COST AND ACCESS TO CREDIT IN BRAZIL

A thesis presented to
the faculty of
the Center for International Studies of Ohio University

In partial fulfillment
of the requirements for the degree
Masters of Arts

Daniel M. Viana
June 2006
This thesis entitled
COST AND ACCESS TO CREDIT IN BRAZIL

by
DANIEL M. VIANA

has been approved for
the Center for International Studies by

Julia A. Paxton
Assistant Professor of Economics

Drew McDaniel
Interim Director, Center for International Studies
Abstract

VIANA, DANIEL M., M.A., June 2006, International Affairs

COST AND ACCESS TO CREDIT IN BRAZIL (65 pp.)

Director of Thesis: Julia A. Paxton

This paper investigates the cost and access to credit for individuals and businesses in Brazil during the last decade. These are two important elements to provide adequate conditions for economic development. Barriers to access to credit in the form of interest spreads are analyzed with descriptive statistics and econometrics. Inflation is found to be positively related to spreads in a relatively stable economy. Despite the fact that this is a highly concentrated market, no evidence is found that concentration is a determinant of higher spreads. The high base interest rates determined by the government are found to cause a crowding out effect in the private credit market.

Approved:

Julia A. Paxton

Assistant Professor of Economics
Acknowledgments

Expressing my gratitude to everyone that directly or indirectly offered me the support necessary to finally accomplish this endeavor is harder than the task itself. Nevertheless, I shall try to do so, even at the risk of excluding many. My family was always there for me; thanks are due to my parents, Stella and Rubens and my siblings Raquel and Bernardo. I must thank Renata for bearing with the distance and giving me support. To her I say: Fortitudine Vincimus.

Dr. Julia Paxton offered not only guidance but she is also a distinguished example of professionalism and kindness in her work as an economist. I could always count on the assistance and constructive criticism from Dr. Erik Devos. Dr. Tom Walker’s passion for teaching is inspiring as is his family to whom I express my gratitude.

I have to thank Dr. Brad Jokisch, Dr. Betsy Partyka and the staff of the Center for International Studies for their support. Many professors helped me along the way, among them Dr. Shamila Jayasuriya, Dr. Tony Caporale, Dr. Kyongwook Choi, Dr. William Shambora, Dr. Khosrow Doroodian and Dr. John Puthenpurackal.

Many were the friends and classmates that in one way or another helped me during this period. My roommates, Nasim and Weiqi, had to bear with me. Gio de Reaño was an inestimable friend all of the way. All my colleagues from the LAS and the MFE programs were very helpful. In addition, I need to thank, Emily, Natty, Roberta, Li Wei, Dali, Cathy and Paulinha. Also the Brazilian network in Athens, my friends in Brazil and my brother Down Under. Finally I must thank God for being on my side at all times.
# Table of Contents

Abstract............................................................................................................................... 3  
Acknowledgments............................................................................................................... 4  
List of Tables ...................................................................................................................... 6  
List of Figures ..................................................................................................................... 7  
Chapter 1. Introduction................................................................................................. 8  
Chapter 2. Literature Review...................................................................................... 13  
  2.1 Credit as a Tool for Economic Growth............................................................... 13  
  2.2 Barriers to the Access to Credit .............................................................................. 14  
  2.3 Spread Determination ............................................................................................. 16  
Chapter 3. Descriptive Statistics of the Brazilian Credit Market ............................... 21  
  3.1 Financial Market ..................................................................................................... 21  
    Inflationary Period .................................................................................................... 30  
    Spreads in Brazil ....................................................................................................... 34  
    Taxation .................................................................................................................... 37  
    The Financial Market Opening, Privatization and Foreign Bank Investments ....... 38  
    Basel Agreement Effects ......................................................................................... 39  
    Other Factors Relevant to the Brazilian Credit Market ............................................ 41  
  3.2 Consumer Credit ..................................................................................................... 42  
    Stand-by Credit ......................................................................................................... 43  
    Switching costs and Information rents ................................................................... 44  
Chapter 4. Methodology and Data for Econometric Regressions .............................. 46  
Chapter 5. Results of the Regressions ........................................................................ 54  
  5.1 Regression 10/1996 – 06/2004 ............................................................................... 54  
  5.2 Regression 6/2000 – 2/2006 ................................................................................... 57  
Chapter 6. Conclusion ................................................................................................ 60  
References......................................................................................................................... 63
# List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 3-1: Financial System Domestic Credit to Private Sector in GNP%</td>
<td>22</td>
</tr>
<tr>
<td>Table 3-2: Financial Constraints in Brazil: An International Comparison</td>
<td>25</td>
</tr>
<tr>
<td>Table 3-3: Depth of Financial Markets: Brazil and Other Emerging Economies</td>
<td>26</td>
</tr>
<tr>
<td>Table 3-4: Inflationary Transfers from 1980 to 1992</td>
<td>33</td>
</tr>
<tr>
<td>Table 3-5: Share of Financial Institutions in the Banking Sector Total Net Equity</td>
<td>38</td>
</tr>
</tbody>
</table>
# List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 3-1: Credit Operations in Brazil</td>
<td>23</td>
</tr>
<tr>
<td>Figure 3-2: Credit Markets in Latin America in 2004</td>
<td>28</td>
</tr>
<tr>
<td>Figure 3-3: Brazilian Base Interest Rate – Selic</td>
<td>29</td>
</tr>
<tr>
<td>Figure 3-4: Inflation in Brazil 1945-2006</td>
<td>30</td>
</tr>
<tr>
<td>Figure 3-5: Inflation after Plan Real</td>
<td>31</td>
</tr>
<tr>
<td>Figure 3-6: Spreads in the World</td>
<td>34</td>
</tr>
<tr>
<td>Figure 3-7: Evolution of Spreads in Brazil</td>
<td>35</td>
</tr>
<tr>
<td>Figure 3-8: Spread vs. Selic</td>
<td>36</td>
</tr>
<tr>
<td>Figure 3-9: Spread Composition in Brazil</td>
<td>37</td>
</tr>
<tr>
<td>Figure 3-10: Evolution of Credit to Private Sector/GDP Ratio 1993-2006</td>
<td>39</td>
</tr>
<tr>
<td>Figure 3-11: Proportion of Treasuries in Relation to Operational Assets</td>
<td>40</td>
</tr>
<tr>
<td>Figure 3-12: Production of Durable Goods vs. Interest Rate Individuals</td>
<td>42</td>
</tr>
<tr>
<td>Figure 3-13: Composition of “Cheque Especial” Spreads</td>
<td>44</td>
</tr>
<tr>
<td>Figure 5-1: Regression Output</td>
<td>59</td>
</tr>
</tbody>
</table>
Chapter 1. Introduction

This paper analyzes the cost and access to credit for consumers and businesses in developing countries, specifically focusing on the credit market in Brazil over the last decade. These are two important elements in considering the level of development of financial systems. Many studies show a causal relationship between the development of the financial system and economic growth (Levine et al. 2000 and Rajan and Zingales, 1998 in Reis e Valadares, 2004). OECD (2005) argues that further development of the financial sector can allow for faster economic growth and “better protection of vulnerable groups to income shocks” (p. 62).

A twofold approach will be applied in order to capture the nature of the access to credit and its costs. First, this paper will analyze descriptive statistics of the Brazilian credit market to investigate credit access. Considering that the cost of credit is often a barrier to access, this research will further analyze the determinants of the interest margins charged by banks to individuals and businesses with a multiple variable econometric regression.

The main contributions of this research are investigating the barriers to access to credit to individuals and businesses in general and examining how macroeconomic variables influence spread determination. A better understanding of these issues will allow for policymaking to provide for a safe and sound financial environment and target
the conditions necessary for lowering the cost of borrowing and improving access to credit.

The high level of interest rates charged to customers in developing countries represent an important barrier to credit access and decreases general investment levels in those countries. Bader and Chu (2002) argue that high spreads can jeopardize potential economic growth. Similarly, Demirgüç-Kunt and Huizinga (1999, p.379) cite Levine’s research that indicates that the efficacy of financial intermediation can influence economic growth.

Interest rates and commercial bank margins have fluctuated during the last decade in Brazil but remained high throughout the period. Interest rates charged to customers are composed of the base interest rate, in the case of Brazil the Selic, plus a spread determined by commercial banks. This approach considers the base interest rate to be an opportunity cost. The spread is the remuneration to banks to cover its operational costs, the potential risks involved and the profit margin. Alternatively, it is possible to say that spreads are the difference between the bank’s cost of borrowing and the final interest rate charged to customers. In this paper, the terms spreads, interest margins and mark up will be used interchangeably.

The literature supports the general idea that spreads are higher in developing countries and in less developed financial markets (Demirgüç-Kunt and Huizinga,1999). On the other hand, scholars also defend that a certain level of profitability is necessary to provide stability to the financial system. Carvalho (2003) argues that high profitability was essential for Brazilian banks to avoid the banking crisis that afflicted other countries affected by the debt crisis in the region.
Demirgüç-Kunt and Huizinga (1999) propose that bank interest spreads could be viewed as an indicator of the efficiency of the banking system. The level of spreads can also be the difference between a reasonable and a prohibitive cost of capital. It is important to understand the main determinants of spreads since their reduction can be an efficient way to decrease the final interest rates charged to customers and improve access to credit.

Additionally, reducing spreads might be a more feasible goal than reducing the base interest rate level. The political implications of providing an adequate environment for smaller spreads can be less complex than those of significantly reducing the base interest rate. The monetary policies that determine the base interest rates are not only subjected to domestic macroeconomic environment and political interests; they are also subjected to international economic conditions. This is especially true in the context of Latin American countries after the debt crisis of the 1980’s. The debt crisis left Brazil and many other Latin American nations in a delicate situation regarding their considerable debts and the conditions to roll them over; which somewhat limits the ability of governments to apply monetary policy.

The period in question is just after the introduction of a new currency, the Brazilian Real, in 1994, and the resulting control of inflation from its long history of exorbitant rates. Reforms in the financial system were implemented all through the period and are reflected in the research. Researching seven other countries in Latin America, Brock and Suarez (2000) found that persistent ‘high interest rate spreads has been a disquieting outcome of the reforms” (p.113).
The literature on interest rates and spreads in Brazil deals with many different aspects of the determination of spreads in the Brazilian banking system. Accounting based methods and microeconomic analysis are the most common methods used in studying the issue. However, there is evidence that macroeconomic aspects have significant relevance to help understand decisions on spread determination.

The econometric regression intends to shed light into the reasons that high interest margins are observed in developing countries, by focusing on the determinants of commercial bank credit margins in Brazil in the last decade. Econometric techniques will be used to analyze the relationship between spreads and macroeconomic variables such as inflation, total credit operations, debt level, GDP, base interest rate, bank concentration and aspects of the regulation over the sector.

There are many hypotheses about the reasons high interest margins are found in developing countries and particularly in Brazil. The main hypotheses to be tested are the effects of inflation, the crowding out effect and the competitiveness of the market; assessed by its structure and scale. Additionally, the effects of the implementation of the Basel Agreement will be analyzed.

In the descriptive statistics analysis aspects section, such as the size and distribution of credit will be assessed. The effects of inflation both currently and during the inflationary period are going to be discussed. The base interest rate will be analyzed and related together with other variables, to the spread and access to credit. The reforms to the financial system including further opening, privatization and increased foreign bank investments as well as their effects will be discussed. In addition, a section will discuss credit to consumers.
This paper is structured in the following manner. First, the literature available on credit as a tool for economic growth and spread determination is discussed in chapter 2. An analysis of descriptive statistics of the Brazilian credit market is given in chapter 3. The methodology and data for econometric regressions are explained in detail in chapter 4. The expected relationships are also described in this section as well as their theoretical explanations. The results of the regression analysis are presented in chapter 5, and finally the main conclusions are offered in chapter 6.

Inflation is found to be positively related to spreads in a relatively stable economy. Despite the fact that this is a highly concentrated market, no evidence is found that concentration is a determinant of higher spreads. The high base interest rates determined by the government are found to cause a crowding out effect in the private credit market.
2.1 Credit as a Tool for Economic Growth

There are many studies that show a causal relationship between the development of the financial system and economic growth (Levine et al. 2000 and Rajan and Zingales, 1998 in Reis e Valadares, 2004). Beck et al. (2004, p.29) states that “extensive literature shows that financial development is positively associated with the growth rate of per capita GDP”, although it may not necessarily reduce poverty. According to Kumar (2005) “greater financial system depth and soundness contribute to broad-based economic growth with poverty reduction”. He also notes that research by McKinsey Global Institute show that Brazil could gain a large effect on economic growth, due to improvements in financial services. The development of the financial system provides better resource allocation, higher levels of investment, optimization of scale, lower transaction costs reflecting in higher levels of productivity and welfare for both consumers and producers.

Beck et al. (2004) studied the effects of financial development on income distribution and poverty alleviation. They found that “countries with better-developed financial intermediaries experience faster declines in measures of both poverty and income inequality”. They considered two components of poverty alleviation: faster economic growth and changes in income distribution.
In 1999 Banco Central do Brasil - BCB (Brazilian Central Bank) promoted a project targeting the interest margins and spreads, considered to be at high levels at the period (BCB, 1999, p.3). They argued that the high interest rates were only part of the reasons behind the high costs imposed on borrowers in the country. According to BCB (1999, p.4) the behavior of the interests rates in Brazil is well defined and is structured in layers. It means that changes in the base rate would produce shifts in the interest rates charged for the different credit operations at a similar level, without significant changes in their positioning in terms of each layer. The authors use the term “steps” to describe that.

2.2 Barriers to the Access to Credit

According to Bardhan (in Bardhan and Udry, 2000) market imperfections such as incomplete and asymmetric information problems are “particularly acute in the context of development”. Understanding these features and how they can affect the credit market is important to be able to better analyze the Brazilian case.

Bardhan (in Bardhan and Udry, 2000) points that market imperfections will result in smaller scale and risk taking by lenders. Similarly, Aghion and Murdoch (2005, p. 25) argue that entrepreneurs cannot obtain all the capital needed to run their businesses when there are market failures. Among the most important concepts are adverse selection, moral hazard and credit rationing.
Adverse selection arises from lack of good information of the riskiness of borrowers and unable banks to distinguish the riskier borrowers (Aghion and Murdoch, 2005). Stiglitz and Weiss (2001, p.393) explain that since different borrowers have different probabilities of repayment and banks cannot properly access them, they have to resort to the use of a variety of screening devices.

The interest rates individuals are willing to pay could be used for that, as argued by Stiglitz and Weiss (2001). Individuals willing to pay higher interest rates would be perceived, on average, as riskier. Aghion and Murdoch (2005) argue that since banks do not have good information, the outcome is exceedingly high interest rates that results in the exclusion of the worthy potential borrowers (more prudent or better informed). They anticipate the difficulties in generating returns enough to repay very expensive loans and leave the market.

Stiglitz and Weiss (2001, p.393) explain that the perception that the remaining borrowers are riskier is because there is a considerable chance that either they are taking more risk, by undertaking projects that have lower probability of success but higher returns when successful; or in a moral hazard approach, borrowers accept greater interest rates because their assessment of probability of repayment is low. Aghion and Murdoch (2005) further argue that ex-post moral hazard can emerge from contract enforcement difficulties (such as the lack of proper institutional background).

Credit rationing as defined in Stiglitz and Weiss (2001, p. 394) will be the result of the imbalance in supply and demand of loanable funds because the equilibrium interest rate is the one that maximizes the expected returns to the bank that under market imperfections is not the one that clears the market. Their definition of credit rationing is
reserved for two situations (1) among borrowers with apparent identical risk profiles some receive loans while others do not, and those that did not receive it would not do so even at higher interest rates; or (2) there are identifiable groups of individuals that are unable to obtain loans (at any interest rates) with a given supply of credit but would be able to obtain these loans with a larger supply.

According to Dermirguc-Kunt and Huizinga (in Bader and Chu 2002) developing countries’ financial systems typically have high intermediation spreads in a persistent and significant manner. Bader and Chu (2002, p.9) argue that high spreads can be an important barrier to the growth and further development of financial intermediation. It reduces investment since it requires even higher returns and end up excluding many potential borrowers. The lower investment levels jeopardize the potential economic growth.

2.3 Spread Determination

Demirguc-Kunt and Huizinga (1999, p.406) argue that understanding bank profitability and interest margins is essential to formulate banking policies. They researched many variables, including bank characteristics, macroeconomic conditions, explicit and implicit bank taxation, deposit insurance regulation, concentration and competitiveness.

The authors found empirical evidence that inflation is associated with higher spreads and profitability (Demirguc-Kunt and Huizinga, 1999, p. 405). They argue that income
increases more than costs due to inflation and the measures associated. They also found that high real interest rates are associated with higher spreads and that more competitive banking sectors have smaller margins.

Bank concentration can be evidence of less competitive markets, tending to oligopoly or monopoly. The absence of market competition allows for price setting above the equilibrium without losing profits to competitors. Araújo et al. (2003) found that a larger ratio of concentration results in less competition among Brazilian banks.

Bank concentration was found to have a positive relationship in Demirgüç-Kunt and Huizinga (1999), showing higher spreads for more concentrated markets. According to Tonooka and Koyama (2003) a positive relationship was also found by Berger and Hannan for the U.S banking industry. However, Tonooka and Koyama (2003) using the general estimating equation (GEE) approach of Liang and Zeger (1986) did not find statistically significant relationship between concentration and interest charged in loans. Note that they used the final interest rate charged to customers instead of spreads. They also argue that Nakane (2002) shows that despite evidence of some market power by Brazilian banks; there is no evidence that they act like a cartel.

Araújo et al. (2005) calculated various concentration ratios for Brazil in the period of December 1995 until June 2004. The results showed high concentration levels, with decreasing credit concentration during the time analyzed. Araújo et al (2005) further compare these levels to those found in Portugal and Spain. Regarding the credit concentration decreasing while the assets and deposits concentration ratios increased;
they point to the transfer of assets by Caixa Econômica Federal to an agency as the main responsible.

The CR10 concentration ratio lies between zero and one. Since it only accounts for the larger institutions, the closest it tends to one indicates a more concentrated market such as oligopoly. Similarly, a structure closer to perfect competition will present values tending to zero.

Koyama and Nakane (2002 b) analyzed the spread according to two factors; what they called “persistence” and the “conjuncture”. The first indicates a relation between present and past values, characterizing an inertial component. The second excludes the effects from the first and intends to represent purely the macroeconomic effects. In this study, the authors found that the in the year of 2001 the behavior of the intermediation spread is better explained by the deterioration of macroeconomic conditions.

BCB (1999, p. 7) concluded that default/insolvency costs are the most important variable in determining the cost of lending. It mentions the second quarter of 1999 as having the insolvency costs responsible for some 35% of the spread. The other relevant components are administrative expenses (22%), tax revenues (11%), net profit (18%) and indirect taxes (14%).

BCB (1999, p.8) indicates that the credit risks are responsible for the high costs of lending. Even prime clients must be charged a risk premium to guarantee the resource of depositors. The risk analysis is more efficient for larger operations, despite still having some level of subjectivity. Smaller standardized operations represent higher costs because of the difficulties in evaluating credit risk for each of them. Only few variables

---

1 This might affect the results of the regression depending on how to interpret the effects of the securitization in the supply of credit.
are then evaluated and the higher historical levels of default determine the higher costs of lending and therefore the spreads.

In Koyama and Nakane (2002) the main objective was to “identify the main determinants of the intermediation spread as well as evaluate the sensitivity of the spread to variations in its components” (p.5). They considered the base rate (Selic), indirect taxes, administrative costs and economic risk in an econometric analysis. The most important determinant found was the risk, which was measured comparing the yield on the C-Bond against a U.S instrument with similar maturity. They found that in 2001 the risk was responsible for 39.9% in February increasing to 44.8% in September, which could be explained by the deterioration of the macroeconomic environment. They also found that despite increases in the Selic at the time, its importance was declining for the period studied. It came down from around 20% in the beginning of 2001 to a low point of 16.2% in September 2001 (p.13).

Koyama and Nakane (2002) also compared the results of the accounting analysis of the spread for August 2001 to their studies and proposed interesting conclusions. The determinants studied are different, which does not allow for direct comparisons; nevertheless their assumptions are very relevant. The default/insolvency costs were 15.8% in the accounting approach. The authors suggest that there are two main reasons for the difference. First, the measure of risk is a measure of global uncertainty rather than only credit risk. Second, the risk variable has a predicting character whereas, because insolvency costs reflect loans granted in the past, they have a historical character. There is a great sensitivity of the spread to variations in the risk and its ex ante nature is important to explain that. The effects of those changes are not fully or immediately
reflected in the insolvency costs because it takes a while until it produces the expected results.

We can understand from this that the risk can be an important measure to formulate the banks policies regarding setting spreads, considering its *ex ante* nature and its predicting capabilities and should be considered to understand the influences on the determination of the intermediation spread.
Chapter 3. Descriptive Statistics of the Brazilian Credit Market

3.1 Financial Market

The Brazilian financial market can be misleading in some aspects. While some features of the banking industry are developed, with complex financial solutions available, other areas are undersupplied or lack development. An example is Bolsa de Mercadorias e Futuros, ranked by the Futures Industry Association as fifth largest futures exchange in volume in 2005. However, the supply of credit to the private sector is one that is often questioned.

There are arguments in Vasconcelos and Fucidji (2003) and similarly in Reis and Valadares (2004) that the financial system in Brazil does not provide properly what could be considered one of its main functions, offering credit. They affirm that although the Brazilian financial system is solid and significantly resistant to economic shocks, provides a high degree of confidence to economic agents and successfully plays its role as receptor of deposits; it still underperforms in terms of financing private economic agents. Table 3.1 shows that Brazil has a relatively low credit supply to the private sector, even compared to some other developing countries, especially those in Asia.
### Table 3-1: Financial System Domestic Credit to Private Sector in GNP%

<table>
<thead>
<tr>
<th>Country</th>
<th>Domestic Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>187.7</td>
</tr>
<tr>
<td>Switzerland</td>
<td>165.2</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>158.7</td>
</tr>
<tr>
<td>United States</td>
<td>143.5</td>
</tr>
<tr>
<td>South Africa</td>
<td>141.9</td>
</tr>
<tr>
<td>Malaysia</td>
<td>135.5</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>135.1</td>
</tr>
<tr>
<td>China</td>
<td>124.6</td>
</tr>
<tr>
<td>Germany</td>
<td>120.3</td>
</tr>
<tr>
<td>New Zealand</td>
<td>117.7</td>
</tr>
<tr>
<td>Singapore</td>
<td>110</td>
</tr>
<tr>
<td>Thailand</td>
<td>108.8</td>
</tr>
<tr>
<td>Ireland</td>
<td>108.6</td>
</tr>
<tr>
<td>South Korea</td>
<td>101.9</td>
</tr>
<tr>
<td>Korea</td>
<td>101.6</td>
</tr>
<tr>
<td>Poland</td>
<td>26</td>
</tr>
<tr>
<td>Brazil</td>
<td>37.6</td>
</tr>
<tr>
<td>Sweden</td>
<td>46</td>
</tr>
<tr>
<td>Brazil</td>
<td>37.6</td>
</tr>
<tr>
<td>Argentina</td>
<td>23.8</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>14.6</td>
</tr>
<tr>
<td>Mexico</td>
<td>13.2</td>
</tr>
<tr>
<td>Venezuela</td>
<td>12.1</td>
</tr>
<tr>
<td>Belgium</td>
<td>6.7</td>
</tr>
<tr>
<td>Germany</td>
<td>6.7</td>
</tr>
</tbody>
</table>

Source: Adapted from Reis and Valadares (2004)

Data from the Brazilian Central Bank in 2003 (Reis and Valadares, 2004, p.2) shows the total credit volume as being only 25% of the GDP. When considering freely allocated funds (not related to funding specific sectors/types of projects – usually funded by public financial institutions) the results are even more dramatic, amounting to only 14% of the GDP. This distinction is important in determining the volume available in the market to firms in general, showing that the supply is very limited.

Figure 3.1 shows the composition of the total credit available according to Brazilian Central Bank. The role of the state is strikingly high and the consequences might help explain the vicious cycle that keeps credit offers low and inefficient. Almost 50% of the available credit is offered by state funds, either social security related such as FGTS that partially funds housing, BNDES and resources drawn from labor assistance funds like FAT – Fundo de Amparo ao Trabalhador. These resources are not evenly
distributed and access to them can depend on the political agenda guiding industrial policies and sectors supported by these funds.

Figure 3-1: Credit Operations in Brazil

![Credit Operations Chart]

Source: Brazilian Central Bank

This interference prevents an optimal allocation of resources, and considering the scarcity of capital, might generate distortions and social costs. According to OECD (2005), extensive directed lending results in higher costs of borrowing for freely allocated funds. Aghion and Murdoch (2005) argue that state owned banks can mismanage resources and prevented viable operations for privately owned institutions. On the other hand, the use of those funds to promote industrial policy could give it more leverage and direct the development; if the role of the government is to be considered beneficial.

On the demand side, Kumar (2005) compared the perception of financing constraints and showed that Brazil is below the Latin American average and somewhat in
the upper-middle-income countries average (slightly above in some aspects). This shows a perception the difficulty to access adequate financing in the country.
Table 3-2: Financial Constraints in Brazil: An International Comparison

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Is financing a constraint?</th>
<th>High interest rates</th>
<th>Collateral requirements</th>
<th>Access to long term loans</th>
<th>Banks lack loanable funds</th>
<th>Access to lease finance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>2.69</td>
<td>3.71</td>
<td>2.91</td>
<td>2.90</td>
<td>1.81</td>
<td>1.71</td>
</tr>
<tr>
<td>Latin America</td>
<td>2.86</td>
<td>2.79</td>
<td>2.79</td>
<td>2.91</td>
<td>2.22</td>
<td>2.08</td>
</tr>
<tr>
<td>of which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Argentina</td>
<td>2.99</td>
<td>3.57</td>
<td>2.71</td>
<td>3.13</td>
<td>1.98</td>
<td>1.96</td>
</tr>
<tr>
<td>Mexico</td>
<td>3.19</td>
<td>3.47</td>
<td>2.82</td>
<td>3.45</td>
<td>3.10</td>
<td>2.50</td>
</tr>
<tr>
<td>Chile</td>
<td>2.41</td>
<td>2.35</td>
<td>2.32</td>
<td>2.29</td>
<td>1.75</td>
<td>1.53</td>
</tr>
<tr>
<td>Upper-middle-income countries</td>
<td>2.69</td>
<td>3.41</td>
<td>2.37</td>
<td>2.54</td>
<td>1.83</td>
<td>1.71</td>
</tr>
<tr>
<td>OECD</td>
<td>2.35</td>
<td>2.65</td>
<td>2.25</td>
<td>1.80</td>
<td>1.59</td>
<td>1.68</td>
</tr>
</tbody>
</table>

Note: The ratings are as follows: 1 = no obstacle, 2 = minor obstacle, 3 = moderate obstacle, 4 = major obstacle. Numbers for individual countries are averages and numbers for country groups are medians, because of the small number of observations. Source: Kumar (2005)
Table 3-3: Depth of Financial Markets: Brazil and Other Emerging Economies

<table>
<thead>
<tr>
<th>Country</th>
<th>Private credit/GDP</th>
<th>Equity market capitalization/GDP</th>
<th>Equities - value traded/GDP</th>
<th>Domestic public bonds on issue/GDP</th>
<th>Domestic private bonds on issue/GDP</th>
<th>Total financial assetsa/GDP</th>
<th>GDP per capita 1999b (current US$)</th>
<th>Total financial assetsa (US$ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>40.5</td>
<td>39.0</td>
<td>17.0</td>
<td>40.9</td>
<td>8.9</td>
<td>139.7</td>
<td>4,350</td>
<td>780,739</td>
</tr>
<tr>
<td>Argentina</td>
<td>23.4</td>
<td>44.0</td>
<td>2.1</td>
<td>11.8</td>
<td>1.0</td>
<td>81.0</td>
<td>7,550</td>
<td>231,166</td>
</tr>
<tr>
<td>Mexico</td>
<td>28.5</td>
<td>24.7</td>
<td>7.9</td>
<td>9.2</td>
<td>2.1</td>
<td>68.3</td>
<td>4,440</td>
<td>386,366</td>
</tr>
<tr>
<td>India</td>
<td>36.4</td>
<td>34.2</td>
<td>104.7</td>
<td>21.8</td>
<td>0.4</td>
<td>92.8</td>
<td>440</td>
<td>437,293</td>
</tr>
<tr>
<td>China</td>
<td>128.9</td>
<td>42.5</td>
<td>66.8</td>
<td>19.5</td>
<td>8.5</td>
<td>199.4</td>
<td>780</td>
<td>2,153,717</td>
</tr>
<tr>
<td>Malaysia</td>
<td>103.8</td>
<td>146.5</td>
<td>65.5</td>
<td>29.6</td>
<td>50</td>
<td>370.9</td>
<td>3,390</td>
<td>331,302</td>
</tr>
</tbody>
</table>

a. Simplified definition based on aggregate of assets described in this table.
Sources: Kumar 2005
Table 3.3 shows that the overall depth of the financial market in Brazil is somewhat above average for Latin America. But what is striking is that the Domestic Public Bonds on Issue/GDP level is similar to that of Private Credit/GDP, and the highest among other emerging economies.

Figure 3.2 below displays a more detailed comparison of the credit provided by the banking sector in Latin American countries and the average of OECD countries. It shows that Argentina, Brazil and Mexico have a greater portion of its credit supplied to the government. This can be considered as evidence that the debt crisis of the 1980’s might still be playing an important role in the credit market of these three countries. Not coincidentally, they were the main players of the crisis that culminated in the default on their debts during the 1980’s.

The considerable level of debt remaining from the debt crisis forces the Brazilian government to offer high interest rates to attract the capital necessary to roll it over. The other alternatives would be increase taxes or print money to service the debt. However, the current tax levels are already high and printing money leads to inflation. Since maintaining price stability has been one of the top priorities for the last decade and it is implausible to raise tax levels, attracting capital with new debt issuance is the only option.

The level of debt itself, or associated with budget deficit, is a measure of repayment risk and therefore investors require higher compensation for cases like Brazil. The episode of the default back in the 1980’s is also still in the memory of many investors and the possibility of a recurrence is also considered a risk to be remunerated for.
The volume of credit directed to the government in comparison to the private sector is often used as evidence for the argument of the existence of a crowding out effect by Brazilian treasury instruments on the credit market. Crowding out effect can be characterized when government borrowing volumes are so high that the resulting interest rates are not affordable to corporations and individuals. OECD (2005, p. 62) states that at least part of the credit market is crowded out by the public sector, the main borrower.
The high levels of the base interest rate provide a profitable alternative for investing in Brazilian treasury securities. They might help explain the large volumes of bonds traded and a potential crowding out effect.

Figure 3-3: Brazilian Base Interest Rate – Selic

Source: Banco Central do Brasil

Being considered the safest of the domestic assets, the base interest rate is currently targeted at 15.75% a year (while the U.S. T-bill is around 5%); with inflation in Brazil expected to be around 5% (and in the U.S around 2%). Adding high spreads can make it unbearable for many companies, since they would have to generate sizeable returns in order to repay a loan. Considering that the Selic peaked higher than 80% (without considerable inflation either) it seems reasonable to expect a crowding out effect.
**Inflationary Period**

Brazil had a historical relation with inflation. It once was believed to be in the own roots of Brazilian economy. Franco (2004, p.2) argue that generations of so called “developmental” economists even defended some inflation as a natural cost for economic growth. Inflation rates in the country have been high for more than five decades and have stimulated different theories about the different types of existing inflation (demand, supply, inertial,...) how to combat it (orthodox and heterodox plans), the role of inflation in the economic growth, inflation as a instrument of government and firms revenues and so on.

Figure 3-4 presents inflation as measured by the IGP-DI. Analyzing it superficially, or looking at it a glance, it is noticeable the problems that Brazil suffered in the mid 1980’s until the mid 1990’s. However, it is easy to undervalue the scale of the graph or think inflation was not significant in other moments.

**Figure 3-4: Inflation in Brazil 1945 -2006**

![Inflation graph](source: IPEADATA)
According to Stanley Fischer et al. (in Franco, 2004), after 1956, considering episodes when inflation rates reached over 100% yearly and finishing after a period of one year remaining below that mark, Brazil have had 182 months of what was defined high inflation, accumulating 20,759,903,275.651%.

Among measures to combat inflation, the most noticeable heterodox plans were Cruzado (1986), Bresser (1987), Verão (1989), Collor I (1990) and Collor II (1991). Some of the characteristics of those plans were, price freezing, wage freezing, public services price rise, changes in the indexation of the economy and even capital freezing.

The Inflation Era would only end after 1994 with the implementation of Real Plan, a comprehensive plan that would include a temporary reference currency (to combat inertial inflation), a new currency, political reforms, imports as a way to control internal prices, exchange as an anchor and privatization among others. The inflation dropped from 2,075% a year in 1994 to 66% a year in 1995 and 15.75% a year in 1996.

Figure 3-5: Inflation after Plan Real

![Inflation after Plan Real](image)

Data Source: IPEADATA
These new reality of not having high inflation was put into test especially twice, according to Franco (2004). In 1999 with the change in the exchange system from currency bands to currency float, leading to a devaluation of Real in about 40%, and in 2002 with the election of President Lula, a former union leader. In both occasions inflation was kept under control.

According to Arcoverde (2002, p. 5) the long inflationary period in Brazil inhibited the development of a credit market in the country. This is explained by the preference of the larger banks to finance the internal debt, which was of a considerable size and yielded considerably high rates. It was also more liquid and less risky than operating regular credit operations since it constituted of government issued instruments. Arcoverde also argues that the economic stability resulting from Plan Real forced changes in becoming more efficient and adopting more sophisticated risk ratings.

Carvalho (2003, p. 14) argues that for several years the operations with overnight repurchase agreements of treasury securities provided a very profitable and safe alternative for the banks to concentrate in the intermediation of debt instruments instead of offering credit to the private sector. He considers this negative incentive to offering credit is considered by the author to be responsible for high spread levels.

Another important factor is what is known in Brazil as inflationary gains, inflationary transfers or inflationary revenues. Carvalho (2003, p. 5) describes them as the gains to the banks resulting from the use of funds deposited in non-interest-bearing accounts by their clients. They were not compensated (since they were non interest bearing accounts, or had less than inflation remuneration) and represented a loss in real value to the clients. However, when lending the money to other clients, the banks always
charged interest rates to compensate for inflation. Despite some controversy in measuring inflationary gains, there is general acceptance that banks indeed had relevant inflationary gains. Carvalho (2003, p. 21) calculates these gains around R$ 8 billion for 1993. Below Table 3-4 presents results of inflationary transfers from 1980 to 1992.

Table 3-4: Inflationary Transfers from 1980 to 1992

<table>
<thead>
<tr>
<th>Year</th>
<th>Inflation(^a)</th>
<th>TI(^b)/GDP(^c)</th>
<th>TIT(^b) / GDP(^c)</th>
<th>II (US$ bi)(^d)</th>
<th>TI (US$ bi)(^d)</th>
<th>TIT (US$ bi)(^d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>110.20</td>
<td>3.81</td>
<td>6.27</td>
<td>7.86</td>
<td>12.23</td>
<td>20.09</td>
</tr>
<tr>
<td>1981</td>
<td>95.10</td>
<td>2.64</td>
<td>4.48</td>
<td>6.21</td>
<td>8.94</td>
<td>15.15</td>
</tr>
<tr>
<td>1982</td>
<td>99.80</td>
<td>2.49</td>
<td>4.45</td>
<td>6.53</td>
<td>8.29</td>
<td>14.82</td>
</tr>
<tr>
<td>1983</td>
<td>210.90</td>
<td>2.89</td>
<td>5.47</td>
<td>6.35</td>
<td>6.98</td>
<td>13.33</td>
</tr>
<tr>
<td>1984</td>
<td>223.80</td>
<td>2.23</td>
<td>4.26</td>
<td>4.61</td>
<td>5.09</td>
<td>9.70</td>
</tr>
<tr>
<td>1985</td>
<td>235.10</td>
<td>2.45</td>
<td>4.56</td>
<td>4.65</td>
<td>5.19</td>
<td>9.84</td>
</tr>
<tr>
<td>1986</td>
<td>65.00</td>
<td>1.88</td>
<td>3.22</td>
<td>3.71</td>
<td>5.16</td>
<td>8.87</td>
</tr>
<tr>
<td>1987</td>
<td>415.80</td>
<td>3.42</td>
<td>6.69</td>
<td>10.71</td>
<td>11.58</td>
<td>22.29</td>
</tr>
<tr>
<td>1988</td>
<td>1,037.80</td>
<td>3.06</td>
<td>6.50</td>
<td>10.27</td>
<td>9.06</td>
<td>19.33</td>
</tr>
<tr>
<td>1989</td>
<td>1,782.90</td>
<td>2.36</td>
<td>6.70</td>
<td>13.70</td>
<td>7.72</td>
<td>21.42</td>
</tr>
<tr>
<td>1990</td>
<td>1,476.60</td>
<td>1.89</td>
<td>5.28</td>
<td>14.36</td>
<td>7.69</td>
<td>22.06</td>
</tr>
<tr>
<td>1991</td>
<td>480.20</td>
<td>2.11</td>
<td>5.20</td>
<td>9.90</td>
<td>6.62</td>
<td>16.52</td>
</tr>
<tr>
<td>1992</td>
<td>1,157.90</td>
<td>1.90</td>
<td>4.59</td>
<td>8.53</td>
<td>6.01</td>
<td>14.54</td>
</tr>
<tr>
<td>Average</td>
<td>1947-1992(^e)</td>
<td>85.9</td>
<td>4.2</td>
<td>4.11</td>
<td>3.78</td>
<td>7.89</td>
</tr>
</tbody>
</table>

\(^a\) Inflation measured by IGP-DI (Fundação Getúlio Vargas - FGV)

\(^b\) Monetary aggregates calculated with monthly averages

\(^c\) GDP in constant dollars of 1987.

\(^d\) In billions of constant dollars of 1987.

\(^e\) From 1947 to 1979, the monetary base included demand deposits in Banco do Brasil and end of month monetary aggregates were used.

Source: Adapted from Carvalho (2003)
Spreads in Brazil

The end of the high inflation period with the implementation of the Plan Real in 1994 forced the banks to change their strategies in order to maintain their profitability. Carvalho (2003) argues that they managed to do so by increasing the credit volume offered to the private sector with very high spreads.

Figure 3-6: Spreads in the World

The spread rates in Brazil are among the highest in the world. Similarly, when comparing different data for different regions using WDI data, Latin America is found to be the region with the highest spread average. Adding high spreads to the already high base rate, makes loans really expensive for those who actually end up qualifying for
them. They can be as high as 14.2% for companies to 51.7% for individuals (in October 2003, Reis and Valadares, 2004).

Figure 3-7: Evolution of Spreads in Brazil

![Evolution of spreads in Brazil 1994:7 to 2006:2](image)

Source: Banco Central do Brasil

Figure 3-7 shows the evolution of analyzed spreads in the period. It is possible to notice that there is a significant drop after the end of 1995. This coincides with a relevant drop in the Selic. Also in the beginning of 1998 and 1999 there are spikes both in Selic and spreads.
Analyzing figures 3-8 above, and also considering that inflation started to get under control in the middle of 1994 but spreads only started falling after 1995, there is evidence of sticky prices. It is also possible to find these patterns when comparing the spikes in spread and Selic, where the latter presents greater downward moves. In this case, sticky prices would mean that upward changes in lending rates would happen quickly while downward changes would smooth out on a longer period.
As shown by the accounting composition of the spread in Figure X, taxation plays a major role in terms of transaction costs. Direct taxes represent 21% of the spread charged from banks, and indirect taxes 8%. Reis and Valadares (2003) argue that currently there is “overtaxation”. OECD (2005) indicates that heavy tax burdens are among the reasons for the high spreads encountered in the Brazilian credit market. However, the likelihood of changes in this area is somewhat discouraging, especially considering the need to generate surpluses and keep the austerity.
The Financial Market Opening, Privatization and Foreign Bank Investments

After the 1994 there was a move towards a more open financial market with less state participation and greater consolidation as found in Araújo et al. (2003). That was translated in the regulations regarding bank operation and merger and acquisition, the privatization of state banks, among other actions. That caused an expectation of improvements in the credit market, as the foreign banks that would acquire state banks being privatized, would bring their expertise and experience from their countries.

However, Vasconcelos e Fucidji (2003) did not find empirical evidence that the increased presence of international banks promoted expansion of credit supply in Brazil. There was a certain fear of foreign banks taking over the financial market, which so far seems not to be happening, especially in the retail sector, still dominated by Brazilian banks.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Banks</td>
<td>12,4</td>
<td>11,5</td>
<td>11,4</td>
<td>11,1</td>
<td>5,7</td>
<td>3,5</td>
<td>4,6</td>
<td>4,3</td>
<td>4,7</td>
</tr>
<tr>
<td>Banco do Brasil</td>
<td>11,9</td>
<td>11,8</td>
<td>10,0</td>
<td>9,7</td>
<td>9,9</td>
<td>8,8</td>
<td>7,8</td>
<td>8,3</td>
<td>8,7</td>
</tr>
<tr>
<td>CEF</td>
<td>8,9</td>
<td>9,1</td>
<td>5,4</td>
<td>5,2</td>
<td>3,8</td>
<td>3,9</td>
<td>3,9</td>
<td>3,9</td>
<td>4,1</td>
</tr>
<tr>
<td>Private Domestic Banks</td>
<td>54,2</td>
<td>51,8</td>
<td>49,8</td>
<td>46,7</td>
<td>50,3</td>
<td>51,1</td>
<td>48,7</td>
<td>53,2</td>
<td>52,9</td>
</tr>
<tr>
<td>Foreign Banks</td>
<td>11,4</td>
<td>14,3</td>
<td>21,9</td>
<td>25,5</td>
<td>28,3</td>
<td>30,7</td>
<td>32,9</td>
<td>28,1</td>
<td>27,1</td>
</tr>
<tr>
<td>Credit Cooperatives</td>
<td>1,3</td>
<td>1,6</td>
<td>1,6</td>
<td>1,8</td>
<td>2,0</td>
<td>2,0</td>
<td>2,2</td>
<td>2,2</td>
<td>2,6</td>
</tr>
<tr>
<td>Total</td>
<td>100,0</td>
<td>100,0</td>
<td>100,0</td>
<td>100,0</td>
<td>100,0</td>
<td>100,0</td>
<td>100,0</td>
<td>100,0</td>
<td>100,0</td>
</tr>
</tbody>
</table>

Source: Banco Central do Brasil - Relatório de Evolução do SFN
The expectations of the improvement on the level of productivity in the financial system and especially of the overall credit offer were not found as illustrated in figure 3-10 below; it actually felt relatively to the growth of the GDP before 2005. According to Vasconcelos e Fucidji (2003), the financial institutions, either domestic or foreign, operate more as fund managers than credit intermediaries.

Figure 3-10: Evolution of Credit to Private Sector/GDP Ratio 1993 - 2006

Source: Banco Central do Brasil

**Basel Agreement Effects**

Vasconcelos and Fucidji (2003) argue that the Basel Agreement which regulates risk measurement could promote even more risk aversion and further the option to invest in government bonds. Those are considered by the Central Bank as risk free assets and
the bank avoids having to set aside more capital for reserves. The current situation of high interest rates allows banks to maintain their profitability using mostly risk free instruments. According to the authors, the Brazilian Central Bank adopted criterion even more rigorous than that defined in the agreement, potentially leading to even more risk avoidance.

Figure 3-11: Proportion of Treasuries in Relation to Operational Assets

![Chart showing the proportion of Treasuries in relation to operational assets over time.](chart.jpg)

Source: Adapted from Vasconcelos e Fucidji (2003)

Figure 3.11 above shows how the banks increased their proportion of government bonds in detriment of providing more credit to the private sector. A similar argument is also found in Arcoverde (2002).
Other Factors Relevant to the Brazilian Credit Market

In order to improve credit information and lessen the problem of adverse selection, a Credit Risk Central was created in 1997 by the Central Bank. Currently, a major improvement was to include positive information as well as negative. This allows for identification of good clients as well as the bad ones. According to OECD (2005) there is empirical evidence of greater scope of credit creation associated with more and improved credit information available to lenders. It also states that in those markets with better credit information businesses tend to rely more on debt than on markets were credit information is scarce.

Arcoverde (2002, p. 9) states that the securitization market is not very developed. He suggests that the bankruptcy laws are poor in giving support for this kind of operation and says there are some changes being studied. Other important restrictions are the uncertainty in the projection of the long term yield curve, which according to him is improving. He also highlights that the volatility has been considerably smaller since the adoption of the floating exchange rate regime (p.10), suggesting that there is relevant relation between the exchange rate regime and the yield and consequently the spread.

In addition, currently there are taxes being charged repeatedly over the different phases of the securitization process, configuring over taxation and diminishing the profitability and attractiveness.

Another aspect highlighted by Arcoverde (2002, p. 12) is the absence of a formal credit derivatives market at that time, that could improve risk management by active trading of credits. He expects that those instruments could decisively contribute to the
reduction of the credit spreads but acknowledges some challenges, especially related to applying the available credit risk models to developing countries.

### 3.2 Consumer Credit

The participation of individuals in the share of the free resources available seems to indicate that a relevant portion of the credit is financing personal expenses, among them indebted individuals and consumption, instead of economic activities directly (even considering that individuals will use a part of that credit in investments). The return to the productive sector is shown by the graph below. Further analysis would enlighten if the promotion of consumption is taking place in detriment to a higher level of offer to investment and development; after consideration of the effects of the internal consumption in the domestic market.

**Figure 3-12: Production of Durable Goods vs. Interest Rate Individuals**

![Graph showing production of durable goods vs. interest rate individuals](image)

Source: Adapted from Banco Central do Brasil
**Stand-by Credit**

BCB further analyzed a specific credit product that had the highest average rates in all rates analyzed and is very common in Brazil. It is a “stand by” credit applied towards checking account called “cheque especial”. BCB (1999, p. 11) believes that the high spreads cannot be explained by credit risk or administrative costs. The logic behind the argument is that clients that were granted this credit are “special” clients and would have a good credit history with the bank. That in turn would decrease the risk of default, the credit risk cost and therefore the need of charging a higher premium.

In the other hand, because its use became so popular, it is not necessarily so restricted anymore. Additionally, perhaps like what is similarly happening in some countries with credit cards, people and small businesses are using these credits to finance longer term investments and or purchases. In the case of Brazil, mostly because of lack of access to other types of credit lines. That change in the scope of the lines might be responsible for higher risks and therefore explain some the premium charged by banks.

Regarding the administrative costs, BCB (1999, p. 11) argues that there is not much additional costs to the bank since the clients are already charged for opening and maintaining/renewing their accounts. Besides that, technology allows for better processing with less cost.

Figure 3-13 below shows that default or risk costs changed place with bank profit, indicating evidence that this type of operation is more profitable than the average.
Switching costs and Information rents

Their explanation on the high rates is that since to get a “cheque especial” credit approved demands time building a relationship with a particular bank, the switching costs to the client are being explored by banks to charge higher rates (BCB, 1999, p.11). There is empirical evidence of information rents in Schenone (2005) that would particularly support that possibility.

Considering that banks are exploring information rents, BCB (1999) suggested that different measures should be taken regarding that specific product (cheque especial). Among them would be allowing for the entrance of more institutions to raise competition, the creation of a credit information system with also positive information (at the time
only negative information was available). Additionally, providing with more information regarding the rates charged by each bank to enable for the selection of lower rates BCB, 1999, p.12)
Chapter 4. Methodology and Data for Econometric Regressions

In order to investigate the effect of macroeconomic variables on the intermediation spread, an econometric model using multiple variable linear regression will be constructed using spread as the dependent variable. Formal tests will be conducted to ensure that the model complies to the underlying assumptions of the least squares method multiple variable regressions. The error terms assumptions will also be tested to assure robust results for serial correlation and heteroskedasticity. Significance tests of each coefficient as well as a joint significance test will indicate the adequacy of the specification of the model and also indicate the variables that present evidence of influencing the spreads.

The main hypotheses to be tested are market competitiveness, the effects of inflation, the crowding out effect and finally the effects of the Basel agreement. The degree of competition found in the market is reflected in its market structure. The four most important broad categories of market structure are perfect competition, monopolistic competition, oligopoly and monopoly. Market structure influences how banks behave, determine their prices and quantity supplied and allocation of credit. It also determines the incentives or pressures to become more efficient. To investigate the market structure and its effects on the interest margins in Brazil, the relationship between concentration ratio and spread will be investigated.
Another important aspect also associated with competition and access to credit is the scale of the market. The larger the market, the greater the possibilities of entering the market as a supplier and increasing competition. The size of the market is also important to lenders to diversify the risk of default in a broader base and therefore reduce costs or increase profits.

According to the Fischer equation, expected inflation is a component of nominal interest rates. An increase in expected inflation causes an increase in nominal interest rates. This relationship is widely used in economics and finance and also related to the interest margins to the extent that bankers must decide now contracts that will go into the future. They have to determine the rates they will receive and most often will be exposed to fluctuations in the future nominal interest rates that constitute their costs. However, under certain conditions, once found in the Brazilian financial market, it is possible that inflation provides with gains that ease the pressure for efficiency and might result in lower spreads.

The government issues securities to raise money to cover its deficits or to promote monetary policy. A crowding out effect occurs when it is so great that due to the supply and demand of loanable funds, the interest rates become prohibitive to companies and individuals. This paper will test the hypothesis that because Brazil and many Latin American countries became heavily indebted, there is a crowding out effect caused by treasury securities.

Finally Vasconcelos and Fucidji (2003) argue that the Basel agreement has increased risk aversion. That is because the agreement implemented a credit rating system that also imposes reserve requirements for each level of risk. The capital set aside
to reserves are not remunerated and considered an indirect cost. The riskier the rating the higher the reserves; therefore, if the hypotheses is true, a decrease in spreads will be observed as a result of less risky positions.

The proposed model to test the above mentioned hypotheses follows:

$$\text{Spread} = \beta_0 + \beta_1 \cdot \text{Inflation} + \beta_2 \cdot \text{GDP} + \beta_3 \cdot \Delta \text{Monetary Base} + \beta_4 \cdot \text{Government Debt} + \beta_5 \cdot \text{Base interest rate} + \beta_6 \cdot \text{Credit volume} + \beta_7 \cdot \text{Risk} + \beta_8 \cdot \text{Basel Effects} + \beta_9 \cdot \text{Concentration}$$

The first two variables are very important macroeconomic indicators widely used in decision making in general. The next three variables regard general monetary policy and also reflect the financing needs of the government. The conditions in which they will be implemented will be highly influenced by the first two variables and the budget deficit. The credit volume measures the depth of the credit market and should capture some aspects of competitiveness. The risk variable should be one of the main components of the spread because conceptually that is the main reason for the mark up besides the intermediation service provided. The Basel effects are somewhat related to the risk because it implements credit risk measurements and reserve requirements that are likely to influence the cost of lending, the risk aversion of financial institutions or both. The concentration ratio should indicate the relationship between the market structure and the mark up.
The data available to test the hypotheses were not all from the same time frame making the use of two different models necessary to properly investigate the relevant variables. All variables were measured in monthly terms or adjusted to monthly data. The concentration ratio used in the regression goes until June of 2004, whereas data regarding the effects of the Basel agreement were available only after March of 2000. Data on the spread itself is readily available starting in 1994 and other variables vary somewhat in their availability. Therefore, in order to have statistically significant sized samples and investigate the hypotheses proposed, two different regressions must be run.

The first regression measures market concentration, market competitiveness and tests for a crowding out effect. It does not test for the Basel agreement effects.

\[
\text{Spread} = \beta_0 + \beta_1 \text{Inflation} + \beta_2 \text{GDP} + \beta_3 \Delta \text{Monetary Base} + \beta_4 \text{Government Debt} + \\
\beta_5 \text{Base interest rate} + \beta_6 \text{Credit volume} + \beta_7 \text{Risk} + \beta_8 \text{Concentration}
\]

Inflation is expected to have a positive relationship with spreads. Higher expected inflation values will lead to higher nominal interest rates in the future. Additionally, higher levels of inflation are generally associated with a more unstable economic environment. Whenever the conditions allow, greater mark ups are expected in order to guarantee positive net returns. However, inflationary gains during periods of high or hyperinflation could lead to the opposite; inflation could have a negative relationship. As argued by Arcoverde (2002) and Araújo et al (2003) inflationary gains provided negative incentives to banks to become efficient at offering credit to the private sector.
Considering the success of the stabilization plan in 1994, the independent variable for the period analyzed is expected to show a positive coefficient. To measure the relationship between spread and inflation, the IGP-M index calculated by Fundação Getúlio Vargas (FGV) is used. Monthly data was obtained from IPEADATA.

The Gross Domestic Product (GDP) was measured with the natural logarithm of monthly data calculated by the Instituto Brasileiro de Geografia e Estatística (IBGE). Using the natural logarithm allows a comparison between the considerably greater values of the GDP and the spread values. The relationship could be positive or negative, depending on the relative growth of supply and demand for loanable funds and their elasticities.

The changes in the monetary base reflect part of the government’s monetary policy and are related also to the base interest rates. If the changes are large enough to affect the supply of loanable funds, it could have a positive relationship with the spreads. The data was obtained from IPEADATA and calculated by the Central Bank.

The supply of treasury securities is an important source of financing for the government but also could lead to a crowding out effect. A positive relationship would then be expected to indicate that the treasuries are actually competing with the private economic actors for funds, leading to an increase in the final price of capital. The data was obtained from the Central Bank.

The base interest rate in Brazil is the SELIC. According to BCB (1999, p.4) the behavior of the interests rates in Brazil is well defined and is structured in layers with the SELIC acting as the risk free rate. A positive relationship could indicate that the increase in the yield that government securities pay would attract more capital from the banking
sector and decrease the supply of loanable funds for the private sector. A positive relationship could also reflect an increase in the risk of default since firms would have to generate higher returns to be able repay the more costly loans.

The outstanding credit volume should indicate the depth of the market and reflect aspects of its competitiveness. The credit volume measure in the regression is calculated by the Brazilian Central Bank and presents all credit operations in the financial system including leasing contracts. A negative relationship is expected because the growth of the credit volume is often associated with increased competition and efficiency. However if the growth of the credit volume outstanding is smaller than the growth of the demand for credit in the period, a positive relationship might be found.

The risk measure chosen for this time period was data from one the most popular credit services in Brazil, Serviço de Proteção ao Crédito (SPC). It reflects the number of negative records received during the period. The relationship is expected to be positive since greater risk requires greater returns.

In order to have a more precise measure of the effects of concentration on the final cost of credit, the concentration on the credit market was selected as an independent variable. The ratio in particular is the CR10C calculated by Araújo et al (2005). This ratio measures the participation of the 10 largest commercial banks in Brazil in the total credit market. The data was adjusted for monthly variation by smoothing the difference between December results throughout the year. This assumes that changes in the concentration in the market were evenly distributed and avoid that the end of year months capture all variation.

---

2 It is important to note that the decrease in the concentration of credit concomitant to an increase in concentration of assets can affect the results.
The second regression is intended to capture the effects, if any, of the implementation of the Basel agreement. Additionally, it has some variables that differ slightly from those used in the first regression. They are expected to be better parameters to measure the relationship with the spread since they are obtained from the same operations. They are not available before March 2003. To have a better understanding of these effects, considering the smaller sample and degrees of freedom, the explanatory variables were limited to a lesser number.

\[
\text{Spread} = \beta_0 + \beta_1 \text{Inflation} + \beta_2 \text{Government Debt} + \beta_3 \text{Credit volume} + \beta_4 \text{Base interest rate} + \beta_5 \text{Basel Effects} + \beta_6 \text{Risk}
\]

It is important to note that the credit volume and the risk variables in this regression use different data from the first one. They try to capture the same relationships; however, they can be considered an improvement because they should capture closer relationships. The credit volume used in this regression is from the same data which generated the spread series, guaranteeing a more precise relationship. Similarly, the risk measure is more specific to the operations since it is a measure in percent terms of the arrears of more than 15 and less than 90 days.

A new variable is included in this second regression. It should capture the effects of the Basel agreement on the mark up. It was obtained in a similar manner as found in Vasconcelos and Fucidji (2003, p.10). Using data obtained from the Central Bank, weights varying from 1 to 9 are assigned to each of the nine different risk categories and multiplied by the outstanding volumes in each category. The AA category are assigned a
weight 9 whereas the worst credit level, H, was assigned a weight 1. Therefore, a ratio closer to 1 indicates a riskier loan portfolio. Similarly, a ratio of 9 would indicate a risk-free loan portfolio. It is expected to present a negative relationship because greater ratios mean less risk and therefore less mark up.

Despite some concerns as expressed by Arcoverde (2002) that the enforcement of the Basel agreement could lead to an increase in risk aversion of Brazilian banks; the evolution of the ratio calculated does not show a tendency towards less risky loan portfolios over time. However, it tests the credit rating only after the implementation of the agreement terms and measures variations in the composition of the risky loan portfolio.
Chapter 5. Results of the Regressions

5.1 Regression 10/1996 – 06/2004

\[ \text{Spread} = \beta_0 + \beta_1 \cdot \text{Inflation} + \beta_2 \cdot \text{GDP} + \beta_3 \cdot \Delta \text{Monetary Base} + \beta_4 \cdot \text{Government Debt} + \]
\[ \beta_5 \cdot \text{Base interest rate} + \beta_6 \cdot \text{Credit volume} + \beta_7 \cdot \text{Risk} + \beta_8 \cdot \text{Concentration} \]

For the first regression, the individual coefficients are generally significant at very low significance levels, with the exception of the change in the monetary base which is statistically significant only at higher than 12% significance level.

The GDP is negatively related to spread, indicating that the economic growth tends to decrease the level of mark up. That could be explained by an increase in the general level of activity and funds available to credit. Alternatively, one could expect that an increase in GDP will allow for better performance by the firms individually and increase their chances of performing well enough and yield the high returns necessary to repay their loans considering the high level of interest rates. This aspect would be more related to the risk part of the spread composition. On the competitiveness side, an increase in the economic activity could also increase the competition among banks to attract the best clients that are increasing their investments due to the improving environment.

Inflation is positively related to mark up as expected. After 1994 when the Plan Real was implemented, inflation is considerably smaller than before, generating no
significant inflationary gains. Therefore, the positive relationship could be interpreted as a sign of stable economic conditions. The inflation expectations are priced into the loans as predicted in the Fischer equation.

Changes in the monetary base are not significant until approximately the twelve percent significance level. The relationship is positive, which could indicate that an expansion on the monetary base would lead to an increase in supply of loanable funds and a decrease in the mark up would result.

In this sample the levels of treasury securities is not a statistically significant determinant of the spreads. It means that in this sample the volume of treasury securities did not significantly affect the spreads. It could be interpreted as a evidence of the absence of the crowding out effect.

The base interest rate Selis is statistically significant at the one percent significance level and positively related to the spreads. This could indicate that there is indeed some sort of crowding out effect by Brazilian treasury securities. Arguments that the higher levels of the base interest rate would demand higher spreads could only be based on an increase in the levels of risk associated with the increase in the price debtors would have to pay. That should be somewhat captured by the risk variable or at least theoretically an expected risk variable. Additionally, the competitiveness of the market would determine how much of an increase would be able to be transferred to the consumers of credit. In the case of Brazil in which the interest rates show a well defined layer structure (BCB, 1999, p.4), an increase in the base interest rate is expected to lead to a somewhat proportional increase in all the layers. A part of the increase in the interest
margins could be explained by an effort to maintain a percentage mark up instead of a fixed one.

The level of outstanding credit in the market is significant and negatively related as expected. An increase in the volume of credit outstanding means that the market of credit is increasing in its size and therefore deeper and more prone to higher competition.

The proxy for the risk variable, the negative reports to the SPC, captures a positive relationship significant at very low significance levels. It shows that increases in the financial distress in the private sector will be priced into the loans to account for higher risk of default.

The concentration variable is probably the greatest surprise in this model. It shows a statistically significant negative relationship. That means that an increase in market concentration instead of leading to monopolistic (oligopolistic) profits due to higher mark ups, actually leads to lower levels of spread. One possible explanation could be economies of scale. Economies of scale would decrease the non financial costs and therefore allow for a decrease in the final interest rate. Another possible explanation could be related to imperfect information. Competitors would not share information on its clients; however, after mergers or acquisitions a broader client base would allow for the banking groups to access better information on their clients.

As often found in time series analysis, serial correlation was present in the initial regressions. To correct for this problem and get a result robust both for serial correlation and also heteroscedasticity, the Newey-West HAC standard errors & covariance method was applied.\(^3\)

---

\(^3\) The software Eviews was used to estimate the regressions.
Assessing the fit of the model, the explanatory power as measured by the R-squared is good. Approximately eighty eight percent of the variation in the spread in this period could be explained by the combined variation of the variables of the model. The value of the sum of squares of the regression is low and represents about 7.24% of error.


\[ \text{Spread} = \beta_0 + \beta_1 \text{.Inflation} + \beta_2 \text{.Government Debt} + \beta_3 \text{.Credit volume} + \beta_4 \text{.Base interest rate} + \beta_5 \text{.Basel Effects.} + \beta_6 \text{.Risk} \]

The individual coefficients are significant at very low significance levels, with the exception of the proxy for the Basel effects which is statistically significant only at higher than 12% significance level.

Again the inflation is statistically significant and positively related to spreads. Considering that the time frame is somewhat similar regarding the price levels, no change in signs is expected. This sample presents a little more variation than the previous one.

The level of government debt is statistically significant at the five percent level in this sample. It is positively related to spreads indicating that the increase in the public debt will be related to an increase in spreads. This corroborates to the hypothesis that there is some crowding out effect by Brazilian treasury securities in the credit market.

The credit volume in this sample is also statistically significant and negatively related to the dependent variable. It further indicates that the increase in size of the credit
market leads to smaller spreads. That could be interpreted as an increase in the competition among banks.

The interest rate paid by the government is again statistically significant and positively related to the spreads. This is further evidence of the crowding out effect.

There was less variation in the Selic during the period of the sample of this regression. The value of the coefficient for the second regression is smaller than the previous one, and the difference might be explained by the difference in the fluctuation. Furthermore, Koyama and Nakane (2002) also found declining values for relevance the Selic. This could be a sign that the crowding out effect has also declined.

The proxy measuring the Basel agreement effects is inconclusive since the coefficient would be statistically significant only at the twenty percent significance level. The negative sign reflects the assumption that lower credit risk levels, in this case measured by higher ratios, would lead to lower spreads. However, due to the low confidence level of this coefficient its sign could be misinterpreted.

The proxy for risk in this sample is statistically significant and positively related to the spreads as expected. Especially considering that this data was obtained from the arrears of the same contracts reflecting the spreads, it is of no surprise that this risk is reflected in the mark up.

Assessing the fit of the model, the explanatory power as measured by the R-squared is good. Approximately eighty two percent of the variation in the spread in this period could be explained by the combined variation of the variables of the model. The value of the sum of squares of the regression is low and represents about 3.54% of error.
Figure 5-1: Regression Output

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>444.6614***</td>
<td>81.0749</td>
</tr>
<tr>
<td></td>
<td>(77.0297)</td>
<td>(49.3179)</td>
</tr>
<tr>
<td>GDP</td>
<td>-19.5213**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(8.1164)</td>
<td></td>
</tr>
<tr>
<td>Inflation</td>
<td>0.1460***</td>
<td>0.0522***</td>
</tr>
<tr>
<td></td>
<td>(0.0286)</td>
<td>(0.0107)</td>
</tr>
<tr>
<td>Monetary Base</td>
<td>0.1757</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.1127)</td>
<td></td>
</tr>
<tr>
<td>Government Debt</td>
<td>-0.0611</td>
<td>0.0324**</td>
</tr>
<tr>
<td></td>
<td>(0.0667)</td>
<td>(0.0161)</td>
</tr>
<tr>
<td>Selic</td>
<td>8.1545***</td>
<td>6.6723***</td>
</tr>
<tr>
<td></td>
<td>(1.2825)</td>
<td>(1.0148)</td>
</tr>
<tr>
<td>Credit Volume</td>
<td>-0.1521***</td>
<td>-0.1942***</td>
</tr>
<tr>
<td></td>
<td>(0.0302)</td>
<td>(0.0240)</td>
</tr>
<tr>
<td>Risk</td>
<td>0.0454***</td>
<td>2.6999***</td>
</tr>
<tr>
<td></td>
<td>(0.0102)</td>
<td>(0.8246)</td>
</tr>
<tr>
<td>Concentration</td>
<td>-262.6182***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(38.5844)</td>
<td></td>
</tr>
<tr>
<td>Basel</td>
<td></td>
<td>-7.9712</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(6.1492)</td>
</tr>
<tr>
<td>Observations</td>
<td>93</td>
<td>69</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.8808</td>
<td>0.8220</td>
</tr>
</tbody>
</table>

Note: Standard errors are given in parenthesis
* Significant at the 10% significance level
** Significant at the 5% significance level
*** Significant at the 1% significance level
Chapter 6. Conclusion

In this paper the cost and access to credit in Brazil were analyzed. It is possible to affirm that the intermediation cost of credit despite some reductions after 1995, remains high. Added to the high base interest rate, the result is final interest rates that not only do not foment investment and economic growth, but hinder the internal conditions that allow for them. In an increasingly globalized economic environment, this outcome represents additional challenges especially for small and medium firms in competing with foreign companies.

Inflation was found to have a significant role in the cost and access to credit. In an environment of relative price stability, such as the one experienced in Brazil in the last decade, a positive relationship between inflation and interest margins can be expected. This can be considered as an additional reason to maintain inflation under control.

There is considerable evidence of a crowding out effect in the Brazilian credit market. Nevertheless, changing the current situation might require more than political willingness. The government financing needs and the internal debt that needs to be rolled over are constraints to lowering the levels of Brazilian treasury securities in the market. The question of whether the interest rates paid by the government are above equilibrium prices could be a subject of further research. It seems clear that it is essential to create macroeconomic and institutional conditions to lower the perceived country risk and therefore the risk premium paid by Brazilian debt instruments.
There is evidence of a low degree of competition in the credit market for individuals and businesses. This could be partially explained by the competition of the credit directed to the private sector with that directed to government securities, as explained by the crowding out effect. No evidence of monopoly profits was found associated with industry concentration. However, there is evidence of market imperfections, which explains lower competition. High levels of interest rates cause problems of adverse selection and decrease the demand and supply of credit. Lower levels of interest rates could improve the competition by attracting more and better debtors as well as attracting more lenders which would perceive the safer environment as a better investment alternative.

Significant benefits can be expected from a sustained policy of inflation control. Price stability can be considered an important condition to improve the efficiency of the financial environment and provide more fertile ground for economic development. The maintenance of a fiscal austerity program with the purpose of generating budget surpluses and diminishing the government debt is also important in reducing spreads.

Improvements in the credit risk information system are expected to improve the problem of asymmetric information. Additionally, improvements on judiciary agility could decrease moral hazard and further decrease risk. Lower risk levels would attract more lenders to supply credit, resulting in increased competition.

This paper analyzes the aggregate credit market, making no distinction on the size of borrowers. Further research investigating the credit market for small and medium companies could help shed light into ways to improve their access to credit. Larger companies have access to broader financing alternatives, including issuing debt through
bonds or similar instruments. Medium and small businesses are more restricted to bank financing; and at the same time because they are not publicly traded companies do not have the same disclosure requirements.

The lack of disclosure requirements and stricter external control make their financial statements less credible and therefore banks might be more wary about their worthiness. Creating and stimulating viable ways in which smaller companies could submit and have their financial statements audited could in turn provide better inputs for credit analysis by banks. That could have a relevant effect on the final cost of capital for such businesses.

Further research on the government’s financing needs, the demand for Brazilian treasuries and possible equilibrium interest rates can assist in devising viable strategies to lower the interest rates paid by the Brazilian government and diminish the crowding out effect. The eventual adjustments by the Brazilian financial markets in the absence of high interest rates would also be very important to determine its capability to provide the government’s financing needs jointly with external financing.

Research on other Latin American countries which were similarly affected by the debt crisis but do not present such high intermediation spreads could further suggest alternatives to combat the crowding out effect.
References


