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Capital Flows and Sovereign Debt Markets: Evidence from Index Rebalancings

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Lorenzo Pandolfi* **and Tomas Williams****

Abstract
In this paper, we analyze how capital flows into the sovereign debt market affect government bond prices and liquidity. Additionally, we explore whether these flows spill over to the exchange rate. To address endogeneity concerns, we construct a measure of informationless capital Flows Implied by (mechanical) Rebalancings (FIR) in the largest local currency government debt index for emerging countries. We find that FIR is associated with higher returns on bonds and greater depth in the sovereign debt market after the rebalancings. These capital flows also impact the exchange rate market; larger inflows (outflows) are associated with greater currency appreciations (depreciations).

JEL Classification: F32, G11, G12, G15, G23

Keywords: sovereign debt; international capital flows; index rebalancings; mutual funds; benchmark indexes; exchange rate.

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1 Introduction

How do informationless international capital flows affect sovereign debt markets? Economic theory does not provide an unequivocal answer to this question. On the one hand, under the expectation hypothesis of the term structure of interest rates, changes in sovereign bond prices should only reflect changes in the risk-free interest rates at the relevant maturities and expected default losses.[1] Thus, informationless capital flows should not affect sovereign debt prices. On the other hand, in the presence of preferred-habitat investors and limits to arbitrage, changes in the demand for sovereign bonds can affect their prices.[2] Despite these different theoretical predictions, there is little empirical evidence on the subject. In this paper, we fill this gap by studying how international capital flows affect sovereign debt markets and the extent to which these flows spill over to the exchange rate market.[3]

Understanding how capital flows affect sovereign debt markets is important for at least two reasons. First, sovereign debt markets are central to the macroeconomy of a country. Not only do changes in the price and liquidity of sovereign debt securities affect governments' cost of financing, but they can also impact the extension of credit by financial institutions.[4] Second, international capital flows directed to sovereign debt markets have grown meaningfully in the past decade. Figure 1 depicts the cumulative gross inflows to emerging markets divided by asset type in both absolute and relative terms. Portfolio debt flows have overtaken portfolio equity flows in importance in the past decade, and their median growth rate has exceeded that of foreign direct investment inflows.[5]

[1] Since we focus on emerging markets, we are adapting the notion of the expectation hypothesis of the term structure of interest rates to this type of country. See, for instance, Broner et al. (2013).

[2] Vayanos and Vila (2009) and Greenwood and Vayanos (2010) discuss how demand shocks can impact bond prices in the presence of preferred-habitat investors and risk-averse arbitrageurs. Demand shocks can affect the price of securities also when arbitrageurs are financially constrained, as in Shleifer and Vishny (1997), or endowed with limited attention, as in Duffie (2010).

[3] Since this paper is concerned with sovereign debt markets, we use the term international capital flows to refer to net purchases of government debt securities by foreigners.

[4] See, among others, Adelino et al. (2017) for evidence on how changes in governments' cost of financing affect economic activity. There is also a large literature on the relationship between sovereign debt and financial institutions. Gennaioli et al. (2014b) provide a theoretical contribution on this relationship. Numerous empirical studies, such as Acharya et al. (2014), Becker and Ivashina (2017), Altavilla et al. (2017), and Williams (2017), examine this topic.

[5] Portfolio debt inflows include capital flows going to both government and private debt. However, in emerging markets, government debt is a much more important and liquid market than that for private debt securities. See, for instance, Avdjiev et al. (2017).

Despite its importance, the relationship between capital flows and sovereign debt markets has received little attention in empirical research. This can be attributed in large part to the difficulty of identifying a causal relationship from capital flows to sovereign debt returns and liquidity, as these variables are all jointly determined. For instance, an improvement in the economic prospects of a country is likely to increase foreign demand for its government debt while reducing its probability of default. Thus, such an improvement would trigger both capital inflows to the sovereign debt market and an increase in sovereign debt prices. However, the resulting correlation between capital flows and sovereign debt prices would not imply any causal relationship.

This paper overcomes this endogeneity problem via a novel identification strategy, based on monthly index rebalancings in a major local currency sovereign debt market index constructed by J.P. Morgan for emerging markets. This index has a feature that is crucial for our identification strategy: the relative importance – *i.e.*, the *benchmark weight* – of any single country cannot exceed 10% of the index at the beginning of each month. This induces substantial monthly rebalancings for a purely mechanical reason. For instance, if a country that at the beginning of a month is at the 10% cap overperforms the rest of the countries in the index, its benchmark weight at the end of the month will exceed 10%. As the rule establishes that no country can exceed the aforementioned threshold, at the beginning of the subsequent month, its weight in the index will be returned to 10%. Moreover, as the weights have to sum to 100%, the weights of the other countries in the index will also be adjusted. This index is also the most widely used benchmark by mutual funds that invest in sovereign debt in emerging markets. These funds tend not to deviate substantially from the composition of their benchmark index to ensure that they have a small tracking error.[6] Therefore, any rebalancing of the index is closely matched by a rebalancing in the portfolio of these funds. This feature, along with the mechanical rebalancings due to the 10% cap rule, could trigger informationless capital flows across countries at the end of each month.

We construct a measure of such "Flows Implied by the Rebalancings" (FIR) that we use to estimate the impact of informationless capital flows on sovereign debt markets – using bond-level

[6] Raddatz et al. (2017) document this fact at the international level for both equity and bond funds. We also provide evidence of such passive behavior of funds using data from EPFR.

data on prices and bid-ask spreads – and exchange rates.[7] This measure is constructed by multiplying the mechanical changes in benchmark weights by the amount of assets under management benchmarked against this index, normalized by the size of the sovereign debt market of each country.

We show that FIR is positively associated with both cumulative returns and changes in the liquidity of sovereign debt securities around the rebalancing dates. Moreover, these flows spill over to the exchange rate market. Figure 2 illustrates our main results. Around the day of the rebalancing, there is a clear divergence in the cumulative returns of sovereign debt prices for the most positive and negative values of FIR. While more short lived, a similar result obtains for the cumulative percentage change in the bid-ask spreads of sovereign bonds. This divergence is also present for the exchange rate. In our main analysis, we estimate these effects, and we show that they are not only statistically significant but also quantitatively important and consistent with episodes of large capital flows into the sovereign debt market, such as those triggered by upgrades/downgrades of countries in the index. Importantly, we show that in the days prior to the rebalancing, the relationship between FIR and prices, liquidity and the exchange rate is very close to zero and only becomes statistically significant after the rebalancing dates. This lends important support to our identification strategy. In terms of quantitative importance, a one-standard-deviation increase in FIR is associated with an increase of 8 basis points in the returns of sovereign debt prices in the five days following the rebalancing. The same increase in FIR leads to an appreciation of 36 basis points in the cumulative change of the exchange rate.

These findings are consistent with a theory of preferred-habitat investors as the one developed by Vayanos and Vila (2009). Given their tendency to replicate the index composition, mutual funds investing in local currency sovereign debt in emerging markets mainly trade bonds that are included in the J.P. Morgan GBI-EM Global Diversified Index, which therefore constitutes their preferred habitat. Thus, the rebalancings produce shocks to the demand of these bonds that are in principle unrelated to changes in the economic prospects of emerging countries. Hence, in the presence of risk-averse arbitrageurs these demand shocks should have an impact on bond prices, as we observe

[7] Our results are robust to using different subsamples of funds to compute FIR. Details of these robustness tests are provided in Section 4.3.

in our data. Furthermore, we present two additional results that can be interpreted in the light of the preferred habitat view. First, we find that the prices of both bonds included and not included in the J.P. Morgan GBI-EM Global Diversified Index are affected by the rebalancing-implied flows, the effect being stronger for bonds that are part of the index. This is in line with the prediction of the theory, according to which shocks to the demand for a specific set of bonds should be partially transmitted, by risk-averse arbitrageurs, to bonds with similar characteristics, since these are close substitutes. Second, we find the effect of FIR on cumulative returns to be more pronounced in recent years, consistent with the increase in the importance of the J.P. Morgan GBI-EM Global Diversified Index as a preferred habitat for international investors.

We contribute to several strands of the literature. First, we contribute to a large literature on how demand shocks affect financial markets, which focuses primarily on equity markets at both the domestic and international levels.[8] To the best of our knowledge, this paper is the first attempt to understand the systematic effect of demand shocks on sovereign debt markets in a large cross-section of countries over several years. More broadly, we contribute to a large literature on the aggregate effects of institutional investors.[9] We effectively provide evidence that institutional investors in sovereign debt markets affect asset prices through their rebalancings.

Moreover, this paper is broadly related to the empirical literature studying the determinants of government bond yields. Several articles analyze which global and local factors affect government bond yields, focusing on both emerging and advanced economies.[10] More closely related to our work, some studies focus on how changes in the foreign investor base of government debt affect government bond yields. For instance, Arslanalp and Poghosyan (2016) show that positive (negative) changes in the foreign investor base decrease (increase) government bond yields for advanced economies.[11]

[8] There is a longstanding literature on how index redefinitions affect stock returns, pricing, and liquidity. See, among others, Harris and Gurel (1986), Shleifer (1986), Chen et al. (2004), Barberis et al. (2005), Greenwood (2005), Hau et al. (2010), Hau (2011), Claessens and Yafeh (2013), Vayanos and Woolley (2013), Chang et al. (2014), and Raddatz et al. (2017).

[9] See, among others, Broner et al. (2006), Jotikasthira et al. (2012), Levy-Yeyati and Williams (2012) and Raddatz and Schmukler (2012).

[10] See, for example, Gonzalez-Rozada and Yeyati (2008) for evidence on emerging markets. For advanced economies, the European Sovereign Debt Crisis prompted a number of papers on this topic. See, for example, Afonso et al. (2015) and the references therein.

[11] See Warnock and Warnock (2009) for similar evidence on the United States.

For emerging economies, a number of articles present evidence in the same direction but with a somewhat stronger effect.[12] Our contribution to this literature is to provide plausibly causal evidence that capital inflows (outflows) increase (decrease) sovereign debt prices using a novel identification strategy.

Our evidence also bears on the effects of capital flows on market liquidity. Economic theory offers very different predictions: on the one hand, foreign investors may deepen the market by increasing the probability that market makers and local investors will be able to execute their orders; on the other hand, they might withdraw liquidity if their presence increases the volatility of the market and generates order imbalances. The empirical evidence on this topic is mixed.[13] We present evidence that capital inflows improve liquidity in sovereign debt markets, at least temporarily. Additionally, we contribute to the literature studying how flows from other asset markets affect the exchange rate market. Our evidence shows that sovereign debt investment flows are transmitted to the exchange rate market, in line with previous findings for equity market flows. [14]

More broadly, this paper contributes to the literature studying whether capital flows are expansionary or contractionary: several studies analyze whether capital inflows lead to higher credit growth and an increase in economic activity.[15] Most of these studies have problems addressing endogeneity issues, as capital flows are almost always related to local economic prospects. We avoid this pitfall, as we focus on capital flows triggered by informationless mechanical rebalancings. Our evidence that even such capital flows increase bond prices and liquidity supports the idea that capital flows are expansionary *per se*, at least in emerging countries.

The rest of the paper is structured as follows. Section 2 presents our empirical strategy based on index rebalancings. Section 3 details the data. Section 4 presents the results and a set of robustness

[12] See, among others, Peiris (2013) and Dell'Erba et al. (2013).
[13] See Vagias and Van Dijk (2011) for a detailed literature review on theory and evidence on this topic.
[14] See Hau et al. (2010) and references therein.
[15] For instance, Mendoza and Terrones (2012) find that credit booms are positively correlated with net capital inflows. Calderon and Kubota (2012) suggest that private capital inflows are good predictors of credit booms. In a more granular approach, Lane and McQuade (2014) argue that only net debt inflows generate domestic credit growth in European countries. In a related theoretical and empirical work, Blanchard et al. (2015) find that only equity inflows are correlated with credit expansions.

tests. Section 5 discusses the potential implications of our results. Section 6 concludes.

2 Index Rebalancings and Empirical Strategy

2.1 J.P. Morgan Government Bond Index EM Global Diversified

Our empirical strategy relies on the use of the most important local currency government debt index for asset managers investing in emerging markets.[16] This index is constructed by J.P. Morgan and is named the Government Bond Index EM Global Diversified (henceforth, GBI-EM Global Diversified). The GBI-EM Global Diversified is part of the GBI-EM family of indexes. These indexes are constructed using a bottom-up approach and consist of local currency government debt securities in emerging markets. J.P. Morgan decides which countries are included in each of the indexes in the family and then which securities from each country are part of each index. Next, they construct the *benchmark weight* (w_{ct}^B). This is the relative importance of each country in an index. In most of the indexes in the GBI-EM family, this is simply the total market capitalization of the securities from country c at time t – all of these indexes are rebalanced on a monthly frequency – included in benchmark B, divided by the total market capitalization of all securities in the benchmark.[17]

In this paper, we use the rebalancings of the GBI-EM Global Diversified to identify information-less flows to sovereign debt markets. We focus on this index for two different reasons. First, this is the most important index for emerging markets' sovereign debt denominated in local currency. The assets under management benchmarked against this index as of the end of 2016 were 186 billion dollars, compared to only 20 billion dollars for the rest of the indexes in the GBI-EM family of indexes.[18] Second, the GBI-EM Global Diversified limits the benchmark weights to preserve the

[16] In this paper, we use the terms index and benchmark interchangeably.

[17] Before October 2013, the rebalancing took place on the first weekday of each month. Since this date, it has taken place on the last weekday of each month.

[18] These data come from reports from J.P. Morgan. The assets benchmarked to the Barclays Emerging Markets Local Currency Government Index and the Citi Emerging Markets Government Debt Index are estimated to be much smaller than those benchmarked against the J.P. Morgan GBI-EM Global Diversified. At the end of 2016, 89% of the assets of the funds in EPFR investing in local currency denominated sovereign debt were benchmarked against a J.P. Morgan index.

diversification of the index: countries in this index cannot have a benchmark weight higher than 10%. This generates substantial periodic rebalancings at a monthly frequency that are, in principle, informationless and unrelated to any new information about the economic prospects of a country.[19]

We use such rebalancings alongside a documented feature of mutual funds widely documented in the finance literature: most international mutual funds track their performance against this type of benchmark index. A large portion of these funds have portfolios that closely resemble the composition of the benchmark index that they report following.[20] Since these funds do not wish to move away from their benchmark index, the monthly rebalancings potentially trigger capital flows across countries. Exploiting these features of the GBI-EM Global Diversified, we construct a measure to capture this notion of implied capital flows across countries.

2.2 Flows Implied by the Rebalancings (FIR)

To construct our measure, we start from the following identity that captures the relationship between benchmark weights and capital flows triggered by portfolio shifts by international mutual funds:

$$F_{ict} = w_{ict} F_{it} + \tilde{A}_{it} \left(w_{ict} - w_{ict}^{BH} \right), \tag{1}$$

where F_{ict} is the net investment flow (in dollars) from fund i to country c at time t. w_{ict} is the portfolio weight that the fund decides to place on that country at time t. F_{it} is the net inflow (in dollars) from investors to fund i at time t, also known as injections or redemptions. $\tilde{A}_{it} = R_{it} A_{it-1}$ is the value of the fund's assets at t, and w_{ict}^{BH} is the fund's buy-and-hold weight for that country resulting from movements in total and relative returns.

[19] This is one of the reasons that we do not focus on EMBI, which is the most important foreign currency denominated government debt index for emerging markets. This index does not have any limit on benchmark weights, and the rebalancings for most of the countries are relatively small.

[20] See Cremers and Petajisto (2009) for evidence on the U.S. equity mutual fund industry. Cremers et al. (2016) and Raddatz et al. (2017) document this pattern at the international level. An extreme instance of this strategy is that used by exchange traded funds (ETFs), the importance of which has increased recently.

We make three simplifying assumptions to facilitate the construction of our measure for the entire population of funds. In Section 4.3, we show that the results are robust to relaxing these assumptions. First, we assume that $F_{it} = 0$ since we examine very short windows of time around each rebalancing, in which net inflows of investors into these funds can be assumed to be negligible. Second, we assume that all international mutual funds act as passive funds and thus $w_{ict} = w^B_{ct}$ and $w^{BH}_{ict} = w^{BH,B}_{ct}$, where w^B_{ict} is the benchmark weight of country c at time t. While extreme, we base this assumption on the documented feature that a large portion of mutual funds act as passive funds. Third, we assume that the value of the fund's assets at time t equals the total assets under management at time t, and therefore, $\tilde{A}_{it} = A_{it}$.[21] We sum across funds and normalize by market size to obtain our measure of Flows Implied by the Rebalancings (FIR):

$$FIR_{ct} = \frac{A_t \lambda_{ct}}{MV_{ct-1}}, \tag{2}$$

where $\lambda_{ct} = (w^B_{ct} - w^{BH,B}_{ct})$ is the reallocation implied by the rebalancings. A_t is the total amount of dollars that are benchmarked against the GBI-EM Global Diversified, and MV_{ct-1} is the previous period market value of government debt securities denominated in local currency (i.e., the size of the market). Intuitively, our measure captures the implied dollars that should enter or leave a country, at the time of each rebalancing, as a percentage of market size.

Figure 3 shows the distribution of FIR across countries. Two findings emerge from this picture. First, although most of the rebalancings are small in size, some of them are quite large, as many rebalancing-implied flows are in absolute value between 3 and 6% of the market value of the sovereign debt of a given country (left panel). Furthermore, most countries have an average FIR centered around 0, implying that FIR is not persistently positive or negative within each country.[22]

[21] We do this because it is difficult to obtain aggregate data on $\tilde{A}_{it}$ for the entire universe of funds benchmarked against the index.

[22] We drop months with substantial rebalancing events in the J.P. Morgan GBI-EM Index such as the upgrades of Colombia, Nigeria and Romania and the downgrade of Nigeria from our database. This rebalancings are usually announced in the middle of the month and generate large price effects around these announcements. An example of this is documented for Colombia in Williams (2017). Since our identification strategy relies on the fact that all the rebalancings are done at the month end, we drop these episodes.

2.3 Empirical Strategy

We exploit our FIR measure alongside with the fact that the rebalancings are effective at the end/beginning of each month, and we estimate the following specification:

$$\Delta y^z_{jct} = \theta_t + \beta FIR_{ct} + \phi X_{jct} + \varepsilon_{jct}, \tag{3}$$

where $\Delta y^z_{jct} = y_{jct,d+z} - y_{jct,d-5}$ is the change in the log of our dependent variable of interest for bond j from country c in month t. The cumulative log change is measured over an interval that goes from 5 days prior to the rebalancing date, d, to z days after it. In our main specifications, $z = [3, 5, 7]$ since we examine the cumulative log change in y, that is, either the price or the bid-ask spread of bonds 3, 5 and 7 days after the rebalancing. θ_t are time fixed effects indicating the month of each rebalancing, FIR_{ct} is our measure of informationless capital flows, X_{jct} is a set of dummies that account for bonds' life to maturity, and ε_{jct} is the error term.[23] We also analyze whether these uninformative capital flows spill over to the exchange rate market. In that case, we only have country-level data, and thus, our specification becomes

$$\Delta y^z_{ct} = \theta_t + \beta FIR_{ct} + \varepsilon_{ct} \tag{4}$$

where y_{ct} is the log of the exchange rate measured as dollars per local currency, and thus, an upward (downward) movement signals a depreciation (appreciation). In both specifications, β captures how FIR affects the cross-section of returns in the sovereign debt market and in the exchange rate one. Additionally, we examine how FIR affects changes in bid-ask spreads for government bonds to test whether capital flows affect liquidity in sovereign debt markets.

The time dimension is a key part of our identification. If rebalancing-implied flows do not correlate with some country-specific unobservables that also affect prices, liquidity and exchange

[23] We have only 16 countries in our sample, and thus, we cannot use clusters at the country level, which would be the ideal clustering for this specification. In the individual bond specification, we cluster at the country-by-time-to-maturity level. Time to maturity is a dummy indicating whether a bond is maturing in 1 to 3, 3 to 5, 5 to 7, 7 to 10, or more than 10 years. In the exchange rate specification, we use robust standard errors.

rates – thus being purely informationless and not driven by a change in the economic prospects of a country – then FIR should not be associated with changes in the three variables of interest in the days immediately prior to the rebalancing. Therefore, we perform a sort of placebo test alongside our main results and examine how our dependent variables correlate with FIR on a day-by-day basis, before and after the rebalancing dates. According to our identification strategy, we should observe that this relationship becomes significantly important on the rebalancing dates or immediately after. These tests not only confirm the goodness of our measure as a measure of rebalancing-driven informationless flows but also provide evidence of the aforementioned fact that international mutual funds do not wish to deviate far from their benchmark weights, thus rebalancing their portfolios contemporaneously with the rebalancings of the index.

3 Data

The dataset used to conduct the empirical analysis is obtained by combining information from multiple data sources. First, we draw monthly data on *benchmark weights* and rebalancing events from the "Index Composition and Statistics" reports published on the J.P. Morgan Markets' website, from which we also obtain the value of the assets benchmarked against the GBI-EM Global Diversified. Second, the list of ISINs of sovereign debt bonds issued by any of the countries included in the index comes from Bloomberg. Bond characteristics and daily data on bonds, exchange rates and stripped EMBI Global spreads relative to the countries in the sample are from Datastream. Finally, data on the funds tracking the J.P. Morgan GBI-EM Global Diversified that we use to perform a set of robustness tests come from the Emerging Portfolio Fund Research (EPFR) dataset.

Starting from the reports on index composition – in which J.P. Morgan conveys information on *benchmark weights* and market capitalization for each of the countries in J.P. Morgan GBI-EM Global Diversified – we construct a dataset containing the time series (from September 2009 to March 2016) of the weights assigned to each of the 16 emerging countries included in the Index, namely: Brazil, Chile, Colombia, Hungary, Indonesia, Malaysia, Mexico, Nigeria, Peru, the Philippines, Poland, Romania, Russia, South Africa, Thailand and Turkey. After merging this

information with the data on the value of the assets benchmarked to the Index, we use the methodology described in the previous section to calculate the monthly, country-specific time series of FIR, that is, our main independent variable.

For each of the countries in the index, we search Bloomberg to collect the ISINs of all the sovereign bonds issued before or during the sample period. Starting from the list of ISINs, we download from Datastream the characteristics of each bond, that is, the issuance and maturity dates, the issuance price, the currency, the issuer type and the bond type. We use such information to identify all sovereign debt straight bonds in local currency with at least one year of life to maturity at issuance. For these bonds, we then collect the time series of the bid, ask and mid-prices.

Regarding prices, Datastream provides two distinct ask, bid and mid-quotes: the *Thomson Reuters Composite* price and the *Thomson Reuters Pricing Service (TRPS)* price. While the first is an average price from all available key market contributors, the second is the price as evaluated by the Fixed Income Pricing Service team at Thomson Reuters.[24] To summarize the information conveyed by each of the two sources in a single variable, we compute the average of the daily Composite and TRPS mid-prices, and we label this variable "Price". Similarly, after computing the absolute spread as the difference between the ask and the bid quote, for each of the two price sources, and after replacing with *missing* all those observations with a negative absolute bid-ask spread or with a relative spread larger than 20%, we take the average between the TRPS and the Composite absolute spread and define it as our "Bid-Ask Spread", that is, our measure of the liquidity of sovereign debt markets. From Datastream, we also obtain the stripped EMBI Global spread to proxy for sovereign risk in each of the countries.[25]

Starting from this panel containing a time series of prices and bid-ask spreads for each bond, we compute cumulative returns around each rebalancing date, d, by taking the difference between

[24] The composite price is exactly equal to the average quote when there are 1 or 2 contributors. With 3 contributors, the contributor with the most extreme quote is excluded, and the composite price equals the average between the two remaining quotes. Finally, when there are more than 4 contributors, the highest and the lowest quotes are excluded before calculating the average quote. The TRPS prices are provided daily by the Reuters Evaluated Pricing Service through evaluation models combining bond characteristics, pricing models and real-time dealer quotes, electronically obtained from market contributors.

[25] Data on the stripped EMBI Global spread were available for all the countries except Thailand.

the log of Price in $d-5$, that is, five days before the rebalancing date, and the log of Price z days after the rebalancing date.[26] Similarly, we measure the percentage change in the liquidity of the market z days after the rebalancing as the difference in the log of Spread in $d+z$ and $d-5$. To clean our dataset, we finally exclude from the analysis i) bonds with more than 90% of zero changes in the price from one day to the subsequent day because these are mainly bonds that were never traded; ii) bonds maturing in less than one year, as these are also excluded from the Index; and iii) bonds traded after the maturity date. As a result, we ultimately have a panel containing data on 638 bonds issued by the governments of 16 countries and 19,348 bond-month observations with non-missing prices. In particular, the final dataset has the following structure: for each bond and rebalancing date in the sample, we have the change in the log of the price (or the spread) between $d-5$ and $d+z$, where $z \in [-4; +9]$ is the number of trading days after (or before, if negative) the rebalancing date, d. The summary statistics for the bonds in our sample are reported in Panel A of Table 1 and Panel A of Table 2, where means are computed separately for each of the 16 countries in the sample.

We also retrieve from Datastream the time series of daily exchange rates for each of the 16 countries in the sample. The exchange rate is the amount of local currency needed to buy one U.S. dollar, meaning that a decrease in the exchange rate reflects an appreciation of the local currency. As with the price information, we define the log change in the exchange rate z days after (or before) the rebalancing as the difference between the log of the exchange rate on day $d+z$ and that on $d-5$. Summary statistics on exchange rates, as well as on Market capitalization and FIR – which also vary at the country level – are reported in Panel B of Table 1 and Table 2.

To test the validity of our assumptions when calculating FIR, we complement these data with information on mutual funds from EPFR. This is the most comprehensive source of data on international mutual funds investing in sovereign debt markets and contains the assets under management, fund returns, and injections/redemptions from investors into the funds (which for simplicity we call fund flows), at the share-class level. It covers (among others) funds that invest in emerging markets

[26] The rebalancing date in a given month coincides with the last trading day of the month until October 2013 and the first day of the subsequent month thereafter.

and track the J.P. Morgan GBI-EM Global Diversified. Of the total assets benchmarked against the J.P. Morgan GBI-EM indexes, on average, 49% are managed by funds covered in the EPFR dataset. Among those, we clean the database by dropping share classes with less than 12 months of observations and less than 0.1 million U.S. dollars in average assets. We then collapse the data at the fund-month level. The corresponding summary statistics are reported in Table 3.

Finally, we exclude from the analysis those months in which there were extremely large rebalancing events, such as the upgrades of Colombia, Nigeria and Romania and the downgrade of Nigeria.[27] The rationale for this choice is that, when rebalancings are particularly relevant, J.P. Morgan already announces them in the middle of the month, or even before, and – given our identification strategy – we only focus on cases in which the rebalancing takes place at the end of the month and is contemporaneous with the announcement made by J.P. Morgan.

4 Results

4.1 Main Results

Table 4 presents the main results for sovereign bond prices. Columns 1 to 3 (with time fixed effects) show that the FIR measure is positively associated with the cumulative returns of government bond prices, and the relationship is statistically significant at the 1% level. We start by estimating this relationship for cumulative returns from $d-5$ to $d+3$ (Column 1), and then we extend it to $d+5$ (Column 2) and $d+7$ (Column 3). In all of these cases, the coefficient is relatively stable and is statistically significant even 7 days after the day of the rebalancing. The results are very similar when we control for the years to maturity of the bonds in the sample (Columns 4 to 6) and when we include country fixed effects (Columns 7 to 9).

Quantitatively, these results are in line with some of the substantial episodes of rebalancings in J.P. Morgan GBI-EM Global Diversified. A one-standard-deviation increase in FIR (0.872 percentage points) leads to an average increase in sovereign debt prices of 8 basis points in the symmetrical

[27] Similarly, we exclude the top and the bottom 1% in the distribution of FIR.

window from $d-5$ to $d+5$. While this number seems low, it is consistent with large episodes of rebalancings, such as the inclusion of five Colombian treasury securities in March 2014. The estimated FIR for that episode was approximately 22.3%.[28] Multiplying this number by the coefficient in Table 4, Column 2 we obtain an estimated average cumulative return of 2.05%. The average cumulative returns for sovereign bonds in the local currency bond market in Colombia was 2.2% in a 10-day window around the announcement date.[29] Thus, our estimates are consistent with these substantial rebalancing episodes, which can be quantitatively important for the countries in our sample.

To estimate the impact of informationless flows on liquidity, we perform a similar estimation using as the dependent variable the cumulative change in the log of the bid-ask spread of sovereign bonds (Table 5). The FIR measure is negatively associated with the cumulative percentage changes in the bid-ask spread, thus showing that informationless flows are positively associated with sovereign debt liquidity (Column 1). This result, however, is statistically significant only in our shortest window. This suggests that the effect on liquidity is more transitory than that for prices. Regarding the magnitude of the estimated coefficient, a one-standard-deviation increase in FIR leads to a decrease of 0.82 percentage points in the bid-ask spread, meaning that a large event such as the inclusion of Colombian bonds in 2014 would produce a decrease in the spread approximately equal to 21 percentage points.

Since the FIR variable captures non-information-driven capital flows into the local currency denominated sovereign debt market, we are also interested in the potential spillovers to the exchange rate market. If an international mutual fund has to direct capital inflows (outflows) into the local sovereign debt market as a consequence of the rebalancings, it will typically need to buy (sell) local currency in exchange for foreign currency (commonly, U.S. dollars). Therefore, our FIR measure might also predict the cross-section of returns in the exchange rate market. Our results in Table 6 confirm this hypothesis. In this table, we regress the cumulative returns of the exchange rate (in local currency per U.S. dollar) on FIR and show that they are negatively correlated with

[28] For this estimated FIR, we take the average of the market value before and after the rebalancing because of the large differences in market value after the inclusion of the Colombian sovereign bonds in the index.
[29] For further details on this inclusion episode, see Williams (2017).

informationless flows.[30] The coefficients are stable across the different windows used (Columns 1 to 3), when we add country fixed effects (Columns 4 to 6), and when we cluster standard errors at the country-year level. Furthermore, the results are larger than those for sovereign bond prices. A one-standard-deviation increase in FIR is associated with an appreciation of 36 basis points in the exchange rate, which is consistent with the higher volatility in the exchange rate market compared to the sovereign debt market.

4.2 Placebo Tests

Our identification relies on two main hypotheses: i) international mutual funds do not wish to deviate far from the benchmark they track and thus rebalance their portfolio when the index does so; ii) our measure of informationless capital flows actually captures flows that are purely driven by the mechanical rebalancings made by J.P. Morgan to comply with the 10% cap rule and are not driven by new information about the fundamentals of the countries in the index. To test whether these two hypotheses hold in our dataset, in this section, we perform a sort of placebo test by examining the correlation between our dependent variable and FIR on a day-by-day basis around the rebalancing dates. Under our identification hypothesis, we should observe that this relationship only becomes significant in the days following the rebalancings. Therefore, we regress FIR on the changes in price, liquidity and exchange rate from $d-4$ to $d+4$, where d is the rebalancing date. As long as mutual funds following the index do not anticipate rebalancings and FIR is not systematically correlated with unobservables at the country-month level that also affect our dependent variables, we expect the coefficients from $d-4$ to d to not be statistically significantly different from zero.

Our results show that after the rebalancing, there is a strong increase in the relationship between FIR and the cumulative returns of sovereign bonds (Table 7). The coefficient between $d-4$ and d is very close to zero in magnitude and not statistically significant. On $d+1$, we already observe an increase in the coefficient, which increases by more than three times and is statistically significant

[30] As our measure of exchange rate is in local currency per U.S. dollar, an increase in it signals a depreciation of the currency, while a decrease in the measure shows an appreciation of the currency.

at the 10% level. From $d+2$ to $d+4$, the β coefficient keeps increasing and is always significant at the 1% confidence level. A very similar picture emerges when we examine the results for the bid-ask spread (Table 8). The β is statistically (and in magnitude) not different from zero before the date of the rebalancing. This changes importantly both on d and thereafter when we observe an increase in the absolute value of the coefficient. From $d+1$ to $d+4$, β is negative and statistically significant. This implies that a higher FIR is associated with greater liquidity in the sovereign debt market after the rebalancing dates. For the exchange rate, the results are qualitatively similar (Table 9). We have very low negative coefficients before d with $d-1$ being significant at the 5% level. However, and more important, from d onwards, the coefficient is much larger in absolute value, twice the size of the previous coefficient, and significant at the 1% level. These placebo tests lend important support to our identification strategy.

4.3 Robustness

To facilitate the empirical analysis, we make three simplifying assumptions when calculating the FIR measure in Section 2. In this section, we test and relax each of these three assumptions and show that the main results are robust to removing them. For this purpose, we complement our dataset with information on funds tracking the J.P. Morgan GBI-EM Global Diversified covered in the EPFR dataset. These funds account for approximately 50% of the assets under management benchmarked against the index. Before testing the aforementioned assumptions, we replicate our main specifications while replacing the total assets benchmarked against the J.P. Morgan GBI-EM Global Diversified with the assets benchmarked against this index that are present in the EPFR data. Specifically, we re-calculate FIR following equation (2), replacing A_t with $A_{EPFR,t}$, namely the sum of the assets under management by funds that track their performance against J.P. Morgan GBI-EM Global Diversified in the EPFR database. We use this new FIR in our main specification to test whether our results hold for this subset of funds. The results in Table 10 show that the signs and statistical significance of the coefficients are consistent with our main results. The size of the coefficients is different since we are using a subset of funds, but the quantitative magnitude of the coefficients is unchanged: a one-standard-deviation increase in FIR (constructed with the EPFR

assets) leads to an average increase in sovereign debt prices of 8.4 basis points in the symmetrical window from $d-5$ to $d+5$.

Next, we test the validity of each of the three assumptions made in Section 2. Our first assumption is that the flows to the funds on the rebalancing date are negligible. To ensure that the results are not driven by funds receiving very large flows, we rank funds by their monthly absolute flows and re-compute the FIR measure when considering only the sub-sample of funds whose monthly absolute flows are lower than 3 million U.S. dollars, which corresponds to approximately the median net inflow in our sample. Panel A in Table 11 presents the results from this robustness test. Neither the sign nor the significance of the coefficients change relative to our preferred specification. As a further check, we use an even more conservative specification – the results of which are reported in Table 11, Panel B – where we exclude from the analysis the months in which aggregate fund flows are particularly large in absolute value, that is, months in the top and the bottom decile of the distribution of aggregate fund flows. In this case also, the sign and the significance of the coefficients do not change. Finally, we complete the analysis by explicitly controlling for aggregate fund flows in the regressions to completely relax the first assumption. Specifically, we start from equation (1), and we let F_{it} be different from 0. Relaxing this assumption means that the flows entering a country at each rebalancing equal the sum of two terms: the FIR and an additional term that we denote as $\gamma_{ct} = \frac{w_{ct}^{B} F_t}{MV_{ct-1}}$, where F_t is the sum of flows going to funds benchmarked against the J.P. Morgan GBI-EM Global Diversified at each point in time. We add γ_{ct} to our main specification and present the resulting estimates in Panel C. The coefficient of FIR is unchanged, and the gamma has no predictive power on the outcomes of interest, thus confirming that aggregate fund flows are not driving the results.

Second, we move to the assumption regarding funds' passivism. In this case, we provide two additional pieces of evidence. First, we test this assumption by computing funds' R-squared from a regression of fund returns versus the returns of the J.P. Morgan GBI-EM Global Diversified index, similar to Amihud and Goyenko (2013) (Figure 4). We show that for more than half of the funds in the EPFR data, more than 90% of the variation in fund returns can be explained by the index returns. Additionally, we ensure that active funds are not driving our main results by re-calculating

FIR using the assets under management of passive funds. Table 12, Panel A presents the results obtained when considering exchange traded funds only, while in Panel B, we consider only funds whose R-squared is higher than 0.95, that is, funds that behave as *de facto* passive funds.

Finally, we relax our third assumption according to which the market value of assets equals the book value, namely $\tilde{A}_{it} = A_{it}$. We re-compute FIR using $\tilde{A}_{it} = A_{it-1}R_{it}$ from the EPFR data and replace it in our main specification (Table 13). Once again, our baseline results do not change significantly.

4.4 Additional Results

In this section, we present a set of additional results. First, we analyze whether our results are robust to episodes of high sovereign risk. We proceed in two steps. First, we add the stripped EMBI Global spread of each country (a proxy for sovereign risk) five days before the rebalancing date as a control in our main specification (Table 14, Panel A).[31] The coefficient for this variable is not significant at the 5% level and does not alter our baseline estimated coefficients. Second, we exclude episodes of very high sovereign risk (those beyond the 95th percentile of the stripped EMBI Global spread, roughly 396 basis points in our sample) in Panel B of Table 14.[32] Again, the results are not altered by dropping these episodes of high sovereign risk.

We also conduct additional tests to further explore potential heterogeneity in our results. We analyze four additional dimensions of heterogeneity for our main specifications. First, we examine the potential differences in negative and positive informationless capital flows by estimating the coefficient of FIR conditional on its sign (Table 15, first panel). For sovereign debt prices, there does not seem to be an asymmetry, as the coefficients are not statistically different. Instead, for bid-ask spread, only the inflows of capital seem to improve liquidity. In the case of the exchange rate, outflows seem to have a larger impact than inflows. Second, we divide our sample into two

[31] We obtained data on the stripped EMBI Global spread for all the countries in our sample except Thailand, which we drop from our sample for these tests.

[32] Notice that these episodes are far from being episodes of sovereign default such as those in Gennaioli et al. (2014a). For instance, Ecuador during its 2009 default had a peak of almost 5000 basis points of spread, more than 12 times our threshold.

different time periods, 2009-2012 and 2013-2016 (Table 15, second panel). It is interesting to notice that the effect of FIR on cumulative returns appears to be much stronger for the later period in our sample. This is consistent with two facts: first, international mutual funds investing in local currency denominated sovereign debt in emerging markets have become larger in size; second, there has been a rise in passive funds, meaning more benchmarking. As a result, the importance of the index as a preferred habitat for international investors has increased in recent times. Third, we split our sample of bonds according to their maturity into short-term (1 to 5 years of maturity), medium-term (5 to 10 years of maturity) and long-term (more than 10 years of maturity) bonds (Table 15, third panel). The effects of non-information-driven flows on prices appear to be stronger for long-term government bonds, which is consistent with the fact that the the price of bonds maturing in the short term is less volatile than that of long-term bonds. By contrast, the effects on liquidity are very similar for the different maturities. We also divide our sample into government bonds that are included in J.P. Morgan GBI-EM Global Diversified versus bonds that are not. The results for sovereign bond prices (Table 15, last panel) show that the impact of FIR is positive and statistically significant for bonds included and not included in the index. This is consistent with the predictions from the preferred habitat theory, according to which demand shocks that are local to a specific set of bonds should be partially transmitted, by arbitrageurs, to bonds with similar characteristics. Notice that both coefficients are positive, and the effect of FIR is more pronounced for bonds that are included in the index, since these are the ones directly affected by the demand shocks implied by the rebalancings.

5 Implications

Our results show that capital inflows (outflows), even when not driven by changes in the economic prospects of a country, increase (decrease) the prices of sovereign bonds, improve (decrease) the liquidity in the sovereign debt market, and appreciate (depreciate) the exchange rate. Given our identification strategy, and the fact that index rebalancings occur at a monthly frequency, we can only identify the effect of such informationless flows in a short window around the rebalancing date.

Thus, it is difficult to disentangle the short- and the long-term effects of flows and to gauge the impact of these flows (through the sovereign debt market) on real economic activity. Nevertheless, the estimated impact of FIR on both sovereign debt prices and exchange rates does not vanish – and actually increases – 7 trading days after the rebalancing date, thus suggesting that these effects have some persistence over time. In this section, we discuss the potential implications of these results if these effects were to persist even after the window we study.

Both sovereign bond prices and the exchange rate are asset prices central to the macroeconomy. Sovereign bond prices are inversely related to government bond yields. Thus, our results suggest that capital flows might significantly affect (at least temporarily) the cost of capital for governments in emerging markets. This might lead to a variation in the amount of debt a government might want to issue and might ultimately affect government expenditure. Finally, one implication of the results in this paper is that even informationless capital flows to the sovereign debt market can have important effects on economic cycles in emerging markets through government expenditures.

Even if the government did not react to the increase (decrease) of government bond yields due to capital inflows (outflows), there could be other potential channels impacting the real economy. For instance, the transmission mechanism could go through financial institutions. As capital flows affect the price of sovereign debt, they can also affect the balance sheets of these institutions. In emerging markets, these financial institutions, mainly banks, hold a sizable amount of government bonds. As their prices increase, and the institutions' balance sheets consequently improve, banks may be able to increase their supply of credit, thus fostering economic activity (and vice versa in the case of capital outflows). This valuation channel might be exacerbated by changes in the exchange rate. As banks also hold a large amount of assets and liabilities denominated in foreign currency, capital flows might also affect the health of the balance sheet through the exchange rate.

Finally, the exchange rate (absent any intervention from the central bank or the government) might have a per se effect on the macroeconomy. As informationless capital flows affect exchange rates, they consequently affect the competitiveness of the country and, therefore, net exports. When this channel is at work, informationless inflows (outflows) might decrease (increase) economic

activity.

6 Conclusion

This paper analyzes the effect of informationless capital flows on the sovereign bond market in emerging markets and their spillovers to the exchange rate. In principle, it is unclear whether these flows should affect prices and liquidity in these markets, or in what direction. To shed light on this topic, we use a novel identification strategy based on the index rebalancings of a major index of local currency denominated government debt in emerging markets. We construct a measure of the capital flows implied by these rebalancings (FIR) that is, in principle, informationless and not driven by changes in the future prospects of these emerging markets.

Our results show that the FIR measure is positively correlated with both the returns and liquidity in the sovereign debt markets of emerging economies in the days following the rebalancings. Moreover, the effects of these informationless capital flows spill over to the exchange rate market. The estimated effects are consistent with episodes of large capital flows in the sovereign debt market. Importantly, we present evidence that in the days prior to the rebalancing, the relationship between FIR and prices, liquidity and the exchange rate is close to zero and only becomes sizable and statistically significant after the rebalancing dates, thus confirming the informationless nature of our measure of rebalancing-driven flows.

As both sovereign debt prices and exchange rates are central asset prices for the macroeconomy, our results suggest a broader impact of capital flows to the sovereign debt market.

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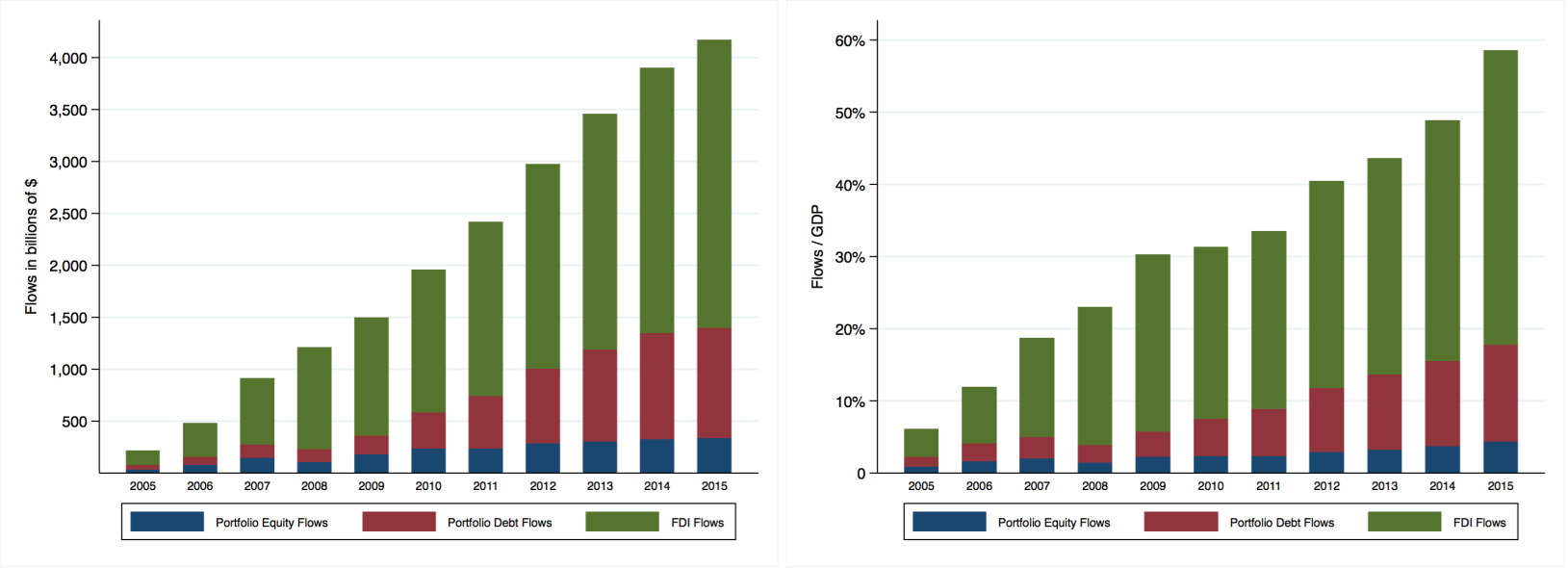
Figure 1: Gross Liability Flows

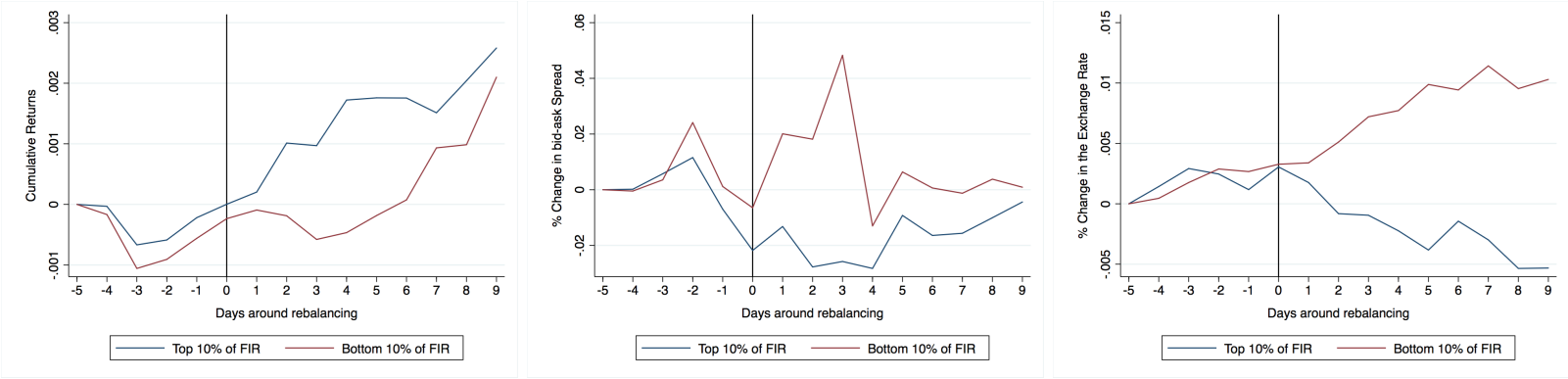


Absolute

Relative to GDP

Note: This figure plots the cumulative gross liability flows to emerging markets, divided by the type of assets. The left panel presents the sum of all gross inflows to emerging markets (in Billions of U.S. dollars). The right panel depicts the gross inflows as a percentage of GDP and is created by computing the cumulative flows over GDP for each country and then averaging across countries in each year. The countries included in the sample are: Brazil, Chile, Colombia, Hungary, Indonesia, Mexico, Peru, Philippines, Poland, Romania, Russia, South Africa, Thailand and Turkey. Source: IMF International Financial Statistics.

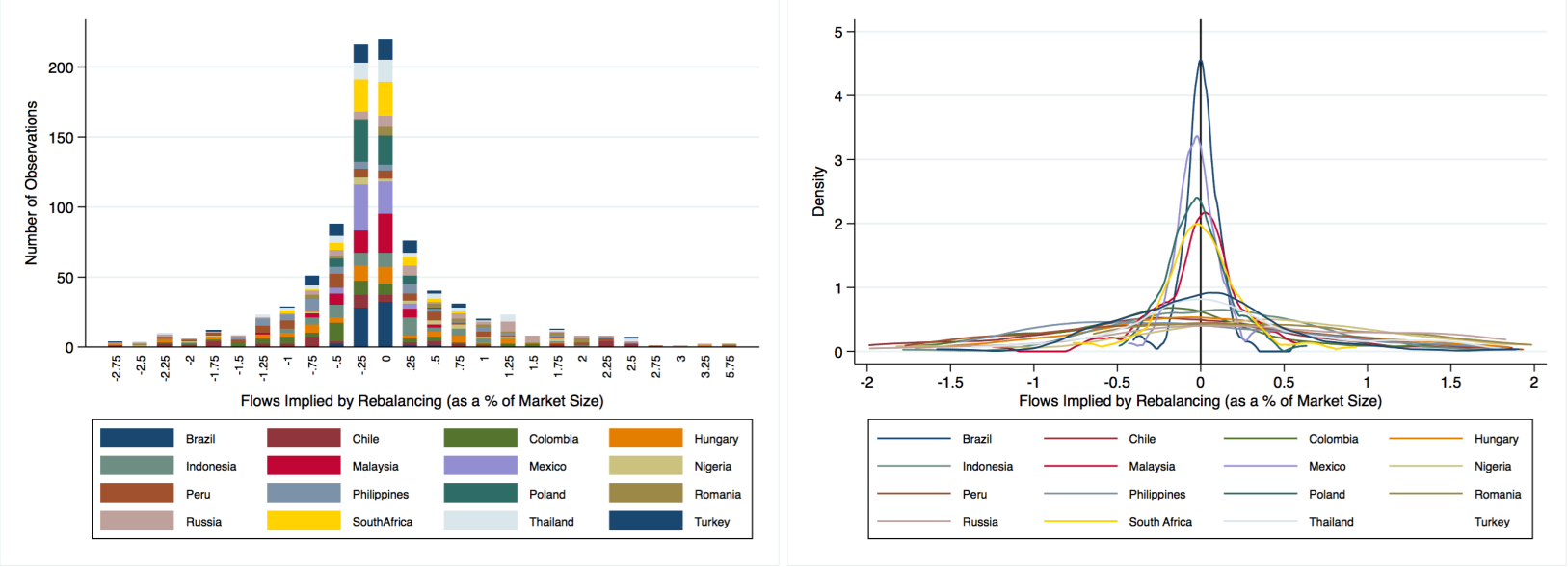
Figure 2: Price, Liquidity and Exchange Rate around the Rebalancing date



Price Spread Exchange Rate

Note: The three figures illustrate the average cumulative change in the log of price, bid-ask spread and exchange rate, in a window that starts 5 days prior to the rebalancing date and ends 9 days after it. The blue and the red lines represent the average in the first and the last decile of the distribution of Flows Implied by the Rebalancing (FIR), respectively.

Figure 3: Distribution of Flows Implied by Rebalancing

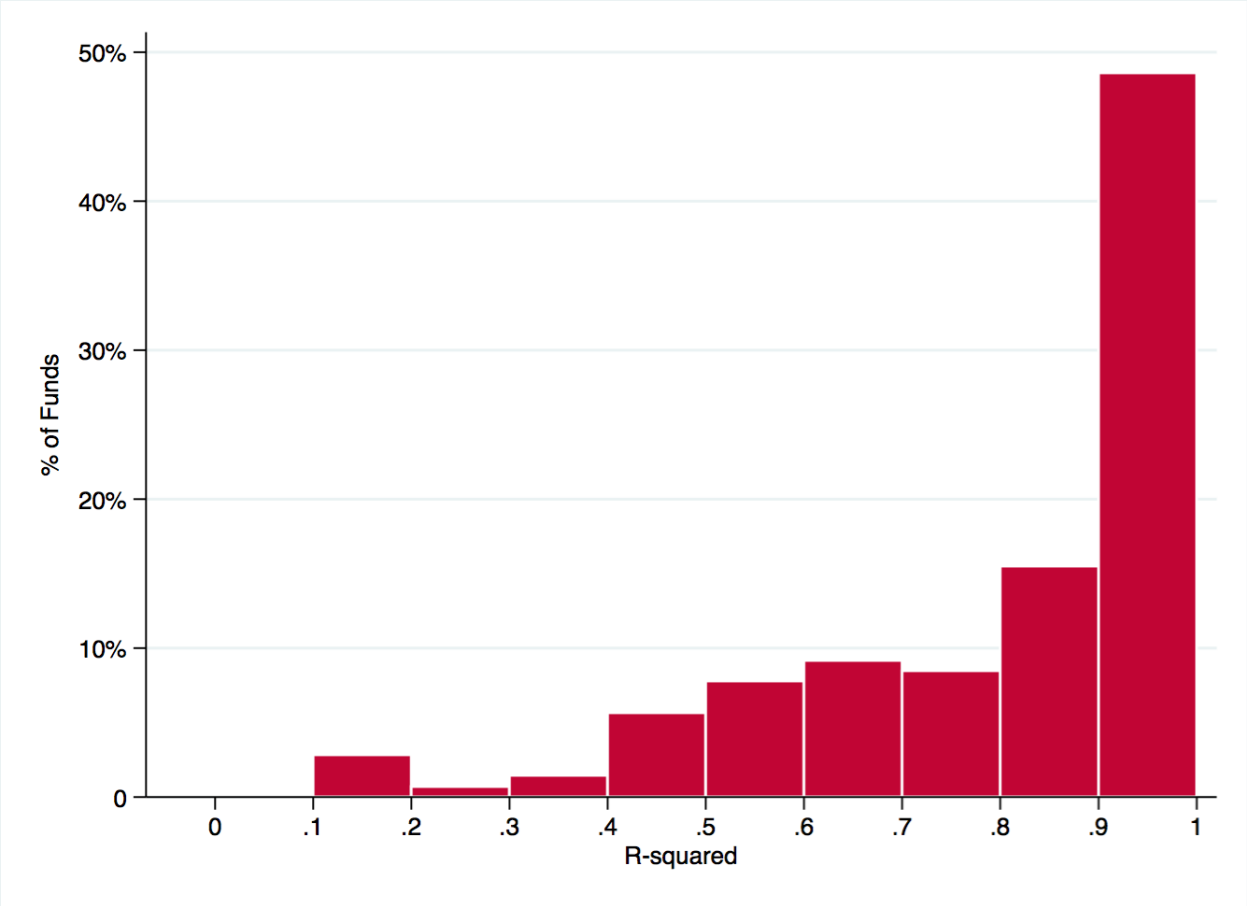


Histogram

Kernel density

Note: This figure depicts the distribution of Flows Implied by the Rebalancing (FIR) for each country in the sample. In the left panel, each bin in the histogram contains the number of month-specific observations, both aggregate and by country, for which the FIR is included in the interval whose lower bound is on the x axis. The right panel shows the Kernel density estimate of the country-specific distributions of the FIR measure.

Figure 4: Distribution of Funds' R^2



Note: This figure depicts the distribution of funds' by their closeness to the benchmark index. The latter is measured as the fraction of the variance in a fund's monthly return that can be explained by the variance in the returns from the JP Morgan GBI-EM Global Diversified. Funds' R^2 are obtained by running a set of fund-level regressions of the type: $r_{it} = \alpha + \beta r_{Bt}$, where r_{it} is the return from fund i at time t, and r_{Bt} is the return from the benchmark (B) at time t.

Table 1: Summary Statistics

Panel A: Bond-level summary statistics					
	Mean	Sd	Min	Median	Max
$\Delta\log(\text{Price})_3$	-0.01	1.31	-11.6	0.00	10.2
$\Delta\log(\text{Price})_5$	-0.03	1.49	-14.2	0.00	11.0
$\Delta\log(\text{Price})_7$	-0.05	1.68	-18.3	0.00	11.9
Relative Bid-Ask Spread	0.01	0.01	0.0	0.00	0.2
$\Delta\log(\text{Bid-Ask Spread})_3$	-1.13	34.15	-624.6	0.00	552.5
$\Delta\log(\text{Bid-Ask Spread})_5$	-0.72	35.55	-583.5	0.00	621.7
$\Delta\log(\text{Bid-Ask Spread})_7$	-0.82	35.25	-579.4	0.00	621.7
Years to Maturity	8.60	7.29	1.0	6.26	50.4
Years of Life	4.70	3.38	0.0	4.05	22.6
Panel B: Country-level summary statistics					
FIR	0.05	0.86	-2.6	0.00	5.9
$\Delta\log(\text{FX rate})_3$	0.14	2.10	-6.4	-0.02	15.7
$\Delta\log(\text{FX rate})_5$	0.16	2.30	-6.0	-0.02	14.1
$\Delta\log(\text{FX rate})_7$	0.28	2.51	-10.7	-0.01	16.8
Total Market Value in Billions of U.S. \$ (MV)	60.12	54.56	0.6	49.87	261.9
Weight in the Index (w^B)	6.93	3.69	0.1	9.21	10.0
Stripped EMBI Global Spread	220.91	84.56	78.0	205.00	631.0

Note: This table reports the summary statistics for the sample used in main analysis. The statistics in Panel A are calculated on the full sample of bonds used in the main regressions on Price and Bid-Ask Spread. The statistics in Panel B are computed after collapsing the dataset at the country-time level. $\Delta\log(y)_z$ is the cumulative log change in y over an interval that goes from 5 days prior to the monthly rebalancing date to z days after it. The relative Bid-Ask Spread is computed in $d-5$, that is, 5 days before each rebalancing, and equals the difference between the ask and the bid price of a bond, divided by its midquote. Years to Maturity and Years of Life measure a bond's number of years to maturity and since issuance, respectively. FIR is the measure of Flows Implied by the Rebalancings, and is computed as $FIR_{ct} = \frac{A_t \lambda_{ct}}{MV_{ct-1}}$, where λ_{ct} is the reallocation implied by the rebalancings; A_t is the total value of funds' assets under management benchmarked against the GBI-EM Global Diversified; and MV_{ct-1} is the previous period market value of government debt securities in local currency (i.e., the size of the market). w^B is the percentage that each country represents in the GBI-EM Global Diversified at the beginning of each month. The Stripped EMBI Global Spread (in basis points) of each country in each period is measured five days before the rebalancing date.

Table 2: Summary Statistics by Country

	Brazil	Chile	Colom-bia	Hungary	Indone-sia	Malaysia	Mexico	Nigeria	Peru	Philip-pines	Poland	Romania	Russia	S. Africa	Thai-land	Turkey
Panel A: Bond-level summary statistics, by country																
$\Delta\log(\text{Price})_3$	-0.30	-0.16	-0.05	-0.01	-0.12	0.01	-0.09	-0.10	-0.21	0.11	-0.03	-0.01	0.06	-0.06	0.07	0.01
$\Delta\log(\text{Price})_5$	-0.24	-0.15	-0.03	0.06	-0.27	-0.01	0.04	-0.13	-0.28	0.10	-0.02	-0.04	0.01	-0.07	0.04	-0.03
$\Delta\log(\text{Price})_7$	-0.20	-0.18	-0.06	0.06	-0.39	-0.02	0.06	-0.29	-0.26	0.16	-0.02	-0.01	-0.04	-0.06	-0.01	-0.10
Relative Bid-Ask Spread	0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.01
$\Delta\log(\text{Bid-Ask Spread})_3$	0.66	-0.48	-0.28	-3.07	0.73	-1.55	-0.62	4.49	-0.75	-2.39	2.33	-0.76	-1.63	-1.04	-2.52	-2.23
$\Delta\log(\text{Bid-Ask Spread})_5$	0.25	-0.69	0.26	-2.62	3.11	0.34	2.01	0.81	-0.94	-2.28	0.42	-2.59	-0.93	-1.01	-3.00	-2.94
$\Delta\log(\text{Bid-Ask Spread})_7$	-0.06	-0.86	-0.43	-3.81	2.72	0.92	-0.23	0.08	-1.52	-2.24	0.12	-1.67	1.23	-0.18	-3.02	-3.69
Years to Maturity	8.24	10.29	7.95	7.61	11.59	9.55	10.43	7.71	15.82	9.60	8.48	5.04	6.58	15.04	10.80	6.45
Years of Life	2.31	0.93	2.54	2.04	3.10	2.35	3.09	2.89	3.12	3.80	1.97	3.74	0.58	3.99	3.13	-0.88
Panel B: Country-level summary statistics, by country																
FIR	0.01	-0.10	-0.23	-0.01	0.10	-0.03	-0.01	0.24	0.12	-0.02	-0.02	0.69	0.39	0.00	0.13	-0.00
$\Delta\log(\text{FX rate})_3$	0.33	-0.15	0.04	0.45	0.48	-0.16	-0.05	0.26	0.07	-0.25	0.21	0.30	0.83	-0.13	-0.01	0.26
$\Delta\log(\text{FX rate})_5$	0.27	-0.20	0.03	0.39	0.47	-0.08	-0.02	0.36	0.04	-0.19	0.11	0.41	1.04	-0.04	0.08	0.18
$\Delta\log(\text{FX rate})_7$	0.38	-0.13	-0.11	0.60	0.87	-0.03	0.18	0.75	0.01	-0.14	0.41	0.24	1.17	0.43	0.04	0.37
Total Market Value in Billions of U.S. \$ (MV)	201.28	1.12	29.51	32.76	51.19	67.56	135.61	11.66	10.09	2.73	100.85	13.67	40.18	74.90	47.46	59.68
Weight in the Index (w^B)	10.00	0.19	4.83	6.34	9.20	9.98	10.00	1.82	1.91	0.47	10.00	2.12	7.13	9.96	8.51	9.88
Stripped EMBI Global Spread	243.44	157.70	195.77	314.25	255.52	162.38	207.66	367.48	184.05	164.18	156.48	199.07	274.32	229.14	.	264.06
Panel C: Average number of bonds observed in each period, by years to maturity																
1 to 3 years to maturity	1.56	0.50	3.39	4.48	6.11	8.55	4.09	1.25	1.89	11.52	3.25	2.78	7.61	2.02	10.02	4.31
3 to 5 years to maturity	1.34	0.36	2.94	2.97	3.47	6.31	3.48	1.38	1.45	9.58	3.61	1.73	4.73	1.80	6.41	2.98
5 to 7 years to maturity	1.02	0.91	1.88	1.92	2.77	4.80	1.75	0.52	1.64	7.30	1.66	1.56	2.42	1.41	3.81	0.52
7 to 10 years to maturity	1.61	0.97	2.19	2.19	4.78	3.91	2.28	0.44	3.08	9.52	2.42	0.80	1.52	1.95	4.89	2.55
More than 10 years to maturity	1.88	0.19	3.38	2.19	14.67	8.98	6.63	1.59	10.42	20.33	3.42	0.50	1.48	5.98	11.86	0.00
Total N. of bonds	7.41	2.92	13.77	13.75	31.80	32.55	18.23	5.17	18.48	58.23	14.36	7.38	17.77	13.16	36.98	10.36

Note: This table reports the summary statistics for each of the countries in our sample. The statistics in Panel A are calculated on the full sample of bonds used in the main regressions on Price and bid-ask Spread for each of the 16 countries included in the analysis, separately. The statistics in Panel B are computed after collapsing the dataset at the country-time level. Panel C reports the average number of a country's bonds in the sample, for different maturities and in total. $\Delta\log(y)_z$ is the cumulative log change in y over an interval that goes from 5 days prior to the monthly rebalancing date to z days after it. The relative Bid-Ask Spread is computed in $d-5$, that is, 5 days before each rebalancing, and equals the difference between the ask and the bid price of a bond, divided by its midquote. Years to Maturity and Years of Life measure a bond's number of years to maturity and since issuance, respectively. FIR is the measure of Flows Implied by the Rebalancings, and is computed as $FIR_{ct} = \frac{A_t \lambda_{ct}}{MV_{ct-1}}$, where λ_{ct} is the reallocation implied by the rebalancings; A_t is the total value of funds' assets under management benchmarked against the GBI-EM Global Diversified; and MV_{ct-1} is the previous period market value of government debt securities in local currency (i.e., the size of the market). The Stripped EMBI Global Spread (in basis points) of each country in each period is measured five days before the rebalancing date. w^B is the percentage that each country represents in the GBI-EM Global Diversified at the beginning of each month.

Table 3: Summary Statistics - EPFR data

Fund-level summary statistics					
	Mean	Sd	Min	Median	Max
Assets Under Management	604.62	1297.79	0.0	156.53	15642.1
Fund Returns	0.00	0.03	-0.3	0.00	0.2
Fund Flows in U.S. $ (F)	2.63	74.27	-1856.1	0.00	1079.7
Fund Flows as a % of AUM	3.03	110.76	-110.4	0.00	9232.4
Abs(Fund Flows)	25.69	69.73	0.0	2.96	1856.1
Fund R^2	0.81	0.20	0.1	0.91	1.0
Average N. of Share Classes within a Fund	7.82	8.14	1.0	4.00	34.0
Total N. of Funds	142.00	0.00	142.0	142.00	142.0
Total N. of Share Classes	898.00	0.00	898.0	898.00	898.0

Note: This table reports the summary statistics relative to the funds benchmarked against the JP Morgan GBI-EM Global Diversified in the EPFR dataset. Assets under management are the total assets in the portfolio of the fund at the end of the month, in Millions of U.S. $). Fund returns are computed as the percentage change in the value of a fund's portfolio from the beginning to the end of each month. Fund flows (in Millions of U.S. dollars, as a % of the previous period assets under management, and in absolute value) are the flows that enter or leave a fund in each month. Fund R^2 measures how close a fund replicates its benchmark, and is obtained by running a set of fund-level regressions of the type: $r_{it} = \alpha + \beta r_{Bt}$, where r_{it} is the return from fund i at time t, and r_{Bt} is the return from the benchmark (B) at time t.

Table 4: Effects of Flow Implied by Rebalancing on Bond Prices

Dependent Variable: Cumulative Returns									
	Time FE			Maturity & Time FE			Maturity, Country & Time FE		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$
FIR	0.086***	0.092***	0.111***	0.087***	0.092***	0.112***	0.087***	0.097***	0.121***
	(0.021)	(0.025)	(0.035)	(0.021)	(0.025)	(0.035)	(0.022)	(0.027)	(0.036)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	No	No	No	No	Yes	Yes	Yes
Maturity controls	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Mean of FIR	0.068	0.067	0.067	0.068	0.067	0.067	0.068	0.067	0.067
Stand. dev. of FIR	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872
Observations	19348	19334	19324	19348	19334	19324	19348	19334	19324
N. of Countries	16	16	16	16	16	16	16	16	16
N. of Bonds	638	638	638	638	638	638	638	638	638
R^2	0.175	0.208	0.231	0.176	0.209	0.231	0.182	0.217	0.242

Note: This table reports the OLS coefficients of FIR on cumulative returns – computed as the change in the log of the price – during a period that starts 5 days before the rebalancing and ends 3, 5 and 7 days after it. Observations are at the bond-month level. The main independent variable is the measure of Flows Implied by the Rebalancings, computed as $FIR_{ct} = \frac{A_t \lambda_{ct}}{MV_{ct-1}}$, where λ_{ct} is the reallocation implied by the rebalancings, A_t is the total value of funds' assets under management benchmarked against the GBI-EM Global Diversified, and MV_{ct-1} is the previous period market value of government debt securities denominated in local currency (i.e., the size of the market). Maturity controls are dummies identifying bonds with maturities between 1 and 3 years, 3 and 5 years, 5 and 7 years, 7 to 10 years, and more than 10 years. Standard errors in parentheses are clustered at the country-by-years-to-maturity level (following the categories described above). *** p< 0.01, ** p< 0.05, and *p< 0.10.

Table 5: Effects of Flow Implied by Rebalancing on the Bid-Ask Spread

Dependent Variable: Δ log(Bid-Ask Spread)									
	Time FE			Maturity & Time FE			Maturity, Country & Time FE		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$
FIR	-0.967***	-0.258	-0.186	-0.943***	-0.229	-0.157	-1.057***	-0.216	-0.240
	(0.331)	(0.279)	(0.307)	(0.330)	(0.276)	(0.314)	(0.340)	(0.307)	(0.320)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	No	No	No	No	Yes	Yes	Yes
Maturity controls	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Mean of FIR	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066
Stand. dev. of FIR	0.871	0.870	0.870	0.871	0.870	0.870	0.871	0.870	0.870
Observations	19078	19052	19021	19078	19052	19021	19078	19052	19021
N. of Countries	16	16	16	16	16	16	16	16	16
N. of Bonds	632	632	632	632	632	632	632	632	632
R^2	0.035	0.030	0.043	0.036	0.031	0.045	0.038	0.034	0.047

Note: This table reports the OLS coefficients of FIR on the change in the log of the bid-ask spread during a period that starts 5 days before the rebalancing and ends 3, 5 and 7 days after it. Observations are at the bond-month level. The main independent variable is the measure of Flows Implied by the Rebalancings, computed as $FIR_{ct} = \frac{A_t \lambda_{ct}}{MV_{ct-1}}$, where λ_{ct} is the reallocation implied by the rebalancings, A_t is the total value of funds' assets under management benchmarked against the GBI-EM Global Diversified, and MV_{ct-1} is the previous period market value of government debt securities denominated in local currency (i.e., the size of the market). Maturity controls are dummies identifying bonds with maturities between 1 and 3 years, 3 and 5 years, 5 and 7 years, 7 to 10 years, and more than 10 years. Standard errors in parentheses are clustered at the country-by-years-to-maturity level (following the categories described above). *** p< 0.01, ** p< 0.05, and *p< 0.10.

Table 6: Effects of Flow Implied by Rebalancing on the Exchange Rate

Dependent Variable: Δ log(FX Rate)									
	Time FE			Country & Time FE			Clustered SE		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$
FIR	-0.328***	-0.365***	-0.370***	-0.362***	-0.414***	-0.427***	-0.362***	-0.414***	-0.427***
	(0.092)	(0.098)	(0.112)	(0.097)	(0.101)	(0.116)	(0.097)	(0.101)	(0.116)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Mean of FIR	0.052	0.053	0.052	0.052	0.053	0.052	0.052	0.053	0.052
Stand. dev. of FIR	0.875	0.874	0.875	0.875	0.874	0.875	0.875	0.874	0.875
Observations	875	877	876	875	877	876	875	877	876
N. of Countries	16	16	16	16	16	16	16	16	16
R^2	0.438	0.451	0.421	0.462	0.478	0.451	0.462	0.478	0.451

Note: This table reports the OLS coefficients of FIR on the change in the log of the exchange rate during a period that starts 5 days before the rebalancing and ends 3, 5 and 7 days after it. Observations are at the country-month level. The main independent variable is the measure of Flows Implied by the Rebalancings, computed as $FIR_{ct} = \frac{A_t \lambda_{ct}}{MV_{ct-1}}$, where λ_{ct} is the reallocation implied by the rebalancings, A_t is the total value of funds' assets under management benchmarked against the GBI-EM Global Diversified, and MV_{ct-1} is the previous period market value of government debt securities denominated in local currency (i.e., the size of the market). Robust standard errors in parentheses in columns (1)-(6). Standard errors in parentheses in columns (7)-(9) are clustered at the country-time level. *** p< 0.01, ** p< 0.05, and *p< 0.10.

Table 7: Cumulative Returns around the Rebalancing date

Dependent Variable: Cumulative Returns									
	Pre-rebalancing				Rebalancing	Post-rebalancing			
	$[d-4]$	$[d-3]$	$[d-2]$	$[d-1]$	d	$[d+1]$	$[d+2]$	$[d+3]$	$[d+4]$
FIR	0.013	0.004	0.017	0.021	0.015	0.035*	0.064***	0.087***	0.102***
	(0.008)	(0.013)	(0.014)	(0.018)	(0.018)	(0.018)	(0.019)	(0.022)	(0.025)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of FIR	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.067
Stand. dev. of FIR	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872	0.872
Observations	19348	19348	19348	19348	19348	19348	19348	19348	19339
N. of Countries	16	16	16	16	16	16	16	16	16
N. of Bonds	638	638	638	638	638	638	638	638	638
R^2	0.063	0.105	0.129	0.145	0.165	0.161	0.165	0.182	0.196

Note: This table reports the OLS coefficients of FIR on cumulative returns, computed as the difference between the log of the price on $d-5$, where d is the rebalancing date, and the log of the price in the days around the rebalancing. Observations are at the bond-month level. The main independent variable is the measure of Flows Implied by the Rebalancings, computed as $FIR_{ct} = \frac{A_t \lambda_{ct}}{MV_{ct-1}}$, where λ_{ct} is the reallocation implied by the rebalancings, A_t is the total value of funds' assets under management benchmarked against the GBI-EM Global Diversified, and MV_{ct-1} is the previous period market value of government debt securities denominated in local currency (i.e., the size of the market). Maturity controls are dummies identifying bonds with maturities between 1 and 3 years, 3 and 5 years, 5 and 7 years, 7 to 10 years, and more than 10 years. Standard errors in parentheses are clustered at the country-by-years-to-maturity level (following the categories described above). *** p< 0.01, ** p< 0.05, and *p< 0.10.

Table 8: Change in the Spread around the Rebalancing date

Dependent Variable: Δ log(Bid-Ask Spread)									
	Pre-rebalancing				Rebalancing	Post-rebalancing			
	$[d-4]$	$[d-3]$	$[d-2]$	$[d-1]$	d	$[d+1]$	$[d+2]$	$[d+3]$	$[d+4]$
FIR	0.109	0.391	0.383	0.090	-0.325	-0.671**	-0.625*	-1.057***	-0.552
	(0.245)	(0.272)	(0.326)	(0.212)	(0.315)	(0.292)	(0.353)	(0.340)	(0.343)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of FIR	0.064	0.064	0.065	0.064	0.064	0.064	0.066	0.066	0.066
Stand. dev. of FIR	0.872	0.872	0.872	0.872	0.872	0.871	0.872	0.871	0.871
Observations	19091	19095	19088	19098	19091	19090	19055	19078	19067
N. of Countries	16	16	16	16	16	16	16	16	16
N. of Bonds	632	632	632	632	632	632	632	632	632
R^2	0.009	0.009	0.008	0.044	0.043	0.041	0.039	0.038	0.050

Note: This table reports the OLS coefficients of FIR on the change in bid-ask spread, computed as the difference between the log of the spread on $d-5$, where d is the rebalancing date, and the log of the spread in the days around the rebalancing. Observations are at the bond-month level. The main independent variable is the measure of Flows Implied by the Rebalancings, computed as $FIR_{ct} = \frac{A_t \lambda_{ct}}{MV_{ct-1}}$, where λ_{ct} is the reallocation implied by the rebalancings, A_t is the total value of funds' assets under management benchmarked against the GBI-EM Global Diversified, and MV_{ct-1} is the previous period market value of government debt securities denominated in local currency (i.e., the size of the market). Maturity controls are dummies identifying bonds with maturities between 1 and 3 years, 3 and 5 years, 5 and 7 years, 7 to 10 years, and more than 10 years. Standard errors in parentheses are clustered at the country-by-years-to-maturity level (following the categories described above). *** p< 0.01, ** p< 0.05, and *p< 0.10.

Table 9: Change in the Exchange Rate around the Rebalancing date

Dependent Variable: Δ log(FX Rate)									
	Pre-rebalancing				Rebalancing	Post-rebalancing			
	$[d-4]$	$[d-3]$	$[d-2]$	$[d-1]$	d	$[d+1]$	$[d+2]$	$[d+3]$	$[d+4]$
FIR	-0.025	-0.069*	-0.074	-0.133**	-0.270***	-0.311***	-0.330***	-0.362***	-0.410***
	(0.032)	(0.039)	(0.048)	(0.058)	(0.071)	(0.078)	(0.094)	(0.097)	(0.109)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of FIR	0.051	0.051	0.053	0.053	0.049	0.052	0.053	0.052	0.053
Stand. dev. of FIR	0.874	0.874	0.874	0.874	0.871	0.874	0.874	0.875	0.874
Observations	876	876	878	878	876	874	875	875	877
N. of Countries	16	16	16	16	16	16	16	16	16
R^2	0.353	0.443	0.379	0.422	0.434	0.445	0.439	0.462	0.465

Note: This table reports the OLS coefficients of FIR on the change in the exchange rate, computed as the difference between the log of the exchange rate on $d-5$, where d is the rebalancing date, and the log of the exchange rate in the days around the rebalancing. Observations are at the bond-month level. The main independent variable is the measure of Flows Implied by the Rebalancings, computed as $FIR_{ct} = \frac{A_t \lambda_{ct}}{MV_{ct-1}}$, where λ_{ct} is the reallocation implied by the rebalancings, A_t is the total value of funds' assets under management benchmarked against the GBI-EM Global Diversified, and MV_{ct-1} is the previous period market value of government debt securities denominated in local currency (i.e., the size of the market). Robust standard errors in parentheses. *** p< 0.01, ** p< 0.05, and *p< 0.10.

Table 10: FIR with EPFR data

Re-computing FIR on the subsample of EPFR funds									
	Cumulative Returns			Δ log(Bid-Ask Spread)			Δ log(FX Rate)		
	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$
FIR	0.246***	0.266***	0.331***	-3.090***	-0.815	-0.750	-0.968***	-1.071***	-1.102***
	(0.063)	(0.076)	(0.102)	(0.905)	(0.849)	(0.871)	(0.262)	(0.269)	(0.311)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity controls	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Mean of FIR	0.022	0.022	0.022	0.022	0.021	0.022	0.018	0.018	0.018
Stand. dev. of FIR	0.313	0.313	0.313	0.313	0.313	0.313	0.320	0.320	0.320
Observations	19348	19334	19324	19078	19052	19021	875	877	876

Note: This table reports the OLS coefficients of FIR on the change in the log of price, bid-ask spread and exchange rate during a period that starts 5 days before the rebalancing and ends 3, 5 and 7 days after it. Observations are at the bond-month level for the regressions on price and bid-ask spread, while they are at the country-month level in the regressions on the exchange rate. The main independent variable is the measure of Flows Implied by the Rebalancings, computed as $FIR_{ct} = \frac{A_t \lambda_{ct}}{MV_{ct-1}}$, where λ_{ct} is the reallocation implied by the rebalancings, A_t is the total value of funds' assets under management benchmarked against the GBI-EM Global Diversified in the EPFR dataset, and MV_{ct-1} is the previous period market value of government debt securities denominated in local currency (i.e., the size of the market). Maturity controls are dummies identifying bonds with maturities between 1 and 3 years, 3 and 5 years, 5 and 7 years, 7 to 10 years, and more than 10 years. Standard errors in parentheses are clustered at the country-by-years-to-maturity level in the regressions on price and spread. Robust standard errors are used in the exchange-rate regressions. *** p< 0.01, ** p< 0.05, and *p< 0.10.

Table 11: Fund Flows Robustness Tests

Panel A: Re-computing FIR on the subsample of EPFR funds with net flows lower than 3M dollars									
	Cumulative Returns			Δ log(Bid-Ask Spread)			Δ log(FX Rate)		
	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$
FIR	1.911***	2.305***	2.783***	-26.431***	0.080	-5.468	-7.299***	-8.462***	-8.444***
	(0.463)	(0.615)	(0.857)	(8.826)	(7.872)	(7.882)	(2.032)	(2.171)	(2.494)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity controls	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Mean of FIR	0.003	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002
Stand. dev. of FIR	0.039	0.039	0.039	0.039	0.039	0.039	0.040	0.040	0.040
Observations	19348	19334	19324	19078	19052	19021	875	877	876
Panel B: Excluding months in the top and the bottom decile of the distribution of aggregate fund flows									
	Cumulative Returns			Δ log(Bid-Ask Spread)			Δ log(FX Rate)		
	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$
FIR	0.209***	0.279**	0.439***	-3.190**	-1.954**	-2.748**	-1.078***	-1.184***	-1.158***
	(0.078)	(0.114)	(0.138)	(1.223)	(0.926)	(1.071)	(0.334)	(0.336)	(0.380)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity controls	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Mean of FIR	0.018	0.018	0.018	0.017	0.017	0.018	0.017	0.017	0.017
Stand. dev. of FIR	0.307	0.307	0.307	0.306	0.306	0.306	0.309	0.309	0.309
Observations	14353	14342	14336	14131	14115	14092	657	659	659
Panel C: Controlling for non-zero aggregate fund flows									
	Cumulative Returns			Δ log(Bid-Ask Spread)			Δ log(FX Rate)		
	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$
FIR	0.245***	0.269***	0.340***	-3.068***	-0.762	-0.645	-0.973***	-1.074***	-1.108***
	(0.064)	(0.077)	(0.102)	(0.903)	(0.844)	(0.863)	(0.261)	(0.269)	(0.311)
γ	-1.614	4.664	16.211*	34.694	83.822	167.398	-15.259	-9.227	-17.160
	(6.562)	(6.982)	(8.468)	(75.911)	(118.679)	(100.834)	(17.285)	(17.149)	(17.954)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity controls	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Mean of FIR	0.022	0.022	0.022	0.022	0.021	0.022	0.018	0.018	0.018
Stand. dev. of FIR	0.313	0.313	0.313	0.313	0.313	0.313	0.320	0.320	0.320
Observations	19348	19334	19324	19078	19052	19021	875	877	876

Note: This table reports the OLS coefficients of FIR on the change in the log of price, bid-ask spread and exchange rate during a period that starts 5 days before the rebalancing and ends 3, 5 and 7 days after it. Observations are at the bond-month level for the regressions on price and bid-ask spread, while they are at the country-month level in the regressions on the exchange rate. The main independent variable is the measure of Flows Implied by the Rebalancings, computed as $FIR_{ct} = \frac{A_t \lambda_{ct}}{MV_{ct-1}}$, where λ_{ct} is the reallocation implied by the rebalancings, A_t is the total value of funds' assets under management benchmarked against the GBI-EM Global Diversified in the EPFR dataset, and MV_{ct-1} is the previous period market value of government debt securities denominated in local currency (i.e., the size of the market). In Panel A, A_t and, consequently, FIR_{ct} are computed summing only across funds whose monthly absolute flows are smaller than 3 million U.S. $; in Panel B the top and the bottom decile in the distribution of aggregate fund flows are excluded, and A_t is calculated on the funds in the EPFR sample. In Panel C, we control for non-zero aggregate fund flows by including as a control $\gamma_{ct} = \frac{w^B_{ct} F_t}{MV_{ct-1}}$, where w_{ct} is the benchmark weight, and F_t are aggregate fund flows in the EPFR data. Maturity controls are dummies identifying bonds with maturities between 1 and 3 years, 3 and 5 years, 5 and 7 years, 7 to 10 years, and more than 10 years. Standard errors in parentheses are clustered at the country-by-years-to-maturity level in the regressions on price and spread. Robust standard errors are used in the exchange-rate regressions. *** p< 0.01, ** p< 0.05, and *p< 0.10.

Table 12: Passivism Robustness Tests

Panel A: Re-computing FIR on the subsample of passive mutual funds									
	Cumulative Returns			Δ log(Bid-Ask Spread)			Δ log(FX Rate)		
	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$
FIR	7.761***	7.753***	9.571***	-104.840***	-3.039	5.768	-28.076***	-32.200***	-33.791***
	(2.138)	(2.596)	(3.492)	(32.065)	(31.846)	(31.585)	(8.536)	(9.341)	(10.833)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity controls	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Mean of FIR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Stand. dev. of FIR	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Observations	19348	19334	19324	19078	19052	19021	875	877	876
Panel B: Re-computing FIR on the subsample of funds with R^2 higher than 95%									
	Cumulative Returns			Δ log(Bid-Ask Spread)			Δ log(FX Rate)		
	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$
FIR	0.794***	0.855***	1.047***	-10.022***	-2.179	-1.932	-3.037***	-3.385***	-3.504***
	(0.191)	(0.238)	(0.326)	(2.937)	(2.811)	(2.829)	(0.841)	(0.879)	(1.017)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity controls	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Mean of FIR	0.007	0.007	0.007	0.007	0.007	0.007	0.006	0.006	0.006
Stand. dev. of FIR	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
Observations	19348	19334	19324	19078	19052	19021	875	877	876

Note: This table reports the OLS coefficients of FIR on the change in the log of price, bid-ask spread and exchange rate during a period that starts 5 days before the rebalancing and ends 3, 5 and 7 days after it. Observations are at the bond-month level for the regressions on price and bid-ask spread, while they are at the country-month level in the regressions on the exchange rate. The main independent variable is the measure of Flows Implied by the Rebalancings, computed as $FIR_{ct} = \frac{A_t \lambda_{ct}}{MV_{ct-1}}$, where λ_{ct} is the reallocation implied by the rebalancings, A_t is the total value of funds' assets under management benchmarked against the GBI-EM Global Diversified in the EPFR dataset, and MV_{ct-1} is the previous period market value of government debt securities denominated in local currency (i.e., the size of the market). In Panel A, A_t and, consequently, FIR_{ct} are computed summing only across Exchange Traded Funds (ETFs); in Panel B these are computed using the subset of *de facto* passive funds, that is, funds whose R^2 is greater than 95%. The R^2 measures how close a fund replicates its benchmark, and is obtained by running a set of fund-level regressions of the type: $r_{it} = \alpha + \beta r_{Bt}$, where r_{it} is the return from fund i at time t, and r_{Bt} is the return from the benchmark (B) at time t. Maturity controls are dummies identifying bonds with maturities between 1 and 3 years, 3 and 5 years, 5 and 7 years, 7 to 10 years, and more than 10 years. Standard errors in parentheses are clustered at the country-by-years-to-maturity level in the regressions on price and spread. Robust standard errors are used in the exchange-rate regressions. *** p< 0.01, ** p< 0.05, and *p< 0.10.

Table 13: Market Value of Assets Robustness Test

Re-computing FIR using the market value of funds assets									
	Cumulative Returns			Δ log(Bid-Ask Spread)			Δ log(FX Rate)		
	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$
FIR	0.244***	0.264***	0.329***	-3.130***	-0.781	-0.718	-0.964***	-1.074***	-1.106***
	(0.062)	(0.075)	(0.102)	(0.901)	(0.849)	(0.872)	(0.262)	(0.271)	(0.315)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity controls	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Mean of FIR	0.023	0.023	0.023	0.023	0.022	0.023	0.018	0.019	0.018
Stand. dev. of FIR	0.314	0.314	0.314	0.314	0.314	0.314	0.319	0.319	0.319
Observations	19348	19334	19324	19078	19052	19021	875	877	876

Note: This table reports the OLS coefficients of FIR on the change in the log of price, bid-ask spread and exchange rate during a period that starts 5 days before the rebalancing and ends 3, 5 and 7 days after it. Observations are at the bond-month level for the regressions on price and bid-ask spread, while they are at the country-month level in the regressions on the exchange rate. The main independent variable is the measure of Flows Implied by the Rebalancings, computed as $FIR_{ct} = \frac{A_t \lambda_{ct}}{MV_{ct-1}}$, where λ_{ct} is the reallocation implied by the rebalancings, A_t is total market value of funds' previous period assets under management benchmarked against the GBI-EM Global Diversified in the EPFR dataset, and MV_{ct-1} is the previous period market value of government debt securities denominated in local currency (i.e., the size of the market). The market value of assets is obtained by multiplying a fund's previous period assets by the gross return of its portfolio. Maturity controls are dummies identifying bonds with maturities between 1 and 3 years, 3 and 5 years, 5 and 7 years, 7 to 10 years, and more than 10 years. Standard errors in parentheses are clustered at the country-by-years-to-maturity level in the regressions on price and spread. Robust standard errors are used in the exchange-rate regressions. *** p< 0.01, ** p< 0.05, and *p< 0.10.

Table 14: Sovereign Risk

Panel A: Controlling for sovereign risk									
	Cumulative Returns			Δ log(Bid-Ask Spread)			Δ log(FX Rate)		
	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$
FIR	0.071***	0.091***	0.116***	-1.111***	-0.261	-0.306	-0.369***	-0.427***	-0.442***
	(0.023)	(0.029)	(0.041)	(0.373)	(0.354)	(0.372)	(0.102)	(0.106)	(0.123)
EMBI Spread	-0.000	-0.000	-0.000	-0.007	-0.012*	-0.010	0.002	0.002	0.003
	(0.000)	(0.000)	(0.001)	(0.007)	(0.007)	(0.007)	(0.002)	(0.002)	(0.002)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity controls	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Mean of FIR	0.054	0.054	0.054	0.052	0.052	0.052	0.046	0.047	0.046
Stand. dev. of FIR	0.864	0.863	0.863	0.862	0.861	0.861	0.874	0.873	0.874
Observations	16981	16969	16961	16715	16699	16679	813	815	814
Panel B: Excluding observations in the top 5% of the distribution of the EMBI spread									
	Cumulative Returns			Δ log(Bid-Ask Spread)			Δ log(FX Rate)		
	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$
FIR	0.071***	0.086***	0.112**	-1.259***	-0.387	-0.494	-0.412***	-0.447***	-0.474***
	(0.023)	(0.031)	(0.044)	(0.367)	(0.378)	(0.383)	(0.105)	(0.104)	(0.120)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maturity controls	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Mean of FIR	0.048	0.048	0.048	0.046	0.045	0.046	0.038	0.039	0.039
Stand. dev. of FIR	0.857	0.857	0.857	0.855	0.855	0.855	0.869	0.868	0.868
Observations	16547	16535	16527	16281	16265	16245	782	784	783

Note: This table reports the OLS coefficients of FIR on the change in the log of price, bid-ask spread and exchange rate during a period that starts 5 days before the rebalancing and ends 3, 5 and 7 days after it. Observations are at the bond-month level for the regressions on price and bid-ask spread, while they are at the country-month level in the regressions on the exchange rate. The main independent variable is the measure of Flows Implied by the Rebalancings, computed as $FIR_{ct} = \frac{A_t \lambda_{ct}}{MV_{ct-1}}$, where λ_{ct} is the reallocation implied by the rebalancings, A_t is total market value of funds' previous period assets under management benchmarked against the GBI-EM Global Diversified in the EPFR dataset, and MV_{ct-1} is the previous period market value of government debt securities denominated in local currency (i.e., the size of the market). In Panel A, the monthly country-specific Stripped EMBI Global Spread five days before the rebalancing date is used as an additional control. In Panel B the country-time observations with an EMBI Spread beyond the 95th percentile - corresponding to 396 basis points - of its distribution are excluded from the analysis. Maturity controls are dummies identifying bonds with maturities between 1 and 3 years, 3 and 5 years, 5 and 7 years, 7 to 10 years, and more than 10 years. Standard errors in parentheses are clustered at the country-by-years-to-maturity level in the regressions on price and spread. Robust standard errors are used in the exchange-rate regressions. *** p< 0.01, ** p< 0.05, and *p< 0.10.

Table 15: Heterogeneity Analysis

Heterogeneous effects of FIR on Price, Liquidity and Exchange Rate									
	Cumulative Returns			Δ log(Bid-Ask Spread)			Δ log(FX Rate)		
	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$	$[d+3]$	$[d+5]$	$[d+7]$
negative FIR × FIR	0.194**	0.140	0.210*	0.058	1.539	1.617	-0.787***	-0.895***	-0.944***
	(0.075)	(0.094)	(0.118)	(0.881)	(1.146)	(1.198)	(0.235)	(0.236)	(0.267)
positive FIR × FIR	0.157***	0.176***	0.199***	-1.373**	-0.609	-1.277**	-0.239**	-0.217	-0.170
	(0.046)	(0.062)	(0.075)	(0.586)	(0.569)	(0.503)	(0.121)	(0.139)	(0.151)
2009-2012 × FIR	0.039	0.015	0.033	-0.653	-0.638	-0.756	-0.392***	-0.327***	-0.357***
	(0.032)	(0.032)	(0.036)	(0.564)	(0.497)	(0.509)	(0.110)	(0.107)	(0.118)
2013-2016 × FIR	0.171***	0.170***	0.234***	-1.580**	0.045	0.376	-0.338*	-0.331*	-0.424*
	(0.034)	(0.044)	(0.068)	(0.679)	(0.653)	(0.654)	(0.192)	(0.186)	(0.227)
Long-Term × FIR	0.156***	0.167***	0.220***	-0.966**	-0.420	-0.520			
	(0.028)	(0.033)	(0.049)	(0.474)	(0.484)	(0.441)			
Medium-Term × FIR	0.069**	0.087	0.087	-1.350**	0.087	0.282			
	(0.031)	(0.057)	(0.081)	(0.667)	(0.622)	(0.734)			
Short-Term × FIR	0.025	0.031	0.034	-1.059**	-0.108	-0.123			
	(0.021)	(0.028)	(0.038)	(0.454)	(0.321)	(0.378)			
Bonds in GBI-EM × FIR	0.096***	0.151***	0.199***	-1.095**	0.007	0.203			
	(0.029)	(0.039)	(0.059)	(0.497)	(0.434)	(0.461)			
Bonds not in GBI-EM × FIR	0.083***	0.067**	0.078**	-1.026***	-0.327	-0.484			
	(0.028)	(0.030)	(0.039)	(0.353)	(0.352)	(0.371)			
Observations	19348	19334	19324	19078	19052	19021	875	877	876

Note: This table reports the OLS coefficients of FIR on the change in the log of price, bid-ask spread and exchange rate during a period that starts 5 days before the rebalancing and ends 3, 5 and 7 days after it. Observations are at the bond-month level for the regressions on price and bid-ask spread, while they are at the country-month level in the regressions on the exchange rate. All regressions include Time and Country FE, and regressions on price and spread also include the usual maturity controls. The main independent variable is the measure of Flows Implied by the Rebalancings, computed as $FIR_{ct} = \frac{A_t \lambda_{ct}}{MV_{ct-1}}$, where λ_{ct} is the reallocation implied by the rebalancings, A_t is the total value of funds' assets under management benchmarked against the GBI-EM Global Diversified, and MV_{ct-1} is the previous period market value of government debt securities denominated in local currency (i.e., the size of the market). Positive (negative) FIR is a dummy variable that equals 1 when FIR is greater (smaller) than 0. 2009-2012, 2013-2016 are dummy variables that equal 1 when the observation is from a date included in the corresponding time interval. Long-Term is a dummy that equals 1 when the bond has less than 5 years of life to maturity; Medium-Term is a dummy that equals 1 when the bond has 5 to 10 years of life to maturity. Long-Term equals 1 when the bond matures in more than 10 years. Bonds in GBI-EM and Bonds not in GBI-EM denote bonds that are included or not included in the index, respectively. Standard errors in parentheses are clustered at the country-by-years-to-maturity level in the regressions on price and spread. Robust standard errors are used in the exchange-rate regressions. *** p< 0.01, ** p< 0.05, and *p< 0.10.