Capital Inflows, Sovereign Debt and Bank Lending: Micro-Evidence from an Emerging Market

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Abstract

This paper uses a quasi-natural experiment to show that government access to foreign funding increases private access to credit. I identify a sudden, unanticipated and exogenous increase in capital inflows to the sovereign debt market in Colombia. This was due to J.P. Morgan's inclusion of Colombian bonds into its emerging markets local currency government debt index, which led to an increase in the share of sovereign debt held by foreigners from 8.5 to 19 percent. This event had significant and heterogeneous effects on Colombia's commercial banks: banks that acted as market makers in the treasury market reduced their sovereign debt holdings by 4.2 percentage points of assets and increased their commercial credit supply by 3.9 percentage points of assets compared to the rest of the banks. The differential increase in credit is around 2 percent of GDP. Firm and industry level evidence suggests that this had positive effects on the real economy. A higher exposure to market makers led to a higher growth in financial debt, investments, employment, production and sales.

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1 Introduction

How do public and private access to credit interact? Economic theory suggests that when governments borrow from domestic institutions this may lead to a crowding out of private debt.[1] This crowding out depends crucially on public access to foreign funding. When there is little access to foreign investors, governments rely heavily on domestic institutions to absorb the issuance of debt. If foreign investors become willing to purchase sovereign debt, this reliance on local financial institutions may be reduced, freeing resources for the private sector. As a result, local firms may be able to finance investment projects and boost economic activity.

Although intuitive, there is no clear evidence on this topic because sovereign risk, sovereign bond holdings of banks and foreigners, and loans to the private sector are all jointly determined. For instance, an improvement in local economic conditions may increase both foreign investor demand for sovereign debt and credit demand from local firms. In such a case, one would observe both an increase in the share of sovereign debt held by foreign investors and an increase in private credit, but this correlation would not imply causation. This common problem illustrates the difficulty of finding causal evidence on this issue.

The main contribution of this paper is using a novel episode to overcome the identification problems previously encountered in the literature. By doing so, I provide clear evidence that government access to foreign funding increases private access to credit and boosts economic activity. I exploit a sudden, unanticipated and exogenous shock that triggered the entrance of foreign investors to the local currency sovereign debt market in Colombia.[2] In March 2014, J.P. Morgan announced the inclusion of several Colombian treasury bonds into its emerging markets local currency government debt index. J.P. Morgan explained that the index rebalancing was due to an increased transparency and efficiency in the sovereign debt market and thus, exogenous to the economic conditions in Colombia. Since many international mutual funds track their performance against this index, they changed their portfolio suddenly, directing capital flows to the Colombian local currency sovereign debt market.

Besides exogeneity, this shock had a number of appealing features. First, it was sizable: the share of debt held by foreigners in this market went from 8.5 to 19 percent in only 7 months (Figure 1). Second, it appears to have been unanticipated. Third, provided that the

[1] See for instance Diamond (1965).

[2] As shown by Du et al. (2016) and Du and Schreger (2016) most of the local (foreign) currency sovereign bonds in emerging markets are issued under domestic (foreign) law, and traded in domestic (foreign) markets. Thus, the terms domestic sovereign debt and local currency sovereign debt will be used interchangeably throughout the paper.

index is specific to government debt, it does not directly affect flows to the private sector.

I find that the entrance of foreign investors had sizable effects on commercial banks. Moreover, it had heterogenous effects on banks according to their participation in the local currency sovereign debt market. In Colombia, the Ministry of Finance selects financial institutions to act as market makers or official intermediaries in the treasury market. Each of the intermediaries participating in the program is obliged to absorb 4.5 percent of the total debt issued by the government in the primary market. I find that market maker banks reduced their domestic sovereign debt holdings by 4.2 percentage points of assets, compared to the rest of the banks. Using data either at the city-zone or industry level, I also show that they increased differentially their commercial credit supply by 3.9 percentage points of their assets. Results show an almost complete substitution between sovereign debt and commercial credit. This effect is also economically significant, around 2 percent of Colombia's GDP.

I analyze whether the shock had real effects in two different ways. First, I look at the balance sheet of firms in Colombia during this period using data from Superintendencia de Sociedades. I construct a proxy for the exposure to market maker banks at the industry level, and show that firms in industries with more exposure to market makers increased both their financial debt and investments during this period. Second, I obtain data on monthly employment, production and sales from the Monthly Manufacturing Polls conducted by the Departamento Administrativo Nacional de Estadistica (DANE). Using this data, I find that industries more exposed to market makers had higher growth of employment, production and sales during this period.[3]

I conduct several robustness checks to confirm the results. I try a placebo test for the same period a year before, confirming that the effect is not present during this other period. Moreover, I estimate the cross-sectional coefficients of a regression of credit growth on a dummy variable indicating whether a bank is a market maker or not. I find that the coefficients are only statistically significant during the rebalancing, showing an important support for the identification strategy. I discard several alternative hypotheses. Most importantly, the effect on credit growth is not driven by valuation effects on the balance sheet of banks.

The evidence is consistent with the following narrative. Before the entrance of foreign investors, there was a crowding out of private credit. The domestic sovereign debt market was dominated by local participants and the investor base was undiversified. Therefore, the government used market makers to absorb debt issued in the primary market. Since the

[3]Unfortunately, I do not have access to the credit registry in Colombia, which provides information at the bank-firm level, which would facilitate the analysis for the real effects on firms.

secondary market was less liquid, market makers kept part of the issued debt in their balance sheet because it was difficult to find investors to offload this debt.[4] As foreign institutional investors entered the domestic sovereign debt market, they sold the excess of debt that could not offload before and used the proceeds to extend credit.

This paper contributes to two broad strands of literature. From a macroeconomic perspective, it is related to the literature on the interrelationship between the supply of credit to public and private sectors. This line of research has received a lot of attention during the recent European Sovereign Debt Crisis, emphasizing two different mechanisms. On the one hand, there is a line of research highlighting that an increase in the home bias of sovereign debt holdings crowds out private credit. For instance, Broner et al. (2014) propose a model with creditor discrimination and crowding out effects that accounts for the reallocation of credit from the private to the public sector observed in the euro zone periphery during the European Sovereign Debt crisis. Becker and Ivashina (2014) and Altavilla et al. (2015) also provide empirical evidence consistent with this reallocation channel. On the other hand, there is a part of the literature that emphasizes how shifts in sovereign risk affect the balance sheets of banks. For example, Bolton and Jeanne (2011), Gennaioli et al. (2014) and Perez (2015) propose models in which sovereign defaults hurt the balance sheet of banks and reduce private credit. From an empirical point of view, Bofondi et al. (2013), Acharya et al. (2014), Gennaioli et al. (2014), and Baskaya and Kalemli-Ozcan (2016) present evidence consistent with this channel.[5] Most of these papers have problems identifying an exogenous shock that exclusively affects foreign demand for sovereign debt. I provide such a shock and to the best of my knowledge this paper is the first to use this type of event and separate between the two channels highlighted by the literature.

Second, from a finance perspective, this paper contributes to a growing literature on the aggregate effects of institutional investors. Since the Global Financial Crisis, there has been an increased interest in the activities of financial intermediaries other than traditional banks. Investment activities by mutual funds have been at the core of the discussion and index-tracking funds have received special attention because of their exponential growth in size.[6] There have been several studies analyzing the consequences on financial markets of the

[4] As defined by Reinhart and Sbrancia (2011) this could be an implicit form of financial repression.

[5] This empirical literature is closely related to the growing literature on the real effects from credit supply changes. See among others Gan (2007), Ivashina and Scharfstein (2010), Iyer and Peydro (2011), Jimenez et al. (2012), Jimenez et al. (2014), Iyer et al. (2014). Within this literature my paper is more related to several papers studying the effect of international shocks to emerging markets and lending by banks. See Khwaja and Mian (2008), Paravisini (2008), and Schnabl (2012) for episodes in Pakistan, Argentina and Peru, respectively.

[6] This phenomenon is the consequence of a large switch of investor funds from active to passive funds and a

presence of these funds. For instance, Chang et al. (2014) and Raddatz et al. (2015) document the price effects generated by these funds during index rebalancing periods. Sullivan and Xiong (2012), Bhattacharya et al. (2013), Ben-David et al. (2014), and Israeli et al. (2015) show that index-tracking investors increase market vulnerability and volatility.[7] However, the evidence on the possible economic consequences of index-tracking investors is slim as highlighted by Wurgler (2010).[8] To the best of my knowledge, this paper is the first attempt to document that international capital flows by index-tracking investors have effects on the real economy.

More broadly, this paper contributes to the literature on the relationship between international capital flows, credit booms and economic activity. On the one hand, there are several studies analyzing whether capital inflows lead to higher credit growth and an increase in economic activity.[9] On the other hand, there are several studies analyzing the relationship between large capital inflows and the consequences for the economy.[10] Most of these studies have problems addressing endogeneity issues, since capital flows are almost always related to local economic conditions. I contribute to this literature by using an exogenous increase in capital inflows for identification. Thus, I provide evidence that capital inflows to the sovereign debt market cause an increase in credit growth and an expansion in economic activity.

The rest of the paper is organized as follows. Section 2 provides the empirical setting, with a detailed account of the index rebalancing and sovereign debt market in Colombia.

documented movement of active funds into more passive investment strategies. See among others Cremers and Petajisto (2009).

[7] More broadly, there is a large literature on the aggregate effects of international mutual funds on financial markets. See among others Broner et al. (2006), Jotikasthira et al. (2012), Levy-Yeyati and Williams (2012) and Raddatz and Schmukler (2012).

[8] There has been a recent literature focusing on the real effects of institutional investors flows in general. Chernenko and Sunderam (2012) analyze how flows into high-yield mutual funds have effects on the issuance of firms and their investments. Adelino et al. (2014) document how changes in credit ratings by Municipalities in the United States have consequences for public financing and for economic activity. Almeida et al. (2015) and Adelino and Ferreira (2015) document how credit ratings upgrades and downgrades affect firms' real investment decisions and banks' credit supply.

[9] For instance, Mendoza and Terrones (2012) find that credit booms are positively correlated with net capital inflows. Calderon and Kubota (2012) suggest that private capital inflows are good predictors of credit booms. In a more granular approach, Lane and McQuade (2014) argue that only net debt inflows generate domestic credit growth in European countries. In a related theoretical and empirical work, Blanchard et al. (2015) find that only equity inflows are correlated to credit expansions.

[10] Reinhart and Reinhart (2009) study how capital flow bonanzas affect the likelihood of economic crises. Caballero (2016) shows that capital inflows bonanzas increase the probability of banking crises. Kalantzis (2015) and Benigno et al. (2015) study the changes in the sectorial allocation of resources due to large capital inflows.

Section 3 presents the identification strategy and empirical analysis for the results on bank lending. Section 4 shows the results for the real economic activity. Section 5 concludes.

2 Empirical Setting

2.1 Indexing in International Markets

International indexes (or international benchmarks) are broad market indexes of different assets that involve several countries. They are constructed by different companies (index providers) such as Morgan Stanley Capital International (MSCI) for international equities or J.P. Morgan for international debt securities. The former constructs, for instance, the MSCI Emerging Markets Index and, the latter, the J.P. Morgan Emerging Markets Bond Index (EMBI), two of the most recognized indexes in the world for emerging countries.

The construction process for these indexes involves different broad steps that are used by almost all index providers. They first define the main scope of a benchmark index (such as, geography, industry, and type of firms) and in which category each country is classified at each point in time (developed, emerging, or frontier). Then, they select a number of securities that fall within the scope and meet the size, market capitalization, liquidity, and other requirements. Each of these securities gets a loading (or inclusion factor) in the index portfolio assigned by the index producer according to how much it meets the index-construction criteria and how accessible it is to investors (given by the free-float market capitalization, restrictions to foreign investors, and so forth). The return of the index consists of the returns of its constituent securities, using various approaches to aggregate fluctuations in individual instruments (e.g., Laspeyres, chain-weighting). Namely, each index captures the market capitalization weighted returns of all constituents included in the index.[11] The indexes are periodically rebalanced to ensure their continuity and representativeness.

Countries' weights in a specific index are assembled with the portfolio weights of individual securities included in a benchmark index, aggregated at the country level according to the market where the security was issued. That is, international benchmark indexes are typically constructed using a bottom-up approach and consist of composite stock or bond market indexes that include securities from many countries as constituents.

The market for local currency sovereign debt indexes is mainly dominated by the World Government Bond Index (WGBI) by Citigroup and the Government Bond Index Emerging

[11] More recently, index providers have focused on constructing alternative indexes not based on market capitalization (such as GDP-weighted indexes or fundamentals based indexes).

Markets (GBI-EM) by J.P. Morgan. The former is a local currency government bond index that includes securities mainly from developed markets. The latter only includes emerging market government debt in local currency.[12] While many more funds track the WGBI (approximately 1.5 trillions U.S. dollars) than the GBI-EM (200 billions U.S. dollars), the weights of emerging countries significantly differ in both indexes. For instance, Mexico (one of the few emerging countries included in both indexes) has a weight of around 0.7 percent in the WGBI and of 10 percent in the GBI-EM. Thus, the exposure of emerging markets is generally lower in the WGBI.

These indexes have become popular and are frequently used as benchmarks by international mutual funds, which manage a significant part of international assets. By helping alleviate agency problems, benchmarks allow the underlying investors and supervisors to evaluate and discipline fund managers on a short-run basis using, for example, the tracking error of the fund (the deviation of its returns from the benchmark returns). To the extent that the investment strategy of these funds is pinned down by the composition of their benchmark indexes, changes in the weights that a popular benchmark gives to different countries can trigger a similar rebalancing among the funds that track it and result in sizeable movements in international portfolio allocations, capital flows and asset prices.

2.2 Benchmark Change in Colombia

On March 19th 2014, J.P. Morgan announced the inclusion of five Colombian bonds into its benchmark indexes. J.P. Morgan constructs three type of major international indexes: (i) foreign currency denominated sovereign debt; (ii) local currency denominated sovereign debt and; (iii) corporate debt. The addition of these bonds involved only local currency sovereign debt indexes, namely the Government Bond Emerging Markets Indexes (GBI-EM). The securities introduced were treasury bonds (named TES) issued by the Colombian government with maturities in 2016, 2018, 2022, 2024 and 2028. The process was done in a phased approach starting at the end of May 2014 and finishing at the end of September 2014. The most popular index, the GBI-EM Global Diversified saw a large rebalancing of Colombia's benchmark weight.[13] It went from 3 to 8 percent, representing the largest restructuring by J.P. Morgan in one of its indexes. At the time of the announcement there

[12] J.P. Morgan also constructs the Emerging Markets Bond Index (EMBI) which is a foreign currency sovereign debt index. Since emerging markets governments shifted their preference towards local currency debt, this index has been steadily declining in popularity.

[13] The benchmark weight of a country is defined as the sum of the market capitalization of all securities issued in a country divided by the total market capitalization of all the securities included in the benchmark index.

were estimations of 10 billions U.S. dollars in inflows into the Colombian government debt market with an estimated outstanding debt of 90 billions U.S. dollars.[14]

The reason for Colombia's inclusion in the index revolves around an improvement in market access. The note provided to investors by J.P. Morgan stated: "As a result of improved transparency and accesibility for international investors in the local TES market, Colombia sufficiently meets inclusion requirements for complete GBI-EM inclusion." This note did not mention a specific policy change as the trigger for this inclusion. However, many newspapers highlighted that this decision could have been motivated by Law 1607 of January 2013, which reduced taxes on foreign investors' earnings from domestic securities from 33 to 14 percent.

Around the years 2013-2014 there were many events affecting Colombia as a country. Then, it is useful to observe the evolution of the price of domestic sovereign bonds in Colombia. (Figure 2, Panel A). The tax reform seems to have a positive impact on the price of these bonds (while part of this upward trend was due to a global factor driving up bond prices of emerging markets during large part of 2012). Not long after the tax reform, the Federal Reserve of the United States started considering unwinding quantitative easing (Taper Tantrum). The beginning of this event was marked by the Federal Reserve Chairman Ben Bernanke's suggestion of this unwinding in his testimony before Congress on May 22, 2013. Bond prices of emerging markets dropped sharply around that period, and Colombia's bonds were not an exception as they experienced a drop of nearly 12 percent during that summer. Prices remained low during the rest of 2013, mostly due to the uncertainty generated by Taper Tantrum talks. Upon the announcement by J.P. Morgan in March, Colombian bonds increased in price by almost 5 percent in two weeks. Most of this gain was reversed by the end of the rebalancing in October. The pattern in the price of these bonds suggests two things. First, the event was unexpected and sizable as there was a sharp and sudden increase upon its announcement. Second, most of the effect was temporary, probably induced by the increased demand by funds that track J.P. Morgan's indexes.[15]

Figure 2, Panel B shows a proxy for the liquidity in secondary markets. It shows the bid-ask spread index constructed by Thomson Reuters Pricing Source of the affected bonds. For most of the period until the announcement the index is relatively stable. After the announcement there is a reduction, and, coincidental with the first effective date, there is a large drop in the index of almost 60 percent. Evidence suggests that there was a large

[14] Reuters (2014).

[15] Section 3.4.3 provides an account of the exchange rate evolution during this period. Since there were large capital inflows, the exchange rate appreciated considerably during the first part of the rebalancing.

increase in market liquidity, triggered by the entrance of foreign investors. This effect seems permanent as opposed to the change in prices around the rebalancing.

Institutional investors that track these indexes closely were forced to rebalance their portfolio. These portfolio changes had aggregate consequences for Colombia in terms of capital flows to local currency sovereign debt as shown in Figure 3, Panel A. This figure presents the net purchases of TES securities by foreigners and commercial banks. Prior to the announcement by J.P. Morgan there were some capital inflows to domestic sovereign debt. However, after the announcement, foreigners started massively buying local currency sovereign debt in Colombia. Purchases made between the end and the beginning of the rebalancing were 8 percent of the total outstanding local currency sovereign debt securities.[16] During the same period, foreigners more than doubled their participation in the affected local currency sovereign debt market (Figure 3, Panel B). Furthermore, by the end of 2014 they were the largest holders of the affected bonds.

Another interesting feature of Figure 3 is the different agents that were on the other side of the purchases of domestic sovereign debt by foreigners. Commercial banks, with relatively stable purchases before the announcement, started selling treasury securities in an image that mirrors the one by foreigners (Panel A). Compared to the rest of the agents in the economy, commercial banks were the main providers of liquidity during the rebalancing (Panel B). Out of the 10 percentage point increase in the participation of foreigners in this market, 7 were accomodated by banks (almost a 30 percent decline in their participation in the TES market). Alternatively, pension funds, insurance companies and domestic mutual funds only reduced their participation by 0.3 percentage points (1 percent decline), while public institutions reduced their share in this market by 2.5 percentage points (7 percent decline). Both of these figures suggest that commercial banks in Colombia reduced their holdings of affected bonds by much more than the rest of the agents in the economy.

On the macroeconomic front, the rebalancing by J.P. Morgan did not bring a renewed appetite to issue more debt by the government. During the period under analysis, the Colombian government maintained a relatively constant growth of its local currency debt securities.[17] Another potential consequence from the event could be an added appetite by foreigners for domestic private assets. Foreign direct investment and private portfolio flows only experienced a slight increase in inflows relative to GDP. Instead, public debt securities had gross inflows of 0.7 percent of GDP on average before the rebalancing. This number

[16] This number increases to 10.3 percent if we consider the March-December 2014 period, accounting for the fact that some funds slowly change their positions.

[17] See Appendix Figure 1, Panel A.

increased to 2.9 percent during 2014, indicating an increase of almost 400 percent. The evidence suggest that the event generated a sudden and large increase in capital inflows that was exclusive to domestic sovereign debt markets in Colombia.[18]

2.3 Market Makers in TES bonds

In Colombia, commercial banks are important participants in the sovereign debt market. Before the benchmark change, banks were the largest participant in the TES market that was affected by the rebalancing. They held collectively around 25 percent of government issued bonds. Moreover, around 11 percent of their assets were local currency sovereign bonds as of December 2013. As noted above, commercial banks were on the other side of the transactions from foreigners in the market for TES bonds during the rebalancing. This suggest that there might be a special feature about commercial banks that may have generated this large response.

One noticeable feature of the market for TES in Colombia is that the Finance Ministry designates official market makers in this market. By law, these market makers are within the set of commercial banks, financial corporations and brokerage firms. The objective of this program is to promote adequate conditions for the financing of the government in capital markets by developing the domestic sovereign debt market. Every year, each institution decides whether it wants to participate in the program or not. In order to participate, they need to fulfil a minimum net worth and corporate rating criteria. Then, the Finance Ministry ranks institutions according to their activity in primary and secondary debt markets and designates the official market makers. At the end of every year, a maximum of 20 entities are designated as such. There are two main obligations for these institutions. First, they need to absorb at least 4.5 percent of all primary market debt issuances during the year. Second, they need to quote permanently and simultaneously bid and ask prices in secondary markets subject to a maximum bid-ask price determined by the government.[19] On the other hand, designated market makers benefit from having special access to debt issuances from the government, constant access to officials from the Ministry of Finance, and access to a liquidity window in case of problems.[20] Under this program, at the end of 2013, 9 commercial banks in Colombia were designated as market makers among 14 participants in the program.

[18] See Appendix Figure 1, Panel B.

[19] The other two obligations are to construct monthly reports about the state of the domestic sovereign debt market and to inform of any mergers/sales to the treasury department.

[20] y Credito Publico (2010)

2.4 Conceptual Framework

The difference between commercial banks that are designated official market makers and those that are not could be insightful to understand the channel at work during the benchmark rebalancing. These financial institutions are obliged to absorb certain amount of debt issued by the government in the primary market. Every institution by law has to be awarded at least 4.5 percent of total debt issued by the government during the year. In the case of both frequent auctions and the absence of a diversified investor base in the secondary market, these banks have a lower probability of offloading this debt to other investors. As a result, they keep a considerable amount of it in their balance sheet. After the entrance of foreign investors, these banks can offload debt absorbed in the primary auction more easily and can use the proceeds for other purposes.

The type of foreign institutional investors that enter the market is also important. In this episode, these were index-tracking investors. Moreover, the indexes affected (GBI-EM) are market capitalization weighted indexes. As such, every time the government issues this type of debt, it gets included into these indexes, and index-tracking investors have to inmediately buy it, creating an almost certain demand in the secondary market for this debt. This increases the probability that market maker banks offload the debt from the primary market. Therefore, after the benchmark change they should reduce their holdings of sovereign debt.[21]

Figure 4 presents evidence in this direction. Before the rebalancing, average holdings of market makers were considerably higher than those of the rest of the banks. Between the announcement and the end of J.P. Morgan's index rebalancing, the ratio of local currency sovereign debt to total assets decreases 28 percent for commercial banks that are market makers, while it is almost the same for the rest of the banks. This effect is driven entirely by reductions in sovereign debt positions.[22] With this figure I compute the reduction in local public debt by market maker banks, which is 4.2 percentage points of assets relative to the

[21] Anecdotal evidence from several people working in banks around the period suggest that the reduction in sovereign debt from market makers was due to the entrance of foreign investors. Furthermore, monthly average net issuances during 2013 amounted to 0.25 percent of the initial assets of market makers. A back of the envelope calculation shows that if they can offload 90% of this amount, the stock that would remain in their balance sheet would be 0.3 percent of their assets in a year. Since the birth of the program was in 1999, in 14 years this would amount to 4.3 percent of their assets. These simple calculations show how market makers could end up with a large stock of debt if they cannot offload it quickly in secondary markets.

[22] More strikingly, all market maker banks were net sellers of sovereign debt during the event, and half of the banks among non market makers were net sellers of government bonds.

rest of the banks.[23][24]

3 Bank Lending

3.1 Data and Identification

In the previous section, I established that commercial banks that were market makers sold a sizable amount of their positions in local currency government bonds. This section presents the data and methodology to understand whether the proceeds from these sales resulted in an increase in credit by these banks. I use the following baseline specification:

$$\Delta L_{ibt} = \theta_{it} + \theta_b + \beta_1 \mathbb{1}_b^{\text{MM 2013}} \mathbb{1}_t^{\text{Rebalancing}} + \beta_2 X_b \mathbb{1}_t^{\text{Rebalancing}} + \varepsilon_{ibt} \tag{1}$$

where L_{ijt} is the log of credit to total assets for a city-zone or an industry i, bank b at time t. θ_{it} are fixed effects at the city-zone-time or at the industry-time level. X_b is a set of observable variables at the bank-level. $\mathbb{1}_b^{\text{MM 2013}}$ is a dummy variable that indicates whether a commercial bank was a market maker at the end of 2013 or not. $\mathbb{1}_t^{\text{Rebalancing}}$ is a dummy variable that takes the value 1 from March until the end of September 2014. The identification comes from the difference-in-difference estimation of credit growth for market maker and non market maker banks. During the rebalancing, market makers were more affected than the rest of the banks, since they could sell domestic sovereign debt more easily. The rest of the banks should not be affected by this channel. Therefore, as long as the evolution of credit for both groups before the rebalancing was similar, we can use $\mathbb{1}_b^{\text{MM 2013}} \mathbb{1}_t^{\text{Rebalancing}}$ as a treatment variable and analyze whether the entrance of index-tracking investors in the sovereign debt market had an effect on bank lending through this channel. β_1 identifies this by comparing the differential average growth in credit between market maker and non market maker banks during the rebalancing within a city-zone or industry. By comparing observations within a city-zone or an industry I can partially control for any concerns that credit demand may be affecting this estimation.[25] For all the estimations, I use standard

[23] This number is computed from the difference-in-difference between the holdings at the end of September 2014 versus February 2014 for the two groups of banks.

[24] Appendix Table 1 presents the estimates for the differential effect of being a market maker during this period. Results are very similar to those in the picture.

[25] As explained by Adelino et al. (2015) this might not be a perfect control for credit demand. However, I will try to present suggestive evidence on the unlikely possibility that this shock is coming through credit demand. While a more sound strategy would be controlling at the firm level, I do not have data on the credit register of Colombia. In some cases, even data at the bank-firm level might not capture perfectly

errors bootstrapped clustered at the bank-time level.[26]

I use data from Colombia's banking system. I gather data from Superintendencia Financiera de Colombia on credit by banks. The main database consists on different types of credit to a specific city-zone (for instance Bogota-Centro Internacional) at the bank level. I match this data on credit with balance sheet data for each bank to use different bank-level variables. I complement data with the official designation of market makers by the Finance Ministry. Data is on a quarterly basis for the 2011-2014 period and contains data for 24 commercial banks on 86 city-zones (with 10 zones). While most of the results use the city-zone credit database, I rely on an alternative database at the industry level for robustnes. This database contains information for 94 industries. [27] Table 1 presents a list of all the commercial banks with their classification into market makers at the end of 2013, and whether they are domestic or foreign banks.

Table 2 shows the descriptive statistics of the balance sheet structure divided by whether a bank was an official market maker at the end of 2013 or not. There are substantial observable differences between the two type of banks. Market makers are larger both in assets and liabilities than non market maker banks. Market makers hold more investments and more local public debt, and thus less total credit in their asset side. On average, market makers hold 15.4 percent of their assets in local public debt, while non market makers hold 8.9 percent of their assets in local currency sovereign debt. Within credit, they seem more exposed to commercial credit, while non market makers lean more to consumer credit. Regarding balance sheet health, all Colombian banks are above the minimum solvency ratio (9 percent for the total solvency ratio) and non market maker banks have a larger solvency ratio than market-maker banks.

3.2 Empirical Analysis

Before going in-depth into the full formal analysis, I start by estimating Equation (1) at the aggregate bank level from balance sheet monthly data in Table 3 for the period 2013-2014. Market maker banks significantly increased their total credit growth during J.P. Morgan's rebalancing. This increase is exclusively driven by commercial credit, rather than by consumer credit. A possible explanation is that banks usually have a relationship established with firms, and this type of credit provides the next best substitute to sovereign debt in

credit demand as suggested by Paravisini et al. (2015).

[26] Alternative clustering at the bank-time level do not alter the results.

[27] Throughout the paper I mainly rely on the city-zone database due to its balance among different banks and for brevity. Results are qualitatively similar at the industry level.

Colombia. In the rest of the paper, I will only look at commercial credit growth, since it is the driver large differential in credit between market maker and non market makers.

Table 4 presents the results from the main empirical specification. When I control only for time fixed effects, there is a positive and significant differential credit growth of 5.6 percent during the rebalancing (Column 1). The coefficient and standard errors are almost the same when I include city-zone-time fixed effects (Column 2). Moreover, the R-squared goes from 4.3 percent to 17.2 percent indicating that these fixed effects are capturing an important amount of the credit demand varying at the city-zone-time level. This lends support to the hypothesis that this effect is coming from an increase in credit supply rather than by changes in credit demand.[28] When I include bank fixed effects, which control for any unobserved fixed bank characteristics, there is a differential average growth of 5.4 percent for market makers (Column 3). Effects estimated at the city-zone level are qualitatively similar when I use the industry database. The coefficients are statistically similar, and the analysis mirrors the one at the geographical level. One thing to notice is that by using the industry database I partially control for any credit demand shock that may affect tradable and non-tradable industries differently due to the exchange rate changes during the rebalancing.

The economic size of these estimations are also meaningful. The results in Column 3 suggest that the differential average growth for market makers versus non market makers during the period was close to 11 percent. This implies an increase in commercial credit of 3.9 percentage points of assets. Using the total assets of market maker banks, this amounts to a differential growth in commercial credit of 12.8 trillions of Colombian Pesos.[29] These numbers suggest that the shock induced an increase in commercial credit of 2.25 percent of GDP. Moreover, the estimations suggest almost a full substitution between local public debt and commercial credit. The increase in commercial credit was only 0.3 percentage points lower, in absolute terms, than the decrease in sovereign debt. This small difference could be explained by regulatory purposes. If banks do not want to change their risk profile, they would need to increase credit by less than the decrease in sovereign debt since government debt is zero-risk weighted for regulatory purposes.

[28] Another way to partially rule out a demand-based hypothesis is to analyze the interest rates on commercial credit. For this to be supply driven I should observe that quantities and prices go in opposite directions. During the period between September 2014-March 2014, the average interest rates on commercial credit for market makers went down by almost 2 percent. In the same period, the average rate for non market makers increased by almost 5 percent, showing a differential evolution between the two that is not present before the rebalancing (Appendix Figure 2).

[29] These numbers are obtained by using the estimated differential credit growth during the period multiplied by the commercial credit for market makers in February 2014. After this, I multiply it by the total assets of market makers in February 2014 to obtain the differential growth in commercial credit.

3.3 Threats to Identification

There are important identification threats that I address in this section. More specifically, the presence of differential credit growth between market maker and non market maker banks in other time periods. Table 5 runs a placebo test, by creating a dummy that equals 1 during the same period of the rebalancing but one year before, from March to September 2013. This test has two advantages. First, that by using a different time dummy I control for capturing non-effects in the baseline estimation. Second, that I also test for the possibility of the tax reform being the true trigger of capital inflows. The table shows that both in the city-zone and industry databases, the treatment variable loses its signficance in all the specifications. Therefore, it is hard to argue both that the effect is present in other periods and that was not created by the index rebalancing event.

Along the lines of this test, I also estimate a cross-sectional version of Equation (1). More specifically, I run the following regression:

$$\Delta L_{ibt} = \theta_i + \beta_1 \mathbb{1}_b^{\text{Market Maker 2013}} + \varepsilon_{ib} \tag{2}$$

where I use bootstrapped errors clustered at the bank level. I do this for every quarter from 2013-2014 and plot this time series in Figure 5. The evidence shows that the market maker dummy is only positive and significant during the rebalancing, giving further support to the identification strategy.

Another possible threat to identification is the existence of a differential prior evolution of the outcome variable. While the placebo test and plot are partially showing this, I present a figure with the actual evolution of commercial credit over assets during the period of study. Figure 6 presents these trends, and shows that the evolution of credit between market makers and the rest of the banks before the rebalancing is quite similar, and it differs considerably afterwards.[30]

[30] Upon announcement, there is both an increase in commercial credit for market makers and a decrease in commercial credit by the rest of the banks. One concern in the identification strategy is that the increase in credit by market makers increase competition for non market makers and reallocate credit within the two types of banks. Appendix Table 2 shows evidence against this hypothesis by using a competition measure at the city-zone-time level interacted with the treatment variable.

3.4 Alternative Hypotheses

3.4.1 Sovereign Debt Exposure

The above mentioned results show a direct relationship between credit growth and market makers during the benchmark rebalancing. However, market makers are significantly different from non market maker banks. One considerable difference is that they hold more local currency government bonds. In principle, since market makers had more debt to begin with, they could have experienced a greater net worth increase due to a price effect, and extended more credit. Then, the effect captured in Table 4 would be driven by the holdings of local public debt by commercial banks. Interestingly, there is variation across the sovereign debt holdings of debt that I can exploit to rule out this potential explanation. Figure 7, Panel A shows the local public debt to assets ratio. On average, market makers hold more debt, but the correlation is not perfect. Some banks that are not market makers, have more debt than some market maker banks. Therefore, I am able to use this variable to understand whether the effect on credit is coming from the fact that a bank is a market maker or that it holds more sovereign debt. Since there was a considerable price increase after the announcement of the rebalancing, there are two straightforward predictions to test. First, that banks with more holdings of local public debt should have a larger increase in credit. Second, that this effect should be more pronnounced for banks with lower balance sheet health.

I test these two predictions in Table 6. The estimations confirm that the effect is coming from the nature of being a market maker. Once I introduce sovereign debt to total assets (Column 1), this variable is positive but not significant at the 10 percent level. When I add the treatment variable the coefficient for local public debt is significantly reduced (Column 2). Also, controlling for the different fixed effects does not alter the results (Columns 3 to 4). In Column 5, I test the second prediction and find that banks that had more local public debt and were more constrained did not change significantly their credit. These estimations show that the effect on credit is not coming through the holdings of sovereign debt and due to a potential balance sheet channel.

The estimations in Table 6 may suffer from a data problem since I do not observe the actual holdings of local public debt. Therefore, some banks may have government debt that was not affected by the rebalancing and this might by affecting this regression. To control for this, I use the profits over assets during March 2014 as a proxy for banks' valuation gains (Table 7). The results are qualitatively similar to the ones using the local public debt exposure. Furthermore, the treatment variable is still significant and the coefficient is very

similar to the one estimated in Table 6.

3.4.2 Bank Size

Another important difference between market maker and non market maker banks is their size. The former are much larger than the latter when we look at the total banking system, the average and the median. A valid hypothesis is that these banks have more resources, a larger network of contacts compared to non market makers and thus can contact foreign investors more easily and sell them more bonds than non market makers. I control for this possibility by interacting the log of initial assets with the rebalancing dummy in Columns 1-4 in Table 8. While positive, this variable is not statistically significant. Therefore it is hard to argue that size is behind the differential credit growth. Still, there could be a few very large or very small banks that could be affecting this estimation. Figure 7, Panel B shows the average assets in 2013 for all Colombian banks and shows that this could be a possibility. To perform a more stringent test of whether assets are driving results, I keep only banks with less than 25 or more than 5 trillions Colombian pesos. Therefore, I am using banks that are very close to the threshold in Figure 7, Panel B. Columns 5-7 in Table 8 show that the main results are not affected when using only these banks. Moreover, both the coefficient and significance levels are very similar to the ones in Table 4.

3.4.3 Exchange Rate Exposure

Capital inflows usually involve the entrance of foreign currency into the country. Therefore, in times where there are large capital inflows, such as during the rebalancing, the pressure for an exchange rate appreciation is also at play. Figure 8, Panel A shows the evolution of the exchange rate during the period of study. After the announcement there is a sharp appreciation of almost 10 percent until July 2014. Afterwards, there was an important depreciation of almost 8 percent until the end of the rebalancing. This coincides with an official intervention in the exchange rate market by the central bank around July 2014. Then, towards the end of the year, it coincides with falling oil prices worldwide. These amplified movements during the event could suggest that the exposure to the exchange rate in the balance sheet of banks could be an important explanatory variable of credit growth during the event. I collect data on the exchange rate exposure on Figure 8, Panel B. This plot shows the assets denominated in foreign currency minus the liabilities denominated in foreign currency divided by banks' net worth. It is a proxy for the currency mismatch of banks. A lower (or negative) value indicates that a currency depreciation could hurt the

banks' balance sheet more than a larger value in this proxy.

Table 9 shows the results from adding the exchange rate exposure and interacting it with the rebalancing dummy. Surprisingly, Column 1 shows a positive and statistically significant coefficient. However, when I add the treatment variable, this variable loses its significance. When I control with bank fixed effects, the coefficient is negative but still not significant. In the last column, I interact the exposure to the exchange rate with balance sheet health, but the evidence suggests that the exchange rate exposure did not play a role during the rebalancing for banks.[31]

3.5 Robustness Tests

While I have tested the main alternative hypotheses to the market making channel, there could be other variables affecting the baseline specification. In Table 10, Columns 1-3 I present three different tests. First, I remove the only state-owned bank (Banagrario) from the regression. The results show that there is no difference in the results from excluding this bank (Column 1). Second, the appetite of investors for sovereign bonds could spillover to corporate bonds, reducing the cost of financing for banks that use this instrument for funding. In Column 2 I include the outstanding debt securities issued by each bank normalized by total liabilities, which does not alter the main results. Third, foreign banks have a tighter relationship with international mutual funds. Thus, I introduce a dummy indicating the origin of the bank (Column 3). Again, this variable does not affect the coefficient of the treatment variable which still signals an average differential credit growth around 5.4 percent.

There is also the possibility that market maker banks have trading expertise and the results capture a similar channel to that in Abbassi et al. (2016). As the affected bonds increase in price, banks with expertise reduce their holdings since these securities are overvalued, and thus increase the credit supply. For the evidence to be consistent with this channel, I should observe that after an initial overvaluation of the bonds' price, the banks return to a similar level of ex-ante holdings of debt. However, the evidence is not consistent with a reversal of sovereign debt holdings. The price of sovereign bonds have a maximum peak the first week of April 2014. After that, these bonds suffer a 3 percent decrease in their price until the end of July. However, the average holdings of sovereign debt by market makers have a constanst decrease with a minimum at the end of July. This suggests that the evidence is not consistent with the channel presented by Abbassi et al. (2016) in the case of

[31] These results are qualitatively similar when I use external credit over liabilities by a certain bank as a proxy for the funding they receive in foreign currency.

Germany.

I also perform a robustness test using the commercial credit growth (not normalized by assets) in Table 10, Columns 5 to 8. The results are quantitatively similar to when I do normalize credit by assets. [32]

During all these estimations I choose to maintain a parsimonious specification, adding only the relevant variables to test for alternative hypothesis. Table 11 presents the baseline specification but using all the observable variables interacted with the rebalancing dummy. Results are qualitatively similar and suggest a causal link from being a market maker during the rebalancing period.

4 Real Effects

4.1 Balance Sheet Data

Until now I have shown that the entrance of foreign investors had consequences for the extension of private credit in Colombia. However, it remains to be seen whether this credit shock had consequences for the real economy. A problem towards this end is that I do not have access to the information at the bank-firm level such as the ones provided by the credit registry of each country. Therefore I need to rely on alternative data to gain understanding of the impact of the shock on the real economy. For this purpose, I collect balance sheet data on Colombian firms from Superintendencia de Sociedades. Data is yearly from 2011-2014. This organization provides the balance sheet of the population of Colombian firms, namely 7928 firms with complete information on financial debt and investments. Additionally, data contains the industry each single firm belongs to. Then, I can construct a proxy of the exposure to market maker banks at the industry level. More specifically,

$$Exp^{MM}_{i,2013} = \frac{\sum_{b \in MM} C_{ib,2013}}{\sum_{b \in B} C_{ib,2013}} \tag{3}$$

where $Exp^{MM}_{i,2013}$ is the exposure of industry i to market makers at the end of 2013. The numerator indicates the total credit extended by market makers to industry i at the end of 2013. The denominator contains the total credit extended by all banks to industry i. This

[32] The city-zone database also has data on deposits that I use to investigate whether the effect was only a substitution on the asset side of the balance sheet or whether it had consequences for the liability side. In Appendix Table 3, I estimate equation (1) but using total deposits instead of commercial credit. Again, there seems to be no effect from being a market maker during the event on the total deposits growth.

information is helpful to understand whether a firm in a given industry was more likely to be exposed to these banks before the benchmark change.

Appendix Tables 4 and 5 show the 86 industries that I was able to match between the two databases, along with the specific exposure at the end of 2013. This exposure is also presented graphically in Figure 9. Two things are worth noticing: First, there is a large degree of specifity in each industry included in the database. For instance, there is a category named Coking, Refined Petroleum Product Production and Fuel Blending Activity and another one for the Extraction of Crude Petroleum and Natural Gas. Second, there is a good amount of variation in the exposure to market makers. For example these two industries have a very different degree of exposure to market makers, with the former having a 59.3 percent, and the latter 96.6 percent. Still, the exposure to market makers from most of the industries is high, probably a consequence of these banks having a sizable part of the total assets in the banking system in Colombia. The median exposure is 81.6. The lowest industry has close to 11 percent exposure (Building Management Services and Landscaping), and the largest only received credit from market maker banks (Social work Activities without Accommodation).

With this variable, I estimate the following specification for the period 2011-2014,

$$\Delta y_{jt} = \theta_t + \theta_j + \alpha_1 Exp^{MM}_{i,2013} \mathbb{1}^{2014}_t + \alpha_2 Z_{jt-1} + \varepsilon_{jt} \tag{4}$$

where y_{jt} is the log variable of interest from the balance sheet for firm j and time t.θ_t and θ_j are fixed effects at the time and firm level respectively which captures aggregate time trends and unobservable fixed characteristics of firms. $Exp^{MM}_{i,2013} \mathbb{1}^{2014}_t$ is the treatment variable that identifies the exposure to market makers for the period of interest. I use the year 2014 since data is at yearly frequency. Z_{jt} is a vector of time-varying firm controls and ε_{jt} is the error term. I cluster errors at the industry level. I am specifically interested in two variables for y_{jt}. The first one is the financial debt of firms, which indicates the debt from financial institutions. If the shock was transmitted from banks to firms, then firms more likely to be exposed to market makers should have increased their financial debt. Second, I am also interested in the possible use of these funds. Therefore, I look at investments in these firms and how it was related to the industry exposure to market makers. As control variables I use assets, cash over assets, cash flow over assets, leverage, net worth and a dummy indicating whether a firm has access to corporate debt markets. All of these variables are lagged one period. I look only at firms that are at least 0.1 percent of the total credit given by banks within an industry in 2013. This reduces the sample from the initial 7928 to 2561 firms, but these firms only account for 2.6 percent of total assets and close to 6.8 percent of the total

sales in Colombia. This sample cleaning serves two purposes. First, it reduces the volatility that small firms introduce. Second, it allows me to concentrate only on firms that were more likely affected by the change in commercial credit.

Table 12 presents the results for firms balance sheet data. Financial debt growth is positively correlated with exposure to market makers at the industry level during the rebalancing (Column 1). When I include firm controls, the coefficient is statistically similar and significant at the 1 percent level (Column 2). Results for investment growth are qualitatively similar (Columns 3 and 4). The economic size is also significant. An interquartile movement in the exposure to market makers is close to an 18 percentage point change in exposure. This implies a differential growth of 6 and 8 percentage points in financial debt and investments, respectively.[33]

4.2 Manufacturing Data

To complement balance sheet data results, I gather data for a subsample of industries from the Monthly Manufacturing Polls conducted by the Departamento Administrativo Nacional de Estadistica (DANE) in Colombia. This database contains the yearly growth at monthly level of employment, production and sales for each manufacturing industry. I match this information with the exposure to market makers as calculated in Equation (3). Information on all the industries in this database and their exposure is presented in Appendix Table 6. While this is a subsample of 21 industries, there is still significant variation in the exposure to market makers, with a median exposure of 82.4 percent.

To analyze whether the shock to credit had an impact on the real variables for these industries, I estimate the following specification:

$$\Delta y_{it} = \theta_t + \theta_i + \gamma_1 Exp^{MM}_{i,2013} \mathbb{1}_t^{\text{Rebalancing}} + \varepsilon_{it} \tag{5}$$

This estimation is very similar to the one in Equation (4), but at the industry level. y_{it} is either employment, production or sales. θ_t and θ_i are time and industry fixed effects, respectively. $Exp^{MM}_{i,2013} \mathbb{1}_t^{\text{Rebalancing}}$ is the treatment variable, with the exposure to market makers interacted with a time dummy for the period of the rebalancing. The estimation is a classical differences-in-differences approach, and γ_1 captures the differential effect on real variables of being more exposed to the credit shock. Errors are bootstrapped clustered at

[33] Table 13 presents the results for the parallel trends assumption test. The exposure to market makers at the industry level is not statistically significant for the previous year.

the industry level.[34]

Results show that being more exposed to a market maker bank led to a statistically significant increase in employment, production and sales during the rebalancing period (Table 14). The economic size of the effect is important. For example, consider an interquartile movement for an industry in the exposure to market makers, which implies an almost 10 percentage point increase in the exposure to market makers. This would have implied an increase in the average yearly growth of 1.2, 1.7, and 2.4 percentage points for employment, production and sales, respectively. Overall, there were important effects for economic activity from the credit shock.

I also check whether the assumption of parallel trends holds for the different industries. Figure 10 presents the average growth for each real variable divided into two groups: low and high exposure to market makers, according to whether they are below or above the median exposure to market makers in the sample. The figure indicates that before the rebalancing, yearly growth for each of the variables had a similar pattern for the two groups, and this changes after the start of the rebalancing by J.P. Morgan.

5 Conclusions

In this paper, I exploit a sudden and unanticipated shock that triggered the entrance of foreign investors to the local currency sovereign debt market in an emerging market. I use an episode in which J.P. Morgan introduced several Colombian bonds in its local currency governemnt debt indexes in emerging markets. Since foreign institutional investors often use benchmark-tracking strategies, they rebalanced their portfolio towards Colombia increasing capital inflows to the domestic sovereign debt market. As foreign investors purchased this debt, banks officially designated as market makers in the sovereign debt market decreased their exposure to these securities. On average, they reduced their local public debt over total assets by 4.2 percentage points, compared to the rest of the banks. This shock, that was originated on the government debt market, spillovered to the credit market. Market maker banks increased their commercial credit to total assets ratio by 3.9 percentage points on average, relative to the rest of the banks. This transmission channel is not found during other periods and is not driven by other observable differences between market and non market maker banks. The differential commercial credit growth amounts to 2.25 percent of Colombia's GDP during the period. The evidence suggests that the shock had an impact

[34]Results are very similar when using cluster at the industry-rebalancing level.

on the real economy. I construct a proxy for the exposure to market maker banks at the industry level and find that firms in industries with more exposure to market makers had a higher growth of both their financial debt and investments during this period. Moreover, I use the same proxy and find that manufacturing industries with more exposure to market makers had a higher growth in employment, production and sales during this period.

The evidence is consistent with a crowding out of private credit before the entrance of foreign investors. Because of the illiquidity of the sovereign debt market, the government used market makers to absorb debt issued in the primary market. As foreign institutional investors entered the domestic sovereign debt market, these domestic financial institutions were able to sell the excess of debt that they could not offload before and used the proceeds to extend credit.

There are two possible extensions for this study. First, in this paper, I use data from Colombia for mainly two reasons: (i) the size of the shock, and; (ii) the availability of detailed credit data across geographical areas and industries. However, several other countries have received upgrades/downgrades from index providers in their local government bond indexes (Mexico, South Africa, Romania and Nigeria for instance). As long as there is data availability, one possible avenue of future research is to extend this study for other countries to understand the external validity of these results. Another potential interesting question is whether capital outflows in sovereign debt markets have a symmetrical effect. During these episodes, banks could be prompt to hold more sovereign debt and decrease credit supply, transmitting financial cycles into the domestic economic.

Second, data in this paper has variation at the geographical and industry level. The use of the credit registry data for Colombia would be beneficial. By using this data, I could quantify in more detail the real effects of the entrance of foreign investors to the domestic sovereign debt market. Such an analysis would improve this paper by having a look at whether market maker banks increase credit supply based on maturity, risk, interest rate, collateral type. While I have not had access to this data, such an analysis is ear-marked for future inspection.

The evidence in this paper has implications from a policy-making perspective for a number of reasons. For instance, large countries such as China and India still have less than 2 percent of their local currency debt in the hands of foreign investors. This study sheds light on the possible consequences of using policies to increase the share of foreign investors in domestic sovereign debt markets. Moreover, on March 2016, J.P. Morgan included China on a watchlist to enter the GBI-EM. The evidence suggests that the confirmation of this process

could lead to a boost in private credit for the Chinese economy. Another consideration is that China would have the largest weight in the index (10 percent). As a consequence, its introduction to the index could lead to a decrease in the weights of the rest of the countries. This might ultimately lead to negative spillovers to the other constituents of the GBI-EM.

Furthermore, this study contributes to the ongoing policy debate on the effects of capital flows. A recent discussion by Blanchard et al. (2015) suggests that there is a disconnection between the academic and the policy view on the effects of capital inflows. The former argues that capital inflows are contractionary and the latter that they are expansionary. Since capital inflows are endogenous to local economic conditions, is hard to come up with evidence to enlighten the debate. Using an exogenous shock to capital inflows, the results in this paper show that even capital inflows to sovereign debt lead to credit booms and an increase in economic activity.

Finally, results also suggest that sovereign debt index rebalancing can have effects on the economy beyond the usual price effects found in the literature. Thus, one policy concern is related to the regulation of activities of both institutional investors with index-tracking strategies and index providers. Ultimately, the effects documented in this paper were started by a decision made by a single index provider. Is this desirable? Should there be regulation on the construction of benchmark indexes and their reconstitutions? Moreover, a decision to remove Colombia from the index may produce the opposite effect. The evidence suggests that activities by index-tracking investors and index providers should be followed more closely by policy makers.

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Figure 1
Foreign Share of Domestic Government Debt Securities

This figure presents the evolution of the share of domestic government debt securities (TES) held by foreigners. The dashed line shows a linear trend using the average growth during the 12 months prior to the announcement of the change in the index by J.P. Morgan. The grey bar represents the announcement of the rebalancing by J.P. Morgan.

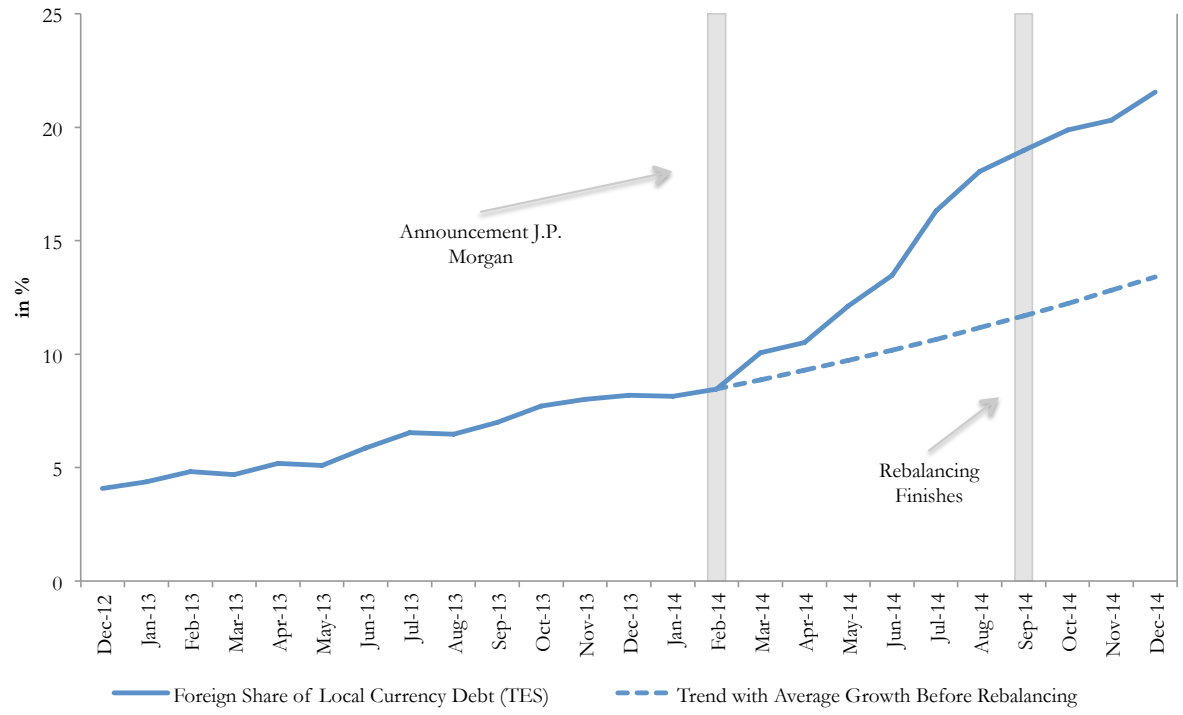
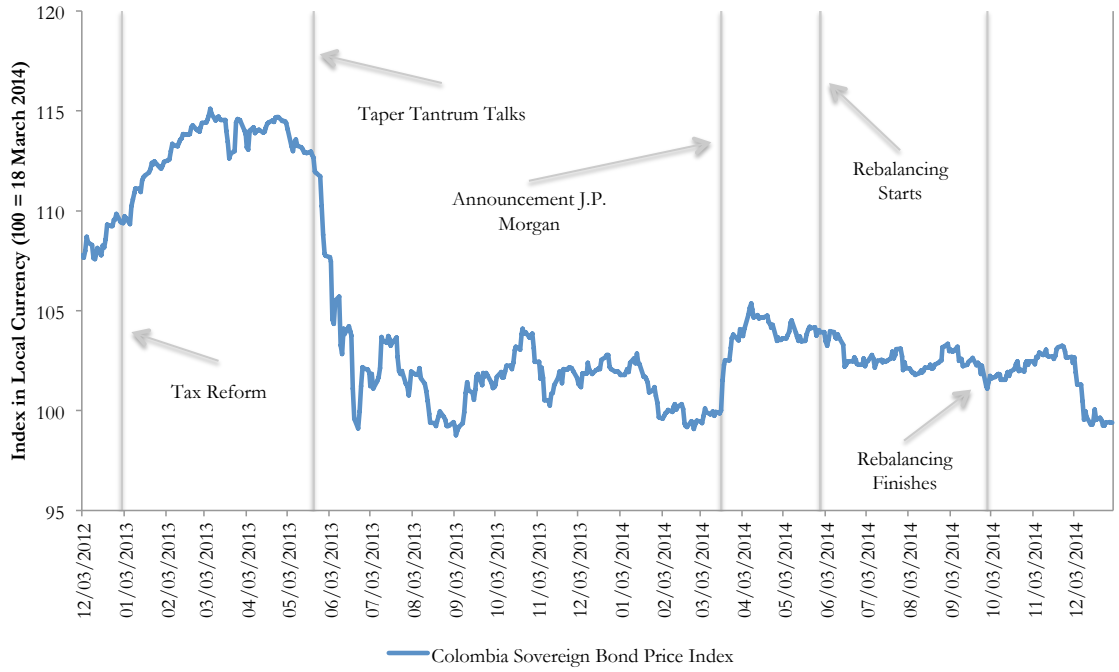


Figure 2
Domestic Sovereign Bonds Index

This figure presents the price and bid-ask spread evolution of the domestic sovereign bonds in Colombia. Panel A shows the bond prices and Panel B depicts the bid-ask spread. The bond price index weights the price return of each bond by its outstanding amount. Only the bonds included in the index rebalancing by J.P. Morgan are included and the index equals 100 at the day before the announcement of the rebalancing (18 March 2014).. The bid-ask spread is from data from Thomson Reuters Pricing Service and is presented as a percentage of the price. Each grey bar represents the events denoted in the picture.

A. Sovereign Bond Prices



B. Bid-Ask Spread Index

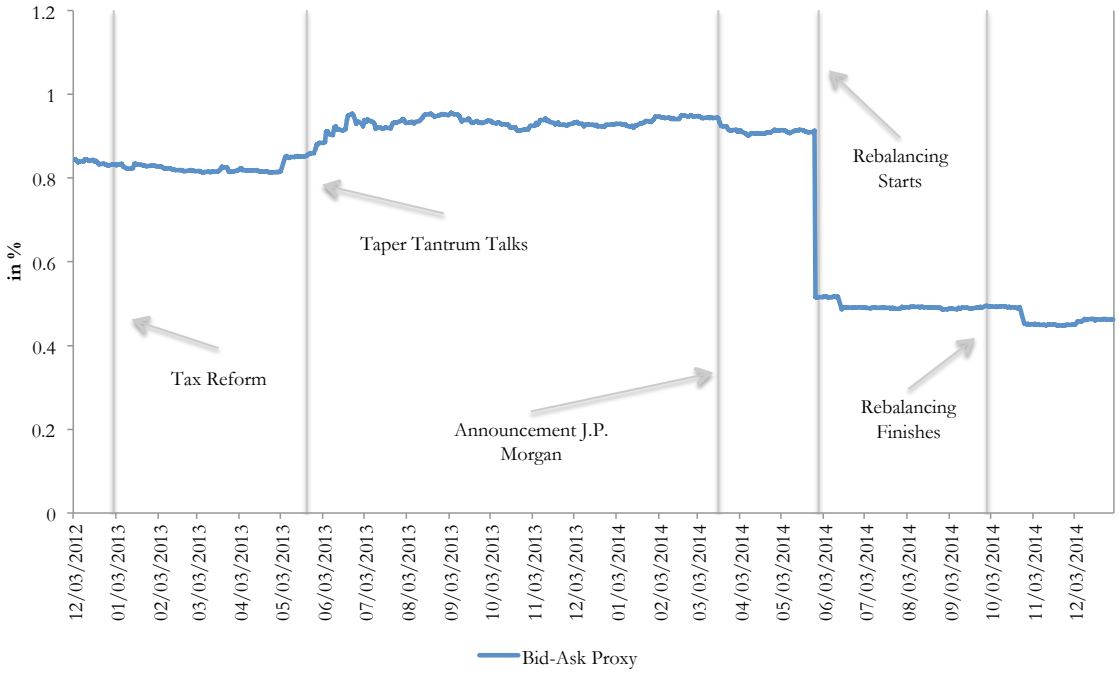
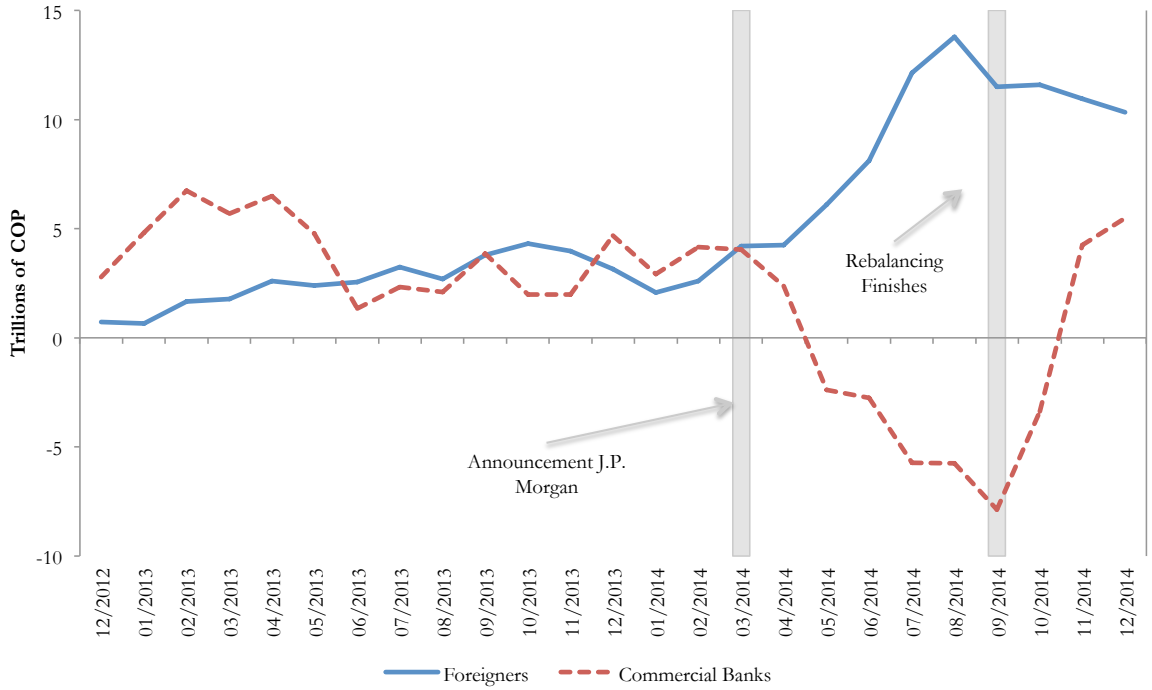


Figure 3
Holdings of Domestic Sovereign Bonds

This figure presents the net purchases of domestic sovereign bonds in Colombia around the index rebalancing by J.P. Morgan. Panel A depicts 6-month rolling purchases by foreigners and commercial banks. The grey bars indicate the events described in the picture. Panel B shows the percentage of TES bonds held by the different economic agents in the economy before and after the rebalancing. PF, IC and MF are pension funds, insurance companies and domestic mutual funds respectively.

A. Purchases of Domestic Sovereign Bonds



B. Share of Affected Domestic Sovereign Bonds by Investor Type

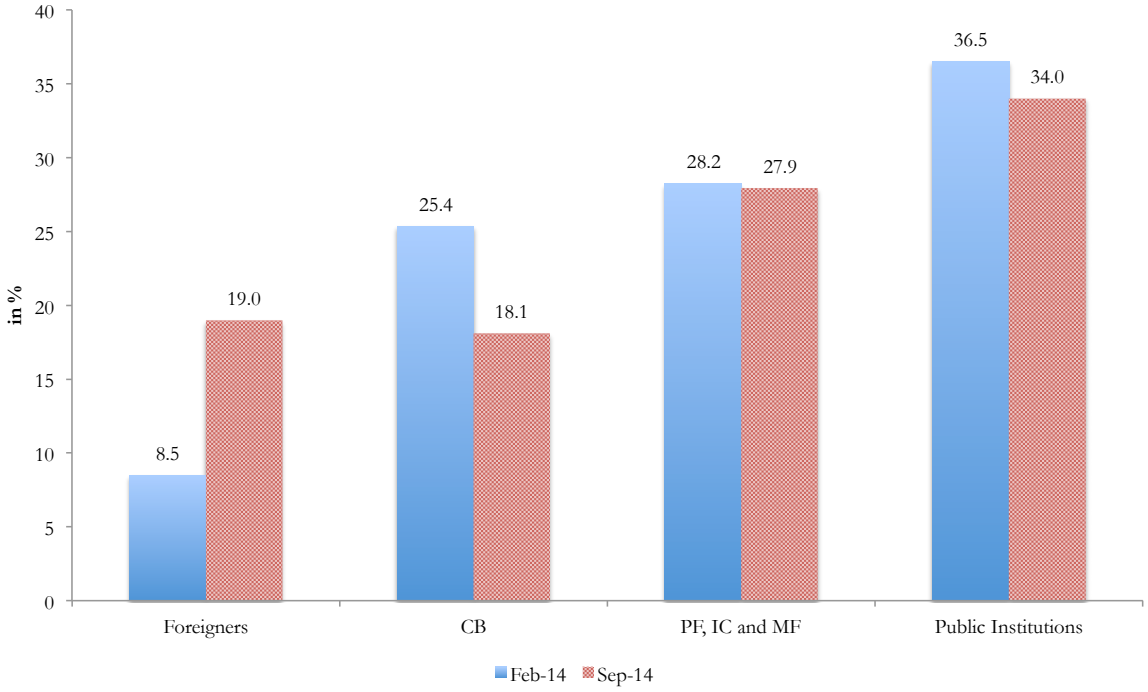


Figure 4

Domestic Sovereign Debt Exposure in Commercial Banks

This figure shows the evolution of sovereign debt over assets dividing by market maker and non market maker banks at the end of 2013. The index is constructed by averaging the growth of domestic debt over total assets at each point in time. The index is normalized to the average holdings of sovereign debt over assets for the two groups in February 2014. The grey bars indicate the events described in the picture.

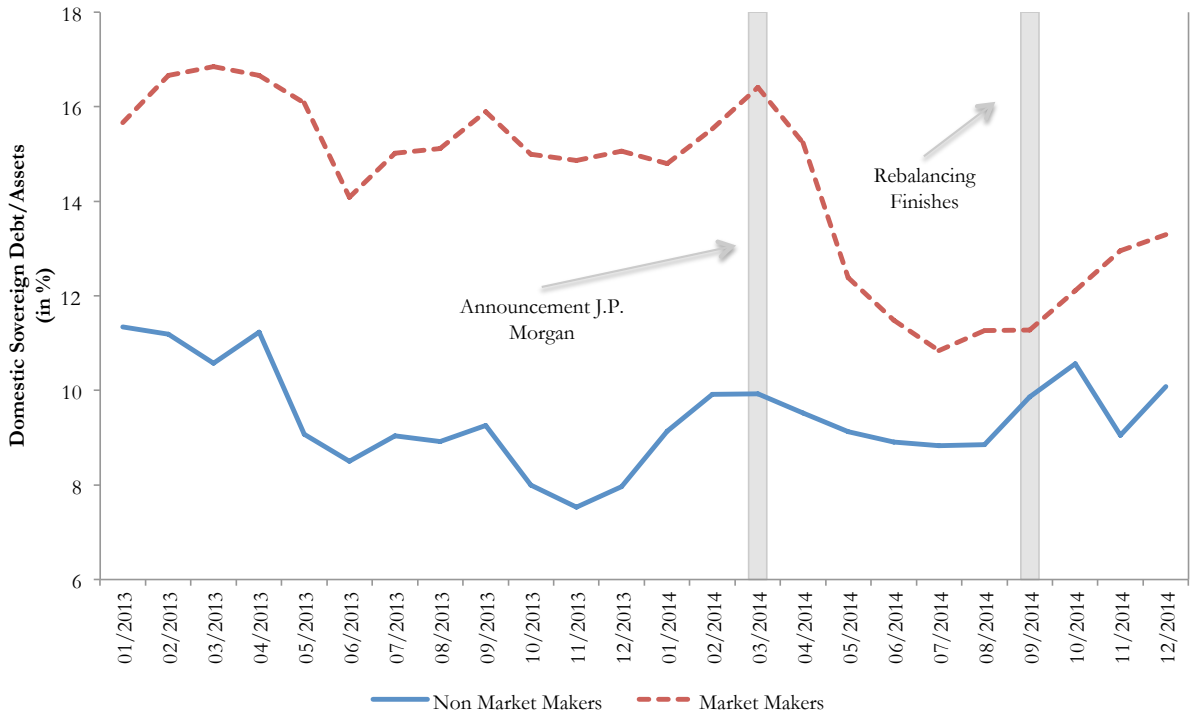


Figure 5
Cross-Sectional Estimation Betas

This figure presents the coefficient from an estimation of the growth of commercial credit over assets to a market maker dummy with city-zone fixed effects. Errors are constructed with bootstrapping and are clustered at the bank level. The dashed lines indicate the 5-95% confidence interval. The grey bars indicate the events described in the picture.

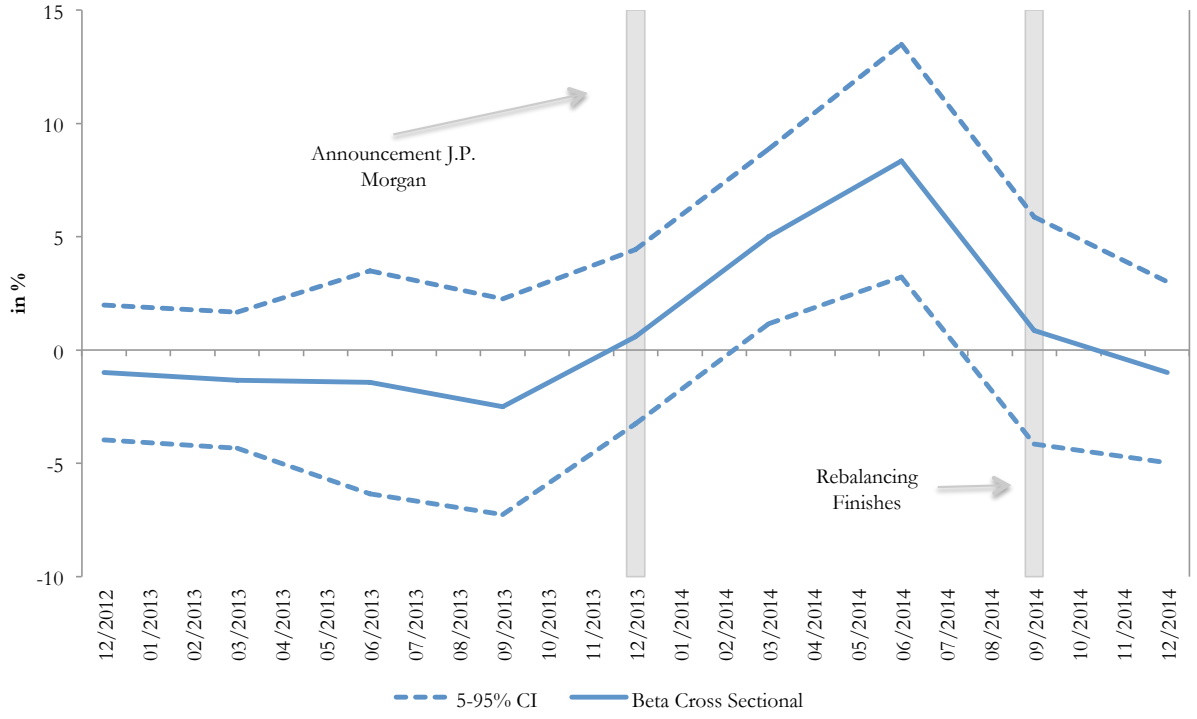


Figure 6
Commercial Credit Evolution

This figure shows the evolution of commercial credit over total assets dividing by market maker and non market maker banks at the end of 2013. The index is constructed by averaging the growth of commercial credit over total assets at each point in time. The index is normalized to 100 for March 2014. The grey bars indicate the events described in the picture.

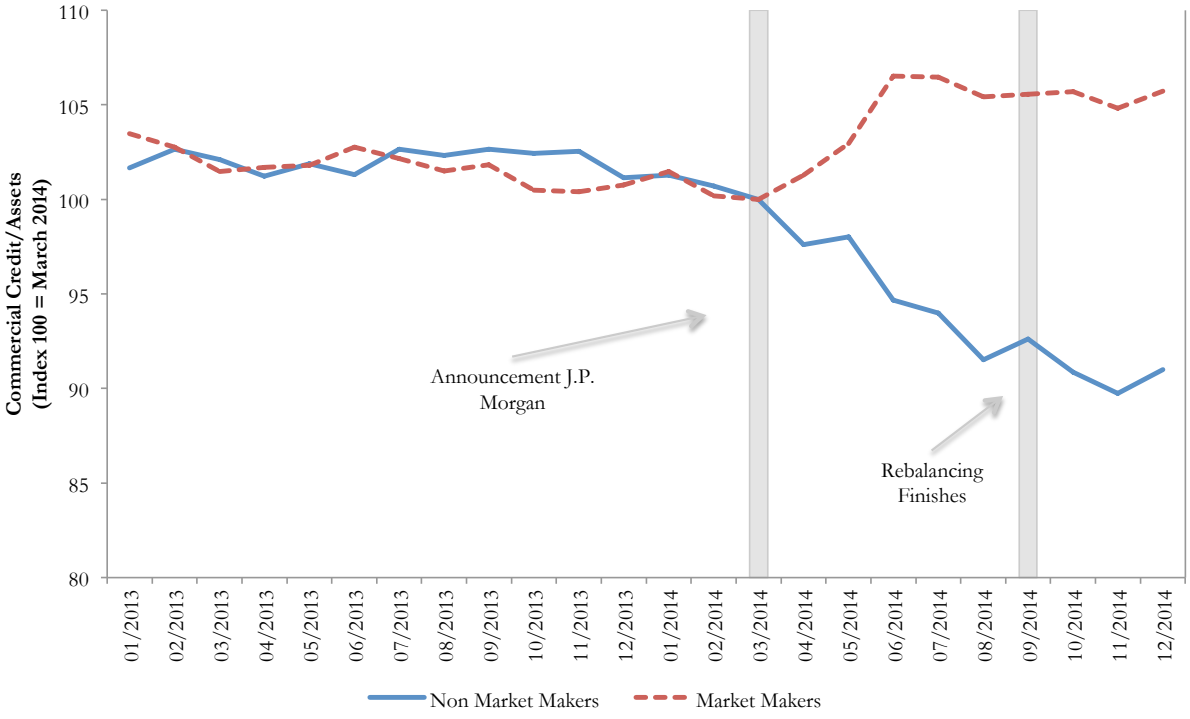
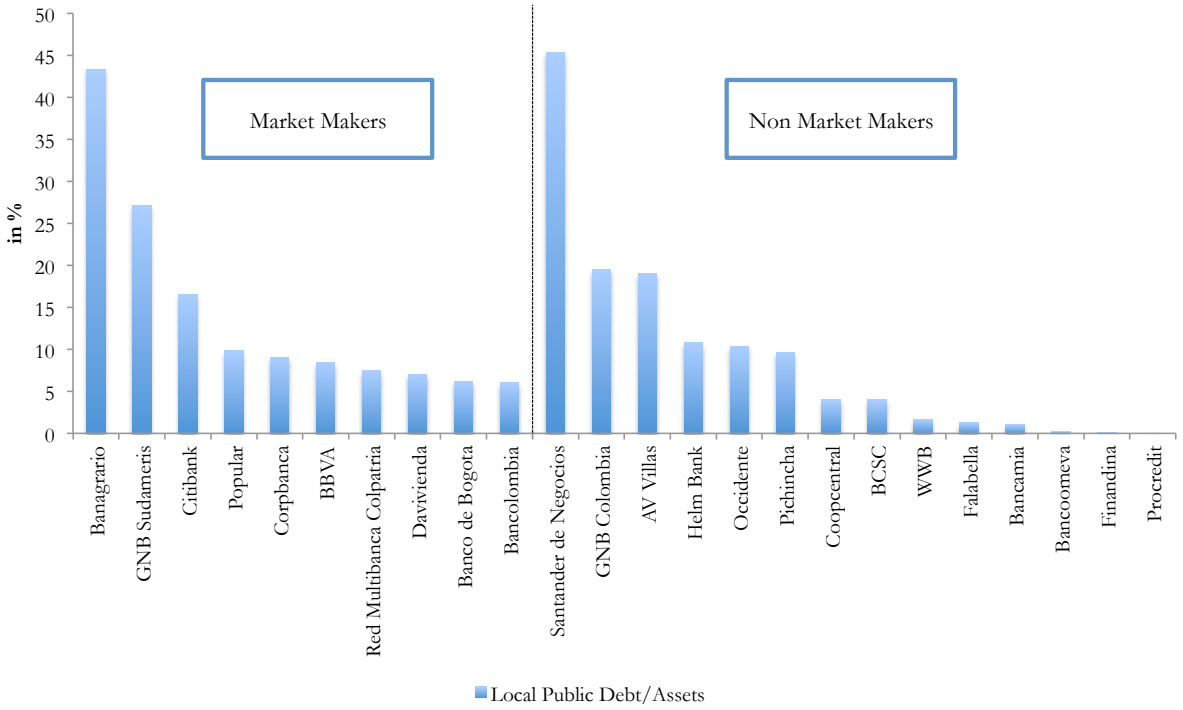


Figure 7
Assets and Domestic Sovereign Debt in Commercial Banks

This figure presents the total assets and domestic sovereign debt exposure dividing by market maker and non market maker banks at the end of 2013. Panel A depicts the local public debt divided by total assets. Panel B shows the total assets. Each bar is constructed by averaging the positition of each bank during 2013.

A. Local Public Debt over Assets by Bank Type



B. Total Assets by Bank Type

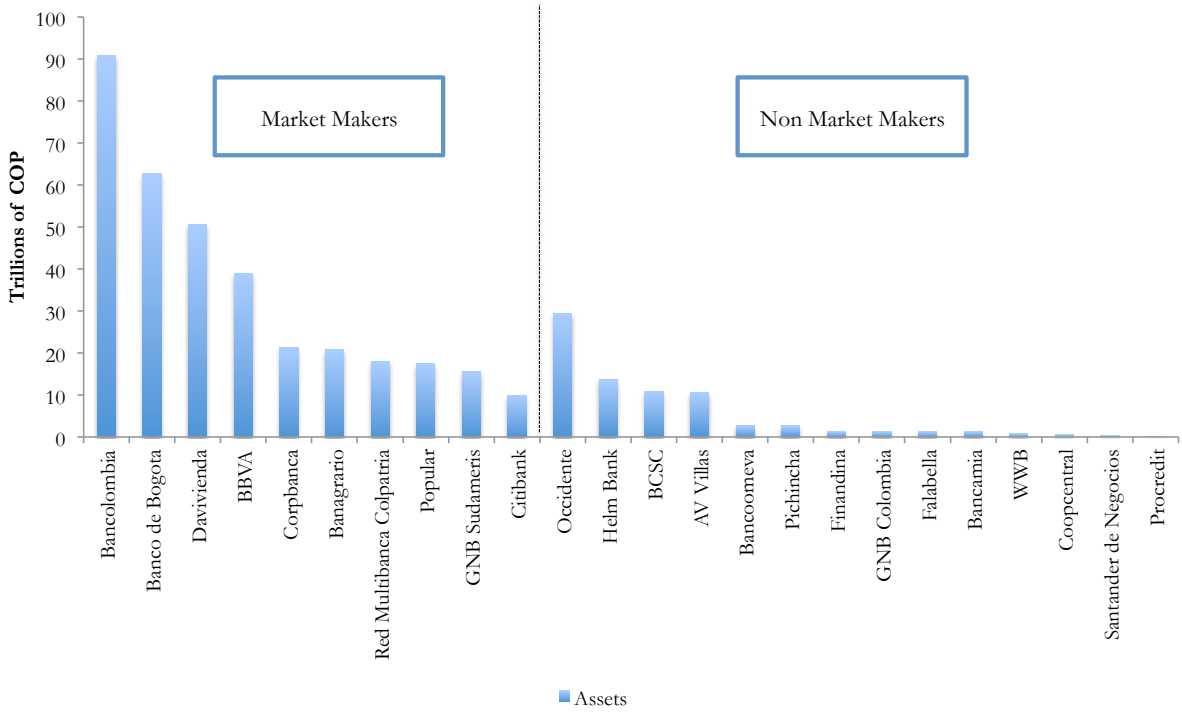
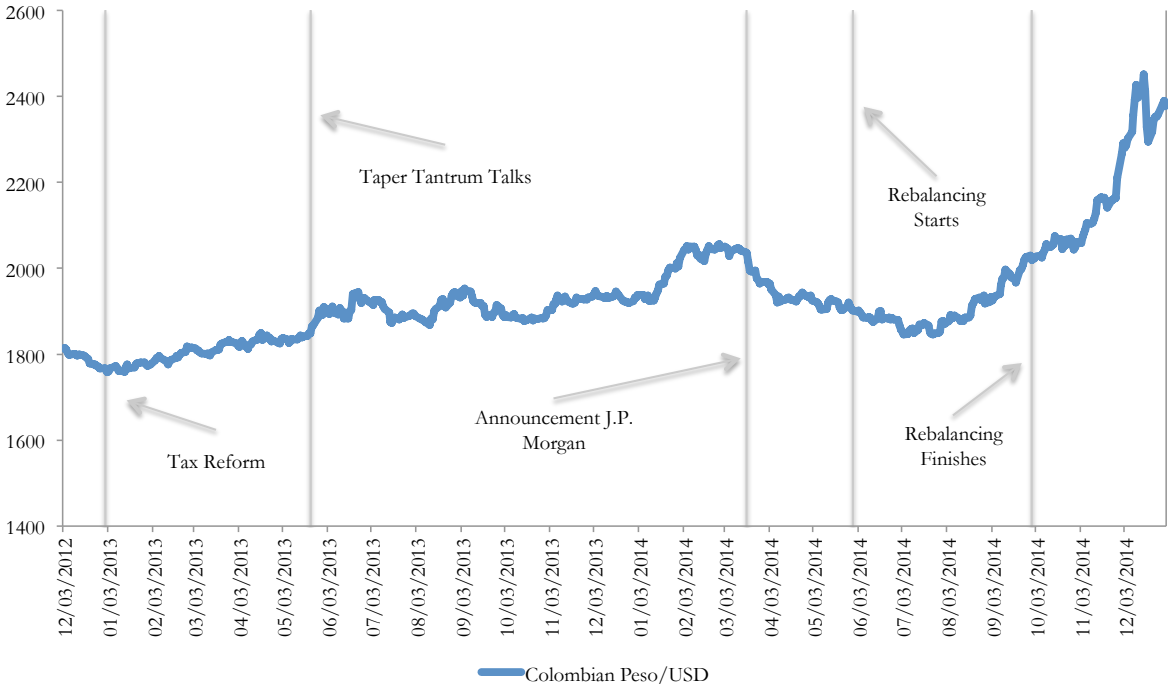


Figure 8
Exchange Rate

This figure presents the evolution of the exchange rate and the exchange rate exposure dividing by market maker and non market maker banks at the end of 2013. Panel A shows the time series of the exchange rate defined as local currency per US dollars. Each grey bar represents the events denoted in the picture. Panel B depicts the total assets minus total liabilities denominated in foreign currency divided by the net worth. Each bar is constructed by averaging the positition of each bank during 2013.

A. Exchange Rate



B. Exchange Rate Exposure by Bank Type

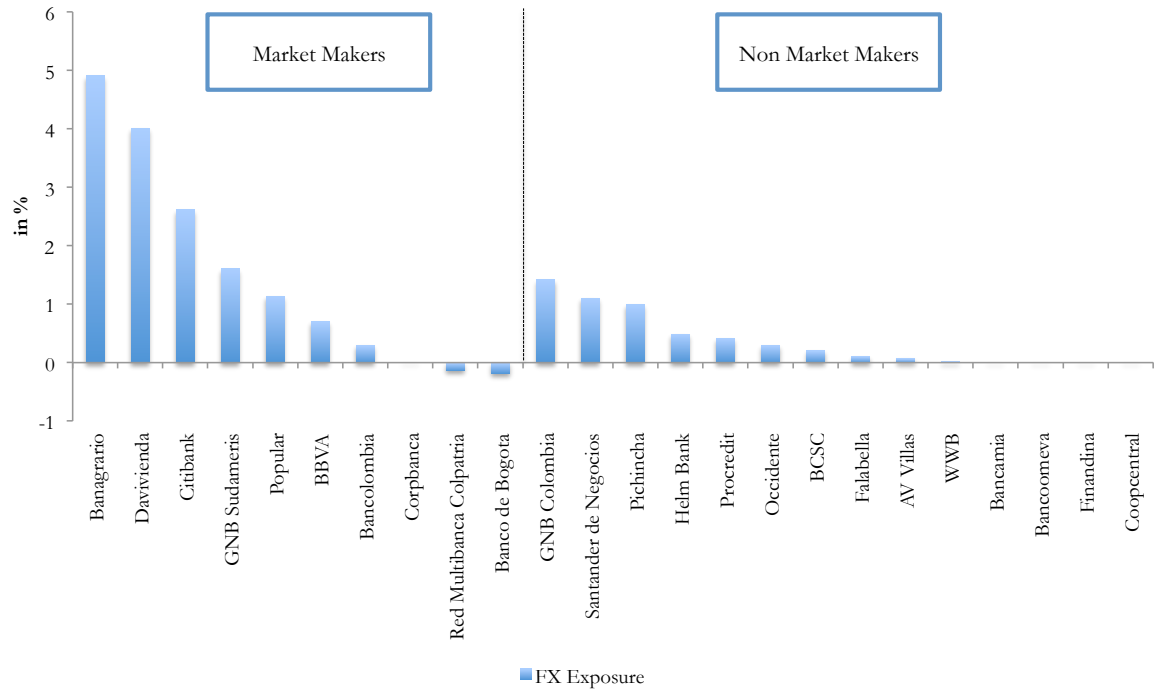


Figure 9
Exposure to Market Makers Across Industries

This figure presents the exposure of each industry to market maker banks at the end of 2013. The exposure is constructed by summing the commercial credit of market maker banks to each industry and dividing it by the total credit to the same industry by all commercial banks.

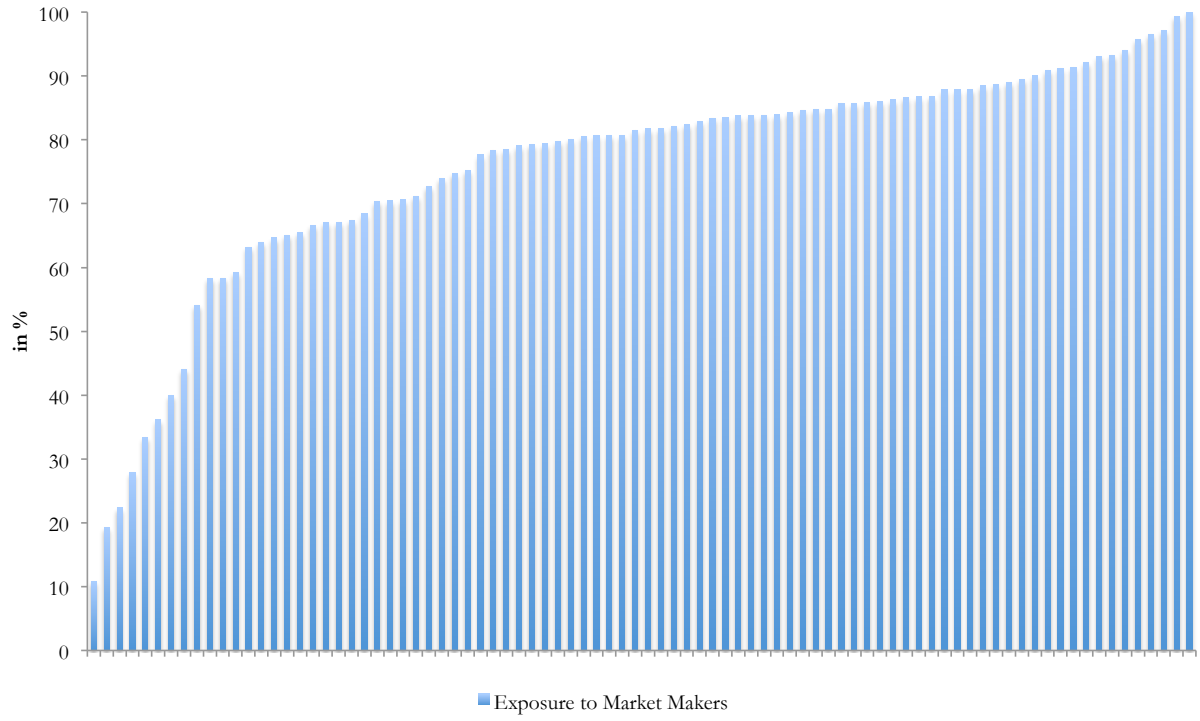
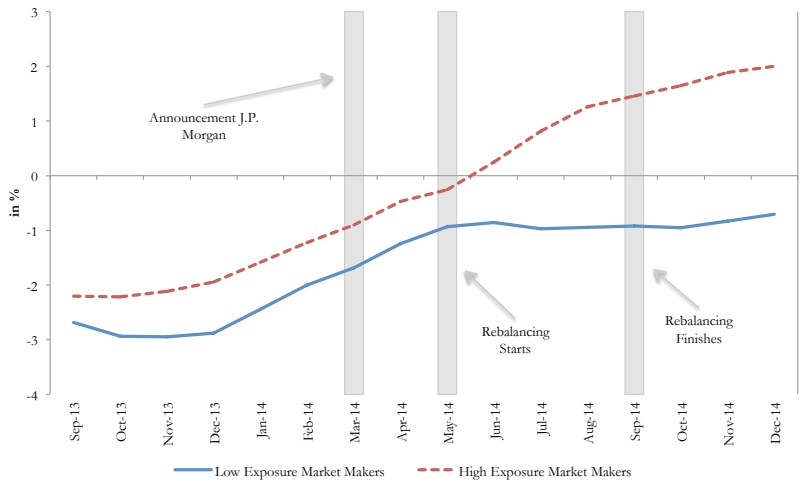


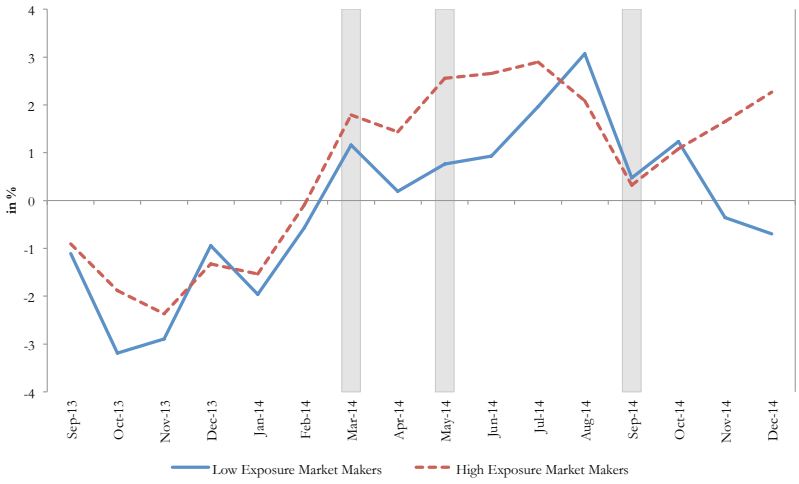
Figure 10
Real Effects: Employment, Production and Sales

This figure presents the evolution of the growth in employment, real production and real sales from the manufacturing industries in Colombia. The figure shows the 6-month rolling average of yearly growth for industries with low and high exposure to market makers after removing industry fixed effects. Industries are separated into the low (high) category if it is below (above) the median exposure in the sample. The grey bars indicate the events described in the picture.

A. Employment



B. Production



C. Sales

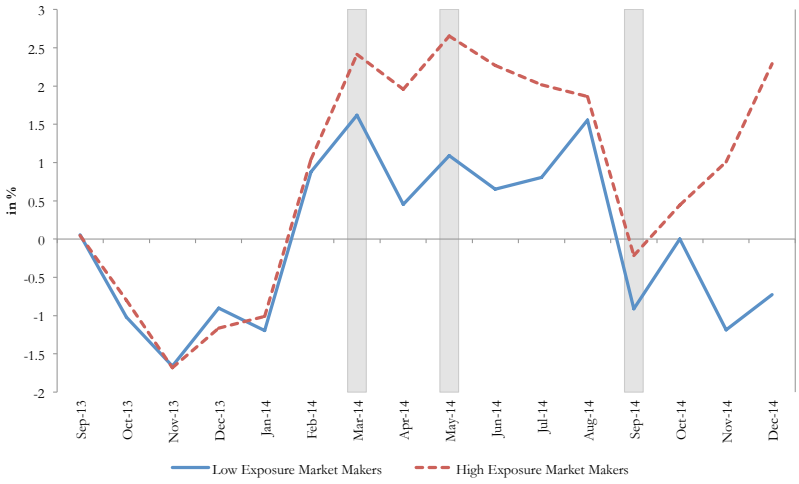


Table 1
Commercial Banks in Colombia

This table shows the commercial banks in Colombia during 2013-2014 and their classification into market makers in 2013 and into foreign or domestic banks.

Bank Name	Market Maker	Foreign
Banagrario	Yes	No
Banco de Bogota	Yes	No
Bancolombia	Yes	No
BBVA	Yes	Yes
Citibank	Yes	Yes
Corpbanca	Yes	Yes
Davivienda	Yes	No
GNB Sudameris	Yes	Yes
Popular	Yes	No
Red Multibanca Colpatria	Yes	Yes
AV Villas	No	No
Bancamia	No	No
Bancoomeva	No	No
BCSC	No	No
Coopcentral	No	No
Falabella	No	Yes
Finandina	No	No
GNB Colombia	No	Yes
Helm Bank	No	No
Occidente	No	No
Pichincha	No	Yes
Procredit	No	Yes
Santander de Negocios	No	Yes
WWB	No	No

Table 2
Balance Sheet Structure of Commercial Banks (December 2013)

This table presents the structure of the balance sheet for commercial banks before Colombia's benchmark rebalancing by J.P. Morgan. Panel A depicts the asset structure, with all variables in percentage of total assets unless indicated. Panel B shows the liability structure with all variables in percentage of total liabilities unless indicated. Panel C presents other relevant variables. The exchange rate exposure is the total assets minus total liabilities denominated in foreign currency divided by the net worth. The solvency ratio is the tier 1 capital divided by risk-weighted assets and market risk.

	Total Sum		**Average**		**Median**	
Variable	Non Market Makers	Market Makers	Non Market Makers	Market Makers	Non Market Makers	Market Makers
			A. Assets			
Total Assets (in Trillions COP)	72.3	328.8	5.2	29.9	1.3	16.6
Liquid Assets	8.7	8.8	9.9	8.2	8.8	7.2
Investments	14.6	20.3	12.5	23.3	6.2	19.2
Local Public Debt	8.2	11.5	8.9	15.4	2.3	10.8
Total Credit	63.5	63.8	70.3	62.8	75.4	64.8
Commercial Credit	31.5	37.7	25.5	32.5	19.0	35.1
Consumer Credit	22.6	18.2	27.8	22.8	19.4	20.4
Microcredit	3.0	1.7	12.4	2.4	0.0	0.0
Mortgages	6.4	6.2	4.5	5.1	0.0	4.6
Public Credit	2.7	3.0	1.5	2.8	0.2	3.0
Other Assets	6.3	7.3	6.8	6.5	5.7	5.8
ROA	1.0	1.4	0.4	1.2	0.9	1.2
			B. Liabilities			
Total Liabilities (in Trillions COP)	62.3	281.5	4.4	25.6	1.1	14.9
Total Deposits	79.5	76.6	65.5	77.0	75.6	73.1
Credit Other Institutions	9.3	10.7	20.4	11.5	11.7	11.8
External Credit	2.5	4.3	0.7	3.4	0.0	3.0
Debt	7.6	8.8	8.2	7.3	2.7	5.6
			C. Other Variables			
Exchange Rate Exposure	0.2	1.0	0.3	0.9	0.1	0.9
Solvency Ratio	15.1	14.7	28.5	15.6	15.5	13.4

Table 3
Credit Growth and Market Makers

This table presents OLS estimations of the growth of credit to total assets against a treatment variable using balance sheet monthly data. The growth of the dependent variable is constructed as the difference in logs. The treatment variable is a market maker dummy multiplied by a dummy indicating the period of the index rebalancing by J.P. Morgan. Consumer credit includes housing credit. All estimations are for the period 2013-2014. The dependent variable is winsorized at the 5th and 95th percent level. Errors are bootstrapped clustered at the bank level. *, **, and *** denote 10, 5 and 1 percent level of significance respectively.

	Total Credit	Commercial Credit	Consumer Credit
Explanatory Variables	**Dependent Variable: Growth Credit/Assets**		
Market Maker*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	0.011 **	0.020 **	0.009
	(0.005)	(0.008)	(0.008)
Time Fixed Effects	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes
Observations	429	429	429
R-Squared	0.103	0.129	0.150

Table 4
Commercial Credit and Market Makers

This table presents OLS estimations of the growth of commercial credit to total assets against different explanatory variables for commercial banks and a treatment variable. The growth of the dependent variable is constructed as the difference in logs. The treatment variable is a market maker dummy multiplied by a dummy indicating the period of the index rebalancing by J.P. Morgan. All estimations are for the period 2013-2014. The dependent variable is winsorized at the 5th and 95th percent level. Errors are bootstrapped clustered at the bank level. *, **, and *** denote 10, 5 and 1 percent level of significance respectively.

	City-Zone Database			Industry Database		
Explanatory Variables	**Dependent Variable: Growth Commercial Credit/Assets (2013-2014)**					
Market Maker*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	0.056 ***	0.057 ***	0.054 ***	0.079 ***	0.077 ***	0.075 ***
	(0.017)	(0.018)	(0.015)	(0.023)	(0.022)	(0.022)
Time Fixed Effects	Yes	No	No	Yes	No	No
City-Zone-Time Fixed Effects	No	Yes	Yes	No	No	No
Industry-Time Fixed Effects	No	No	No	No	Yes	Yes
Bank Fixed Effects	No	No	Yes	No	No	Yes
Observations	4,571	4,571	4,571	6,402	6,402	6,402
R-Squared	0.044	0.176	0.224	0.026	0.153	0.168

Table 5
Commercial Credit and Market Makers: Placebo Test

This table presents OLS estimations of the growth of commercial credit to total assets against different explanatory variables for commercial banks and a treatment variable. The growth of the dependent variable is constructed as the difference in logs. The treatment variable is a market maker dummy multiplied by a dummy indicating the period March 2013-September 2013. All estimations are for the period 2012-2013. The dependent variable is winsorized at the 5th and 95th percent level. Errors are bootstrapped clustered at the bank level. *, **, and *** denote 10, 5 and 1 percent level of significance respectively.

	City-Zone Database			Industry Database		
Explanatory Variables	**Dependent Variable: Growth Commercial Credit/Assets (2012-2013)**					
Market Maker*Placebo$_{\text{Mar 2013-Sep 2013}}$	0.009	0.006	0.008	-0.010	-0.013	-0.016
	(0.026)	(0.026)	(0.024)	(0.020)	(0.021)	(0.020)
Time Fixed Effects	Yes	No	No	Yes	No	No
City-Zone-Time Fixed Effects	No	Yes	Yes	No	No	No
Industry-Time Fixed Effects	No	No	No	No	Yes	Yes
Bank Fixed Effects	No	No	Yes	No	No	Yes
Observations	5,051	5,051	5,051	5,858	5,858	5,858
R-Squared	0.036	0.141	0.171	0.008	0.163	0.170

Table 6

Commercial Credit and Market Makers: Domestic Sovereign Debt Exposure

This table presents OLS estimations of the growth of commercial credit to total assets against different explanatory variables for commercial banks and a treatment variable using the city-zone database. The growth of the dependent variable is constructed as the difference in logs. The treatment variable is a market maker dummy multiplied by a dummy indicating the period of the index rebalancing by J.P. Morgan. All estimations are for the period 2013-2014. Domestic sovereign debt exposure is the initial local public debt divided by assets. Solvency ratio is the initial tier 1 capital divided by risk-weighted assets and market risk. The dependent variable is winsorized at the 5th and 95th percent level. Errors are bootstrapped clustered at the bank level. *, **, and *** denote 10, 5 and 1 percent level of significance respectively.

	City-Zone Database				
Explanatory Variables	**Dependent Variable: Growth Commercial Credit/Assets (2013-2014)**				
Market Maker*Rebalancing$_{\text{Mar 2014-Sep 2014}}$		0.055 ***	0.057 ***	0.054 ***	0.054 ***
		(0.017)	(0.018)	(0.016)	(0.017)
Domestic Sovereign Debt Exposure*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	0.200	0.016	0.003	-0.006	-0.132
	(0.124)	(0.084)	(0.086)	(0.091)	(0.649)
Domestic Sovereign Debt Exposure*Solvency Ratio*Rebalancing$_{\text{Mar 2014-Sep 2014}}$					0.007
					(0.036)
Solvency Ratio*Rebalancing$_{\text{Mar 2014-Sep 2014}}$					-0.001
					(0.001)
Time Fixed Effects	Yes	Yes	No	No	No
City-Zone-Time Fixed Effects	No	No	Yes	Yes	Yes
Industry-Time Fixed Effects	No	No	No	No	No
Bank Fixed Effects	No	No	No	Yes	Yes
Observations	4,571	4,571	4,571	4,571	4,571
R-Squared	0.031	0.044	0.176	0.224	0.224

Table 7
Commercial Credit and Market Makers: Valuation Effect

This table presents OLS estimations of the growth of commercial credit to total assets against different explanatory variables for commercial banks and a treatment variable using the city-zone database. The growth of the dependent variable is constructed as the difference in logs. The treatment variable is a market maker dummy multiplied by a dummy indicating the period of the index rebalancing by J.P. Morgan. All estimations are for the period 2013-2014. Profits March 2014 are the profits during the month of the announcement by J.P. Morgan over assets. Solvency ratio is the initial tier 1 capital divided by risk-weighted assets and market risk. The dependent variable is winsorized at the 5th and 95th percent level. Errors are bootstrapped clustered at the bank level. *, **, and *** denote 10, 5 and 1 percent level of significance respectively.

	City-Zone Database				
Explanatory Variables	**Dependent Variable: Growth Commercial Credit/Assets (2013-2014)**				
Market Maker*Rebalancing$_{\text{Mar 2014-Sep 2014}}$		0.060 ***	0.061 ***	0.054 ***	0.056 ***
		(0.018)	(0.019)	(0.017)	(0.016)
Profits March 2014*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	0.010	-0.042	-0.038	-0.002	0.231
	(0.052)	(0.053)	(0.055)	(0.062)	(0.324)
Profits March 2014*Solvency Ratio*Rebalancing$_{\text{Mar 2014-Sep 2014}}$					-0.015
					(0.019)
Solvency Ratio*Rebalancing$_{\text{Mar 2014-Sep 2014}}$					0.005
					(0.007)
Time Fixed Effects	Yes	Yes	No	No	No
City-Zone-Time Fixed Effects	No	No	Yes	Yes	Yes
Industry-Time Fixed Effects	No	No	No	No	No
Bank Fixed Effects	No	No	No	Yes	Yes
Observations	4,571	4,571	4,571	4,571	4,571
R-Squared	0.027	0.045	0.177	0.224	0.224

Table 8
Commercial Credit and Market Makers: Bank Size

This table presents OLS estimations of the growth of commercial credit over total assets against different explanatory variables for commercial banks and a treatment variable. The growth of the dependent variable is constructed as the difference in logs. The treatment variable is a market maker dummy multiplied by a dummy indicating the period of the index rebalancing by J.P. Morgan. Estimations in Columns 6-9 are for the period 2013-2014 and only includes banks with average assets in 2013 between 25 and 5 trillions of COP. Assets is the initial log of assets. Solvency ratio is the initial tier 1 capital divided by risk-weighted assets and market risk. The dependent variable is winsorized at the 5th and 95th percent level. Errors are bootstrapped clustered at the bank level. *, **, and *** denote 10, 5 and 1 percent level of significance respectively.

	City-Zone Database						
Explanatory Variables	**Dependent Variable: Growth Commercial Credit/Assets (2013-2014)**						
Market Maker*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	0.066 ***	0.065 ***	0.064 ***	0.065 ***	0.061 ***	0.060 ***	0.055 ***
	(0.018)	(0.019)	(0.009)	(0.009)	(0.021)	(0.022)	(0.021)
Assets*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	0.008	0.008	-0.005	-0.011			
	(0.007)	(0.007)	(0.004)	(0.009)			
Assets*Solvency Ratio*Rebalancing$_{\text{Mar 2014-Sep 2014}}$				0.000			
				(0.001)			
Solvency Ratio*Rebalancing$_{\text{Mar 2014-Sep 2014}}$				-0.004			
				(0.007)			
Time Fixed Effects	No	No	No	No	Yes	No	No
City-Zone-Time Fixed Effects	Yes	Yes	Yes	Yes	No	Yes	Yes
Industry-Time Fixed Effects	No	No	No	No	No	No	No
Bank Fixed Effects	No	Yes	Yes	Yes	No	No	Yes
Observations	4,571	4,571	4,571	4,571	3,048	3,048	3,048
R-Squared	0.055	0.185	0.224	0.224	0.042	0.237	0.265

Table 9
Commercial Credit and Market Makers: Exchange Rate Exposure

This table presents OLS estimations of the growth of commercial credit to total assets against different explanatory variables for commercial banks and a treatment variable using the city-zone database. The growth of the dependent variable is constructed as the difference in logs. The treatment variable is a market maker dummy multiplied by a dummy indicating the period of the index rebalancing by J.P. Morgan. All estimations are for the period 2013-2014. Exchange rate exposure is the total assets minus total liabilities denominated in foreign currency divided by the net worth. Solvency ratio is the initial tier 1 capital divided by risk-weighted assets and market risk. The dependent variable is winsorized at the 5th and 95th percent level. Errors are bootstrapped clustered at the bank level. *, **, and *** denote 10, 5 and 1 percent level of significance respectively.

	City-Zone Database				
Explanatory Variables	**Dependent Variable: Growth Commercial Credit/Assets (2013-2014)**				
Market Maker*Rebalancing$_{\text{Mar 2014-Sep 2014}}$		0.051 **	0.054 **	0.073 ***	0.073 ***
		(0.022)	(0.023)	(0.022)	(0.022)
Exchange Rate Exposure*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	0.023 **	0.005	0.003	-0.024	-0.033
	(0.010)	(0.014)	(0.015)	(0.015)	(0.067)
Exchange Rate Exposure*Solvency Ratio*Rebalancing$_{\text{Mar 2014-Sep 2014}}$					0.001
					(0.004)
Solvency Ratio*Rebalancing$_{\text{Mar 2014-Sep 2014}}$					-0.000
					(0.001)
Time Fixed Effects	Yes	Yes	No	No	No
City-Zone-Time Fixed Effects	No	No	Yes	Yes	Yes
Industry-Time Fixed Effects	No	No	No	No	No
Bank Fixed Effects	No	No	No	Yes	Yes
Observations	4,571	4,571	4,571	4,571	4,571
R-Squared	0.037	0.046	0.177	0.227	0.227

Table 10
Commercial Credit and Market Makers: Robustness Tests

This table presents OLS estimations of the growth of commercial credit to total assets or the growth of commercial credit against different explanatory variables for commercial banks and a treatment variable. The growth of the dependent variable is constructed as the difference in logs. The treatment variable is a market maker dummy multiplied by a dummy indicating the period of the index rebalancing by J.P. Morgan. All estimations are for the period 2013-2014. Corporate debt is the debt securities issued by a bank divided by total liabilities. Foreign is a dummy indicating whether a bank is foreign. The dependent variable is winsorized at the 5th and 95th percent level. Errors are bootstrapped clustered at the bank level. *, **, and *** denote 10, 5 and 1 percent level of significance respectively.

	City-Zone Database (Only Private Banks)	City-Zone Database				
Explanatory Variables	**Dependent Variable: Growth Commercial Credit/Assets (2013-2014)**			**Dependent Variable: Growth Commercial Credit (2013-2014)**		
Market Maker*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	0.056 ***	0.059 ***	0.054 ***	0.037 ***	0.037 **	0.034 ***
	(0.015)	(0.018)	(0.018)	(0.014)	(0.015)	(0.012)
Corporate Debt*Rebalancing$_{\text{Mar 2014-Sep 2014}}$		-0.001	-0.000			
		(0.001)	(0.001)			
Foreign*Rebalancing$_{\text{Mar 2014-Sep 2014}}$			0.017			
			(0.024)			
Time Fixed Effects	No	No	No	Yes	No	No
City-Zone-Time Fixed Effects	Yes	Yes	Yes	No	Yes	Yes
Industry-Time Fixed Effects	No	No	No	No	No	No
Bank Fixed Effects	Yes	Yes	Yes	No	No	Yes
Observations	4,396	4,571	4,571	4,571	4,571	4,571
R-Squared	0.231	0.226	0.226	0.046	0.176	0.229

Table 11
Commercial Credit and Market Makers: Robustness Tests

This table presents OLS estimations of the growth of commercial credit to total assets against different explanatory variables for commercial banks and a treatment variable. The growth of the dependent variable is constructed as the difference in logs. The treatment variable is a market maker dummy multiplied by a dummy indicating the period of the index rebalancing by J.P. Morgan. All estimations are for the period 2013-2014. Corporate debt is the debt securities issued by a bank divided by total liabilities. Foreign is a dummy indicating whether a bank is foreign. Domestic sovereign debt exposure is the initial local public debt divided by assets. Exchange rate exposure is the total assets minus total liabilities denominated in foreign currency divided by the net worth. Assets is the initial log of assets. Liquid assets is the initial liquid assets to total assets. Investments is the initial total investments in securities over total assets. ROA is initial return on assets. Solvency ratio is the initial tier 1 capital divided by risk-weighted assets and market risk. The dependent variable is winsorized at the 5th and 95th percent level. Errors are bootstrapped clustered at the bank level. *, **, and *** denote 10, 5 and 1 percent level of significance respectively.

	City-Zone Database				
Explanatory Variables	**Dependent Variable: Growth Commercial Credit/Assets (2013-2014)**				
Market Maker*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	0.085 ***	0.082 ***	0.090 ***	0.105 ***	0.091 ***
	(0.021)	(0.023)	(0.025)	(0.028)	(0.030)
Assets*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	-0.018 **	-0.018 *	-0.014	-0.014	-0.011
	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)
Liquid Assets*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	0.004 **	0.004 *	0.004 *	0.005 **	0.005 **
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Investments*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	0.002	0.001	0.001	0.000	0.001
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
ROA*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	0.022 ***	0.021 ***	0.02 ***	0.018 **	0.021 ***
	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)
Solvency Ratio*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	-0.003 **	-0.003 **	-0.002 **	-0.003 **	-0.002 **
		(0.001)	(0.001)	(0.001)	(0.001)
Domestic Sovereign Debt Exposure*Rebalancing$_{\text{Mar 2014-Sep 2014}}$		0.028	0.067	-0.151 *	-0.116
		(0.092)	(0.094)	(0.090)	(0.082)
Exchange Rate Exposure*Rebalancing$_{\text{Mar 2014-Sep 2014}}$			-0.020	-0.019	-0.018
			(0.015)	(0.015)	(0.015)
Corporate Debt*Rebalancing$_{\text{Mar 2014-Sep 2014}}$				-0.000	0.000
				(0.001)	(0.001)
Foreign*Rebalancing$_{\text{Mar 2014-Sep 2014}}$					0.022
					(0.024)
Time Fixed Effects	No	No	No	No	No
City-Zone-Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry-Time Fixed Effects	No	No	No	No	No
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	4,571	4,571	4,571	4,571	4,571
R-Squared	0.227	0.230	0.232	0.233	0.234

Table 12
Real Effects: Firm-Level Database

This table presents OLS estimations of the growth of financial debt and investments against different explanatory variables. The growth of the dependent variable is constructed as the difference in logs. Assets is the initial log of assets. Cash is the initial cash over assets. Cash flow is the initial total cash flow divided by the fixed assets. Leverage is total debt divided by assets. Net worth is the initial assets minus liabilities divided by assets. Debt securities is a dummy indicating whether a firm issued debt securities. The dependent variable is winsorized at the 1th and 99th percent level. Errors are clustered at the industry level. *, **, and *** denote 10, 5 and 1 percent level of significance respectively.

Explanatory Variables	**Dependent Variable: Growth Financial Debt (2011-2014)**		**Dependent Variable: Growth Investments (2011-2014)**	
Exposure to Market Makers*Rebalancing$_{2014}$	0.353 **	0.338 ***	0.518 **	0.467 **
	(0.154)	(0.112)	(0.217)	(0.219)
Assets		-61.05 ***		-47.625 ***
		(5.238)		(16.477)
Cash		-1.143		23.566
		(25.607)		(96.657)
Cash Flow		0.003		-0.010
		(0.002)		(0.010)
Leverage		-276.005 ***		30.216
		(20.188)		(41.110)
Net Worth		-5.107		55.363
		(21.318)		(54.556)
Debt Securities		33.772 **		-0.126
		(16.186)		(22.935)
Time Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Observations	6,818	6,818	6,818	6,818
R-Squared	0.390	0.525	0.341	0.345

Table 13
Real Effects: Parallel Trends Assumption Test

This table presents OLS estimations of the growth of financial debt and investments against different explanatory variables. The growth of the dependent variable is constructed as the difference in logs. Assets is the initial log of assets. Cash is the initial cash over assets. Cash flow is the initial total cash flow divided by the fixed assets. Leverage is total debt divided by assets. Net worth is the initial assets minus liabilities divided by assets. Debt securities is a dummy indicating whether a firm issued debt securities. The dependent variable is winsorized at the 1th and 99th percent level. Errors are clustered at the industry level. *, **, and *** denote 10, 5 and 1 percent level of significance respectively.

Explanatory Variables	**Dependent Variable: Growth Financial Debt (2011-2014)**		**Dependent Variable: Growth Investments (2011-2014)**	
Exposure to Market Makers*Rebalancing$_{2014}$	0.350 **	0.322 **	0.640 ***	0.617 **
	(0.170)	(0.152)	(0.236)	(0.244)
Exposure to Market Makers*Rebalancing$_{2013}$	-0.006	-0.037	0.334	0.321
	(0.155)	(0.143)	(0.379)	(0.384)
Assets		-61.083 ***		-28.177 **
		(6.212)		(12.452)
Cash		-1.211		131.296 *
		(31.831)		(68.263)
Cash Flow		0.003		-0.002
		(0.002)		(0.002)
Leverage		-276.066 ***		-12.288
		(20.156)		(35.700)
Net Worth		-5.246		3.309
		(22.532)		(41.026)
Debt Securities		33.78 *		-14.676
		(20.084)		(22.153)
Time Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
Observations	6,818	6,818	6,818	6,818
R-Squared	0.390	0.525	0.341	0.345

Table 14
Real Effects: Employment, Production and Sales

This table presents OLS estimations of the yearly growth of real variables against different set of fixed effects and a treatment variable for manufacturing industries. The growth of the dependent variable is constructed as the difference in logs of a month versus the month of the year before. The treatment variable is the exposure of an industry to market makers in 2013 multiplied by a dummy indicating the period of the index rebalancing by J.P. Morgan. All estimations are for the period 2013-2014. The dependent variable is winsorized at the 1th and 99th percent level. Errors are bootstrapped clustered at the industry level. *, **, and *** denote 10, 5 and 1 percent level of significance respectively.

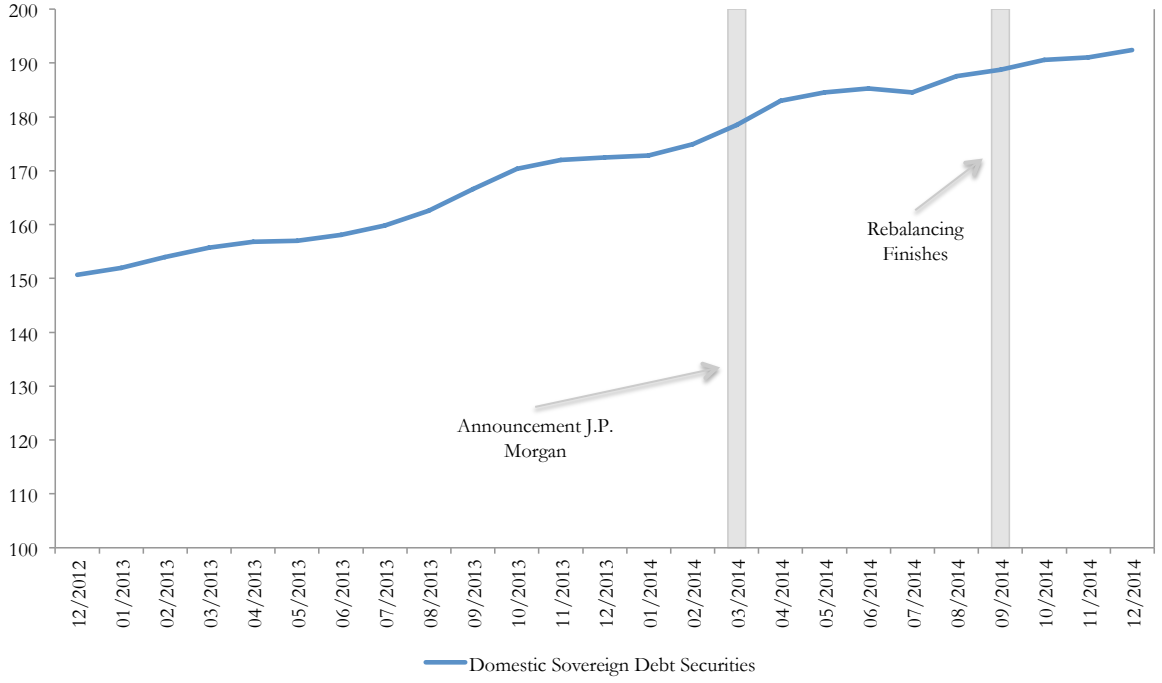
	Employment	Production	Sales
Explanatory Variables	**Dependent Variable: Growth Real Variable (2013-2014)**		
Exposure Market Maker*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	0.124 **	0.166 ***	0.237 ***
	(0.055)	(0.045)	(0.034)
Time Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Observations	757	757	757
R-Squared	0.285	0.301	0.349

Appendix Figure 1

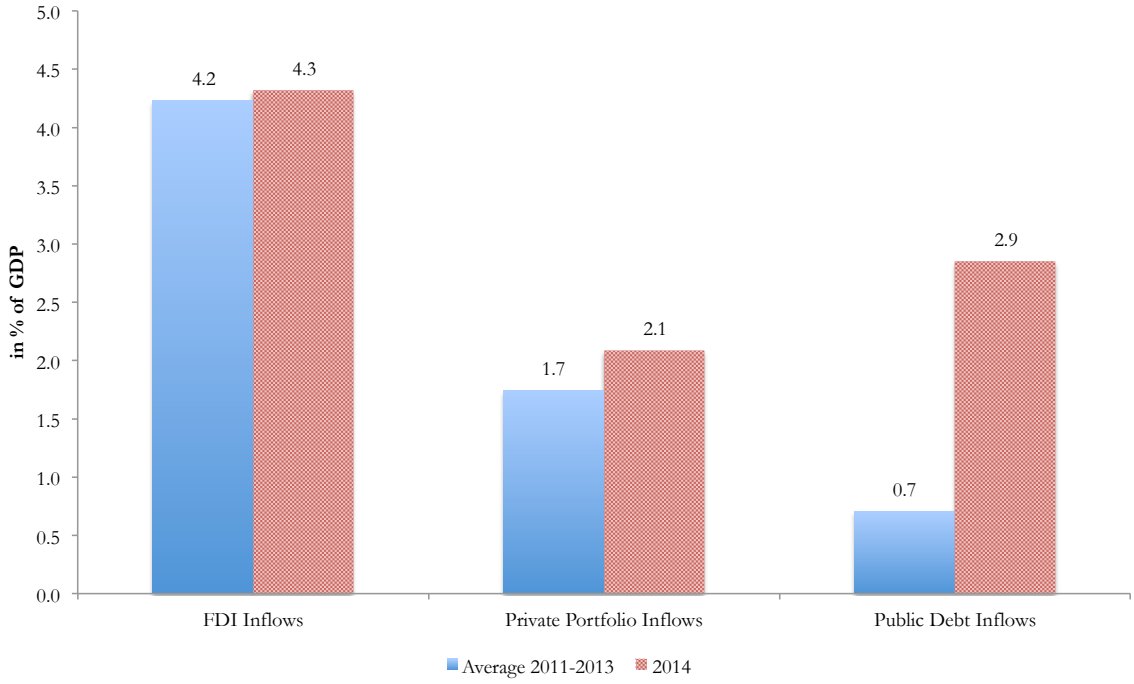
Total Domestic Debt Securities and Capital Flows Balance of Payments

This figure presents the total local currency sovereign debt securities and gross liability flows from the balance of payments by instrument type. Panel A shows the total local currency sovereign debt securities in trillions of Colombian Pesos. The grey bars indicate the events described in the picture. Panel B depicts the gross inflows from balance of payments data. The blue bars depicts the average inflows during the period 2011-2013 and the red bars show the inflows during 2014, the year of J.P. Morgan's index rebalancing. All values are in percentage of nominal GDP. FDI is foreign direct investment, private portfolio flows are liability flows in private portfolio debt and equity, and public debt inflows are liabiity flows to government debt securities.

A. Total Domestic Sovereign Debt Securities

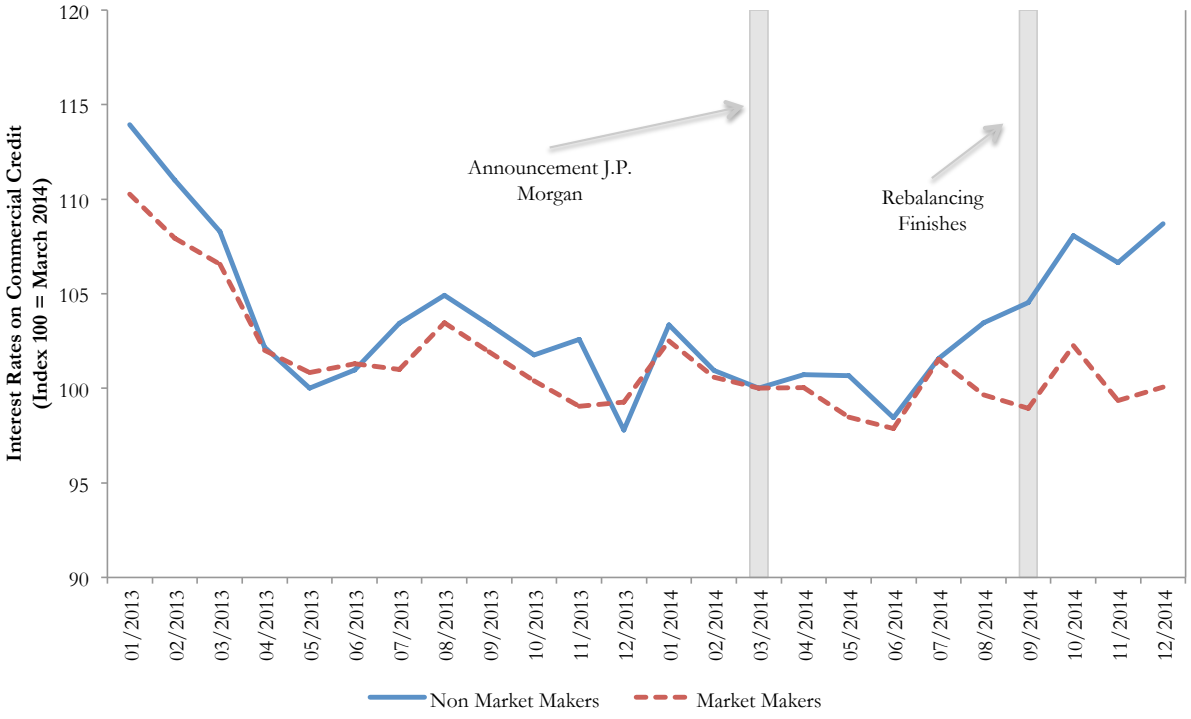


B. Balance of Payments Gross Inflows



Appendix Figure 2
Interest Rates on Commercial Credit

This figure shows the evolution of the interest rates on commercial credit dividing by market maker and non market maker banks at the end of 2013. The index is constructed by averaging the growth of interest rates at each point in time. The index is normalized to 100 for March 2014. The grey bars indicate the events described in the picture.



Appendix Table 1
Sovereign Debt Exposure and Market Makers

This table presents OLS estimations of the growth of local public debt to total assets against a treatment variable using balance sheet monthly data. The growth of the dependent variable is constructed as the difference in logs. The treatment variable is a market maker dummy multiplied by a dummy indicating the period of the index rebalancing by J.P. Morgan. All estimations are for the period 2013-2014. Errors are bootstrapped clustered at the bank level. *, **, and *** denote 10, 5 and 1 percent level of significance respectively.

Explanatory Variables	**Dependent Variable: Growth Local Public Debt/Assets**	
Market Maker*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	-0.086 **	-0.080 **
	(0.035)	(0.031)
Time Fixed Effects	Yes	Yes
Bank Fixed Effects	No	Yes
Observations	429	429
R-Squared	0.090	0.102

Appendix Table 2
Commercial Credit, Market Makers and Competition

This table presents OLS estimations of the growth of commercial credit to total assets against different explanatory variables for commercial banks and a treatment variable. The growth of the dependent variable is constructed as the difference in logs. The treatment variable is a market maker dummy multiplied by a dummy indicating the period of the index rebalancing by J.P. Morgan. The herfindahl index is the initial sum of market shares squared for market makers and non market makers and is created at the city-zone-time level. All estimations are for the period 2013-2014. The dependent variable is winsorized at the 5th and 95th percent level. Errors are bootstrapped clustered at the bank level. *, **, and *** denote 10, 5 and 1 percent level of significance respectively.

	City-Zone Database		
Explanatory Variables	**Dependent Variable: Growth Commercial Credit/Assets (2013-2014)**		
Market Maker*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	0.073 ***	0.068 ***	0.065 ***
	(0.020)	(0.022)	(0.019)
Market Maker*Herfindahl Index*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	-0.004 *	-0.002	-0.002
	(0.002)	(0.003)	(0.003)
Time Fixed Effects	Yes	No	No
City-Zone-Time Fixed Effects	No	Yes	Yes
Industry-Time Fixed Effects	No	No	No
Bank Fixed Effects	No	No	Yes
Observations	4,569	4,569	4,569
R-Squared	0.045	0.176	0.224

Appendix Table 3
Deposits and Market Makers

This table presents OLS estimations of the growth of total deposits over total assets against different explanatory variables for commercial banks and a treatment variable. The growth of the dependent variable is constructed as the difference in logs. The treatment variable is a market maker dummy multiplied by a dummy indicating the period of the index rebalancing by J.P. Morgan. All estimations are for the period 2013-2014. The dependent variable is winsorized at the 5th and 95th percent level. Errors are bootstrapped clustered at the bank level. *, **, and *** denote 10, 5 and 1 percent level of significance respectively.

	City-Zone Database		
Explanatory Variables	**Dependent Variable: Growth Total Deposits/Assets (2013-2014)**		
Market Maker*Rebalancing$_{\text{Mar 2014-Sep 2014}}$	0.028	0.027	0.025
	(0.021)	(0.021)	(0.019)
Time Fixed Effects	Yes	No	No
City-Zone-Time Fixed Effects	No	Yes	Yes
Industry-Time Fixed Effects	No	No	No
Bank Fixed Effects	No	No	Yes
Observations	4,706	4,706	4,706
R-Squared	0.016	0.108	0.135

Appendix Table 4
Industry Exposure to Market Makers - Part 1

This table shows the exposure of each industry to market maker banks at the end of 2013. The exposure is constructed by summing the commercial credit of market maker banks to each industry and dividing it by the total credit to the same industry by all commercial banks.

Industry Name	Exposure to Market Makers (in %)
Building Management Services and Landscaping (gardens, parks)	10.79
Residential Care Medical Services	19.29
Maintenance and Repair of Computers, Personal and Household Goods	22.34
Recreational, Artistic and Entertainment Activities	27.90
Gambling and Betting Activities	33.43
Scientific Research and Development	36.14
Capital Rentier (only for Individuals)	39.93
Employees	44.03
Activities of Households as Employers of Domestic Staff	54.11
Installation, Maintenance and Repair of Specialized Machinery and Equipment	58.29
Libraries, Archives, Museums and other Cultural Activities	58.33
Coking, Refined Petroleum Product Production and Fuel Blending Activity	59.26
Legal and Accounting Activities	63.12
Collection, Treatment and Garbage Disposal; Recovery of Materials	63.94
Forestry and Logging	64.63
Aquatic Transport	64.99
Real Estate	65.50
Architectural and Engineering; Technical Testing and Analysis	66.57
Food and Beverage Services	67.05
Other Personal Service Activities	67.08
Information Service Activities	67.32
Disposal and Treatment of Wastewater	68.40
Manufacture of Furniture, Mattresses and Box Springs	70.41
Health Care Activities	70.44
Mining of Metal Ores	70.58
Advertising and Market Research	71.17
Trade, Maintenance and Repair of Motor Vehicles and Motorcycles, Parts and Accessories	72.75
Other Manufacturing Industries	73.96
Beverage Manufacture	74.68
Manufacture of Computer, Electronic and Optical Products	75.26
Water Collection, Treatment and Distribution	77.63
Wholesale Business except for businesses of Motor Vehicles and Motorcycles	78.29
Manufacture of Other Non-metallic Mineral Products	78.51
Land Transport and Transport Via Pipelines	79.04
Public Administration and Defense; Compulsory Social Security Schemes	79.22
Accomodation Sector	79.38
Activities of Head offices; Management Consultancy Activities	79.75
Education	80.09
Clothing Manufacture	80.46
Motion-Pictures Production, etcétera	80.62
Financial Services Activities, except Insurance and Pension Funding	80.64
Office Administrative, Office Support and Other Business Support Activities	80.69
Manufacture of Motor Vehicles, Trailers and Semi-trailers	81.44
Manufacture of Machinery and Equipment n.c.p.	81.71

Appendix Table 5
Industry Exposure to Market Makers - Part 2

This table shows the exposure of each industry to market maker banks at the end of 2013. The exposure is constructed by summing the commercial credit of market maker banks to each industry and dividing it by the total credit to the same industry by all commercial banks.

Industry Name	Exposure to Market Makers (in %)
Mining-Services Support Activities	81.83
Wood Processing and Manufacture of Wood and Cork Products, except Furniture	82.14
Tanning and Retanning of Leather; Shoemaking; etc.	82.40
Rental and Leasing Activities	82.90
Storage and Transport ancilliary Activities	83.34
Manufacture of Chemicals and Chemical Products	83.54
Extraction of Coal and Lignite	83.74
Manufacture of Pharmaceuticals, Medicinal Chemicals and Botanical Products for Pharmaceutical Use	83.78
Private Security and Investigative Activities	83.83
Manufacture of Rubber and Plastic Products	83.92
Sports, Leisure and Recreational Activities	84.28
Other Mining and Quarrying	84.65
Other Professional, Scientific and Technical Activities	84.72
Retail Trade, except of Motor Vehicles and Motorcycles	84.74
Civil Engineering Works	85.68
Employment Activities	85.73
Agriculture, hunting and related service activities	85.80
Manufacture of Fabricated Metal Products, except Machinery and Equipment	85.97
Publishing Activities	86.24
Manufacture of food products	86.70
Electricity, Gas, Steam and Air Conditioning	86.72
Air Transport	86.81
Manufacture of Appliances and Electrical Equipment	87.82
Building Construction	87.83
Manufacture of Textiles	87.93
Manufacture of Basic Metal Products	88.46
Insurance (including Reinsurance), Social Insurance and Pension Funds, excluding Social Security	88.65
Activities auxiliary to Financial Service Activities	89.00
Computer Systems Development and Related Activities	89.43
Building Construction Specialized Activities and Civil Engineering Works	90.01
Fisheries and Aquaculture	90.87
Activities of Membership Organisations	91.12
Manufacture of Paper, Cardboard and Paper Products and Cardboard	91.36
Activities of Travel Agencies, Tour Operators, Reservation Services and Related Activities	92.08
Telecommunications	93.13
Printing activities and Production of Copies from Original recordings	93.24
Programming and Broadcasting Activities	94.05
Manufacture of Other Transport Equipment	95.66
Extraction of Crude Petroleum and Natural Gas	96.56
Mail and Messaging Services	97.19
Manufacture of Tobacco Products	99.31
Social work Activities without Accommodation	100.00

Appendix Table 6
Manufacturing Industries and Exposure to Market Makers

This table shows the exposure of each manufacturing industry to market maker banks at the end of 2013. The exposure is constructed by summing the commercial credit of market maker banks to each industry and dividing it by the total credit to the same industry by all commercial banks.

Industry Name	Exposure to Market Makers (in %)
Coking, Refined Petroleum Product Production and Fuel Blending Activity	59.26
Manufacture of Furniture, Mattresses and Box Springs	70.41
Other Manufacturing Industries	73.96
Beverage Manufacture	74.68
Manufacture of Computer, Electronic and Optical Products	75.26
Manufacture of Other Non-metallic Mineral Products	78.51
Clothing Manufacture	80.46
Manufacture of Motor Vehicles, Trailers and Semi-trailers	81.44
Manufacture of Machinery and Equipment n.c.p.	81.71
Transformación de la madera y fabricación de productos de madera y de corcho, excepto muebles	82.14
Wood Processing and Manufacture of Wood and Cork Products, except Furniture	82.40
Manufacture of Chemicals and Chemical Products	83.54
Manufacture of Pharmaceuticals, Medicinal Chemicals and Botanical Products for Pharmaceutical Use	83.78
Manufacture of Rubber and Plastic Products	83.92
Manufacture of Fabricated Metal Products, except Machinery and Equipment	85.97
Publishing Activities	86.24
Manufacture of food products	86.70
Manufacture of Appliances and Electrical Equipment	87.82
Manufacture of Textiles	87.93
Manufacture of Basic Metal Products	88.46
Manufacture of Paper, Cardboard and Paper Products and Cardboard	91.36