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Brazil
The Industry Structure of Banking Services

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Brazil Country Management Unit
Poverty Reduction and Economic Management Unit
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ACKNOWLEDGEMENTS

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Results of the study have also been shared with Government officials at different stages of its preparation. Nevertheless, views expressed in this document are those of its authors, and do not necessarily represent those of the Government of the Federative Republic of Brazil.

CURRENCY EQUIVALENTS

Exchange Rate Effective June 1, 2007
Currency Unit = Brazilian Real
US$1.00 = R$1.92

GOVERNMENT FISCAL YEAR

January 1 – December 31

WEIGHTS AND MEASURES

Metric System

Vice President	Pamela Cox
Chief Economist	Guillermo Perry
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Executive Summary

Understanding the industry structure of banking services in Brazil is an important task both for the financial community at large and for country specialists. The Brazilian financial system is the largest and most sophisticated in Latin America. Brazilian banks successfully navigated through several episodes of hyperinflation in the 1980s by creating extensive networks to reap the gains of float, while they have also adapted to the more stable environment of the last decade. However, the cost of financial intermediation, in terms of both absolute interest rates and spreads, remains among the highest in the world. In addition, there exist large differences in rates between corporate and retail lending products, driving a wedge in access to credit between different groups of firms and individuals. Identifying and analyzing the various contributory factors for this phenomenon, particularly the role played by the industry structure of banking services, is therefore an important exercise.

Unlike many studies, this one gets to the market level in order to derive sensible policy implications. While other studies have attempted to assess the degree of competition, the causes of spreads, business trends, and other factors in the Brazilian banking system at an aggregate level, they have not analyzed individual markets. Macroeconomic factors seem to dominate the level of spreads at high interest rate levels, but as rates decrease microeconomic factors become more relevant. In order to provide relevant policy recommendations, one needs to study individual market segments since the banking system is only an umbrella covering markets with very different characteristics, financial performance, and drivers. The study focuses in particular on the two most important banking market segments: Corporate and Retail. Each of the two segments is defined at a high level due to data availability constraints, but they align fairly closely with actual bank practice since banks typically have separate business lines catering to the needs (loans, deposits, payments) of these distinct types of clients.

In order to pursue this task, the study combines an industrial organization perspective with a practitioner approach. Firstly, stylized facts about the Brazilian banking system are identified and compared with a selected peer group of developed and developing countries. Secondly, the degree of price competition is assessed via an econometric model that estimates the sensitivity of bank revenues by market segment to an increase in the main cost drivers. Thirdly, the performance of different market segments is estimated by disaggregating all the revenues, costs, and risks of the banking system into different lines of business in order to obtain key profitability ratios such as the return on capital and assets. While high profitability is insufficient *per se* to infer the level of competition by market segment, it is typically positively correlated to market power, and it represents one of the most relevant indicators used by banking practitioners and analysts. Finally, a review of the existing financial sector literature and interviews with senior management of eight Brazilian banks of different size and ownership structures, serve as a consistency check on the study's findings and are used to identify the main drivers in each market segment.

From a benchmarking perspective, this study concludes that the Brazilian banking system is fairly similar to the peer group, except for the relative scarcity of credit and higher operational expenses and non-performing loans. In spite of its large size, Brazil is similar to other countries in terms of the degree of concentration (Herfindahl Index of 900), as well as the efficiency ratio (Cost-to-income of 62 percent) and capital adequacy (Capital ratio of 15 percent). However, credit is relatively low compared with other countries (34 percent of assets) and a significant portion of bank assets is invested in government bonds (43 percent of assets). The moderate efficiency ratio is actually hiding high operational expenses that are compensated with high revenues, seemingly revealing room for efficiency gains. Non-performing loans have been declining in recent years, but are still at the higher end of the sample of countries at 4.1 percent, partly because of high differences between the Retail and Corporate segments (8.2 and 2.7 percent respectively). The largest Brazilian commercial banks exhibit significant differences in financial performance that are largely explained by their different segment focus, thus calling for a deeper understanding of the drivers and profitability in each market segment.

The findings of the econometric model corroborate the hypothesis that retail products are significantly less prone to movements in the cost of funds than corporate products. Based on the Panzar and Rosse (1987) model, the sensitivity of bank revenues by market segment to an increase in the cost drivers was estimated. This method is based on the assumption that, under perfect competition, an increase in marginal costs would be reflected one-to-one in higher prices. While the results need to be interpreted with some caution given the relatively short time series available and other data constraints, they show that retail loan products (especially *Cheque Especial* and *Credito Pessoal*) are significantly less prone to movements in the cost of funds than corporate products, implying that Corporate has a higher degree of price competition than Retail. In particular, the results show that on average 40 percent of any decrease/increase in the cost of funds is reflected in lower/higher rates charged to customers for corporate loan products, whereas this pass-through declines to 20 percent in the case of retail loans.

A key finding of the financial analysis is that the retail business line exhibits significantly higher returns than corporate, in spite of being costlier. Retail is the largest business line in the banking system (around 40 percent of total assets) with a different asset/liability structure from Corporate. Although Retail is more costly than Corporate both in terms of operational expenses (it absorbs 80 percent of operational costs) and credit expenses (it accounts for almost two-thirds of total loan loss provisions), a combination of higher lending rates and fees (it generates 70 percent of the total interest margin) more than compensates these additional expenses. As a result, the profitability of Retail is significantly higher, with a risk-adjusted return on capital reaching 38 percent compared to 21 percent in Corporate. This finding is in line with that of the econometric approach and appears robust to sensitivity scenarios. While not unusual in the international context, Brazil appears exceptional regarding the extent of these differences in performance.

A host of factors that influence revenues, costs, and risks explains the distinct characteristics and financial performance of different markets. These drivers can be common across business lines (reserve requirements, taxation, directed lending), but they can also differ substantially by – and even within a – business line. They include, among others, inherent client and transaction features, regulation (including the type and degree of government involvement in the financial system), and the state of the financial infrastructure. All these drivers are relevant in determining the degree of effective competition and financial access in particular market segments and, by implication, market structure and relative profitability. In Retail, the ability to keep clients in the network, the efficiency of managing large volumes of standardized transactions, the ability of capturing information on borrowers, and the level of standardization of risk management are key levers. In Corporate, the ability to manage the overall relationship with individualized customers (who are more mobile and have more choices) in order to maximize cross-selling opportunities, the effectiveness of managing low volumes of complex transactions, and the reliance on credit infrastructure (reliability of corporate financial information, creditor rights, etc.) are some of the most important factors.

Both system-wide and market segment-specific policy implications can be drawn from the analysis. The study illustrates how differences across market segments – which tend to be averaged out in aggregate analysis – need to be taken into account when designing public policy. At the banking system level, there is a need to strengthen the oversight framework and institutional capacity to promote competition in the financial sector. With regards to market segment-specific issues, government policies that encourage price competition among banks – especially in the retail segment – should address those factors that drive up revenues, costs, and risks, and hence adversely impact efforts to ensure wide and affordable access to banking services across Brazil. Examples of such policies, which are elaborated in the study, include: further promoting the portability of bank accounts (e.g., by separating the corporate from the retail relationship of companies and their employees); permitting positive credit information sharing; expanding payment system interconnection and improving the retail payments mix; developing the role of capital markets in the provision of long-term finance; improving corporate financial reporting; strengthening legal rights and judicial procedures for contract enforcement; and carefully reassessing the nature and extent of government interventions over the medium to longer term in the Brazilian banking system (i.e., directed lending schemes, reserve requirements, special regulated deposits, and the tax structure).

Going forward, some of these policies will become even more relevant as the different markets continue to evolve. Business perspectives of the Retail and Corporate markets are quite different. In Retail, credit to employees of large companies and civil servants seems to be progressively reaching maturity, leading to a next wave of credit expansion via independent workers and SMEs for which the credit infrastructure (positive information sharing, creditor rights) is very relevant. In the corporate banking market, fee-based services to finance corporations through capital markets will likely gain share with respect to traditional lending products, stressing the importance of capital markets policy initiatives.

1. Introduction

1. **Understanding the causes of high interest spreads and low access to credit in Brazil is an important task both for the financial community at large and for country specialists.** The Brazilian financial system is by far the largest and arguably the most sophisticated in Latin America[1]. Brazilian banks successfully navigated through several episodes of hyperinflation in the 1980s by creating sophisticated networks to reap the gains of float, while they have also adapted to the more stable environment of the last decade. However, the cost of financial intermediation, in terms of both absolute interest rates and spreads, remains among the highest in the world, and credit is still scarce for a significant proportion of the economy[2]. While spreads have recently declined, they have not yet achieved a reduction to sufficiently moderate levels by international standards. Identifying and analyzing the various contributory factors for this phenomenon, including the role played by the industry structure of banking services, is therefore an important exercise for policy purposes.

2. **An important feature of the high average lending rate is that it conceals important differences between the spreads charged to different types of clients.** The Central Bank of Brazil (Bacen) has released since 1999 a series of papers under the research program on "Juros e Spread Bancario", which quantify the various determinants of the spread through an accounting decomposition. According to this program, the main factors behind high interest spreads appear to be operational costs, the costs imposed by the government through explicit and implicit taxation (including unremunerated reserve requirements), and high returns. All three factors may be influenced by, as well as contribute to, the industry structure and degree of competition in different market segments. In particular, there exist large differences in rates between corporate and retail lending products, driving a wedge in access to credit between corporations and individuals or small firms. The extent to which those differences could be attributed to segmentation and market power in different segments is therefore an important question.

3. **While other studies have attempted to assess the degree of competition in the Brazilian banking sector and link it to high spreads, they have not analyzed individual market segments.** For example, both Nakane (2001) and Belaisch (2003) perform such an analysis at the aggregate banking level and conclude that the Brazilian banking industry neither behaves as a cartel nor is it perfectly competitive, a finding that

[1] The Brazilian financial system is relatively more sophisticated than other peer countries. Aside from the data presented in Section 2 and Appendix I of this study that serves to corroborate this statement, Brazil fares better than most Latin American countries in terms of stock market capitalization (market cap to GDP for Brazil in 2005 stood at 51% against 34% in Argentina, 29% in Colombia and 27% in Mexico), standard measures of technology penetration (e.g., the number of ATMs per 100,000 people for Brazil in 2004 was 18, while in Argentina, Colombia and Mexico this figure was 15, 10, 17), and diversity of financial products, three further proxies of financial sophistication.

[2] Empirical results in the World Bank's Investment Climate Assessment for Brazil (December 2005) suggest that firms of all sizes – particularly smaller ones – are credit constrained, with the cost of credit being the most commonly cited reason for not applying for a loan.

is not particularly useful for policy recommendations[3]. The studies do not take account of the aforementioned anecdotal evidence of strong competition among banks in the market for loans to large corporations[4], in contrast to the market for loans to consumers and small firms[5]. Understanding the characteristics and drivers of performance in different market segments is critical for the formulation of public policy to make access to credit more affordable, but there has not been – to our knowledge – a study on this issue in Brazil.

4. **The objective of this study is to analyze the industry structure of banking services in Brazil, assessing competition and performance at a disaggregated market level**. In particular, the study focuses on the characteristics, financial performance and drivers – including the degree of price competition – of the two most important banking market segments: Corporate and Retail. Each of the two segments is defined at a high level due to data availability constraints, but they align fairly closely with actual bank practice since banks typically have separate business lines catering to the needs (loans, deposits, payments) of these different markets.

5. **In order to pursue this task, the study combines an industrial organization perspective with a practitioner approach**. Firstly, stylized facts about the Brazilian banking system are identified and compared with a selected peer group of developed and developing countries. Secondly, the degree of price competition is assessed via an econometric model that estimates the sensitivity of bank revenues by market segment to an increase in the main cost drivers (cost of funds, labor and operational expenses)[6]. Thirdly, the performance of different market segments is estimated directly by disaggregating all the revenues, costs, and risks of the banking system into different lines of business in order to obtain key profitability ratios[7]. While high profitability is insufficient per se to infer the level of competition by market segment, it is typically positively correlated to market power, and it represents one of the most relevant indicators used by banking industry practitioners and analysts. It is worth noting that, while methodologically different, the direct approach can be seen as complementary to the indirect or econometric approach (see chapter 4 for more details). Finally, a review of the existing financial sector literature and interviews with senior management of eight

[3] Belaisch (2003) also distinguishes between state-owned, small/medium size and foreign-owned banks, and finds that the first two types behave oligopolistically while only foreign banks behave competitively.
[4] Large corporate clients can access short-term trade finance at a small premium over LIBOR, medium-term loans for working capital and business expansion at relatively narrow margins over the SELIC rate, and long-term funds from BNDES (directed lending) at even lower rates than the SELIC.
[5] Individuals face short maturities and interest rates from around 25-30 percent p.a. (per annum) on car loans, to 60-70 percent p.a. on personal loans and up to 150 percent p.a. on overdrafts.
[6] This method, introduced by Panzar and Rosse (1987), is very popular in the empirical industrial organization literature and is based on the assumption that, under perfect competition, an increase in marginal costs would be reflected one-to-one in higher prices and therefore revenues. The further actual market dynamics are from this ideal competitive benchmark, the lower is the elasticity coefficient.
[7] The approach results in the creation of stand-alone notional financial statements and related financial ratios (e.g. pre-tax return on capital and assets) by business line as of December 2005, which can then be compared to each other and to the ones for the entire banking system.

Brazilian banks of different size and ownership structures, serve as a consistency check on the study's findings and are used to identify the main drivers in each market segment[8].

6. **The study is in line with the World Bank's program in Brazil and complements well on-going financial sector work.** In particular, one of the pillars of the World Bank's Country Assistance Strategy is a more competitive Brazil to spur sustainable growth; this study, by tackling the issue of competition in the financial system, comes under this pillar. In addition, the study is a natural follow-up to the recently-completed report entitled "Brazil: Interest Rates and Intermediation Spreads" by de la Torre and Claessens (World Bank, June 2006), in which the industry structure and level of competition in specific market segments are recognized as potentially important – but still unexplored – issues in the current debate on interest rates and spreads. Where relevant, the study also draws upon other World Bank financial sector analytic work in Brazil, as well as upon issues highlighted under the financial sector component of the two recent Programmatic Loans for Sustainable and Equitable Growth. Finally, the timing of the study is appropriate, both because these types of microeconomic factors will become increasingly important as market rates approach single digits[9], and because the Brazilian authorities have recently announced (and are considering additional) reforms in the regulatory framework for the banking industry in order to promote competition.

7. **The study is organized into five additional sections in line with the main analytical building blocks, complemented by appendices that describe methodological aspects in more detail.** Section 2 (and Appendix I) presents some stylized facts on the Brazilian banking system – including dissagregations by market segment – and compares it to a peer group of countries in order to identify those areas where Brazil remains an outlier. Section 3 describes and presents the results of the industrial organization perspective (indirect approach). Section 4 (as well as Appendices II and III) presents the methodology and results – including sensitivity analysis – of the direct approach. Section 5 identifies and discusses the characteristics and main drivers of revenues, costs and risks by market segment, while Section 6 concludes and presents policy implications.

[8] Interviews were conducted both with senior bank management to get an overall perspective of the system, as well as with business line managers to obtain more detailed information. The interviews covered 2 public banks, 2 large domestic private banks, 1 smaller domestic private bank, and 3 foreign banks.

[9] The World Bank (June 2006) report states that "*the 'largest bang for the reform' buck in terms of reducing intermediation spreads would come, at this stage, from sustainable reductions in the SELIC rate...as the SELIC declines, these types of factors [implicit and explicit taxation, administrative and operational costs, competition, contract enforcement institutions] will increasingly become binding constraints to further reduction of intermediation spreads. Hence, reforms to tackle these micro factors should remain an important priority in the government's reform agenda*".

2. The Brazilian Banking System: Stylized Facts

8. **The analysis of stylized facts of the Brazilian banking system comprises an international comparison with a peer group of countries, as well as an in-depth assessment of selected indicators across different market segments**. The largest and more developed financial systems in Latin America besides Brazil – i.e. Mexico, Argentina, Chile and Colombia – are selected for comparison purposes. In addition, the United States (largest financial system globally) and Spain (given that Brazil's financial system structure is closer to the European universal banking model) are also included in the group of countries as international benchmarks.

9. **Brazil has by far the largest banking system in Latin America (Figures 2.1 and 2.2)**[10]**.** System assets as of end-2005 accounted for almost US$611 billion (US$ 684 billion when the development bank BNDES and other consolidated level II banking institutions are included), which is almost three times the size of the second largest regional system (Mexico), and around one-half of the total Latin American banking system assets. Relative to GDP, bank assets are also high at 74 percent of GDP, and only lower than Spain[11] (205 percent) and Chile (95 percent). Financial assets are complemented by a wide network of more than 20,000 branches and 50,000 ATMs that provide a sound infrastructure and technological base to expand market access across dispersed geographical regions. There is also an important network of correspondent banking agencies, including lottery houses and retail stores[12].

10. **In spite of its large size, the Brazilian banking system presents many characteristics similar to those of other Latin American countries**. The degree of concentration[13] is in line with most markets, and is actually at the lower end of the sample. The cost-to-income ratio – a key efficiency measure used by the industry – is very similar to that of other countries in the sample, while the capital adequacy ratio is also in line with its peers (see Appendix I for complementary benchmarking data against peer countries).

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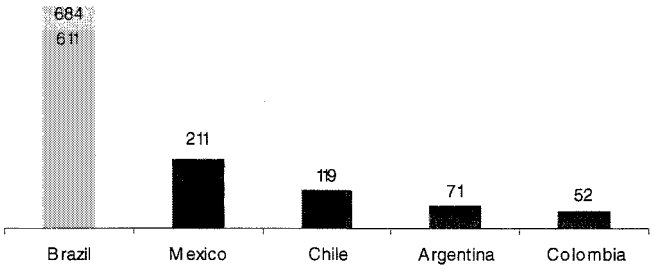
[10] The financial data used for the Brazilian banking system, taken from Bacen, is at the so-called consolidated level I, which includes both independent commercial banking institutions, and banking conglomerates containing at least one commercial or universal bank. The choice of consolidated level I, which excludes BNDES, was made in order to make the ratios comparable to those of other countries.

[11] The figures for Spain exclude international operations of domestic banks; including those as well would raise the bank assets to GDP ratio for Spain above 300 percent.

[12] See Kumar, Nair, Parsons and Urdapilleta (2005) for more details.

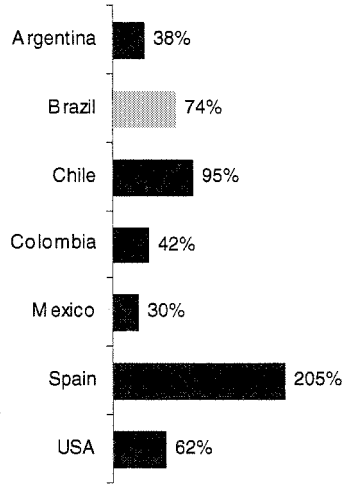
[13] The Herfindahl index of market concentration shows that Brazil, with an index of 906, is actually less concentrated than Colombia (1,642, once common ownership patterns for some banks are taken into account), Mexico (1,530) and Spain (1,394).

Figure 2.1: Total Assets of the Commercial Banking System (2005, US$ billion)



Source: Study calculations based on Banco Central do Brasil, Comisión Bancaria y de Valores México, Banco Central de Chile, Banco Central de la República Argentina, Superintendencia Bancaria de Colombia, Banco Central de Venezuela, Superintendencia de Bancos de Panamá.

Figure 2.2: Bank Assets to GDP (2005)[14]



Source: Study calculations based on Federal Reserve, Banco de España, Comisión Bancaria y de Valores de México, Superintendencia Bancaria de Colombia, Banco Central de Chile, Banco Central do Brasil, Banco Central de la República Argentina, World Bank Financial Sector Development Indicators (FSDI).

11. **However, there also exist a few salient factors that are particular to the Brazilian system and that may contribute to spreads being higher than the norm.** First, bank lending is low compared with other countries. Credit, at 34 percent of total assets, is relatively low vis-à-vis other regional and global peers, while securities absorb almost 43 percent of total assets; a significant portion of banking activities is dedicated to financing the government through, for example, investments in government securities (Figure 2.3). It is important to note, however, that a decomposition of credit by market segment suggests relatively higher participation of retail credit (46 percent) in total credit compared to other countries (Figure 2.4). Moreover, although system deposits represent a lower percentage than in other countries – Brazil stood at 49 percent of the system's liabilities compared to 71 percent in Argentina, 76 percent in Colombia and 83 percent in Spain – a large part of this difference stems from the existence of other funding sources related to directed lending schemes that are not considered in total deposits.

[14] Banking assets corresponds to the relevant definition of commercial banks in each country of the sample to make ratios comparable among them. Data is for non-consolidated, tier-one assets of the banking system. United States (Domestically Chartered Commercial Banks); Spain (Domestic assets of Commercial Banks, Saving Banks and Credit Cooperatives), Mexico (Banca Múltiple), Colombia (Sistema Financiero, excluding credit unions and public sector special institutions), Chile (Sistema Bancario), Brazil (Consolidated I Financial Institutions, which excludes second-tier banks), and Argentina (Sistema Financiero).

Figure 2.3: Composition of Assets (% of total assets, 2005)

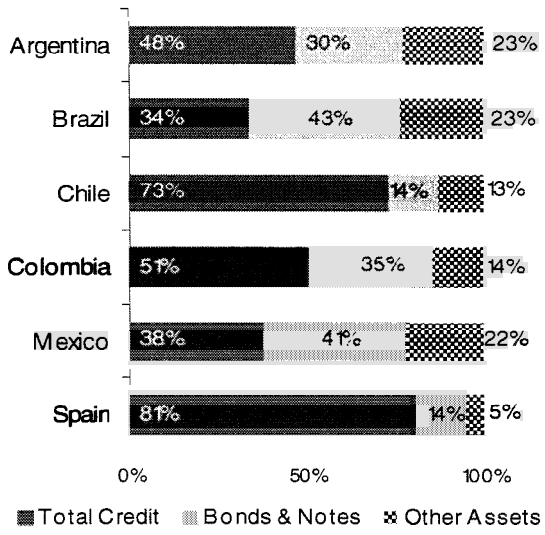
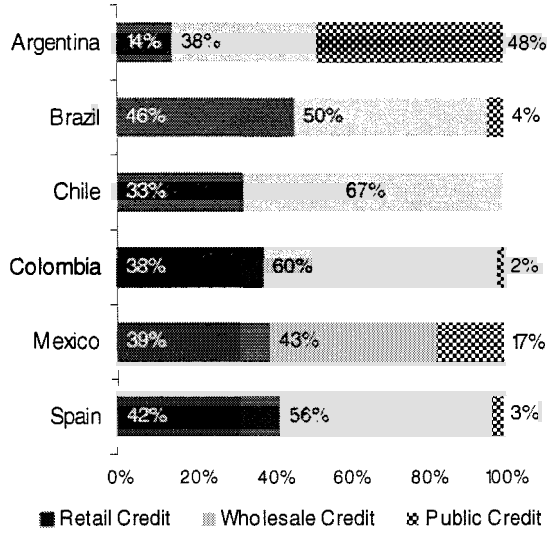


Figure 2.4: Composition of Credit (% of total credit, 2005)



The composition of credit figures in Mexico includes Fideicomisos UDI but excludes IPAB and FOBAPROA. The figures for public sector credit for Colombia come from the Superintendencia Financiera.
Source: Study calculations based on Federal Reserve, Banco de España, Comisión Bancaria y de Valores de México, Superintendencia Bancaria de Colombia, Banco Central de Chile, Banco Central do Brasil, and Banco Central de la República Argentina.

12. **Brazil's moderate cost-to-income ratio is actually hiding high operational expenses that are compensated with high revenues, seemingly revealing room for efficiency gains**[15]. In 2005, the cost-to-income ratio in Brazil stood at 59 percent, which is similar with the levels observed in Latin America and in industrialized countries (Figure 2.5). Nonetheless, this conceals structural inefficiencies that are being masked by high operating income, which itself is partly related to the very high nominal interest rates of the system. As a comparison, the ratio of operating expenses to total assets for Brazil in 2004 (6.5 percent) was the highest in the sample, while overhead costs to assets were almost 50 percent higher than in Argentina and four times higher than in Spain (Figure 2.6). This could arise from a number of factors, including the legacy of high operational costs from the 1980s, expenses related to government-imposed financial taxes, regulation and directed lending requirements, credit monitoring costs due to a lack of positive information sharing, or the lack of sufficient competition to promote efficiency. This evidence therefore suggests that there remains potentially important room for efficiency gains in the banking system, especially by tackling business environment factors that feed directly into banks' operational costs.

[15] In this context the term *efficiency* is used as per financial analysts' definition of high costs to operate. The origin of such inefficiencies may be internal to the institution or related to the business environment.

Figure 2.5: Cost to Income Ratio (2005)

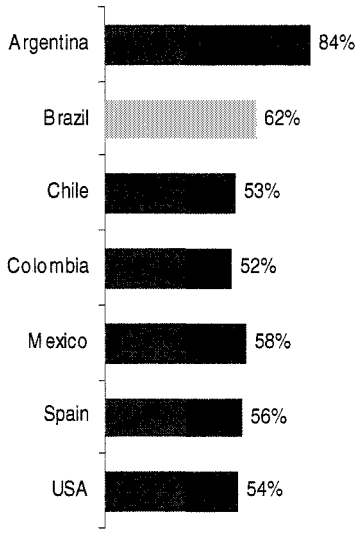
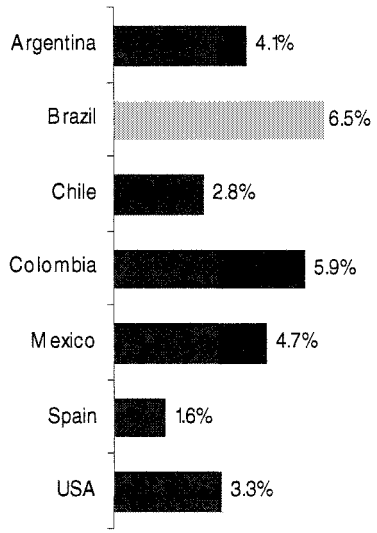


Figure 2.6: Operating Expenses to Total Assets Ratio (2004)

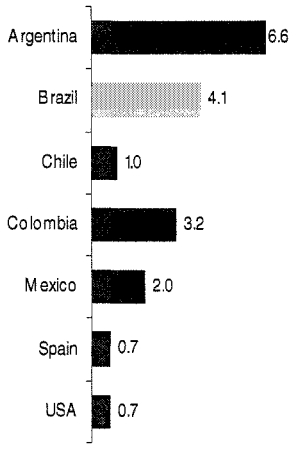


Source: Study calculations based on Federal Reserve, Banco de España, Comisión Bancaria y de Valores de México, Superintendencia Bancaria de Colombia, Banco Central de Chile, Banco Central do Brasil, Banco Central de la República Argentina, World Bank Financial Sector Development Indicators.

13. **Non-performing loans (NPLs) have been declining in recent years, but are still at the higher end of the sample of countries.** The Brazilian banking system's NPL ratio as of end of 2005 stood at 4.1 percent of total non-earmarked loans, well above most of its regional peers (Figure 2.7) [16]. A closer look at NPLs across market segments (retail and corporate) and products shows large disparities in asset quality. For instance, the NPL ratio for retail non-earmarked loans was around 8 percent in 2005, while the respective ratio for corporate non-earmarked loans stood at below 3 percent (Figure 2.10). Despite this, the quality of banks' credit portfolio has consistently improved over the past 10 years, and the system exhibits strong capitalization (Figure 2.8) and adequate loan loss provisioning (Figure 2.9). In fact, in 2005 the Brazilian system's capital adequacy ratio was 18.2 percent, well above the minimum regulatory capital ratios imposed by Basel (8 percent) or Bacen (11 percent), and higher than the levels reported by peer countries.

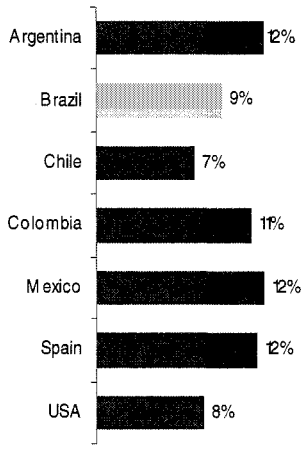
[16] The NPL ratio is calculated as the volume of non-performing loans to total loans for the entire system and it is a widely used measure of asset quality. The figures for Brazil exclude earmarked lending that, if included, would further raise such NPL ratio to 6.6 percent. NPLs are higher in Brazil than in peer countries partly due to the higher proportion of retail loans (see Figure 2.4). However, this is not the only factor- it is also the case that NPLs related to the corporate segment are higher than in other countries, resulting in overall higher NPLs for the system.

Figure 2.7: NPL Ratio (% of Total Loans, 2005)



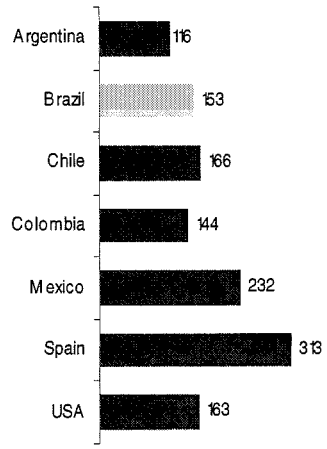
Source: Financial Soundness Indicators (IMF)

Figure 2.8: Bank Equity to Assets (2005)



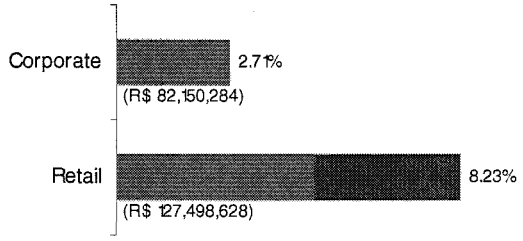
Source: Study calculations based on Bank Equity to Assets Ratio calculated directly from the Federal Reserve, Banco de España, Comisión Bancaria y de Valores de México, Superintendencia Financiera de Colombia, Banco Central de Chile, Banco Central do Brasil, Banco Central de la Republica Argentina

Figure 2.9: Bank Provisions to NPLs (%, 2005)



Source: Financial Soundness Indicators (IMF).

Figure 2.10: Non-Performing Loans by Market Segment (2005)

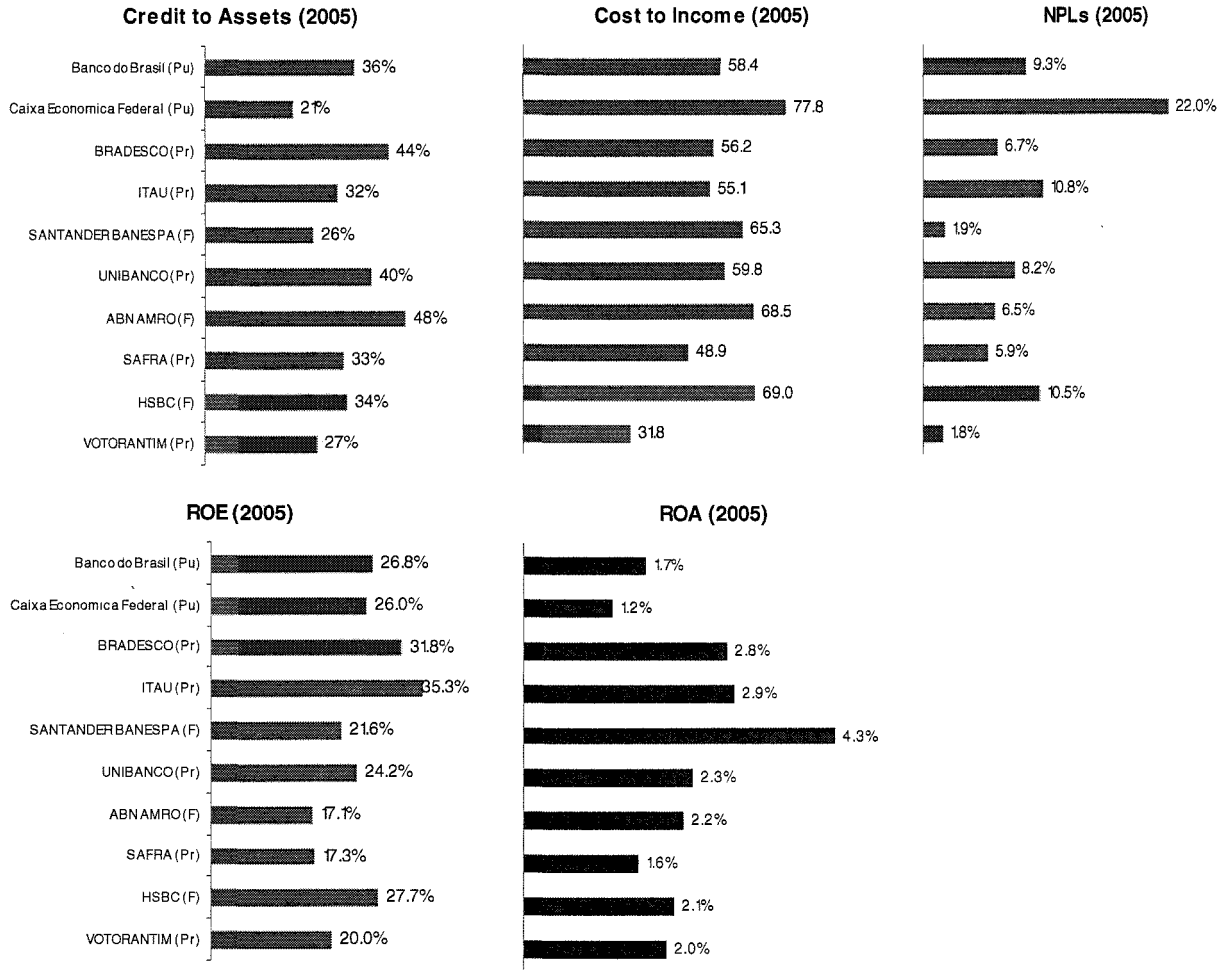


NPLs are only for non-earmarked products and for categories D and over (90 days past-due). The NPL ratio for the entire banking system (both earmarked and non-earmarked) in 2005 amounted to 6.6 percent.
Source: Bacen.

14. **The largest Brazilian commercial banks exhibit significant differences in performance that are largely explained by their different orientation and segment focus.** The top ten commercial institutions in Brazil are categorized as follows: two institutions are public (*Banco do Brasil and CEF*), five are domestic private (*Bradesco,*

Itaú, Unibanco, Safra, and Votorantim), and three are foreign (*Santander, ABN AMRO, and HSBC*). It is interesting to note that all three foreign institutions grew by acquiring established domestic banks (*Banespa, Banco Real, and Bamerindus*) rather than organically via a greenfield operation[17]; this salient feature of the banking system tends to emphasize the importance of being an incumbent. Furthermore, banks that focus on the retail segment have costs and NPLs that are higher than the rest, but they tend to perform better (Figures 2.11 and 2.12)[18]. While evidence at this level is largely circumstantial, such differences in profitability, especially in the presence of high overall interest rates, call for a deeper understanding of the drivers and profitability in each market segment.

Figure 2.11: Performance Ratios of Top Ten Brazilian Banks

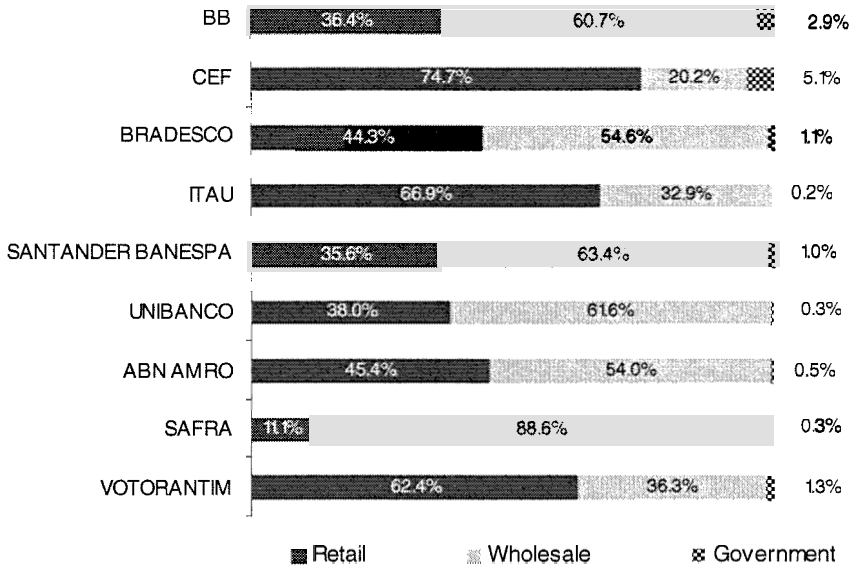


(Pu) Public Bank; (Pr) Private Bank; (F) Foreign Bank
Source: Banco Central do Brasil, Bankscope.

[17] This is also true for the largest local banks which have grown by merging smaller institutions, albeit over a longer period of time.

[18] For instance, *Itaú*, a leading retail bank, exhibits a NPL rate that is higher than average at 10.8 percent, but also has above-average profitability with an ROE of 35 percent and ROA of 2.9 percent. Conversely, *Safra*, which has a mostly corporate focus, has a NPL rate of 5.9 percent but lower profitability, with an ROE of 17 percent and ROA of 1.6 percent.

Figure 2.12: Composition of Credit by Market Segment (%, 2005)



Source: Bank annual reports and interviews.

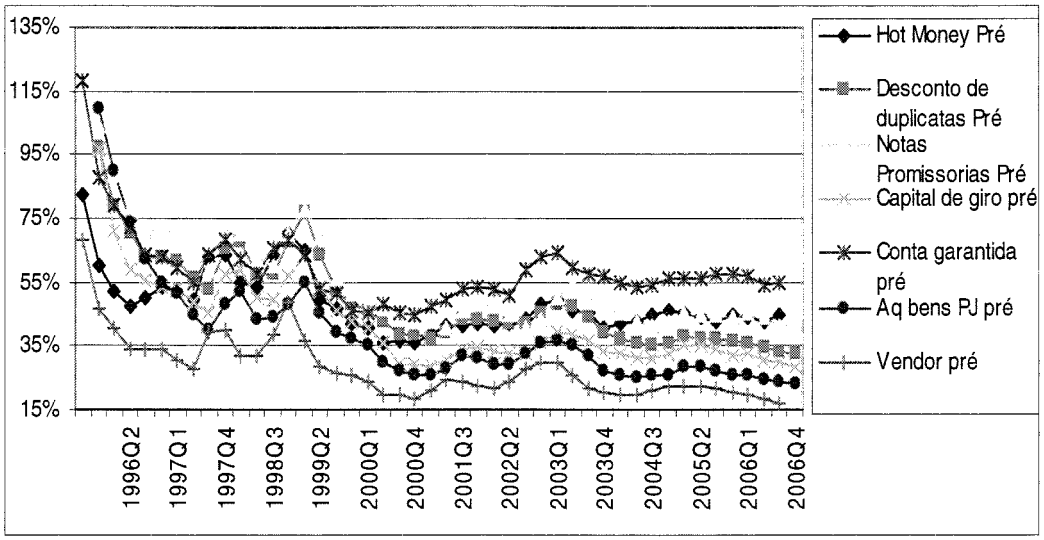
3. Assessing the Degree of Competition by Market Segment

15. **This chapter presents a measure of competition by estimating the sensitivity of bank revenues by market segment to an increase in the cost drivers.** The method, introduced by Panzar and Rosse (1987), is based on the assumption that, under perfect competition, an increase in marginal costs would be reflected one-to-one in higher prices and therefore revenues (total elasticity equal to one). The further actual market dynamics are from this ideal competitive benchmark, the lower is the elasticity coefficient (zero in the extreme case of monopoly).

3.1 Evolution of Loan Rates by Market Segment and Individual Product

16. **The very high average lending rate in Brazil conceals large differences among the terms of credit offered to corporate versus retail customers.** Therefore, it is particularly instructive to take a closer look at the wide spectrum of lending rates and their evolution over time[19]. A first observation that can be drawn from looking at the time series plotted in Figures 3.1, 3.2 and 3.3 below is that interest rates charged on some of the main corporate loan types tend to follow movements in the SELIC[20] very closely, whereas the main retail loan products are priced well above their corporate counterparts and tend to appear largely unaffected by changes in the relevant cost of funds (see Table 3.1 for a description of each loan product).

Figure 3.1: Corporate Loans: Average All-Inclusive Rates for Banking System (1995Q4-2006Q4)

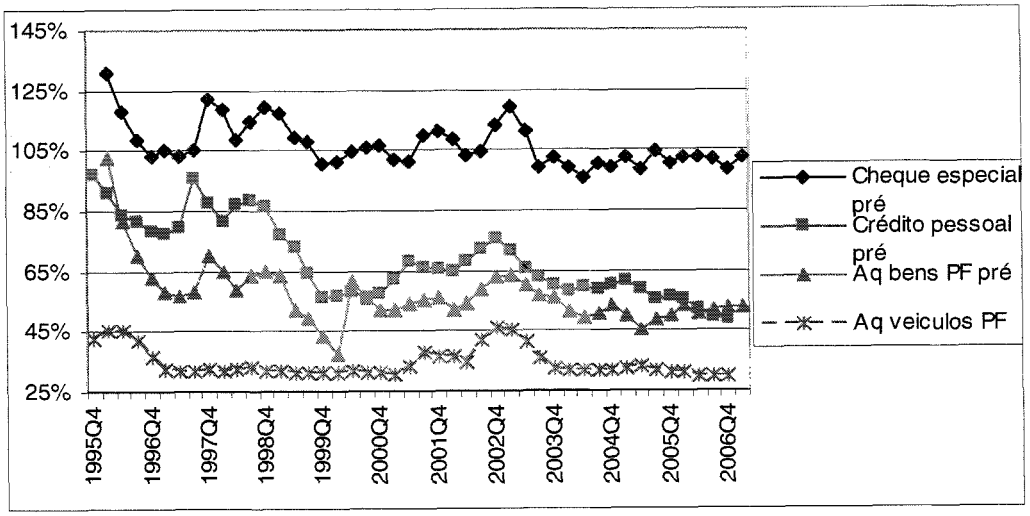


Source: Central Bank of Brazil (Bacen)

[19] The analysis in this chapter includes only financial products (pre-fixed) within the context of non-earmarked loans. These products comprise around 40 percent of total loans and advances as of December 2006. Directed (ear-marked) loans are not considered due to lack of sufficient data and due to the fact that their rates are administratively determined and are therefore insensitive to changes in market rates.

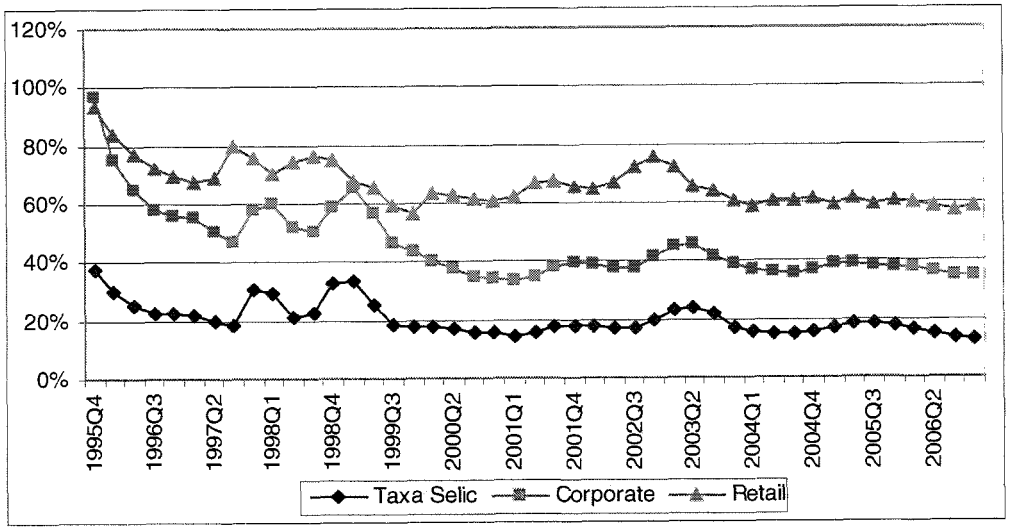
[20] The SELIC (*Sistema Especial de Liquidação e Custodia*) is Bacen's overnight base rate for repo operations. The overnight interbank rate (CDI) tends to track the SELIC rate very closely.

Figure 3.2: Retail Loans: Average All-Inclusive Rates for Banking System (1995Q4-2006Q4)



Source: Central Bank of Brazil (Bacen)

Figure 3.3: Corporate Lending Rates on Average Follow the SELIC More Closely than Retail Lending Rates (1995Q4-2006Q4)



Source: Central Bank of Brazil (Bacen)

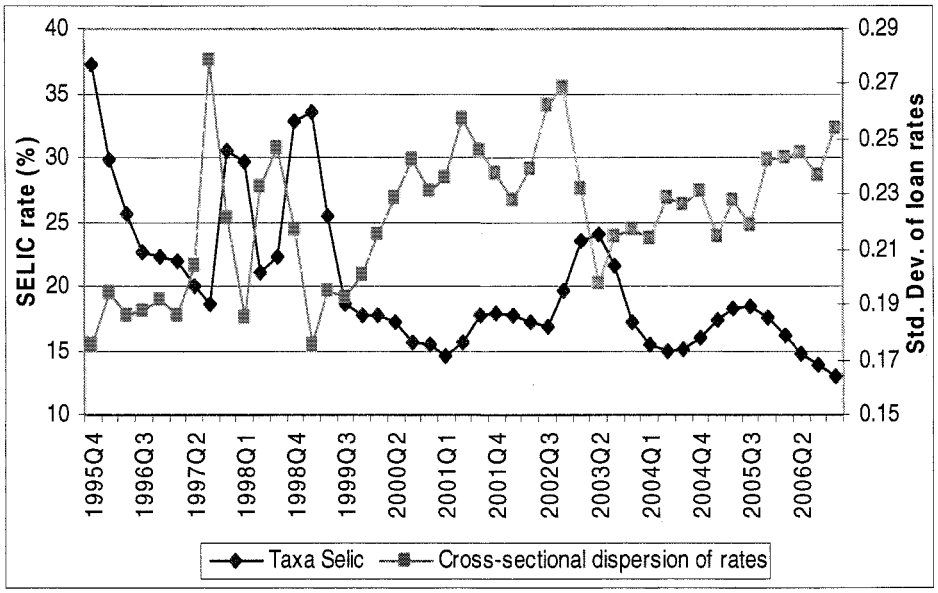
Table 3.1: Description of Main Loan Product Categories

Category	Description	Volume (BRL Million)[21]
Hot Money	Short-term loan with no collateral. Can be asked for at any time by companies respecting its credit limit. No need to define the use for the money.	286
Duplicatas	Discount of Receivables. The bank lends money equivalent to the amount of an invoice that the company has the right to receive in the future. The company sells a future cash flow to receive cash in advance.	12,012
Nota promissória	Discount of Promissory Notes. Similar to the previous product but the nota promissoria does not require any contract. The bank buys a right to receive a specific payment and provides the advanced cash to the company.	160
Capital de Giro	Working Capital. Credit line to meet the cash flow needs of a company, financing its operational cycle. Requires a collateral.	23,620
Conta Garantida	Overdraft Line of Credit. Can be used with no collateral at any time until the credit limit is reached. Nowadays some banks have a version with a collateral.	17,171
Aq. Bens PJ	Credit line for companies for the purchase of goods. There is always a collateral that depending on the good can be a nota promissoria.	10,581
Vendor	Credit line to allow companies to finance their clients, allowing the seller to receive cash immediately and sell with a longer payment due date for their clients. Collateral is a must in this product. Limited to 180 days. The purchaser receive a boleto bancario for payment directly to the bank.	8,477
Cheque Especial	Overdraft for individuals.	11,738
Crédito Pessoal	Very broad range of products for consumer financing. The usual product did not require any collateral but nowadays banks offer other options at lower rates considering collaterals like vehicles. Limited to 24 months.	78,895
Aq Veiculos PF	Consumer loans for financing purchase of vehicles.	63,472
Aq Outros Bens PF[22]	Credit line for the purchase of goods other than vehicles. A collateral is required, usually the good itself but sometimes a nota promissoria.	10,763

17. **As the level of the SELIC has progressively decreased over time, corporate loan rates appear to have adjusted downwards much faster than rates for retail loans (see Figure 3.3).** This may help explain why the dispersion among loan rates (largely driven by differential terms of credit offered to corporate versus retail customers) has increased over the last decade in Brazil. In general, a significant negative correlation can be observed over time (correlation coefficient = -0.60) between the level of the SELIC and the standard deviation of loan rates (see Figure 3.4).

[21] As of December 31, 2006.
[22] Aq Bens PF is the sum of Aq Veiculos PF and Aq Outros Bens PF, with volume of BRL 74,235 million

Figure 3.4: The SELIC versus the Standard Deviation of Loan Rates (1995Q4-2006Q4)



Source: Central Bank of Brazil (Bacen)

3.2 Assessment of Price Competition in Corporate vs. Retail Loan Products

18. **Recent studies have analyzed the competitive structure of banking services in Brazil, albeit mostly at the aggregate level**. Nakane, Alencar and Kanczuk (2005) estimate two alternative oligopoly models (Bertrand and collusion) and try to determine which of them better fits the actual price-cost margins observed in the industry. The analysis is disaggregated by 3 product markets (demand deposits, time deposits and loans) and 3,252 Brazilian municipalities. While some data is available at the municipal level (e.g., ATM and branch density, GDP, and population), other variables and particularly product prices are only observed at the bank level for the whole country. The authors find that the Bertrand model overestimates the degree of market power for time deposits and loans. Bertrand competition seems to be a good description of the way banks set service fees. Belaisch (2003) applies the Panzar and Rosse methodology to Brazil using bank-level data from Bankscope. The author finds positive evidence of the presence of a noncompetitive market structure in the Brazilian banking system, particularly in state-owned banks and small/medium-sized banks that are found to behave oligopolistically. Nakane (2001) applies a dynamic version of the Bresnahan (1982) and Lau (1982) approach to assess the degree of competition in the Brazilian banking industry as a whole. Error-correction models of both the demand for bank loans and the bank interest rate spread are estimated on seven years of aggregate monthly data. The author finds evidence that the banking industry in Brazil can be described as highly competitive, although not perfectly competitive; the hypothesis that Brazilian banks behave collusively is strongly rejected. In summary, the main conclusions of previous studies are not particularly clear to guide policy making, since the typical finding is that the Brazilian banking industry neither behaves as a cartel nor is perfectly competitive.

19. **The present study extends and complements the previous ones by analyzing the degree of competition in corporate and retail loan products following a version of the Panzar and Rosse (1987) methodology**. Data limitations imply that the regression framework, as described in this chapter, is somewhat different from the original setup – for example, the dependent variable in the original setup is loan revenues and not loan rates. However, while we are not using a measure of unit revenue as a dependent variable, we do control for changing loan amounts per product as a regressor. It is also worth noting that related literature – for example, Claessens and Laeven (2004) – uses the ratio of gross interest revenue to total assets as a dependent variable to proxy for the output price of loans. Given the unavailability of individual product rates by banks, this study does not use bank-level variables as explanatory variables in the regression.

20. **A panel regression is estimated using quarterly data for the period 2003-2006 from Bacen to evaluate the sensitivity of individual product rates to movements in the main bank-wide cost factors**[23]. The novelty of this regression, compared to the literature, is that the cross-sectional dimension captures the different loan product rates for an average bank as opposed to an average rate (across all products) for different banks, as it has usually been done so far by, for example, Belaisch (2003) and Claessens and Laeven (2003).

$$ln(loan\ rates_{it}) = \alpha_i + \beta_1\ ln(cost\ of\ funds_t) + \beta_2\ ln(cost\ of\ equipment_t) + \beta_3\ ln(cost\ of\ labor_t) + \gamma Retail + \gamma_1\ Retail\ x\ ln(cost\ of\ funds_t) + \gamma_2\ Retail\ x\ ln(cost\ of\ equipment_t) + \gamma_3\ Retail\ x\ ln(cost\ of\ labor_t) + \delta_1\ ln(loans\ outstanding\ as\ \%\ of\ total_{it}) + \delta_2\ ln(\%\ of\ loans\ >90\ days\ past\ due_{it}) + \phi_1\ ln(GDP\ growth_t) + \phi_2\ ln(inflation_t) + \varepsilon_{it}$$

i indexes individual product rates and t indexes time

21. **Due to the unavailability of sufficient information on bank revenues and costs disaggregated at the product level, publicly available product rates are used as a dependent variable and the three main cost components included as regressors are measured for the whole banking system over time**. While this could be improved if we obtained more disaggregated data on revenues and costs by market segments, we believe this approach may offer a useful comparison of competitive conditions across market segments to assess, in particular, which bank product rates are more/less affected by bank-wide cost pressures over time. To this purpose, we also include in the regression a dummy for retail products interacted with each of the three main cost components, in order to test whether competitive conditions (and therefore the elasticity of product rates to input prices) are significantly different between the corporate and retail loan markets. We also include additional explanatory variables, such as performing and non-performing loans outstanding for each product category, to control for any size or risk characteristics

[23] The estimation period for the loan rates by categories is from 2003 to 2006 because of noisy NPLs data in the early years (2000-2002) due to the restructuring of public banks (particularly Caixa) and the acquisition of São Paulo State's bank Banespa by Santander. The unavailability of bank-level data on NPLs, or alternative measures of risk, is a constraint for the econometric analysis although the overall pattern seems to confirm the conclusions of the study that the retail sector is significantly less competitive than the corporate segment.

of individual market segments that may affect pricing. Fixed effects by product category are added to capture any other contractual features (such as differences in collateral, maturity, etc.), which can independently affect loan rates. Finally, we also add GDP growth and inflation since all rates considered are nominal and we would like to account for the influence of cyclical macroeconomic fluctuations.

22. **Regression results are reported in the second column of Table 3.2.** Meanwhile, Tables 3.3 and 3.4 below contain more details on the definitions of the variables.

Table 3.2: Regression Results

Dependent variable:	Loan rates by product category	Return on assets
	(Panel regression with fixed effects)	(Time-series regression with robust standard errors)
Explanatory Variables:		
Cost of funds	0.39***	0.00**
Cost of equipment	-0.05	-0.01
Cost of labor	0.35**	0.01
Dummy for Retail products interacted with:		
cost of funds	-0.18***	
cost of equipment	0.03	
cost of labor	-0.14	
Loans outstanding by product category as a % of total loans	-0.12***	
% loans over 90 days past due by product category	0.03**	
Total loans as a % of assets		-0.02
Total deposits as a % of GDP		0.00
Total number of banks		-0.08
GDP growth	-0.40***	-0.01
Inflation	3.36***	0.06
R-squared	0.76	0.54

Above results are tests of market power and long-term equilibrium. ***, ** and * indicate statistical significance at the 1%, 5% and 10% confidence level respectively. All variables are in natural logs. In the case of GDP growth, inflation and ROA, we use the approximation ln(1+variable), as these variables occasionally show negative values. Data is quarterly for the period 2000-2006 and is obtained from the public online database of the Central Bank of Brazil. The estimation period for the loan rates by categories is from 2003 to 2006, and from 2000 to 2006 for the long-term condition.

Table 3.3: Coefficient Values and Tests of Hypotheses

Value of Coefficients: Retail Segment	
Cost of funds	0.21 ***
Cost of fixed capital	-0.02
Cost of labor	0.21 **
H-Statistics (Retail)	**0.40** ***
Value of Coefficients: Corporate Segment	
Cost of funds	0.39 ***
Cost of fixed capital	-0.05
Cost of labor	0.34 ***
H-Statistics (Corporate)	**0.69** ***
Test of Hypotheses	***p-value***
H-statistic (Corporate) = H-statistic (Retail)	0.00
Corporate	0.00
H-Statistic = 0	0.00
H-Statistic = 1	
Retail	
H-Statistic = 0	0.00
H-Statistic = 1	0.00

***, **, * Significant at the 1,5, and 10 percent level respectively.

Table 3.4: Variable Definitions

Loan rates by product category	Annualized quarterly loan rates for each loan category. Rates include financial taxation, commissions, and fees. Rates are publicly available for each loan category only at the banking-system level, averaging across banks using as weights the flow of new loans originated by each bank on each day.
Return on assets	Quarterly ratio of pre-tax income over total assets for the aggregate banking system excluding BNDES and credit cooperatives (Consolidated I)
Cost of funds	Unit cost of borrowed funds (total cost of deposits, acceptances and repos divided by their stocks outstanding)
Cost of labor	Unit cost of labor (total payroll expenses as a ratio of total assets)
Cost of equipment	Unit cost of equipment/fixed capital (total administrative and other operational expenses as a ratio of fixed assets)

23. **Results tend to confirm our early hypotheses.** Three main outcomes from the econometric analysis are worth highlighting:

- *Monopolistic competition dominates the corporate market segment.* In fact, the sum of ($\beta_1 + \beta_2 + \beta_3$), i.e. the H-statistic (degree of price competition), equals 0.69, which implies that the average degree of price competition for the corporate market segment lies between 0 and 1. The hypotheses that the H-statistic for the corporate segment is zero or one are rejected at the 1 percent level of significance[24]. The costs of funds and labor appear to be the most important drivers of movements in product rates, whereas changes in the cost of fixed capital/equipment do not seem to have a significant impact.
- *Retail loan products are significantly less sensitive to movements in the cost of funds compared to corporate products*[25]. Regression results in Table 3.2 and 3.3 suggest that, on average for the corporate market segment, 39 percent of any increase/decrease in the cost of funds is reflected in higher/lower rates charged to bank customers, whereas this pass-through coefficient declines to only 21 percent (=0.39-0.18) in the case of retail. This seems to confirm our hypothesis of weaker price competition in retail banking markets. Moreover, the degree of price competition for retail (0.40) is lower than the H-statistic for the corporate market (0.69). Both statistics suggest that these markets are further away from the perfect competition paradigm (H-statistic=1).
- *Among the additional control variables included in the regression, the significant negative coefficient on the level of loans outstanding by product category (as a percentage of total loans) could be read as an indication of prevailing demand forces (growing/decreasing demand for relatively more/less affordable products).*[26] The coefficient on the stock of non-performing loans by market segment has the right sign and is statistically significant, which show that asset risk has an effect on interest rates levels.

24. **The Panzar and Rosse (1987) methodology also requires the assumption that banking markets are in long-term equilibrium, which implies in particular that marginal and average costs are equal.** Only in this case an H-statistic=1 corresponds to the perfect competition paradigm, while a value between 0 and 1 points to a monopolistic competition environment as obtained in the analysis above. We proceed to test the market equilibrium assumption following an approach commonly used in the economic literature, for example by Shaffer (1982), Molyneux et al. (1996) and by Claessens and

[24] With respect to the retail segment, the value of the H-statistic is 0.40. As in the case of corporate, the hypotheses that the H-statistic is zero or one are rejected at the 1 percent level of significance (see Table 3.3 for details). As mentioned in para. 27, due to the lack of data on revenues for financial products, interest rates by products were included as a dependent variable. In this context, care is needed with the interpretation of results.

[25] Results presented here are robust to replacing the average cost of funds variable with the SELIC rate.

[26] It is important to note that this is only one plausible explanation of the result. Still, empirical results of a related study by the World Bank (2006) suggest that an increase in the general level of interest rates reduces firms' overall demand for credit (more reliance on internal sources of funds) and is associated with a higher supply by banks of those loan products with safer collateral cover (e.g. discount receivables, vendor) to mitigate adverse selection problems.

Laeven (2004). In particular, we estimate the following regression for the period 2000-2006:

$$ln(ROA_t) = \alpha + \beta_1 ln(cost\ of\ funds_t) + \beta_2 ln(cost\ of\ equipment_t) + \beta_3 ln(cost\ of\ labor_t) + \delta_1 ln(total\ loans\ as\ a\ \%\ of\ assets_t) + \delta_2 ln(total\ deposits\ as\ a\ \%\ of\ GDP_t) + \delta_3 ln(total\ number\ of\ banks_t) + \phi_1 ln(GDP\ growth_t) + \phi_2 ln(inflation_t) + \varepsilon_{it}$$

where ROA is the pre-tax return on assets and the three main cost components are defined as already described in Table 3.4. Furthermore, the evolution of the deposits-to-GDP and loan-to-asset ratios, as well as of the number of banks in the system, are used to control for changes in the depth and structure of the banking sector over time. Finally, we include GDP growth and inflation as macroeconomic control variables as well as a dummy to isolate an outlier negative observation of ROA in mid-2001, mainly due to large losses reported by CEF (NPL restructuring) and Santander (Banespa acquisition).

25. **Without the necessary information to construct a ROA measure by product category, the regression is preliminarily run on time series data for the whole banking system.** Results are reported in the third column of Table 3.2 and should be taken with some caution given data constraints. While the increase in ROA over time appears related to the consolidation process in the banking system (as proxied by the declining number of banks), the degree of price competition ($\beta_1 + \beta_2 + \beta_3$) is not significantly different from zero (i.e. the ROA remains largely unaffected by changes in input prices), which is consistent with the long-term equilibrium assumption.[27]

26. **In sum, the findings of the indirect approach tend to corroborate the hypothesis that the degree of price competition is significantly higher in corporate than in retail banking markets in Brazil.** Preliminary evidence at the individual product level indicates that Cheque Especial and Credito Pessoal are among the retail products where the lack of price competition seems most evident.

27. **While the overall message regarding competition in different market segments arising from the analysis seems clear, more data and additional sensitivity tests would be needed to strengthen the econometric results.** Unit root tests indicate an overall stationarity of the data. However, they need to be interpreted with some caution given the relatively short time series available. In order to keep consistency with the previous regression, we have used balance sheet data for over 100 Brazilian banks in the "Consolidated I" aggregate from the Central Bank of Brazil. Unfortunately, this information is only available with quarterly frequency between 2000 and 2006. Data from Bankscope may have longer time series coverage but a large number of banks appear missing in their sample. Furthermore, comparable cross-country data at the market segment level would be useful to verify to what extent weaker price competition in the retail sector and higher dispersion of rates at lower interest rate levels are results specific to Brazil or applying in general to other countries as well. This specific question, which also applies to the results of the direct approach in the next chapter, would require significant additional analysis given the amount of country-specific information needed.

[27] The p-value of the hypothesis test that the sum of the coefficients of the cost of funds, labor and capital is equal to zero is 0.29.

4. Estimation of Performance by Market Segment

4.1 Overview of the Approach

28. **In order to obtain a deeper understanding of competitive behavior in the banking system, a financial measure of bank performance by market segment is estimated**. This so-called 'direct approach' consists of allocating revenues, costs and all other line items in the financial statements (balance sheet and income statement) of the banking system into different business lines[28]. The approach results in the creation of stand-alone notional financial statements and related financial ratios (e.g. pre-tax return on capital and assets) by business line as of December 2005, which can then be compared to each other and to those for the entire banking system. The objective of this exercise is not to pinpoint precisely the actual returns of each business line, but rather to compare profitability across business lines – in particular, to demonstrate that retail banking is significantly more profitable than corporate banking.

29. **Although methodologically different, the direct approach can be seen as complementary to the indirect approach**. Firstly, while the indirect approach can be interpreted as an exercise on *market conduct* (i.e. rate setting/sensitivity for retail vs. corporate lending products), the direct approach can be perceived as a related exercise on *performance* (i.e. profitability for retail vs. corporate banking)[29]. Secondly, while neither approach is sufficient *per se* to determine the level of competition by market segment, both lower lending rate sensitivity and higher business line profitability are typically positively correlated to market power. In other words, one would expect that, ceteris paribus, a more profitable business line, or one with relatively less sensitive lending rates, would be characterized by relatively lower price competition. It is also important to note that the results of the two approaches, as well as the process of arriving at them, facilitate the identification of different factors that drive performance and means of competition in each market segment (see Chapter 5).

30. **Four lines of business were identified following standard market practice and used in this analysis: Retail, Corporate, Government, and Treasury**. Each business line has been defined such that it aligns closely with actual bank practice, i.e. each business caters to the banking needs of a specific market segment with common infrastructure that is managed as a unit within a typical bank[30]:

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[28] The broadest definition of the Brazilian banking system (the so-called 'consolidated – level III') was adopted for purposes of analysis, which covers all banks (including BNDES), finance companies, and credit cooperatives.

[29] While the indirect approach focuses on the lending side, the direct approach adopts a more comprehensive view that includes other types of bank services (e.g. deposits, payments) relevant for financial performance. For comparative purposes, subsequent analysis in this chapter attempts to disentangle the relative contribution of loans and deposits on profitability.

[30] Various types of services (loans, deposits, payments, etc.) are included under the same business line because they address the same client base and require the use of the same bank delivery channel and staff. Different services within a business line might generate different profitability patterns, and there might also be cross-subsidy effects; however, there is insufficient information to undertake a more disaggregated

- Retail is the branch-based business of commercial banks, and includes deposits, loans and payments services of individuals and small businesses[31]
- Corporate is a more centralized function that comprises all banking business (lending, cash management, etc) related to medium-sized and large companies
- Government consists of all banking business related to federal, state and municipal authorities. State-owned entities are excluded from this business line since they are in practice usually mapped to Corporate. Bank investments in government bonds are also excluded since they are handled by Treasury
- Treasury includes the central trading, investment, and money management facilities, as well as all other, relatively smaller businesses supplied by some banks that are not captured in the other three business lines.

31. **Since the primary focus is to assess differences between Retail and Corporate, the other two business lines are not analyzed in detail.** As shown later in the chapter, the size of the Government business line is very small and is not representative of the public sector's importance as a client (e.g., securities) and of its influence (e.g., via bank ownership or directed lending) in the banking system. In addition, since Treasury is effectively the residual of all other bank businesses, its estimated financial performance cannot be taken as fully representative.

32. **Various public data sources were tapped and assumptions were made in order to estimate a stand-alone notional balance sheet and income statement for each of the business lines.** Although the majority of the data comes from Bacen, other sources[32] were included as necessary in order to facilitate the allocation of different line items in the financial statements. Table 4.1 below summarizes the main allocation results, while a detailed description of the methodology and allocation mechanisms can be found in Appendix II. Given that the allocation assumptions (particularly about costs and equity) are important, interviews with senior management of eight Brazilian banks of different size and ownership structures served as a consistency check on the overall methodology. Finally, a sensitivity analysis was undertaken on those variables with higher uncertainty and potentially higher impact on the results of the relevant market segments; the main results are summarized at the end of this chapter, while the detailed analysis can be found in Appendix III.

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analysis. It is also not required: the objective of the exercise is to compare performance across – as opposed to within – business lines that represent different market segments (retail vs. corporate).

[31] Depending on the bank, other products and services provided by the Retail business line could include sales of investment products, insurance brokerage, payroll/employee benefits, safe-keeping services, etc. Small business includes micro-enterprises and those small-sized firms that are typically served by the same distribution channels as individuals (i.e., branch networks), so they share the same cost base; this implies that the definition may vary across different banks depending on their target market and strategic approach to this market segment. See Clark et al (forthcoming) for a similar approach.

[32] These included, for example, data from the Brazilian deposit insurance agency (*Fundo Garantidor de Créditos* or FGC) and annual 20-F reports filed with the US *Securities and Exchange Commission* (SEC) by Brazilian banks that are listed in the New York Stock Exchange.

Table 4.1: Banking System Balance Sheet (December 2005) – Allocation by Business Line

Statement Item	Market Share of Banking System			
	Retail	**Corporate**	**Government**	**Treasury**
Assets and Liabilities				
Cash, floating and repos				100%
Securities and derivatives	23%	5%	1%	71%
Loans and leases	45%	52%	3%	
Other assets	64%	18%	1%	17%
Deposits	58%	35%	3%	4%
Reverse repos				100%
Acceptances	18%	18%		64%
Borrowings		23%		77%
Other liabilities	59%	28%	1%	13%
Net Worth/Equity	46%	30%	2%	22%
Total Assets / Liabilities	***42%***	***26%***	***2%***	***30%***
Profit and Loss				
Interest revenues				
- Loans and leases	69%	29%	3%	
- Securities and repos	12%	5%	1%	82%
- Derivatives and F/X				100%
- Required deposits	73%	24%	3%	
Interest expenses				
- Deposits, accept. and repos	35%	22%	2%	41%
- Borrowings		49%		51%
- Leases	80%	15%	1%	4%
- F/X				100%
Non-interest income	42%	8%	1%	50%
Operating expenses				
- Payroll expenses	80%	15%	1%	4%
- Overhead	80%	15%	1%	4%
- Other operating expenses				100%
Allowance for bad credits	63%	31%	6%	
Pre-tax income	***60%***	***21%***	***1%***	***18%***

4.2 Main Findings

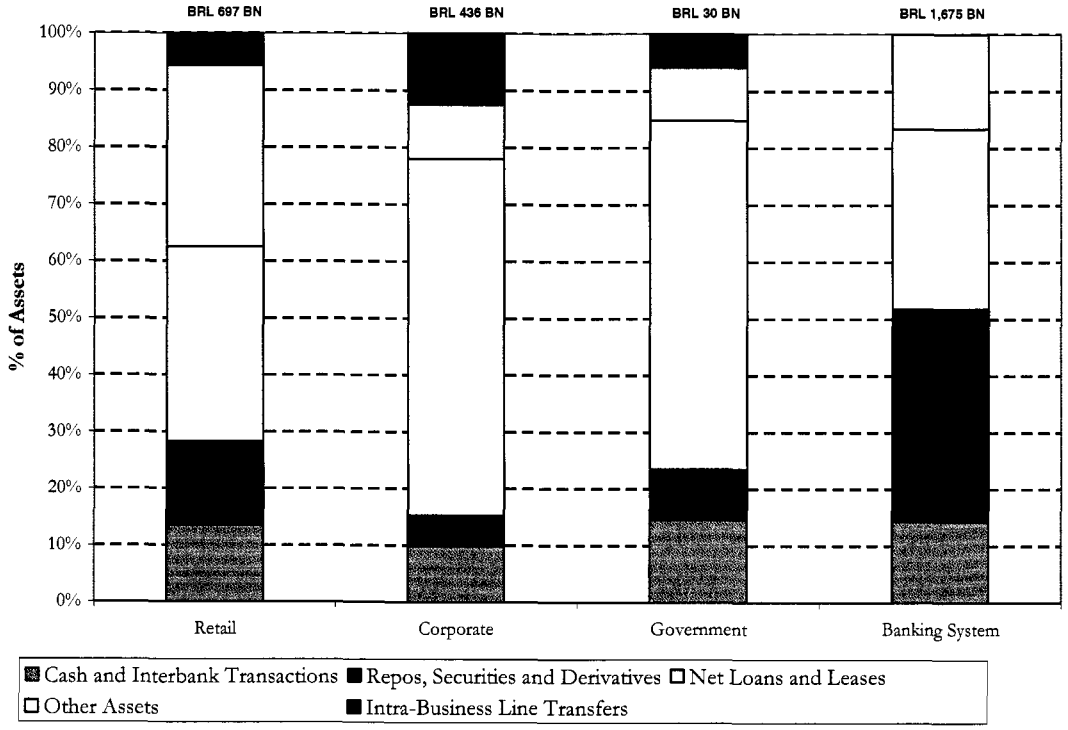
33. **Retail is the largest business line in the banking system and has a very different structure from Corporate** (see Figures 4.1 and 4.2). Retail represents around 40 percent of the system while Corporate accounts to only about 26 percent, while both are much bigger than the Government business line[33]. On the assets side, loans represent only around one third of the Retail business line as a result of the large share of other assets that are related to its infrastructure (branches and ITC systems); by contrast, loans represent the majority of assets for the other two business lines. On the liabilities side, deposits constitute around half of both Retail and Corporate liabilities and are proportionally higher than for the Government business line.

34. **The Retail business line generates a much greater proportion of net interest income than Corporate**. This can be attributed to a combination of higher loan rates and spreads (the average loan yield on performing loans for Retail is around 45 percent) and relatively lower cost of funding (the weighted average cost of deposits, reverse repos and acceptances is around 9 percent)[34]. As a result, this business line generates around 70 percent of the total interest margin of the banking system (see Figure 4.3). Conversely, the Corporate business line exhibits much tighter terms, with relatively lower loan rates (average yield on performing loans of only 16 percent, primarily due to the presence of significant volumes of directed lending remunerated at below-market rates) and somewhat higher funding rates (weighted average cost of deposits, reverse repos and acceptances is around 10 percent). As a result, Corporate is only responsible for 20 percent of the total banking system's interest margin (see Figure 4.4).

[33] Analysis of the Treasury line is omitted here since, as previously mentioned, it is not the focus of the study and it includes a variety of other unrelated businesses.

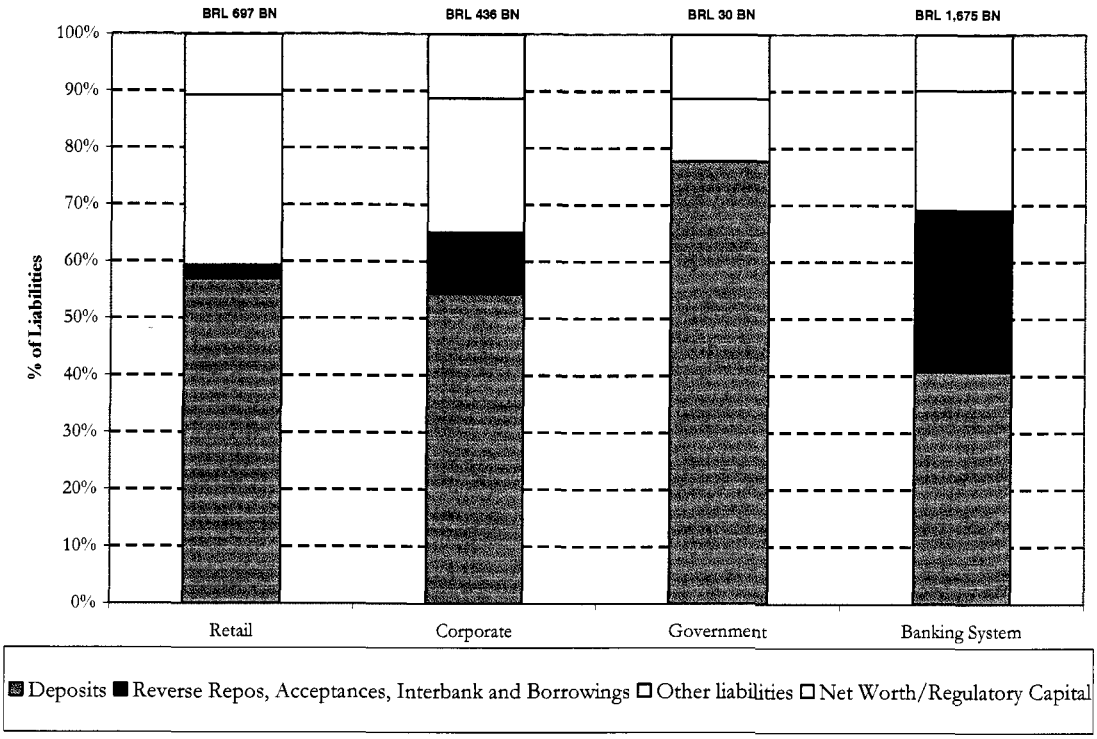
[34] The counterpart to lower funding costs is high reserve requirements and other limitations (e.g., on the use of savings accounts for housing finance) that do not allow putting much of this liquidity into profitable use.

Figure 4.1: Structure of Assets



Source: Study calculations based on Bacen data.

Figure 4.2: Structure of Liabilities



Source: Study calculations based on Bacen data.

Figure 4.3: Net Interest Income for Retail Business Line (BRL million)

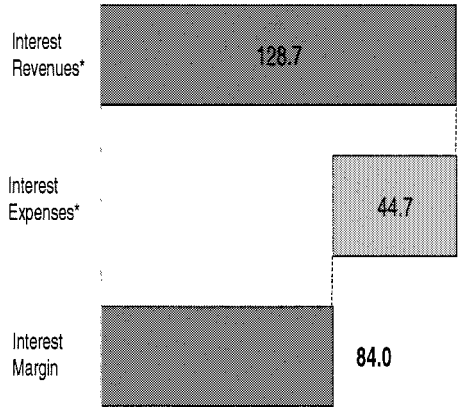
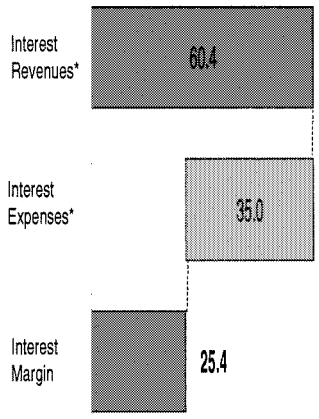


Figure 4.4: Net Interest Income for Corporate Business Line (BRL million)



** Interest revenues include interest received from performing and non-performing loans, remunerated reserve requirements, and inter-business line transfers. Interest expenses include interest paid on various types of liabilities (deposits, acceptances, reverse repos, borrowings used to fund directed lending) where applicable. Interest margin is the difference between interest revenues and expenses (i.e. net interest income).*
Source: Study calculations based on Bacen data.

35. **Most of the Retail business line's net interest income is actually derived from lending rather than deposit-taking, while the situation is more balanced for Corporate**. Using a transfer pricing methodology that is common in financial analysis, one can actually decompose the interest margin by business line into two parts: margin from lending versus margin from deposit-gathering activities. The lending margin consists of the loan spread over-and-above the relevant funding rate, while the borrowing margin is essentially the interest benefit derived from sourcing deposits at a lower cost than the interbank market – see Appendix II for a detailed explanation. According to this decomposition, more than 80 percent of Retail's margin comes from lending activities, while for Corporate the figure is close to 50 percent (figures 4.5 and 4.6). It is worth noting that, even though the benefit of deposit gathering is quite significant (i.e., the difference between the interbank rate and the average deposit rate is large), it is partly negated by the fact that around 40 percent of total deposits are 'tied up' in low-yielding reserve requirements and directed lending (e.g., housing finance) obligations.

Figure 4.5: Margin Decomposition for Retail (BRL million)

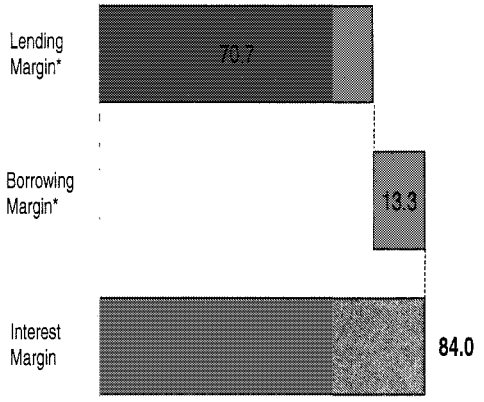
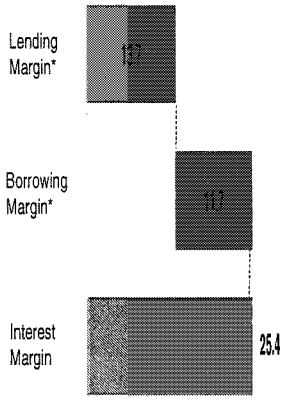


Figure 4.6: Margin Decomposition for Corporate (BRL million)

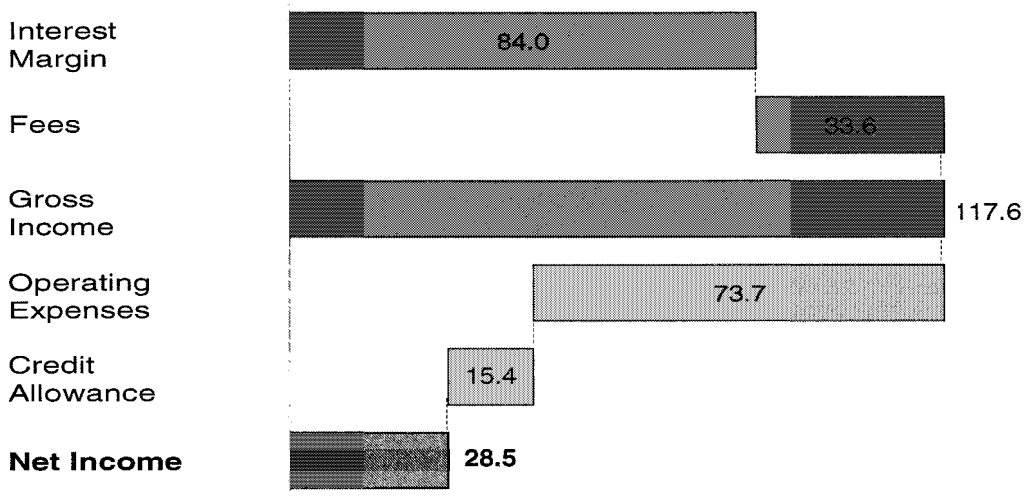


** The Lending Margin is the difference between loan-related interest revenues and the cost of funding them (interbank rate for free lending and relevant 'tied funding' rate for directed lending). The Borrowing Margin is the difference between interest income from deposits (both actual income from reserve requirements and 'notional' income from investing freely available deposits at the interbank rate) and interest expenses. The Interest Margin is the sum of these two margins (i.e. net interest income).*
Source: Study calculations based on Bacen data.

36. **The Retail business is significantly costlier to operate than Corporate.** This stems both from high operational costs (as shown by higher cost-income and operational expenses/total assets ratios) and from credit expenses (Retail accounts for almost two-thirds of total loan loss provisions). The former are associated with the required supporting infrastructure (i.e. the branch network and ICT), while the latter can be attributed to the relatively higher average default and loss experience of Retail clients (itself partly due to insufficient credit history and lack of positive information sharing, see next chapter for a discussion of the main drivers).

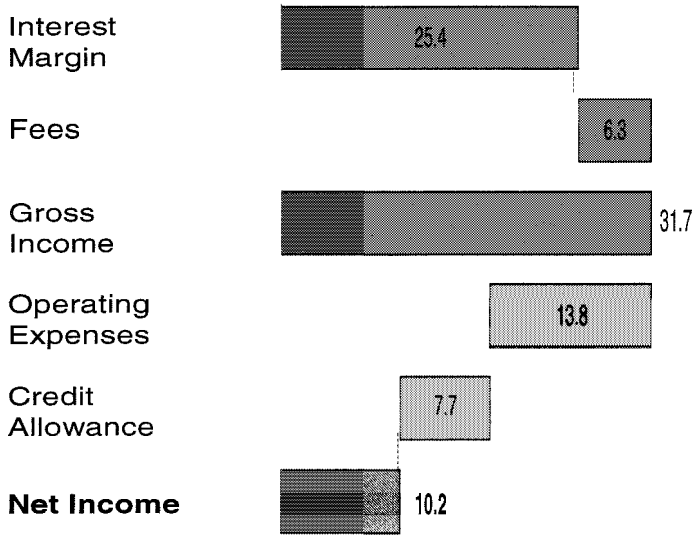
37. **Even after controlling for risks and expenses, the Retail business line generates higher profits than Corporate because its high margins and fees more than compensate higher operating costs.** This is due to the aforementioned higher spreads, in particular the lending margin. Higher profits also stem from the much greater participation of the Retail business line in non-interest income, which comprises fees generated by loans, payments and other banking services. As a result, Retail generates around 60 percent of the total banking system's pre-tax income. By contrast, even though the Corporate business line is responsible for less than 15 percent of operating costs and one third of credit expenses, it only generates around 20 percent of the total pre-tax income of the banking system (see Figures 4.7 and 4.8).

Figure 4.7: Net Income Decomposition for Retail Business Line (BRL million)



Interest Margin and Fees represent net interest and non-interest income respectively. Operating expenses include payroll, overhead, tax and other operating expenses. Credit allowance refers to loan loss provisions.
Source: Study calculations based on Bacen data.

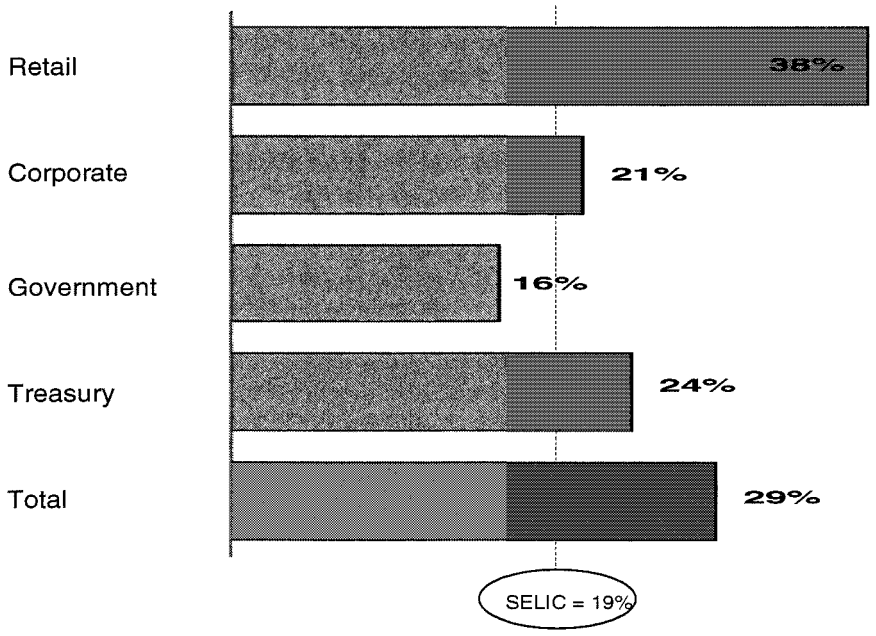
Figure 4.8: Net Income Decomposition for Corporate Business Line (BRL million)



Interest Margin and Fees represent net interest and non-interest income respectively. Operating expenses include payroll, overhead, tax and other operating expenses. Credit allowance refers to loan loss provisions.
Source: Study calculations based on Bacen data.

38. **The Retail business line is also more profitable when judged by profitability ratios such as the pre-tax return on assets (ROA) or risk-adjusted ones such as the pre-tax return on capital (ROC).** While the former indicator is not weighted for risk, the latter attempts to capture the relative riskiness of different business lines by estimating their capital requirement for credit risk and inserting it in the denominator of the equation[35]. As shown in Figure 4.9 below, Retail's estimated ROC is 38 percent, compared to only 21 percent for Corporate. While Corporate is a nominally profitable activity, it is worth noting that its ROC is close to the base rate (SELIC) during 2005, which is often used as a standard hurdle rate. The Government business line generates a lower ROC partly due to its proportionally higher NPLs and related credit expenses, while Treasury exhibits a ROC closer to the banking system average of 29 percent, but – as previously mentioned – these two business lines are not so relevant for the study. Using the ROA indicator also yields similar relative performance results for the Retail and Corporate business lines (4.1 percent and 2.3 percent respectively).

Figure 4.9: Estimated Return on Capital for Different Business Lines (2005)



Source: Study calculations based on Bacen data.

[35] This is also the approach undertaken by the Cruickshank Report (2000). Even though economic capital (i.e., capital needed to support the economic risks of the business) would be a conceptually more appropriate variable than regulatory capital, the latter is easier to estimate and is often in practice the binding constraint, particularly for larger, well-diversified banks. The estimated regulatory capital is allocated to the various business lines based on their respective credit exposures measured using Basel I rules (i.e., specific credit risk weights by asset type), with the residual book equity kept in Treasury. This is also consistent with the fact that such business lines mostly incur credit risk, while Treasury typically 'collects' and is responsible for managing market and interest rate risk. It should be noted that the capital charge for credit risk used in the study is based on the banking system's actual capital adequacy ratio (15 percent) rather than on the regulatory minimum capital requirement according to Basel I (8 percent) or for Brazil itself (11 percent).

4.3 Discussion of Findings

39. **The findings of the direct approach are in line with those of the indirect approach.** In particular, although there might remain some uncertainty about the level of absolute returns or the extent of out-performance by the Retail business line, the above estimations provide support to the hypothesis that the degree of price competition is lower in the retail (as opposed to the corporate) banking market. The findings also substantiate the study's premise that such analysis needs to take place at a disaggregated level in order to derive meaningful results.

40. **The aforementioned results are also similar to those reached by studies elsewhere.** The finding that retail banking in Brazil is higher-yielding and more profitable – even on a risk-adjusted basis – than corporate banking is not unusual. Previous studies in other countries have confirmed this result, either directly by estimating risk-adjusted profitability measures for different business lines or indirectly by comparing the valuations of different financial institutions[36]. Importantly, these findings have also been corroborated by various antitrust commission initiatives and other studies on specific segments of the retail banking market, such as payments services and lending to small firms[37]. In that sense, Brazil does not appear to be exceptional in terms of differences in performance between business lines, although this would have to be fully substantiated by undertaking a similar type of analysis for other countries. What seems particular of Brazil is the extent of such differences[38].

41. **Findings need to be treated with caution due to significant methodological and data constraints.** Methodological constraints include heavy reliance on accounting statements that might significantly differ from economic reality (e.g., in the treatment of expected credit losses), and estimation at a point in time (2005) as opposed to a full business cycle, which might distort both absolute and relative rates of return[39]. Data constraints include the unavailability of business line-level information on volumes and rates, which necessitated making allocation and rate assumptions.

42. **In any case, sensitivity analysis supports the robustness of the results under plausible scenarios.** Analysis was undertaken for key variables that were not fully corroborated[40] in order to identify the robustness of different assumptions[41]. Appendix III

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[36] See, for example, Clark et al (forthcoming), the Cruickshank Report (2000), Oliver, Wyman & Company (2003), and Morgan Stanley and Oliver Wyman & Company (2002).

[37] For example, the Cruickshank Report (2000) attempts to estimate financial performance for UK banks at a disaggregated level (i.e. by individual economic market and customer class) using accounting data.

[38] Still, Clark et al (forthcoming) compare recent performance of eight large US banks and find that the retail business has returns two to three times higher than non-retail. However, the same article later concedes that the evidence is mixed about the extent of such differences.

[39] However, international experience from developed countries suggests that default rates on corporate banking are more correlated and volatile than those on retail banking. As a result, one would expect corporate banking to exhibit even better performance in 'good times' than normally. This phenomenon is also recognized in Basel II, where exposures to retail and small/medium-sized firms receive a lower credit risk weight than corporate exposures and therefore have relatively lower regulatory capital requirements.

[40] Sensitivity analysis on variables whose values are confirmed – for example, the average interest rate of Selic for 2005 – is not undertaken, even though these may also represent key drivers of performance.

provides a detailed description of the different sensitivity tests and of their outcomes. Assumptions about lending rates and the allocation of operating expenses were found to be the most sensitive variables, in terms of influencing the relative profitability of the Retail versus the Corporate business lines. However, the results reported above were generally insensitive to most plausible scenarios, thereby confirming their robustness.

43. **The above analysis could be usefully extended in the future if sufficient data was available**. In particular, additional valuable insights could be attained by making the analysis more granular. Examples include adopting a more disaggregated definition of business lines (e.g., separating out rural, asset management, credit cards, investment banking activities etc.), or analyzing and comparing performance by groups of banks (e.g., by ownership, size, or target market segment) or by geographical regions. However, such analysis would require significantly more bank-level (and likely non-public) data than is currently available, and would need to address the additional complexities that would be introduced (e.g., allocation of costs given the likely presence of joint cost structures/economies of scope at a more disaggregated level, allocation of risks, treatment of cross-subsidies etc.).

44. **One avenue of future research would be to analyze the effect of government interventions on the Brazilian banking system's financial performance**. In addition to the fact that the government represents the largest client of the banking system (government securities), it also has a very important and multidimensional influence. This includes the complex role played by state-owned banks (40 percent of total system assets), directed lending schemes (one-third of total lending), reserve requirements (30 percent of total demand, savings and time deposits), special and regulated deposits (one-fourth of total deposits), and the tax structure (corporate income and financial transaction taxes). Additional scrutiny on the effects of individual types of government intervention would shed light on the nature and extent to which each one contributes to the system's structure and performance.

[41] Sensitivity analysis is undertaken at the level of individual variables; it is possible that combinations of different variables, while insignificant on an individual basis, could also significantly affect the results.

5. Drivers of Performance by Market Segment

45. **Several underlying causes may account for the significantly different financial performance of retail and corporate banking.** Firstly, the difference in performance might be apparent rather than real because the estimated stand-alone results do not capture the complex inter-linkages and cross-sales/subsidies between business lines. For example, as was indicated in several bank interviews, corporate banking sometimes represents a 'loss leader' for generating additional business booked in Retail (e.g., payroll loans) or Treasury (e.g., foreign exchange trading). This is a valid argument in the case of Brazil, although it likely cannot explain by itself the large difference in performance across business lines. Secondly, and consistent with traditional finance theory, the discrepancy in performance might be a temporary phenomenon related to the current stage in the business cycle that will eventually sort itself out. While there might be some merit to this argument[42], one would need to show that retail banking was less profitable on a risk-adjusted basis than corporate banking at an earlier point in the cycle, perhaps during the 2002 downturn – an unlikely result given the even higher loan spreads that existed for retail loans at that time. Finally, as described below, the various market drivers (which can include cross-sales and the business cycle mentioned above) affect business lines in different ways, and their combined effect leads to the differences in performance across bank business lines.

46. **Importantly, a host of factors that influence revenues, costs, and risks explains the structure and financial performance of different market segments.** These factors can be common across business lines (although they might have different effects), but they can also differ substantially by – and even within a – business line. They include, among others, inherent client and transaction features, regulation (including the type and degree of government involvement in the financial system)[43], and the state of the financial infrastructure. All these factors are relevant in determining the degree of effective competition[44] and contestability[45] in particular market segments and, by implication, on market structure and relative profitability (see Table 5.1 for a summary).

5.1 Retail Banking

47. **Retail banking shows many aspects of a network business in which physical presence is very important.** It is characterized by significant fixed costs of operation,

[42] For example, Clark et al (forthcoming) speculate that there is a cyclical element at play in explaining the higher returns on retail activities for large US bank holding companies, while Hirtle and Stiroh (2005) analyze a sample of 700 US bank holding companies for 1997-2004 and conclude that in the US "*while retail banking may be a relatively stable activity, it is also a relatively low-return one*".

[43] For example, McKinsey (1998 and 2006) stresses the importance of regulation as a key barrier to increased productivity growth for Brazil's capital-intensive retail banking sector.

[44] Competition is effective only if the consumer has sufficient information to make rational choices and is able to exercise them at low transaction costs.

[45] A contestable market has low entry and exit barriers, thereby restraining incumbent firms from exercising monopoly power because of the credible threat of new entrants.

including branches, ATMs and information and communications technology (ICT) infrastructure. Yet, as the study indicates, margins and fees of this business more than compensate the higher inherent fixed and overhead costs. Not surprisingly, efficiency is a key driver of this business and the cost-to-income ratio is the traditional control variable.

48. **There are several drivers on the revenues side that support high interest income and fees.** The small size of individual clients does not typically allow them to negotiate rates, while independent alternative non-bank providers of such services are relatively few[46]. Regulation is important since it tends to discourage client switching due to the penalizing financial transaction tax CPMF (*Contribucao Provisoria sobre Movimentacao Financiera*)[47], the lack of sufficient positive information sharing on borrowers (*cadastro positivo*)[48], and the structure of payroll account relationships[49]. Other potentially important switching barriers include the convenience factor and related need for a branch network by individuals, product bundling by banks (e.g. linking of deposit accounts to cheaper payment and loan services), as well as inefficiencies in the retail payment systems infrastructure. Examples of the latter issue include a low level of interoperability between banks and clearinghouses, deficient integration among Automated Teller Machine (ATM) and Point of Sale (POS) networks, and lack of standardization in communication protocols[50]. As a result, customers of some banks cannot access other banks' networks, creating an infrastructure barrier to competition. Other factors such as branding, service quality and perceptions of solvency also act as barriers to entry for potential competitors by leading to less price-sensitive behavior by consumers. Many of these are common to other countries, as evidenced by international consumer surveys indicating that proximity, perceptions of solvency, and brand image tend to be ranked above pricing as determinants of the primary banking relationship.

49. **Although funding costs are low, operating costs in the Retail market segment are very high.** Regulation – in particular, the presence of savings and special deposit accounts – has contributed to low-cost funding. However, high reserve requirements tend to offset this advantage. On the operational side, in spite of economies of scale stemming from Brazilian banks's success at standardizing and automating important features of the delivery system, operational costs remain very high. These include high fixed costs that are needed to set up the branch network and ICT infrastructure, as well as high variable costs that are needed to run it, which stem from high-volume, small value transactions

[46] Although there exist several credit providers for consumer durables (e.g. appliance stores), they tend to be associated with – and financed by – the banks themselves.

[47] In fact, CPMF is not charged if there is an account transfer of the same type and with the same names, but according to bank interviews it dissuades most retail customers from performing any financial movements. See Ebrill, Summers and Coelho (2000) for a discussion of such taxes.

[48] The lack of positive information limits the predictive ability of collected data and prevents consumers who honor their obligations to benefit from the 'reputation collateral' that they have built.

[49] The current practice in Brazil is that payroll accounts tend to lock-in retail relationships. On the one hand, banks obtain important information on the customer while, on the other hand, customers increasingly receive payroll-linked loans and therefore tend to stay with the same bank. The potential payoffs from this "captive market" seem to be so high that, in fact, banks pay considerable amounts to corporations and state/local governments in order to obtain those relationships.

[50] See Western Hemisphere Payments and Securities Clearance and Settlement Forum (2004) for more details.

and from an inefficient retail payments mix. In particular, the infrastructure for clearing and settling transactions among banks is fragmented and sometimes incompatible, which reduces economics of scale. The predominant use of cash and checks as payment instruments also implies higher costs and increased operational risks. In order to cope with these costs, banks continually strive to capture and keep customers in their own network. Finally, additional costs might also exist relating to non-price competition[51] and possibly to internal technical inefficiencies[52] stemming from inadequate competition in specific product markets.

50. **The loan loss experience of the Retail business is relatively higher, but less volatile, than for Corporate**. This segment is prone to higher default and loss rates (albeit more granular and less correlated to the business cycle) than for corporate, as evidenced by the ratio of non-performing loans in the study. Knowledge of customer credit history, including both positive and negative information, is relevant to any credit decision – however, Brazil lacks private credit bureaus that can fully share such information. This not only reduces access to credit to potentially creditworthy customers while increasing overall costs to the system, but also helps strengthen the customer relationship with a bank that possesses such information.

5.2 Corporate Banking

51. **In contrast to retail, the corporate business line is more akin to an auction market and presents relatively more price competition**. Our results strongly suggest that the corporate market has a higher degree of price competition than retail, as evidenced by tight interest rate margins and much lower profitability. Although this business is less costly to operate, reduced margins depress returns to the point where they are comparable to those obtained simply by investing in government bonds.

52. **Lower corporate loan spreads and revenues can be largely explained by regulation, as well as by greater effective competition and contestability**. Anecdotal evidence from interviews suggests that Chief Financial Officers of corporations tend to shop around for rates, and look at the banking relationship with a comprehensive view. Thus, share of wallet of the customer is a key driver for banks in this business and it encourages cross-subsidization[53]. There exist more substitute providers (e.g. capital markets, offshore banks) in this market segment, while entry barriers – at least on the lending side – are lower. In addition, the significant presence of directed lending (46 percent of all corporate loans as of end-2005, compared to only 20 percent for retail loans) depresses average loan spreads and interest income.

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[51] Banks not only compete in terms of prices; non-price competition can take place in terms of quality of service, delivery channels, branding, product innovation, relationship management etc.

[52] This type of efficiency measure (so-called X-efficiency) is the effectiveness with which a given set of inputs is used to produce outputs.

[53] This may also provide indications of cross-subsidies in the payroll account business mentioned above – for example, Brazilian banks may sacrifice returns on the corporate relationship in order to profit from the relationship with employees of those corporations that are served in retail through payroll accounts.

53. **The cost of running the corporate business line is relatively low**. Even though the cost of funding is higher than for retail due to the lack of low-cost savings deposits, operational costs are much lower. The main contributing factor is the nature of the delivery model (no need for extensive branch network, combined with lower-volume, higher-value transactions), although the extensive scale and type (e.g., rural credit) of directed lending operations might add to operational costs.

54. **Another important feature of the corporate market is its relatively lower (but more volatile) credit expenses**. As previously shown, non-performing corporate loans are closer to international averages than those in retail. Although the information needed to assess the credit risk of firms in Brazil – particularly larger ones – is more widely available, the impact of individual credit exposures is larger and more correlated to the macroeconomic environment, requiring customized risk management models with professional financial analysis. In addition, there is significant room for improvement in the quality of Brazilian corporate financial statements[54], which would enhance the reliability of the input data in those models. The inability to include positive information (including by public banks) in the borrower reports produced by the credit reporting industry also hinders the predictive ability of such models. Moreover, much of corporate lending (especially to the middle market) is collateral-driven and is therefore more reliable on the credit infrastructure, making it vulnerable to related problems with weak creditor rights such as judicial debt collection difficulties. In fact, Brazil fares below many Latin American countries in terms of legal rights and contract enforcement proceedings[55]. Finally, the inter-linkage among different credit registries is not yet complete, while links between credit registries and payments systems remain imperfect[56].

[54] Examples include overlapping mandates for accounting and reporting standard-setting, as well as significant gaps between Brazil's Generally Accepted Accounting Principles and International Financial Reporting Standards.

[55] According to the WB Doing Business 2006 statistics, Brazil's legal rights index score is 2 (versus 4.5 for the region and 6.3 for the OECD), while the cost of enforcing contracts is 16 percent of debt value (versus 23 for the region and 11 for the OECD) and the time required is 616 days (versus 642 for the region and 351 for the OECD).

[56] See Western Hemisphere Credit and Loan Reporting Initiative (2005) for more details.

Table 5.1: Profitability and Drivers for different Market Segments

Key Attributes by Market Segment		**Retail**	**Corporate**
Profitability		ROA = 4.1 % ROC = 38%	ROA = 2.3 % ROC = 21%
Sources	**Revenues**	• Loan spreads with a yield of 45% (60% of total income) • Fees from payments and accounts (30% of total income)	• Income from deposits (70% of total income) • Fees for advisory activities (20% of total income) • Cross-selling to other businesses (not accounted in Corporate)
	Costs	• Fixed costs related to infrastructure: branch networks, ATMs, and ICT (cost to income ratio of 55%)	• Lower operational costs (cost to income ratio of 38%)
	Risks	• High default and loss rates (Expected Loss)	• High variability of default and loss rates (Unexpected Loss)
Relevant Drivers		• Ability to keep clients in the network (e.g. convenience factor, product bundling and innovation, CPMF, payments interconnection, payroll account relationships, etc.) • Branding, perceptions of solvency, proximity and quality of service • Level of reserve requirements, which reduce volume of free deposits and income from deposit-gathering • Level and type of directed lending, which affects volume and income of loan operations • Efficiency to manage high volume of standardized transactions and related fees • Capturing/sharing of negative and positive information on borrowers • Automation and standardization of risk management (e.g. credit scoring)	• Ability to manage the overall relationship with individual customers, resulting in cross-selling to other businesses • Presence of substitute providers (e.g. foreign institutions, capital markets) • Level of reserve requirements, which reduce volume of free deposits and income from deposit-gathering • Level and type of directed lending, which affects volume and income of loan operations • Effectiveness to manage low volume of complex transactions • Reliability of borrowers' financial statements, ability to analyze individual risks • Extent of reliance on credit infrastructure, including corporate bankruptcy, collateral enforcement, and judicial uncertainty

6. Conclusions and Policy Implications

55. **The study confirms the need to analyze the Brazilian banking system at a disaggregated level.** The banking system must not be seen as a single homogeneous business, but rather as a set of markets in which competitive conditions can vary substantially. For example, as both the direct and indirect approaches strongly indicate, the retail and corporate market segments are characterized by different size, structure, conduct (in terms of loan pricing) and performance. There are also significant differences within each of these segments (e.g., between deposit and loan product markets), so defining the relevant market and accessing data become important issues for such analyses[57]. Differences across market segments in particular need to be taken into account, aggregate studies tend to average these out and thus provide a blurred picture. As such, the answer to Belaisch's (May 2003) paper entitled "*Do Brazilian Banks Compete?*" cannot be a simple yes or no; it is rather a question of degree and it depends greatly upon the specific market segment.

56. **One key finding of the study is that the Retail business line is less sensitive to price competition and exhibits considerably higher returns than Corporate.** Even though the Retail business line is both costlier and riskier than Corporate, it is significantly more profitable – even on a risk-adjusted basis – due to higher loan spreads and fees. Although this result needs to be treated with some caution due to methodological and data constraints in the analysis, it appears robust to most plausible sensitivity scenarios. While this finding is not unusual in the international context, Brazil may appear exceptional in the extent of such performance differences. The analysis also highlights the importance of identifying the different drivers of performance and determinants of levels of (effective) price competition and contestability. Some of these factors are within the scope of government policy, while others are inherent to the type of client/transaction and are therefore less amenable to change.

57. **There are both system-wide and market segment-specific policy recommendations that can be drawn from the analysis**. At the banking system level, there is a clear need to strengthen the oversight framework and institutional capacity to promote competition in the financial sector, which is currently primarily (at least until the new antitrust law for the banking sector is approved by Congress) in the hands of Bacen[58]. Drawing a clear distinction between the criteria underlying the prudential/supervisory and competition/consumer protection perspectives, as is the practice in other countries, would be a useful practical step, which would also facilitate relevant data collection and analysis. With regards to market segment-specific issues, government policies that encourage price competition among banks – especially in the Retail market – should address those factors that drive up revenues, costs, and risks, and hence adversely impact efforts to ensure wide and affordable access to banking services.

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[57] More disaggregated (but non-public) data for this study would have been welcome and could allow analysis at bank group level – for example, testing whether McKinsey's (1998) finding that "*public banks have contributed to the low level of price competition by creating a price ceiling [because of lower productivity] under which private banks can comfortably operate*" still holds.

[58] See World Bank (May 2006) for more details. A formal agreement on a reformed antitrust regime for the banking industry was reached in 2005 between the antitrust authorities (*Conselho Administrativo de Defesa Economica*) and Bacen as an interim measure until the law is passed.

58. **Further promoting the portability of bank accounts would encourage more price competition and contestability, especially in Retail banking.** As previously mentioned, current regulations discourage the transfer of accounts from one bank to another either by punishing financial transactions (CPMF tax) or by inherently locking clients with one bank as a result of the nature of payroll account relationships. The latter is a particularly important consideration given that the growth of consumer lending in recent years can be attributed primarily to payroll loans[59]. In this realm, an attempt to de-link the retail and corporate relationships has already been initiated by the authorities in late 2006 and it should be considered as a first step in facilitating client switching in the banking system.

59. **The issue of positive credit information sharing is crucial in facilitating access to credit, particularly for lower-income borrowers and for smaller firms**. A draft "*cadastro positivo*" law that provides the legal foundation for the creation of positive information databases is awaiting approval by Congress. This initiative will allow banks to share the positive credit history on prospective borrowers, reducing information asymmetries in credit markets (particularly for lower-income borrowers) and broadening access. Passage of this law would be particularly timely given the current move by banks to expand loans to independently employed individuals and small firms, because the market for lending to employees of larger firms and the public sector is progressively reaching maturity. Expanding this market is conditional on securing access to sufficient credit information[60]. In addition, strengthening the inter-linkage among credit registries as well as the links between credit registries and payments systems would increase transparency and contribute to reducing the costs and risks of bank lending, thereby promoting access and decreasing loan spreads.

60. **Expanding payment system interconnection and improving the retail payments mix would also increase banking system competition and efficiency**. While the technological platform for large-value transactions is fully operational and follows best international practices, there is ample room for improvement in the efficiency of retail payment systems and instruments. To address these issues, Bacen is implementing a series of reforms to modernize retail payments systems (*Sistema de Pagamento Brasileiro*) by encouraging integration of ATM networks, standardizing communication protocols, and promoting electronic means of payment. Looking forward, it is of paramount importance that Bacen fully implements this reform agenda since it will promote efficiency and encourage greater competition among payments providers.

61. **Further development of capital markets is also critical to enable them to play a more active role in the provision of long-term finance.** Brazil's long history of macroeconomic instability, coupled with high interest rates and public intervention in the market for long-term capital, has contributed to historically weak local capital markets. The recent increase in public listings of new companies on BOVESPA (São Paulo stock exchange) has mobilized equity markets, but fixed income markets remain incipient[61]. In

[59] In fact, payroll loans have grown dramatically from around 10 percent of loans to individuals as of end-2003 to over 25 percent as of end-2006.

[60] Interviews with senior executives of banks that are active in the retail segment indicate that their focus will progressively move to independent workers and other professionals not affiliated to a corporation.

[61] Trading value at BOVESPA has doubled over 2000-05, while commercial debt offerings registered with the Brazilian Securities and Exchanges Regulator (CVM) multiplied 10 times, albeit from a very low base.

addition to continued macroeconomic discipline and development of the domestic long-term sovereign yield curve, initiatives to address distortions in the long-term debt market would also be beneficial. Furthermore, the potential of pension funds and insurance markets to mobilize long-term financial resources and contribute to financial development (e.g., via infrastructure and project finance) can be exploited. Assuming the current scenario of decreasing interest rates persists, capital market-based operations will likely grow more and will progressively replace traditional corporate lending in this market segment.

62. **Likewise, improvements in corporate financial reporting are essential to boost the development of capital markets and to promote sound corporate governance practices.** Currently, corporate financial reporting is governed by several laws and regulations outlined in the Corporations Law. Although this Law has been amended twice (1997 and 2001) since its inception in 1979, the legislative process can be lengthy and cumbersome, especially when contentious issues are at stake. A positive development in this realm would entail amendment of the Corporations Laws to exclude detailed accounting and financial reporting rules, which in turn should be governed by sub-legislative acts. Furthermore, the establishment of an independent standard-setting body with authority to issue standards on general corporate financial practices would facilitate Brazil's convergence with international practices[62].

63. **Legal rights and judicial procedures for contract enforcement should also be tackled to improve the overall efficiency of the system.** Brazil fares below many Latin American countries in terms of legal rights and contract enforcement proceedings[63]. Recent changes to the bankruptcy law (Law No.11.101, February 9th, 2005) have been beneficial, but a higher focus on enforcement is needed, which would help reduce credit risks and costs, thereby expanding access to credit for certain borrower segments that depend on collateral-based lending (e.g., small firms).

64. **Finally, the nature and extent of government interventions in the Brazilian banking system also need to be reassessed carefully going forward.** In addition to the fact that the government represents the largest client in the banking system (government securities), it also has a very important, complex, and multidimensional influence via state-owned banks, directed lending schemes, reserve requirements, special and regulated deposits, and the tax structure. As indicated in the study, the various types of government interventions represent important drivers of performance in different market segments, necessitating a deeper analysis of their individual impact and overall value-added. The improved macroeconomic conditions and declining interest rate environment in Brazil provide a good opportunity to tackle these medium to longer term issues.

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[62] There are gaps between Brazil's generally accepted financial and accounting practices and International Financial Reporting Standards (IFRS). For instance finance leases are not recorded as such in the financial statements; Brazilian financial reporting standards are less demanding in terms of disclosure; and the text of standards is less detailed, leading to inconsistencies in their application.

[63] According to the World Bank's Doing Business 2006 statistics, Brazil's legal rights index score is 2 (versus 4.5 for the region and 6.3 for the OECD), while the cost of enforcing contracts is 16 percent of debt value (versus 23 for the region and 11 for the OECD) and the time required is 616 days (versus 642 for the region and 351 for the OECD).

Appendix I: The Brazilian Banking System from an International Perspective – Additional Comparisons

The Brazilian banking system's deposits represent a lower proportion of liabilities than in other countries, partly due to the role of legally mandated (non-deposit) funds that are used for directed lending purposes. In addition, retail deposits (including poupança) represent a significant share of total deposits.

Figure I.1: Composition of Liabilities (2005)

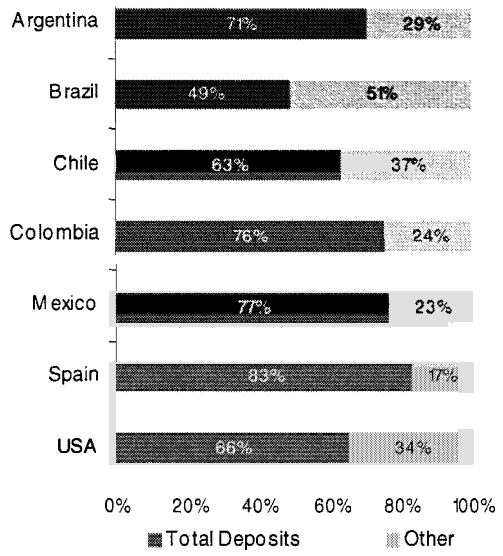
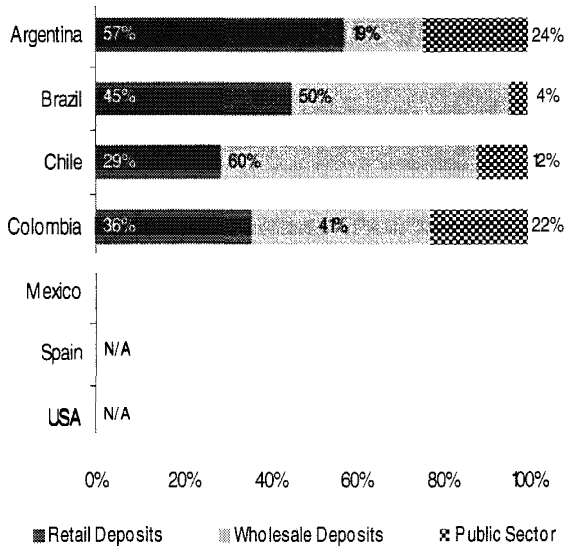


Figure I.2: Composition of Deposits (% total deposits, 2005)



Source: Superintendencia Bancaria de Colombia - Dirección Técnica - Subdirección de Análisis Financiero y Estadística; Superintendencia de Bancos e Instituciones Financieras de Chile- Revista de Información Financiera Dic. 2005- Corporate Deposits includes Pension System Deposits; Brazil Credit Guarantee Fund (FGC) and IMF International Monetary Survey; Banco Central de la Republica Argentina- Subgerencia de Estadísticas Monetarias y Financieras- Informacion Diaria sobre Depositos y Obligaciones & Boletin Estadistico, Federal Reserve, and Superintendencia Bancaria de México. Composition of Deposits excludes financial system deposits (Argentina, Colombia, Chile).

Although the Brazilian banking system includes some large banks, it is not out of line in terms of traditional measures of concentration.

Figure I.3: Market Share of Top 3 Banks

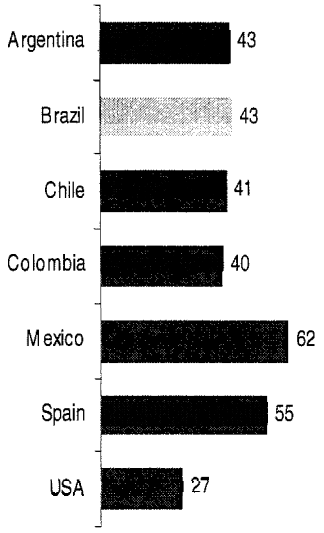


Figure I.4: Market Share of Top 10 Banks

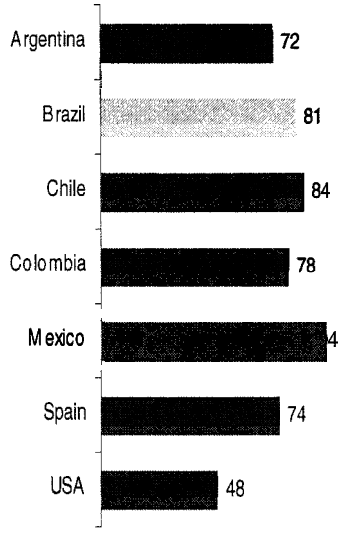
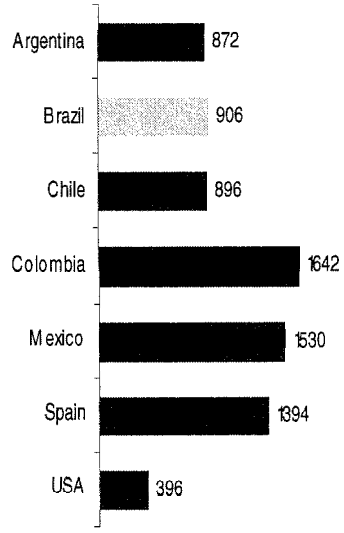


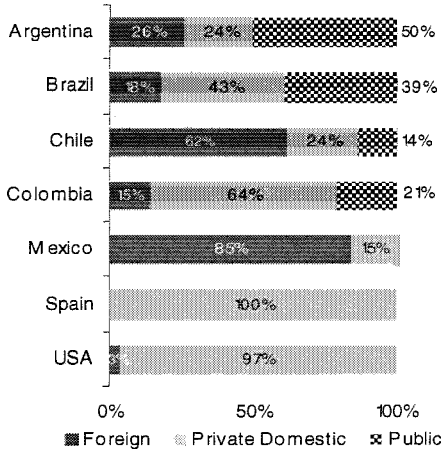
Figure I.5: Herfindahl Index of Market Concentration



Source: Federal Reserve, Banco de España, Comisión Bancaria y de Valores de México, Superintendencia Bancaria de Colombia, Banco Central de Chile, Banco Central do Brasil, Banco Central de la República Argentina.
Note: The Herfindahl index is calculated as the sum of the squares of market shares of each institution. For Colombia, it is based on the share of all banks belonging to a single banking conglomerate considered as one institution.

Compared to most Latin American countries, Brazil has a high participation of private domestic and public banks.

Figure I.6: Ownership of Top Ten Banks



Source: Federal Reserve, Banco de España, Comisión Bancaria y de Valores de México, Superintendencia Bancaria de Colombia, Banco Central de Chile, Banco Central do Brasil, Banco Central de la República Argentina

Appendix II: Description of the Methodology to Estimate Performance by Market Segment

Financial statements of the Brazilian banking system

The broadest definition of the Brazilian banking system (the so-called 'consolidated – level III') is adopted for purposes of analysis, which covers all banks (including BNDES), finance companies, and credit cooperatives. In this way, all directed lending schemes are properly accounted for as part of the banking system. The financial statements for 2004 and 2005 are collected, tabulated and re-arranged into a suitable format (Table II.1).

Table II.1: Brazilian Banking System – Consolidated Financial Statements (2004-2005)

ASSETS (LESS BROKERAGE)	2004	2005	INCOME STATEMENT	2005
Cash and floating	32,617	23,410	Interest revenues	255,657
Repos	143,892	182,419	*Loans and leases*	*149,905*
Securities and derivatives	387,422	445,321	*Securities and repos*	*86,204*
Interbank transactions	198,931	214,882	*Derivatives*	*4,205*
Branches due transfers	1,068	773	*F/X*	*3,747*
Net loans and leases	442,841	530,445	*Required deposits*	*11,596*
Gross loans and leases	*474,108*	*569,227*	Interest expenses	136,960
Loan loss provisions	*31,267*	*38,783*	*Deposits, acceptance and reverse repos*	*107,060*
Other credit outstanding	162,310	173,851	*Borrowing*	*19,525*
Other assets	5,615	8,127	*Lease*	*9,806*
Leased assets	20,147	33,538	*F/X*	*569*
Fixed assets	55,783	61,857	Net interest income	118,698
Total Assets	**1,450,626**	**1,674,624**	Non-interest income	80,132
			Service charges	*42,026*
			Method equity	*4,468*
LIABILITIES	**2004**	**2005**	*Other operating revenues*	*33,637*
Deposits	571,670	682,703	Gross income	198,829
Demand	*87,500*	*100,501*	Operating expenses	115,625
Savings	*159,383*	*169,032*	*Payroll expenses*	*37,732*
Interbank	*23,623*	*25,605*	*Overhead*	*43,364*
Time	*262,824*	*334,379*	*Other operating expenses*	*34,529*
Other	*38,340*	*53,184*	Tax expenses	10,976
Reverse repos	194,395	243,926	Net operating income before provisions	72,229
Acceptances	37,115	39,162	Allowance for bad credits	24,545
Interbank transactions	6,184	8,948	Net operating income after provisions	47,684
Suspense accounts branches	9,056	9,609	Non-operating income	166
Borrowings	184,445	172,947	Pre-tax income	47,850
Derivatives	15,522	25,293	Income tax	11,231
Other liabilities	284,880	327,802	Profit sharing	2,820
Net worth	146,904	164,235	**Net after-tax income**	**33,798**
Total Liabilities	**1,450,171**	**1,674,624**		

Source: Bacen.

Allocation of Deposits, Acceptances and Reverse Repos

Given the unavailability of deposit information by business line, the allocation of deposits and acceptances is based on interviews with banks, complemented by data from Bacen, the Brazilian deposit insurance agency (*Fundo Garantidor de Créditos* or FGC) and the IMF's *International Financial Statistics* (IFS).

In particular, the Government's demand deposits are derived from Bacen reports, while the IFS provide the source of total central Government deposits as of end-2005. Non-Government demand and time deposits are assigned evenly between the Retail and Corporate business lines based on bank interviews, while savings deposits ("*poupança*") are allocated exclusively to Retail. Acceptances are assumed to comprise of two types: various types of 'letras' (e.g. *letras hipotecarias*, *letras de cambio* etc.) insured by FGC are allocated based on their relative size based on FGC data, while all other types of acceptances are assumed to be mainly debentures and are therefore mapped to Treasury.

Interbank deposits and reverse repos (a form of funding using pledged securities) are also mapped to Treasury. Other deposits, which consist of so-called 'special deposits' by institutions such as FAT (*Fundo de Amparo ao Trabalhador*) and are mostly held by state-owned banks, are assumed to be primarily used for directed lending purposes and are therefore allocated by business line based on the type of lending that they are assumed to support (see below for more details).

As can be seen in Table 4.1, the Retail business line holds 58 percent of total deposits and 18 percent of acceptances, while Corporate controls 35 percent and 18 percent respectively. Treasury holds 4 percent of deposits and all remaining acceptances, while Government only has a small share (3 percent) of total deposits.

Allocation of Interest Expenses on Deposits, Acceptances and Repos

Two types of data are required in order to estimate and allocate interest expenses on deposits, acceptances and repos by business line:

- Average 2005 balance by business line – this is estimated by taking the simple average of balances at the beginning and end of 2005
- Average interest rate by type of deposit during 2005 – this is estimated based on rate information in Bacen's website, as well as on yield information found in the 20-F reports for 2005 of Brazilian banks filed with the SEC[64].

Total interest expenses by deposit product can be estimated by multiplying these two types of data; their accuracy can be assessed by comparing the resulting figure to the one published by Bacen for the banking system. The allocation of interest expenses by product and business line is then based on the volume of each product that belonged to each business line as of end-2005.

As can be seen in Table 4.1, the Retail business line is charged 34 percent of all interest expenses on deposits, acceptances and repos; Corporate and Treasury are charged 22 percent and 41 percent respectively, with the remainder (2 percent) charged to Government.

Allocation of Reserve Requirements on Deposits and of their Remuneration

Not all demand, savings and time deposits collected by a business line are freely available to finance loans, because of the existence of reserve requirements (RR) that need to be estimated and appropriately allocated. Each type of deposit has its own RR, which vary with respect to the required proportion, utilization (placed with Bacen or invested in securities) and remuneration. For example, 53 percent of all demand deposits must be kept with Bacen as RR (of which only 8 percent is remunerated), while banks have the obligation to either lend another 25 percent for rural projects (earning a fixed rate of 8.75 percent) or leave those funds with Bacen earning no interest (some banks

[64] The average interest rate by type of deposit is effectively a weighted average of rates of different maturities and currencies (both local and foreign currency) offered in each type of deposit.

actually prefer this option). This means that only 12 percent of demand deposits collected by business lines are freely available to be used for lending purposes[65].

RR are estimated by type of deposit and then allocated to business lines based on their respective deposit share. RR that are placed with Bacen appear as interbank transactions in the banking system's balance sheet, so business lines that have such RR actually book them as such on their stand-alone balance sheets. All remaining interbank transactions (i.e. those that are not RR with Bacen) are assumed to be placements with other banks and are therefore allocated to Treasury.

Assumptions also need to be made about the remuneration of RR in order to estimate the income from such transactions (shown as interest revenue from required deposits in the banking system's financial statements); the average Selic rate for 2005 is assumed to be 19 percent, while the average yield on savings accounts is assumed to be 8 percent. This income is allocated across business lines based on their respective type and volume of RR.

It is worth noting that 15 percent of time deposits must be held as RR in the form of securities investments; these investments are also allocated across business lines, while the residual volume is assigned to Treasury. No explicit assumption about the yield of these securities was made, so they effectively earn the average yield of all securities on the banking system's balance sheet, which is implicitly calculated by dividing the relevant interest income by the average volume of these investments in 2005.

As can be seen in Table 4.1, the RR of the Retail business line account for 44 percent of interbank transactions and 5 percent of total banking system securities (another 18 percent booked in Retail corresponds to housing finance-related investments – see below), and generate 73 percent of interest income on required deposits. The Corporate business line accounts for 20, 5 and 24 percent respectively. Treasury has all non-RR-related interbank transactions (34 percent) as well as securities and derivatives (71 percent), while Government has small shares of each.

Allocation of Loans

Bacen's monthly report on financial system credit operations is used to allocate different types of loans (earmarked vs. non-earmarked, individuals vs. corporations, etc.) by business line. The report includes a higher credit figure than that reported by the banking system (BRL 607 billion vs. BRL 569 billion as of end-2005) because the former is more comprehensive and includes non-bank sources of lending (e.g. credit unions, lending by development agencies etc.). These loans are selectively excluded from the analysis in order to arrive at the same gross credit figure as for the banking system (i.e. BRL 569 billion), which needs to be allocated across business lines. Bacen's report also includes the total volume of public sector credits (BRL 20.6 billion).

Given that the Retail business line includes small firms, dividing up reported lending figures between individuals and firms is insufficient for the allocation mechanism. An additional assumption that was made, based on bank interviews and 20-F reports on the

[65] There are additional complications for demand deposits that are not treated in this exercise, e.g. banks have the obligation of lending an additional 2 percent of their demand deposits to microcredit.

distribution of loans by client size, is that 15 percent of all corporate loans are given to small firms – with two exceptions[66] – and should therefore be allocated to Retail (as opposed to Corporate).

As a result of the aforementioned allocation mechanism, the Retail business line accounts for 46 percent of the banking system's gross loans (37 percent and 9 percent are loans to individuals and small firms respectively), while Corporate and Government account for 50 and 4 percent respectively.

Allocation of Non-Performing Loans and Loan Loss Provisions

Bacen's monthly report on financial system credit operations is also used to measure non-performing loans (NPLs) and allocate loan loss provisions (LLP) by business line. NPLs are defined based on Bacen regulations as those loans whose credit ratings are D-H, which are loans representing higher levels of credit risk and/or are already in arrears for more than 60 days. The NPL ratios for some loan types (e.g. individuals, housing, public sector, rural etc.) can be explicitly derived from the report, while assumptions are made for all other types such that the overall estimated NPL rate for the banking system is consistent with that reported in the Bacen report (10.2 percent as of end-2005[67]).

Once the volume of NPLs by business line is calculated, the reported LLP – found in both the balance sheet and income statement – of the banking system are allocated in the same proportion as their respective NPLs. It could be argued that retail loans, which are generally unsecured, have lower recovery rates and should therefore have proportionally higher LLP than their corresponding figure for default rates; however, to the extent that ratings and their corresponding LLP already reflect collateral coverage (i.e. they measure Expected Loss and not just Probability of Default), this problem should not arise.

As a result of its higher NPL rates, the Retail business line accounts for 63 percent of LLP even though it only has 46 percent of gross loans. By contrast, Corporate accounts for 31 and 50 percent of LLP and gross loans respectively, while Government represents 6 and 4 percent of LLP and gross loans respectively.

Allocation of Interest Income on Loans

Two types of data are required in order to estimate and allocate interest income on loans by business line:

- Average 2005 volume of performing loans by business line – this is estimated by appropriately 'scaling down' the volume of performing loans that had been previously calculated for end-2005

[66] Those exceptions are earmarked rural lending (assumed to be divided equally between Retail and Corporate based on interviews) and first-tier direct BNDES lending (assumed to consist entirely of Corporate loans from interviews).

[67] The reported NPL rate is higher than mentioned in chapter 2 of this study because it is based on stricter domestic regulations (i.e. 60 rather than 90 days past due) and because it includes a broader definition of the banking system (i.e. consolidated level III rather than level I).

- Average interest rate by type of loan during 2005 – this is estimated based on rate information found in Bacen's report on financial system credit operations[68].

Total interest income on loans can be estimated by multiplying these two types of data, and its accuracy can be assessed by comparing the resulting figure to the one published by Bacen for the banking system. The allocation of interest income by business line is then based on the volume of performing loans that belonged to each business line as of end-2005[69].

As a result of its significantly higher lending rates, the Retail business line accounts for 69 percent of interest income on loans and leases even though it only has 46 percent of gross loans. By contrast, Corporate accounts for 29 and 50 percent of interest income and gross loans respectively, while Government has 3 and 4 percent of interest income and gross loans respectively. The average yield on performing loans by business line is 45/16/22 percent for Retail/Corporate/Government respectively, while the average yield on the banking system's performing loan book is around 29 percent. As can be deduced, the results for the Corporate business line are heavily influenced by earmarked credit, which brings down the average loan yield and related interest income.

Funding of Directed Credit and its Remuneration

In contrast to non-earmarked loans, directed credit typically has its own dedicated funding sources[70] and it is provided at below-market interest rates. It is therefore important to identify the funding source of the three main directed lending schemes in order to allocate such funding – and its cost – to the relevant business line.

Housing finance, as well as a small portion of rural finance, is assumed to be funded via voluntary passbook savings accounts (*cadernetas de poupança*). Given that the actual amount of housing finance is relatively small compared to the legal requirement to use 65 percent of total *poupança* for such purposes[71], it is further assumed that the remaining balance is invested in low-yielding securities. Directed rural finance, primarily via *Banco do Brazil*, is assumed to be funded by other ("special") deposits and demand deposits. Finally, directed long-term finance via BNDES (both first and second-tier lending) is assumed to be funded – based on information provided in BNDES's financial statements

[68] The average interest rate by type of loan is effectively a weighted average of rates of different maturities. Corporate non-earmarked loans in domestic currency are assumed to be based on a spread over the CDI rate, while all foreign currency loans are assumed to be priced off the US Libor. In the case of earmarked credit with pre-defined rates (e.g. TR, TJLP etc.), assumptions were also made about the additional spread charged by banks in order to effect the transaction.

[69] One additional complication relates to interest income that is actually derived from loans classified as non-performing (i.e. D-H ratings). In order to overcome this problem, which affects the assumptions about the average interest rate of performing loans, it is assumed that 10 percent of all interest income on loans actually derives from NPLs and that its allocation across business lines is the same as for interest income on performing loans.

[70] These include constitutional funds, worker funds based on mandated contributions, legal reserve requirements, and passbook saving accounts.

[71] Although regulations require 65 percent of *poupança* funding to go to housing-related credit, banks currently enjoy several exemptions that substantially diminish the effective amount of such funding.

– via a combination of other ("special") deposits, borrowings and subordinated debt (classified as "other liabilities" in Bacen's balance sheet for the banking system).

Allocation of All Other Line Items

Notwithstanding the above analysis, there remain several unallocated line items in the balance sheet and income statement of the banking system. With regards to assets and liabilities, the following are the main additional assumptions that are made:

- Treasury is responsible for managing all cash, floating and repos, reverse repos and interbank liabilities; it is also responsible for the residual of securities and derivatives, interbank assets, acceptances and borrowings that were not already allocated using the above methodology
- All other line items (e.g. other assets/liabilities, leased and fixed assets) are assumed to be allocated in the ratio of 80/15/1/4 for Retail/Corporate/Government/Treasury respectively – this is based on bank interviews on their approximate allocations across business lines[72].

With regards to the income statement, the following additional assumptions are made:

- Treasury is allocated all net interest revenues stemming from derivatives and foreign exchange, as well as all income from equity participations, other operating revenues/expenses and non-operating income
- Interest revenues from securities and repos, as well as interest expenses on borrowing and leases, are allocated based on their balance sheet share
- Service fees, as well as payroll, overhead and tax expenses are allocated in the same ratio as for all other line items on the balance sheet (i.e. 80/15/1/4 for Retail/Corporate/Government/Treasury respectively) based on interviews.

In addition, each type of asset is assigned a credit risk weight for regulatory capital purposes in order to estimate and allocate capital[73]. The allocation mechanism used in the study is based on the banking system's actual capital adequacy (15 percent) rather than on the regulatory minimum capital requirement (11 percent for Brazil)[74]. The estimated capital is allocated to the Retail, Corporate and Government business lines based on their respective share of each asset type, with the residual book equity kept in Treasury[75].

Finally, given that the assets and liabilities of each business line are not equal, it is assumed that Treasury plays the 'transfer clearing and pricing' role by either supplying or absorbing the difference between the assets and liabilities of each business line. As is common practice in financial institutions, such inter-business line transfers are assumed to be remunerated at the interbank rate (CDI).

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[72] As previously mentioned, Treasury includes the residual of all other, relatively smaller businesses that are not captured in the other 3 business lines.

[73] Given the unavailability of disaggregated data, assignment of risk weights takes place at a high level – for example, 100 percent risk weight for all loans and other/fixed assets, 20 percent for securities etc.

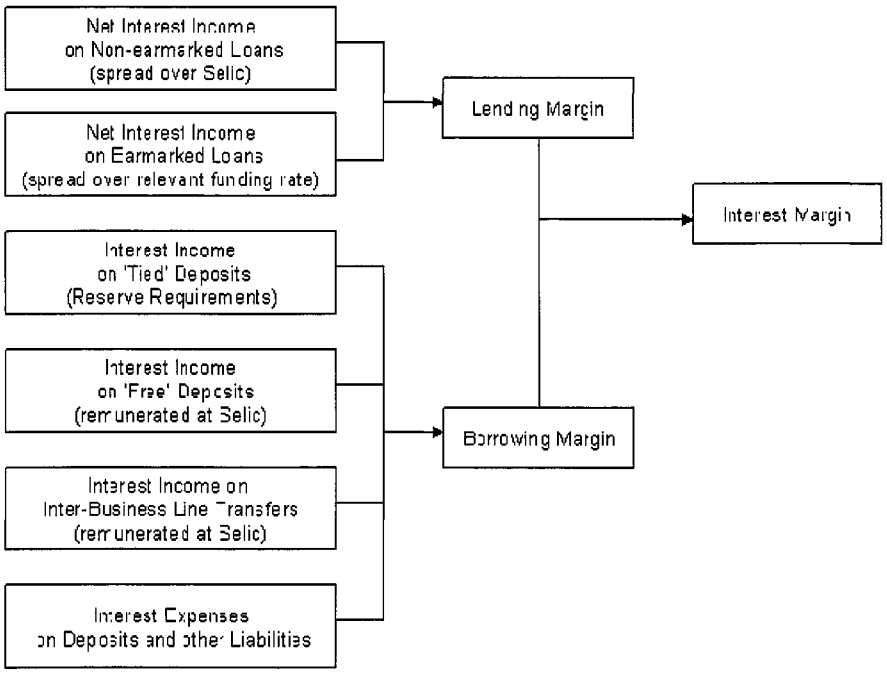
[74] Bank book equity can be allocated across business lines in two basic ways: (1) by allocating the minimum required capital to support each business line, with Treasury keeping 'excess' book equity; (2) by allocating all book equity proportionally across business lines based on their relative riskiness; a version of the former approach is used here.

[75] In its function as the bank's central money management 'clearinghouse', Treasury also incurs all market and interest rate risk.

Allocation of Interest Margin

For comparative purposes, the interest margin is decomposed into margin from lending versus margin from deposit-gathering activities using a method standard in financial practice. The lending margin consists of the loan spread over-and-above the relevant funding rate, while the borrowing margin is essentially the interest benefit derived from sourcing deposits at a lower cost. The funding rate for non-earmarked loans is generally assumed to be the interbank rate CDI which in the case of Brazil closely follows the Selic rate. For earmarked loans, we used the relevant 'tied' rate (e.g., interest rate paid on poupança deposits for housing loans). The borrowing margin represents the difference between interest income and interest expenses on deposits and other liabilities. Interest income stems from three sources: (1) remunerated reserve requirements ('tied' deposits); (2) 'freely available' deposits (i.e., net of reserve and directed lending requirements), which are assumed to be remunerated at the interbank rate; and (3) any 'excess' liabilities of each business line which are transferred to Treasury and are also assumed to be remunerated at the interbank rate. See Figure II.1.

Figure II.1: Decomposition of Interest Margin between Lending and Borrowing Activities



Appendix III: Sensitivity Analysis in the Performance Estimation

The results of the direct approach that are described in chapter 4 are conditional on assumptions made about the allocation of line items in the balance sheet and income statement, as well as on specific interest rates. Thus, sensitivity analysis is undertaken for key variables that are not fully corroborated[76] in order to identify the robustness and relative contribution of the different assumptions to the results. The outcomes of the different tests are reported in Tables III.1a and b below.

We have tested the relative share of *deposits* between the Retail and Corporate business lines. As discussed above, an important part of the allocation was based on the assumption – based on bank interviews – of an even allocation for the lines of demand and time deposits, which were not previously allocated to Government or other specific rules. We have tested the effect of this assumption by shifting 10 percent of total Retail deposits to Corporate (and vice versa). In both cases, the key result of the returns of Retail being higher than those of Corporate is maintained. While in the base case the relation of ROC between Retail and Corporate is 38/21, in the first test the relationship moves to 34/29 and in the other test to 42/12. In fact, one needs to assume that the Retail business has less than 20% of time and demand deposits – an unlikely assumption, which would itself cast doubt on one of the main reasons for having a branch network – in order for the two business lines to have a similar rate of return.

Results are also fairly insensitive to changes in *deposit rates*. We have tested for different assumed rates for time deposits, reverse repos and acceptances such that the total interest expense which is already known from Bacen reports remains the same. The variability in the relationship of ROCs between the Retail and Corporate businesses is between 35/15 and 41/26 (Treasury actually exhibits the greatest volatility in ROC across the two scenarios), thus confirming the robustness of our key result.

We have tested the results of changes in the relative share of *gross loans*. In the above analysis, we have assumed that around 15 percent of loans to companies were actually loans to small firms that come under the Retail business line. We tested this assumption in two ways: firstly, by assuming that no loans to these companies belong to Retail; and secondly, by assuming that a larger number of loans to firms (25 percent) are actually served by the branch network and should therefore come under Retail. The results of the tests show that the contribution of small businesses to profitability is fairly small. In fact, the ratio of ROCs between Retail/Corporate moves from 38/21 in the base case to 41/18 and 37/21 in the respective scenarios.

Sensitivity analysis was also undertaken with respect to the distribution of *loan loss provisions* (LLP) among different loan products, while ensuring that the overall LLP rate remains the same as the one reported by Bacen. One test increased LLP of Retail compared to Corporate, and the other did the reverse. Results are fairly insensitive to

[76] Sensitivity analysis on variables whose values are confirmed – for example, the average interest rate of Selic for 2005 – is not undertaken, even though these may also represent key drivers of performance.

these tests, there is little change in profitability by business line and therefore in the relative performance of Retail versus Corporate.

Results are more sensitive to changes in certain *loan rates*. We have tested this assumption in two ways: (1) by increasing a key Retail lending rate (average non-earmarked lending to individuals) by 300 basis points, while adjusting downwards by 300 basis points certain Corporate loan rates to maintain overall interest revenues; and (2) by doing the reverse, i.e. decreasing the specific Retail rate by 300 basis points while increasing the key Corporate loan rates by 300 basis points on average. In the latter case, the key result of our analysis (i.e. that the return of the Retail business remains higher than the return of Corporate) is barely maintained, implying a higher sensitivity of results than with other variables tested. Given this sensitivity, it is important to fully confirm the validity of the assumed lending rates and spreads[77].

Eighty percent of *service fees, payroll/overhead expenses and other items* are allocated to the Retail business line based on information gathered in interviews with bank executives. We have tested this assumption by decreasing the share of Retail to 75 percent (while increasing Corporate to 20 percent), and then increasing it to 85 percent (while decreasing Corporate to 10 percent). In both cases, the Retail business remains more profitable than Corporate, with the relationship of ROC varying between 43/14 and 33/27. Only when Retail absorbs close to 90 percent of these line items (and Corporate less than 5 percent) are similar returns obtained for the two business lines, which is a highly doubtful scenario.

One feature of the methodology is *inter-business line transfers*, i.e. the central role assigned to Treasury as a clearinghouse to ensure that assets and liabilities equal each other by business line. We have followed the standard practice that any 'excess' liabilities of each business line that are not used to fund that business line's assets are transferred to Treasury at the prevailing interbank rate of CDI (and vice versa). Since Corporate has a sizable share of funding (deposits, as well as borrowings linked to directed lending) compared to its total loans, it is the business that benefits the most from this remunerated transfer. We tested the hypothesis that these transfers are not remunerated, which would somewhat reduce Retail's profitability but would significantly reduce the profitability of Corporate. Although this result is not realistic (banks typically engage in remunerated transfer pricing across different business lines), it demonstrates (as mentioned in chapter 4) the dependence of Corporate on the liabilities side for its profitability. The reverse test is to allocate completely to the respective business lines the investment gain that Treasury obtains from those funds transferred from the Retail and Corporate business lines, but this test does not have an important impact in profitability since the returns of these investments are close to the CDI rate.

Finally, we have tested the assumption used to allocate the banking system's *capital* base. In the aforementioned base case, we have allocated book equity to business lines according to the credit risk weights of the assets in each business line multiplied by the

[77] In particular, the average 2005 rate for non-earmarked loans to individuals (assumed to be 55 percent) and for non-earmarked domestic and foreign currency loans to medium/large firms (assumed to be 23 and 7 percent respectively, representing a spread over Selic and US Libor of 4 and 3.5 percent respectively).

average banking system capital adequacy of 15 percent, with all excess book equity remaining in Treasury. This figure goes in the denominator of the ROC equation and thus helps to determine profitability by business line. For sensitivity analysis purposes, we performed two tests of this assumption: first, that the distribution of equity is proportional to the size of each business line, and second, that the allocation is based on Bacen's minimum capital adequacy ratio of 11 percent (with Treasury acting as the residual, absorbing excess capital). The ratio of ROC for Retail/Corporate moves from 38/21 in the base case to 41/21 and 45/21 in these two tests.

Overall, it seems likely that the aforementioned messages stemming from the analysis (i.e. higher returns in the Retail business line when compared to those of Corporate) are valid under most sensitivity scenarios, although more information is required in order to ensure the soundness of certain critical assumptions.

Table III.1a: Sensitivity Analysis in the Performance Estimation

	Retail	Corporate	Government	Treasury
Base Case				
Market Share of Deposits	58%	35%	3%	4%
Market Share of Gross Loans	46%	50%	4%	0%
Market Share of Loan Loss Provisions (LLP)	63%	31%	6%	0%
Market Share of Interest Expense	34%	22%	2%	41%
Pre-tax Return on Assets	4.1%	2.3%	1.8%	1.7%
Pre-tax Return on Capital	38%	21%	16%	24%
Sensitivity to Deposits				
Description: 10% of Retail deposits shift to Corporate				
Market Share of Deposits	48%	45%	3%	4%
Pre-tax Return on Assets	4.0%	2.8%	1.8%	1.5%
Pre-tax Return on Capital	34%	28%	16%	21%
Description: 10% of Corporate deposits shift to Retail				
Market Share of Deposits	68%	24%	3%	4%
Pre-tax Return on Assets	4.2%	1.6%	1.8%	1.8%
Pre-tax Return on Capital	42%	12%	16%	26%
Sensitivity to Deposit Rates				
Description: Interest rate on time deposits increased to 18% (from 16%) and interest rate on acceptances and on reverse repos reduced to 4% (from 8%) and 16 % (from 18%) respectively, such that overall interest expenses reported by Bacen remain the same				
Market Share of Interest Expense	37%	25%	3%	36%
Pre-tax Return on Assets	3.7%	1.7%	0.8%	2.7%
Pre-tax Return on Capital	35%	15%	7%	38%
Description: Interest rate on time deposits decreased to 16% and interest rate on acceptances and other deposits increased to 12%, such that overall interest expenses reported by Bacen remain the same				
Market Share of Interest Expense	32%	20%	2%	46%
Pre-tax Return on Assets	4.5%	2.9%	2.9%	0.6%
Pre-tax Return on Capital	41%	26%	25%	9%
Sensitivity to Gross Loans				
Description: All loans to small firms (except directed rural loans) are included in the Corporate business line, as opposed to the Retail business line under the base case				
Market Share of Gross Loans	40%	56%	4%	0%
Pre-tax Return on Assets	4.2%	2.2%	1.8%	1.7%
Pre-tax Return on Capital	41%	18%	16%	24%
Description: The proportion of loans to firms that belong to the Retail business line is raised to 25% of the total (except for directed rural loans), as opposed to 15% under the base case				
Market Share of Gross Loans	50%	46%	4%	0%
Pre-tax Return on Assets	4.1%	2.3%	1.7%	1.6%
Pre-tax Return on Capital	37%	21%	15%	22%
Sensitivity to Loan Loss Provisions (LLP)				
Description: The LLP rate for non-earmarked Corporate loans is increased to 7% and for Retail loans to small firms decreased to 8%, such that the overall LLP rate of 10.2% reported by Bacen remains the same				
Market Share of LLP	61%	34%	6%	0%
Pre-tax Return on Assets	4.2%	2.2%	1.8%	1.7%
Pre-tax Return on Capital	39%	19%	16%	24%
Description: The LLP rate for non-earmarked Corporate loans is decreased to 5% and for Retail loans to small firms increased to 16%, such that the overall LLP rate of 10.2% reported by Bacen remains the same				
Market Share of LLP	66%	29%	6%	0%
Pre-tax Return on Assets	4.0%	2.5%	1.8%	1.7%
Pre-tax Return on Capital	37%	22%	16%	24%

Table III.1b: Sensitivity Analysis in the Performance Estimation (cont.)

	Retail	Corporate	Government	Treasury
Base Case				
Market Share of Interest Revenue on Loans	69%	29%	3%	0%
Market Share of Interest Expense	34%	22%	2%	41%
Market Share of Service Charges & Op. Expenses	80%	15%	1%	4%
Market Share of Capital/Equity	46%	30%	2%	22%
Pre-tax Return on Assets	4.1%	2.3%	1.8%	1.7%
Pre-tax Return on Capital	38%	21%	16%	24%
Sensitivity to Loan Rates				
Description: The interest rate on non-earmarked lending to individuals increased to 58%. while non-earmarked domestic and foreign currency lending to Corporates decreased to 20% and 4% respectively, such that the overall interest income on loans reported by Bacen remains the same				
Market Share of Interest Revenue on Loans	72%	26%	3%	0%
Pre-tax Return on Assets	4.7%	1.3%	1.8%	1.7%
Pre-tax Return on Capital	44%	11%	16%	24%
Description: The interest rate on non-earmarked lending to individuals decreased to 52%. while non-earmarked domestic and foreign currency lending to Corporates increased to 26% and 10% respectively, such that the overall interest income on loans reported by Bacen remains the same				
Market Share of Interest Revenue on Loans	66%	32%	3%	0%
Pre-tax Return on Assets	3.4%	3.4%	1.8%	1.7%
Pre-tax Return on Capital	32%	30%	16%	24%
Sensitivity to Allocation of Service Charges, Operating Expenses and Other Items				
Description: The share of the Retail business line in service charges, operating expenses and all other line items that are allocated similarly drops by 5% to 75%, while the share of Corporate rises by 5% to 20%				
Market Share of Service Charges & Op. Expenses	75%	20%	1%	4%
Pre-tax Return on Assets	4.6%	1.6%	1.8%	1.7%
Pre-tax Return on Capital	43%	14%	16%	24%
Description: The share of the Retail business line in service charges, operating expenses and all other line items that are allocated similarly increases by 5% to 85%, while the share of Corporate drops by 5% to 10%				
Market Share of Service Charges & Op. Expenses	85%	10%	1%	4%
Pre-tax Return on Assets	3.6%	3.1%	1.8%	1.7%
Pre-tax Return on Capital	33%	27%	16%	24%
Sensitivity to Inter-Business Line Transfers				
Description: Treasury, in its central clearing role, does not remunerate excess transfers to/from it in response to an imbalance between assets and liabilities in a specific business line				
Pre-tax Return on Assets	3.0%	0.1%	0.7%	5.1%
Pre-tax Return on Capital	28%	1%	6%	72%
Description: Treasury, in its central clearing role, remunerates excess transfers to/from it in response to an imbalance between assets and liabilities in a specific business line at its own active rate instead of CDI				
Pre-tax Return on Assets	4.1%	2.2%	1.8%	1.8%
Pre-tax Return on Capital	38%	20%	16%	25%
Sensitivity to Capital				
Description: The book equity of the banking system is allocated pro rata to the business lines according to their size instead of according to regulatory requirements for credit risk by type of asset				
Market Share of Capital	39%	23%	2%	36%
Pre-tax Return on Assets	3.9%	1.9%	1.5%	2.4%
Pre-tax Return on Capital	41%	21%	15%	22%
Description: The book equity of the banking system is allocated based on Bacen's minimum capital adequacy ratio of 11% (with Treasury acting as the residual), as opposed to based on the average capital adequacy of the banking system (15%)				
Market Share of Capital	33%	22%	2%	43%
Pre-tax Return on Assets	3.7%	1.8%	1.3%	2.7%
Pre-tax Return on Capital	45%	21%	15%	21%

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