Banking in Brazil

Structure, Performance, Drivers, and Policy Implications

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Abstract

The objective of this paper is to analyze the industry structure of banking services in Brazil in order to shed light on financial performance and its drivers at a disaggregated level. The study illustrates how differences across market segments—which tend to be averaged out in aggregate analysis—need to be taken into account when analyzing performance and designing public policy for the banking sector. In particular, retail banking is found to be less sensitive to price competition and to exhibit considerably higher returns than corporate banking. The authors identify and discuss the factors underlying revenues, costs, and risks in each market segment, and conclude with policy implications.

Banking in Brazil: Structure, Performance, Drivers, and Policy Implications

by

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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, and appear rather resilient to the current international financial crisis. 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 between different groups of firms and individuals. Identifying and analyzing the various contributory factors, particularly the role played by the industry structure of banking services, is therefore an important exercise at this time.

In contrast to previous studies, this paper analyzes banking services at a disaggregated 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. In order to provide relevant policy implications and perspectives, one needs to study individual market segments since the banking system is only an "umbrella" covering markets with heterogeneous characteristics, financial performance and, importantly, business 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 adopts a so-called 'practitioner' approach. In particular, 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. In addition, 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 performance drivers in each segment.

A key finding of the analysis is that the Retail business line exhibits significantly higher returns than Corporate in spite of being costlier to operate. 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 75 percent of operational costs) and credit expenses (it accounts for two-thirds of total loan loss provisions), a combination of higher lending rates and fees (it generates around 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 39 percent compared to 16 percent in Corporate. This finding is 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 depth (access) in particular 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 to capture 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 while maintaining stability in the financial sector, including capital markets. With regards to market segment-specific issues, government policies that encourage price competition among banks – especially in the retail segment – can be used to address those factors that drive up revenues, costs, and risks, and hence adversely impact efforts to ensure depth in banking services in Brazil. Examples of such policies, which are elaborated in the study, include: further promoting the portability of bank accounts; 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 ensuring higher transparency; 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.

Efforts to further increase competition in specific market segments can be undertaken without compromising on the banking system's financial stability. The Brazilian banking system's stricter regulatory regime (minimum capital adequacy ratio, reserve requirements, etc.), compared to many developed markets, has helped to shield it to-date from the effects of the international financial crisis. As the analysis suggests, specific efforts to increase competition in particular financial markets can help expand financial depth and transparency while maintaining the soundness of the banking system.

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. 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, and appear rather resilient to the current international financial crisis. 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 rather scarce for a significant proportion of the economy[1]. Identifying and analyzing the various contributory factors, 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 these 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[2].

3.   **While other studies have attempted to assess the degree of competition in the Brazilian banking sector, 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 is not particularly useful for

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[1] 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. Access to credit has improved in recent years due to a favorable macroeconomic environment, although its cost has not decreased significantly.

[2] The World Bank (June 2006) also cites the industry structure and level of competition in specific market segments as potentially important – but still unexplored – issues in the debate on interest rates and spreads in Brazil. In particular, the 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*".

policy recommendations[3]. The studies do not take account of the aforementioned anecdotal evidence of stronger competition among banks in the market for loans to large corporations compared to the market for loans to consumers and small firms[4]. 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 while keeping the system stable, but there has not been – to our knowledge – a study on this issue in Brazil.

4.   **The objective of this paper is to analyze the industry structure of banking services in Brazil, assessing competition and performance at a disaggregated level[5]**. In particular, the paper focuses on the characteristics, financial performance and drivers 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 etc.) of these different markets.

5.   **In order to pursue this task, the paper adopts a so-called 'practitioner approach'**. In particular, 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[6]. 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. This approach is complemented by a review of the existing financial sector literature and by interviews with senior management of eight Brazilian banks of different size and ownership structures, which serve as a consistency check on the study's findings and are used to identify the main performance drivers in each market segment[7].

6.   **The paper is organized into three main sections, complemented by appendices that describe methodological aspects in more detail.** Section 2 (as well as Appendices I and II) presents the methodology and results, including sensitivity analysis. Section 3 identifies and discusses the characteristics and main drivers of revenues, costs and risks by each market segment, while Section 4 concludes and presents policy implications.

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[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] Individuals face short maturities and interest rates from around 25-30 percent p.a. (per annum) on car loans, to 45-50 percent p.a. on personal loans and up to 140 percent p.a. on overdrafts.
[5] The paper is based on a comprehensive study by the World Bank (June 2007) on this topic, but it has been updated to reflect 2006 figures and recent market developments.
[6] 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, cost-to-income ratio etc.) by business line as of December 2007, which can then be compared to each other and to the ones for the entire banking system.
[7] 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.

2. Estimation of Performance by Market Segment

2.1 Overview of the Approach

7. **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 'practitioner 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[8]. 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 2007, 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, and to discuss the factors behind such differences.

8. **Four lines of business were identified following standard market practice and are 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 separately as a division within a typical bank[9]:

- Retail is the branch-based business of commercial banks, and includes deposits, loans and payments services of individuals and small businesses[10]

- 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

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[8] 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.

[9] 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 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).

[10] 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 (December 2007) for a similar approach.

- 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

9. **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 section, 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.

10. **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[11] were included as necessary in order to facilitate the allocation of different line items in the financial statements. Table 2.1 below summarizes the main allocation results, while a detailed description of the methodology and allocation mechanisms can be found in Appendix I. 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 section, while the detailed analysis can be found in Appendix II.

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[11] These included, for example, data from the Brazilian deposit insurance agency (*Fundo Garantidor de Créditos* or FGC), bank annual reports, 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 2.1: Banking System Balance Sheet (December 2007) – Allocation by Business Line

| Statement Item	Market Share of Banking System			
	Retail	Corporate	Government	Treasury
Assets and Liabilities				
Cash, repos, interbank, reserve requirements, and on-lendings	27%	20%	1%	52%
Securities and derivatives	17%	7%	1%	75%
Net loans and leases	48%	50%	2%	
Other assets	59%	36%	2%	3%
Deposits and acceptances	50%	43%	4%	3%
Reverse repos				100%
Borrowings	10%	39%		51%
Other liabilities	57%	33%	1%	9%
Net Worth/Equity	27%	24%	1%	48%
Total Assets / Liabilities	*38%*	*29%*	*2%*	*31%*
Profit and Loss				
Interest revenues - Loans, leases, on-lendings - Securities, repos, interbank - Derivatives and F/X - Required deposits	 67% 11% 68%	 32% 5% 28%	 1% 1% 4%	 83% 100%
Interest expenses - Deposits, accept., reverse repos and interbank - Borrowings and on-lendings - Leases - F/X	 26% 5% 75%	 25% 39% 15%	 3% 1%	 46% 56% 9% 100%
Non-interest income	38%	8%	1%	53%
Operating expenses - Payroll expenses - Overhead - Other operating expenses	 75% 75%	 15% 15%	 1% 1%	 9% 9% 100%
Allowance for bad credits	68%	29%	3%	
Pre-tax income	*47%*	*13%*	*1%*	*39%*

2.2 Main Findings

11. **Retail is the largest business line in the banking system and has a very different structure from Corporate** (see Figures 2.1 and 2.2). Retail represents around 40 percent of the system and Corporate accounts for 30 percent, while both are much bigger than the Government business line[12]. On the assets side, loans represent around 40 percent of the Retail business line as a result of the large share of other assets that are related to its infrastructure (branches and information technology 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 lower than for the Government business line.

12. **The Retail business line generates a much greater proportion of the banking system's total 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 40 percent) and relatively lower cost of funding (the weighted average cost of deposits, reverse repos and acceptances is around 9 percent)[13]. As a result, this business line generates around 70 percent of the total interest margin of the banking system (see Figure 2.3). Conversely, the Corporate business line exhibits much tighter terms, with relatively lower loan rates (average yield on performing loans of only 15 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 2.4).

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[12] 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.

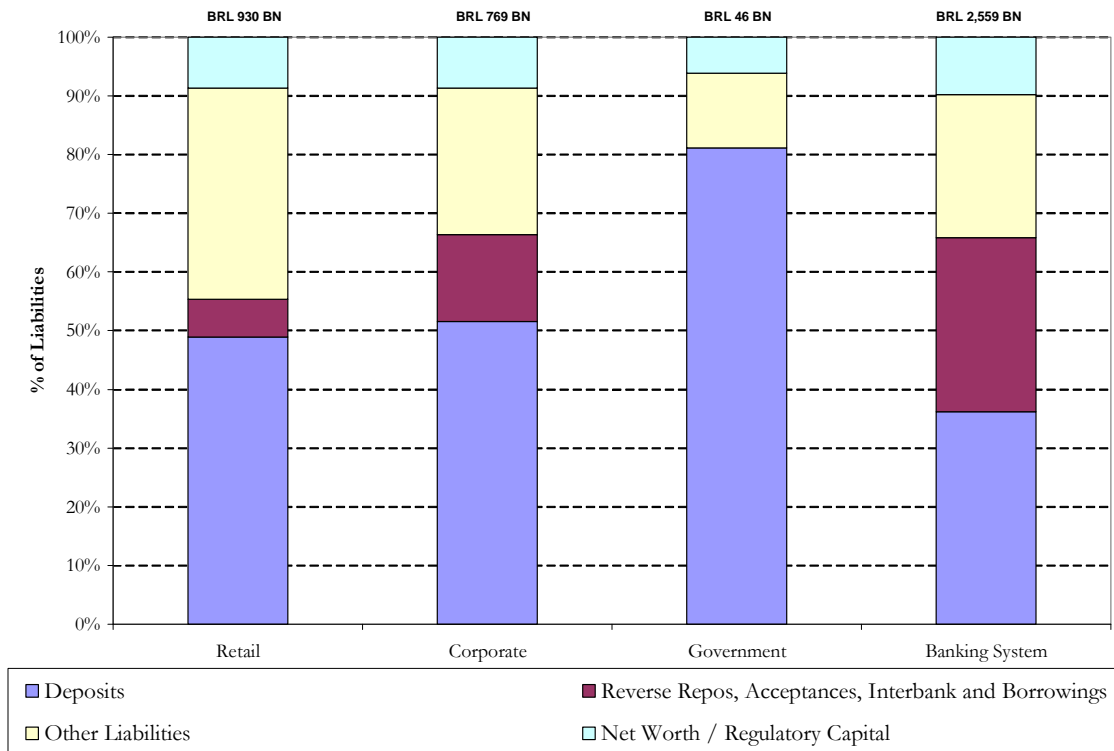[13] The counterpart to lower funding costs is high reserve requirements and other limitations (e.g. on the use of demand deposits for rural finance) that do not allow putting much of this liquidity into profitable use.

Figure 2.1: Structure of Assets
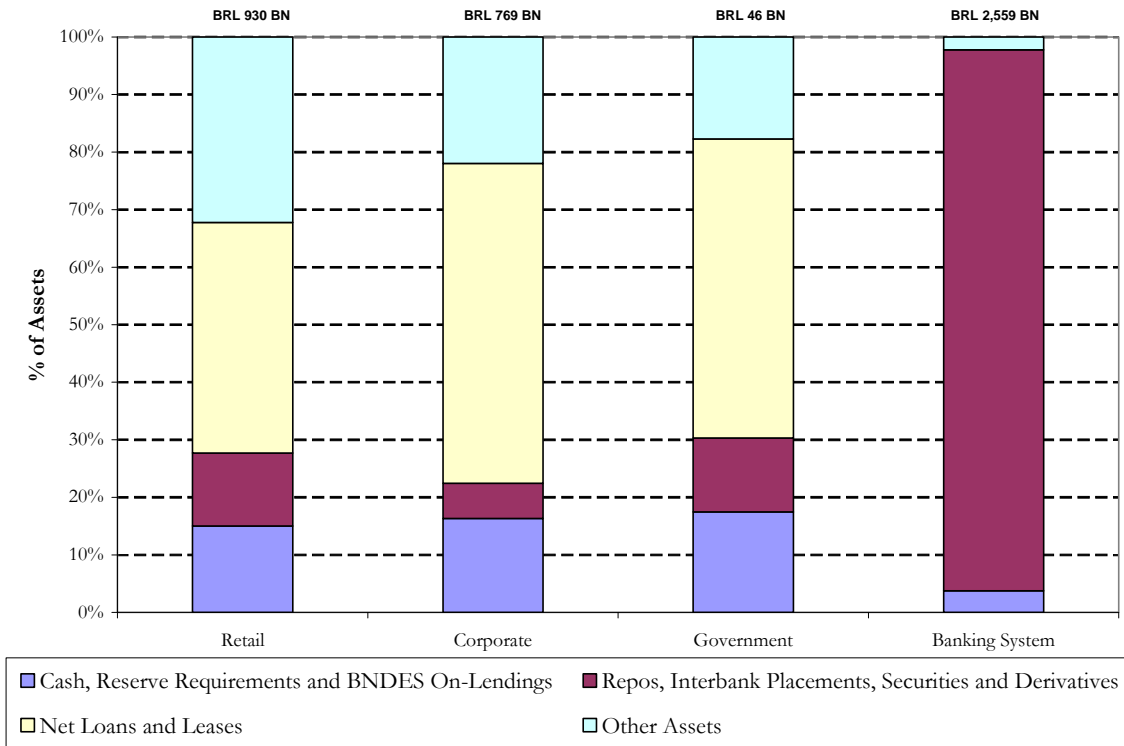
Source: Study calculations based on Bacen data.

Figure 2.2: Structure of Liabilities

Source: Study calculations based on Bacen data.

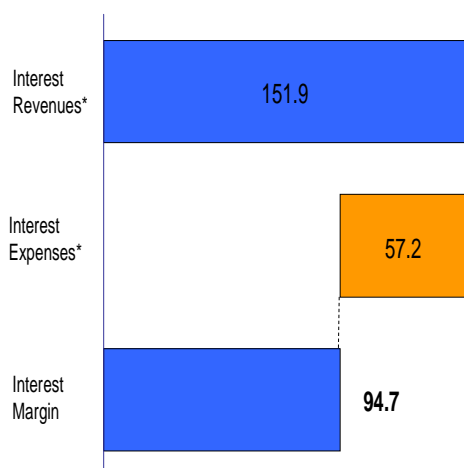Figure 2.3: Net Interest Income for Retail Business Line (BRL million)

Figure 2.4: Net Interest Income for Corporate Business Line (BRL million)

	Retail		Corporate
Interest Revenues*	151.9	Interest Revenues*	73.1
Interest Expenses*	57.2	Interest Expenses*	44.9
Interest Margin	**94.7**	Interest Margin	**28.2**
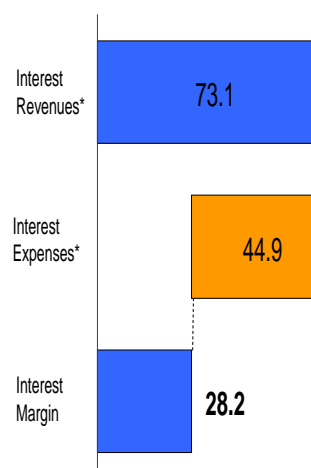
* Interest revenues include interest received from performing and non-performing loans, remunerated reserve requirements, and inter-business line transfers. Interest expenses include interest paid on various types of liabilities (deposits, acceptances, reverse repos, borrowings used to fund directed 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.

13.   **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 I for a detailed explanation. According to this decomposition, around 90 percent of Retail's margin comes from lending activities, while for Corporate the figure is more balanced (Figures 2.5 and 2.6). 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., rural lending and housing finance) obligations. Brazil has unusually high reserve requirements that have proven a good cushion in times of crisis, although they also have an important effect on the system's income structure.

Figure 2.5: Margin Decomposition for Retail
(BRL million)
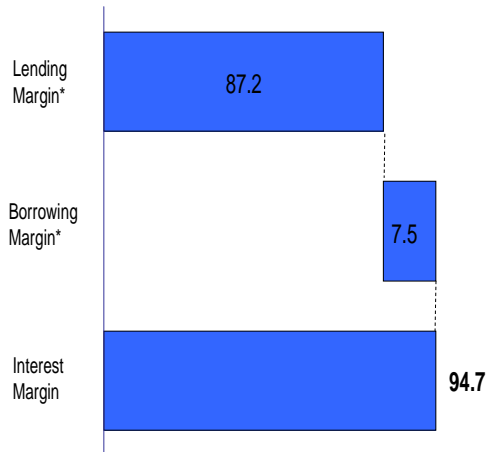
Figure 2.6: Margin Decomposition for Corporate
(BRL million)

14.   **The Retail business is significantly costlier to operate than Corporate**. This stems both from high operational costs (as shown by higher cost-to-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 information technology) 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 section for a discussion).

15.   **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 half 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 less than 20 percent of the total pre-tax income of the banking system (see Figures 2.7 and 2.8).

Figure 2.7: Net Income Decomposition for Retail Business Line (BRL million)
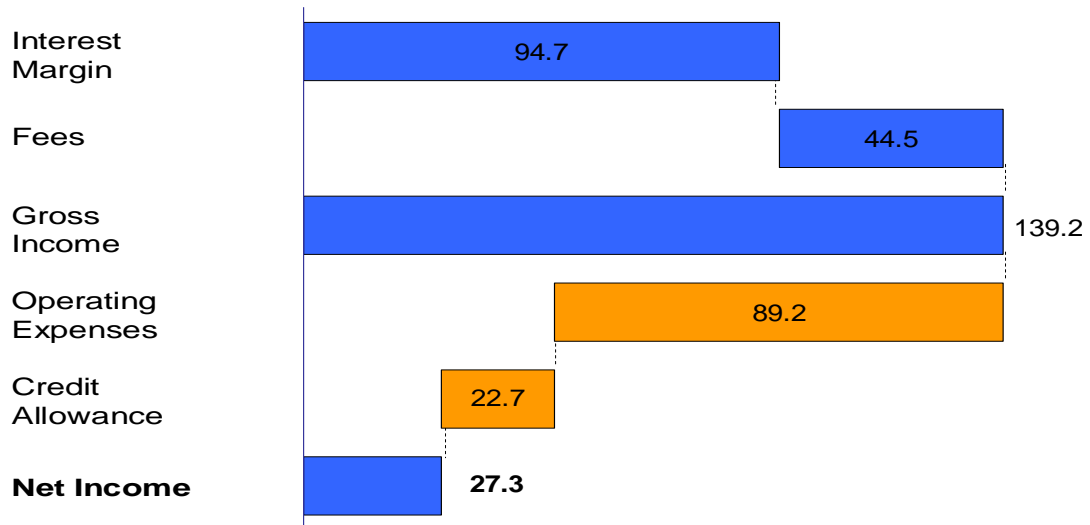
Interest Margin	94.7
Fees	44.5
Gross Income	139.2
Operating Expenses	89.2
Credit Allowance	22.7
Net Income	**27.3**

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 2.8: Net Income Decomposition for Corporate Business Line (BRL million)
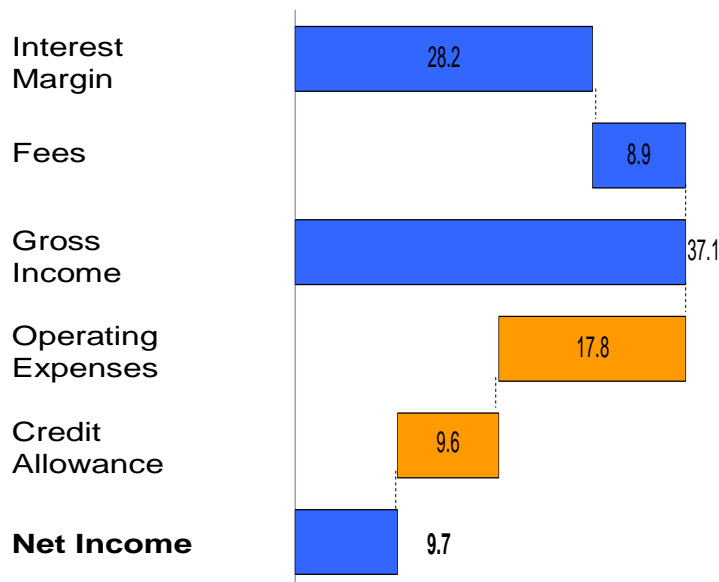
Interest Margin	28.2
Fees	8.9
Gross Income	37.1
Operating Expenses	17.8
Credit Allowance	9.6
Net Income	**9.7**

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.

16.   **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[14]. As shown in Figure 2.9 below, Retail's estimated ROC is 39 percent, compared to only 16 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 2007, 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 purposes of this paper. Using the ROA indicator also yields similar relative performance results for the Retail and Corporate business lines (3.0 percent and 1.3 percent respectively).

Figure 2.9: Estimated Return on Capital for Different Business Lines
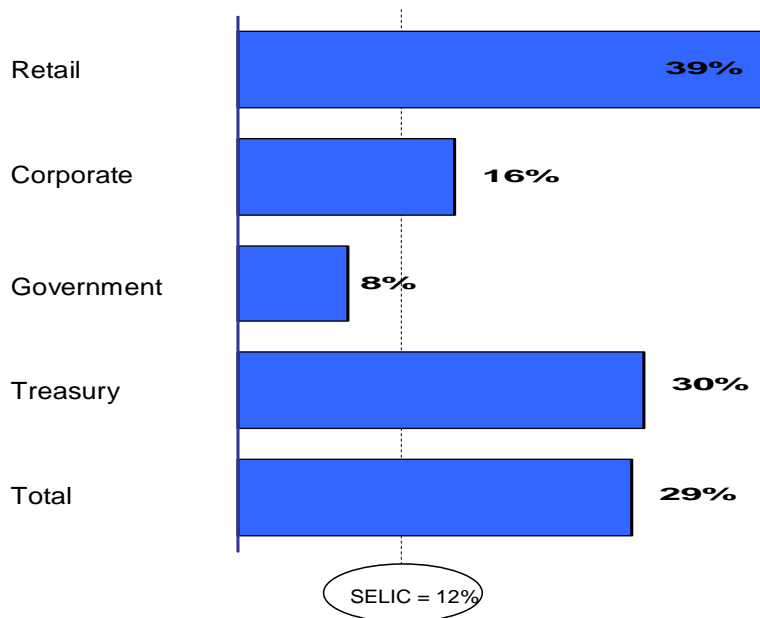
Source: Study calculations based on Bacen data.

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[14] 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 Bacen's more conservative ratio of 11 percent rather than Basel I's recommended minimum level of 8 percent.

2.3   Discussion of Findings

17.   **The findings of the practitioner approach confirm the premise of significantly different performance between bank business lines.** 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 retail, compared to corporate, banking. The findings also substantiate the paper's premise that such analysis needs to take place at a disaggregated level in order to derive meaningful results.

18.   **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[15]. 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[16]. 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[17].

19.   **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 (2007) as opposed to a full business cycle, which might distort both absolute and relative rates of return[18]. Data constraints include the unavailability of business line-level information on volumes and rates, which necessitated making allocation and rate assumptions.

20.   **Sensitivity analysis supports the robustness of the results under plausible scenarios**. Analysis was undertaken for key variables that were not fully corroborated[19]

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[15] See, for example, Clark et al (December 2007), the Cruickshank Report (2000), Oliver, Wyman & Company (2003), and Morgan Stanley and Oliver Wyman & Company (2002).

[16] 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. See also recent financial system competition-related inquiries by Australia, Ireland, Netherlands, South Africa, Sweden, and the European Commission,

[17] Clark et al (December 2007) 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 concedes that the evidence is mixed about the extent of such differences.

[18] 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.

[19] Sensitivity analysis on variables whose values are confirmed – for example, the average interest rate of Selic for 2007 – is not undertaken, even though these may also represent key drivers of performance.

in order to identify the robustness of different assumptions[20]. Appendix II 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.

21.   **The above analysis could be usefully extended in the future if sufficient data were 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 are 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.).

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[20] 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.

3.   Drivers of Performance by Market Segment

22.   **Several explanatory factors may account for the significantly different financial performance of retail and corporate banking.** First, 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. Second, and consistent with traditional finance theory, the discrepancy in performance might be a temporary phenomenon related to the stage in the business cycle that will eventually sort itself out. While there might be some merit to this argument[21], one would need to show that retail banking was less profitable on a risk-adjusted basis than corporate banking at other points in the cycle – an unlikely result given the even higher interest spreads that existed for retail loans in previous years. Finally, as described below, distinct market drivers might affect business lines in different ways, and their combined effect would therefore help explain the differences in performance across bank business lines.

23.   **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)[22], and the state of the financial infrastructure. All these factors are relevant in determining the degree of effective competition and contestability[23] in particular market segments and, by implication, on market structure and profitability (see Table 3.1 for a summary).

3.1   Retail Banking

24.   **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, 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.

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[21] For example, Clark et al (December 2007) 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*".

[22] 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.

[23] 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.

25.   **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[24]. Regulation is important since it has tended to discourage client switching due to the (recently-abolished) penalizing financial transactions tax CPMF (*Contribucao Provisoria sobre Movimentacao Financiera*)[25], the lack of sufficient positive information sharing on borrowers (*cadastro positivo*)[26], and the structure of payroll account relationships[27]. 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. An example of the latter issue is the low level of interoperability between Automated Teller Machine (ATM) and Point of Sale (POS) networks of banks[28]. As a result, bank customers cannot generally access other banks' networks, creating an infrastructure barrier to efficient 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. Some of these factors 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.

26.   **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' 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 and from an inefficient retail payments mix. In particular, the infrastructure for clearing transactions among banks is fragmented, which reduces economies of scale. The predominant use of cash and checks as payment instruments also implies higher costs and

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[24] 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.

[25] 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.

[26] 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.

[27] The practice until recently in Brazil has been that payroll accounts lock-in relationships with banks. On the one hand, banks obtain important information on the customer while, on the other hand, customers for convenience purposes (given search costs and lack of ATM interoperability across banks) tend to stay with the same bank. The potential payoffs from this "captive market" seemed to be so high that, in fact, banks paid considerable amounts to corporations and state/local governments to obtain those relationships. The situation is expected to change going forward, since the Brazilian authorities introduced regulations in 2006 to allow wage and credit account portability across banks – see OECD (October 2006) for a description.

[28] See Western Hemisphere Payments and Securities Clearance and Settlement Forum (2004), Banco Central do Brasil (May 2005), and Cirasino et al. (forthcoming) for more details.

increased operational risks[29]. In order to cope with these costs, banks continually strive to capture and keep customers in their own networks. Finally, additional costs might also exist relating to non-price competition[30] and possibly to internal technical inefficiencies[31] stemming from insufficient competition in specific product markets.

27. **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[32].

3.2   Corporate Banking

28. **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.

29. **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[33]. Traditionally, there exist more substitute providers (e.g., capital markets, foreign banks) in this market segment, while entry barriers – at least on the lending side – are lower. In addition, the significant presence of directed lending (40 percent of all corporate loans as of end-2007, compared to only 20 percent for retail loans) depresses average loan spreads and interest income[34].

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[29] According to Banco Central do Brasil (July 2007), a complete migration from paper-based to electronic-based payment instruments would have implied a social gain of about 0.7 percent of Brazil's GDP.
[30] 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.
[31] This type of efficiency measure (so-called X-efficiency) is the effectiveness with which a given set of inputs is used to produce outputs.
[32] It is no surprise that most of the growth in lending to individuals in recent years has been driven by secured lending (payroll and vehicle financing). Moreover, as Fitch Ratings (April 2008) notes, there are few reliable statistics to accurately measure personal debt levels to banking and non-banking credit sources.
[33] This may also provide indications of cross-subsidies in the payroll account business mentioned above – for example, Brazilian banks had been sacrificing returns on the corporate relationship in order to profit from the relationship with employees of those firms that are served in Retail through payroll accounts.
[34] See World Bank (forthcoming) on the structure, flows and effects of directed lending schemes in Brazil.

30.   **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.

31.   **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 room for improvement in the quality of Brazilian corporate financial statements[35], including issues of transparency and disclosure, 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, in spite of recent reforms that have improved the perfection of collateral and reduced the cost of foreclosure procedures, Brazil fares below many Latin American countries in terms of creditor rights[36]. Finally, the inter-linkage among different credit registries is not yet complete, while links between credit registries and payments systems remain imperfect[37].

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[35] Examples include overlapping mandates for accounting and reporting standard-setting, as well as gaps between Brazil's generally accepted financial and accounting practices and International Financial Reporting Standards (IFRS).

[36] According to the World Bank Group's Doing Business 2009 statistics, Brazil's legal rights index score is 3 (versus 5.6 for the region and 6.8 for the OECD).

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

Table 3.1: Profitability and Drivers for Different Market Segments

Key Attributes by Market Segment		Retail	Corporate
Profitability		ROA = 3.0 % ROC = 39%	ROA = 1.3 % ROC = 16%
Sources	**Revenues**	• Loan spreads with a yield of 40% (65% of total income) • Fees from payments and accounts (30% of total income)	• Income from deposits (55% of total income) • Fees for advisory activities (25% 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 56%)	• Lower operational costs (cost to income ratio of 39%)
	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, 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

4.   Conclusions and Policy Implications

32.   **The paper 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 the study strongly indicates, the retail and corporate market segments are characterized by different size, structure, conduct (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[38]. In particular, differences across market segments need to be taken into account, since aggregate studies tend to average these out and thus provide a blurred picture. Therefore, 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.

33.   **One key finding of the paper is that the Retail business line is less sensitive to price competition and exhibits considerably higher returns than Corporate, in spite of being more costly to operate.** 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 plausible sensitivity scenarios. While this finding is not unusual in the international context, Brazil may appear exceptional in the extent of such differences. The analysis also highlights the importance of identifying the different drivers of performance and determinants of levels of effective price competition and contestability[39]. 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.

34.   **There are both system-wide and market segment-specific policy implications that can be drawn from the analysis**. At the banking system level, there is a need to further 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[40]. This is particularly important in view of increasing banking system concentration in recent years, which is likely to continue as a result of the on-going global financial crisis. With regards to market segment-specific issues, government policies that encourage price competition among banks – especially in the retail market – can be used to address those

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[38] 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.
[39] See Claessens (2008) for an overview of determinants and effects of competition in the financial sector.
[40] See World Bank (May 2006) and OECD (October 2006) for more details. The Brazilian competition policy system is comprised of the administrative tribunal (*Conselho Administrativo de Defesa Economica – CADE*) and the Secretariats of Economic Law (Justice Ministry) and for Economic Monitoring (Finance Ministry) that have analytical and investigative functions. A formal agreement on a reformed antitrust regime for the banking industry was reached in 2005 between the competition authorities and Bacen as an interim measure until the law is passed.

factors that drive up revenues, costs, and risks, and hence adversely impact efforts to ensure wide and affordable access to banking services.

35.   **Further promoting switching by bank clients would encourage more price competition and contestability, especially in retail banking.** As previously mentioned, banks have been generally able to 'lock up' retail clients as a result of non-interoperable ATM networks and 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. In this realm, initiatives to publicize updated information on bank rates and tariffs for different financial services (2003), to de-link the retail and corporate relationships by allowing portability of wage and loan accounts (2006), and to streamline retail product types and make their cost more transparent and comparable across banks (2007), have already been undertaken by the authorities[41] and should be considered as good steps in facilitating client switching. The recent repeal of the CPMF by the Brazilian Congress could also strengthen these efforts.

36.   **The issue of positive credit information sharing is crucial in facilitating a stable increase in credit depth, improving access 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[42]. 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.

37.   **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 networks and promoting electronic means of payment. Going 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.

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[41] According to the OECD (October 2006), "*since the traditional antitrust actions can't solve the conflict between stability and competition, the Brazilian government authorities have turned their attention toward the consumers' role in the competitive process, implementing pro-competitive interventions on the demand side*".

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

38.   **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 past history of macroeconomic instability and high interest rates has contributed to historically weak capital markets. The recent increase in public listings of new companies on BMF-BOVESPA has mobilized equity markets. The current international crisis may prove an opportunity to address distortions in the market for long-term debt, to improve regulations regarding transparency and disclosure of off-balance sheet items of corporations, and to strengthen enforcement. Furthermore, the potential of pension funds and insurance markets to mobilize long-term resources and contribute to financial development (e.g., via infrastructure and project finance) can be further exploited.

39.   **Likewise, improvements in corporate financial reporting are essential to boost the development of capital markets and to promote sound corporate governance practices**. The authorities have recently initiated far-reaching reforms in this area, including the adoption of International Financial Reporting Standards (IFRS) for publicly-listed firms by 2010, the creation of an independent body with authority to issue standards on general corporate financial practices, and the amendment of the Corporations Law with improvements in the quality of corporate financial reporting. All these measures will facilitate Brazil's convergence with good international practices and support further capital markets development.

40.   **Legal rights and judicial procedures for contract enforcement could also be tackled to improve the overall efficiency of the system**. Brazil fares relatively poorly in terms of creditor rights and enforcement proceedings. Recent changes to the bankruptcy law (Law 11.101/2005) have been beneficial but a higher focus on enforcement 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).

41.   **The nature and extent of government interventions in the Brazilian banking system may also need to be carefully reassessed going forward**. In addition to the fact that the government represents the largest client in the banking system (government securities), it 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. The various types of government interventions represent important drivers of performance in different market segments, and will likely need to be reviewed and revised as the financial system develops further.

42.   **Efforts to further increase competition in specific market segments can be undertaken without compromising on the banking system's financial stability**. The Brazilian banking system's stricter regulatory regime (minimum capital adequacy ratio, reserve requirements, etc.), compared to many developed markets, has helped to successfully shield it to-date from the effects of the international financial crisis. However, the current preoccupation with financial stability does not preclude the continuation of efforts to increase competition in specific financial market segments. As the aforementioned analysis suggests, such efforts can help expand financial depth while maintaining the overall soundness of the banking system. Many of the measures discussed above, such as higher information sharing and more transparency, improve the competitive arena while also reduce inherent risks and facilitate the development of a more diversified market.

Appendix I: Description of Methodology

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 2006 and 2007 are collected, tabulated and re-arranged into a suitable format (Table II.1).

Table II.1: Brazilian Banking System – Consolidated Financial Statements (2006-2007)

ASSETS (LESS BROKERAGE)	2006	2007	INCOME STATEMENT	2007
Cash and due from banks	23,721	29,306	Interest revenues	318,664
Repos & Interbank placements	213,172	344,131	*Loans and leases (and on-lendings)*	*201,610*
Securities and derivatives	509,765	560,189	*Securities, repos and interbank placements*	*97,369*
Bacen Compulsory Depos & On-Lendings (E	236,540	276,973	*Derivatives*	*3,033*
Branches due transfers	834	1,486	*F/X*	*5,756*
Net loans and leases	644,058	812,864	*Required deposits*	*10,896*
Gross loans and leases	*690,868*	*865,405*	Interest expenses	168,916
Loan loss provisions	*46,810*	*52,541*	*Deposits, acceptances, reverse repos & interbank tran*	*120,436*
Other credit outstanding	228,407	333,550	*Borrowings (and on-lendings)*	*24,953*
Other assets	11,544	23,223	*Lease*	*22,792*
Leased assets	54,352	100,017	*F/X*	*735*
Fixed assets	75,345	77,369	Net interest income	149,749
Total Assets	**1,997,736**	**2,559,107**	Non-interest income	115,480
			Service charges	*59,058*
			Method equity	*10,016*
LIABILITIES	**2006**	**2007**	*Other operating revenues*	*46,407*
Deposits	781,486	926,734	Gross income	265,229
Demand	*122,113*	*174,363*	Operating expenses	156,437
Savings	*187,432*	*234,267*	*Payroll expenses*	*46,343*
Interbank	*29,451*	*38,058*	*Overhead*	*57,721*
Time	*372,313*	*404,634*	*Other operating expenses*	*52,373*
Other	*70,178*	*75,413*	Tax expenses	14,096
Reverse repos	337,008	457,044	Net operating income before provisions	94,696
Acceptances	45,347	49,090	Allowance for bad credits	33,433
Interbank transactions	10,581	11,954	Net operating income after provisions	61,263
Suspense accounts branches	11,703	12,810	Non-operating income	12,936
Borrowings and On-Lendings	173,104	227,766	Pre-tax income	74,199
Derivatives	27,226	41,153	Income tax and social security contributions	11,227
Other liabilities	412,447	582,637	Profit sharing	5,549
Net worth	198,834	249,919	**Net after-tax income**	**57,423**
Total Liabilities	**1,997,736**	**2,559,107**		

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 general Government's demand deposits are derived from Bacen reports, while the IFS are the source of total central Government deposits as of end-2007; these two figures are used to arrive at an estimate of total general Government deposits. Based on bank interviews, non-Government demand deposits are assigned evenly

between the Retail and Corporate business lines while one-third of non-Government time deposits are allocated to Retail and the rest to Corporate; savings deposits ("*poupança*") are allocated exclusively to Retail. Acceptances that comprise of various types of 'letras' (e.g., *letras hipotecarias*, *letras de cambio* etc.) insured by FGC are allocated to Retail, while the remainder are assumed to belong to Corporate. Interbank deposits and reverse repos (a form of funding using pledged securities) are mapped to Treasury. The proportion of other deposits that represent so-called 'special deposits' by institutions such as FAT (*Fundo de Amparo ao Trabalhador*) and are primarily held by state-owned banks are assumed to be used for directed lending purposes and are therefore allocated by business line based on the type of lending that they support (see below), while the remainder (mostly judicial deposits) are allocated equally between Retail and Corporate.

As can be seen in Table 2.1, the Retail business line holds 50 percent of total deposits, while Corporate controls 43 percent. Government and Treasury hold a small percentage, 4 percent and 3 percent respectively.

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 2007 balance by business line – this is estimated by taking the simple average of balances at the beginning and end of 2007
- Average interest rate by type of deposit during 2007 – this is estimated based on rate information in Bacen's website, as well as on yield information found in the 20-F reports of Brazilian banks filed with the SEC[43].

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 during 2007.

As can be seen in Table 2.1, the Retail business line is charged 26 percent of all interest expenses on deposits, acceptances and repos; Corporate and Treasury are charged 25 percent and 46 percent respectively, with the remainder (3 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

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[43] 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.

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 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[44].

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 2007 is assumed to be 12 percent, while the average yield on savings accounts is assumed to be 7.5 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 2007.

As a result, the RR of the Retail business line account for 63 percent of total, the Corporate business line accounts for 33 percent, and Government has a small share.

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 1.1 trillion vs. BRL 935 billion as of end-2007) 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, which needs to be allocated across business lines. Bacen's report also includes the total volume of public sector credits (BRL 18.8 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 distribution of loans by client size, is that 15 percent of all corporate loans are given to

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[44] 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.

small firms – with two exceptions[45] – 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 50 percent of the banking system's gross loans (39 percent and 11 percent are loans to individuals and small firms respectively), while Corporate and Government account for 48 and 2 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 (8.1 percent as of end-2007[46]).

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 68 percent of LLP even though it only has 50 percent of gross loans. By contrast, Corporate accounts for 31 and 48 percent of LLP and gross loans respectively, while Government represents 3 and 2 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 2007 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-2007
- Average interest rate by type of loan during 2007 – this is estimated based on rate information found in Bacen's report on financial system credit operations[47].

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[45] 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).

[46] Loans rated categories D and higher.

[47] 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

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-2007[48].

As a result of its significantly higher lending rates, the Retail business line accounts for 67 percent of interest income on loans and leases even though it only has 48 percent of gross loans. By contrast, Corporate accounts for 32 and 50 percent of interest income and gross loans respectively, while Government has 1 and 2 percent of interest income and gross loans respectively. The average yield on performing loans by business line is 36/14/18 percent for Retail/Corporate/Government respectively, while the average yield on the banking system's performing loan book is around 24 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[49] 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[50], 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 – 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

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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.

[48] 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.

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

[50] 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.

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 75/15/1/9 for Retail/Corporate/ Government/Treasury respectively – this is based on bank interviews on their approximate allocations across business lines[51].

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. 75/15/1/9 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. The allocation mechanism used in the study is based on Bacen's capital requirement of 11 percent of risk weighted assets, which is higher than the 8 percent Basel rule. The residual book equity is kept in Treasury, since it functions as the bank's central money management 'clearinghouse', and thus it also incurs all market and interest rate risk[52].

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).

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

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

[52] A comparison with a proportional allocation according to the capital adequacy ratio is tested in the sensitivity analysis. This alternative does not change the conclusions of the study

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 I.1.

Figure I.1: Decomposition of Interest Margin between Lending and Borrowing Activities
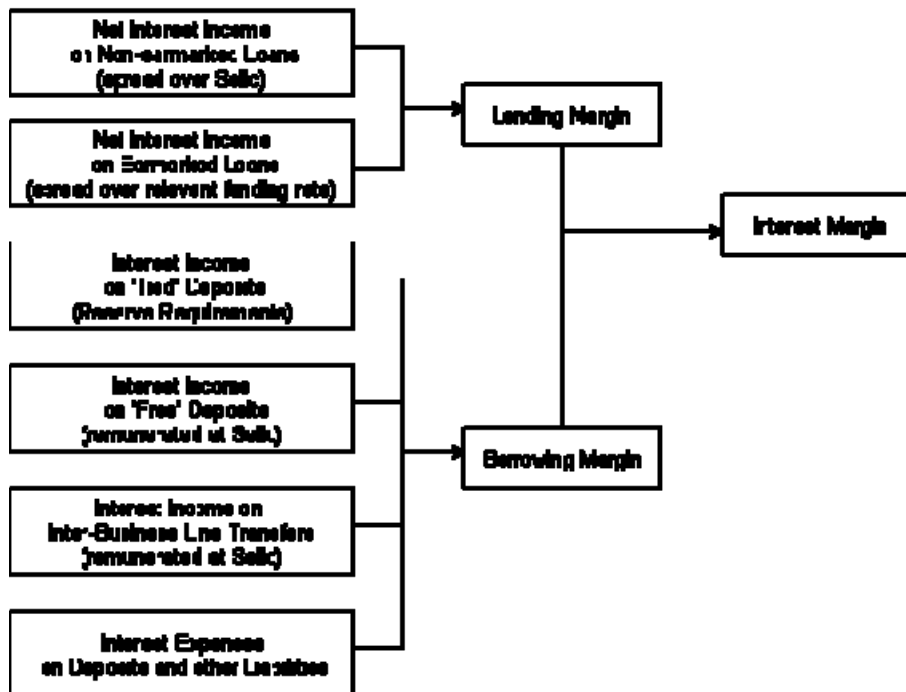
Appendix II: Sensitivity Analysis

The results of the practitioner approach that are described in section 2 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[53] 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 II.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 and banks' 20F reports – of an even allocation for of demand deposits among the two key business lines and a majority of time deposits kept in Corporate, after allocating 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 39/16, in the first test the relationship moves to 38/17 and in the other test to 41/14. 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 37/8 and 42/24 (Treasury actually exhibits 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 39/16 in the base case to 40/16 and 38/16 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

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[53] Sensitivity analysis on variables whose values are confirmed – for example, the average interest rate of Selic for 2007 – 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[54].

Seventy five 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 70 percent (while increasing Corporate to 20 percent), and then increasing it to 80 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 43/13 and 37/19. Only when Retail absorbs 90 percent of all 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). We tested the hypothesis that these transfers are not remunerated, which would impact the profitability of both Retail and Corporate, since they rely on Treasury as part of their funding.. Although this result is not realistic (banks typically engage in remunerated transfer pricing across different business lines), it demonstrates that our assumption is robust. The reverse test is to use as transfer rate the one that Treasury obtains from all its dealing activities instead of the traditionally used interbank rate, 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 required regulatory capital of 11 percent, with all excess book equity remaining in Treasury since this business line also keeps all interest rate risk. 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,

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[54] In particular, the average 2007 rate for non-earmarked loans to individuals and for non-earmarked domestic and foreign currency loans to medium/large firms.

that the distribution of equity is proportional to the size of each business line, and second, that the allocation is based on the average capital of the banking system of 18 percent. The ratio of ROC for Retail/Corporate moves from 39/16 in the base case to 32/15 and 29/15 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 II.1a: Sensitivity Analysis in the Performance Estimation

	Retail	Corporate	Government	Treasury
Base Case				
Market Share of Deposits	50%	43%	4%	3%
Market Share of Gross Loans	50%	48%	2%	0%
Market Share of Loan Loss Provisions (LLP)	68%	29%	3%	0%
Market Share of Interest Expense	29%	26%	2%	43%
Pre-tax Return on Assets	3.0%	1.3%	0.4%	4.4%
Pre-tax Return on Capital	39%	16%	8%	30%
Sensitivity to Deposits				
Description: 10% of Retail deposits shift to Corporate				
Market Share of Deposits	45%	48%	4%	3%
Pre-tax Return on Assets	3.0%	1.4%	0.4%	4.4%
Pre-tax Return on Capital	38%	17%	8%	30%
Description: 10% of Corporate deposits shift to Retail				
Market Share of Deposits	54%	39%	4%	3%
Pre-tax Return on Assets	3.1%	1.2%	0.4%	4.4%
Pre-tax Return on Capital	41%	14%	8%	30%
Sensitivity to Deposit Rates				
Description: Interest rate on time deposits increased to 12.5% (from 10.5%) and interest rate on acceptances and other deposits reduced to 11% (from 13%), such that overall interest expenses reported by Bacen remain the same				
Market Share of Interest Expense	30%	29%	2%	38%
Pre-tax Return on Assets	2.8%	0.7%	-0.9%	5.3%
Pre-tax Return on Capital	37%	8%	-16%	36%
Description: Interest rate on time deposits decreased to 8.5% and interest rate on acceptances and other deposits increased to 15%, such that overall interest expenses reported by Bacen remain the same				
Market Share of Interest Expense	28%	23%	2%	47%
Pre-tax Return on Assets	3.2%	1.9%	1.7%	3.5%
Pre-tax Return on Capital	42%	24%	31%	24%
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	44%	54%	2%	0%
Pre-tax Return on Assets	2.9%	1.4%	0.4%	4.4%
Pre-tax Return on Capital	40%	16%	8%	30%
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	53%	45%	2%	0%
Pre-tax Return on Assets	3.1%	1.2%	0.4%	4.4%
Pre-tax Return on Capital	38%	16%	8%	30%
Sensitivity to Loan Loss Provisions (LLP)				
Description: The LLP rate for non-earmarked Corporate loans is increased to 8% and for Retail loans to small firms decreased to 3%, such that the overall LLP rate reported by Bacen remains the same				
Market Share of LLP	61%	36%	3%	0%
Pre-tax Return on Assets	3.3%	0.9%	0.4%	4.4%
Pre-tax Return on Capital	41%	13%	8%	30%
Description: The LLP rate for non-earmarked Corporate loans is decreased to 3% and for Retail loans to small firms increased to 10%, such that the overall LLP rate reported by Bacen remains the same				
Market Share of LLP	72%	25%	3%	0%
Pre-tax Return on Assets	2.8%	1.5%	0.4%	4.4%
Pre-tax Return on Capital	37%	19%	8%	30%

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

	Retail	Corporate	Government	Treasury
Base Case				
Market Share of Interest Revenue on Loans	66%	33%	1%	0%
Market Share of Interest Expense	29%	26%	2%	43%
Market Share of Service Charges & Op. Expenses	75%	15%	1%	9%
Market Share of Capital/Equity	27%	24%	1%	48%
Pre-tax Return on Assets	3.0%	1.3%	0.4%	4.4%
Pre-tax Return on Capital	39%	16%	8%	30%
Sensitivity to Loan Rates				
Description: The interest rate on non-earmarked lending to individuals increased to 45%. while non-earmarked domestic and foreign currency lending to Corporates decreased to 19% and 5% respectively, such that the overall interest income on loans reported by Bacen remains the same				
Market Share of Interest Revenue on Loans	70%	28%	1%	0%
Pre-tax Return on Assets	3.9%	0.2%	0.3%	4.4%
Pre-tax Return on Capital	51%	3%	6%	30%
Description: The interest rate on non-earmarked lending to individuals decreased to 39%. while non-earmarked domestic and foreign currency lending to Corporates increased to 25% and 11% respectively, such that the overall interest income on loans reported by Bacen remains the same				
Market Share of Interest Revenue on Loans	63%	36%	1%	0%
Pre-tax Return on Assets	2.3%	2.2%	0.4%	4.4%
Pre-tax Return on Capital	30%	28%	8%	30%
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 70%, while the share of Corporate rises by 5% to 20%				
Market Share of Service Charges & Op. Expenses	70%	20%	1%	9%
Pre-tax Return on Assets	3.3%	1.0%	0.4%	4.4%
Pre-tax Return on Capital	43%	13%	8%	30%
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 80%, while the share of Corporate drops by 5% to 10%				
Market Share of Service Charges & Op. Expenses	80%	10%	1%	9%
Pre-tax Return on Assets	2.7%	1.6%	0.4%	4.4%
Pre-tax Return on Capital	37%	19%	8%	30%
Sensitivity to Inter-Business Line Transfers				
Description: Treasury, in its central clearing role, does not charge/remunerate transfers from/to it in response to an imbalance between assets and liabilities in a specific business line				
Pre-tax Return on Assets	3.9%	1.4%	-2.3%	3.6%
Pre-tax Return on Capital	51%	17%	-13%	24%
Description: Treasury, in its central clearing role, charges/remunerates transfers from/to 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	2.9%	1.3%	0.5%	4.5%
Pre-tax Return on Capital	38%	16%	10%	31%
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	3.0%	1.3%	0.4%	4.4%
Pre-tax Return on Capital	32%	15%	9%	42%
Description: The book equity of the banking system is allocated based on the average capital of the banking system of 18% instead of the regulatory capital of 11% per business line with Treasury acting as the residual				
Market Share of Capital	46%	40%	2%	12%
Pre-tax Return on Assets	3.0%	1.3%	0.4%	4.4%
Pre-tax Return on Capital	29%	15%	9%	65%

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