.1354*** (0.0453)				0.1408*** (0.0456)
Conventional Surprise	0.0392* (0.0216)	0.1504** (0.0696)	0.0527** (0.0244)	-0.0909** (0.0421)	0.0394* (0.0221)	0.1303* (0.0718)
Unconventional Surprise	-0.0281* (0.0151)	-0.0132 (0.0260)			-0.0158 (0.0144)	-0.0045 (0.0289)
Constant	0.0318 (0.0324)	-0.0470 (0.0794)	0.0277 (0.0762)	-0.0482 (0.1092)	0.0440 (0.0333)	-0.0445 (0.0802)

(continues)

Table A5 – Baseline Regression with pull and push factors following Chari et al. (2020) (Continued)

Periods	**Full period**		**Precrisis**		**After crisis**	
Dependent Variable	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Lag Push Factors	NO	NO	NO	NO	NO	NO
Lag Pull Factors	YES	YES	YES	YES	YES	YES
Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	3355	3384	1201	1117	3299	3321
No. Countries	20	21	16	17	20	21

Table A5 presents the impacts of FED monetary policy shocks on EMEs portfolio inflows following regression (3.3) however with a different set of push and pull factors. The dependent variables are equity and debt inflows, all inflows are scaled by countries' GDP of the last twelve months. The number of lags of the dependent variable for each regression was determined in an agnostic form minimizing the Akaike Information Criterion (AIC). Monetary policy surprise shocks are obtained following equations (3.1) and (3.2), all the surprises are aggregated monthly by summing. The different periods are: Precrisis: January 2000 – July 2008; After Crisis: January 2009 – December 2022. The dependent variables and pull factors were winsorized at the 5th and 95th percentiles to control for outlier values. For the control variables following Chari et al. (2020) I removed the world GDP, capital controls, ERR, and trade openness variables from the original baseline regression (3.3), and added current account, and fiscal balance variables. A description of each variable and their sources are available in Table 3 in the Appendix. Standard errors are robust to heteroscedasticity and are shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table A6 – Baseline Regression with Random Effects

Periods	Full period		Precrisis		After crisis	
Dependent Variable	Equity Inflows	Debt Inflows	Equity Inflows	Debt Inflows	Equity Inflows	Debt Inflows
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable$_{t-1}$	0.2600***	0.0734*	0.1986***	0.1847***	0.2547***	0.0665
	(0.0354)	(0.0420)	(0.0495)	(0.0408)	(0.0364)	(0.0426)
Dependent Variable$_{t-2}$	0.0621***	0.0565*	0.0889**		0.0590***	0.0524*
	(0.0224)	(0.0289)	(0.0411)		(0.0226)	(0.0300)
Dependent Variable$_{t-3}$	0.1071***	0.1099*	0.0664***		0.1075***	0.1086*
	(0.0198)	(0.0600)	(0.0251)		(0.0191)	(0.0605)
Dependent Variable$_{t-4}$		0.0123	0.0021			0.0131
		(0.0400)	(0.0269)			(0.0372)
Dependent Variable$_{t-5}$		-0.0024				-0.0005
		(0.0254)				(0.0258)
Dependent Variable$_{t-6}$		0.1440***				0.1488***
		(0.0474)				(0.0478)
Conventional Surprise	0.0456**	0.1577**	0.0558**	-0.0748*	0.0437**	0.1366**
	(0.0194)	(0.0652)	(0.0278)	(0.0388)	(0.0196)	(0.0685)
Unconventional Surprise	-0.0151	-0.0171			-0.0073	-0.0132
	(0.0099)	(0.0255)			(0.0097)	(0.0308)
Constant	-0.0078	0.0068	0.0619**	-0.1035**	-0.0078	0.0017
	(0.0067)	(0.0224)	(0.0247)	(0.0509)	(0.0066)	(0.0228)

(continues)

Table A6 – Baseline Regression with Random Effects (Continued)

Periods	**Full period**		**Precrisis**		**After crisis**	
Dependent Variable	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**	**Equity Inflows**	**Debt Inflows**
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Lag Push Factors	NO	NO	NO	NO	NO	NO
Lag Pull Factors	YES	YES	YES	YES	YES	YES
Random Effects	YES	YES	YES	YES	YES	YES
Observations	3269	3462	1099	1145	3205	3395
No. Countries	20	21	16	17	20	21

Table A6 presents the impacts of FED monetary policy shocks on EMEs portfolio inflows following regression (3.3) yet using a random effects estimation method. The dependent variables are equity and debt inflows, all inflows are scaled by countries' GDP of the last twelve months. The number of lags of the dependent variable for each regression was determined in an agnostic form minimizing the Akaike Information Criterion (AIC). Monetary policy surprise shocks are obtained following equations (3.1) and (3.2), all the surprises are aggregated monthly by summing. The different periods are: Precrisis: January 2000 – July 2008; After Crisis: January 2009 – December 2022. The dependent variables and pull factors were winsorized at the 5th and 95th percentiles to control for outlier values. The control variable descriptions can be found in Table 3 in the Appendix. Standard errors are robust to heteroscedasticity and are shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

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