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**STRUCTURED FINANCE AND SECURITIZATION: A STUDY
OF THE BRAZILIAN CASE**

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**Structured Finance and Securitization: A study of the Brazilian
case**

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ABSTRACT

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The present work seeks to develop a deeper knowledge in a theme that is still developing itself in the Brazilian capital market, but is highly explored in the foreign markets. The available data on the topic is scarce and little transparent, which limits the empirical analysis. The content of this work offers a review on the relevant characteristics of the Structured Finance and on the Brazilian market for those instruments, as well as an empirical study of the relevant factors on the pricing of the quotas issued by FIDCs, the Brazilian special purpose vehicle for Securitization. A sample of 32 FIDC quotas offerings was used to build the regression of the pricing.

Among the results attained, it was possible to conclude that the level of activity reflected on the Ibovespa index, the rating of the tranche of a FIDC quota, and the date of the issuance were factors that helped to explain the spread over the CDI promised by the quota. Other variables were proven irrelevant, such as the originator's rating, showing that the fundamentals of the theory seem to be well reflected on the promised spread.

Keywords: Securitization, Structured Finance, FIDC, Capital Markets

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1 INTRODUCTION

The structured finance topic is now in a delicate moment in Brazil and worldwide. Globally, it recently had a leading role on the strong economic turmoil of the subprime crisis in 2007-2008, and it too participated in the Euro zone crisis in 2010. Those roles were mainly regarding the use of structured transactions and derivative instruments. In Brazil, many of these structured instruments are still new, and have shown rapid growth, and the very process of securitization has a recent regulation and is still undergoing development (LIMA NETO, 2007, p.31).

The financial structuring provides a very interesting alternative for raising resources for the economy, and currently is inducing the modernization of capital markets in Brazil. This brings benefits both in the context of increasing credit supply for economic development and also in greater competition and dynamism of the Brazilian credit market, bringing benefits to borrowers of funds and investors (PINHEIRO, 2008, p.34).

There is still much space for growth of the structured finance in Brazil. The volume of asset securitization in Europe in 2009 was approximately €426.1 billion according to JP Morgan's database. In the U.S., ABSs (asset backed securities) together with MBSs (mortgage backed securities) resulted in US\$2.1 billion of issued securities in the same year (down from US\$3.07 trillion in 2006), according to SIFMA. Brazil still has very shy numbers. In 2006 about R\$8.21 billion were issued as FIDC (Credit Rights Investment Fund, the Brazilian Special Purpose Vehicle) quotas, and only R\$1.22 billion in CRIs (Certificates of Real Estate Receivables, equivalent to MBSs), according to CETIP.

The first securitization episode in Brazil was in 1994, when Mesbla Loja de Departamentos issued debentures through a special purpose entity called Mesbla Trust. The structured was tested to its limit when, three years later, Mesbla (the originator) declared bankruptcy and the event didn't cause any kind of loss to the investors of the debentures, demonstrating that that type of structure was effective in segregating the risks (LUXO, 2007).

This shows that the Brazilian market for fundraising has not gone through the process of greater use of structured finance, and many of the benefits of securitization of receivables are not yet explored. The financial disintermediation that is produced by the financial structuring process and its credit enhancement are some of the main drivers of the structured finance use, once it removes the banking spread of funding operations, allows access to a

wider range of investors, has a lower credit risk and is more economically attractive to investors. Additionally, the pool of securities issued could be negotiated with a diverse investor base both nationally and abroad, leaving the bank trusts (PINHEIRO, 2008, p.26) and also permitting the formation of a syndicated fund raising.

There is already some literature on structured finance applied to the Brazilian case, and there is a vast literature on the subject abroad. The truth is that structured finance has a very large set of applications, from infrastructure projects with the need of longer maturities such as Project Finance, to the short-term pre-payment of exports. And among these various arrangements, the elements of the structure and the assets involved vary widely, making scarce the literature that tries to assess the diversity of the structuring process.

In the next section, there will be a literature review that will seek to capture the main elements known so far on the structured finance and securitization topic both internationally and nationally. Subsequently, a review of the fundamentals of structured finance, the characteristics of the Brazilian market, the risks associated to the topic, and its regulation will be performed. Lastly, an empirical test will be conducted trying to construct a regression of the relevant factors that explain the pricing of FIDC quotas in Brazil.

2 LITERATURE REVIEW

2.1 International Literature on Structured Finance

As previously mentioned, the literature on the subject is significant, internationally, when dealing with the issue on an academic perspective, as in *Collateralized Debt Obligations & Structured Finance* (TAKAVOLI, 2003) or *Project Finance in Theory and Practice* (GATTI, 2007). Not only are both of recent publications, but also have very similar approaches, and with a strong focus on credit derivatives instruments that have little focus on Brazilian literature, once this market practically doesn't exist in Brazil. Among those instruments a lot of attention is brought to synthetic securitizations, or the term in English, *Synthetic Collateralized Debt Obligations (SCDOs)* which are a way of securitizing the receivables with credit default swaps, improving the quality of securities and mitigating the

risk of the originator who holds the receivables, and without conducting a true-sale of the assets to the special purpose vehicle.

Furthermore, it is discussed more broadly in the foreign literature the application of tools for project finance, i.e., projects primarily related to infrastructure, with longer term, that often have difficulty in raising large sums of capital, and enabling thus the division of the risks between originators (shareholders) and investors, since the life of the originator and the company's issuing vehicle are separated, making it impossible for shareholders to claim cash flows and assets owned by the vehicle, nor investors to claim flows and assets belonging to shareholders (GATTI, 2007, chp.1).

The presence of the international academic literature indicates that the topics in structured finance are already formal in the current finance theory. This is a topic taught at business schools around the world as well as being a requirement for certification such as the *Chartered Financial Analyst (CFA)*, offered by the *CFA Institute*, or the *Financial Risk Manager (FRM)*, offered by the *Global Association of Risk Professionals (GARP)*. And thus, as the terminology of the concepts already exists, this work will take the international terminology when building the analysis of the Brazilian case.

2.2 Brazilian Literature on Structured Finance

As for the Brazilian literature on the subject, the book *Securitização de Ativos: A Era da Desintermediação Financeira (LIMA NETO, 2007)* consolidated much of what is known about the process of securitization in Brazil and its advancements. It presents the role of the main entities in the process of financial structuring of securitization: the CVM, the determination of rules; lawyers, FIDCs administrators; the custodian; originator, the rating agencies, and auditors. Many items in the bibliography will be used to elucidate the role of each agent in the structuring process.

In the academic sphere, it is possible to mention two important theses for this work, which are: LUXO (LUXO, 2007) and PINHEIRO (PINHEIRO, 2008).

The first sought to find relationships between the securitization process and the impact on beta and financial indicators of companies using this process. In addition to finding strong linear relationships between the company's leverage and the use of securitization, he also concluded that the process implies in significant rating improvements for the companies that are originators of securitization.

The second sought to analyze the risks of the securitization process and its implications for investors and originators. Especially for the latter, it was questioned whether the process of buying back the subordinated quotas wouldn't imply a higher risk to the originator, and if the capital allocation determined by the Central Bank to banks that repurchase subordinated quotas turns out to be insufficient given the Banks' increased risk exposure. All the research results were extremely positive. For investors in senior tranches it was concluded that the risks are small and the ratings given to these tranches are reflecting well the credit exposure. To the originator that repurchases the subordinated quotas it was determined that the risk of returns below the market rate are small, since the quotas' spread is high, and, even under stress scenarios, the return on average remained above the benchmark.

Other works include PULINO (PULINO, 2008) who develops an analytical study of 23 cases of FIDCs securitizations, and concludes that the process actually has the potential to improve the credit quality of assets, resulting in a differential between the rating of originator and the rating of the FDIC, and reducing the cost of capital for the originator. However, in many cases this did not happen, or even worsened the debt rating, suggesting that the motivation for the securitization is not only limited to seeking lower funding costs. This reference is important for this project as a whole, as it tries to show the Brazilian singularities when it comes to the securitization process.

SANTIAGO (Santiago, 2009) sought to do a survey with top executives and decision makers in Brazil about the difficulty in issuing or investing in securitized assets. Among its conclusions, originators seek cheaper rates for funding, and in the other side, investors seek safe investments and greater profitability. This indicates that there is a misalignment in the securitization market, since the process of structured finance seeks to ensure the objectives pursued by both originators and investors, demonstrating the lack of maturity of the Brazilian market on bringing the securitization as an efficient solution.

The UQBAR is a company that publishes material on structured finance in Brazil, and has a series of articles which have become relevant to this work. Spragins (SPRAGINS, 2005) features two articles. In the article *Alquimia Financeira* (SPRAGINS, 2005), he seeks to discuss ways of improving the credit risk of debt securities, and highlights the predominant use of subordination, or tranches, as a structuring tool in Brazil. Furthermore, it appears that the development of better models of credit default, the use of derivatives instruments and credit insurance will be important elements in reducing the over-collateralization and excess spread, that is, these elements will yet reduce the cost of issuing securitized bonds or quotas. In his other article, *O Caminho Mais Longo* (Spragins, 2005), the author remarks the

difficulty on pricing credit risk, which hampers the use of credit derivatives in Brazil, but not so much the use of securitization, since the latter can be based on a diverse pool of assets.

Another author is LOPES (LOPES, 2005) that in a series of four articles published by UQBAR he discusses: the need to boost SME's access to the securitization; the possibility of using more subordination of tranches in securitization; the benefits that the securitization could offer; and the division in four types of FIDCs (securitization vehicles, classic model, structured lending and corporate). Those articles were important to better understand some of the structures that are common in Brazil.

In a fifth article of the series, LOPES (LOPES, 2005) comments one of the main and most challenging topics of the Brazilian market: the enrichment of the available information in terms of quality and quantity as a mean for strengthening the credit default models. The better the predictability of the performance of the securitized assets, the better the benefit to the originator and the investor, since the costs of credit enhancement will be better managed, and therefore there will be greater confidence in the structure.

2.3 Literature on Structured Finance and Financial Crisis

In the article *Observations on Risk Management Practices during the Recent Market Turbulence (2008)*, The Senior Supervisors Group (the group that gathers the most important bank regulators and central banks for discussing regulatory matters) seeks to identify practices of success and failure within the turmoil of the crisis. Among these practices it underscores the poor assessment of the risks present in the instruments of structured finance and syndicated loans, especially on exposure to credit and liquidity risks, as well as excessive reliance on external models of risk assessment, such as rating agencies, and poor development of internal tools and models, especially those that should incorporate forward-looking perspectives on the economy. The main instruments assigned to generate differential performance when incorrectly used were the CDOs, SCDOs, Conduits, Structured Investment Vehicles, and Syndicated and Leveraged Loans.

On *Shareholder Report on UBS's Write-Downs (2008)*, UBS seeks to identify the causes of the crisis and the write-downs of their portfolios. After describing in detail the types of risk mitigation in areas affected by the subprime crisis and how it proceeded with these losses, the bank team reviews the main conclusions by dividing the subject in "Causes Specific to the Individual Businesses" that is, causes related to the instruments used, as well as "Overarching Causes" that were market structural causes in the market and bank positions.

The article *Systemic Risk in the Financial Sector: An Analysis of the Subprime-Mortgage Financial Crisis* (Hellwig, 2008) is fairly relevant to this work, since it gives a strong emphasis on structured finance process and its power of inducing a downward spiral in the financial system, and presents a strong market regulation analysis. Hellwig defends that the events were not merely the result of flaws in decision making, but a problem of economic architecture. He suggests including regulatory reform measures, based on the idea that more regulation and individual incentives could be sufficient to prevent another crash, but rather, there should be paid attention to the systemic interdependence and to transparency.

Gary Gorton in *The Panic of 2007* (2008) follows in a similar line, giving greater focus to structured finance instruments in a more timely manner, and focuses his results in the asymmetry of market information, which undermined the risk management.

Two more articles, *The Failure Mechanics of Dealer Banks* (DUFFIE, 2009) and *This Time is Different: A Panoramic View of Eight Centuries of Financial Crises* (REINHART & ROGOFF, 2008), seek to analyze the financial crisis in a broader way, and not specifically the 2007-2008 crisis. However, from the logic of these texts, the authors try to exemplify what distinguishes the subprime crisis from the other financial crisis, and these differences generally occur on the level of sophistication of the markets. These rationales could suggest that financial crisis usually come from the lack of structure of the markets in a regulatory perspective in guiding the economic incentives, and also a lack of experience of the players in dealing with new financial instruments.

3 FUNDAMENTALS OF STRUCTURED FINANCE

3.1 Fundamentals and Logics

Definition of Structured Finance

First of all, it is important to define Structured Finance.

Structured finance is a general term to describe the activity that seeks the transfer and redesign of risk. Through its instruments it is possible to create different risk-return combinations, and investment characteristics such as maturities, asset diversification, and legal design. This is generally accomplished through a set up of different interacting corporate entities and through credit derivatives.

Thus, the two major instruments used in the structured finance are the Securitization and the Credit Derivatives.

Securitization

Securitization basically is a way of transforming assets into marketable securities. These securities are then sold to investors, and receivables related to those assets are then used to pay the transaction expenses, principal, interests and equity back to those investors.

All kinds of future cash flow can constitute a securitization, and generally those assets are sold to an SPE – Special Purpose Entity (or SPV – Special Purpose Vehicle) through what is called a true sale, in which the company that held those assets sells the rights to receive the cash flows coming from them to the SPE. This new entity is usually bankruptcy remote from the originator, that is, as the true sale is performed there is little exposure to the creditworthiness of the company that sold the assets. Sometimes the receivables depend on the company's continuity of operations, and sometimes the company itself provides some guarantees to the SPE, making the vehicle still exposed to the credit quality of the originator. However, in any case, there is still a capability of developing a vehicle that provides a better credit quality than the originator, and this is one of the main purposes of the structuring.

After designing the structure, the vehicle will put securities on the market that will promise future cash flows from the assets acquired through the true sale, and the rule is that there will be different subordination levels on those securities that will provide different exposures to the underlying receivables.

Given the funding options of a company, such as the issuance of debt or equity, in which both of them will have pros and cons in terms of cost to the current stockholder, the securitization is an alternative to those traditional instruments, and can offer significantly different benefits. The structure of a deal, the benefits and motivation will be further developed in the following sections.

Credit Derivatives

Securitization can be taken as the Structured Finance instrument that seeks funding, while Credit derivatives can be taken as the instrument for hedging. The most important credit derivative is the Credit Default Swap.

In a CDS contract there is a protection buyer, a protection seller and a reference entity. The entity is not directly a party on the contract, but it is the company that has issued some kind of debt and has the obligation to pay its creditor's receivables. In case of default of that

reference entity to a security or liability, the protection seller has to pay an agreed amount for the protection buyer, which could be, for instance, the face value of the security. The defaulted bond is then swapped to the protection seller in exchange for the agreed amount. The settlement doesn't necessarily need to be physical, and could be a cash settlement considering the market value of the securities by the time of the default, besides other kinds of settlement agreements.

During the life of the agreement, the protection buyer pays a premium for the protection seller, given the credit risk that the seller is taking by selling protection. That payment is normally quarterly and ends with the maturity of the contract or in case of a credit event.

Investors can also buy CDSs without having the referenced securities for the purpose of speculation of the credit status of a company. Moreover, there is the possibility of building structures to securitize receivables through the use of CDSs, in which the SPE, instead of issuing securities, sells protection to the originator, receiving periodical premiums and, in case of a default, the originator receives the amount that the investors of the SPE had put within a trustee. These structures are called synthetic structures, and they represent a true derivative transaction, in which there is no commitment of notional, that is, there is no true sale of assets to an SPE.

Risk Transfer Framework

Figure 1 taken from *A primer on structured finance (JOBST, 2007)* tries to gather the risk transfer instruments into a framework. Other than Structured Finance, the author presents "Traditional Products", "Other Instruments" and "Hybrid Products".

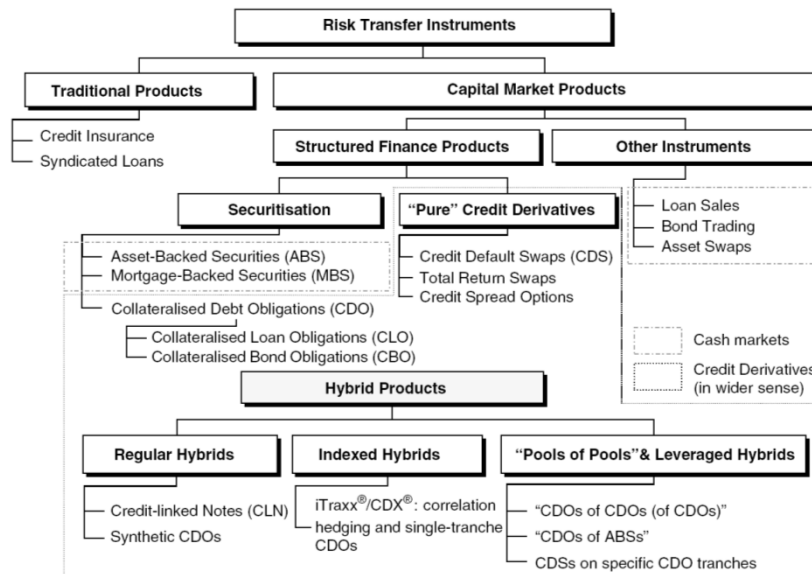


Figure 1: Overview of Risk Transfer Instruments / Source: JOBST, 2007

Through the risk transfer framework, it is possible to understand that the effect of risk transfer is possible through: buying insurance, selling the assets that contain a risk exposure, or using structured finance.

“Traditional instruments” are the credit insurances and syndicated loans. The first one by definition is a sale of protection to a certain risk. The second one is a way of diversifying the risk of one creditor among many other financial institutions, diminishing the risk of being overly exposed to one party and sharing it with the other financial institutions.

The “Other instruments” for risk transfer are all based on the disposal of the risky asset through a sale, trading or swap, which could also be considered a more traditional form of risk transfer.

“Securitization” and “Credit Derivatives” were already discussed previously, and are more heterodox, once they involve complex structures of entities and credit swaps.

“Hybrid products” are complex instruments that use the structured finance products as underlying assets. They are synthetic structures that combine securitization with credit derivatives, indexes based on the price of credit derivatives, or even pools of securitized assets.

In Brazil, the market for risk transfer assets is very little and most of them are far from being a reality, especially the hybrid ones. Credit default swaps are not negotiated domestically and only a handful of Brazilian companies have marketable CDSs. We could list the companies that have an active CDS as: Petrobras, Vale and BNDES.

Motivations for Securitization

There are many reasons that lead to a securitization deal. Here, this paperwork tries to list which are the main drivers of the process, but other reasons could help making the decision, such as tax exemption, for example. But as those other reasons are case by case and market by market situations, there will only be discussed the strongest motivations.

-Transformation of assets into cash

This is a very simple reason to why a company would seek to perform a securitization: it can transform receivables into cash. However, not always it is the best way to do it, once a finance structure such as securitization is not costless, despite being highly complex. But, it can be a fast way of turning assets into cash especially if the company has a good track record on securitization to allow for a quick placement of the securities on the market.

-Lower cost of funding

This is a broad definition of a motivation, but it basically is compound by two other reasons: financial disintermediation and credit enhancement. The first one is linked to the fact that with the securitization vehicle, there is no excessive dependence on the financial intermediation by banks and other financial institutions, and consequently no necessity of bearing the cost of this intermediation. The second reason refers to the effect of enhancing the creditworthiness of the vehicle through the whole structuring process, thus providing a lower cost of capital for the originator. It also could be mentioned that the securitization enables smaller companies to access a more competitive funding (CLARKSON, 2003).

-Diversified investing sources

The benefit of turning receivables into securities is that securities can be traded with many investors from diverse places of the planet, and not just a single creditor. This deleverages the bargaining power of the creditor, once the range of alternative creditors is high, and also allows for a syndicated placement with many types of investors.

-Off-balance-sheet financing

Securitization is a form of funding that doesn't compromise the balance sheet of a company once the liabilities are held in a vehicle. This works well for both companies and financial institutions, once they can "clean" their balance sheet to another entity and provide better financials to investors. For banks, especially, the benefits are even higher as Securitization

lowers the capital requirements when the true sale is put in place. This regulatory benefit shows no problem as long as the vehicle's life is fully independent from the financial institution, however, if there is any kind of co-obligation, guarantee, commitment, or relationship of the financial institution to the vehicle, and usually there is, then it is difficult to say that Securitization is not distorting the regulatory needs if less capital is necessary.

-Risk transference

The risk transference could be seen as, for instance, when there is a sale of assets to an SPE from a bank, and because of that, the measures of the overall bank risk exposure (such as VAR measures) to credit, market and liquidity risks diminishes, indicating that there was a risk transfer from the bank to the investors of the SPE. Sometimes, a certain originator simply doesn't want to bear a particular risk, and simply seeks to perform a securitization so that he could diminish his exposure to that specific risk by selling the assets that contains that risk.

Structuring and Credit Enhancement

-Subordination into tranches

The payment waterfall of the securities issued by the SPE begins with the most senior tranche and only after the promised payment is fully paid the other tranches will be paid. With this, there is a substantial protection of the senior tranches' payment, once the default losses will have to consume all the other tranches to reach them. Along with the seniority there are also different promised yields, which also offer some comfort to investors, as the lower the seniority, the higher the targeted risk premium.

In Brazil, the usual structure is to have a 75% of senior fund shares, and 25% of junior fund shares. Those junior shares usually can't find a market, and end up being held on portfolio by the originator.

-Excess spread

The difference between the interest paid by the assets and the interest promised to the senior tranche minus the expenses of the deal is called the excess spread. This excess spread usually pays the premium to the equity tranche, but part of it could be addressed to a cash collateral account so that it could service the principal and interest of the senior tranche if needed. Basically the excess spread is a cash cushion that could absorb part of the defaults. In some structures, if that cushion isn't used, it is then directed to the originator as a profit.

-Cash collateral account

Aside from receiving excess spread when previously determined, the cash collateral account could receive money from the originator itself to build a cushion to absorb losses or even triggers for posting more collateral if the credit performance of the underlying assets deteriorates.

-Over-collateralization

Over-collateralization happens when the value of the assets sold to the SPE is higher than the amount gathered with the issuance of securities. This creates a bigger confidence to the investor that even if part of the receivables default, the investor will still receive his promised payment. In summary, if there's no default on the assets, there will be leftovers after paying all the tranches, which usually are directed back to the originator.

-Guarantee and Co-obligation

It is common to have guarantees from the originator or even a third party. One example is by providing a cash collateral account as previously mentioned. In some cases, the originator even undertakes to help with the liquidity management of the SPE in case of mismatch events by lending money. Therefore, there is a wide array of guarantees' structures that could be provided as credit enhancements.

3.2 The Brazilian market of Structured Finance

Structures

-CCB – Cédulas de Crédito Bancário

The CCB is a credit security that can be delivered by a person or entity, in favor of an institution of the National Financial System, representing a promise to pay in cash, resulting from a credit operation of any kind. The financial institution may or may not be the creditor of the operation. In the case in which it is not, the role of the financial institution is of a vehicle for the issuance and transition of the CCB to another type of investor. To be distributed in the capital markets, the CCB has to be registered at the CETIP - CAMARA DE LIQUIDACAO E CUSTODIA.

The CCB is an extrajudicial security that does not depend on the approval of the judge to be charged, and represents a debt in cash, described by fixed amount, or by the outstanding

balance shown in spreadsheet or in extracts of the current account offered by the financial institution involved on the issuance.

Within the CCB all the characteristics, commitments and criteria of the security are free to be settled. And, the CCB may be subject to sale in accordance with the provisions of law, in which case the transferee, although not a financial institution, is subrogated to all rights of the transferor. This fact has allowed for the use of CCBs in the securitization of portfolios of bank loans.

-CCCB – Certificado de Cédulas de Crédito Bancário

CCCB is a title representative of many CCBs that can be issued by a financial institution, and its payment flow could come from several securities, with several characteristics and different issuers. This is a genuine pool of credit receivables from lending operations that are securitized through the issuance of the CCCB. It could be said that it is a type of Collateralized Debt Obligation.

-FIDC – Fundos de Investimento em Direitos Creditórios

FIDCs basically are a collected investment vehicle in the form of a condominium of financial interests, with no legal personality and direct more than 50% of its net asset value to investments in credit rights from the financial, commercial, industrial, real estate, mortgage lending, leasing and services sectors (UQBAR, 2010).

The FIDCs are characterized by a securitization of receivables, which could be financial or non-financial assets, and/or provided by an accomplished operation or depending on a future operation. The FIDC quotas are offered to qualified investors as an alternative for their capital investments.

-Qualified Investors

Pursuant to CVM's Instruction no. 409, qualified investors are:

- (i) financial institutions;
- (ii) insurance companies;
- (iii) pension funds;
- (iv) individuals or corporations with financial investments exceeding R\$300,000.00;
- (v) investment funds targeted exclusively to Qualified Investors;
- (vi) portfolio managers and investment consultants registered within the CVM.

-Other Structures

Figure 2 shows the other structures present in Brazil, and basically which type of receivables and entities can constitute them.

Issuer	Issuance	Collateral	Originators
FIDC	Quotas	Receivables from many sources	Companies and Financial Institutions
SPV	Debentures and Credit Receivables	Receivables from many sources	Companies and Financial Institutions
Cia Securitizadora de Créditos Financeiros	Debentures	Receivables from financing operations	Financial Institutions
Cia Securitizadora de Recebíveis Imobiliários	CRI - Certificado de Recebível Imobiliário	Mortgage and Real Estate receivables	Real Estate companies
Cia Securitizadora de Recebíveis do Agronegócio	CRA - Certificado de Recebível do Agronegócio	Receivables from Agrobusiness financing	Cooperatives and agricultural companies

Figure 2: Structures of SPVs in Brazil / Source: Based in LIMA NETO (2007, p.105) & PINHEIRO (2008, p.53)

The legal entity structures for securitization in Brazil are FIDCs, SPVs, CSCFs, CSRIs and CSRAs. This present work is basically trying to focus on the less specific vehicles, and, therefore, only on FIDC vehicles. The entire sample gathered is focused on FIDC structures.

Taxation

Tax	SPV	FIDC
Tax for Unemployment Insurance (PIS) / Tax for Social Security Financing (Cofins)	7.6% on gross income	Exempt
Income Tax of Individuals (IRRF)	20% on investment income	Exempt
Income Tax of Legal Entities (IRPJ) / Tax for Social Security (CSLL)	34% on income	Exempt

Figure 3: Taxation Structure / Source: LIMA NETO (2007, p.104)

It is easy to assess why SPV's securitizations are rarely performed in Brazil. Basically, the FIDCs, which are legally investment funds, have significantly high tax incentives by being exempt of all income taxes. This leads to interest from both parties, originators and investors, in using a FIDC vehicle, also because it has a better legal protection than a standalone company that purchases the receivables and issues debentures.

Participants of a FIDC Structure

-The CVM

The CVM – Comissão de Valores Imobiliários is a federal autarchy under the Finance Ministry that regulates and administrates the securities and exchanges in Brazil and all its participants. It could be said that it is the Brazilian SEC – Securities and Exchange Commission.

Being said that, the FIDC quotas as well as all the securities produced by the structured finance products are supervised by the CVM, which has the role of regulating, registering, monitoring, counseling, disciplining and developing the securities market.

-The originator

The originator is the party that has the initiative of the process. As said before, it is the party that sells the assets to a vehicle for the purpose of funding.

-Administrator

In Brazil, funds usually have separate institutions that are hired to exercise the role of administration and management. Therefore, the administrator has the role of corporate administration, in which it has to monitor the activities of the fund, issue the required reports, comply with the requirements of the supervisory agencies (such as CVM, Bovespa, CETIP and ANBID), be open to communicate with the quotaholders, and oversee the service providers (LIMA NETO, 2007, p.67). It could also be said that the administrator is also a trustee.

-Managers

In the other hand, the role of the manager is to operate and price the portfolio of the fund, when this is necessary. Sometimes there is an active role for the manager and he might even receive a performance fee for that. An example is when the fund has short term receivables and the manager is required to keep selecting and buying others receivables from different companies, making his job extremely important for the profitability of the investors.

-Custodian

The custodian is a financial institution that is licensed by the CVM, which performs the custody of the SPE's assets. It also reviews the eligibility of the assets, conducts the physical

and financial settlement, receives and analyses the collateral documentation, between other functions.

-Rating agencies

The rating agencies act on setting a rating to a specific tranche of the structure. They are supposed to assess all of the risks involving the security that could affect the investor's profitability, and that should be reflected on a single rating. This helps decrease the information asymmetry, once a specialized and recognized team of analysts will investigate the structure, apply their risk methodologies and point out the creditworthiness of the underlying assets to the investors. It must be noted, though, that structured finance products have a very high level of complexity, and some of the products are extremely difficult to analyze in terms of credit risk.

After the 2007 crisis, the rating methodologies applied to structured finance products were highly questioned. In fact, there are strong traces of bad advisory, once many pools that defaulted almost completely were rated AAA, and would be peer and compete with AAA securities issued by strong and reliable companies. Today, most of the rating agencies are re-thinking their methodologies on structured finance and taking measures for a better assessment in the future.

-Independent Auditors

The independent auditor has among his main responsibilities to issue a report with their opinion on the financial statements of the FIDC, providing more transparent and safe information to the investors, regulators and other stakeholders. Other duties are to point out and supervise: the risks inherent to the FIDC; provisioning for losses criteria; the financial operations of the fund; obligations, civil legal relations and tax; among other compliances related to rules and legislation (LIMA NETO, 2007, p.125).

-Lawyers

Lawyers are very important when structuring and setting up the operations of a securitization in Brazil. First they act on the elaboration of the set of rules and obligations that are assigned to the administrator and others involved, embodied in the regulation of the FIDC. Then they work on the constitution of the entity, its registration at CVM, and all the legally required releases such as prospectus and announcements. Finally, the lawyers are responsible for taking care of the analysis, implementation, adequacy to law, and insuring the proper legal

support for the structure of the process, the guarantees, procedures and the services provided by third parties (LIMA NETO, 2007, p.56).

The Brazilian Funding Market

The Brazilian capital market today is very plural. On figure 4 it is possible to analyze the present framework of the Brazilian issuances.

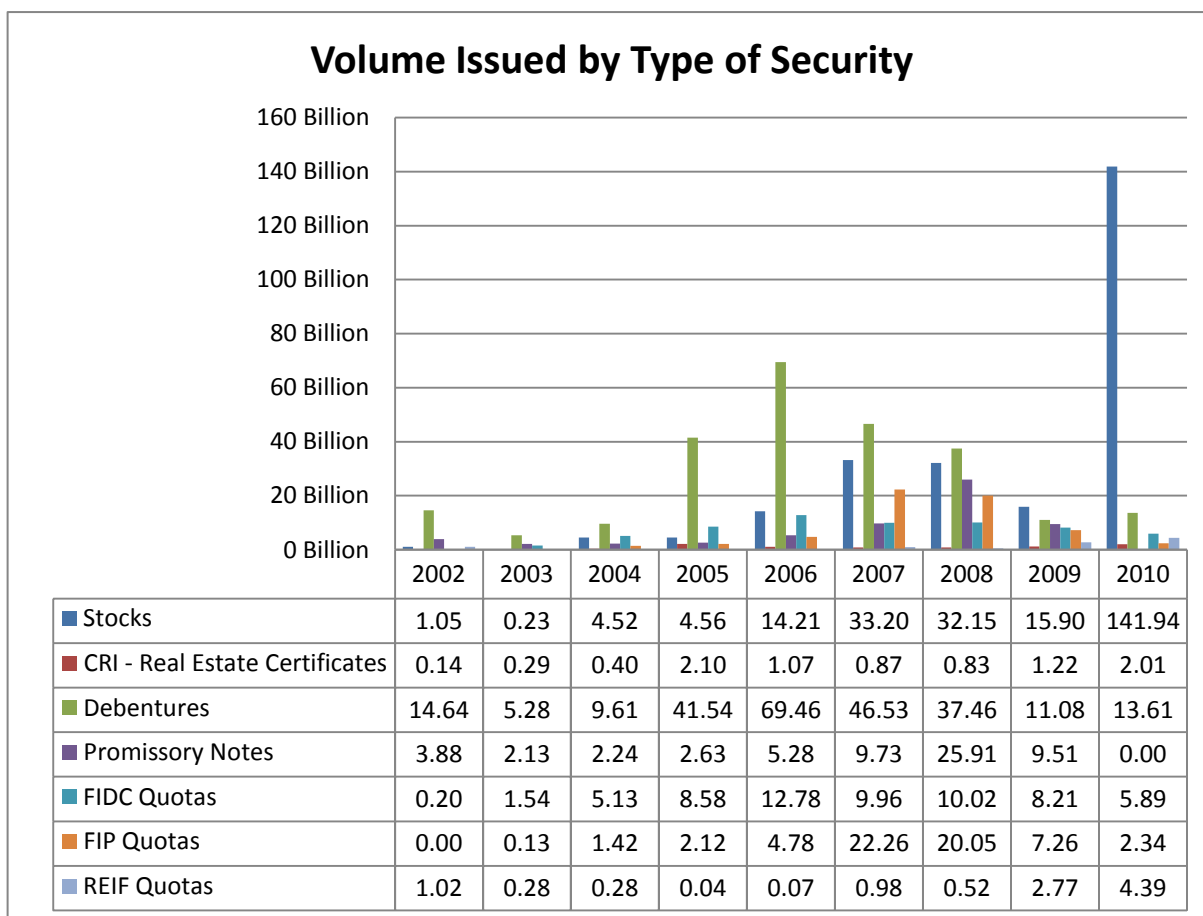


Figure 4: Volume Issued / Source: Own / Data: www.cvm.gov.br

The year 2010 was remarkable because of the record on new primary stock issuances. There were registered 9 new IPOs, and 11 follow-on primary offerings in that year until November. One of those equity offerings represented BRL120.2 billion out of the total BRL141.9 billion, which was the Petrobras offering. The Petrobras offering was the world's biggest equity issuance ever registered.

Taking that extraordinary event aside, it is possible to see that the Brazilian equity market is highly relevant to the funding of the Brazilian economy, and even the Petrobras giant issuance indicates that there is a significant level of maturity on that market.

The debenture market is, in general, the second most important way of funding through securities offering, of course, disregarding all kinds of loans and private placements. Promissory notes are also relevant historically, but CVM doesn't disclose the amount that has been issued in 2010.

FIDCs quotas are probably the fourth most important securities to help funding the market. CRIs are the result of Real Estate securitization, and are still shy in Brazil despite their strong fiscal incentive.

FIPs – Fundo de Investimento em Participacoes are generally the vehicles that are used for Private Equity and Venture Capital initiatives, which have been growing significantly and are expected to be more representative in the future. And finally, the REIFs – Real Estate Investment Funds (called in Brazil as FIIs – Fundos de Investimento Imobiliário) are becoming strongly relevant recently as real estate companies are more and more relying on them to fund themselves allied with their attractive tax incentives to investors.

Looking solely at the Brazilian market for structured finance on Figure 5, it is possible to notice that the volume has risen significantly between 2006 and 2007, but was later impacted by the financial crisis, preventing the trend to continue growing and showing weak signs of recovery so far. CRIs represent a much smaller portion of the securitization market, but expectations are positive that securitization as a whole will strengthen in the near future.

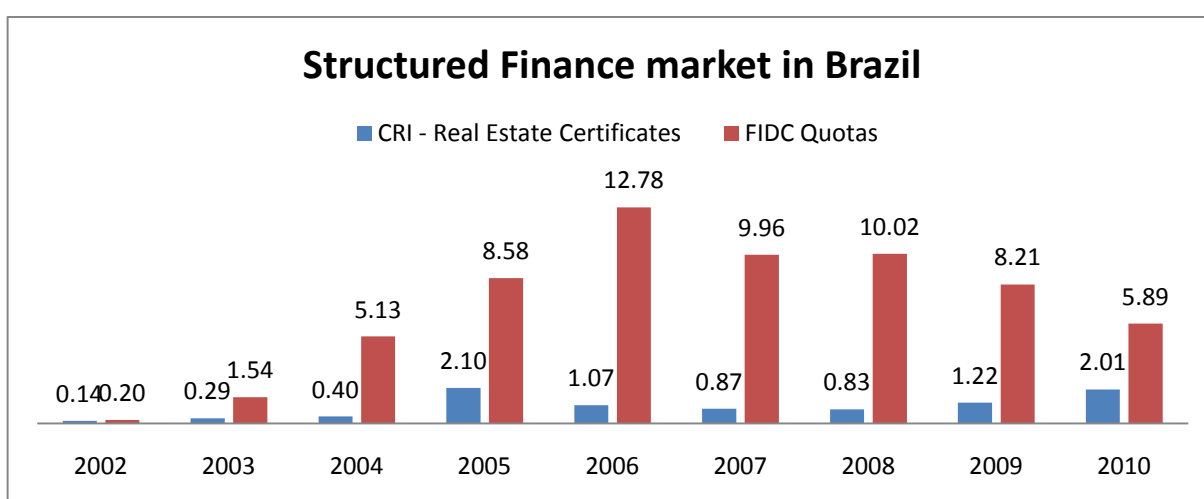


Figure 5: Volume Issued / Source: Own / Data: www.cvm.gov.br

Type of Securitized Assets and Players in Brazil

In Brazil, as could be perceived by the data in the previous section, the structured finance market relies heavily on FIDCs. Securitization is constituted mainly by Trade Receivables, Auto Loans and Personal Loans, being the latter highly represented by payroll guaranteed loans.

On Figure 6, taken from UQBAR (UQBAR, 2010) and built through its database from 2008 and 2009, it is possible to identify the composition of the securitization vehicles on those years. The vast majority are the Multiclass FIDCs, in which the fund holds a pool of assets of different kinds, followed by the FIDCs that are more specific in their portfolios (Trade Receivables, Auto Loans and Personal Loans, respectively).

Once again it is possible to distinguish that the other vehicles such as CRI (real estate receivables) and CRA (agribusiness receivables) are still small and there is a lot of space for that market to grow.

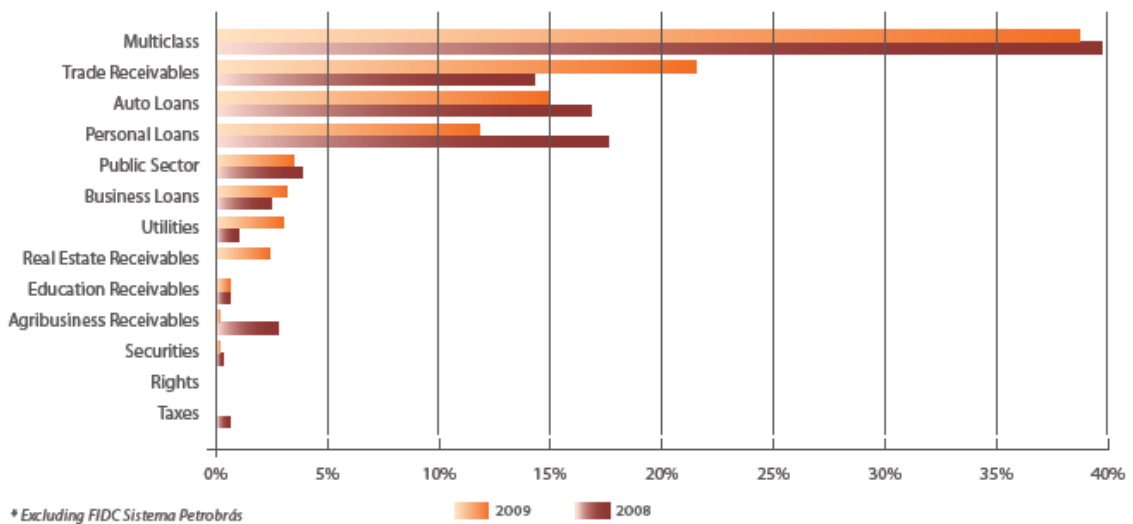


Figure 6: Composition of FIDCs by Percentage of Total / Source: UQBAR (2010, p.39)

Having said that, on Figure 14 in the Appendix, it is possible to comprehend which assets were already securitized in the Brazilian market and their definition. Figure 7 and 8 provide a view of the Investors and Originators by their classes. Through those charts, it is possible to perceive that most of the securitization originators come from Financial Intermediation (58%), Multi-segment (sale of assets that come from many originators from different sectors, accounts for 20%) and Industry (13%). The main investors are Investment Funds (51%), Financial Institutions linked to the originator (15%) and Other Financial Institutions (15%). Foreign investors account for only 1% of the total investors.

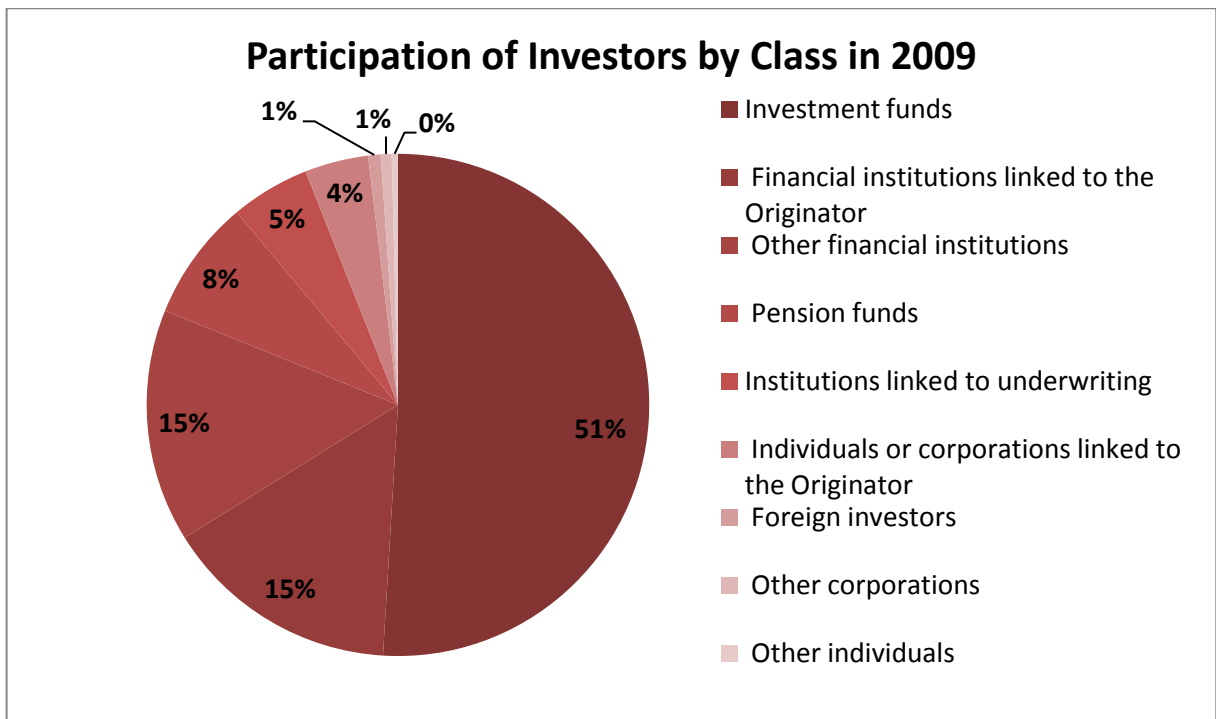


Figure 7: Participation of Investors by Class in 2009 / Source: UQBAR (2010, p.49)

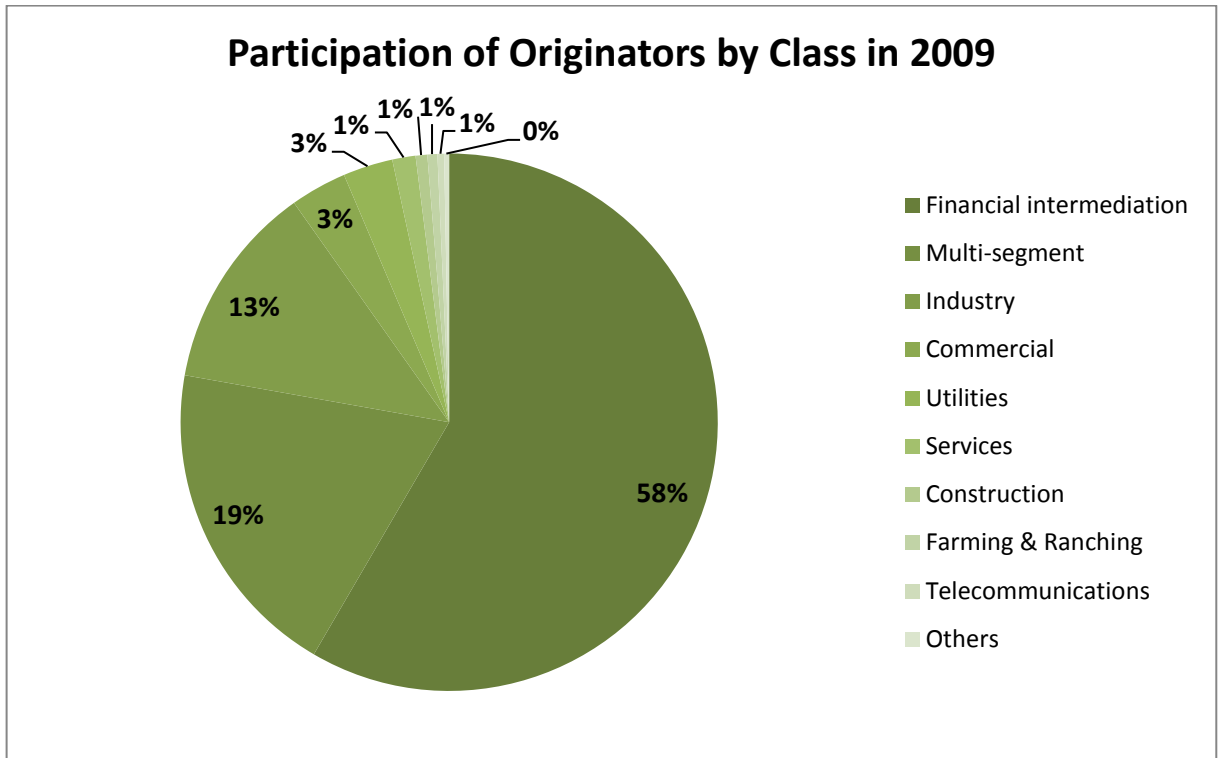


Figure 8: Participation of Originators by Class in 2009 / Source: UQBAR (2010, p.50)

Therefore, it is possible to infer that most of the market comes from a cycle in which financial institutions securitize their assets so that other financial institutions and funds can fund their operations by buying those securities. Consequently, most of the market is still very exclusive for players of the local financial market.

In an overall assessment, the Brazilian market has still much to expand to other segments and reach a bigger part of the economy, and that is expected to happen as the markets matures and both investors and originators feel more confident to engage in such endeavor.

3.3 Risks Associated with the Instruments

Credit risk

Credit risk consists on the possibility of a financial loss originated by a credit event such as: downgrade of the debtor, failure of fulfillment of an obligation or covenant, deterioration of the value of collateral, or the event of an overdue payment (PINHEIRO, 2008).

Through the structured finance, it is possible to transfer the credit risks inherent to the underlying assets from the originator to the investor, and those risks could also be mitigated by the structure of the deal, making it more attractive to investors and less costly to originators.

Pre-payment risk

Basically occurs when there is a premature payment of the receivable. This characterizes as a loss of an opportunity for the creditor. This is further impaired by the fact that the pre-payment usually occurs in a scenario in which the debtor can access less costly funding sources, and usually this is associated with a drop in interest rates. In this case, the creditor that receives the money prematurely, not only loses the investing opportunity, but is also forced to invest the amount in a lower interest rates environment.

Market risk

Mismatch between assets and promised earnings, both in terms of yield and currency, are potential market risks. Many structures have fixed rate assets and promise floating rate payments, and some structures have receivables in a currency and liabilities and/or promised payments in another. For the sample used in the present work, all the FIDCs had promised floating rates in the local currency, and many of them have receivables that award fixed rates. Some structures in Brazil often have receivables from exports, or even promise payments subject to the dollar/real exchange rate. In addition, when the operation is cross-border with the presence of foreign investors, those investors also have a currency risk involved in their transaction.

All of those market risks involved in the structuring can be mitigated through the use of derivatives, and commitments from the vehicle to control the market risk of those operations could be required. Even the investors themselves could design a protection, especially if they have a better creditworthiness or relevance than the vehicle to trade that protection in the market.

Operational risk

It is possible to say that there is a considerable amount of complexity on the structured finance processes, and they are highly subject to operational risks from many agents. PINHEIRO (PINHEIRO, 2010) pointed that the securitization process is subject to

operational risks coming from three different parties: the many service providers; the originator; and the SPE.

According to the CMN – Conselho Monetario Nacional (BCB, 2010), the banks are obliged to create structures to monitor its operational risks, listing the following types: Internal Frauds; External Frauds; Inappropriate labor practices and worker safety; Inappropriate practice with clients, products and services; Damages and physical assets; Failures or interruptions in systems and/or business; Failures in IT systems; Failures in the execution, delivery, processing, and management of activities and/or processes.

All of those operational problems could happen on the three layers of the deal (originator, SPE and service providers), and mitigation relies on compliance to regulatory requirements and proper monitoring of those layer's activities.

Liquidity risk

The liquidity risk present on structured finance products are linked to two very different sources of risk. First, the lack of liquidity of the vehicle due to the mismatch of cash flows that could be triggered by numerous reasons, and, second, by the lack of a secondary market for the securities during its holding period.

The first reason has several forms of mitigation, including reserves in highly liquid securities and co-obligation of another institution on providing liquidity. If the instrument is build with derivatives, and if there are margin requirements, this could really deteriorate the vehicle's liquidity capability in the case of a stressed scenario such as the one that happened in the 2007 financial crisis, and, because of that, it is important to properly assess the risks of the structuring and create mechanisms to prevent excessive exposure to those risks.

The second risk is a reality in the Brazilian market, and the further development of the structured finance market will tend to strongly contribute to the mitigation of that risk.

Systemic Risk

The systemic risk is a very difficult matter to relate to structured finance, given the complexity of the structured finance products. A significant systemic risk exposure was present during the 2007-2008 financial crisis that started mainly in the mortgage market, but highly sponsored by a bull financial market and an inadvertent government and regulatory framework.

As the markets become more integrated, the credit risks are more and more correlated, even between different countries. Also, the credit risk has a high correlation with economic

cycles, because most of those receivables rely on the future performance of a certain activity. As structured finance products are highly exposed to credit risks, they are highly exposed to the economic performance of the economies that are related to their assets. It is expected that they are one of the first instruments to show a big deterioration in the economy, and that is a natural component of the credit risk transfer. Excess exposure to those instruments could lead to a great impact on the financial sector, and that is why investors need to properly assess the risks that are inherent to those instruments in order to prevent themselves from suffering or causing a systemic crisis.

Adverse selection risk

The adverse selection is linked to the choice of the assets that will compose the pool of assets that will be securitized. It is both a risk for the originator and for the investor. Generally, in Brazil, the banks and companies try to gather healthy assets under the vehicle so that they will maintain a track record of secure investments, and keep the credibility of that source of funding. Also, the rule is that most of the originators can't find market for their subordinated tranches and keep them on their portfolio, making their stakes considerably high on the performance of the vehicle, and very little risk for the investor in having a pool of bad assets. Therefore, even with a high asymmetry of information, it is expected that the adverse selection risk will be little in most structures given the importance of the deal to the originator.

4 ANALYSIS ON THE ISSUANCE OF FIDC QUOTAS

4.1 Methodology

Data Picking Criteria

From the data chosen to compose this study, the FIDCs rated by agencies other than S&P, Fitch and Moody's were excluded, once these agencies are internationally renowned and have a higher credibility than local agencies.

Also, the FIDCs that didn't explicitly show all of the required proposed data were obviously excluded. Finally, the FIDCs that had originators that didn't have an agency rating were excluded as well. All other possible adjustments were spared by the previous adjustments.

For the remaining data, it is important to notice that all the originating companies were whether a bank or a public company and they all promised floating rates indexed to the interbank rate, the DI.

Variables

-Promised Yield

The promised yield is usually presented in two forms in Brazilian offerings.

The first is a yield that is referenced in a benchmark, in this case, the Brazilian interbank rate, the DI, plus a fixed coupon. Therefore, this first option is presented as DI + COUPON.

The second form is presented as a multiplier of the benchmark, which usually is greater or less than 100%. For example, the multiplier could be 120% of the benchmark, so it would be presented as 120% of the DI (120%*DI).

For the sample gathered in this project, exactly half of it has presented a yield in accordance with the first option, and by exclusion, the other half was in accordance with the second option. The discrepancy between these patterns had to be eliminated, and a similar method for building a homogeneous series used by FRALETTI & EID Jr (2005) was applied to this project's data.

The yields presented in the form of a multiplier were adjusted to look like a DI + COUPON. This was possible through the solution of this equation for the COUPON:

$$(1 + \text{COUPON}) * (1 + \text{DI}) = \text{multiplier} * \text{DI}$$

This equation depends on the level of the Brazilian interbank rate, and the DI used was the one that was in effect at the moment of the issuance.

Through that procedure it was possible to arrange a homogeneous series for the promised yield, which represented a spread over the interbank rate through the variable COUPON.

-Tranche and Originator Ratings

The ratings for the tranches should capture many intrinsic characteristics of the issuance. First, it should put into account the inherent risk of the receivables that are being sold to the vehicle, especially regarding the credit risk of the debtors. Second, it should take into considerations the structure of the securitization, that is, the seniority involved in the transaction, over collateralization, and guarantees given by the originator.

Therefore, it should contain the whole credit enhancement effects. That is mainly why this work was not concerned in getting the specific information that would enable the appraisal of all the underlying characteristics of the securitization, such as the details of the structuring. Instead, it has used the rating as an overall proxy for the credit characteristics of the quota. A further analysis of the rating as a proxy is presented in the conclusion.

The originators ratings, in the other hand, are really important when capturing the characteristics of the originator that influences the promised yield of a securitization. This inherent information comprises the company's leverage, profitability, market position, forecasts, and many other factors that impact the credit risk of the originator, and are probably correlated in the cases in which the originator offers some kind of credit protection and guarantees.

It was necessary to translate all of the ratings into numbers. This was possible by constructing a conversion table. The Figure 2 bellow presents the methodology used in this project. For example, if a quota was rated as A+ or A1, it would have a value of 5, and that is how the ratings series were constructed for the model.

Moody's	S&P	Fitch	Approximate Brazilian National Scale	Grade	Research Methodology
Aaa	AAA	AAA		Prime. Maximum Safety	1
Aa1	AA+	AA+		High Grade High Quality	2
Aa2	AA	AA			3
Aa3	AA-	AA-			4
A1	A+	A+		Upper Medium Grade	5
A2	A	A			6
A3	A-	A-			7
Baa1	BBB+	BBB+	AAA(bra)	Lower Medium Grade	8
Baa2	BBB	BBB	AA+(bra)		9
Baa3	BBB-	BBB-	AA+(bra)/AA(bra)		10
Ba1	BB+	BB+	AA-(bra)	Non Investment Grade	11
Ba2	BB	BB	AA-(bra)/A+(bra)	Speculative	12
Ba3	BB-	BB-	A(bra)		13
B1	B+	B+	A-(bra)/BBB+(bra)	Highly Speculative	14
B2	B	B	BBB(bra)/BBB-(bra)		15
B3	B-	B-	BB+(bra)		16

Figure 9: Rating Agency Methodology / Source: Own

It is important to notice that all of the ratings assigned in this work were in national scale, which means that they will have a different global scale rating. Global scale ratings are definitely the most important ratings, because they can show you the opportunity cost present in securities of different countries and are, therefore, a very important variable of comparison.

Thus, it is possible to come up with an approximate conversion table for the national scale ratings like the one shown in Figure 9. That conversion table indicates that, for instance, having a AA(bra) is an important notch upgrade, once it gives the security a probable investment grade and probably more liquidity, demand and less spread costs. If any non-linear study is performed considering the rating as an explaining variable of the pricing, then it would probably see some considerable changes in the price when it comes to notch upgrades to investment grade. Also, notch upgrades from BB+(bra) to BBB-(bra) would probably have considerable implications, as it is a national investment grade upgrade.

-Volume

In most of the works surrounding structured finance in Brazil, this variable wasn't relevant in explaining the pricing. As this research takes into account a more updated data, then results could be different. Some relevance of this variable regarding topics such as liquidity in the secondary market could exist, but the Brazilian secondary market for securitization quotas is insipient, and wouldn't be a surprise to reach the same results as previous research. Despite this, the more the amount issued, the more the market would require transparency from the issuance, and a significant transparency enhancement could lead to lesser yields requirements.

-Date

The date of the issuance could indicate market trends toward a better to a lower confidence in the instrument. But this effect could be ambiguous in the period assigned in this project. Primarily, as the market of structured finance develops itself in Brazil, more confidence the national and international investors have to engage into these investments, widening the access and diminishing the credit spreads. On the other hand, as the world recently met a market turbulence that created a great aversion and distrust in the instrument globally, it wouldn't be a surprise if no apparent trend is present in the regression.

-Macroeconomic Variables

Macroeconomic variables were chosen to capture any economic volatility present in the model. As our sample comprises a period of great volatility due to a market crisis, it is reasonable to think that the offerings were highly affected by that. As the entire sample is composed of Brazilian issuances in Real, and as the Brazilian economy was not as volatile as many countries worldwide were, the chosen macroeconomic variables were the BOVESPA

Index (IBOVESPA) and the Real/Dollar exchange rate. It is very likely that the IBOVESPA will be the best suit for the macroeconomic changes.

The data used to complement the model was the economic variable (index or exchange rate) by the time of the issuance of each FIDC quota.

Variables

Promyield – yield promised to reward the quotas in the form of a coupon spread over the CDI

Trancherate – rating given to the tranche in the form of a number

Originrate – rating given to the originator of the FIDC in the form of a number

Date – date of the issuance

Volume – volume of the issuance for the tranche

Ibovespa – Ibovespa index by the time of the issuance

Exchanger – exchange rate Real/Dolar by the time of the issuance

Modeling the price of a FIDC quota

The modeling methodology used in this work was possible through the regression by Ordinary Least Squares (OLS). The basic regression takes the form:

$$\text{Promyield}_i = \beta_0 + \beta_1 * \text{Trancherate}_i + \beta_2 * \text{Originrate}_i + \beta_3 * \text{Date}_i + \beta_4 * \text{Volume}_i + \beta_5 * \text{Ibovespa}_i + \beta_6 * \text{Exchanger}_i + \varepsilon_i$$

The proposed linear regression will be tested until the best model is found.

A similar work, but with debentures was performed by FRALETTI & EID (FRALETTI & EID, 2005), in which it was tried to explain the pricing of a debenture through: volume, rating of the debenture, maturity, Ibovespa, and a set of dummies to capture the different collateral characteristics. Among the variables tested on the different models, the debenture's rating, Ibovespa and maturity has usually shown themselves as relevant variables. This work seeks to find similar results in the case of the FIDCs, and it tried to go in the same line of FRALETTI & EID's model.

The program used to run the model was the EViews 6.0, and the outputs posted here are directly taken from the program.

4.2 Data Collection

To fulfill the proposed research, it was collected the data included in the offering releases (*Prospectos*) of the FIDC quotas (FIDC, FIC-FIDC and FIDC-NP) available at the Brazilian Securities and Exchange Commission website, the CVM (<http://www.cvm.gov.br>). The data collected involved the issuance from 2006 to 2010.

The information gathered in those releases, when it existed, were concerning the promised yield by the senior and mezzanine tranches of the quota, the yield index, volume, data, name of the originator, name of the FIDC, rating agency, and rating of the seniorities.

A second source of information for the FIDCs that wouldn't disclose all the information on their offering releases were the rating agencies' reports, which were accessed by my own subscription to the rating agencies S&P, Fitch and Moody's. Differently from most of the offering releases, the agencies' reports tend to disclose information in a more standardized and clear way than those releases. Yet, through the subscription it was possible to supplement the database with the originators' ratings.

Historical data regarding the CDI rate, exchange rate, IBOVESPA index, SELIC rate was gathered from Bloomberg's database.

At the end, it was possible to reach a sample of 32 FIDCs that had all the information above.

4.3 Empirical Results

On Figure 10, it is presented the descriptive analysis of the data. It is important to highlight that the period seen is from 1/29/2007 to 6/29/2010; the least rating given to a company in the sample is B+/B1 and the least for a tranche rating was BB+/Ba1, which is one notch below investment grade; the average promised yield is 1.66%; and it was a period of volatility for the Brazilian economy, in which the Ibovespa and the exchange rate varied significantly.

Descriptive Analysis					
	Average	Median	Standard Deviation	Minimum	Maximum
Promyield	1.66%	1.35%	0.0144	0.35%	7.50%
Volume	287609375	123750000	539617239	15000000	2880000000
Originrate	5.7	5.5	3.7982	1	14
Trancherate	3.1	3	2.5645	1	11
Date	10/21/2008	6/29/2008	407.19	1/29/2007	6/29/2010
Ibovespa	61248	62067	7407.56	43573	71897
Exchanger	1.79	1.78	0.1324	1.56	2.13

Figure 10: Descriptive Analysis of the Data / Source: Own

The model proposed before was applied and the results are on Figure 11.

Dependent Variable: PROMYIELD
Method: Least Squares
Date: 11/06/10 Time: 15:58
Sample: 1 32
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.778395	0.239813	-3.245845	0.0033
DATE	2.33E-05	6.45E-06	3.611123	0.0013
VOLUME	-1.72E-12	3.81E-12	-0.453218	0.6543
EXCHANGER	-0.024142	0.024414	-0.988887	0.3322
ORIGINRATE	-0.000531	0.000611	-0.869221	0.3930
IBOVESPA	-1.46E-06	5.03E-07	-2.902804	0.0076
TRANCHERATE	0.001989	0.000793	2.507399	0.0190
R-squared	0.535070	Mean dependent var		0.016582
Adjusted R-squared	0.423487	S.D. dependent var		0.014358
S.E. of regression	0.010902	Akaike info criterion		-6.009113
Sum squared resid	0.002971	Schwarz criterion		-5.688483
Log likelihood	103.1458	Hannan-Quinn criter.		-5.902833
F-statistic	4.795257	Durbin-Watson stat		2.430804
Prob(F-statistic)	0.002215			

Figure 11: MODEL 1 - Eviews results from the proposed model / Source: own

The first results of the data manipulation implied that the volume, exchange rate and the originator's rating were not different than zero with a 10% confidence level. The R-squared of 53.5% shown by the model was on acceptable levels, but there were still non-relevant variables. So, on the next step the non-relevant variables were taken out one by one, starting from the most irrelevant, until it was possible to come up with the following model, presented on figure 12.

Dependent Variable: PROMYIELD
 Method: Least Squares
 Date: 11/06/10 Time: 16:02
 Sample: 1 32
 Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.862988	0.217825	-3.961840	0.0005
DATE	2.36E-05	5.76E-06	4.105509	0.0003
IBOVESPA	-1.06E-06	3.22E-07	-3.304211	0.0026
TRANCHERATE	0.001849	0.000766	2.414463	0.0225
R-squared	0.499851	Mean dependent var		0.016582
Adjusted R-squared	0.446264	S.D. dependent var		0.014358
S.E. of regression	0.010684	Akaike info criterion		-6.123594
Sum squared resid	0.003196	Schwarz criterion		-5.940377
Log likelihood	101.9775	Hannan-Quinn criter.		-6.062863
F-statistic	9.327781	Durbin-Watson stat		2.392375
Prob(F-statistic)	0.000194			

Figure 12: MODEL 2 - Eviews results from the adjusted proposed model / Source: own

On this model, all of the variables were relevant in a 5% confidence interval. The R-squared was satisfactory with a 50% level. A possible explanation for the irrelevance of volume, exchange rate and originator's rating is that: first, the volume doesn't seem to matter in terms of credit risk that much and it won't leverage the bargaining power such as a loan would; second, the exchange rate is highly correlated with the Ibovespa, and it is likely that any currency related influence would be already captured by the index; and at last, as the fundamental of structured finance is to separate the credit risk of the originator, it is plausible and confirmed that the credit quality of the originator won't affect the credit spread.

Still, the tranche rate wasn't relevant in a 1% confidence interval, and another model was estimated taking out the variable, which is represented by Figure 13.

Dependent Variable: PROMYIELD
 Method: Least Squares
 Date: 11/06/10 Time: 16:03
 Sample: 1 32
 Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.905012	0.234513	-3.859114	0.0006
DATE	2.51E-05	6.18E-06	4.057080	0.0003
IBOVESPA	-1.23E-06	3.40E-07	-3.612307	0.0011
R-squared	0.395720	Mean dependent var		0.016582
Adjusted R-squared	0.354045	S.D. dependent var		0.014358
S.E. of regression	0.011540	Akaike info criterion		-5.996961
Sum squared resid	0.003862	Schwarz criterion		-5.859549
Log likelihood	98.95138	Hannan-Quinn criter.		-5.951413

F-statistic	9.495487	Durbin-Watson stat	2.675739
Prob(F-statistic)	0.000673		

Figure 13: MODEL 3 - Eviews results from the adjusted proposed model without trancherate / Source: own

The out implies that the model is better than the previous taking into consideration the Schwarz criterion, which diminished. It also implies that the tranche rating is not relevant, but only the date and the Ibovespa index are relevant. That leads to the conclusion in which the higher the Ibovespa the lower the credit spread, and the higher the date the higher the spread, making the credit spread totally subject to the momentum of the market.

Another consideration is that because of the financial crisis, through time, the market was more aware of the risks associated with the structured finance instruments and had less appetite for them. That would explain both the lower volume on the past few years and why the variable DATE appears to be increasing the spread over time.

Even though the model seems to be better with the Schwarz criterion on MODEL 3, the R-squared lowered and it is more plausible to consider the rating as an important variable to the pricing of the FIDC quotas. Therefore, the MODEL 2 was taken as better over MODEL 3.

Another consideration on MODEL 2, is that the rating is shown in the right sense, that is, the better the rating, the lower the required spread over the CDI. However, there are still factors left out that could better explain the pricing of the quotas, once the R-squared were of 50% only.

The final model obtained was the following:

$$\text{Promyield}_i = -0.862988 + 0.001849 * \text{Trancherate}_i + 2.36E - 05 * \text{Date}_i + -1.06E - 06 * \text{Ibovespa}_i + \varepsilon_i$$

5 CONCLUSION

Model's conclusion

Through the research performed here it was possible to understand the causality relationship between the yield promised by a tranche of a FIDC quota and the variables of time, the performance of the local stock market and the credit rating of the tranche. Other variables such as volume, exchange rate and the rating of the originator proved insignificant, and a possible explanation would be that: first, the volume isn't significant for credit risk and

won't leverage the bargaining power of the originator such as in a loan; second, the exchange rate movements have a high correlation with the Ibovespa index, therefore, any currency related effects could be captured by the index; and finally, the SPE is protected from the originator's credit quality, meaning that it is expected that this variable won't be relevant, and as it has proven not to be, the fundamentals of the structured finance seems to be well reflected in the Brazilian market.

The sample gathered issuances from 1/29/2007 to 6/29/2010, and the date of the issuance was a relevant independent variable in the obtained model. This could be explained by the fact that the period was marked by a financial crisis, and through time the market had less appetite for investments on those vehicles, pushing the issuances to offer a higher spread. This variable could be shown as irrelevant in the future if a larger period is taken into consideration.

Both the tranche rating and the Ibovespa index make sense when trying to build a causality relationship with the spread over the CDI. The tranche rating is one of the most relevant quality seals on the securitization vehicles, once they are complex structures that are very difficult to analyze. The Ibovespa index relevance shows that the market relies on the momentum of the economy to price a security, which is highly explained by watching the high yield spread levels during the economic cycles. But it is also plausible that players won't have appetite for a vehicle in a downturn simply because they are not confident that the performance will be good enough.

The sample gathered of 32 FIDCs is still small, but those were the only that fitted the minimum criteria to run the model. Still, the results were very positive and the fundamentals of the structured finance seem to be reflected on the market.

The FIDC market in Brazil is still young and there is little information available on those vehicles and their performance. As the market develops and more information is available, it will be possible to perform better tests and to have a more thorough assessment on the structured finance market.

Other considerations

The rating agencies are summoned basically to do the particular job of analyzing all the many characteristics of the transactions. Therefore, this brings to light two issues: 1) First, the rating agencies try to take into account all the relevant characteristics of the structuring regarding the credit risk, being, therefore, a good proxy for the structuring characteristics (such as the seniority structure, over-collateralization, default probabilities of the receivables,

guarantees, etc), and 2) Second, their opinion have such great impact in the pricing methodology that it influences the market's investment decision, which makes the rating variable likely to be even more important than the actual structuring variables.

This work was not concerned on finding whether the ratings are capturing or not the important characteristics of the securitization process. This is actually a different matter. But one important thing regarding the rating agencies role in the process of a structured finance issuance is that after the recent financial crisis of 2007-2008, and the subsequent failure by the rating agencies' assessment on structured finance products, the market could be less confident and reliable on rating agencies' credit models for investments decisions, and, additionally, those models could have significant changes, leading to a new trend on the structured finance pricing, and leaving the data pre-crisis with little relevance when trying to explain the relationship of the factors surrounding securitization.

With the future development of structured finance market, it will be possible to better assess its economic benefits and its flaws. It is known that it is a highly complex topic that will demand a strong effort to better understand it and overcome its obstacles, including the challenge of regulating it. This work proposed some reflections on the Brazilian market of structured finance so that players could be aware of its challenges and try to better develop it.

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APPENDIX

Registration Date	IBOVESPA Index	Registered name of the FIDC at CVM	Rating Agency	Originator Rating	Tranche Rating	Coupon Type	Yield Index	Promised Yield (Spread)	Volume
10/31/07	65317.70	CONCORDIA FIDC	Fitch	A	AA	Floating	DI	0.35%	50,000,000
03/26/08	61415.28	PAO DE ACUCAR FIDC	Fitch	A	AA	Floating	DI	0.50%	120,000,000
11/29/07	62156.34	FIDC ENERGISA	S&P	A	AAA	Floating	DI	0.80%	150,000,000
02/26/08	65182.61	FIDC BICBANCO CREDITO CONSIGNADO	S&P	A-	AAA	Floating	DI	0.90%	150,000,000
06/23/10	65160.33	FIDC BICBANCO CRÉDITO CORPORATIVO	S&P	A-	AAA	Floating	DI	1.50%	192,500,000
06/11/08	66794.76	FIDC BICBANCO SAUDE GARANTIDA	S&P	A-	AAA	Floating	DI	1.29%	200,000,000
06/14/07	53712.89	FIDC CESP IV	S&P	A-	A	Floating	DI	1.75%	1,250,000,000
12/22/09	67417.93	FIDC BCSUL VERAX CRÉDITO CONSIGNADO II	Moody's	A1	Aa2	Floating	DI	1.27%	300,000,000
01/11/10	70433.49	FIDC BCSUL VERAX CRÉDITO CONSIGNADO II	Moody's	A1	Ba1	Floating	DI	0.63%	15,000,000
06/12/08	67319.63	DAYCOVAL VEICULOS FIDC	S&P	AA-	AA	Floating	DI	1.40%	300,000,000
07/30/08	59997.64	BANIF FIDC AGRO I	Fitch	AA+	AA	Floating	DI	1.70%	82,500,000
03/18/08	61932.78	CHEMICAL III - FIDC - INDUSTRIA PETROQUÍMICA	Moddy's	Aa2	Aa2	Floating	DI	1.20%	324,000,000
06/29/10	61977.91	CHEMICAL V - FIDC - INDÚSTRIA PETROQUÍMICA	Moddy's	Aa2	Aa1	Floating	DI	1.25%	272,400,000
06/29/10	61977.91	CHEMICAL V - FIDC - INDÚSTRIA PETROQUÍMICA	Moddy's	Aa2	Aa2	Floating	DI	5.80%	21,600,000
06/30/09	51465.46	CHEMICAL IV - FIDC - INDÚSTRIA PETROQUÍMICA	Moody's	Aa2	Aaa	Floating	DI	3.00%	227,000,000
06/30/09	51465.46	CHEMICAL IV - FIDC - INDÚSTRIA PETROQUÍMICA	Moody's	Aa2	Ba1	Floating	DI	7.50%	18,000,000
03/20/08	58987.31	BMG FIDC CONSIGNADOS PUBLICOS VII	Moddy's	Aa3	Aaa	Floating	DI	0.80%	207,500,000
12/24/09	67588.86	FCM FIDC MERCANTIS E SERVIÇOS	Fitch	AAA	AAA	Floating	DI	1.40%	127,500,000
12/18/09	66794.21	FIDC FORNECEDORES DA PETROBRAS BR2 - INDUSTRIAL E SERVIÇOS	Fitch	AAA	AA	Floating	DI	1.59%	80,000,000
06/02/08	71897.25	BMC FIDC CREDITO CONSIGNADO INSS	Moddy's	Aaa	Aaa	Floating	DI	0.73%	1,000,000,000
12/04/09	67603.52	CRÉDITO CORPORATIVO BRASIL - FIDC	S&P	AAA	AA	Floating	DI	1.50%	2,880,000,000
12/22/09	67417.93	FIDC FORNECEDORES PETROBRAS - INDUSTRIAL E SERVIÇOS	S&P	AAA	AA+	Floating	DI	1.59%	72,500,000
01/08/10	70262.70	FIDC MERCANTIS MONSANTO	S&P	AAA	AAA	Floating	DI	2.00%	180,000,000
01/14/10	69801.42	FIDC CONSIGNADOS PORTFÓLIO II	S&P	B+	AA	Floating	DI	1.90%	100,000,000
07/17/08	60108.72	RURAL FIDC - EMPRÉSTIMOS CONSIGNADOS	S&P	B+	AA	Floating	DI	2.00%	100,000,000
06/05/07	53162.21	FIDC PAULISTA - VEÍCULOS	Moddy's	Baa2	Aa2	Floating	DI	1.10%	100,000,000
01/29/07	43573.49	FIDC MATONE EMPRÉSTIMOS CONSIGNADOS - SERVIDORES PÚBLICOS	Fitch	BB	AA	Floating	DI	1.14%	100,000,000
10/01/07	62340.34	MAXCRED FIDC	Fitch	BB+	AA	Floating	DI	0.90%	18,000,000
09/12/08	52392.86	FIDC MERCANTIL DO BRASIL FINANCEIRA VEICULOS I	S&P	BBB-	AAA	Floating	DI	1.44%	115,000,000
06/20/07	54029.24	FIDC PANAMERICANO VEICULOS I	Fitch	BBB+	AA	Floating	DI	0.75%	300,000,000
06/20/07	54029.24	FIDC PANAMERICANO VEICULOS I	Fitch	BBB+	BBB+	Floating	DI	2.25%	50,000,000
02/26/07	46207.40	FIDC PARANÁ BANCO II	S&P	BBB+	AA	Floating	DI	1.14%	100,000,000

Table 1: Data Selected / Source: Own

Type of Securitized Asset	Definition
Real Estate Credit	Credits arising from the financed acquisition of residential or commercial property, including operations within the Real Estate Finance System (Sistema Financeiro Imobiliário, SFI) and the Household Finance System (Sistema Financeiro da Habitação, SFH), having as final borrowers either individuals or corporations.
Business Loans	Credits arising from financing individuals, generally for the purpose of acquiring goods (excluding real estate and motor vehicles, that have their own collateral classes), but could include other purposes such as, trade finance, infrastructure and development.
Personal Loans	Credits arising from financing non-specific personal consumption. Included are financing operations with and without direct debit payroll deductions, credit card and checking account overdraft facilities.
Rights	Credits arising from the collection of payments originated from workers rights, patents, production processes, brands, among others, to permit their use and sale.
Auto Loans	Credits arising from financing the acquisition of motor vehicles, having as the final borrower either individuals or corporations.
Utilities	Credits arising from the provision of public service utilities (e.g., water and sewage).
Trade Receivables	Short term credits, generally 30 to 90 days, arising from the sale of a good or service among corporations. Corporations regularly discount these assets at financial institutions to provide for working capital.
Agribusiness Receivables	Credits arising from financing agribusiness, having as the final borrower either individuals or corporations. The purpose of these financings include investment, working capital or sales.
Education Receivables	Credits arising from financing individuals for educational purposes (e.g. Payment of loans to attend a university) and payments originated from providing educational services (e.g. Monthly school fees).
Utilities	Credits that have as their borrower either the federal, state or municipal government, or companies fully controlled by the public sector, arising from the issue of debt instruments, debt assumption and/or restructuring.
Securities	Credits arising from investments in securities (e.g., debentures, commercial paper, etc.).
Taxes	Credits arising from taxes owed to the public sector by individuals or corporations.
Multiclass	Credits that include two or more of the collateral classes mentioned in this table.

Figure 14: Types of Securitized Assets in Brazil / Source: UQBAR (2010, p.40)