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Brazilian Market Portfolio

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Abstract

In recent years, Brazil has achieved substantial progress in capital market development by building a diversified investor base and expanding the menu of available financial instruments. In this context, we evaluated the invested Brazilian market portfolio for a period spanning 2005–15. This is a portfolio of all assets proportionally weighted by their market capitalization, and it is divided in eight broad categories: government bonds, equities, bank funding bonds, corporate bonds, real-estate, agribusiness, private-equity, and credit bonds. While the paper focuses on stylized facts related to market size, composition weighting and changes over time, the estimated market portfolio contains important information for policy makers and market participants alike.

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I. INTRODUCTION

Understanding the structure and composition of a financial market stands prominently on the agenda of a broad range of private sector actors as well as regulatory and policy setting institutions. The recent global financial turbulences have reinforced the idea that tracking asset class dynamics can play a useful role in identifying early on potential pockets of risk. Furthermore, comparing structural features and sizes across countries also deliver insights into how legal or institutional peculiarities can impact capital market structures. Having that as a backdrop, we have set out to shed some light into the recent developments on the size and weighting of asset market components in Brazil. To our knowledge, this paper is the first comprehensive attempt to understand those dynamics for this large economy over this extended period of time.

The concept of a global market portfolio also features prominently in many financial theories and models and serves as an important foundation for asset allocation. The global market portfolio is a theoretical portfolio consisting of all investable capital assets, where the proportion invested in each asset corresponds to its market value divided by the sum of the market values of all assets. It can be used to describe the aggregate portfolio and the investable opportunity set available to all investor globally. In addition, it can serve as a benchmark for purposes of strategic asset allocation.

The idea of a market portfolio has a long history in the financial literature. In a seminal work, Markowitz (1952) introduced his theory of portfolio selection in a static model, developing a mathematical model for diversification. In his model, Markowitz mainly demonstrates that diversification across assets with low correlations reduces the overall risk of the portfolio. He showed that the efficient portfolio is the portfolio that maximizes the expected return for a given level of risk and that there is not only one optimal portfolio, but a set of optimal portfolios which is called the efficient frontier. Later, Tobin (1958) expanded on Markowitz's work by introducing for the investors the possibility to invest in a risk-free asset besides the risky assets already present in the Markowitz's framework. He showed that the efficient frontier becomes a straight line in the presence of a risk-free asset, which leads to the notions of a super-efficient portfolio and the capital market line. Sharpe (1964) brought a further contribution to this building block by developing the capital asset pricing model (CAPM), which is considered one of the major contributions in financial economics in the last decades.

In this study, we document the exercise of estimating the invested Brazilian multi-asset market portfolio for the 2005–15 period. This portfolio is the aggregate portfolio of all investors, in which portfolio weights indicate the constitution of the average portfolio. We used eight established asset classes: equities, private equity, government bonds, bank funding bonds, corporate bonds, real-estate, agribusiness, and credit bonds. All the estimates are quoted in Brazilian *reais* (BRL). Investors have easy access to these asset classes directly or through mutual funds or index funds. Our selection of asset classes was driven by factors like availability of data, usage by the financial community, and finally the desire to capture the Brazilian capital market in its full spectrum.

In line with the work of Doeswijk, Lam, and Swinkels (2014), we focused on the invested market portfolio composed of Brazilian assets, which contains all assets in which financial

investors have actually invested. By definition, finance theory assumes that the market portfolio consists of both traded and non-traded assets (human capital, durable goods, etc.). However, it is difficult to construct a good proxy for the market portfolio in the real world that captures all sources of assets. Therefore, we exclude categories like durable consumption goods, human capital, private housing, family businesses, derivatives, investment funds, etc. and focus on measuring the market value of the securities that constitute the opportunity set faced by most investors.

The rest of our study proceeds as follows. In Section 2, we describe the eight Brazilian asset classes employed in this work. In Section 3, we present our estimates for the Brazilian multi-asset invested market portfolio for the 2005–15 period. In Section 4, we provide explanations of our data sources and methodology. Finally, Section 5 concludes.

II. BRAZILIAN ASSET CLASSES

In this section, we briefly describe the main characteristics of the eight asset classes employed in this study. We present the most important securities traded in each market, the types of investors, and the evolution of each market in terms of market capitalization.

A. Government Bonds

With a total amount of BRL 2.6 trillion in outstanding securities, the Brazilian domestic government bond market has expanded rapidly since the mid-1990s and has become one of the most liquid and sophisticated among emerging markets. Over the same period, broad while uneven improved macroeconomic conditions, foreign investors entering the fixed rate segment of local currency government debt, combined with microstructure reforms, has allowed the government to follow the policy of gradually replacing floating rate bonds with fixed rate and inflation-linked securities.² This new structure of debt has made the country more resilient to various risk factors.

Brazilian government bonds play a dominant role as an investment class in the market, and there are series of reasons for that: (i) while bearing the low sovereign risk of the Federal Government, the spread to private sector instruments is relatively low; (ii) they are a very flexible investment because they allow applications of large or small values, with several due dates and payment arrangements; (iii) it is possible to recover the application before maturity as the National Treasury guarantees the repurchase of securities, on daily basis for securities

² Since 2001, the National Treasury's Annual Borrowing Plan (ABP – *Plano Anual de Financiamento*) has stated that the objective of Federal Public Debt (FPD) management is to “provide federal government borrowing requirements efficiently and at the lowest long-term cost, while maintaining prudent risk levels. Parallel to this, the debt management is designed to contribute to a smooth operation of the Brazilian government bond market” (Annual Borrowing Plan, Tesouro Nacional, 2015). In this regard, the main debt management guidelines include the following: (a) gradually replacing floating rate bonds with fixed rate instruments; (b) consolidating the share of inflation-linked and exchange rate-linked instruments on the outstanding debt, in accordance with long term limits; (c) smoothing of the maturity structure, with special attention to the short-term debt; (d) lengthening of the average maturity of the outstanding debt; and (e) broadening of the investor base. For more information, see [Annual Borrowing Plan 2016– Federal Public Debt](#).

sold through the retail program; (iv) since there are bonds with fixed and floating rates, the “Tesouro Direto”³ allows investors to diversify their allocations, including high or low scenarios of interest and variation of inflation; and (v) it is possible to start with an investment as low as BRL 30 and the income tax (IR) is only charged from the investor upon maturity of the bond or at its early recover, or upon receipt of biannual installments, depending on the type of bond.

The domestic federal public debt (DFPD) is composed of a wide range of securities, including floating rate, fixed rate, inflation-linked, and dollar-indexed instruments (see

Table 1). The Financial Treasury Bill (LFT - *Letra Financeira do Tesouro*), whose floating rate remuneration is based on the Selic⁴ rate, is the largest government security in terms of outstanding amounts. The National Treasury Bill (LTN – *Letra do Tesouro Nacional*), a zero-coupon fixed rate security, has expanded sharply in recent years and is now the second most important type of outstanding marketable liability. The National Treasury Notes Series-F (NTN-F - *Notas do Tesouro Nacional série F*), which is a standard coupon-bearing fixed rate security, has also expanded in recent years. The other NTN securities are indexed to various other indices. The NTN-B and NTN-C, inflation-indexed bonds, have increased their share of total marketable debt in recent years. Overall, the securities discussed in this table represent 99 percent of the total domestic marketable debt of the federal government. Debt issuance by states and municipalities is modest.

³ The “Tesouro Direto” is a program implemented by the National Treasury that allows individuals to purchase public bonds through the internet. For more information, see <http://www.tesouro.gov.br/tesouro-direto>.

⁴ The Special System for Settlement and Custody or *Sistema Especial de Liquidação e Custódia* (Selic) is the settlement system for most—around 96 percent—of central government's domestic securities. The Selic overnight rate, expressed in annual terms, is the average rate weighted by the volume of one-day operations guaranteed by federal government securities, carried out at Selic through repo operations. It is the basic rate used as reference by the monetary policy.

Figure 1. Evolution of the Government Bonds Market

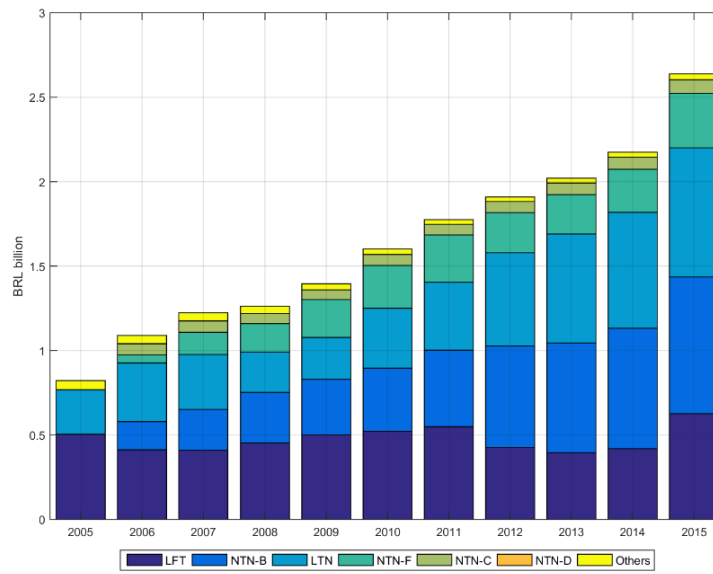


Figure 1 depicts the composition of government bonds from 2005–15. We can see that the level of government bonds increased significantly during this period. It represented 41.43 percent of the GDP in 2005, and reached 52.11 percent in 2015. Notice that the Brazil's domestic federal public debt increased significantly in 2015, reaching its highest value since 2005. According to the National Treasury (2015), the DFPD increased BRL 463 billion from 2014 to 2015, mainly driven by interest expenses. LFTs have been an important debt instrument since 2005, although their proportion in the government bonds decreased from 61.37 percent in 2005 to 23.74 percent in 2015. Since the National Treasury initiated the process of gradual replacement of floating-rate for fixed rate securities, the proportion of NTN-Bs increased from 15.35 percent in 2006 to 30.69 percent in 2015, and from 4.41 percent to 12.25 percent for NTN-Fs. The proportion of LTNs decreased 3.06pps during this period, to 28.98 percent. The sum of all other government bonds decreased from 6.59 percent to 1.31 percent.

Table 1. General Characteristics of Federal Government Bonds

Security	Description	Indices	Type of Interest	Interest	Terms	Maturity Rule
LFT (Letra Financeira do Tesouro)	Floating rate bills	Selic Interest Rate	Floating	None	26 months (average term)	Third month of each quarter
LTN (Letra do Tesouro Nacional)	Short-term, zero-coupon fixed rate bills		Fixed	None	6, 12, 24, and 36 months	First day of January, April, July and October
NTN-F (Notas do Tesouro Nacional série F)	Long-term fixed rate coupon bonds		Fixed	Semi-annually, with adjustment of the term in the first flowing period, when applicable	5 and 10 years	First day of January
NTN-B (Notas do Tesouro Nacional série B)	Inflation-linked coupon bonds	IPCA Price Index	Inflation-Linked	Semi-annually, with adjustment of the term in the first flowing period, when applicable	3, 5, 10, 20, 30, and 40 years	
NTN-C (Notas do Tesouro Nacional série C)	Inflation-linked coupon bonds	IGP-M Price Index	Inflation-Linked	Semi-annually, with adjustment of the term in the first flowing period, when applicable		No longer issued

Comments: Number of Days: Business days of the security/252

Debt management in recent years has been guided by the policy of gradually changing the Domestic Federal Public Debt (DFPD) profile. Since 2001, the Brazilian Treasury⁵ has been trying to extend the yield curve by selling longer term, pre-fixed interest securities, such as the LTN and the NTN-F, as well as concentrating issuance of inflation-indexed bonds on the NTN-B.⁶ Within this framework, the government has aimed at reducing market and refinancing risks

⁵ Since 2002, the Brazilian Treasury (*Secretaria do Tesouro Nacional* - STN) has been the only entity responsible for issuances and management of public debt, both domestic and external. In the past, the Central Bank was responsible for the issuance of external debt and shared the responsibility for domestic debt issuances with the Treasury. Since then, the central bank has been responsible only for repo operations, by managing a stock of securities originally issued by the Treasury.

⁶ For more information, see <http://www.tesouro.fazenda.gov.br/ca/web/stn/objectives-and-guidelines>.

by decreasing the share of the federal debt maturing within 12 months and that of floating rate debt, and raising the share of fixed rate debt. As can be seen in **Figure 2**, the improvement in liquidity indicators and the active role of the Brazilian Treasury have contributed to a significant change in the debt profile.

Figure 2. Profile of Government Bonds

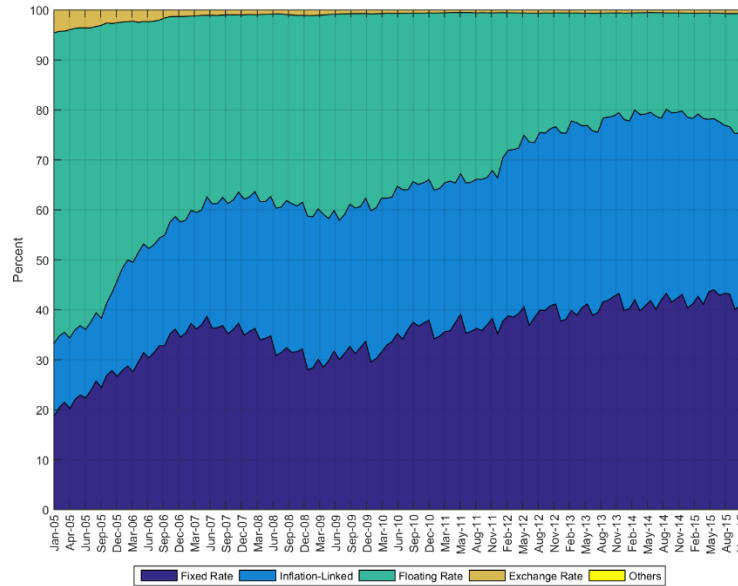
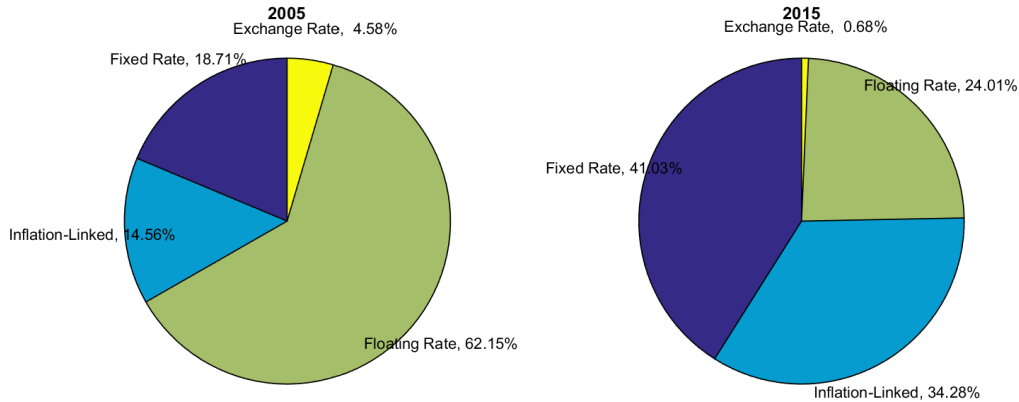


Figure 3 depicts the composition of government bonds in 2005 and 2015. We can see that the profile of the Brazilian public debt has changed significantly during this period. The share of floating rate debt was reduced from 62.15 percent in 2005 to 24 percent at the end of 2015, while the share of fixed rate bonds has risen from 18.71 percent to 41 percent. At the same time, currency-linked debt has declined from 4.6 percent at the end of 2005 to 0.7 percent at the end of 2015 and inflation-linked debt has increased from 14.56 percent in the mid-2000s to a share of 34 percent at the end of 2015. The combined ratio of fixed rate and inflation-linked bonds increased to about 75 percent in 2015, from 33 percent in 2005.

Figure 3. Composition of Government Bonds Outstanding in 2005 and in 2015

The types of investors and their behavior can also have a significant influence on trading and liquidity. In recent years, Brazil has tried to diversify and expand its investor base in order to help manage its debt and ensure a satisfactory level of demand for government bonds over time. As can be seen in **Figure 4**, domestic financial institutions are particularly prominent, accounting for 25 percent of the total ownership of federal government marketable debt, although this share was close to its lowest historic level. At the end of 2015, non-residents owned a record 18.8 percent of Brazil's government debt, some BRL 490 billion worth, up from just 1.55 percent at the end of 2005. This represented the most important change in the public debt investor base in recent times and was the result of the Treasury policy to attract non-resident investors, which usually have a greater appetite for long-term and fixed-rate bonds. In 2005, investment funds held almost 32 percent of the DFPD bonds. From this date on they progressively lost importance and, by the end of 2015, investment funds held 19.5 percent of the DFPD bonds. The share of both Pension and Insurance in the DFPD remained stable over time. **Figure 4** illustrates the evolution of the participation of each investor group in the DFPD.⁷

Figure 5 depicts the evolution of the DFPD maturity profile. In December 2015, the average internal debt term was 4.44 years and has been increasing since 2001 (2.78 years). Brazil has also experienced a reduction in the portion of debt maturing in the next 12 months and an increase in the stock of debt maturing after five years. For debt maturing in less than 12-months, its relative importance has fallen steadily since 2005, from 44 percent down to 22 percent of the DFPD in December 2015. At the same time, the portion of debt maturing after five years increased from 9.75 percent to 33 percent. In theory, the new profile would make the public debt less risky by reducing the share that is directly exposed to exchange rate fluctuations and monetary policy cycles. Notwithstanding this positive evolution, the high

⁷ Government data is available only from Jan/2011 on due to methodological improvements. Before that, government bonds were allocated as Financial Institutions and Investment Funds.

share of debt maturing within one year indicates that the country still remains exposed to higher short-term interest rates and/or refinancing risk.

Figure 4. Evolution of the DFPD Bondholder Base

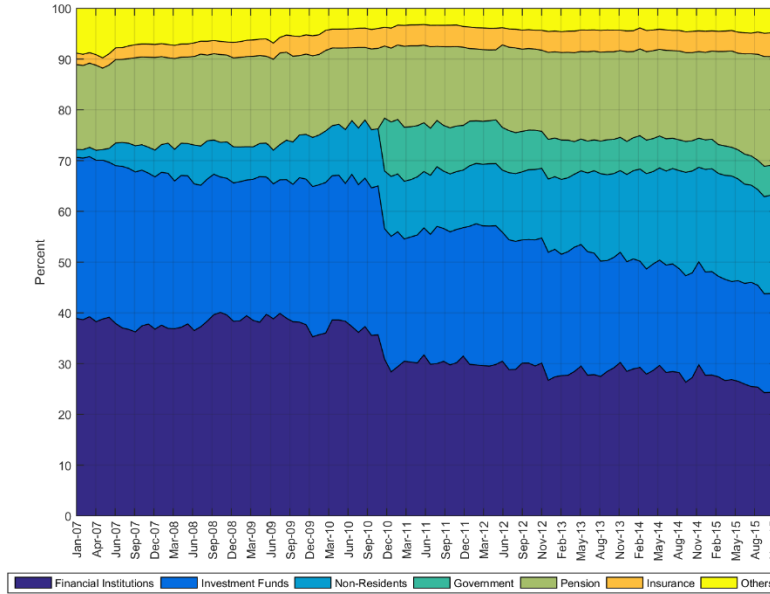
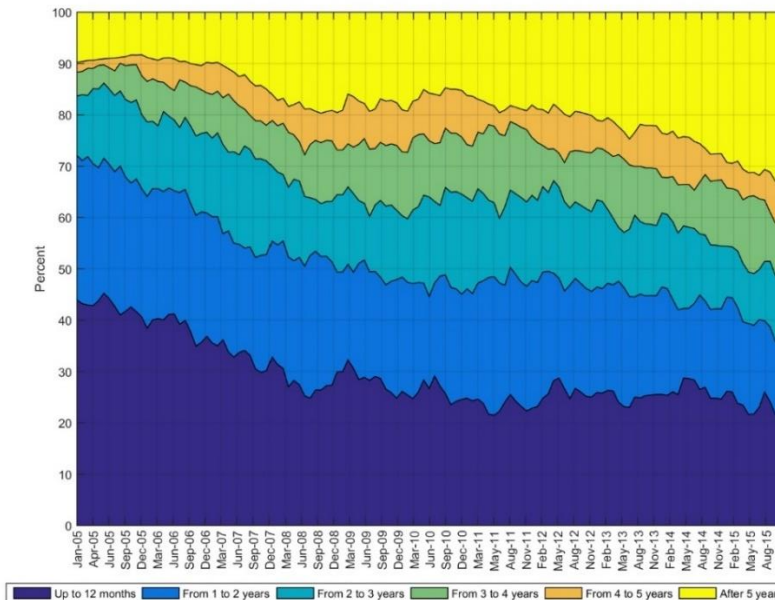


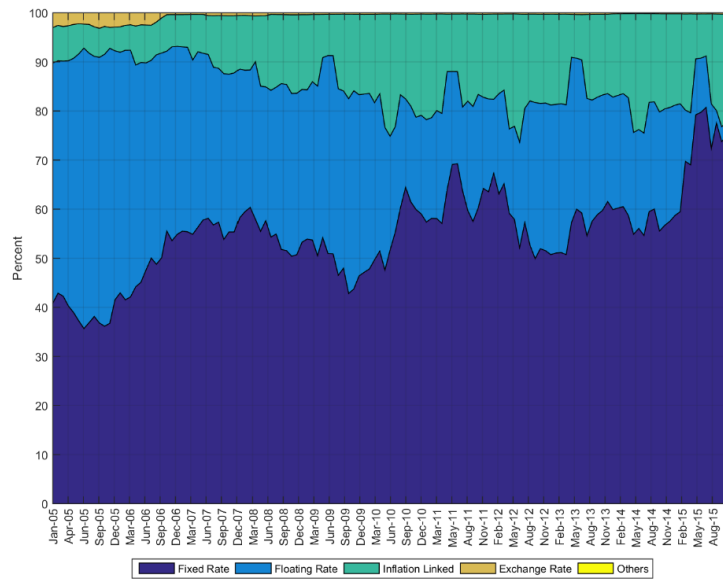
Figure 5. Evolution of the DFPD Maturity Profile



Another important indicator of the maturity structure analyzed is the composition of the debt maturing in 12 months. As mentioned previously, the volume of DFPD securities maturing in up to 12 months represented 22 percent of the total amount of securities held by the public at

the end of 2015. Fixed-rate securities accounted for 75 percent of this total, followed by inflation-linked securities with share of 22 percent of the total, as shown in **Error! Not a valid bookmark self-reference.**. The percentage of floating-rate securities decreased from 49 percent in 2005 to 3 percent in 2015. The biggest fixed-rate debt and the reduction of the floating-rate debt have reflected in less volatility in debt flows maturing in up to 12 months.

Figure 6. Evolution of the DFPD Maturing in 12 Months



B. Equity

Brazil has one of the largest stock market capitalizations in Latin America. By the end of 2015, total equity market capitalization was BRL 1.9 trillion (US\$ 490 billion), representing 37.8 percent of GDP, with a diversified investor base including individuals, institutional investors, financial institutions, private and public companies, and foreign investors.

As will be shown later in **Figure 7**, Brazil's equity market has grown rapidly in terms of market capitalization until 2007, when the equity market capitalization was BRL 2.48 trillion, representing 102.18 percent of the GDP. With the global financial crisis in 2008, Brazil lost equity market capitalization by about 45 percent. Its highest value over the past 10 years was BRL 2.57 trillion in 2010. Since 2012, Brazil has seen its total equity market capitalization drop by about 24 percent, from BRL 2.52 trillion to the current BRL 1.91 trillion.

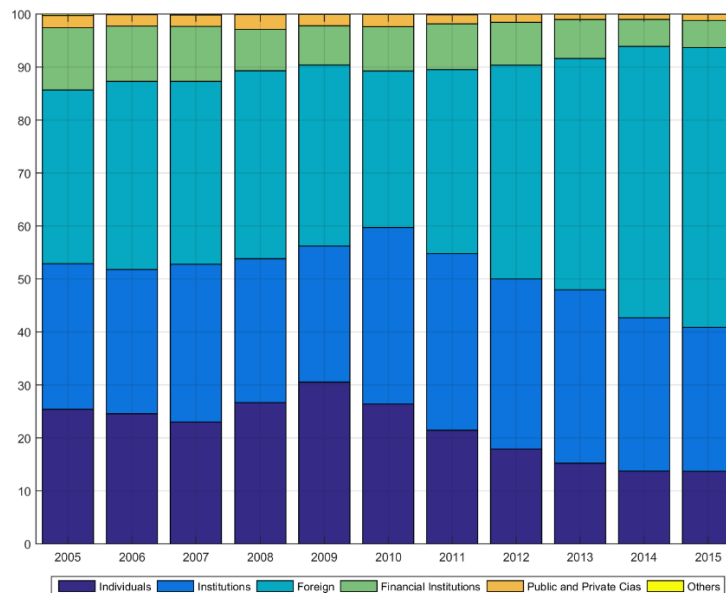
Despite Brazil's large market capitalization, turnover ratio, and number of listed domestic companies, the country was considered to rank poorly in terms of transparency and corporate governance just a few years ago. In 2000, with the hope of encouraging corporations to adopt higher standards for corporate governance, transparency, and minority shareholder protection, as pre-requisites for listing, the Brazil's main stock exchange—BM&FBOVESPA, also known as São Paulo Stock Exchange, introduced three new corporate governance listing categories, in addition to the traditional segment: Level 1, Level 2, and *Novo Mercado* (new market). All

these segments are bound by rigid rules of corporate governance. According to BM&FBOVESPA (2016), these rules go beyond the obligations that the companies have according to the Brazilian Law of Corporations⁸ (*Lei das S.As.*) and are intended to improve the assessment of those who decide to join one of these segments voluntarily.⁹

In 2005, BM&FBOVESPA created the *Bovespa Mais* to help developing the Brazilian equity market. *Bovespa Mais* is an over-the-counter market that focuses on smaller companies seeking gradual access to the stock market. Companies listed on *Bovespa Mais* have up to seven years to reach a minimum required free float of 25 percent, while on *Novo Mercado*, and also on Level 1 and Level 2, such requirement must be met since day one. This particular feature of this segment encourages sustainable growth, because it allows an adequate preparation time for the company, while simultaneously showcasing it to the market and increasing its visibility among investors.

Figure 7 reports the participation by investor type. Foreign investors are significant players in the equity market. The share of foreign investors increased from 32.8 percent in 2005 to 52.8 percent in 2015. By the end of 2015, individuals owned 14 percent of Brazil's equity, down from 25 percent at the end of 2005. In 2005, institutions held almost 27 percent of the Brazilian equity, and this share remained almost constant over time. The share of financial institutions has dropped from 12 percent in 2005 to 5 percent in 2015.

Figure 7. Participation by Investor Type



⁸ Law 6,404/76. For more information, see http://www.planalto.gov.br/ccivil_03/leis/L6404consol.htm.

⁹ According to BM&FBOVESPA (2016), Novo Mercado is the segment with the highest standards in terms of corporate governance and it is also the segment in which the great majority of recent IPOs have been made.

Despite these improvements, the Brazilian equity market still has a small number of listings. Following a record of 70 offerings (IPO and follow-ons) in 2007, the number of offerings in 2014 dropped to just four (see **Figure 8**), in part reflecting weak global and internal financial conditions. As shown in **Figure 9**, the number of listed companies has also slowed in the recent years. In addition, it is worth mentioning that the Brazilian stock market is highly concentrated in a reduced number of companies, showing limited diversification of issuer base. Indeed, by the end of 2015, the major 10 companies account for 51.5 percent of the total stock market capitalization in BM&FBOVESPA. Ambev accounts for 15.5 percent; Itaú-Unibanco, for 8 percent; Bradesco, for 5 percent; Petrobras, for 5 percent; and Cielo, Vale, Santander BR, Telefônica Brasil, BB Seguridade and Brasil Foods, for 18 percent (each one accounts for 3 percent).

Figure 8. Equity Market Characteristics

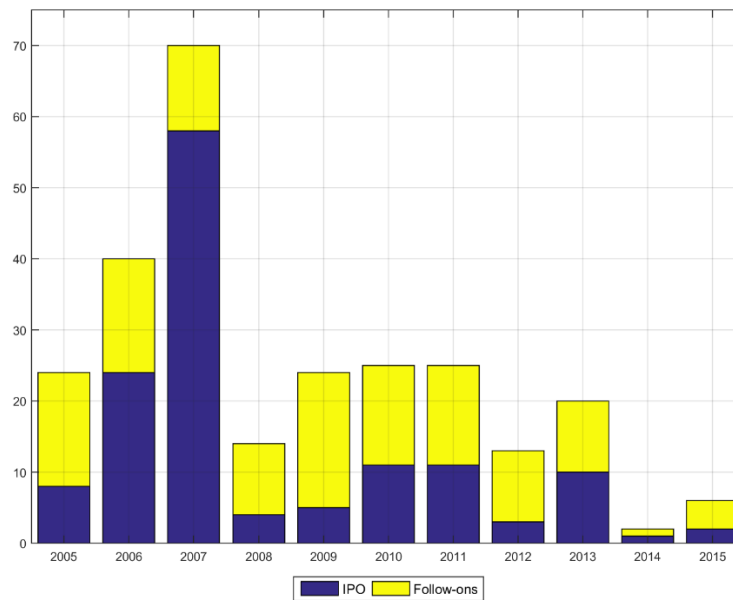
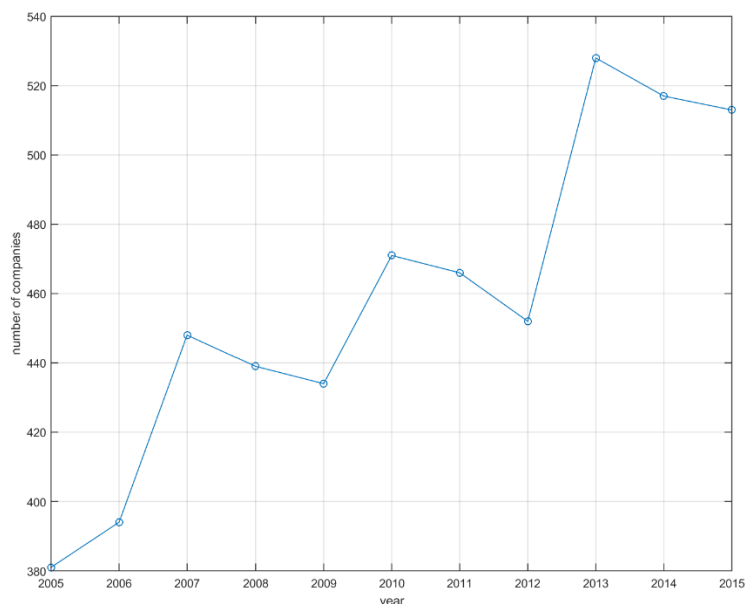


Figure 9. Number of Listed Companies

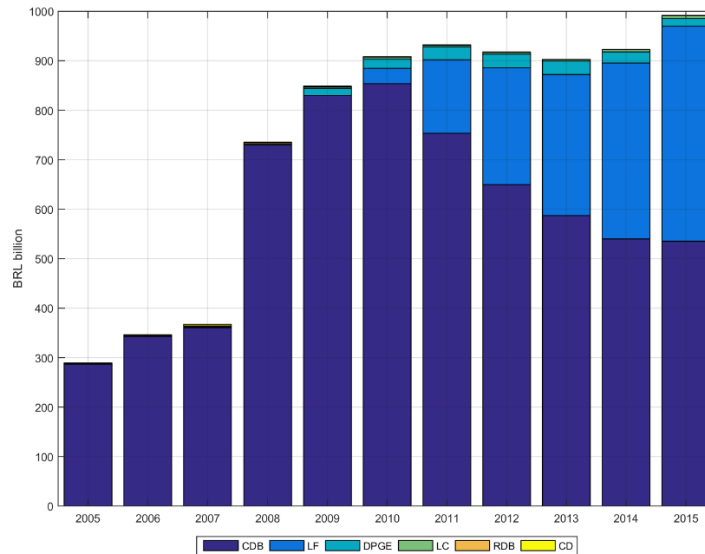
C. Bank Funding

The main fundraising instruments for banks in Brazil are, traditionally, demand deposits, term deposits, and savings. Over the past decade, the large and growing bank funding market has become more diversified with the introduction of the Financial Bill (LF – *Letra Financeira*) in 2010 and the Time Deposit with Special Guarantee (DPGE – *Depósito a Prazo com Garantia Especial*), in 2009. With the expansion of the menu of available financial instruments in recent years, the importance of funding through LFs has increased, although the Bank Certificates of Deposits (CDBs – *Certificados de Depósito Bancário*) still represent the main source of funds in this segment. The increase in the share of LFs and DPGEs partly reflects characteristics of these instruments, such as tax exemption and protection by the Credit Guarantee Fund (FGC – *Fundo Garantidor de Crédito*).

Figure 10 reports the amount outstanding of bank funding securities from 2005 to 2015. The amount of CDBs reached BRL 535 billion in December 2015, from BRL 287 billion in 2005. We can see that the level of CDBs increased significantly during this period, although its participation in the bank funding market decreased from 99 percent in 2005 to 54 percent in 2015. Meanwhile, the amount of LFs held by Brazilian banks increased from BRL 31 billion in 2010 to BRL 435 billion in 2015, contributing roughly 44 percent of the total bank funding market, followed by DPGEs (1.57 percent), Bank Deposit Receipts - RDBs¹⁰ (0.08 percent), and Exchange Bills - LCs¹¹ (0.54 percent).

¹⁰ *Recibo de Depósito Bancário.*

¹¹ *Letras de Câmbio.*

Figure 10. Evolution of the Bank Funding Market

In the next sections, we will look more carefully at the aforementioned bank funding bonds issued by Brazilian financial institutions.

Bank Certificate of Deposit (CDB)

The Bank Deposit Certificate (CDB – *Certificado de Depósito Bancário*) is a fixed income holding, book entry form and nominative, representing a nominal promise of payment of the original deposited amount plus an agreed remuneration. It is an important fundraising instrument for financial institutions, since investors acquiring CDBs loan money to bank in exchange for remuneration.

The Certificate of Deposit is one of the most popular investments in Brazil because it may be acquired with daily liquidity and is protected by the Credit Guarantee Fund (FGC), which covers losses up to the limit provided in regulations by clients (personal or corporate) in each financial institution. Another important feature of CDBs is its decreasing income tax rate during the investment period, since collection only occurs upon redemption or maturity. The risk linked to the investment in CDBs is directly related to the health of its issuer.

The main features of CDBs, like term and yield, are determined at the time of trading. The compensation, which can be pre-fixed or post-fixed, is based on several indices, with the CETIP DI-rate being the most widely used. CDB investments must be registered at CETIP or other custody and settlement system authorized by the Central Bank, up to three working days after booking the operation, providing the investor's identification.

Bank Deposit Receipt (RDB)

The Bank Deposit Receipt (RDB - *Recibo de Depósito Bancário*) is a fixed-income security, with a pre-established maturity, whose remuneration is set at the time of issue and can be either

pre-fixed or post-fixed, adjusted according to the DI over, where the investor is paid a percentage of the market's overnight rate. At the end of the contracted term, the investor receives the applied amount (principal), plus the established remuneration.

RDBs can be issued by multiple, commercial, development and investment banks, and credit, financing and investment companies. Being a nominative, nontransferable security, it may not be traded on the secondary market. However, it can be redeemed with the issuing institutions before the contracted term, as long as the minimum investment period has expired. Before the minimum term, no remuneration is earned.

The difference between the CDB and RDB is that the CDB can be redeemed before maturity, while the RDB is non-negotiable and nontransferable. Similarly to CDBs, RDBs are also eligible to be covered by the Credit Guarantee Fund (FGC).

Time Deposit with Special Guarantee (DPGE)

Time Deposit with Special Guarantee is a fixed income security representing a nominal promise of payment of the original deposited amount plus an agreed remuneration. It was created in 2009 by the National Monetary Council (CMN – *Conselho Monetário Nacional*) to assist small and medium size institutions raise funds. In 2012, the CMN created a new type of asset known as DPGE II. Unlike the DPGE, this new version is secured by the Credit Guarantee Fund (FGC) up to BRL 20 million (by person).

DGPEs can remunerate holders at pre-fixed or post-fixed rates and redemption periods are established at the time of contracting, though not less than 12 months or greater than 36 months. Renegotiation of the remuneration originally established is prohibited, as well as partial or total redemption before the due date.

Bill of Exchange (LC)

Bills of Exchange (LC - *Letras de Câmbio*) are fixed-income bonds representing credit operations. They are linked to the financing of goods and services for individuals or legal entities and for working capital of legal entities.

The instrument allows debtors to grant registrants (acceptor) of the Bill of Exchange an order of payment in the amount owed. Multiple banks with credit portfolios, lenders, investment banks and investment, financing and credit unions can be acceptors of Bills of Exchange. These securities can be traded by registrants and issued with remuneration based on a percentage of the CDI rate, the Selic rate or a prefixed rate. LCs cannot be redeemed prior to the redemption date and are secured by the Credit Guarantee Fund (FGC) up to BRL 250,000 (personal or corporate).

Financial Bill (LF)

The Financial Bill (LF - *Letra Financeira*) is a fixed income security, issued by financial institutions with the purpose of borrow long-term funds. They were created by the CMN in 2009 and can be issued privately between financial institutions and their customers or through public offerings with restricted efforts. The remuneration of the LF can be pre-fixed, combined

or not with floating rates. However, most LFs have post-fixed remuneration, linked to the CDI rate.

The Financial Bill has exclusive features that have made it widely used in the market. It has a minimum maturity of two years, without possibility of partial or total redemption before that period. Another characteristic is that this asset has a minimum nominal unit value of BRL 150 thousand.¹² Financial institutions can acquire LFs of their own issue, at any time, only to be held in treasury for subsequent sale. The amount held in treasury may not exceed 5 percent of the total issue without a subordination clause and the LFs of component entities of the same conglomerate are included in this limit. These securities are not eligible to be covered by the FGC.

D. Corporate Bonds

Companies do not need to issue stocks to raise financial resources. Instead, they may find it more advantageous to issue either debentures or commercial papers. These securities represent cheaper sources of financing when compared to bank credit, with more flexible maturities.

Figure 11 depicts the level of bonds issued by the private sector from 2005 to 2015. There was a substantial increase in the amount outstanding of corporate bonds during this period (from BRL 86 billion in 2005 to BRL 753 billion in 2015). The amount of debentures increased from BRL 85 billion in 2005 to BRL 744 billion in 2005, while the amount of commercial papers increased from BRL 971 million to BRL 7.67 billion during the same period.

As can be seen in **Figure 11**, debentures have been the most important corporate bond since 2005 and represent on average more than 98 percent of the total amount outstanding of corporate bonds, followed by commercial papers (1 percent), Commercial Lease Letters - LAM (0.18 percent), and Audiovisual Investment Certificates - CIA (0.002 percent).

In the next sections, we will look more carefully at the aforementioned corporate bonds issued by Brazilian companies.

Debentures

Debentures are one of the most important debt instruments of large Brazilian companies. They are fixed-income securities representing medium and long term debt that guarantee their owners (debenture holders) right of credit against the issuing company. They can be issued by publicly-held or private companies. However, public offerings can be made only by publicly-held companies. Brazilian companies are also allowed to issue debentures outside the country denominated in foreign currency.¹³

Debentures carry interest, which is to be paid at periodic intervals. The amount borrowed is to be repaid at the end of the stipulated term, as per the terms of redemption. The debenture's particular characteristics regarding terms and remuneration are defined in its Issue Deed. The

¹² BRL 300 thousand if it contains a subordination clause.

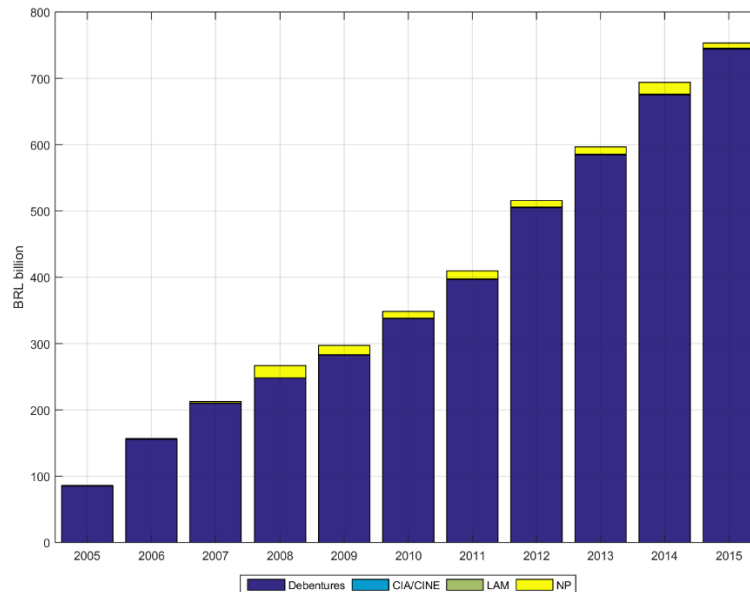
¹³ See also: [Guia de Debêntures - BM&F BOVESPA](#)

maturity of debentures must be defined in the Issue Deed, but the company may issue debentures without maturity (perpetual debentures).

There are two forms of debentures: nominative or book-entry. Regarding class, they can be simple, convertible or exchangeable, and have real, floating, unsecured or subordinate guarantees. Another important feature of debentures is that they are not secured by physical asset or collateral. Thus, debentures are unsecured bonds, which means that a debenture is secured only by the issuer's promise to pay the interest and loan principal.

According to Nunes and Fernandes (2014), the main advantage of using debentures for financing is flexibility because the issuance characteristics can be adjusted to suit the needs of each corporation. The cost reduction is another important advantage. Because debentures are predominantly long-term securities, they have lower funding costs when compared to short bank loans.¹⁴

Figure 11. Evolution of the Corporate Bond Market



Commercial Paper (NP)

Commercial paper (*Nota Promissória*) is an unsecured, short term promissory note with a fixed maturity ranging from 180 to 360 days. They are typically issued for the financing of accounts receivable, inventories and meeting short-term liabilities. Similarly, to debentures, these securities grant holders credit rights against the issuing company, which may be publicly-held or private.

¹⁴ According to Nunes and Fernandes (2014), clauses about renegotiation, profit sharing and convertibility to shares help reduce the issuing costs.

(continued...)

Acquired by individuals or companies, commercial papers can remunerate holders by a pre-fixed rate, a floating rate (DI, Selic), or by the TR¹⁵ or TJLP. The most common is post-fixed remuneration, indexed to the CDI rate, or IPCA¹⁶ plus interest. Commercial Papers can be collateralized by the issuing company.

E. Real-Estate

The Brazilian real-estate market has grown more sophisticated in recent years. Although Real-Estate Credit Bills (LCIs – *Letras de Crédito Imobiliário*) and Real-Estate Receivables Certificates (CRIs – *Certificado de Recebíveis Imobiliários*) are relatively new instruments in Brazil, their amount outstanding has been increasing significantly over the past few years. As can be seen in **Figure 12**, the amount of CRIs increased from BRL 2 billion in 2005 to BRL 61 billion in 2015, while the amount of LCIs increased from BRL 4 billion in 2005 to BRL 204 billion in 2015. Meanwhile, the amount of Real-Estate Credit Notes (CCIs – *Certificados de Crédito Imobiliário*) increased from BRL 1.77 billion in 2005 to BRL 97 billion in 2015. On the other hand, the amount of Mortgage Notes (LH – *Letra Hipotecária*) decreased from BRL 8 billion in 2005 to BRL 1 billion in 2015.

The composition of the real-estate market has also changed significantly over time. In 2005, the real-estate market was mostly represented by LHs (51 percent), followed by LCIs (25 percent), CRIs (13 percent), and CCIs (11 percent). In 2015, LCIs represented 56 percent of the real-estate market, followed by CCIs (27 percent) and CRIs (17 percent). By the end of 2015, the proportion of LHs was just 0.28 percent.

In the next sections, we will look more carefully at the aforementioned real-estate bonds traded in the Brazilian market.

Real-Estate Credit Bill (LCI)

The Real-Estate Credit Bill (LCI - *Letra de Crédito Imobiliário*) is a fixed-income security issued by financial institutions, backed by real estate loans. LCIs can earn pre- or post-fixed remuneration and its due date cannot exceed the term of any of the real estate credits used as collaterals.

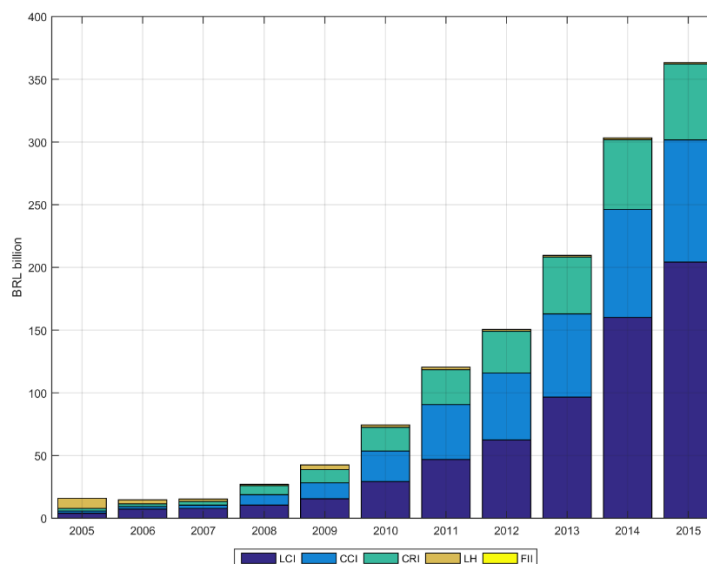
The applications in LCIs have grown a lot in recent times, precisely because they are exempt of income tax for individual investors. In addition, the FGC covers losses up to the limit provided in regulations by clients (personal or corporate) in each financial institution.

¹⁵ TJLP - *Taxa de Juros de Longo Prazo* was created in November 1994 to stimulate long term investments, which were previously less feasible due to the absence of a market for long-term credit in the country. At present, the TJLP is the main rate for credit lines from the Brazilian Development Bank (BNDES – *Banco Nacional de Desenvolvimento Econômico e Social*) and from the Workers' Support Fund (FAT – *Fundo de Amparo ao Trabalhador*). TR – *Taxa Referencial* is a reference rate published daily by the central bank and is valid until the same day of the following month. The calculation of the TR is based mainly on the average of CDB and RDB rates, to which a reduction factor is applied.

¹⁶ The Broad Consumer Price Index (IPCA – *Índice de Preços ao Consumidor Amplo*) is the index most closely followed by market agents, due to its status as the standard price index of the inflation-targeting regime.

The minimum term of maturity of LCIs varies according to its indexer: (i) 36 months when updated monthly by price index; (ii) 12 months, when updated annually by price index; and (iii) 60 days, when updated by other parameters (fixed or floating rate) and not by price index. Normally, this asset cannot be redeemed at will, but it can be traded on the secondary market.

Figure 12. Evolution of the Real-Estate Market



Real-Estate Credit Note (CCI)

Real-Estate Credit Note (CCI – *Certificado de Crédito Imobiliário*) is an instrument representing a mortgage, in which a debtor agrees to pay a real-estate debt to a creditor. The note is issued by the creditor to facilitate and simplify credit concession and may or may not include collateral.

The CCI transforms a private contract into a trading holding, based on pre-fixed or post-fixed compensation rates, including prices indexes, according to the respective credit right indexer. It cannot be traded in the stock market; nevertheless, it may be used as a guarantee for the issuance of CRIs.

Real-Estate Receivables Certificate (CRI)

Real-Estate Receivables Certificate (CRI – *Certificado de Recebíveis Imobiliários*) is a fixed income bond that is freely negotiable in the stock market, backed by real-estate credits. It constitutes a promise of cash payment and can only be issued by Brazilian real-estate securitization companies. CRIs turn a mid- or long-term receivables flow into tradable financial assets, allowing more financial leverage to real-estate companies. They may be acquired by individuals or corporations, and their remuneration is calculated according to pre-

fixed or floating (DI, Selic) rates, TR, TJLP or the Price Index. Similarly to LCIs, the remuneration of this asset is exempt from income tax for individual investors.

Mortgage Note (LH)

Mortgage-Backed Security (LH – *Letra Hipotecária*) is an instrument backed by real-estate receivables. It is issued by financial institutions operating in the concession of loans funded by the Housing Financial System (SFH – *Sistema Financeiro de Habitação*) and mortgages companies. The bond's maturity ranges from 180 days to 60 months, with adjustments from the TR, IGP-M, IGP-DI and INPC variations.¹⁷ In addition, its remuneration is also exempt from income tax for individual investors.

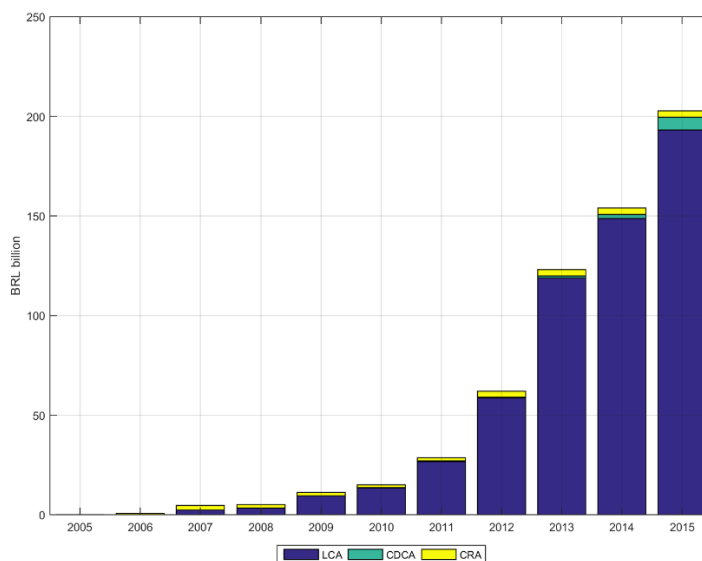
The only risk for the LH is having the issuing institution go bankrupt before the end of the contract. LHs are backed not only by the real estate-property to which they are tied, but also guaranteed by the FGC.

F. Agribusiness

In recent years, Brazil has invested heavily in the promotion of financial instruments designed to attract private capital to the agricultural sector, thus increasing the opportunities for financing of agribusiness activities through the financial and capital markets.

Figure 13 depicts the evolution of the amount outstanding of Agribusiness Credit Bills (LCAs – *Letras de Crédito do Agronegócio*), Agricultural Receivables Certificates (CRAs – *Certificado de Recebíveis do Agronegócio*), and Agribusiness Credit Rights Certificates (CDCAs - *Certificados de Direitos Creditórios do Agronegócio*) from 2005 to 2015. It is worth mentioning that the differences between these agribusiness instruments depend on the issuer. LCAs are issued exclusively by financial institutions, CDCAs by agribusiness companies and CRAs by agribusiness credit rights securitization companies.

¹⁷ The Market General Price Index (IGP-M - *Índice Geral de Preços do Mercado*) is calculated by the Fundação Getúlio Vargas (FGV). It is composed of three indexes: Wholesale Prices Index (IPA), Consumer Price Index (IPC) and Construction Cost National Index (INCC) that represent 60 percent, 30 percent and 10 percent respectively of the IGP-M. The Prices General Index - Internal Availability (IGP-DI - *Índice Geral de Preços - Disponibilidade Interna*) measures prices that directly affect the economic activity of the country, except exports. Like the IGP-M, it is also composed of the weighted average of the IPC, IPA and INCC. The Consumer National Price Index (INPC – *Índice Nacional de Preços ao Consumidor*) is calculated by IBGE (Brazilian Institute of Geography and Statistics). It measures the prices variation of products and services consumed by families with income between 1 and 8 minimum wages.

Figure 13. Evolution of the Agribusiness Market

As shown in **Figure 13**, the amount of agribusiness bonds increased from BRL 59 million in 2005 to BRL 203 billion in 2015. The level of LCAs increased significantly during this period, from BRL 30 million in 2005 to BRL 193 billion in 2015. Meanwhile, the proportion of LCAs in the agribusiness bonds market increased from 51 percent to 95 percent. On the other hand, the proportion of CRAs decreased from 49 percent in 2005 to 1.6 percent in 2015. Finally, the share of CDCAs increased from 0.02 percent in 2008 to 3.15 percent in 2015.

In the next sections, we will briefly discuss the aforementioned agribusiness bonds negotiated in the Brazilian market.

Agribusiness Credit Bill (LCA)

The Agribusiness Credit Bill (LCA) is a security issued exclusively by a financial institution, whether public or private, and it is used to raise funds for agribusiness in Brazil. It is backed by credit rights originating from loan transactions between the financial institution and rural producers or their cooperatives, with remuneration based on a percentage of the CDI rate, the Selic rate or a prefixed rate. The main feature of this security is the fact that gains for individual investors are tax exempt.

Risks linked to LCAs are low. The greater risk is on the possibility of the bank offering the LCA going bankrupt. Even if that happens, LCAs issued as from May 2013 on are covered by the (FGC) up to the limit of BRL 250,000 per investor.

Agribusiness Receivables Certificate (CRA)

The Agribusiness Receivables Certificate (CRA) is a debt security exclusively issued by an agribusiness securitization company backed by agribusiness credit rights. These credit rights arise from financing operations or loans related to agricultural production, trading, processing or industrialization of products, machinery or equipment. The securitization companies structure those receivables in order to issue debt securities and distribute them to investors. CRA operations are IOF- and tax income-exempt for individual investors.

Agribusiness Credit Rights Certificate (CDCA)

The CDCA is a nominative credit bond that can be freely traded, issued by cooperatives of rural producers and other companies with agribusiness-related operations. It can also be distributed in a public offering. The CDCA allows agribusiness segment financing with private funds, and it has been extensively used to structure financial operations to extend deadlines and improve existing financing rates. Its remuneration is also exempt from income tax for individual investors.

G. Private Equity

Over the last few years, the Brazilian Private Equity (PE) and Venture Capital (VC) industry has been progressing rapidly in Brazil. According to Minardi et al (2014), although some few pioneer VC funds existed in the 80s, Brazilian PE industry development started in 1994, with the adoption of Real Plan. By definition, private equity (PE) is an asset class consisting of equity securities and debt in operating companies that are not listed on stock exchanges, independent of the company's business structure. Due to their characteristics (low liquidity, long-term returns, and asymmetry of information), private equity businesses usually offer higher risks and returns than traditional investments.

According to the Brazilian Private Equity & Venture Capital Association (ABVCAP), in contrast to conventional variable income funds (shares), PE/VC funds are normally structured through closed groups. In the traditional structure of PE/VC investments, investors commit themselves to invest in investment vehicles which are managed by the PE/VC organizations. These PE/VC organizations in turn make investment decisions and buy equity stakes in companies which after a period of three to five years are sold, returning capital and hopefully profit to their investors.

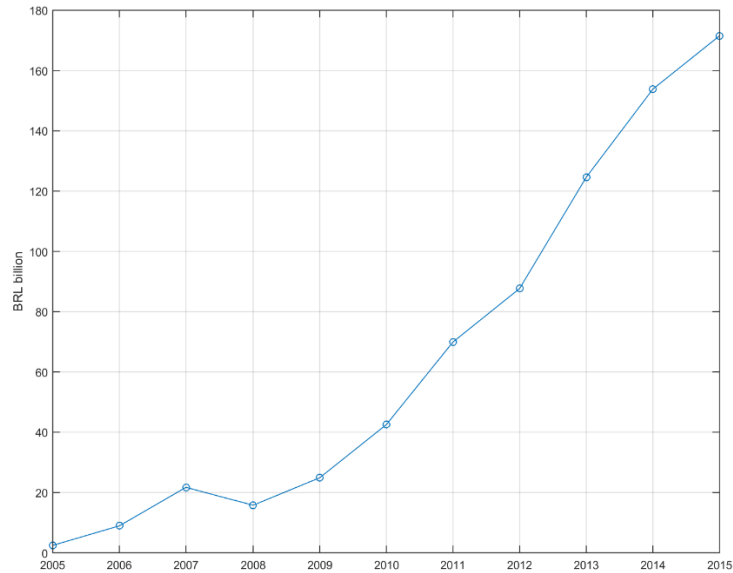
Figure 14. Evolution of the PE/VC Industry

Figure 14 reports the evolution of the PE/VC market in Brazil from 2005 to 2015. Over the last ten years (2005 to 2015), the market value for private equity market has gone from BRL 2.45 billion to BRL 172 billion.

H. Credit Bonds

Although the credit bonds market is still small in Brazil, it has grown significantly in recent years. By the end of 2015, the amount outstanding in this market was BRL 89 billion, from BRL 6 billion in 2005. As can be seen in **Figure 15**, the Bank Credit Note (CCB – *Cédula de Crédito Bancário*) has been the main instrument since 2005. The amount of CCBs increased from BRL 3 billion in 2005 to BRL 38 billion in 2005. Meanwhile, the amount of Export Credit Notes (NCEs – *Notas de Crédito à Exportação*) increased from BRL 1 billion in 2005 to BRL 38 billion in 2015.

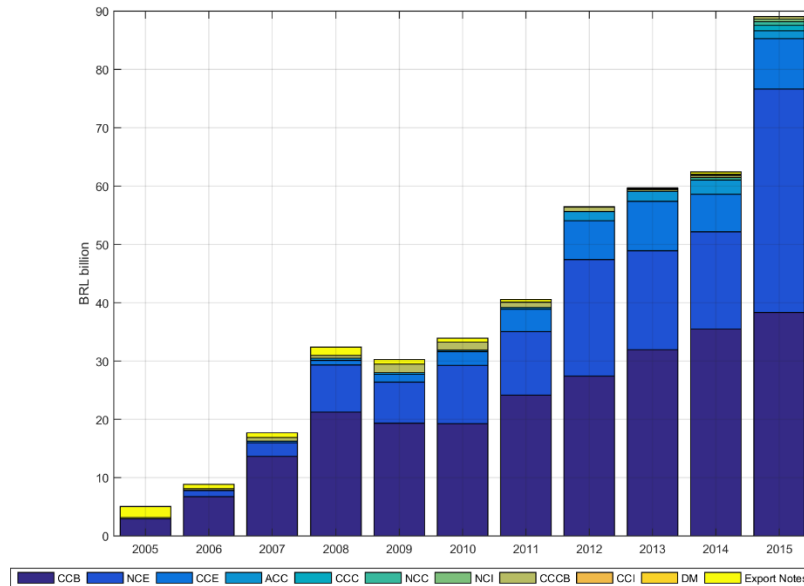
Figure 15. Evolution of the Credit Bonds Market

Figure 15 shows the evolution of the credit bonds market from 2005 to 2015. Although the proportion of CCBs in the credit bonds market has decreased since 2005 (from 58 percent in 2005 to 43 percent in 2015), by the end of 2015 it still remains one of the most important instruments in this market, followed by NCEs (43 percent) and Export Credit Certificates - CCE (10 percent). Other relevant instruments include: Commercial Credit Certificate (CCC), Commercial Credit Note (NCC), Industrial Credit Note (NCI), and Export Notes.

Bank Credit Note (CCB)

The Bank Credit Note (CCB – *Cédula de Crédito Bancário*) is a promise to pay in cash, arising from a bank credit operation. It is issued by corporations or individuals, with a banking institution as counterpart. CCBs are remunerated at pre-fixed rate, floating rate (DI, Selic), the Price Index or foreign exchange variation.

This asset is a credit instrument that can be issued with or without collateral, real guarantee or surety. Financial institutions can also issue certificates representing a group of CCBs held by them in deposit (CCCB – Bank Credit Note Certificate).

Export Credit Note (NCE)

The Export Credit Note (NCE – *Nota de Crédito à Exportação*) represents a credit operation that can be traded by the custodian, backed by exports. It is used to fund export-related financial operations, production of goods for export, and other activities related to the export sector. The remuneration can be pre-fixed or post-fixed.

Export Credit Certificate (CCE)

The Export Credit Certificate (CCE – *Cédula de Crédito à Exportação*) is a security issued by individuals and corporations for export financing, production and support activities. It has real guarantees, constituted as notes, and it can be issued with pre-fixed or post-fixed compensation. It is placed directly by the creditor financial institutions.

III. BRAZILIAN MARKET PORTFOLIO

A. Benchmark Indices

In the Brazilian equity market, two benchmarks are widely used: the Bovespa Index (Ibovespa) and the Brazil 100 Index (IbrX-100). The Ibovespa is a total return index comprising the most representative companies in the market, both by market cap and traded volume. It is the benchmark index of the São Paulo Stock Exchange. The Brazil 100 Index (IbrX-100) is a total return index designed to measure average stock performance tracking changes in the prices of the 100 most actively traded and best representative stocks of the Brazilian stock market.

As the Brazilian equity market is highly concentrated, the IbrX-100 can be considered conceptually better than the Ibovespa as a benchmark for the equity market. The Ibovespa index does not take into account the liquidity of the shares that make up its composition. In the IbrX-100, liquidity is also a criterion for the selection of stocks, but most importantly, the portfolio is weighted by market value. Thus, companies with the highest market capitalization, considering only the number of shares available in the market (free float), tend to have greater weight in the IbrX-100. Thus, the calculation methodology of the Ibovespa index can lead to inconsistencies.

According to Nunes and Fernandes (2014), about 90 percent of the total volume of debentures in the local market from 1995 to 2013 were linked to the interbank deposit rate, or DI rate, known as the *Certificado de Depósito Interbancário* (CDI).¹⁸ Thus, the CDI rate can be considered the natural benchmark for the corporate bonds market. Its daily average is widely used by the market as a basis for profit calculations of a variety of financial products – including the Bank Deposit Certificate, real-estate notes, agricultural credit bills and so on.

For the government bonds market, the Brazilian Financial and Capital Markets Association (ANBIMA) releases several market indices composed of fixed-income securities, which are widespread among market participants. In order to meet the needs of different types of

¹⁸ A CDI has the same basic characteristics of a Bank Deposit Certificate. Its negotiation, however, is restricted to the interbank market.

investors, there is a set of indices that represent the evolution of the different types of bonds traded. Among the indices available, some can be highlighted:

- **IRF-M** (Fixed Rate Government Bonds Index): IRF-M is composed of non-indexed zero-coupon government bonds (NTN-F e LTN).
- **IMA-B** (Consumer Price indexed Government Bonds Index): Composed of inflation-indexed government bonds, where the principal is indexed to IPCA price index (NTN-B). IMA-B is composed of all maturities, IMA B5 of maturities up to 5 years. IMA-B5+ of maturities greater than 5 years.
- **IMA-C** (General Price indexed Government Bonds Index): Composed of inflation-indexed government bonds, where the principal is indexed to IGP-M price index (NTN-C). IMA-C is composed of all maturities.
- **IMA-S** (Floating Interest Rate Government Bonds Index): IMA-S is composed of floating short term rate government bonds, where the principal is indexed to the SELIC rate (LFT).
- **IMA Global** (ANBIMA Market Index): IMA Global is composed by all the eligible bonds. This index is the result of weighting of the variations of each index.

B. Composition

We determined the Brazilian multi-asset market portfolio over the 11-year period 2005–2015 for eight main asset categories: government bonds, equities, bank funding bonds, corporate bonds, real-estate, agribusiness, private-equity, and credit bonds. In addition to estimating the global market portfolio for the end of 2015, we tracked the market portfolio for the eight asset classes over 2005–15. This portfolio is the aggregate portfolio of all investors and contains important information for purposes of asset allocation. To our knowledge, we are the first to have documented the market portfolio for Brazil at these levels of details. We focused on the invested market portfolio, which contains assets in which investors have actually invested.

Figure 16 depicts the Brazilian market portfolio at the end of 2015. Our estimate of the total market capitalization of the invested multi-asset market portfolio is BRL 7.12 trillion. Government bonds represent the largest asset class, with a market value of BRL 2.64 trillion, which equals 37.04 percent of the market portfolio. Equities follow, with BRL 1.91 trillion, or 26.85 percent of the total market capitalization of all asset classes. Bank funding bonds, primarily consisting of CDBs and LFs, are worth BRL 992 billion, or 13.92 percent. Corporate bonds, primarily consisting of debentures and commercial papers, are worth BRL 753 billion, or 10.58 percent. All other asset classes are relatively small, ranging from BRL 363 billion for real-estate (5.1 percent) to BRL 89 billion for credit bonds (1.25 percent).

Figure 16. Brazilian Market Portfolio Weights in December 2015

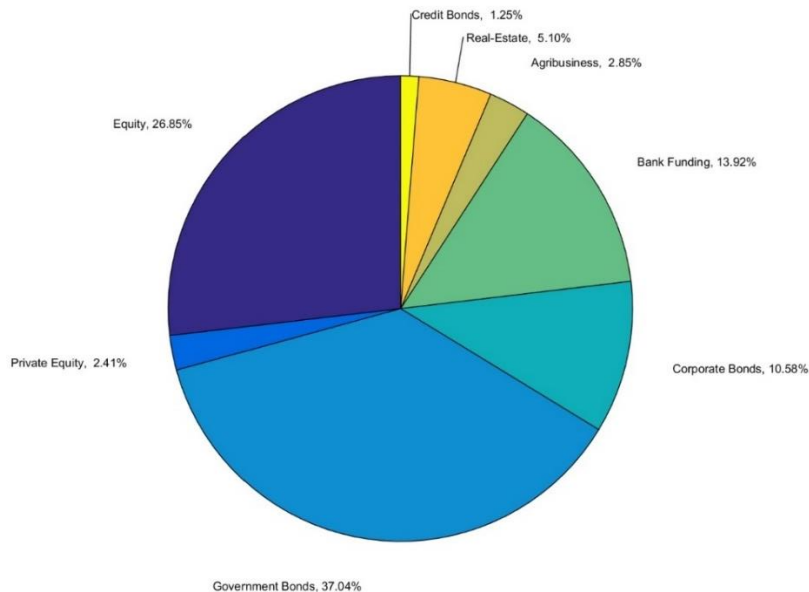


Figure 16 shows a static estimate of the Brazilian multi-asset market portfolio. In **Figure 17**, we depict the Brazilian market portfolio over 2005–15 in order to examine the historical dynamics of the market portfolio weights for the eight asset classes. **Table 2** shows our estimates for the relative global portfolio weights of the eight asset classes in the 2005–15 period and **Table 3** presents data characteristics for the eight main asset classes.

The general picture of the Brazilian market portfolio is of a declining weight for equities from 2008 on to the benefit of other asset classes, especially government, corporate, and bank funding bonds, as reported in **Table 2**. Equities fall from 48.03 percent in 2005 to 26.85 percent at the end of 2015. Government bonds rise from 34.99 percent to 37.04 percent. Corporate bonds increased from 3.66 percent to 10.58 percent. Bank funding bonds grows 1.62 pps, to 13.92 percent. The total weight of the remaining asset classes - private-equity, agribusiness, real-estate, and credit bonds - rises from 1 percent to 11.61 percent over 2005–15.

Figure 17. Estimated Weights in the Market Portfolio, 2005–15

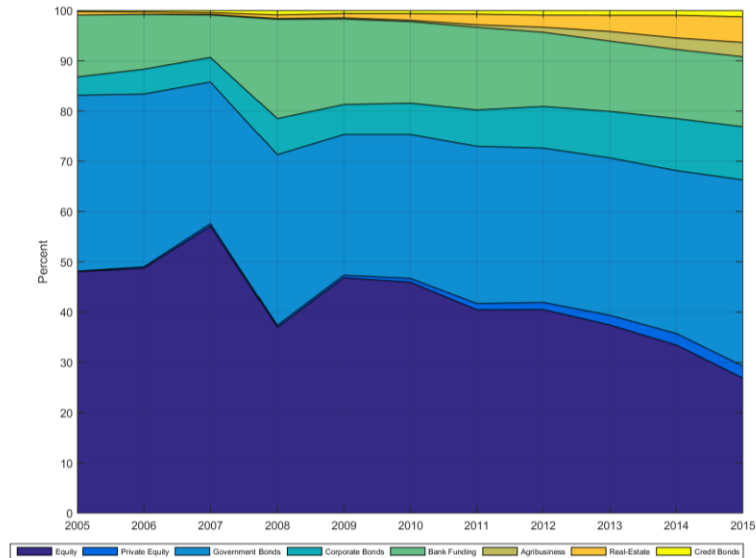
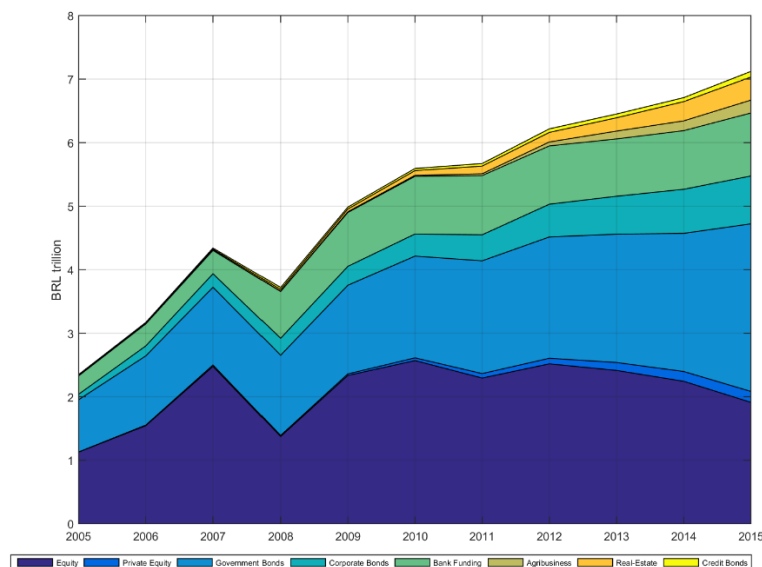


Figure 18 depicts the estimated market values in the Brazilian market portfolio over 2005–15 in absolute numbers (in BRL trillion). The portfolio in 2005 amounts to approximately BRL 2.35 trillion; in 2010, BRL 5.59 trillion; in 2015, BRL 7.12 trillion.

The credit crisis of 2008–09 led to a big decline in the market value of equity. As can be seen in **Table 3**, the weight of equities in 2015 is equal to the record low of 26.85 percent. In 2015, for the first time in our sample period, equities no longer outweigh government bonds. The maximum weight of equities is 57.08 percent, in 2007. The period average for equities is 42.02 percent. Government bonds are subject to a smaller change in portfolio weights than are equities over the sample period. The weight of 37.04 percent of government bonds in 2015 is equal to its maximum over the sample period.

Figure 18. Estimated Market Values in the Brazilian Market Portfolio, 2005–15**Table 2. Brazilian Market Portfolio Weights, 2005–15**

Year	Equity (%)	Private Equity (%)	Gov. Bonds (%)	Corporate Bonds (%)	Bank Funding (%)	Agribusiness (%)	Real Estate (%)	Credit Bonds (%)
2005	48.03	0.10	35.00	3.66	12.31	0.00	0.68	0.22
2006	48.73	0.28	34.35	4.95	10.92	0.02	0.47	0.28
2007	57.08	0.50	28.20	4.90	8.46	0.11	0.35	0.41
2008	36.96	0.42	33.94	7.17	19.77	0.14	0.73	0.87
2009	46.84	0.50	27.99	5.97	17.02	0.22	0.85	0.61
2010	45.94	0.76	28.63	6.23	16.24	0.27	1.33	0.61
2011	40.46	1.23	31.30	7.22	16.44	0.50	2.12	0.71
2012	40.50	1.41	30.71	8.30	14.76	1.00	2.42	0.91
2013	37.43	1.93	31.32	9.25	13.99	1.91	3.25	0.93
2014	33.44	2.29	32.42	10.34	13.76	2.30	4.52	0.93
2015	26.85	2.41	37.04	10.58	13.92	2.85	5.10	1.25

Table 3. Data Characteristics for the Eight Main Asset Classes, 2005–15
(In percentage terms)

Year	2005	2015	Min	Max	Average
Equity	48.03	26.85	26.85	57.08	42.02
Private Equity	0.10	2.41	0.10	2.41	1.08
Government Bonds	35.00	37.04	27.99	37.04	31.90
Corporate Bonds	3.66	10.58	3.66	10.58	7.14
Bank Funding	12.31	13.92	8.46	19.77	14.33
Agribusiness	0.00	2.85	0.00	2.85	0.85
Real Estate	0.68	5.10	0.35	5.10	1.98
Credit Bonds	0.22	1.25	0.22	1.25	0.70

C. Investor Location

If one disregards taxation specificities, both local and foreign investors should be seen as equivalent. They broadly have access to the same set of financial market information and should thereby, on an aggregated level, take similar decisions in terms of asset allocation within the pool of available securities traded in the Brazilian market. Nonetheless, assessing the locational source of funds is interesting on many grounds, but two are particularly relevant: i) what is the degree of foreign dependence of local capital markets, how that has changed over time, and what is the extent of risk to sudden-stop in flows; and ii) what is the international diversification of Brazilian savings and has that changed over time.

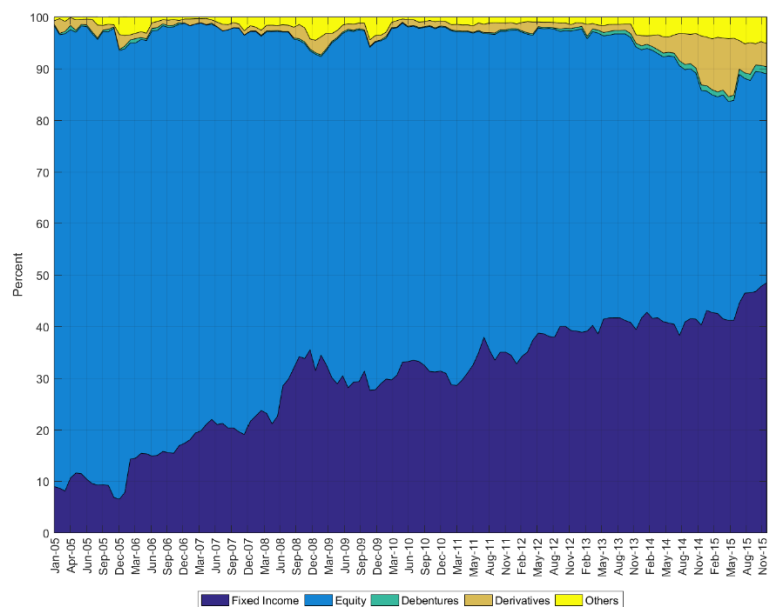
The presence of foreign investors in the different asset classes in Brazil is shown in **Table 4**. Notice that the market value of the portfolio held by foreign investors increased substantially in the period between 2005 and 2015. At the beginning of the period, the market value of equities held by international investors accounted for roughly 2 percent of the market value of all equities traded in BM&FBOVESPA. Ten years later, this amount had reached 9 percent. In the meantime, there was also an increasing volume of fixed income assets and other private securities such as debentures being held by foreign investors. Figure 19 illustrates the composition of the foreign investors' portfolio over the period 2005–15. Observe that the composition of this portfolio also has changed rapidly over the last decade. At the end of 2015, the stock of fixed income securities (mainly including government bonds) held by non-residents exceeded the stock of equities by almost US\$2.5 billion (**Table 4**).

Table 4. Value of Foreign Investors' Portfolio in Brazil by Assets and Financial Volume (US\$ billion)

Year	Total Value	Portfolio	Fixed Income	Equity	Derivatives	Debentures	Others
2005	28.64		2.56	25.59	0.19	0.09	0.21
2006	73.27		4.77	63.73	2.13	0.14	2.49
2007	104.64		18.17	85.20	0.82	0.04	0.43
2008	197.26		42.63	149.08	2.04	0.16	3.35
2009	134.59		42.29	82.58	3.23	0.39	6.10
2010	280.48		81.01	186.50	2.57	0.44	9.95
2011	359.37		111.07	240.85	3.51	0.63	3.31
2012	420.63		144.75	265.11	4.98	1.22	4.57
2013	413.35		161.59	241.38	3.79	2.01	4.58
2014	344.76		143.55	179.27	6.81	2.65	12.47
2015	401.20		172.97	170.48	37.81	4.28	15.66

Source: CVM

Figure 19. Composition of the Foreign Investors' Portfolio in Brazil, 2005–15



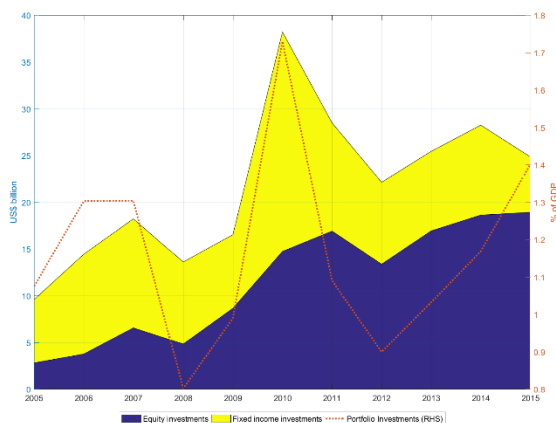
As for the Brazilian investors diversifying abroad, we will focus only on portfolio investments. While the Brazilian Central Bank also provides stock positions on other investment types¹⁹, such as FDI, commercial loans, and currency deposits, we will stick to the set out target of monitoring the tradeable spectrum of securities. Figure 20 allows some insights into the evolution of Brazilian capital invested abroad. In the aftermath of the capital account liberalization push, a continuous diversification of portfolio investments across borders takes place, as can be seen by the rapid nominal value increases. But since it is also a time of rapid

¹⁹ See also <http://www4.bcb.gov.br//rex/CBE/Port/ResultadoCBE2015.asp?idpai=CBE>

output growth, the effect is not reflected in the ratio to GDP. In 2010, a series of outflow restrictions were set up again, particularly on fixed income investments, as can be seen in different capital account restriction indices. This led to a reversal of the international portfolio diversification trend of Brazilian investors.

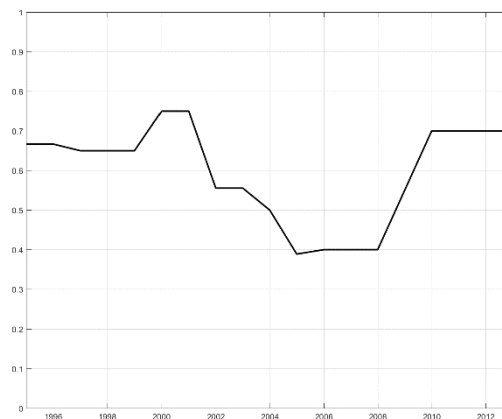
Figure 20. Stock of Brazilian Capital Abroad

(a) Stock of Brazilian Capital Abroad



Source: Central Bank of Brazil, IMF-WEO, Authors calculations

(b) Outflow Restrictions Index
(0 implies no restrictions)



Source: Fernández *and others.* (2015)

IV. DATA SOURCES AND METHODOLOGY

In order to obtain the Brazilian multi-asset market portfolio, we used a variety of sources. In this section, we discuss our data sources and the methodology that we used to arrive at our estimates.

To estimate the Brazilian multi-asset market portfolio, we first defined eight asset classes: Equity, Government Bonds, Bank Funding Bonds, Corporate Bonds, Agribusiness Bonds, Credit Bonds, Real Estate, and Private-Equity. Our sample consists of monthly time series of market values of all the aforementioned asset categories from January 2005 to December 2015. All estimates are quoted in Brazilian *reais* (BRL).

For stocks, we used market capitalization data from BM&FBOVESPA. We considered all the securities that trade on the stock exchange or in the over-the-counter segment of

BM&FBOVESPA during the sample period. Government bonds data were obtained from the Brazilian National Treasury (STN) dataset.²⁰

For bank funding, agribusiness, credit bonds and corporate bonds we used market capitalization data from CETIP²¹ and BM&FBOVESPA. When a specific asset was traded either at CETIP and at BM&FBOVESPA (e.g., debentures, CDBs, CRIs, among others), we summed up the market capitalization of this asset reported by these two companies.

Real-estate data were obtained from ANBIMA, CETIP, and BM&FBOVESPA. In this market, the real-estate investment fund (FII) is one of the most important vehicles for investments in the Brazilian real-estate industry. A FII may hold in its portfolio an extensive variety of assets, including real property, mortgage and other real-estate bonds, real-estate companies' securities, as well as equity in other investment funds. In order to avoid double counting, we estimated that 80 percent of fund assets are applied to real-estate properties.²²

Finally, for private-equity, we used data from ANBIMA and CVM (Brazilian Securities and Exchange Commission, or *Comissão de Valores Mobiliários*). From ANBIMA, we used the market capitalization of FIPs (*Fundos de Investimento em Participações*, or Private Equity Investment Funds) from 2008 to 2015.²³ From 2005 to 2007, we used market capitalization of private-equity companies released by CVM.

V. CONCLUDING REMARKS

The invested Brazilian multi-asset market portfolio is the aggregate portfolio of all investors, in which portfolio weights indicate the constitution of the average portfolio. It represents the view of the investing community with respect to the expected return, variance, and correlation characteristics of each Brazilian asset. Thus, it can serve as a benchmark for investors' strategic asset allocations and can also be used as a starting point for portfolio construction. But the relative asset market weights also reflect the influence of the legal and institutional setting and can therefore deliver insights for policy makers and regulatory agencies—particularly when comparing large differences compared to benchmark third countries.

We focused on the invested Brazilian multi-asset market portfolio. For 2005–15, we determined the market capitalizations of eight asset classes: equities, government bonds, bank

²⁰ The Brazilian National Treasury dataset is publicly available at: http://www3.tesouro.fazenda.gov.br/series_temporais/principal.aspx/#ancora_consulta.

²¹ CETIP is the Latin America's largest depository of private fixed-income securities with a vast over-the-counter, fixed-income derivatives operation. It is the Brazil's largest private-asset clearinghouse, according to the company's website.

²² This estimate was based on information provided by a large Brazilian financial company that operates in the markets of investment banking, wealth management and asset management. In order to get this estimate, we first computed the proportion of each real-estate investment fund managed by this financial company that is allocated to real assets (e.g., houses, properties, buildings, etc.). Second, we sort these funds into quintiles according to the proportion of each fund that is invested in real assets. Finally, our estimate was obtained by taking the average of the first quintile.

²³ FIPs are the typical private equity fund vehicle in Brazil and were designed specifically for the private equity sector.

funding bonds, corporate bonds, real-estate, agribusiness, private-equity, and credit bonds. At the end of 2015, we estimated the total market capitalization of the invested global multi-asset market portfolio at BRL 7.12 trillion. Government bonds represent the largest asset class (37.04 percent), followed by equities (26.85 percent), bank funding (13.92 percent), corporate bonds (10.58 percent), and real-estate (5.10 percent). The total market capitalization of the three other asset categories is relatively small. We also provide historical composition of the Brazilian market portfolio going back to 2005.

Our development of this new historical database on the Brazilian multi-asset market portfolio has important applications for the general understanding of financial market participants, and the strategic asset allocations of practitioners. These results might serve as a fruitful resource for future research in this field.

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