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Winners and Losers from Sovereign Debt Inflows

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Winners and Losers from Sovereign Debt Inflows

Fernando Broner[♣], Alberto Martin[♦], Lorenzo Pandolfi[♥] and Tomas Williams[♠]

Abstract
We study the transmission of sovereign debt inflow shocks on domestic firms. We exploit episodes of large sovereign debt inflows in six emerging countries which are due to the announcements of these countries' inclusion in two major local currency sovereign debt indexes. We show that these episodes significantly reduce government bond yields and appreciate the domestic currency, and have heterogeneous spillovers on domestic firms. Financial and government-related firms experience positive abnormal returns in the days following the announcement episodes. Instead, companies operating in tradable industries exhibit negative abnormal returns after the episodes. We find that the former expansionary effect is more pronounced in countries where the government bond yields drop more in response to the announcement, while the latter recessionary effect is larger in countries where the domestic currency appreciates more. Also, we find that firms which rely more on external financing are positively affected by these events. Our findings shed novel light on the channels through which sovereign debt inflows affect firms in recipient countries. They suggest that these inflows can contribute to reshaping the domestic economy, by increasing the importance of the non-tradable sector at the expenses of the tradable one.

JEL Classification: F31, F32, F36, G15, G23

Keywords: Sovereign debt; capital inflows; exchange rate; government bond yields; stock prices; emerging markets

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1 Introduction

Financial globalization in emerging economies has increased remarkably over the last two decades. Loosening of capital controls and investors' search for yield in times of low interest rates contributed to an upsurge in the presence of foreign investors in emerging asset markets. Local currency sovereign debt markets, in particular, experienced an unprecedented rise in international investors' participation. Since the Global Financial Crisis, the share of emerging countries' local currency sovereign debt held by foreign investors more than doubled, going from about 10% in 2009 to approximately 25% in 2018 (BIS, 2019).

As foreign participation in domestic sovereign debt markets grows, so does the exposure of emerging economies to international investors' demand shocks. Yet, the channels through which sovereign debt inflow shocks affect countries, as well as their ultimate consequences for domestic firms are still debated. For instance, in standard small-open economy models with sovereign debt, interest and exchange rates are determined by no-arbitrage conditions, such as uncovered interest rate parity. This leaves little or no role for demand shocks from international investors to affect asset prices.[1] Recent studies argue that shocks in global investors' demand can instead play a key role in determining sovereign bond yields and exchange rates.[2] Most of these studies depart from the standard assumption of perfect financial markets by introducing frictions such as market segmentation and limited arbitrage. Under this view, sovereign debt inflow shocks can indeed decrease sovereign bond yields and lead to an appreciation of the domestic currency.[3]

If that is the case, sovereign debt inflow shocks can generate important and heterogeneous

[1] For instance, in small-open economy models with default risk, such as the one developed by Arellano (2008), the returns on sovereign bonds are determined by international interest rates and default probabilities only. In models of exchange rates determination based on uncovered interest parity, such as Obstfeld and Rogoff (1995), portfolio flows do not affect the equilibrium exchange rates, as noted in Gabaix and Maggiori (2015).

[2] Gabaix and Maggiori (2015) show theoretically that capital inflows can appreciate the currency of recipient countries as long as international financial intermediaries have limited risk-absorbing capacity. Du and Schreger (2016) argue that local currency sovereign debt markets are typically not internationally integrated, so that clientele demand shocks are important determinants of local currency sovereign bond prices.

[3] Consistent with this, Pandolfi and Williams (2019) provide empirical evidence that sovereign debt inflows increase both the value of the domestic currency and the price of local-currency denominated sovereign bonds. Relatedly, Hofmann et al. (2019) find that currency appreciations in emerging economics are often contemporaneous to reduction in government bond yields.

spillovers for domestic firms. For instance, by reducing government financing costs, such inflows might be beneficial to state-owned companies, and to firms that rely on government demand. Additionally, these inflows could benefit financial firms holding domestic government debt, which could in turn increase their supply of credit, thus benefiting financially constrained firms as well. Instead, by appreciating the domestic currency, sovereign debt inflows could erode the competitiveness of exporting firms, thus reducing their profits.

Assessing the channels through which sovereign debt inflow shocks can transmit to domestic firms is as important as challenging from an empirical point of view. The main challenge is represented by the endogeneity of capital inflows to the domestic economic activity of countries. Typically, sovereign debt inflows, sovereign bond yields, exchange rates, and firms' fundamentals are jointly determined. For instance, they can all be affected by positive technological or political shocks which reduce sovereign risk, improve fundamentals and, at the same time, attract foreign investors. As a result, any correlation between sovereign debt inflows and the profitability of domestic firms cannot be interpreted as evidence of a causal relationship.

The aim of this paper is to empirically assess the impact of sovereign debt inflow shocks on domestic firms, shedding light on the main transmission channels. To do so, we exploit episodes of large sovereign debt inflow shocks in six emerging countries (Colombia, Czech Republic, Mexico, Nigeria, Romania, and South Africa). Specifically, we take advantage of sudden and unanticipated announcements of country inclusions in two major sovereign debt indexes: the Citigroup World Government Bond Index (WGBI) and the J.P. Morgan Government Bond Index Emerging Markets (GBI-EM). These two indexes represent two of the most widely tracked benchmarks for international investors in local currency sovereign debt markets. Because of this, country inclusion announcements induce large rebalancings in the portfolios of international investors who, in order to replicate the composition of the index they follow, suddenly increase their demand for the newly included country's local currency government bonds and domestic currency.

These announcements provide an ideal setting to address our research question. First, they trigger large inflows which are specific to the sovereign debt markets of newly included countries:

as the two indexes are exclusively composed of sovereign bonds, their rebalancings only entail inflows to sovereign bond markets and not to equity nor corporate debt markets. Second, the dates in which index providers announce the inclusions are not anticipated by investors, nor they coincide with important news about the economy of included countries or with major policy changes. Thus, these feature allow us to adopt an event study methodology – which exploits the unexpected timing of the announcements – to assess the impact of sovereign debt inflows on the cost of government debt, the domestic currency, and the stock market returns of domestic firms.

Our results are consistent with the view of local currency asset markets being segmented and highly responsive to demand shocks. In the two days following the announcement episodes, 5-year local currency sovereign bond yields in all countries drop significantly. The 2-day reduction in yields is sizable, as it corresponds on average to 32.5 basis points. Exchange rates also move in the 2 days following the announcement: the domestic currency appreciates in all countries, the average appreciation being 1.1 percentage points.

Domestic firms' stock prices also respond significantly and heterogeneously to the announcements, consistent with the hypothesis of two main channels being at work: one that goes through the reduction in government bond yields, and another one which operates through the appreciation of the currency. Figure 1 provides a graphical representation of these results. The price of financial and government-related firms tend to increase sharply in the first trading day following the announcement episodes. Instead, the market value of firms operating in tradable sectors tend to decrease when inclusions are announced. Importantly, while prices of all these firms are on the same trend in the 7 trading days prior to the episodes, they clearly diverge in the dates of the announcements. Further, this divergence persists even 20 trading days after the announcements.

To assess the economic magnitude of these heterogeneous effects, we analyze how abnormal returns of firms evolve after each announcement episode in a series of regressions in which we can control for potential overlap between different firm categories and for firms' dependance on external financing. The results from this analysis show that the 2-day cumulative abnormal return (CAR) of financial firms is about 1 percentage point higher than that of tradable firms. The difference

ranges between 1.02 and 1.11 percentage points depending on the model used to compute CARs and is highly statistically significant in all models. Similarly, the difference between the 2-day CAR of government-related firms and tradable firms ranges between 1.07 and 1.15 percentage points and is statistically significant in all models. Additionally, consistent with the hypothesis of a potential pass-through from financial to financially-constrained firms, we find that CARs tend to be larger for firms operating in more financially constrained industries: a one one-standard deviation increase in the proxy for external financial dependance (computed following Rajan and Zingales (1998)) is associated with 0.20 to 0.22 percentage points higher 2-day CAR.

These stock market effects vary across countries depending on the size of the changes in sovereign bond yields and exchange rates around the announcement episodes. Countries which experience larger reductions in the 5-year local currency sovereign bond yield are the ones in which the positive effect on financial and government-related firms is more pronounced. Similarly, countries whose currency appreciates more are the ones where tradable firms are more negatively affected by the announcement. This evidence is consistent with the effects of sovereign debt inflow shocks on firms being mostly due to their first-order effects on government bond yields and exchange rates. This analysis allows us to give also a more quantitative interpretation to our results. We find that capital inflows to sovereign debt markets that lead to a 100 basis points reduction in the 5-year government bond yield, increase the CARs of financial and government related firms by 1.7 percentage points. In turn, inflows that lead to a 1% appreciation of the exchange rate, reduce the cumulative abnormal returns of firms in tradable sectors by 0.41 percentage points.

We also find that the cross-country heterogeneity in the 2-day changes in sovereign bond yields and exchange rates following each announcement is related to the magnitude of the inclusion-driven sovereign debt inflows in each country. We compute, for each country, the estimated inflows resulting from the inclusion into the corresponding index, and we show that: i) countries which are expected to receive larger inflows relative to the value of their domestic sovereign debt markets, are the ones where the 5-year government bond yield declines more; ii) countries which are expected to receive larger inflows relative to their GDP are the ones where the currency appreciates more.

Several additional results provide support to our empirical analysis. For instance, we show that the difference in the post-announcement CARs of financial and government-related firms *vs.* tradable firms is not driven by different pre-existing trends. Further, consistent with the fact that the announcements entail shocks which are specific to countries' sovereign debt markets, we show that sovereign debt inflows in these countries increase sharply in the announcement year, while private inflows do not. Finally, we show that the difference in CARs between financial and government-related firms *vs.* tradable firms remains large and significant when enlarging the post-announcement window up to 1 trading week.

Our findings show that shocks to foreign investor demand for emerging markets' local currency sovereign debt affect government bond yields and exchange rates, and have heterogenous spillovers on domestic firms. As such, our results are mostly related to three broad strands of the literature. First, our study is related to the growing literature that focuses on the effects of financial flows on government bond yields and exchange rates in segmented asset markets. Among those, for instance, Gabaix and Maggiori (2015) develops a model of exchange rate determination in which global investors' portfolio flows can lead to currency appreciations in recipient countries because of the limited capacity of financiers to absorb currency demand shocks. Evidence of the imperfect integration across local currency sovereign debt markets is provided in Du and Schreger (2016), which argues that an increased presence of foreign investors in local currency sovereign debt markets can have important implications for the pricing of local-currency denominated bonds.[4] Relatedly, Pandolfi and Williams (2019) presents evidence that sovereign debt inflows due to international investors' portfolio rebalancings can increase the price of local currency sovereign bonds and appreciate the domestic exchange rate. More broadly, our results are also related to the vast literature that focuses on the effects of demand shocks on sovereign bond yields in both emerging and developed economies.[5] Very related to ours is the study by Kolasa and Wesolowski (2020), which

[4] Other studies which focus on the interactions between international investors' participation and the pricing of local currency sovereign bonds are those by Borri and Shakhnov (2018), Hofmann et al. (2019), and Morelli et al. (2019). Relatedly, Warnock and Warnock (2009) and Kohn (2015) analyze the effects of foreign purchases of U.S. government debt on U.S. sovereign bond yields.

[5] Among others, Vayanos and Vila (2009), and Greenwood and Vayanos (2010) discuss the role of demand shocks from preferred-habitat investors in the determination of government bond yields. Recent studies focusing on the quantitative easing measures taken after the Global Financial Crisis also highlight that demand shocks and market

develops a two-country open economy model with segmented markets, and show that quantitative easing in developed countries can induce sovereign debt inflows in emerging countries which boost domestic demand but dampen international competitiveness. Our results are indeed consistent with these theoretical predictions.

Our results speak also to a second important strand of literature that analyzes how changes in government bond yields and exchange rates affect firms. Many of these studies focus on the stock market effects of increased sovereign default risk on domestic firms, and the consequent rise in sovereign bond yields on domestic firms.[6] Our findings are in line with the evidence in these studies even though we exploit events which reduce government financing costs, rather than increase them. They are consistent also with the theoretical predictions in Gennaioli et al. (2014) – according to which changes in sovereign default risk and sovereign bond yields can transmit to firms through the balance sheet of banks holding government bonds[7] – and Arellano et al. (2017) – according to which firms with larger external financing needs are more sensitive to changes in sovereign default risk. Additionally, our findings are related to numerous studies analyzing how exchange rate movements affect the terms of trade of a country and, therefore, domestic firms.[8]

Finally, this paper also relates to a vast international macroeconomics literature that focuses on the channels through which capital flows affect firms in the economy.[9] This literature mostly focus on FDI, bank flows, and equity portfolio flows. A study which is closely related to ours is Blanchard et al. (2017), which argues that, while equity inflows can be expansionary for emerging countries,

segmentation can be important determinants of government bond yields (Krishnamurthy and Vissing-Jorgensen, 2011; Krishnamurthy et al., 2017).

[6] For instance, Hébert and Schreger (2017) estimates the cost of sovereign default for listed Argentinian companies exploiting legal rulings against Argentina. Similarly, Andrade and Chhaochharia (2018) and Chari et al. (2018) analyze the costs of sovereign default (in Europe and Puerto Rico, respectively) and find that firms that are more closely related with the domestic government tend to be more sensitive to changes in the risk of default.

[7] Altavilla et al. (2017), and Bottero et al. (2020) also provide evidence which is consistent with this channel.

[8] Gabaix and Maggiori (2015) argue that a depreciation of the domestic currency improves a country's terms of trade, which in turn leads to an increase in employment in tradable industries. This view is questioned by other studies according to which exchange rate depreciations may not affect firms' competitiveness as export prices are sticky in a dominant currency (*i.e.*, the U.S. dollar) (Gopinath et al., 2020).

[9] See among others Schnabl (2012), Alfaro et al. (2014), Lane and McQuade (2014), Baskaya et al. (2017), and Calomiris et al. (2020). Related to this strand of literature are the studies on capital account liberalizations and their effects on firms' stock market value (see Chari and Henry (2004), Chari and Blair Henry (2008) and Larrain (2015) among others).

bond inflows should be in general contractionary. We show that, when taking into account the effect on government bond yields, sovereign debt inflow shocks can have both expansionary and contractionary effects, depending on the sensitivity of domestic firms to changes in sovereign bond yields and the exchange rate. Finally, our results are in line with the evidence in Benigno et al. (2015) of a systematic reallocation of labor and investment from tradable to non-tradable sectors, after episodes of large capital inflows.

The rest of the paper is structured as follows. Section 2 presents the empirical setting, decribing the testable implications that we bring to data, the announcement episodes, and the data used to conduct the analysis. Section 3 presents the first set of results on sovereign bond yields and exchange rates. Section 3 presents the main results on the stock market effects of sovereign debt inflow shocks on domestic firms. Section 5 discusses the potential determinants of the heterogenous cross-country reaction in response to the announcement episodes, and the medium-long term consequences of sovereign debt inflows on the economy of recipient countries. Finally, Section 6 concludes.

2 Empirical Setting

2.1 Theoretical Background and Testable Implications

In a frictionless small open economy model, shocks to foreigners' demand for local currency sovereign debt which are uncorrelated with changes in the fundamentals of the recipient country have typically no impact on the domestic economy. If financial markets are imperfect, sovereign debt inflow shocks can instead be transmitted to the domestic economy. In this section, we discuss two main channels through which sovereign debt inflow shocks can spillover to domestic firms, and derive the testable implications that we bring to the data.

The first potential transmission mechanism works through changes in government bond yields. When foreign investors increase their demand for domestic sovereign bonds in a given country, the price of these bonds can rise, thus lowering sovereign bonds yields. In turn, a sudden drop in

sovereign bond yields can potentially affect domestic firms. Financial institutions which hold local-currency denominated government debt should experience a positive balance sheet shock (Gennaioli et al., 2014) Similarly, by widening the investor base for local currency bonds, the inflows can reduce the pressure on domestic banks to purchase domestic debt – that is, they can alleviate moral suasion – and allow them to fund alternative and potentially more productive investments (Becker and Ivashina, 2018; Ongena et al., 2019; Williams, 2018). Hence, sovereign debt inflow shocks are likely to benefit financial firms and to mobilize resources which can be used to expand the supply of credit in the economy. As a result, firms which are *ex-ante* more financially constrained should also be positively affected by the inflows, as they could increase their leverage and profitability (Arellano et al., 2017). Further, by reducing government funding costs, sovereign inflows should in principle favor firms which are more closely connected to the domestic government, such as firms which are partially or totally owned by the government, or firms which rely more on government demand for their products (Chari et al., 2018). Thus, the first set of empirical implications which we test in this paper are: i) sovereign debt inflow shocks should positively affect domestic financial firms; ii) sovereign debt inflow shocks should positively affect firms facing greater financial constraints; iii) sovereign debt inflow shocks should positively affect government-related firms.

The second channel through which sovereign debt inflows can affect firms in the economy is the exchange rate. The increased demand for local-currency denominated bonds should be associated with an increased demand for domestic currency as well. If financial markets are unable to absorb this excess demand, the inflows should therefore lead to an appreciation of the domestic currency. This appreciation of the domestic currency can in turn affect the recipient country's terms of trade, eroding the competitive advantage of firms operating in tradable industries (Gabaix and Maggiori, 2015). This leads to the following testable implication: sovereign debt inflow shocks should negatively affect firms operating in tradable sectors.

To sum up, two forces can in principle be at work when large sovereign debt inflows enter a country: one is the expansionary effect of the reduction in sovereign bond yields, and the other one is the contractionary effect of the appreciation of the domestic currency. The former is likely to

benefit financial, government-related, and financially constrained firms. The latter is instead likely to harm firms operating in tradable industries. Hence, the overall effect of sovereign debt inflow shocks on the domestic economy can be either positive or negative, depending on the sensitivity of domestic firms to either of the two channels, and the sectoral composition of the economy. For instance, in countries which are less financially developed and whose economies rely more on exports, the contractionary effect can prevail. Conversely, in countries where the financial sector is large and the government is more involved in the economy, the expansionary effect can dominate. Finally, in the long-run, sovereign inflows might also reshape the economy of recipient countries, by re-allocating resources for the tradable to the non-tradable sectors (Benigno et al., 2015). While we do not explicitly test for this hypothesis in this paper – in which we focus on the short-term consequences of sovereign debt inflow shocks using stock market data – we devote Section 5.2 to a discussion of the potential long-term implications of our results.

2.2 Index Inclusions as Sovereign Debt Inflow Shocks

In order to analyze the consequences of sovereign debt inflows for domestic firms, we exploit episodes of country inclusion in two major global local currency sovereign debt indexes which are widely used as benchmarks by international investors: the Citigroup WGBI and the JP Morgan GBI-EM.[10] Specifically, the episodes we exploit are the inclusions in the GBI-EM of local-currency denominated sovereign bonds issued by the governments of Colombia, Czech Republic, Nigeria, and Romania, and the inclusions in the WGBI of Mexican and Southern African local-currency denominated sovereign bonds. These episodes were announced by index providers on specific dates which we retrieved from their websites.[11]

These inclusion events constitute an ideal laboratory to address our research question as they trigger massive sovereign debt inflows by foreign investors. International investors who are bench-

[10] For more details on how these indexes are created and their importance see Section A.1 in the Appendix.

[11] In particular, the first trading days after the announcement episodes are the 19^{th} of March 2014 (Colombia), the 22^{nd} of February 2017 (Czech Republic), 31^{st} of March 2010 (Mexico) the 16^{th} of August 2012 (Nigeria), the 16^{th} of January 2013 (Romania), and the 17^{th} of April 2012 (South Africa). More details about these two indexes are provided in Section A.2 in the Appendix.

marked against each index have indeed the incentive to rebalance their portfolios, purchasing sovereign bonds of the newly included country to replicate the index composition.[12] Even though the inclusion is usually implemented gradually by index providers over the 3 to 12 months subsequent to the announcement, more active investors have the incentive to start rebalancing their portfolios already at the announcement date in order to minimize the cost of the rebalancing. Figure 2 depicts the evolution in the average share of sovereign debt held by private foreign investors across 4 of the 6 countries in our sample around the corresponding announcement dates.[13] The figure clearly shows that, already in quarter of the announcement, the foreign investor base of these countries' sovereign debt increases sharply and deviates from the pre-announcement trend.

To grasp the magnitude of these inclusion-driven shocks, we follow Pandolfi and Williams (2019) and adapt their Flows Implied by Rebalancings (FIR) measure to our setting. We compute the estimated inflow shocks to the sovereign debt market of each country as the change in benchmark weight – calculated over the entire implementation period – multiplied by the assets under management of funds tracking their returns against the corresponding benchmark index, normalized by the market value of the securities that are going to be included in the index. The FIR measure captures the total inflows that would enter the country if all institutional investors were to precisely replicate the index composition. For the episodes in our sample the estimated FIR is 18% in Colombia, 25% in Czech Republic, 12% in Mexico, 31% in Nigeria, 30% in Romania, and 10% in South Africa. Hence, the estimated sovereign debt inflows due to the inclusion events are very large, especially if compared to the size of these countries' sovereign debt markets.

Additionally, these events share some features which are key for our identification strategy. First, the dates in which index providers announce the inclusions are unexpected. Of course, the inclusions themselves do not come as a surprise, as markets in most cases were expecting

[12] Evidence of international investors' tendency to replicate the composition of the indexes they track is abundant in the literature. See for instance Cremers et al. (2016) and Raddatz et al. (2017). Basak and Pavlova (2013) and Kashyap et al. (2018) show theoretically that asset managers whose performance are evaluated against a common benchmark have the incentive to increase their demand for securities included in the benchmark index. This can in turn affect the price of firms in the benchmark, which end up being subsidized by asset managers.

[13] The data used to produce this figure is from Arslanalp and Tsuda (2014), and do not include information of foreign private holdings of Czech and Nigerian debt.

these countries to get included into an emerging sovereign debt index at some point in the future. However, the exact timing of the inclusion in the index is not anticipated by investors.[14] Second, the announcements made by index providers are not contemporaneous to macroeconomic shocks nor to relevant policy changes which might have a direct effect on stock prices.[15] Because of this, the announcements are very unlikely to reveal information about changes in the countries' fundamentals. If that was the case, the inclusion episodes should be followed by massive inflows into the private sector as well.

The evidence in Figure 3 shows that this is not the case. In it, we depict the cross-country average public and private inflows in the three years before the announcement episode, and the average private and public inflows in the year of the inclusion event. In the figure, private inflows are made of portfolio debt, equity and foreign direct investment inflows, while public inflows are inflows to the sovereign debt market. The figure shows that the events trigger large inflows which are specific to the sovereign debt markets of newly included countries: public inflows nearly triple in the year of the inclusion episode, compared to average inflows in the three years before. Instead, private inflows remain almost unchanged. This evidence provides important support to our empirical strategy, as it further corroborates the hypothesis that the announcement episodes have a negligible information content and are not associated to other events which trigger also private inflows to the countries.[16]

2.3 Data

To conduct the empirical analysis, we combine data from several sources. We collect from Datastream the time-series of daily (end-of-day) stock prices of domestic public companies in Colombia,

[14] Consistent with the unexpected nature of the shock, in Section 3, we show that 5-year government bond yields in all newly included countries drop significantly on the exact dates in which inclusions are announced, which makes implausible that investors were anticipating the events and trading accordingly in the days prior to the announcement dates.

[15] Precisely because of this, the inclusion of Argentina in the GBI-EM is not part of our sample. For this country, the inclusion event coincides with the removal of capital controls, which mostly likely had a direct impact on the Argentinian equity market.

[16] Figure A1 in the Appendix reports the evolution of private and public inflows around the announcement year for each of the countries in our sample, separately.

Czech Republic, Mexico, Nigeria, Romania, and South Africa. We gather from Datastream also additional information about companies in these countries, including the International Securities Identification Number (ISIN), the industry classification, and a concise description of each firm's business activity. We combine this information with end-of-year balance sheet data from Worldscope.

We then collect the daily time series of local currency 5-year government bond yields from Bloomberg, and the daily time series of (end-of-day) exchange rates from Datastream. The exchange rate is computed as the amount of local currency needed to buy one U.S. dollar. To compute the abnormal returns of firms in our sample, we gather data about regional and global factors: from Datastream we obtain the daily time series of returns on the MSCI Emerging Markets Index and the MSCI World Index.

To categorize firms depending on their exposure to sovereign bond yields and exchange rates, we supplement these data with additional firm-specific information. In particular, to identify firms which are closely related to the domestic government, we proceed in two steps. First, from Thomson Reuters Securities Data Company (SDC) Platinum we retrieve the list of firms whose major shareholder is the state. Second, we perform a search in the business description of firms and look for the words *government* or *public*. Hence, we construct the indicator variable $\mathbb{1}(Govt)$, which equals one if a company is partially owned by the domestic government or its business activity is related to the domestic government. To identify financial firms, we follow the industry classification in Datastream. Specifically, we construct the indicator variable $\mathbb{1}(Financial)$ which equals to 1 if a firm is classified as a bank, a financial firm, an investment firm, or a life insurance company. We use the industry classification in Datastream also to identify firms operating in tradable sectors. In particular, we construct the indicator variable $\mathbb{1}(Tradable)$ which takes value 1 if a firm operates in a tradable industry and 0 otherwise, following the classification scheme in Mian and Sufi (2014). Further, we use the balance sheet information from Worldscope to measure firms' dependance on external financing. We follow Rajan and Zingales (1998) and compute, for each firm, the ratio between capital expenditures net of cash flows from operations, and capital expenditures. We then

compute the median of this measure in each industry and use it as our proxy for firms' external financial dependance (which we denote as EFD).

To identify firms which have access to corporate debt markets, we retrieve from Thomson Reuters SDC Platinum the list of companies which issue corporate bonds or have syndicated loans in our sample of countries. We match firms in this list to firms in our database using the SEDOL and generate the dummy variable $\mathbb{1}(DebtIssuer)$ which equals 1 in case of a successful merge. Finally, we merge the list of firms in our sample with the list of companies which are included in the MSCI Emerging Markets index, that we get from the MSCI website. Since stocks of these companies are more likely to be held by foreigners, we use this information to create the indicator variable $\mathbb{1}(ForOwnership)$, which is equal to 1 if a company is included in this equity index in the quarter preceding the shock and 0 otherwise.

Table 1 reports summary statistics about firms in our sample. The table reports the share of financial firms, government-related firms, and tradable firms (on the announcement date) in the entire sample and in each country, separately. About one third of firms in the sample operate in tradable sectors, while 14% of firms are financial firms and 9% of them are classified as government-related. The country where the financial sector is most prominent is Colombia, where 36% of firms in our sample are financial firms. Czech Republic and Romania, instead, feature the largest share of government-related firms and tradable firms, respectively (36% and 54%). In all countries, there are firms which are included in the MSCI Emerging Markets index, and firms issuing corporate bonds or syndicated loans. Finally, the least represented country in our sample is Czech Republic, with 14 companies, while the most represented one is South Africa, with 361 companies. In total, our sample is composed of 909 companies.[17]

[17] In our sample, we consider each observation as a distinct company. Actually, 28 companies appear twice in our dataset, as each of them issue two distinct securities. In the Appendix, we show that reducing each of these companies to a single observation does not change the results of our analysis.

3 Sovereign Debt Inflows, Exchange Rates, and Sovereign Bond Yields

According to our hypotheses, the two key channels through which sovereign debt inflows can transmit to domestic firms are the sovereign bond yield and the exchange rate. In this section, we therefore assess the response of these two variables to the country inclusion announcement episodes in our sample.

First, in Figure 4, we depict the daily time series of each country's local currency 5-year government bond yield in the 2 years around the announcement episode. The figure clearly shows that government yields drop sharply when index providers announce the inclusion of countries in their benchmark indexes. Further, the figure shows that there are no common pre-announcement trends in government bond yields across countries, thus supporting our identifying assumption that announcement dates were unexpected.

Figure 5 reports the daily time series of each country's exchange rate in the 2 years around the announcement episodes. The exchange rate in each country is the amount of domestic currency needed to buy one US dollar and is normalized to its value in the last trading day before the announcement. In all countries, the exchange rate drops on the announcement date, which means that the domestic currency appreciates in response to the inclusion announcements. The appreciation is not as sharp as the drop in the yields, which can be explained by the fact that exchange rates are much more volatile than government bond yields, even in calm periods. What is important to note is that, as for the sovereign bond yields, there is not a pre-announcement trend which is common to all countries.

To assess the economic magnitude of these two effects, we compare, for each country, the 2-day changes in the sovereign bond yield and the exchange rate after the announcement with the average 2-day changes in the 2 years around the announcement. Figures 6 and 7 provide a graphical representation of this comparison. In all countries, the 2-day change in both the government bond

yield and the exchange rate after the announcement is larger (in absolute value) than the average 2-day change. In most cases, the 2-day change after the announcement lies in the very left tail of the distribution of 2-day changes, thus representing an outlier observation. In Table 2, we report the size of these post-announcement changes. In the two days after the announcement episode, the local currency 5-year government bond yield decreases, on average, by 32.5 basis points. The country experiencing the largest drop in the yield is Romania, where the yield decreases by almost 90 basis points. Conversely, the country experiencing the lowest reduction in the yield is Mexico (4.8 basis points). In all countries, the 2-day changes after the announcement episodes are statistically different from the average 2-day change in the yield, which is close to 0. Similarly, the average appreciation across countries is 1.09 percentage points. The lowest appreciation is the one that occurs in Nigeria (0.057 percentage points), while the largest ones are observed in Colombia and Romania (2 percentage points). In all countries, the 2-day appreciation following the announcement date is statistically different from the average 2-day change in the 2 years around the announcement.

4 The Effects of Sovereign Debt Inflows on Domestic Firms: an Event Study

To measure the effect of sovereign debt inflow shocks on domestic firms, we conduct a multiple event study around the dates in which country inclusions are announced by index providers. Specifically, we calculate the cumulative abnormal returns of domestic listed firms in the two trading days following the announcements – which should reflect changes in firms' profitability and future prospects – and use them to test the empirical predictions developed in Section 2.1.

We compute abnormal returns for listed domestic firms in four ways. First, we compute, for each firm, daily abnormal returns as the difference between the return in each trading day and the average daily return in the year preceding the announcement.[18] We then cumulate such abnormal

[18] In particular, the average pre-announcement daily return is calculated over a 252-trading-day window which ends 10 days before each country's announcement date.

returns on the first two trading days after the announcements and define the resulting CAR as CAR_i^{Demeaned}. Second, we compute each firms' daily abnormal returns as the difference between the actual returns and the returns predicted by a 1-factor model where the only risk factor is the daily return of the MSCI EM Index.[19] We label the 2-day CAR thus calculated as $CAR_i^{\text{1-Factor}}$.[20] Third, we calculate daily abnormal returns as the difference between the actual returns and the returns predicted by a 2-factor model which, on top of the regional factor, includes also a global factor, *i.e.*, the daily return of the MSCI World Index. Cumulating these abnormal returns on the days following the announcement we get the $CAR_i^{\text{2-Factor}}$. Fourth, we calculate daily abnormal returns as the difference between the actual returns and the returns predicted by a 5-factor model which adds to the regional and global factors, a small minus big (SMB), high minus low (HML), and momentum (WML) factor, which we use to obtain to calculate the $CAR_i^{\text{5-Factor}}$.[21] In our baseline specification we use 2-day CARs calculated with these four alternative models as our main dependent variables.[22]

4.1 Overall Effect of Sovereign Debt Inflow Shocks

We start our empirical analysis by looking at the overall effect of the announcements and the associated sovereign debt inflow shocks on domestic firms. To this end, we calculate the average CAR of all firms in our sample in the two days following the announcement dates as:

$$\overline{CAR}^j = \frac{\sum_i^I CAR_i^j}{I} \tag{1}$$

[19] We do not use domestic stock market indexes to compute predicted returns since, in some of the countries in our sample, these indexes are made of few large firms (often financial firms), whose returns have a major impact on the performance of the index. Thus, the returns of the domestic index would absorb a large part of the variation that we want to exploit.

[20] Factor loadings of the 1-factor model – as well as those of the 2-factor and 5-factor models – are estimated by running a series of firm-specific regressions over a time window of 252 trading days which ends 10 trading days before the announcement date in each country.

[21] To compute the SMB, HML, and WML factors we follow Cakici et al. (2013). These three factors are computed using stock market data about all countries in our sample.

[22] In our baseline specification we use 2-day CARs, as most of the event studies which exploit stock market data (see for instance Alfaro et al. (2017)). However, in the Appendix (Figure A2), we show that results are robust to using 3-day, 4-day, and 5-day CARs. Also, in our baseline specification, we exclude observation in the top and bottom percentiles of the country-specific distribution of 2-day CARs, to control for outlier observations.

where I the total number of observations and CAR_i^j is the 2-day CAR of firm i calculated using model j.

Table 3, Panel A, reports the average post-announcement CAR of domestic listed firms in our sample. On average, the post-announcement 2-day CARs are positive as they range between 0.11 and 0.22 percentage points, depending on the way abnormal returns are calculated. However, except for those computed with the first model (the demeaned returns), the average 2-day CAR is not statistically distinguishable from 0. Panel B of Table 3 reports, instead, the average CAR before the announcement date, calculated as the average CAR in the interval $[t-3, t-2]$, where t is the first trading day after the announcement. In this case, the average CAR is very close to 0, especially if computed using the 1-, 2-, and 5-factor models. In columns 2 to 4, the average pre-announcement CAR is below 0.05 percentage points. This evidence lends important support to our empirical strategy, as it corroborates the hypothesis that announcement dates are not anticipated by investors and shows that, in the days prior to the events, the factor models used to predict returns deliver a good approximation of the actual returns.

The evidence in Table 3 thus illustrate two important results. First, prior to the announcements, firms' abnormal returns are on average very close to 0. Second, in the two days following the announcements, the average CAR turns positive, but is relatively small in magnitude and not statistically distinguishable from 0. This evidence seems to suggest that sovereign debt inflow shocks have little or no overall impact on domestic firms. However, this result actually masks important heterogeneities across firms, as we show in the next section.

4.2 Heterogeneous Effects of Sovereign Debt Inflow Shocks

As discussed in Section 2.1, sovereign debt inflows can have heterogenous effects on domestic firms depending on their sensitivity to changes in sovereign bond yields and exchange rates. In particular, financial and government-related firms can benefit from the inflows, while firms operating in tradable sectors can be hampered by the inflows. Hence, the small and not significant overall

effect of the announcement episodes on domestic firms might actually be the result of two forces going in opposite directions.

Figure 8 provides evidence that this is indeed the case for firms in our sample. In the figure, we plot the abnormal returns of firms – cumulated on an interval that starts 3 trading days before the announcement date in each country and ends 5 days after it – for all firms in our sample (left panel), and for financial and government-related firms *vs.* tradable firms (right panel). While the average aggregate CAR is close to 0 over the entire interval of time, the average CAR of financial and government-related firms, and that of tradable firms are not. The average CARs of these two groups of firms are both close to 0 in the days before the announcement, but then sharply diverge on the announcement date. In particular, while the average CAR of financial and government-related firms turns positive in the post-announcement period, that of tradable firms becomes negative.

Table 4 reports the average post-announcement 2-day CAR of financial firms, government-related firms, and tradable firms, separately. In the 2 days after the announcement, financial firms experience positive CARs which are on average equal to 0.65 percentage points (and statistically different from 0 in all specifications). Similarly, government-related firms exhibit positive CARs of approximately 0.8-0.9 percentage points (statistically different from 0 under all models). Conversely, tradable firms exhibit negative CARs in the two days following the announcement, even though the coefficients are below the conventional significance level.

Estimates in Table 4, however, do not take into account the potential overlap between the different groups of firms. For instance, some tradable firms might also be government-related. Additionally, they do not take into account the heterogeneity of firms in terms of external financial needs. To take this into account, we therefore estimate the following equation:

$$CAR_i = \alpha + \beta_1 \mathbb{1}(Financial)_i + \beta_2 \mathbb{1}(Govt)_i + \beta_3 \mathbb{1}(Tradable)_i + \beta_4 EFD_i + \varepsilon_i \qquad (2)$$

where: $\mathbb{1}(Financial)$ is an indicator variable which takes value 1 for financial firms, and 0 otherwise; $\mathbb{1}(Govt)$ is an indicator variable which takes value 1 for firms which are connected to the domestic

government; $\mathbb{1}(Tradable)$ is an indicator variable which takes value 1 for firms operating in tradable industries, and 0 otherwise; EFD is a measure of firms' external financial dependance (computed at the industry level following Rajan and Zingales (1998)); and ε is the error term. This specification allows us to measure the differential impact of sovereign debt inflows on each of the above-defined categories of firms, and to test whether the inflows tend to benefit more financially constrained firms.

Results are reported in Table 5 and are consistent with the hypothesized transmission channels. Financial and government-related firms experience larger than average CARs in the two days following the announcement episode. The estimated coefficients of $\mathbb{1}(Financial)$ ranges between 0.53 and 0.61, and is statistically significant in all models. Similarly, the coefficient of $\mathbb{1}(Govt)$ ranges between 0.6 and 0.7, and is always statistically different from 0. Instead, tradable firms experience significantly lower than average CARs in the 2 days following the announcement. The estimated coefficients of $\mathbb{1}(Tradable)$ ranges between -0.45 and -0.51, and is statistically significant in all specifications. Table 5 also reports the difference between the estimated coefficients on financial firms and tradable firms, as well as the difference between the coefficient on government-related and tradable firms. In all models, these differences are statistically significant at the 99% confidence level and quantitatively close to 1 percentage point.

Consistent with the hypothesis that more financially constrained firms also benefit from the shocks, we find that the coefficient of EFD is positive and significant under all specifications. Firms operating in industries which depend more on external financing experience larger CARs in the aftermath of the announcements. Quantitatively, a one-standard deviation increase in the proxy for external financial dependence increases the 2-day CAR by approximately 0.22 percentage points.[23]

[23] In Table A1 in the Appendix, we show that our main results are robust to: i) excluding *illiquid* stocks, that is stocks whose price never change in the 20 trading days around the announcement date; ii) reducing the weight of firms with more than one stock, by considering for each of these companies only the average 2-day CAR of the company's traded securities; iii) excluding Czech Republic and Nigeria from our sample. Czech Republic is indeed the least represented country in our sample, while Nigeria is the only country in our sample whose announcement date is in part ambiguous, as it is unclear whether the news were released on the 14th or on the 15th of August 2012 (as we explain in greater detail in Section A.2 in the Appendix). In all cases, our results are quantitatively and qualitatively very close to those in Table 5. Further, in Table A2 we show that our results are robust to

We then re-estimate the coefficients in Equation 2 controlling for other firm-specific observables. In particular, we use as additional controls: i) the indicator variable $\mathbb{1}(IssueDebt)$ which takes value 1 for companies that have access to the corporate debt market (either through corporate bonds or syndicated loans); ii) the indicator variable $\mathbb{1}(ForOwnership)$, which takes value 1 if a stock is also included in the MSCI Emerging Markets Index, and is therefore more likely held by foreigners; iii) size, measured by the logarithm of total assets. In principle, some of these controls might be related to the effect of the announcement on CARs. For instance, firms issuing bonds could benefit from reductions in government bond yields, as highlighted in Dittmar (2008). At the same time, these firms are more likely to be the least financially constrained (within each industry), so that the overall effect is a priori ambiguous.

Table 6 reports the results from this analysis. None of the additional controls have coefficients which are statistically significant. More importantly, including them does not alter our main results, as our main coefficients of interest remain quantitatively close to those in Table 5. When controlling for the log of assets, some coefficient fall below the conventional significance threshold, but this is most likely because balance sheet data are not available for almost 200 firms and therefore controlling for assets reduces sample size and power. Nevertheless, the difference between the coefficients on financial and tradable firms, as well as the difference between the coefficients on government-related and tradable firms, remain large and highly statistically significant under all specifications.

4.3 Exploiting Cross-Country Variation

Our results so far show that financial and government-related firms tend to have larger than average CARs after the announcement episodes, while firms operating in tradable industries exhibit lower than average CARs. These findings do not exploit the cross-country variation in the changes

controlling for country fixed effects. Finally, in Table A3, Panel A, we replicate our estimates in the days prior to the announcement, using as dependent variable the CARs in the interval $[t-3, t-2]$, where t is the first trading day after the announcement. None of the 16 coefficients of interest is statistically significant at the 95% confidence level, and only one is statistically different from 0 at the 90% confidence level.

in sovereign bond yields and exchange rates after the announcement dates (described in Section 3). Such heterogeneity is potentially important, as it can be exploited to further validate the hypotheses developed in Section 2.1. According to our theoretical background, sovereign debt inflow shocks should affect domestic firms through an expansionary sovereign bond yield channel and a recessionary exchange rate channel. If that is the case, the stock market effects should be heterogenous across countries depending on the impact that the announcement episodes have on sovereign bond yields and the exchange rate. In particular, we should find that: i) the positive effect of the shock on financial and government-related firms is more pronounced in countries with larger reductions in sovereign bond yields; and ii) the negative effect on tradable firms is stronger in countries where the domestic currency appreciates more. Here, we present additional evidence which is consistent with these two hypotheses.

We first estimate six separate regressions, one for each country, of the form: $CAR_i = \alpha + \beta_1 \mathbb{1}(Govt\&Fin)_i + \beta_2 \mathbb{1}(Tradable)_i + \beta_3 EFD_i + \varepsilon_i$, where $\mathbb{1}(Govt\&Fin)$ is an indicator variable which takes value 1 for financial and government-related firms. Then, in Figure 9, we plot the estimated β_1 coefficient as a function of the country-specific 2-day change in the 5-year local currency sovereign bond yield (left panel) and the estimated β_2 as a function of the country-specific 2-day currency appreciation. The figure shows that the magnitude of these changes are related with the stock market impact of the announcements. In particular, financial and government-related firms located in countries where the yield drops more in response to the announcement, experience larger CARs than firms located in countries where the 2-day reduction in the yield is smaller. Moreover, tradable firms in countries that experience larger domestic currency appreciations have 2-day post-announcement CARs that are more negative than those of tradable firms in countries with milder appreciations.[24]

To quantitatively assess the relationship between the shocks to government bond yields and exchange rates, and the CARs of firms around the announcements, we estimate the following

[24] In Section 5, we discuss some potential determinants of the differential effects of the inclusion announcements on sovereign bond yields and exchange rates across countries.

equation:

$$CAR_i = \theta_c + \beta_1 \mathbb{1}(Govt\&Fin)_i \times \Delta Yield_c + \beta_2 \mathbb{1}(Tradable)_i \times \%\Delta ExchRate_c + \beta_3 EFD_i + \varepsilon_i \quad (3)$$

where: θ_c are country fixed effects, and $\mathbb{1}(Govt\&Fin)$ and $\mathbb{1}(Tradable)$ are interacted, respectively, with the country-specific 2-day change in the 5-year local currency sovereign bond yield ($\Delta Yield$) and the 2-day currency appreciation ($\%\Delta ExchRate$). Both shocks are in absolute values: larger values correspond to larger reductions in sovereign bond yields and larger appreciations. Under this specification, the β_1 coefficient should capture the cross-country relationship between the reduction in the sovereign bond yield and the CARs of financial and government-related firms. Similarly, the β_2 coefficient captures the relationship between the appreciation of the domestic currency and the CARs of tradable firms.

Table 7 reports the estimated coefficient from Equation (3). The coefficient of both interaction terms are statistically significant and consistent with the above-stated hypotheses. This analysis allows us also to provide a more quantitative interpretation to our results: according to the estimates in Table 7, a sovereign debt inflow shock which reduces the 5-year government bond yield by 100 basis points increases the CARs of financial and government-related firms by 1.7 percentage points. Conversely, a sovereign debt inflow shocks which leads to a 1% appreciation of the domestic currency reduces the CARs of tradable firms by 0.41 percentage points.[25]

[25] In Table A3, Panel B, we present the results of a placebo test where we re-estimate Equation (3) using as dependent variable the CARs in the interval $[t-3, t-2]$, where t is the first trading day after the announcement. None of the coefficients is statistically distinguishable from 0, thus further corroborating that the cross-country relationships estimated in Table 7 emerge only after the announcement episodes.

5 Discussion

5.1 Estimated Inflows and Heterogeneity of Shocks

The evidence in Section 4.3 shows that the effects of the announcement episodes on the stock prices of domestic firms are heterogeneous depending on the size of the 2-day changes in sovereign bond yields and exchange rates in the aftermath of the announcements. In this section, we test whether such heterogeneity is related to the magnitude of the inflows which are expected to enter each of the countries in our sample as a result of the index inclusion. First, we compute the estimated flows, in U.S. dollars, entering each country as the change in benchmark weight – over the entire implementation period – multiplied by the assets under management of funds benchmarked against the corresponding index. We normalize the inflows first with respect to the total value, in U.S. dollars, of the local currency sovereign bonds which are going to be included in the index, and then with respect to GDP (in U.S. dollars). The first normalized inflows proxies for the magnitude of the inclusion-driven inflow shocks relative to the size of the sovereign debt market of each country. The hypothesis is that, in countries whose sovereign debt markets are *smaller*, the impact of an inflow shock on sovereign bond prices and yields could be larger than the impact of the same inflow shocks in countries with *larger* sovereign debt markets. The second measure, that is, the estimated inflows relative to GDP, measures the magnitude of the estimated inclusion-driven inflows relative to the overall size of the country. We use this second measure to test for the hypothesis that countries experiencing a larger sovereign debt inflow shock relative to the overall size of the country are the ones where the domestic currency appreciates more.

Figure 10 presents the results from this analysis. Panel A shows the relationship, across countries, between the 2-day change in the 5-year local currency sovereign bond yield after the announcement and the estimated inflows relative to the size of the sovereign debt market. Panel B depicts the relationship between the 2-day percentage appreciation of the domestic currency and the estimated inflows relative to the GDP. In both cases, we see that sovereign bond yields and exchange rates tend to respond more in countries experiencing larger relative inflow shocks. The only country

which appears to be in outlier in both figures is Czech Republic. However, this can be explained by two things: first, Czech Republic is the only country that is being included in the GBI-EM, but at the same time is being excluded from another index, the GBI-DM (for developed markets). J.P. Morgan does not provide data on the amount of assets benchmarked against the GBI-DM, so we cannot estimate the potential outflows due to this exclusion. As a result, the estimated net inflows in Czech Republic are smaller than those we estimate; second, the 5-year sovereign bond yield is Czech Republic is already close to the zero lower bound on the announcement date, which plausibly reduces the scope for inflow shocks to reduce the yield.[26]

In light of this evidence, the cross-country heterogeneity in the impact of the announcement episodes on sovereign bond yields and exchange rates can be explained, at least in part, by the heterogeneous size of the inflow shocks associated to the country inclusion events.

5.2 The Long-Term Consequences of Sovereign Debt Inflows

In this study, we assess the impact of sovereign debt inflow shocks on firms by looking at the evolution of stock market prices in the days immediately following six major sovereign debt inflow shocks in emerging countries. Our identification relies on the implicit assumption that stock market prices efficiently respond to changes in the profitability and, more in general, in the future prospects of firms operating in countries receiving such inflows. Yet, one might be interested in testing whether the heterogeneous stock market effects documented in this paper effectively translate into a heterogenous evolution of firms' real variables in the long run. Addressing this issue requires expanding the sample period much beyond the country inclusion announcement episodes, making estimates more vulnerable to some identification concerns.

Despite these potential concerns, in Pandolfi and Williams (2020) we provide suggestive evidence about the long-term effects of the country inclusion events, which are consistent with the

[26] In fact one news article suggests that estimated inflows at the time of the announcement were between 3 and 6 billions U.S. dollars. Our estimated inflows are 6.8 billion dollars, much larger than the average estimated net inflows. Source: Pio Online. https://www.pionline.com/article/20170428/ONLINE/170429837/j-p-morgan-drops-czech-republic-bonds-to-emerging-markets-indexes-inflows-expected (Retrieved on May 6, 2020).

results of the present study. By looking at the evolution of domestic firms' real variables in the years around the inclusion episodes exploited in this study, in Pandolfi and Williams (2020) we show that: i) financial and government-related firms grow significantly more, in terms of income and number of employees, than firms operating in tradable industries in the 3 years following the inclusion events; ii) financial and government-related firms tend to pay higher dividends than firms in tradable industries after the inclusions; iii) more financially constrained firms also exhibit higher profitability and pay more dividends in the post-inclusion period. The evidence in Pandolfi and Williams (2020) therefore suggests that the heterogeneous stock market effects on domestic firms of sovereign debt inflow shocks are the result of real changes in domestic firms' future prospects. An important implication of these results is that sovereign debt inflows can have important distributional effects which reshape emerging economies, increasing the importance of the non-tradable sector and reducing the country's dependency on export-intensive industries.

6 Conclusions

This paper studies the effects of large sovereign debt inflows on domestic firms. To this end, we exploit six announcements of country inclusion into two major local currency sovereign debt market indexes. These announcements are not anticipated by investors and trigger large inflows from international investors wishing to replicate the index compositions.

Our results show that sovereign debt inflows significantly reduce the local currency sovereign bond yields and lead to an appreciation of the domestic currency. In turn, these first-order effects transmit heterogeneously to domestic firms: financial and government-related firms exhibit larger CARs in the 2 days following country inclusion announcements; instead, firms operating in tradable industries experience lower CARs. The former effect is more pronounced in countries where the sovereign debt inflow shocks reduce more the 5-year government bond yields, whilst the latter effect is larger in countries where the shocks produce larger currency appreciations.

Our findings shed novel light on the channels through which capital inflows to sovereign debt

markets affect firms in the economy. They highlight that sovereign debt inflows have both an expansionary effect – that goes through a reduction in government borrowing costs – and a contractionary effect – coming from the appreciation of the domestic currency. As a result, the overall effect of sovereign debt inflows depends on the sectoral composition of the economy of recipient countries. Finally, our results suggest that sovereign debt inflows can contribute to reshape emerging economies, favoring the growth of the financial sector and reducing the countries' dependency on export-intensive industries.

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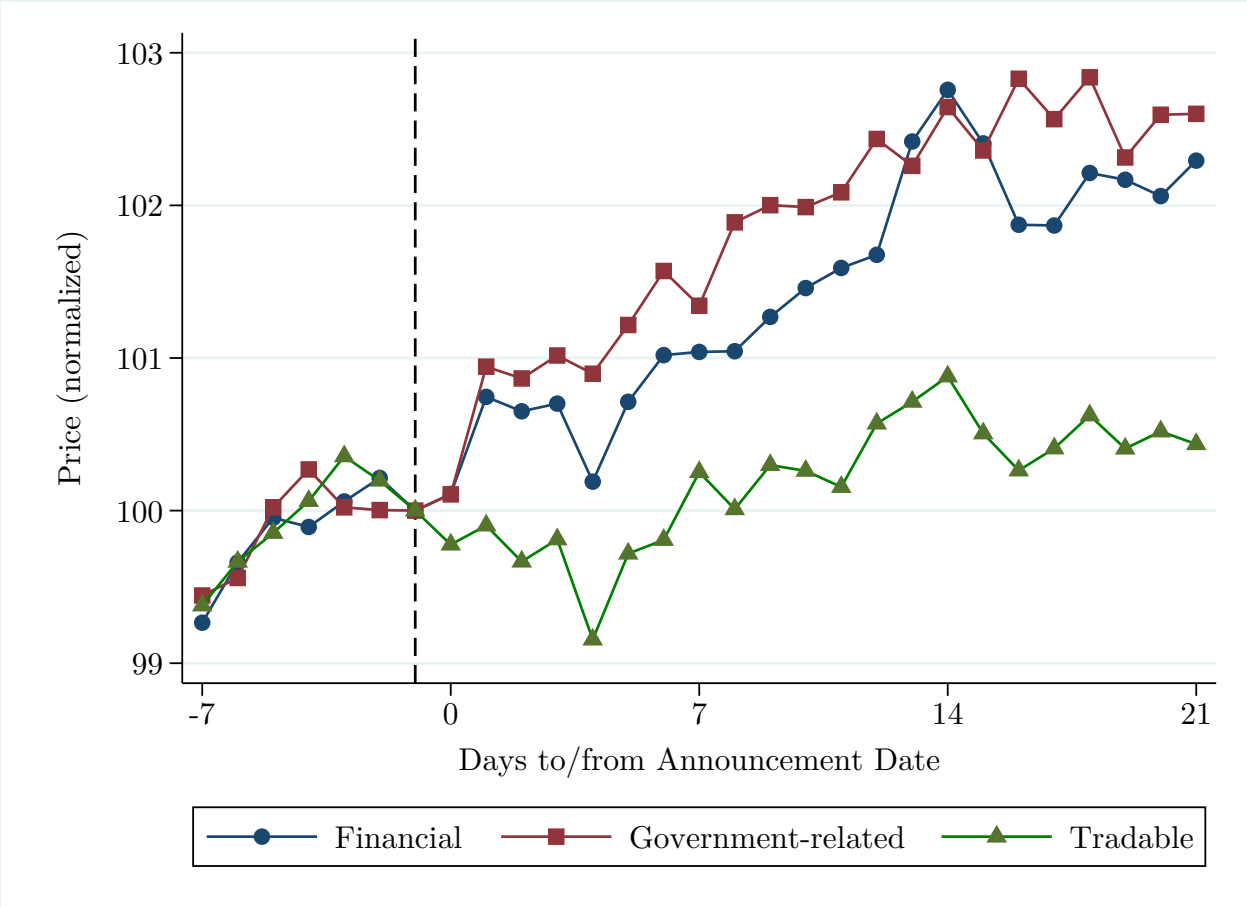
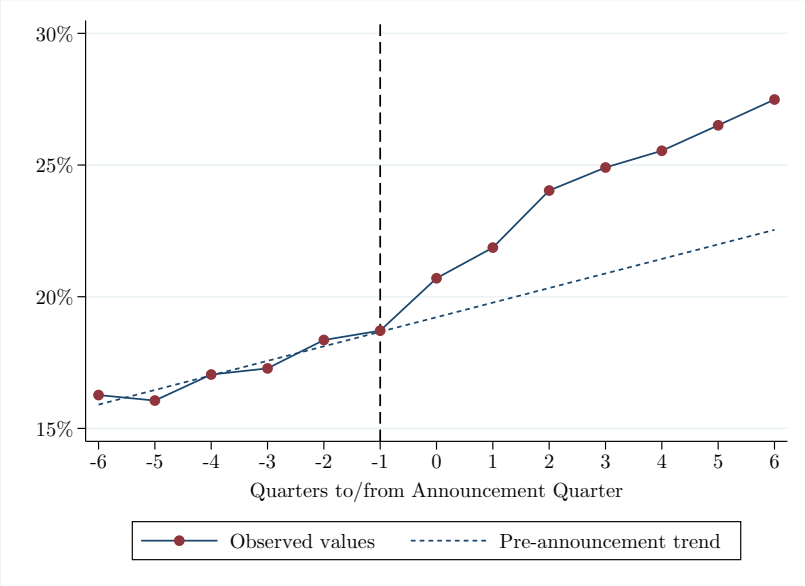
Figure 1: Stock Prices around Events

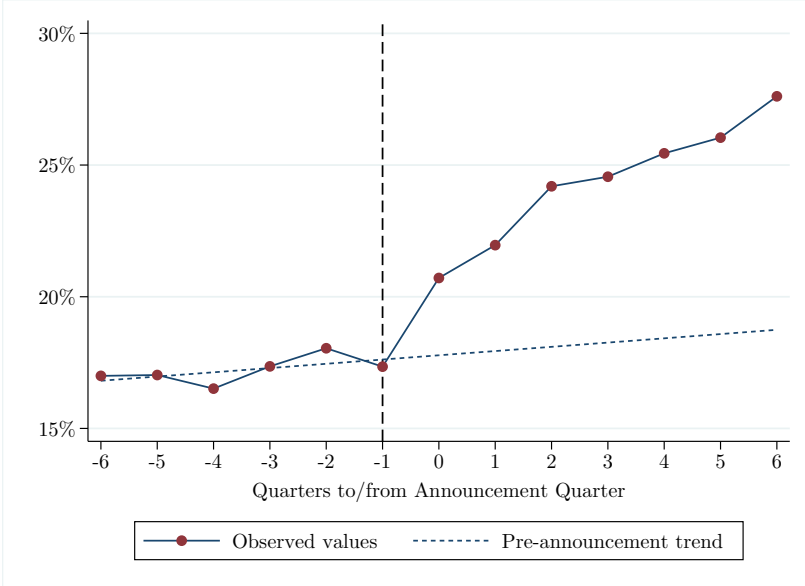


Note: This figure depicts the evolution of the stock prices of financial firms, government-related firms, and firms operating in tradable sectors, separately, over a time window which starts 7 days before the announcement of each country's inclusion in the corresponding index, and ends 14 days after it. Stock prices are normalized to their values in the last trading day before each announcement episode, indicated by a vertical dashed line. Observations in the top and the bottom percentile of the country-by-date distribution of stock prices are excluded.

Figure 2: Foreign Share of Sovereign Debt around Events



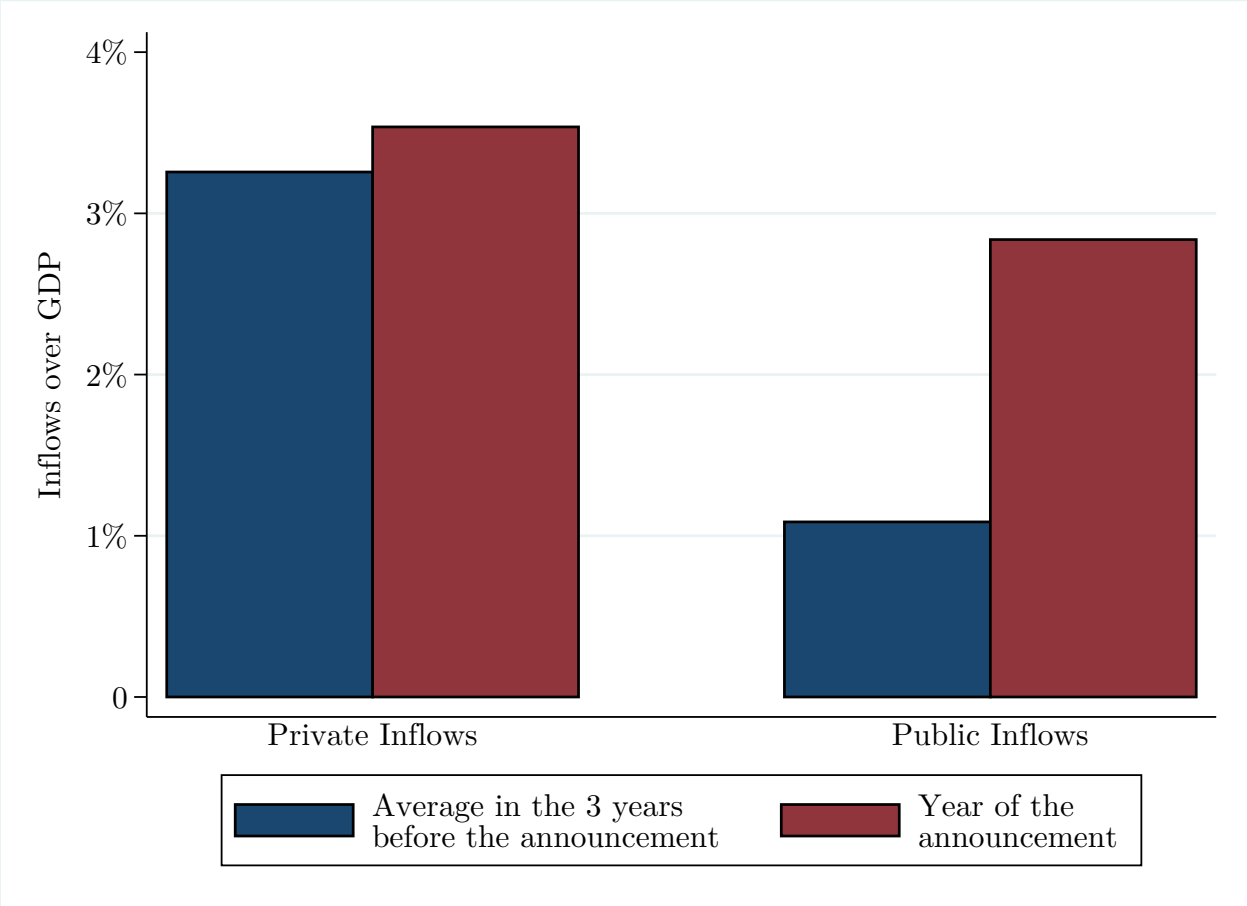
Average Private Foreign Share of Government Debt



Median Private Foreign Share of Government Debt

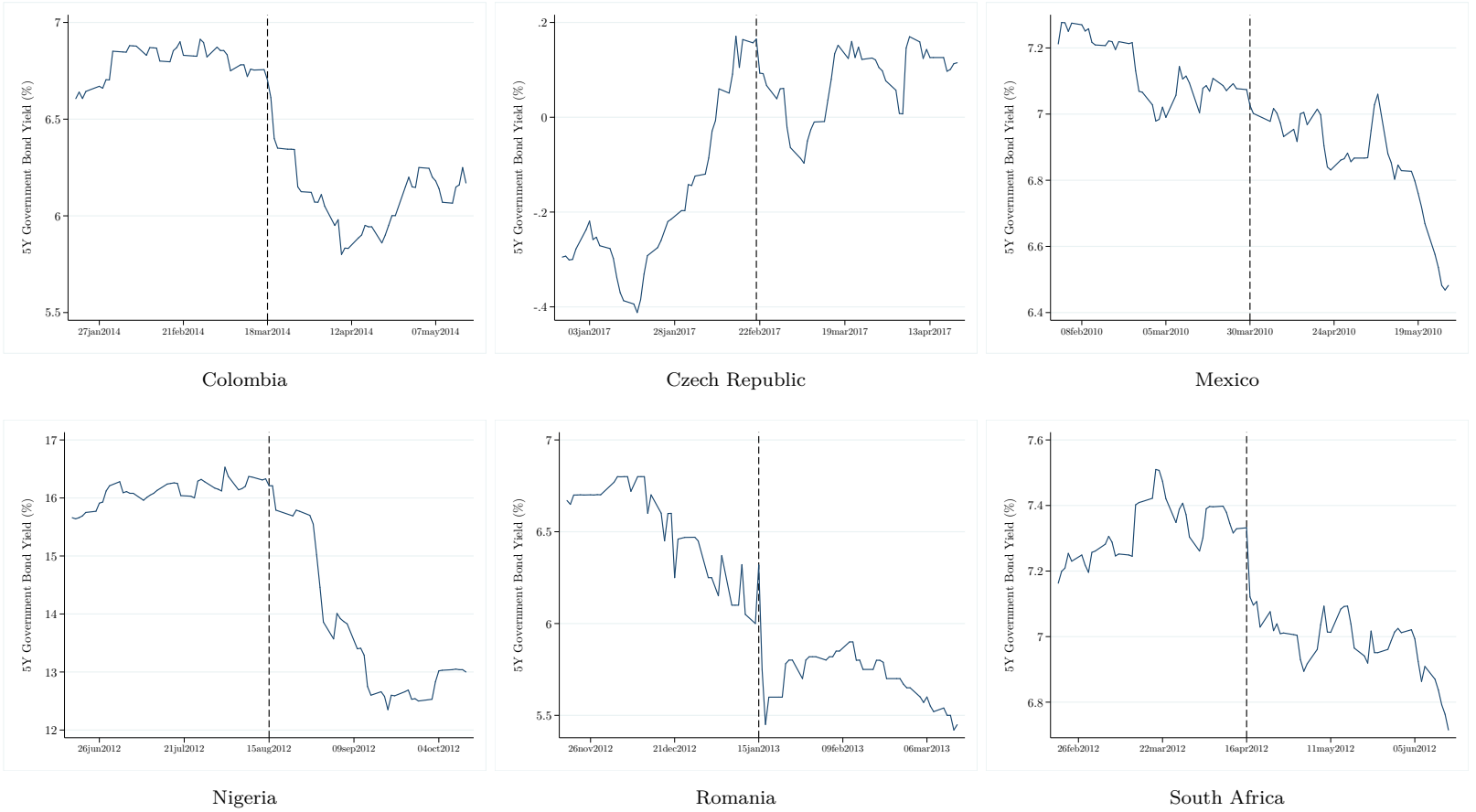
This figure depicts the quarterly time series of the average and the median (left panel and right panel, respectively) share of sovereign debt held by foreign private investors for Colombia, Mexico, Romania and South Africa over a time window which starts 6 quarters before the announcement of each country's inclusion in the corresponding index, and ends 6 quarters after it. In both panels, the dotted line is a linear trend estimated on the pre-announcement period. The vertical dashed line indicates the quarter prior to the announcement episodes. Data is from Arslanalp and Tsuda (2014).

Figure 3: Balance of Payments: Private *vs.* Public Inflows



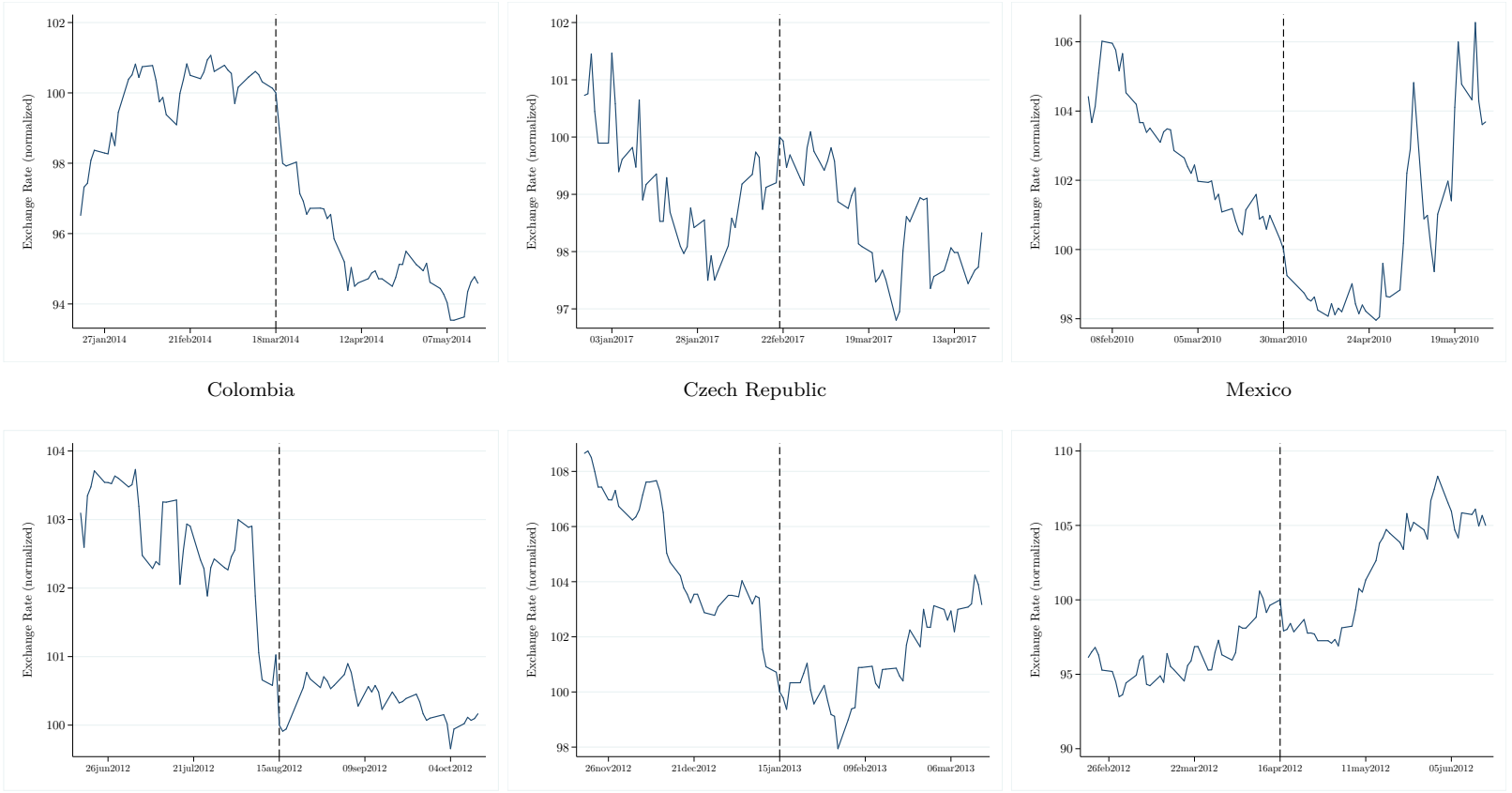
This figure depicts the average private and public net inflows to Colombia, Czech Republic, Mexico, Nigeria, Romania and South Africa in the year of the announcement of each country's inclusion into the corresponding index *vs.* the average of public and private inflows to these countries in the three years before the announcement episodes. Private inflows are the sum of foreign direct investments, portfolio equity net inflows and private debt net inflows. Public inflows are net inflows to the countries' sovereign debt markets. Both are in U.S. dollars and are normalized by the GDP of each country, before being averaged across countries. Data is from the IMF Balance of Payments Statistics and IMF WEO.

Figure 4: 5-Year Government Bond Yields around Events



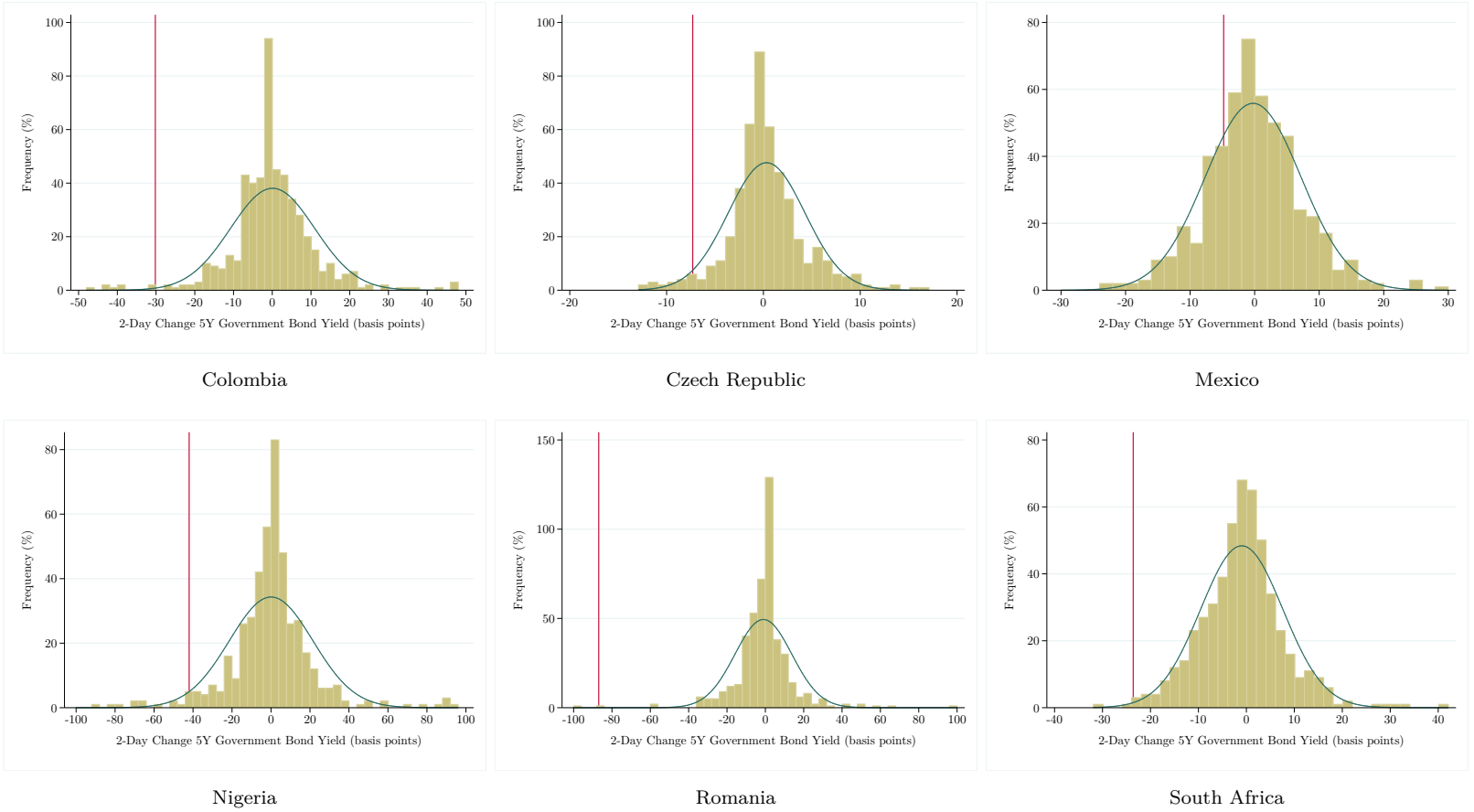
This figure depicts the time series of the 5-year local currency government bond yield in Colombia, Czech Republic, Mexico, Nigeria, Romania and South Africa over a time window which starts 2 months before the announcement of each country's inclusion in the corresponding index, and ends 2 months after it. The vertical dashed line indicates the last trading day before each announcement episode.

Figure 5: Exchange Rates around Events



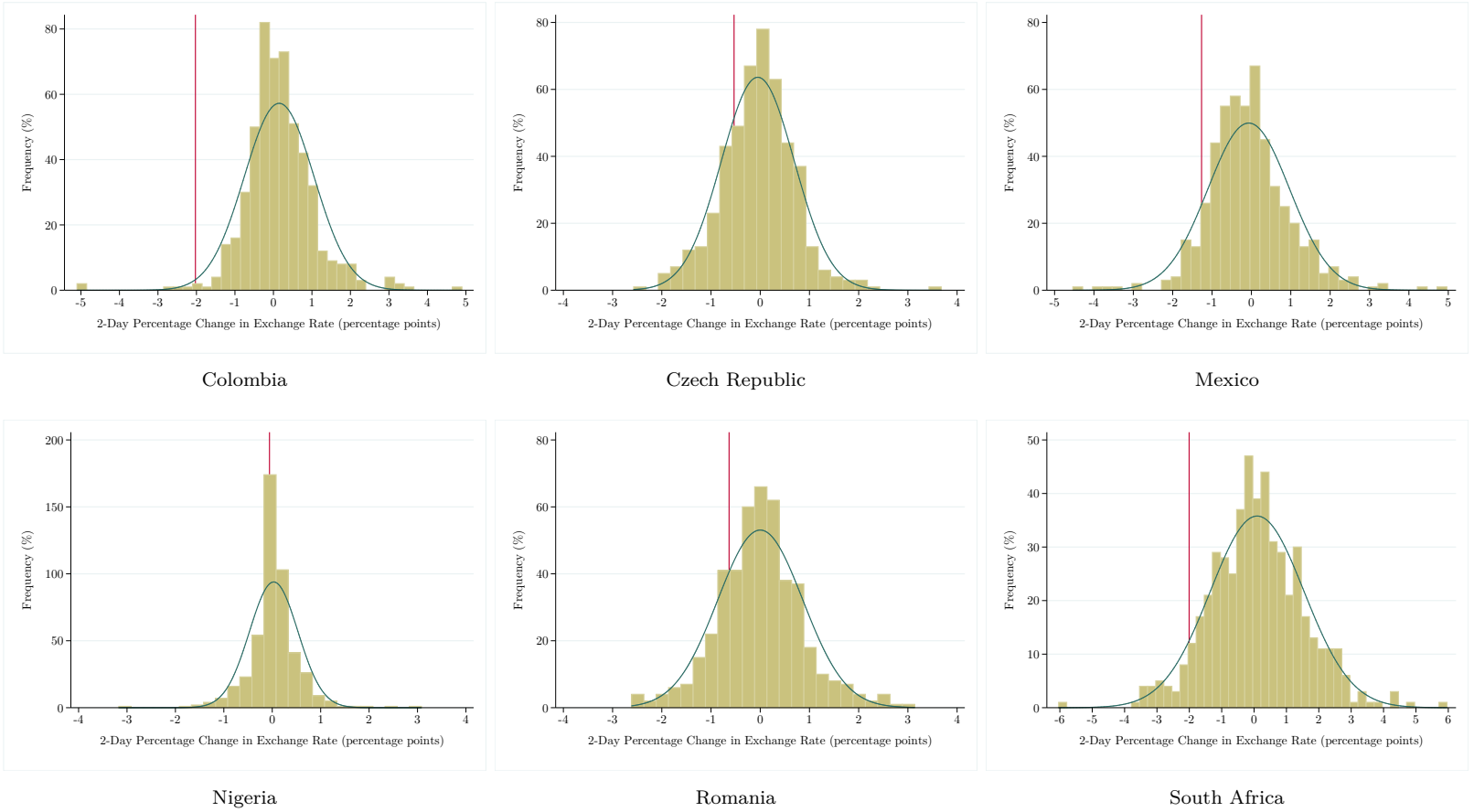
This figure depicts the time series of the exchange rate in Colombia, Czech Republic, Mexico, Nigeria, Romania and South Africa over a time window which starts 2 months before the announcement of each country's inclusion in the corresponding index, and ends 2 months after it. The exchange rate for each country is the amount of local currency needed to buy 1 U.S. dollar, and is normalized to its value in the last trading day before each announcement episode, indicated by a vertical dashed line.

Figure 6: Distribution of 2-day Changes in 5Y Government Bond Yields



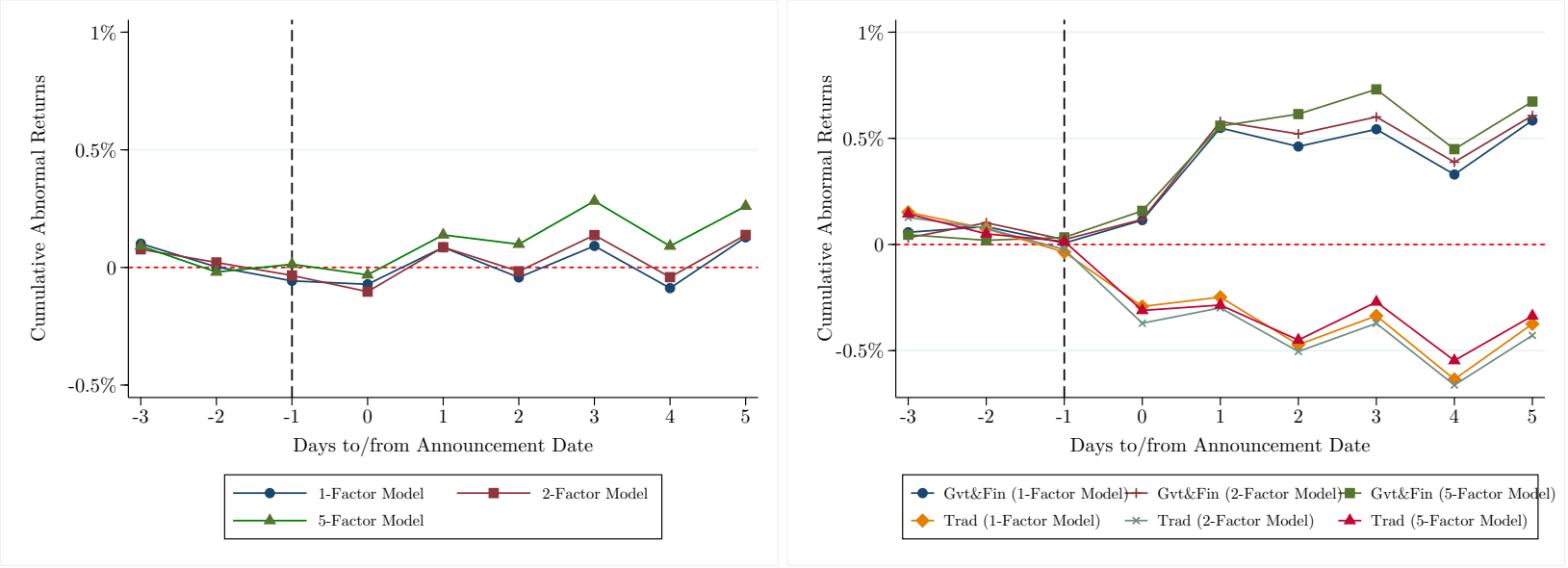
This figure depicts the distribution of 2-day changes in the 5-year local currency government bond yield in Colombia, Czech Republic, Mexico, Nigeria, Romania and South Africa in the 2 years around the announcement of each country's inclusion in the corresponding index. The vertical line in each panel indicates the change in the 5-year government bond yield in the 2 days following the announcement episode in each country.

Figure 7: Distribution of 2-day Percentage Changes in Exchange Rates



This figure depicts the distribution of 2-day changes in the log of the exchange rate in Colombia, Czech Republic, Mexico, Nigeria, Romania and South Africa in the 2 years around the announcement of each country's inclusion in the corresponding index. The vertical line in each panel indicates the percentage change in the exchange rate in the 2 days following the announcement episode in each country.

Figure 8: Cumulative Abnormal Returns around Events

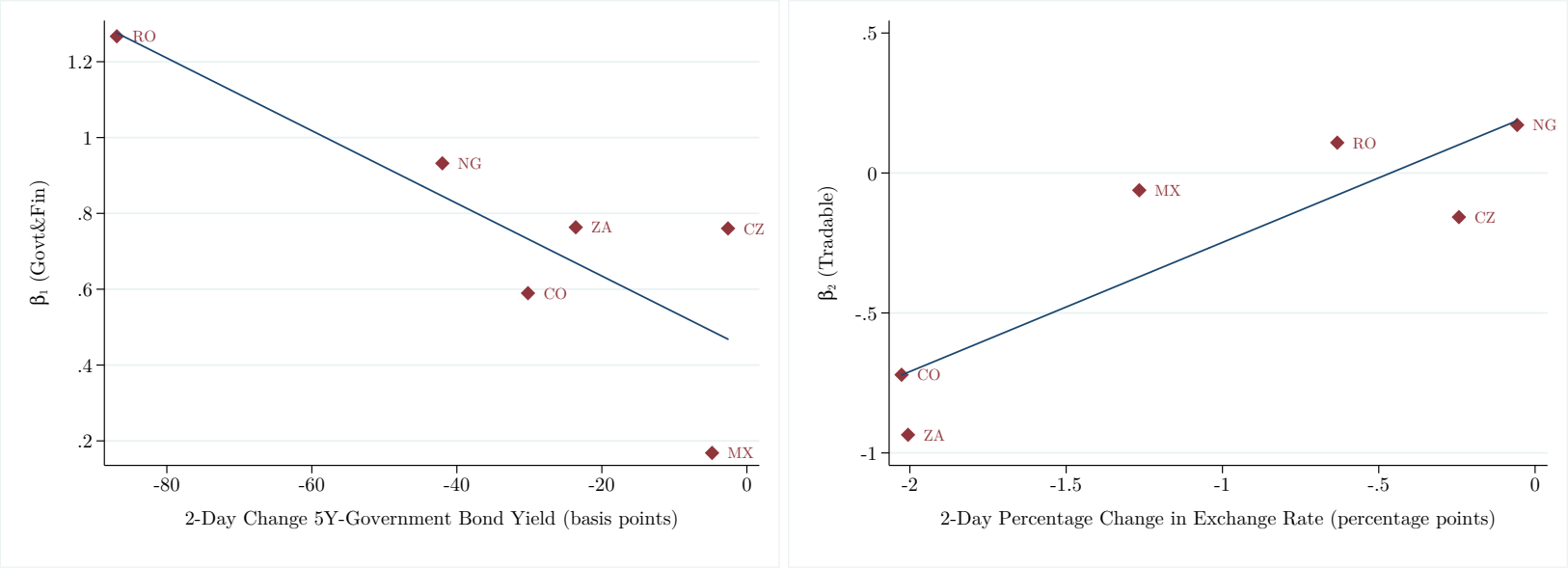


All firms

Financial & Government-related *vs.* tradable firms

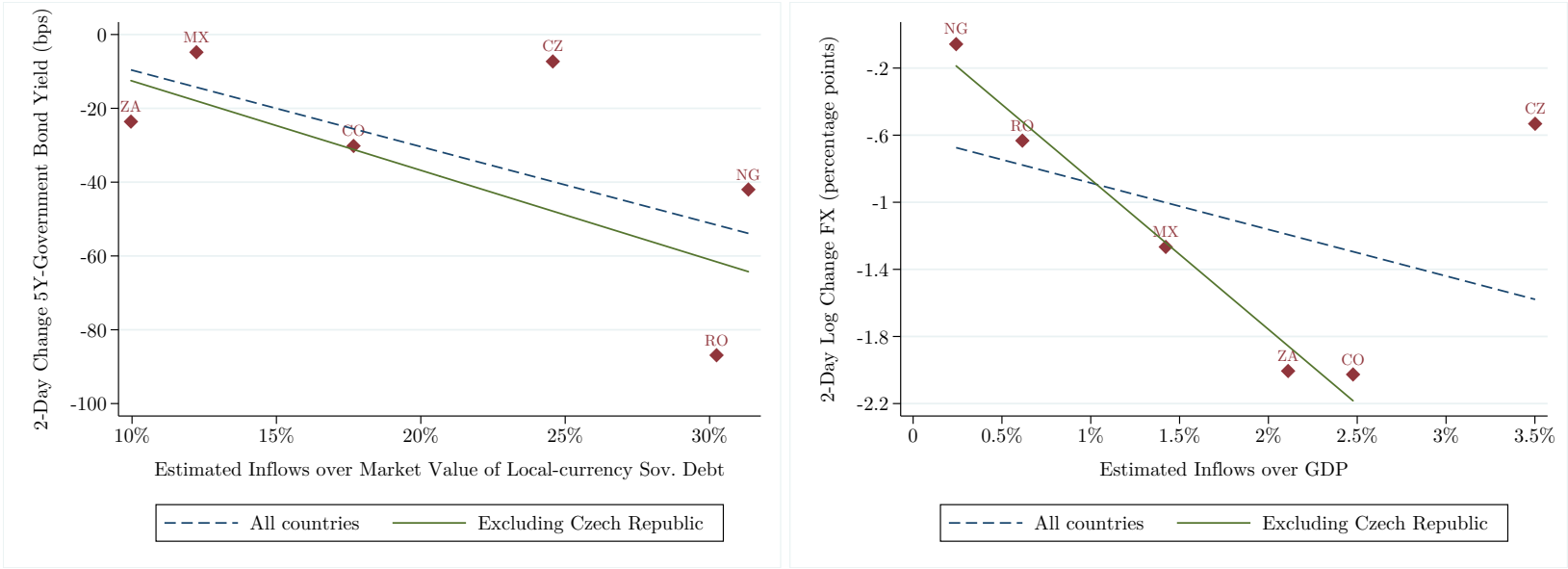
This figure depicts the evolution of the cumulative abnormal returns of domestic firms over a time window which starts 3 days before the announcement of each country's inclusion in the corresponding index, and ends 5 days after it. The left panel depicts the cumulative abnormal returns of all firms, while the right panel depicts the cumulative abnormal returns of financial and government-related firms, and tradable firms, separately. Cumulative abnormal returns are computed using three models. The only risk factor in the 1-factor model is the return of the MSCI Emerging Markets Index; the two risk factors in the 2-factor model are the return of the MSCI Emerging Markets Index and the return of the MSCI World Index; the 5-factor models include these two risk factors plus small minus big (SMB), high minus low (HML), and momentum (WML) factors. The vertical dashed line indicates the last trading day before the announcement. Observations in the top and the bottom percentile of the country-by-date distribution of cumulative abnormal returns are excluded.

Figure 9: Heterogeneous Effects of the Shocks



This figure depicts the relationship between the size of the 2-day changes in sovereign bond yields and exchange rates (in the two days following the announcement of each country's inclusion in the corresponding index), and the stock market effects on government-related and financial firms (left panel), and tradable firms (right panel), separately. β_1 and β_2 are the OLS estimated coefficients of 6 country-specific regressions of the form: $CAR = \beta_1 \mathbb{1}(Govt\&Fin) + \beta_2 \mathbb{1}(Tradable) + \beta_3 EFD + \varepsilon$, where CAR is the cumulative abnormal returns of each firm in the two days following the announcement episode (computed using a 1-factor model where the only risk factor is the return of the MSCI Emerging Markets Index), $\mathbb{1}(Govt\&Fin)$ is a dummy variable which equals 1 for government-related and financial companies, $\mathbb{1}(Tradable)$ is a dummy which equals 1 for firms operating in tradable sectors, and EFD is a measure of external financial dependance computed at the industry-level. Observations in the top and the bottom percentile of the country-specific distribution of 2-day cumulative abnormal returns are excluded.

Figure 10: Estimated Inflows and Size of the Shocks



This figure depicts the relationship between the size of the 2-day changes in sovereign bond yields and exchange rates (in the two days following the announcement of each country's inclusion in the corresponding index), and the estimated sovereign debt inflows relative to the size of each country's local-currency sovereign debt market (left panel) and each country's GDP (right panel), separately. The estimated inflows, the market value of sovereign debt markets, and countries' GDP are in US dollars. Estimated inflows are computed as the change in benchmark weight following the inclusion of each country in the index, calculated over the entire implementation period, multiplied by the assets under management of funds tracking their returns against the corresponding index. The dashed and the solid line are regression lines describing the relationship between estimated inflows and shocks, with and without Czech Republic, respectively.

Table 1: Summary Statistics

	Mean	St. Dev.	CO	CZ	MX	NG	RO	ZA
Financial	0.14	0.35	0.36	0.21	0.14	0.17	0.10	0.10
Government-Related	0.09	0.29	0.19	0.36	0.07	0.11	0.05	0.08
Tradable	0.35	0.48	0.19	0.21	0.23	0.42	0.54	0.32
External Financial Dependance	-2.04	2.91	-2.53	-1.88	-2.04	-2.19	-1.65	-2.05
Foreign Ownership	0.11	0.31	0.18	0.21	0.16	0.09	0.02	0.12
Issue Debt	0.16	0.36	0.38	0.36	0.47	0.04	0.05	0.09
Log(Assets)	15.44	3.25	21.68	16.57	16.43	17.41	12.18	14.33
Observations	909		72	14	137	170	155	361

This table reports summary statistics about domestic firms in our sample. The first two columns report the mean and the standard deviation of our main explanatory variables computed over the entire sample of firms. Columns 3 to 8 report the average of these variables in each of the countries in our sample (Colombia, Czech Republic, Mexico, Nigeria, Romania, and South Africa). *Financial* is an indicator variable that is equal to 1 for financial firms. *Government-Related* is an indicator variable that is equal to 1 for government-related firms. *Tradable* is an indicator variable that is equal to 1 for firms in tradable industries (according to the classification in Mian and Sufi (2014)). *External Financial Dependance* is a measure of firms' dependance on external financing sources, computed following Rajan and Zingales (1998). *Foreign Ownership* is an indicator variable that is equal to 1 for firms which are included in the MSCI Emerging Markets Index in the year prior to the announcement date. *Issue Debt* is an indicator variable that is equal to 1 for firms that issued corporate debt or obtained a syndicated loan in the years before the announcement date.

Table 2: Shocks

	Colombia	Czech Rep.	Mexico	Nigeria	Romania	South Africa
ΔYield (bps)	-30.190	-7.300	-4.800	-42.000	-86.900	-23.600
$\Delta\text{Yield} - \overline{\Delta\text{Yield}}$	-30.649***	-7.641***	-4.569***	-42.870***	-85.819***	-22.674***
$\%\Delta$ExchRate (pp)	-2.026	-0.532	-1.266	-0.057	-0.633	-2.006
$\%\Delta\text{ExchRate} - \overline{\%\Delta\text{ExchRate}}$	-2.179***	-0.484***	-1.200***	-0.077***	-0.635***	-2.120***

This table reports the changes in government bond yields and exchange rates in the 2 days following the announcement of each country's inclusion in the corresponding index. $\Delta Yield(bps)$ is the 2-day change in the 5-year local currency government bond yield in basis points. $\%\Delta ExchRate(pp)$ is the 2-day percentage change in the exchange rate (computed as the difference in the log of the exchange rate) in percentage points. $\Delta Yield - \overline{\Delta Yield}$ and $\%\Delta ExchRate - \overline{\%\Delta ExchRate}$ are the differences between the changes in government bond yields and exchange rates in the 2 days following the announcement episodes, and the average 2-day changes of these two variables in the 2 years around the announcement of each country's inclusion in the corresponding index. *, **, ***, denote that these differences are statistically different from 0 at the 10%, 5%, and 1% confidence level, respectively.

Table 3: Aggregate Cumulative Abnormal Returns

Panel A: Cumulative Abnormal Returns after Announcement Dates				
	Demeaned Returns	1-Factor Model	2-Factor Model	5-Factor Model
Average 2-day CAR	0.219**	0.133	0.111	0.117
	(0.099)	(0.102)	(0.102)	(0.108)
Number of Countries	6	6	6	6
Observations	861	861	861	861
Panel B: Cumulative Abnormal Returns before Announcement Dates				
	Demeaned Returns	1-Factor Model	2-Factor Model	5-Factor Model
Average 2-day CAR	0.117	0.014	0.041	-0.006
	(0.096)	(0.096)	(0.096)	(0.097)
Number of Countries	6	6	6	6
Observations	861	861	861	861

This table reports the average cumulative abnormal return of firms in our sample after and before the announcement of each country's inclusion in the corresponding index (Panel A and Panel B, respectively). The average CAR in Panel A is computed as the average CAR in the 2 days following the announcement. The average CAR in Panel B is computed as the average CAR over the interval $[t-3, t-2]$, where t is the first trading day after the announcement. CARs in the first column (the demeaned returns) are computed as the cumulated differences between the daily returns and the average daily return in the year preceding the announcement. CARs in columns 2 to 4 are computed using three different factor models. The only risk factor in the 1-factor model is the return of the MSCI Emerging Markets Index; the two risk factors in the 2-factor model are the return of the MSCI Emerging Markets Index and the return of the MSCI World Index; the 5-factor model include these two risk factors plus small minus big (SMB), high minus low (HML), and momentum (WML) factors. Observations in the top and the bottom percentile of the country-specific distribution of 2-day cumulative abnormal returns are excluded. Standard errors in parenthesis are clustered at the country-by-industry level. *, **, ***, denote that the the average CAR is statistically different from 0 at the 10%, 5%, and 1% confidence level, respectively.

Table 4: Cumulative Abnormal Returns, by Firm Type

Panel A: Financial firms				
	Demeaned Returns	1-Factor Model	2-Factor Model	5-Factor Model
Average 2-day CAR	0.688***	0.666***	0.643***	0.607***
	(0.181)	(0.173)	(0.166)	(0.183)
Number of Countries	6	6	6	6
Observations	118	118	118	118
Panel B: Government-related firms				
	Demeaned Returns	1-Factor Model	2-Factor Model	5-Factor Model
Average 2-day CAR	0.909***	0.802***	0.831***	0.866***
	(0.237)	(0.245)	(0.247)	(0.250)
Number of Countries	6	6	6	6
Observations	78	78	78	78
Panel C: Tradable firms				
	Demeaned Returns	1-Factor Model	2-Factor Model	5-Factor Model
Average 2-day CAR	-0.132	-0.205	-0.239	-0.202
	(0.173)	(0.166)	(0.165)	(0.177)
Number of Countries	6	6	6	6
Observations	306	305	305	304

This table reports the average cumulative abnormal return of financial firms (Panel A), government-related firms (Panel B), and firms operating in tradable sectors (Panel C) in the 2 days following the announcement of each country's inclusion in the corresponding index. CARs in the first column (the demeaned returns) are computed as the cumulated differences between the daily returns and the average daily return in the year preceding the announcement. CARs in columns 2 to 4 are computed using three different factor models. The only risk factor in the 1-factor model is the return of the MSCI Emerging Markets Index; the two risk factors in the 2-factor model are the return of the MSCI Emerging Markets Index and the return of the MSCI World Index; the 5-factor model include these two risk factors plus small minus big (SMB), high minus low (HML), and momentum (WML) factors. Observations in the top and the bottom percentile of the country-specific distribution of 2-day cumulative abnormal returns are excluded. Standard errors in parenthesis are clustered at the country-by-industry level. *, **, ***, denote that the the average CAR is statistically different from 0 at the 10%, 5%, and 1% confidence level, respectively.

Table 5: Main Results

2-Day Cumulative Abnormal Returns after Announcement Dates				
	Demeaned Returns	1-Factor Model	2-Factor Model	5-Factor Model
Financial	0.525*	0.613**	0.614**	0.573*
	(0.290)	(0.285)	(0.280)	(0.302)
Government-Related	0.632***	0.598**	0.656***	0.700***
	(0.241)	(0.249)	(0.247)	(0.252)
Tradable	-0.514**	-0.472**	-0.495**	-0.450*
	(0.218)	(0.220)	(0.220)	(0.235)
External Financial Dependance	0.072*	0.070*	0.075*	0.073*
	(0.041)	(0.041)	(0.040)	(0.043)
Financial – Tradable	1.04***	1.09***	1.11***	1.02***
	(0.31)	(0.30)	(0.29)	(0.31)
Govt-Related – Tradable	1.15***	1.07***	1.15***	1.15***
	(0.32)	(0.33)	(0.32)	(0.33)
Number of Countries	6	6	6	6
Observations	857	857	857	857
R^2	0.02	0.02	0.02	0.02

This table reports the OLS coefficients of a regression where the dependent variable is the CAR of each firm in the 2 days following the announcement of each country's inclusion in the corresponding index. The explanatory variables are: *Financial*, which is an indicator variable that is equal to 1 for financial firms; *Government-Related*, which is an indicator variable that is equal to 1 for government-related firms; *Tradable*, which is an indicator variable equal to for firms in tradable industries (according to the classification in Mian and Sufi (2014)); and *External Financial Dependance*, which is a measure of firms' dependance on external financing sources, computed following Rajan and Zingales (1998). The table reports also the difference between the estimated coefficient on *Financial* and that on *Tradable*, as well as the difference between the estimated coefficients on *Government-Related* and that on *Tradable*. CARs in the first column (the demeaned returns) are computed as the the cumulated differences between the daily returns and the average daily return in the year preceding the announcement. CARs in columns 2 to 4 are computed using three different factor models. The only risk factor in the 1-factor model is the return of the MSCI Emerging Markets Index; the two risk factors in the 2-factor model are the return of the MSCI Emerging Markets Index and the return of the MSCI World Index; the 5-factor model include these two risk factors plus small minus big (SMB), high minus low (HML), and momentum (WML) factors. Observations in the top and the bottom percentile of the country-specific distribution of 2-day cumulative abnormal returns are excluded. Standard errors in parenthesis are clustered at the country-by-industry level. *, **, ***, denote significance at the 10%, 5%, and 1% confidence level, respectively.

Table 6: Additional Controls

2-Day Cumulative Abnormal Returns after Announcement Dates								
	Demeaned Returns		1-Factor Model		2-Factor Model		5-Factor Model	
Financial	0.497*	0.494	0.584**	0.618*	0.569**	0.557*	0.578*	0.539
	(0.276)	(0.339)	(0.275)	(0.336)	(0.271)	(0.329)	(0.297)	(0.364)
Government-Related	0.505**	0.451*	0.500**	0.441	0.569**	0.498*	0.641***	0.557**
	(0.237)	(0.264)	(0.244)	(0.270)	(0.243)	(0.271)	(0.245)	(0.271)
Tradable	-0.431*	-0.539**	-0.398*	-0.499*	-0.421*	-0.533*	-0.364	-0.431
	(0.226)	(0.273)	(0.226)	(0.279)	(0.227)	(0.279)	(0.246)	(0.307)
External Financial Dependance	0.074*	0.083*	0.072*	0.083*	0.076*	0.087*	0.076*	0.085*
	(0.041)	(0.048)	(0.042)	(0.050)	(0.041)	(0.049)	(0.043)	(0.051)
Foreign Ownership	0.222	0.112	0.073	0.002	0.049	-0.092	0.056	-0.089
	(0.243)	(0.262)	(0.255)	(0.278)	(0.249)	(0.277)	(0.249)	(0.283)
Issue Debt	0.133	0.087	0.040	0.010	0.008	-0.049	-0.042	-0.113
	(0.246)	(0.266)	(0.253)	(0.274)	(0.268)	(0.295)	(0.279)	(0.314)
Log(Assets)		0.026		0.013		0.039		0.046
		(0.046)		(0.046)		(0.049)		(0.060)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Financial – Tradable	0.93***	1.03***	0.98***	1.12***	0.99***	1.09***	0.94***	0.97**
	(0.29)	(0.37)	(0.29)	(0.36)	(0.28)	(0.35)	(0.31)	(0.39)
Govt-Related – Tradable	0.94***	0.99***	0.90***	0.94**	0.99***	1.03***	1.01***	0.99**
	(0.32)	(0.37)	(0.33)	(0.39)	(0.33)	(0.39)	(0.34)	(0.40)
Number of Countries	6	6	6	6	6	6	6	6
Observations	857	663	857	663	857	663	857	664
R^2	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03

This table reports the OLS coefficients of a regression where the dependent variable is the CAR of each firm in the 2 days following the announcement of each country's inclusion in the corresponding index. The explanatory variables are: *Financial*, which is an indicator variable that is equal to 1 for financial firms; *Government-Related*, which is an indicator variable that is equal to 1 for government-related firms; *Tradable*, which is an indicator variable equal to for firms in tradable industries (according to the classification in Mian and Sufi (2014)); *External Financial Dependance*, which is a measure of firms' dependance on external financing sources, computed following Rajan and Zingales (1998); *Foreign Ownership*, which is an indicator variable that is equal to 1 for firms which are included in the MSCI Emerging Markets Index in the year prior to the announcement date; *IssueDebt*, which is an indicator variable that is equal to 1 for firms that issued corporate debt or obtained a syndicated loan in the years before the announcement date; and *Log(Assets)*, which is the logarithm of the total value of a firm's assets. All regressions include country fixed effects. The table reports also the difference between the estimated coefficient on *Financial* and that on *Tradable*, as well as the difference between the estimated coefficients on *Government-Related* and that on *Tradable*. CARs in the first column (the demeaned returns) are computed as the cumulated differences between the daily returns and the average daily return in the year preceding the announcement. CARs in columns 2 to 4 are computed using three different factor models. The only risk factor in the 1-factor model is the return of the MSCI Emerging Markets Index; the two risk factors in the 2-factor model are the return of the MSCI Emerging Markets Index and the return of the MSCI World Index; the 5-factor model include these two risk factors plus small minus big (SMB), high minus low (HML), and momentum (WML) factors. Observations in the top and the bottom percentile of the country-specific distribution of 2-day cumulative abnormal returns are excluded. Standard errors in parenthesis are clustered at the country-by-industry level. *, **, ***, denote significance at the 10%, 5%, and 1% confidence level, respectively.

Table 7: Interaction with Size of the Shocks

2-Day Cumulative Abnormal Returns after Announcement Dates								
	Demeaned Returns		1-Factor Model		2-Factor Model		5-Factor Model	
ΔYield × Govt&Fin	0.015***	0.017***	0.015***	0.017***	0.015***	0.017***	0.015***	0.017***
	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)
%ΔExchRate × Tradable	-0.354**	-0.411***	-0.341**	-0.393***	-0.358**	-0.414***	-0.295*	-0.349**
	(0.147)	(0.144)	(0.145)	(0.144)	(0.146)	(0.144)	(0.166)	(0.162)
External Financial Dependance		0.070*		0.066		0.070*		0.068*
		(0.038)		(0.040)		(0.039)		(0.041)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Countries	6	6	6	6	6	6	6	6
Observations	861	857	861	857	861	857	861	857
R^2	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.04

This table reports the OLS coefficients of a regression where the dependent variable is the CAR of each firm in the 2 days following the announcement of each country's inclusion in the corresponding index. The explanatory variables are: $\Delta Yield \times Govt\&Fin$, which is the product of indicator variable that is equal to 1 for financial and government-related firms, and the 2-day change in the 5-year local currency government bond yield, in basis points; $\%\Delta ExchRate \times Tradable$, which is the product of indicator variable that is equal to 1 for firms in tradable industries (according to the classification in Mian and Sufi (2014)), and the 2-day percentage change in the exchange rate (computed as the difference in the log of the exchange rate) in percentage points; and *External Financial Dependance*, which is a measure of firms' dependance on external financing sources, computed following Rajan and Zingales (1998). All regressions include country fixed effects. CARs in the first column (the demeaned returns) are computed as the cumulated differences between the daily returns and the average daily return in the year preceding the announcement. CARs in columns 2 to 4 are computed using three different factor models. The only risk factor in the 1-factor model is the return of the MSCI Emerging Markets Index; the two risk factors in the 2-factor model are the return of the MSCI Emerging Markets Index and the return of the MSCI World Index; the 5-factor models include these two risk factors plus small minus big (SMB), high minus low (HML), and momentum (WML) factors. Observations in the top and the bottom percentile of the country-specific distribution of 2-day cumulative abnormal returns are excluded. Standard errors in parenthesis are clustered at the country-by-industry level. *, **, ***, denote significance at the 10%, 5%, and 1% confidence level, respectively.

A Appendix

A.1 International Benchmark Indexes for Local Currency Sovereign Bond Markets

International indexes are indexes which combine and track assets of different classes from different countries. Depending on the criteria used to select the countries to be included in the index, international indexes can be categorized in regional and global indexes. The former track securities whose issuers are located in a given region – either geographically or based on the classification of countries in frontier, emerging, and developed markets –, while the latter track securities whose issuers are located in multiple regions. With the rise of financial globalization, international indexes have gained considerable importance, as they constitute the main benchmark for an increasingly large number of international investors.

Two of the main and most widely tracked international indexes for local currency–denominated government debt securities are the World Government Bond Index (WGBI) and J.P. Morgan Government Bond Index Emerging Markets (GBI-EM), which are constructed by Citigroup and J.P. Morgan, respectively. Both indexes represent key benchmarks for international investors in local currency sovereign debt markets. However, while the former is a global index which tracks the returns on sovereign bonds denominated in local currency issued by the governments of both developed and emerging countries, the latter is a regional index which solely focuses on emerging countries.[27]

As of 2016, the assets under management benchmarked against the WGBI were approximately 1.5 trillions U.S. dollars, and those benchmarked against the GBI-EM were approximately 200 billion U.S. dollars. Hence, when index providers change the composition of these two indexes,

[27] As a result, the sovereign debt bonds of some emerging countries are included in both indexes. However, given that the average market capitalization of the securities in the WGBI is much larger than that in the GBI-EM, the weight of emerging countries in the former is typically much lower than the weight they have in the latter. For instance, Mexican local currency sovereign bonds account for about 10% of the GBI-EM, while they account for less than 1% of the WGBI.

many international investors wishing to replicate the index composition rebalance their portfolios accordingly. Index rebalancings therefore trigger capital flows which, as shown in Pandolfi and Williams (2019), can have important price effects on the value of the local currency sovereign bonds involved in the rebalancing.

In this paper, in particular, we focus on some large rebalancings in these two indexes which are due to the inclusion of the following emerging countries: Colombia, Czech Republic, Mexico, Nigeria, Romania, and South Africa. During our sample period – which spans from 2010 to 2018 – Argentina was also included in the GBI-EM (in 2017). However, this event is not included in our sample as the inclusion was driven by the decision of the Argentinian government of removing the mandatory 120-days holding period for foreign capital, which was taken the day before the country inclusion announcement.

A.2 Details on Country Inclusion Events

A.2.1 Colombia

On the 19th of March 2014, J.P. released a communication to investors which announced the inclusion of five Colombian treasury bonds (named TES) into the GBI-EM family of indexes. The index inclusion was planned to be implemented gradually between May and September 2014, bringing Colombian weight in the GBI-EM Global Diversified from 3.2% to an estimated 8% (as three TES were already included in the index before the inclusion episode). The document released by J.P. Morgan does not contain a time stamp, so we searched the web for news related to this event. The first news article we found was published by Reuters at 1:52PM (Eastern Standard Time), which corresponds to 12:52PM in Colombian time, when Colombian markets were still open.[28] Hence, the first trading day for Colombia coincides with the announcement date and is set on the 19th of March 2014. As regards the drivers of the inclusion, J.P. Morgan states that this the "[...] result of improved transparency and accessibility for international investors in the

[28]Source: Reuters. https://www.reuters.com/article/colombia-jpmorgan-debt/j-p-morgan-to-boost-colombia-bond-weighting-peso-up-most-in-6-months-idUSL2N0MG12I20140319 (Retrieved on May 6, 2020).

local TES market [...]". Nevertheless, we could not find any relevant news about policy changes or changes in the functioning of Colombian sovereign debt market which might overlap with the inclusion announcement made by J.P. Morgan. The most significant regulatory change affecting Colombian sovereign debt market before the inclusion episode was a tax cut on foreigners investing in TES which occurred in January 2013, more than one year before the inclusion announcement.

A.2.2 Czech Republic

On the 22nd of February 2017, J.P. Morgan released a communication to investors which announced the inclusion of nine local-currency denominated Czech sovereign bonds into the GBI-EM family of indexes. The index inclusion was planned to be implemented gradually between April and June 2017, bringing Czech weight in the GBI-EM Global Diversified from 0% to an estimated 3.3%. The document was disseminated at 9:44AM (Eastern Standard Time), which corresponds to 3:44PM in Czech Republic time, when Czech markets were still open. Hence, the first trading day for Colombia coincides with the announcement date and is set on the 22nd of February 2017. The inclusion of Czech Republic in the J.P. Morgan GBI-EM was due to reclassification of the country from a developed to an emerging market, since: "Czech Republic's GNI per-capita levels falling below the Index Income Ceiling for three consecutive years". As a result, Czech sovereign bonds were excluded from developed markets indexes and included in the Emerging Markets ones. As the weight of Czech Republic in the index for developed countries was much smaller than that in the GBI-EM, the outflows due to the exclusion from the former were going to be much smaller than the inflows due to the inclusion in the latter. According to experts, the transition should have brought between 3 and 6 billion U.S. dollar inflows to the country.[29]

[29]Source: Pensions&Investments Online. https://www.pionline.com/article/20170428/ONLINE/170429837/j-p-morgan-drops-czech-republic-bonds-to-emerging-markets-indexes-inflows-expected (Retrieved on May 6, 2020).

A.2.3 Mexico

On the 31st of March 2010, Citigroup announced that Mexican sovereign bonds were eligible for inclusion in the WGBI, with an estimated weight equal to 0.65%. We searched the web for news related to this event. The first news article we found was published by Reuters at 12:41PM (Eastern Standard Time), which corresponds to 11:41AM in Mexican time, when Mexican markets were still open.[30] Hence, the first trading day for Mexico coincides with the announcement date and is set on the 31st of March 2010. The eligibility announcement stated that: "If Mexico continues to meet all WGBI criteria for three consecutive months starting with the April 2010 index profile, it will become the first Latin American and the 24th government bond market to enter the WGBI. Entry would be effective October 2010". The criteria refer to the size and ratings of the Mexican sovereign bonds, and their accessibility to foreign investors. Several news articles highlighted that Mexico already fulfilled the size and ratings requirements and that during the past year the government of Mexico improved the liquidity of the government bond market by issuing 30-year bonds, selling syndicated debt to foreigners and creating a primary dealers program. As a result, Mexico was eventually included in the WGBI in October 2010.

A.2.4 Nigeria

On the 14th of August 2012, J.P. Morgan released a communication to investors which announced the inclusion of local-currency denominated Nigerian sovereign bonds (FGN) maturing in 2014, 2019 and 2022, into the GBI-EM family of indexes. The index inclusion was planned to be implemented gradually between October and December 2012, bringing Nigerian weight in the GBI-EM Global Diversified from 0% to an estimated 0.59% (the estimate was later revised to 0.72%). The document released by J.P. Morgan does not contain a time stamp, so we searched the web for news related to this event. The first news article we found was published by Reuters on the 15th of August at 12:46PM (Eastern Standard Time), which corresponds to 5:46PM in Nigerian time, when Nigerian

[30] Source: Reuters. https://www.reuters.com/article/mexico-index/update-1-citi-says-mexico-eligible-for-wgbi-bond-index-idUSN3121335820100331 (Retrieved on May 6, 2020).

markets had already closed.[31] Due to the one-day delay between the communication by J.P. Morgan and the diffusion of the news, we assume that the latest date is the one in which the information was effectively received by international investors. In fact, we do observe an increase in transaction of local currency sovereign bonds on the day following the dissemination of the Reuters' article. Hence, we set the first trading day after the announcement on the 16th of August 2012. As regards the drivers of the inclusion, J.P. Morgan stated that this is the result of the improved liquidity of the Nigerian sovereign debt market, in large part due to the removal of the mandatory one-year holding period for foreign capital occurred in June 2011, more than one year before the inclusion announcement.

A.2.5 Romania

On the 16th of January 2013, J.P. Morgan released a communication to investors which announced the inclusion of local-currency denominated Romanian sovereign bonds (RON) maturing in 2015, 2016 and 2017, into the GBI-EM family of indexes. The index inclusion was planned to be implemented gradually between March and May 2013, bringing Romanian weight in the GBI-EM Global Diversified from 0% to an estimated 0.54% (the estimate was later revised to 0.87%). The document released by J.P. Morgan does not contain a time stamp, so we searched the web for news related to this event. The first news article we found was published by Reuters on the 16th of January, according to which J.P. Morgan had announced the inclusion overnight.[32] We therefore set the first trading day after the announcement on the 16th of January 2013. As regards the drivers of the inclusion, J.P. Morgan stated that this was the result of the improved liquidity of the Romanian sovereign debt market occurred in the 18 months preceding the announcement.

[31] Source: Reuters. https://in.reuters.com/article/us-nigeria-debt-idINBRE87E0TF20120815 (Retrieved on May 6, 2020).

[32] Source: Reuters. https://www.reuters.com/article/romania-debt/jp-morgan-gives-fresh-impetus-to-romania-debt-idUSL6N0AL7IY20130116 (Retrieved on May 6, 2020).

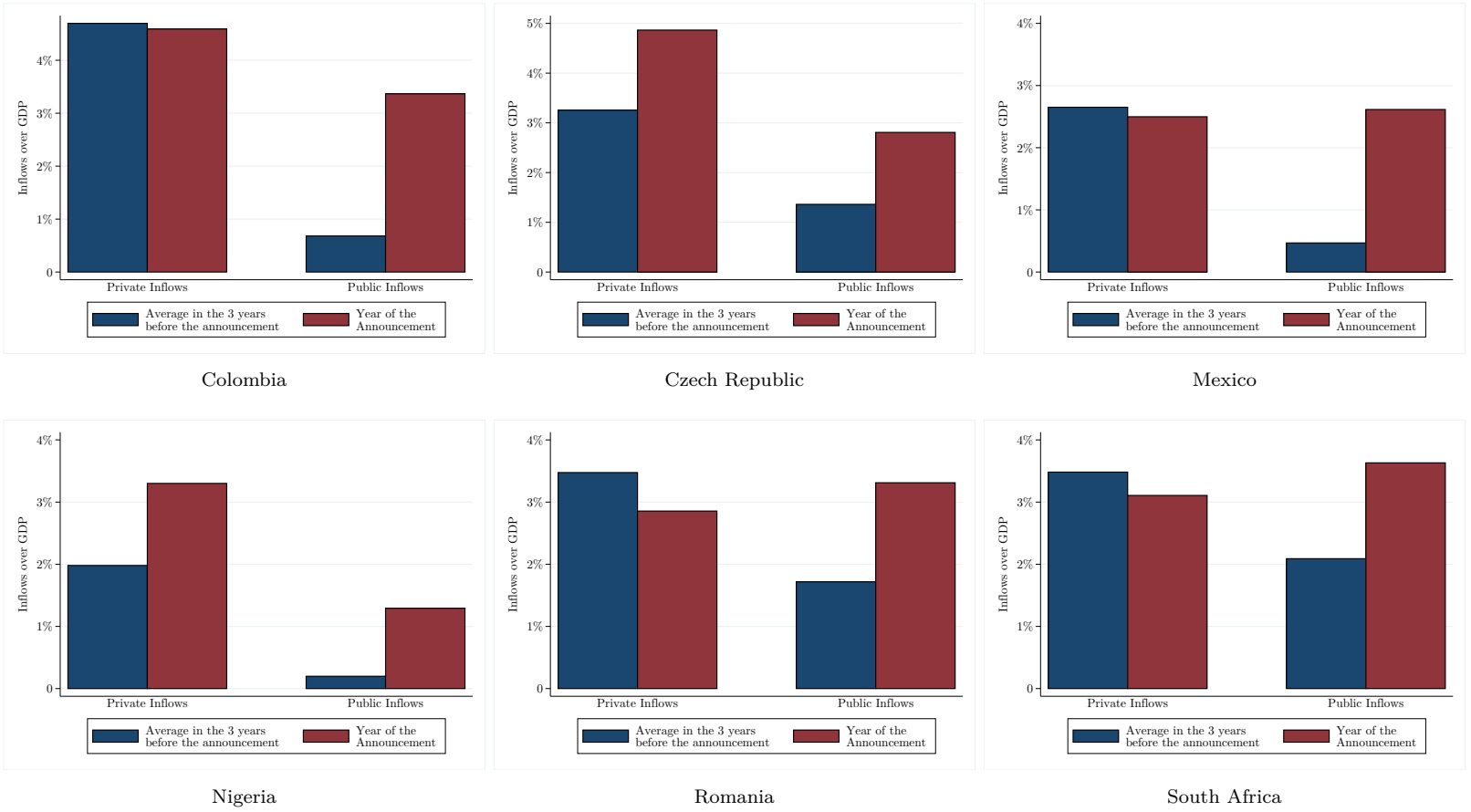
A.2.6 South Africa

On the 16th of April 2012, Citigroup announced that 11 Southern African sovereign bonds were eligible for inclusion in the WGBI. The document released by Citigroup does not contain a time stamp, so we searched the web for news related to this event. The first news article we found was published on the 17th of April by Reuters at 07:05AM (Eastern Standard Time), which corresponds to 1:05PM in the time of South Africa, when markets were still open.[33] Hence, we set the first trading day after the announcement on the 17th of April 2012. The eligibility announcement stated that: "If South Africa continues to meet all WGBI criteria with the May and June 2012 profiles, it will become the first African government bond market to be included in the WGBI". The criteria refer to the size and ratings of the domestic sovereign bonds, and their accessibility to foreign investors. South Africa already fulfilled the size and ratings requirements at the time of the announcement. As for the accessibility to foreign investors, it most likely improved in the year preceding the inclusion, but we could not find more detailed information.

[33] Source: Reuters. https://af.reuters.com/article/southAfricaNews/idAFL6E8FH3YH20120417 (Retrieved on May 6, 2020).

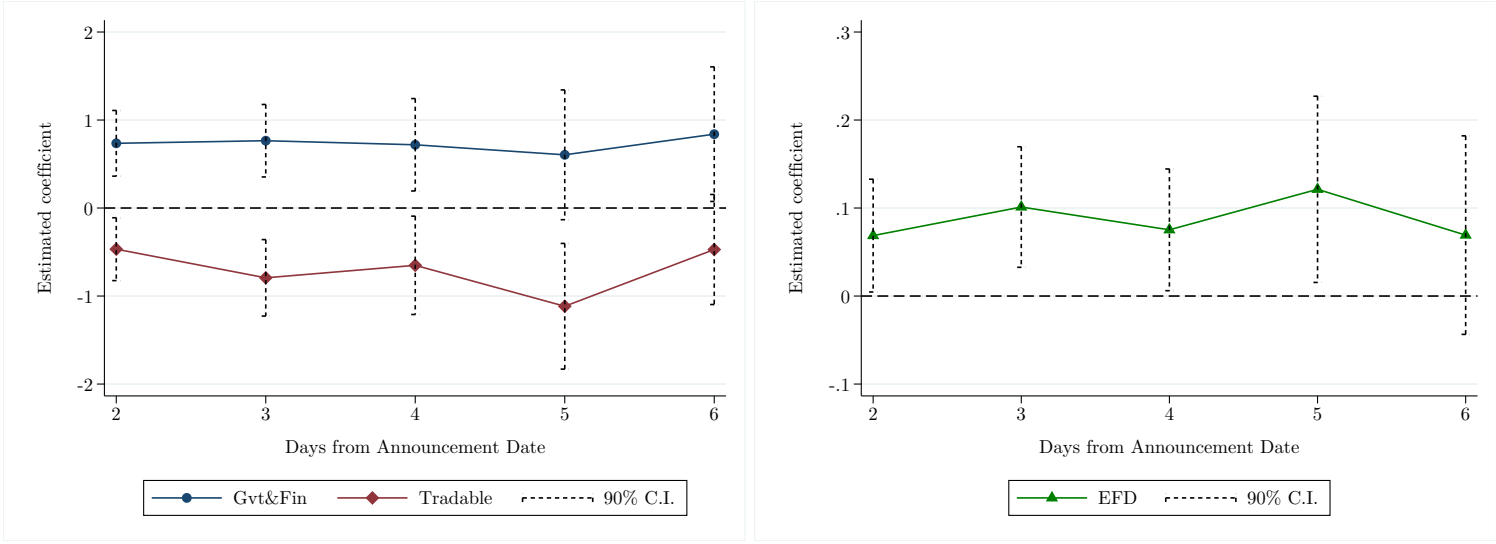
A.3 Additional Figures & Tables

Figure A1: Balance of Payments: Private vs. Public Inflows in Each Country



This figure depicts the private and the public net inflows to Colombia, Czech Republic, Mexico, Nigeria, Romania and South Africa in the year of the announcement of each country's inclusion into the corresponding index *vs.* the average of public and private inflows to these countries in the three years before the announcement episodes. Private inflows are the sum of foreign direct investments, portfolio equity net inflows and private debt net inflows. Public inflows are net inflows to the countries' sovereign debt markets. Both are in U.S. dollars and are normalized by the GDP of each country. Inflows are reported separately for each of the countries in our sample. Data is from the IMF Balance of Payments Statistics and IMF WEO.

Figure A2: Alternative Time Windows



Gvt&Fin-Tradable

External Financial Dependance

This figure depicts the estimated coefficients of $\mathbb{1}(Govt\&Fin)$, $\mathbb{1}(Tradable)$, and EFD in 5 regressions of the form: $CAR_i^t = \beta_1 \mathbb{1}(Govt\&Fin)_i + \beta_2 \mathbb{1}(Tradable)_i + \beta_3 EFD_i + \varepsilon_i$, where CAR_i is the cumulative abnormal return of firm i in the t days following the announcement episode, with $t \in [2, 6]$. CARs are computed using a 1-factor model where the only risk factor is the return of the MSCI Emerging Markets Index. $\mathbb{1}(Govt\&Fin)$ is a dummy variable which equals 1 for government-related and financial companies, $\mathbb{1}(Tradable)$ is a dummy which equals 1 for firms operating in tradable sectors, and EFD is a measure of external financial dependance computed at the industry-level. In each regression, observations in the top and the bottom percentile of the country-specific distribution of cumulative abnormal returns are excluded.

Table A1: Robustness Tests

Panel A: No companies with zero returns in (-10,10)				
	Demeaned Returns	1-Factor Model	2-Factor Model	5-Factor Model
Financial	0.537	0.703	0.682	0.678
	(0.451)	(0.448)	(0.430)	(0.474)
Government-Related	0.692**	0.628*	0.672*	0.694*
	(0.350)	(0.362)	(0.353)	(0.357)
Tradable	-0.878***	-0.802**	-0.844***	-0.816**
	(0.313)	(0.316)	(0.315)	(0.332)
External Financial Dependance	0.083	0.084	0.089	0.093
	(0.063)	(0.063)	(0.061)	(0.064)
Financial – Tradable	1.42***	1.50***	1.53***	1.49***
	(0.48)	(0.47)	(0.44)	(0.49)
Govt-Related – Tradable	1.57***	1.43***	1.52***	1.51***
	(0.48)	(0.49)	(0.48)	(0.49)
Observations	565	565	565	565
R^2	0.03	0.03	0.03	0.03
Panel B: No multi-stock companies				
	Detrended Returns	1-Factor Model	2-Factor Model	5-Factor Model
Financial	0.444	0.543	0.526	0.545
	(0.388)	(0.387)	(0.370)	(0.408)
Government-Related	0.703**	0.622*	0.656**	0.676**
	(0.307)	(0.322)	(0.313)	(0.310)
Tradable	-0.715***	-0.668**	-0.688***	-0.664**
	(0.262)	(0.265)	(0.264)	(0.279)
External Financial Dependance	0.067	0.064	0.068	0.073
	(0.051)	(0.051)	(0.050)	(0.052)
Financial – Tradable	1.16***	1.21***	1.21***	1.21***
	(0.41)	(0.40)	(0.38)	(0.41)
Govt-Related – Tradable	1.42***	1.29***	1.34***	1.34***
	(0.40)	(0.42)	(0.41)	(0.41)
Observations	652	652	652	652
R^2	0.03	0.02	0.03	0.02
Panel C: Without Nigeria and Czech Republic				
	Demeaned Returns	1-Factor Model	2-Factor Model	5-Factor Model
Financial	0.413	0.534	0.519	0.507
	(0.364)	(0.363)	(0.348)	(0.383)
Government-Related	0.633**	0.566*	0.598*	0.625**
	(0.305)	(0.316)	(0.308)	(0.310)
Tradable	-0.716***	-0.661**	-0.686***	-0.661**
	(0.258)	(0.261)	(0.260)	(0.274)
External Financial Dependance	0.066	0.064	0.069	0.072
	(0.050)	(0.050)	(0.049)	(0.051)
Financial – Tradable	1.13***	1.20***	1.20***	1.17***
	(0.39)	(0.38)	(0.36)	(0.39)
Govt-Related – Tradable	1.35***	1.23***	1.28***	1.29***
	(0.40)	(0.41)	(0.40)	(0.41)
Observations	680	680	680	680
R^2	0.03	0.02	0.02	0.02

This table reports the OLS coefficients of a regression where the dependent variable is the CAR of each firm in the 2 days following the announcement of each country's inclusion in the corresponding index. In Panel A, we exclude firms whose price never changes in the 20 trading days around the announcement date. In Panel B, we reduce the weight of firms issuing more than one stock, by considering for each of these companies only the average 2-day CAR of the company's traded securities. In Panel C, we exclude Nigeria and Czech Republic. In all panels, the explanatory variables are: *Financial*, which is an indicator variable that is equal to 1 for financial firms; *Government-Related*, which is an indicator variable that is equal to 1 for government-related firms; *Tradable*, which is an indicator variable equal to for firms in tradable industries (according to the classification in Mian and Sufi (2014)); and *External Financial Dependance*, which is a measure of firms' dependance on external financing sources, computed following Rajan and Zingales (1998). The table reports also the difference between the estimated coefficient on *Financial* and that on *Tradable*, as well as the difference between the estimated coefficients on *Government-Related* and that on *Tradable*. CARs in the first column (the demeaned returns) are computed as the the cumulated differences between the daily returns and the average daily return in the year preceding the announcement. CARs in columns 2 to 4 are computed using three different factor models. The only risk factor in the 1-factor model is the return of the MSCI Emerging Markets Index; the two risk factors in the 2-factor model are the return of the MSCI Emerging Markets Index and the return of the MSCI World Index; the 5-factor model include these two risk factors plus small minus big (SMB), high minus low (HML), and momentum (WML) factors. Observations in the top and the bottom percentile of the country-specific distribution of 2-day cumulative abnormal returns are excluded. Standard errors in parenthesis are clustered at the country-by-industry level. *, **, ***, denote significance at the 10%, 5%, and 1% confidence level, respectively.

Table A2: Main Results with Country FE

2-Day Cumulative Abnormal Returns after Announcement Dates				
	Demeaned Returns	1-Factor Model	2-Factor Model	5-Factor Model
Financial	0.533*	0.595**	0.574**	0.579*
	(0.284)	(0.279)	(0.274)	(0.300)
Government-Related	0.576**	0.523**	0.579**	0.641**
	(0.241)	(0.245)	(0.244)	(0.248)
Tradable	-0.419*	-0.394*	-0.420*	-0.365
	(0.226)	(0.226)	(0.227)	(0.248)
External Financial Dependance	0.075*	0.072*	0.076*	0.075*
	(0.041)	(0.042)	(0.041)	(0.043)
Country FE	Yes	Yes	Yes	Yes
Financial – Tradable	0.95***	0.99***	0.99***	0.94***
	(0.30)	(0.29)	(0.28)	(0.31)
Govt-Related – Tradable	0.99***	0.92***	1.00***	1.01***
	(0.32)	(0.33)	(0.33)	(0.34)
Number of Countries	6	6	6	6
Observations	857	857	857	857
R^2	0.04	0.04	0.04	0.03

This table reports the OLS coefficients of a regression where the dependent variable is the CAR of each firm in the 2 days following the announcement of each country's inclusion in the corresponding index. The explanatory variables are: *Financial*, which is an indicator variable that is equal to 1 for financial firms; *Government-Related*, which is an indicator variable that is equal to 1 for government-related firms; *Tradable*, which is an indicator variable equal to for firms in tradable industries (according to the classification in Mian and Sufi (2014)); and *External Financial Dependance*, which is a measure of firms' dependance on external financing sources, computed following Rajan and Zingales (1998). All regressions include country fixed effects. The table reports also the difference between the estimated coefficient on *Financial* and that on *Tradable*, as well as the difference between the estimated coefficients on *Government-Related* and that on *Tradable*. CARs in the first column (the demeaned returns) are computed as the the cumulated differences between the daily returns and the average daily return in the year preceding the announcement. CARs in columns 2 to 4 are computed using three different factor models. The only risk factor in the 1-factor model is the return of the MSCI Emerging Markets Index; the two risk factors in the 2-factor model are the return of the MSCI Emerging Markets Index and the return of the MSCI World Index; the 5-factor model include these two risk factors plus small minus big (SMB), high minus low (HML), and momentum (WML) factors. Observations in the top and the bottom percentile of the country-specific distribution of 2-day cumulative abnormal returns are excluded. Standard errors in parenthesis are clustered at the country-by-industry level. *, **, ***, denote significance at the 10%, 5%, and 1% confidence level, respectively.

Table A3: Placebo Tests

Panel A: 2-Day Cumulative Abnormal Returns (2 Days before announcement)

	Demeaned Returns	1-Factor Model	2-Factor Model	5-Factor Model
Financial	0.264	0.254	0.248	0.219
	(0.250)	(0.263)	(0.264)	(0.258)
Government-Related	-0.160	-0.227	-0.237	-0.227
	(0.232)	(0.245)	(0.249)	(0.242)
Tradable	0.402*	0.343	0.337	0.349
	(0.225)	(0.224)	(0.223)	(0.226)
External Financial Dependance	-0.041	-0.044	-0.046	-0.047
	(0.038)	(0.039)	(0.039)	(0.039)
Number of Countries	6	6	6	6
Observations	857	857	857	857
R^2	0.01	0.01	0.01	0.01

Panel B: 2-Day Cumulative Abnormal Returns (2 Days before announcement)

	Demeaned Returns		1-Factor Model		2-Factor Model		5-Factor Model	
ΔYield $\times$ Govt&Fin	0.003	0.001	0.002	-0.000	0.002	-0.000	0.002	-0.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
%ΔExchRate $\times$ Tradable	0.118	0.158	0.068	0.110	0.067	0.112	0.068	0.112
	(0.149)	(0.155)	(0.150)	(0.156)	(0.151)	(0.156)	(0.152)	(0.157)
External Financial Dependance		-0.048		-0.052		-0.054		-0.053
		(0.036)		(0.037)		(0.038)		(0.037)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Countries	6	6	6	6	6	6	6	6
Observations	861	857	861	857	861	857	861	857
R^2	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01

This table reports the OLS coefficients of a regression where the dependent variable is the CAR of each firm over the interval $[t-3, t-2]$, where t is the first trading day after the announcement of each country's inclusion in the corresponding index. In Panel A, the explanatory variables are: *Financial*, which is an indicator variable that is equal to 1 for financial firms; *Government-Related*, which is an indicator variable that is equal to 1 for government-related firms; *Tradable*, which is an indicator variable equal to for firms in tradable industries (according to the classification in Mian and Sufi (2014)); and *External Financial Dependance*, which is a measure of firms' dependance on external financing sources, computed following Rajan and Zingales (1998). In Panel B, the explanatory variables are: $\Delta Yield \times Govt\&Fin$, which is the product of indicator variable that is equal to 1 for financial and government-related firms, and the 2-day change in the 5-year local currency government bond yield, in basis points; $\%\Delta ExchRate \times Tradable$, which is the product of *Tradable* and the 2-day percentage change in the exchange rate (computed as the difference in the log of the exchange rate) in percentage points; *External Financial Dependance*; and country fixed effects. CARs in the first column (the demeaned returns) are computed as the the cumulated differences between the daily returns and the average daily return in the year preceding the announcement. CARs in columns 2 to 4 are computed using three different factor models. The only risk factor in the 1-factor model is the return of the MSCI Emerging Markets Index; the two risk factors in the 2-factor model are the return of the MSCI Emerging Markets Index and the return of the MSCI World Index; the 5-factor model include these two risk factors plus small minus big (SMB), high minus low (HML), and momentum (WML) factors. Observations in the top and the bottom percentile of the country-specific distribution of 2-day cumulative abnormal returns are excluded. Standard errors in parenthesis are clustered at the country-by-industry level. *, **, ***, denote significance at the 10%, 5%, and 1% confidence level, respectively.