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FERNANDO MORAIS FARRÉ SALAZAR

**ASSESSING COMPETITION IN BANKING INDUSTRY: A MULTIPRODUCT
APPROACH**

SÃO PAULO

2013

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obtenção do título de Mestre em Economia

Campo de conhecimento:

Microeconomia Bancária

Orientador: Prof. Dr. Klênio Barbosa

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Banca Examinadora

Prof. Dr. Klênio de Souza Barbosa (Orientador)
FGV-EESP

Prof. Dr. Bruno Rocha
UFMG e Cedeplar

Prof. Dr. Cláudio Lucinda
USP-FEARP

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*Dedico este trabalho à minha família, em especial
à minha esposa Roberta e aos meus pais, Amélia
e Francisco, por todo o suporte, apoio e
compreensão nesta jornada.*

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ABSTRACT

This paper aims to investigate the competition aspects of banking multiproduct operation. Based on an extension of Panzar and Rosse (1987)'s test to the case of a multiproduct banking firm, we take advantage of a new dataset constructed to Brazilian banking conglomerates to infer the impact of conglomeration on market power. We find that banks offering classic (i.e., loans and credit cards) and other bank products (i.e., brokerage services, insurance and capitalization bonds) have substantially higher market power than the ones which offer only classic products. Results suggest a positive bias on the traditional estimates of competition in which the multioutput actions are not taken into account.

Keywords: Microeconomics of Banking; Banking Competition; Multiproduct firm

RESUMO

Este trabalho tem por objetivo investigar os aspectos de competição bancária envolvendo as operações de firmas multiprodutos. Com base na extensão do modelo de Panzar e Rosse (1987) aplicado para os casos de instituições financeiras multiproduto, o trabalho busca inferir sobre o impacto da concentração de mercado no poder de mercado dos bancos multiprodutos. Observa-se que as instituições financeiras que oferecem produtos clássicos (i.e., empréstimos e cartões de crédito) e outros produtos (i.e., serviços de corretagem, seguros, produtos de previdências e capitalização) possuem substancialmente maior poder de mercado vis-à-vis aqueles que apenas trabalham com produtos clássicos. Os resultados sugerem uma tendência positiva para as estimações tradicionais de competição, na qual as ofertas de diversos produtos não são levadas em considerações.

**Palavras-chave: Microeconomia bancária; Competição Bancária; Firmas Multi-
produtos**

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1. INTRODUCTION

The world banking sector has experienced enormous changes during the last few decades. Marked growth in technological and financial innovation and strong deregulation in the sector has led to increased banking concentration and the creation of large financial conglomerates (Bikker and Haaf, 2002). These structural changes have provoked a vast literature on the topic of banking sector competition.

More specifically, some studies have investigated the potential effects of market concentration on competition in this sector (Bikker and Haaf, 2002, Shaffer, 2004, and Coccoresse, 2009, among others). Curiously, little attention has been paid to the effects of competition in creating financial conglomerates. These are defined as institutions that offer financial, banking and insurance services using the same corporative structure (Freixas, Lóránth and Morrison, 2007). Possession of a multiproduct structure allows these companies to benefit from economies of scale and scope in addition to providing greater opportunities for risk diversification when supplying this range of services as a package¹.

Indeed, multiproduct operations have been a characteristic feature of the banking sector in recent years. It even received special attention in the new banking regulations drafted in the aftermath of the recent international financial crisis (see, for example, Levine, 2011). The only piece of research dealing with the effects of multiproduct operations on banking competition has been written by Berger and Kim (1994). These authors analyze the behavior of banks that operate simultaneously in the retail and corporate banking loan segments. The results revealed asymmetries in the degree of competition, which can be related to the characteristics of the consumers in each of these segments.

Although important, the article by Berger and Kim (1998) is essentially of a descriptive nature and does not investigate the possible relation between conglomeration and competition. In this article we intend to study the effects of a multiproduct structure on patterns of competition in the banking sector by using an approach based on Panzar and Rosse (1987), explicitly examining the behavior of a representative bank in a multimarket environment.

¹ A more detailed discussion of the economic justification for the development of conglomerates may be found in Milbourn et al. (1999) and Dierick (2004).

In order to consider the multiproduct dimension intended in our analysis, the dataset needs to be adjusted to include the accounting information of banking conglomerates. Imagine a particular institution that offers only a range of banking loan products. From her point of view, she could be classified as a single banking product institution. However, this sort of conclusion would be incomplete if she is part of a financial conglomerate with a colligate firm offering other types of financial products, like insurance or private pension plans. In such a case, from the point of view of the conglomerate, there is a multiproduct operation.

To take into account these possibilities, our dataset was constructed using accounting information in the level of the banking conglomerates instead of the single institutions. This strategy ends to be highly data-consuming since we have to identify the final products and the individual institutions that compose a given banking conglomerates.

In our empirical analysis we used information on Brazilian banking conglomerates. To the best of our knowledge, Brazil is the only country when regulatory authority provides the accounting statements consolidating the information of individual institutions that compose each conglomerate. That information enables us to make a new and complete dataset with account data of Brazilian banking conglomerates between 2001Q1 and 2012Q4. Based on an extension of Panzar and Rosse (1987)'s test to the case of a multiproduct banking firm, we infer the impact of conglomeration on market power. We find that banks offering classic (i.e., loans and credit cards) and other bank products (i.e., brokerage services, insurance and capitalization bonds) have substantially higher market power than the ones which offer only classic products. Therefore, the test from Panzar e Rosse (1987) reveals that the measurement of market power is underestimated when multiproduct information is not considered.

Trying to identify which of those other banks leads to an increase in multiproduct bank market power, we estimate the market power of the banks that offer the following profile of products (i) classic and other financial bank products (like brokerage, currency exchange services), (ii) classic and other nonfinancial bank products (like insurance, life insurance, capitalization bonds and reinsurance), and (iii) classic and financial and nonfinancial products, vis-à-vis banks that offer only

classic products. Our estimates show that banks which offer any of those product profiles hold higher market power than the ones which offer only classic products. Those results indicate that either financial or nonfinancial bank products may increase bank market power.

The paper is organized as follows. In the next section we highlight recent literature related to banking competition. Section 3 briefly presents an institutional background highlighting some major features of Brazilian banking system. In the following section we present the data and the empirical procedures used along with the main econometric results. Section 5 presents our conclusions. The tables are in the appendix.

2. RELATED LITERATURE

There is an extensive literature related to the study of competition in the banking sector². Some of these studies are associated with the traditional Structure-Conduct-Performance (SCP) approach and they almost always use the unidirectional causal hypothesis to explain the relation between market structure and conduct. Consequently, the level of competition can be evaluated by means of structural measurements such as C4 and HH1 (Degryse et al. 2009)³.

This article uses Panzar and Rosse's (1987) model, which allows a distinction to be made between perfect competition, monopolistic competition or monopoly. Their approach consists of simply estimating a reduced form equation for revenue from financial intermediation as a function of input prices for banking products.

Panzar and Rosse (1987) show how the effects of variations in input prices on income in the banking sector are influenced by market power. The test statistic (H) for the level of competition is given by the sum of the elasticities of revenue in relation to input prices. A monopoly situation would be consistent with an H value of lower or equal to zero, since the company would always operate in the elastic part of the demand curve. On the other hand, equilibrium with perfect competition would mean H equals to 1. In this market environment a rise in input prices would lead to a proportional increase in both marginal costs and income in the sector. Last of all, intermediate values of H, between zero and one, would be typical of monopolistic competition.

Panzar and Rosse's (1987) test procedure became popular in the literature largely due to the low level of information required about the sector under investigation. The level of market competition could be inferred by means of simple restrictions on the values of price elasticity in the income equation. Bikker and Haaf (2002) used this procedure for a set of 23 countries and in general obtained evidence of monopolistic competition in the markets where they carried out their research. In addition, these authors found evidence that markets with higher concentration typically have lower levels of competition. Claessens and Laevens (2004), on the other hand, found no significant relation between market competition and concentration. Structural factors

² A list of the studies on banking competition contains many articles. Good surveys of this literature may be found in Cetorelli (1999), Berger et al. (2004) and Degryse et al. (2009).

³ For a discussion of this model see Degryse et al. (2009).

associated with restrictions on market entry and on banking operations were more relevant for competition⁴. Panzar and Rosse's (1987) test was used in this article for a sample of 50 countries and, once again, evidence of monopoly competition was found with the H statistic showing values between 0.6 and 0.8.

In the literature dealing with Brazil there is also evidence that the banking sector operates in an environment with a reasonable level of competition. The available tests however, generally reject the extreme hypotheses of perfect competition or monopoly and suggest that intermediate levels of competition are more likely⁵. Belaish (2003), Araujo, Jorge Neto and Ponce (2005) and Lucinda (2010) used the methodology developed by Panzar and Rosse (1987) and found some support for the hypothesis that there is monopolistic competition in the Brazilian banking market.

In contrast to the study of the concentration – competition relation, multiproduct operations in the banking sector have been neglected in the Brazilian and international literature⁶. The only study to deal explicitly with the question of banking competition and multiproduct supply was carried out by Berger e Kim (1998). These authors studied the segmentation of the banking market into two products – retail and banking loans.

Banking operations differ significantly in each of these segments and this has implications for competition in each of them. The retail loan segment, for example, is usually funded by deposits obtained from a widespread network of branches. On the other hand, banks that concentrate the activities in the corporate loan segment usually acquire purchased funds (Berger and Kim, 1998). The authors argue that clients in the corporate loan segment are typically more capable of gathering and processing relevant information and that market concentration is also typically stronger in this segment.

Berger and Kim (1998) estimate variable conjectural parameters that evaluate the reaction of banks to the variations in rivals' offer of credit in each segment. The results reveal that there is greater competition in the corporate loans segment where

⁴ Other pieces of research report evidence that the relation between concentration and competition is not a direct one. See, for example, Shaffer (2004) and Coccorese (2009).

⁵ For a recent survey of empirical work on banking competition in Brazil, see Lucinda (2010).

⁶ As Berger and Kim (1998) point out, studies in this area have concentrated on questions related to product mix and the economies of scale associated with multiproduct operations. See, for example, Murray and White (1983) and Dierick (2004).

concentration is higher. This therefore provides further evidence of just how complex the concentration – market power relation is.

3. INSTITUTIONAL BACKGORUND

Brazilian banking system has experimented important changes in the last few decades⁷. After the Real Plan, a set of major points has been characteristic of the sector, including a strong process of financial deepening and changes in the sector structure, with entry of foreign banks and market consolidation.

A first significant change in the operation of Brazilian banks was caused by the qualitative improvement in the macroeconomic environment. Until the early nineties, high inflation rates had guided the actions of economic agents. With the Real Plan, launched in July 1994, the Brazilian inflation rate converged from the annual average of 715% p.a. between 1980 and 1993 to 22% p.a in December 1995.

Macroeconomic stability has increased the economic agents' predictability, bringing strong stimulus for demand and supply of banking products, especially credit. During the hyperinflationary period, Brazilian banking operations had become very concentrated in gains from "floating" on basic banking services⁸. With monetary stability and more favorable macroeconomic conditions, especially in last decade, the banking system actions were channeled toward the traditional functions of raising funds and providing credit.

The improvement in the macroeconomic environment was not the only determinant of the recent growth in the provision of banking services. Brazilian government has also promoted important reforms in the financial system institutional environment, which contributed to the expansion of credit market in Brazil. Costa and De Mello (2006) argue these governmental measures were implemented to reduce information asymmetries in credit market, increase the quality of the collateral instruments, raise the enforcement of contracts, improve the regulatory system of insolvency problems solving and create alternative mechanisms for credit⁹.

⁷ For a historical overview about Brazilian banks' evolution, see Baer and Nazmi (2000) and Ness Jr. (2000).

⁸ Floating revenues can be defined as the financial gains originated in raising non-indexed and low costs resources (for example, bills and tax collection) and investing it interest indexed financial assets. According to Baer and Nazmi (2000), inflationary revenues with floating operations reached 40% of total banking revenues between 1990 and 1992.

⁹ Examples of such measures include the approval of the New Bankruptcy Law (Law 11,105/2005), Law on Positive Registers (Law 12,414/2011), the stricter rules for risk credit operations classification and provision (Resolution 2,682/1999), among others. For a further discussion on the institutional changes, see Costa and De Mello (2006).

As a result of these improvements in the macroeconomic conditions and in the institutional environment, Brazilian economy has undergone a robust process of financial deepening. The proportion of the total credit to GDP increased from an average of 27% between 1998 and 2003 to 53% in 2012.

Besides the process of financial deepening, Brazilian banking system has also been characterized for important structural changes. The end of easy gains with floating operations induced a painful adjustment in the sector. Added to the international crises in the nineties, this fact created great difficulties to the domestic banks, resulting in credit crunch and increasing losses.

The problems in the banking system in nineties led Brazilian government to promote a series of packages aiming the industry restructuring. The Program of Incentives to the Restructuring and Strengthening of the National Financial System (PROER), Program of Incentives to the Reduction of State-Level Public Sector in the Bank Activity (PROES) and Program for the Strengthening of the Federal Financial Institutes (PROEF) represented the beginning of important changes in the market structure of Brazilian banking¹⁰. One of these changes was the increase in market concentration, with the reduction in the number of commercial banks. In 1996 there were 230 of these institutions authorized to operate in Brazil. The commercial banks summed 159 in 2012. In this period, foreign banks were the only segment to present market gains. Foreign institutions, such as HSBC, ABN Amro and Santander, took the recent consolidation to enter in the Brazilian market. As a result, the number of banks under foreign control increased from 41 in 1996 to 59 in 2012.

Finally, it is important to stress the remarkable position of state-owned banks in Brazil. Despite the reduction in the public banking sector promoted by PROES, government banks are still widespread in Brazil. Three state-owned banks, Banco do Brasil (BB), Caixa Econômica Federal (CEF) and BNDES, are the largest banks in the country in terms of total assets in December 2012. Furthermore, state-owned banks accounted for 44% of assets, 49% of credit and 49% of total deposits in the banking sector in that month. This leading position of state-owned banks gives to Brazilian government an important role in the credit market dynamics. One example

¹⁰ For a more detailed discussion, see Baer and Nazmi (2000), Ness Jr (2000), and Nakane and Weintraub (2005).

occurred after the international financial crisis in 2008, when Brazilian government deliberately used the state-owned institutions to provide liquidity to the markets.

4. ESTIMATION AND RESULTS

4.1. DATA

In Brazil, banks present to local regulator, the Brazilian Central Bank (BCB), their statements in three levels of consolidated financial statements: Economic-Financial¹¹, Financial¹² and Single units¹³. In order to analyze the multiproduct nature of the bank, we used Economic-Financial statements for each bank, since it consolidates all different nature companies, including financial institutions and non-financial institutions. In the case that a bank does not belong to any bank Economic-Financial conglomerate, we use information of Financial or Single units to obtain the financial statements of the financial institutions operating in Brazil. To our knowledge, Brazil is the only country where is available this consolidated information on the financial conglomerates global operations.

The data used in this paper has been obtained from the database of Brazilian Central Bank. Such data was obtained from the BCB online reports, namely BCB's Informações Financeiras Trimestrais (IFT). Those reports provide information on financial statements of all financial institutions authorized to operate in Brazil in all the three levels described above on a quarterly basis. The reports are free from download directly from the BCB website¹⁴. Data are drawn from 1Q2001 to 4Q2012 for a set of 163 individual and conglomerate financial companies.

In addition, the products of the analyzed institutions were divided into three categories which sustain our multiproduct analyses. Table 1 shows the market division in classic bank products, other financial bank product, and other non financial bank product. This division is based on the nature of products offered by the banks. Therefore, according to the core activity, each one of 163 individual institutions was classified in one of these three product categories. Then, each banking conglomerate

¹¹ Economic-Financial (CONEF – document 4050 from BCB): group of companies of any nature that integrate the economic group, including financial and non-financial companies whose financial statements are published quarterly by BCB.

¹² Financial (document 4040 from BCB): group of banks that integrate the economic group, whose financial statements are published quarterly by BCB.

¹³ Single units (document 4010 from BCB): Legal units with National Registers of Legal Entities (CNPJ) whose financial statements are published monthly by their regulators, in this case BCB for banks and SUSEP for insurance companies.

¹⁴ Data available in: <https://www3.bcb.gov.br/iftimagem>

was assigned to a set of products following the classification of the individual institutions which were part of it¹⁵.

Our final sample is an unbalanced panel composed of 74 banking conglomerates with a total of 2,219 observations, as shown in tables 2, 3, 4, 5 and 6 in the appendix. All figures are expressed in real values of 2001Q1, according to official Brazilian consumer price index (IPCA).

Table 2 presents the number of banks, the distribution by ownership and capital origin. Most of the banking conglomerates in the sample are private and national ones. Only a fraction of 12.1% (9) is foreign, whereas 4 (5.4%) are state owned banks. Table 2 also shows the distribution of banks in the proposed three product division. The majority of banking conglomerates operate only in the classical banks segment, providing evidence to some prevalence of single output operations in the industry. However, 30% of conglomerates operate offering jointly other types of products, specially the financial banking products. Finally, only 10 conglomerates act in the tree segments.

The market structure varies across the segments, with signals of higher levels of market concentration in the multioutput definitions of supplying. As we can see in the second column of table 4, banks supplying only classic products typically have lesser average market share in terms of total assets. The average market share of classic banks is 2.8% compared to 15.7% of conglomerates supplying classic and other financial products and 13.7% of conglomerates operating in classic and other non financial products. The same pattern arises whether market share is calculated in terms of total revenue or when the Herfindhal-Hirschman Index (HHI) is employed to capture the level of concentration in the segments.

Finally, banks operating in each set of products are fairly different. Tables 5 and 6 show that, in general, more diversified banking conglomerates are larger, operating with higher market share and input prices. In table 5 we have some figures for conglomerates operating only with classic banking products (third column) and for conglomerates operating at the same time in classic and financial or non financial products (second column). The fourth and fifth columns present the test for mean

¹⁵ Independent banking institutions are treated as a single firm conglomerate.

equality, with strong evidence of heterogeneity in these two types of banks. The null hypothesis of equality cannot be rejected only for cost of fixed capital variable.

On the other hand, in the table 6 we have the comparison between the characteristics of banks supplying all the three products and the average of all others conglomerates. The nature of results remains the same. On average, the multiproduct operation is associated with bigger banks managing in an environment with more concentration and higher input prices.

4.2. EMPIRICAL STRATEGY

This subsection describes the econometric model that we use to estimate the change in the market power due to multiproduct nature of the bank. Following the banking literature summarized by Degryse et al. (2009), we estimate the change in the market power due to multiproduct bank operation using Panzar and Rosse (1987) approach. So, we first estimate the revenue equation as a function of bank input prices, and then we compute the Standard Panzar-Rosse H-Statistic and the change in H-Statistic due to multiproduct nature of the bank, namely ΔH . To conclude, we obtain the and Adjusted Panzar and Rosse for conglomerate–multiproduct banks.

The revenue equation is described the following equation:

$$\ln(RT_{it}) = \alpha + \ln(w_{it})' \beta + \ln(w_{it}) * dumMultiproduct_i' \gamma + Z_{it}' \theta + \mu_i + \delta_t + \varepsilon_{it} \quad (1)$$

where $\ln(RT_{it})$ is the total financial revenue of a bank i at time t . The vector w_{it} corresponds to the bank input prices. The variable $dumMultiproduct_i$ is a dummy variable which is equal to 1 if the bank i has other bank products, and zero otherwise. The vector Z_{it} and the variables μ_i , δ_t and ε_{it} are, respectively, the control variables, bank fixed-effects, time-fixed effects and an erratic term which is assumed to be not correlated to the other independent variables in equation (1).

The usual Panzar-Rosse H-Statistic is estimated by the following equation

$$\text{Standard-H} = \sum_{k=1}^m \hat{\beta}_{m,it} \quad (2)$$

such that

Values for Standard-H	Market Power compatible with
Standard-H ≤ 0	Monopoly or Monopolist Competition
Standard-H ≤ 1	Monopolist Competition
Standard-H = 1	Perfect Competition

The change in traditional Panzar-Rosse H-Statistic due to the multiproduct nature of the bank, namely ΔH , is estimated by $\Delta H = \sum_{k=1}^m \hat{\gamma}_{m,it}$. Therefore, the Adjusted Panzar-Rosse H-Statistic to account for the multiproduct nature of a bank, is estimated by

$$\text{Adjusted-H} = \sum_{k=1}^m \hat{\beta}_{m,it} + \sum_{k=1}^m \hat{\gamma}_{m,it} \quad (3)$$

In this paper we examine empirically whether the market power of a bank increases when it is taken into account that the multiproduct nature of a bank, i.e., when it is considered the revenues and cost that they have which come from other bank products than the classic ones.

This hypothesis is tested in the econometric model describe above proceeding the following test of hypothesis:

$$H_0: \Delta H \geq 0$$

$$H_a: \Delta H < 0$$

If we reject H_0 , it means that the market power of a bank increases when it is taken into account that the multiproduct nature of a bank.

To estimate the values of Standard-H and Adjusted-H, as in (2) and (3), we run the regression (1), using as dependent variable the natural logarithm of the total

revenues of financial intermediation ($\ln(\text{Revenue})$). The vector w_{it} containing the input prices of banking activity is given by:

- **Funding expenses ($\ln(\text{cost of capital})$):** natural logarithm of the ratio between total expenses with raising funds (capital) and total assets.
- **Personnel expenses ($\ln(\text{wage})$):** natural logarithm of the ratio between total payroll and total assets.
- **Fixed capital expenses ($\ln(\text{cost of fixed capital})$):** natural logarithm of the ratio between total fixed capital (own and leased) and total assets.

The estimated models include additionally a set of control variables, Z_{it} , in order to capture the effects of other relevant factors in the revenues determination:

- **Provision rate:** ratio between the total of provision for doubtful accounts and the shareholder Equity.
- **Profitability:** return of equity by the ratio between the total Profits and the shareholder Equity.
- **Market share:** banking conglomerate market share in terms of total assets.
- **HHI:** Herfindhal-Hirschman Index in the relevant market in terms of total assets.

The estimation and econometric results are shown in next subsection.

5. ECONOMETRIC RESULTS

Tablet 7 presents several estimates of equation (1) in which the dependent variable is the natural logarithm of a bank's financial revenue. The independent variables of interest are the inputs prices ($\ln(\text{cost of capital})$, $\ln(\text{wage})$, and $\ln(\text{cost of fixed})$, and interaction of input prices and the dummy variable *Dummy Banks which Classic and other Bank products*. That dummy variable assumes value equal to 1 if the bank offer Classic and some of other bank products (financial or nonfinancial products), and zero otherwise. The coefficients associated to those independent variables are used to estimate the Standard-H, ΔH and the Adjusted-H to account for the multiproduct nature of the banks. Those estimates are in the bottom of the table.

Each column in Table 7 corresponds to a different estimated specification of equation (1). In all specifications we take into account the panel structure of the data set by including fixed effects for each different bank, quarter and year. The aim is to control for unobservable bank characteristics and some trend dependence in the bank's revenue.

At column (1) in Table 7 we estimate equation (1) by generalized least squares (GLS) in which we include only the input prices and their interaction with the Dummy Banks which Classic and other Bank products as independent variables. Yet in column (2)-(4) we estimate the coefficients of interest including observable bank's and market structure's characteristics. In particular, in column (2) we include provision rate and profitability as independent variable, in column (3) bank's market share and in column (4) industry's HHI.

First, we observe that in all four specifications the estimated Standard H is between 0 and 1, which support the hypothesis that there is monopolistic competition in the Brazilian banking market within banks which offer only classic products. That is consistent with previous works as Belaish (2003), Araujo, Jorge Neto and Ponce (2005) and Lucinda (2010). However, we find that in all regressions that the estimated ΔH is negative, which indicates that banks offering classic (i.e., loans and credit cards) and other bank products (i.e., brokerage services, insurance and capitalization bonds) have higher market power than the ones which offer only classic products. As a result, the estimated Adjusted-H is negative. It suggests that

banks supplying classic and other bank products operate in an environment with little level of competition.

In order to examine whether ΔH is statically negative, we test of the following hypothesis: $H_0: \Delta H \geq 0$ and $H_a: \Delta H < 0$. The results of those one-sided tests reject H_0 at 4.7 percent at specification in column (1) and at 3.7 percent at the specification in column (2) to (4). Those results means the estimated market power of banks offering classic (i.e., loans and credit cards) and other bank products (i.e., brokerage services, insurance and capitalization bonds) is greater than the one estimated for the banks which offer only classic products. Note that the results are robust to different specifications, and the punctual estimated ΔH is about the same in all specifications.

In order to identify which of the other banks (financial or nonfinancial bank products) leads to an increase in multiproduct bank market power, we estimate the ΔH for the banks that offer each different subset of products. In particular, Table 8 estimates the market power of the banks offering classic and other financial bank products (like brokerage, currency exchange services) vis-à-vis banks that offer only classic products. In Table 9, we estimate the ΔH for banks that offer classic and other nonfinancial bank products (like insurance, life insurance, capitalization bonds and reinsurance). To conclude, Table 10 estimates the ΔH for those banks that offer classic, financial and nonfinancial products vis-à-vis banks that offer only classic products.

5.1. Banks supplying classic and other financial bank products versus Classic Banks

Table 8 presents several estimates of equation (1) in which the dependent variable is the natural logarithm of a bank's financial revenue. The independent variables of interest are the inputs prices ($\ln(\text{cost of capital})$, $\ln(\text{wage})$, and $\ln(\text{cost of fixed})$, and interaction of input prices and the dummy variable *Dummy Banks which Classic and Financial Bank products*. That dummy variable assumes value equal to 1 if the bank offer Classic and financial products (like, brokerage and currency exchange services), and zero otherwise. The banks supplying classic and only nonfinancial products are excluded from the regressions in that table. As in table 7, the

coefficients associated to those independent variables are used to estimate the Standard-H, ΔH and the Adjusted-H. Those estimates are in the bottom of the table.

As in Table 7, each column in Table 8 corresponds to a different estimated specification of equation (1). In all specifications we include fixed effects for each different bank, quarter and year. At column (1) in Table 8 we estimate equation (1) by generalized least squares (GLS) in which we include only the input prices and their interaction with the Dummy Banks which Classic and other financial products as independent variables. Yet in column (2)-(4) we estimate the coefficients of interest including, respectively, provision rate and profitability, bank's market share, and industry's HHI as independent variable.

We find that in all regressions that the estimated ΔH is negative, which indicates that banks offering classic and other financial products have higher market power than the ones which offer only classic products. The test of hypothesis with $H_0: \Delta H \geq 0$ and $H_a: \Delta H < 0$ reject H_0 at 4.6 percent at specification in column (1) and at 3.6 percent at the specification in column (2) to (4). Those results means the estimated market power of banks offering classic and other financial products is greater than the one estimated for the banks which offer only classic products. Note that the results are robust to different specifications, and the punctual estimated ΔH is very similar in all specifications.

5.2. Banks supplying classic and other nonfinancial bank products versus Classic Banks

Table 9 presents several estimates of equation (1) in which the dependent variable is the natural logarithm of a bank's financial revenue. The independent variables of interest are the inputs prices ($\ln(\text{cost of capital})$, $\ln(\text{wage})$, and $\ln(\text{cost of fixed})$, and interaction of input prices and the dummy variable *Dummy Banks which Classic and NonFinancial Bank products*. That dummy variable assumes value equal to 1 if the bank offer classic and nonfinancial products (like, life an nonlife insurance, capitalization bonds), and zero otherwise. The banks supplying classic and only financial products are excluded from the regressions in that table.

Table 9 reports several estimations of equation (1). In all specifications we include fixed effects for each different bank, quarter and year. At column (1) in Table 9 we

estimate equation (1) by generalized least squares (GLS) in which we include only the input prices and their interaction with the Dummy Banks which Classic and other nonfinancial products as independent variables. Yet in column (2)-(4) we estimate the coefficients of interest including observable bank's and market structure's characteristics.

According to the all estimations in Table 9, the estimated ΔH is negative, which indicates that the market power of banks offering classic and other nonfinancial products is higher of the ones which offer only classic products. The test of hypothesis with $H_0: \Delta H \geq 0$ and $H_a: \Delta H < 0$ reject H_0 at 4.1 percent at specification in column (1), at 6.2 percent at the specification in column (2), and at 6.9 percent at the specifications in column (3) and (4). Those results mean the banks offering classic and other nonfinancial products have greater market power than the one estimated for the banks which offer only classic products. Note that the results are robust to different specifications.

5.3. Banks supplying classic, other financial and nonfinancial bank products versus Classic Banks

Table 10 presents several estimates of equation (1) in which the dependent variable is the natural logarithm of a bank's financial revenue. The independent variables of interest are also the inputs prices (*ln(cost of capital)*, *ln(wage)*, and *ln(cost of fixed)*, and interaction of input prices and the dummy variable *Dummy Banks which Classic, Financial and NonFinancial Bank products*. That dummy variable assumes value equal to 1 if the bank offer classic, financial and nonfinancial products, and zero otherwise. The banks supplying classic and only financial or nonfinancial products are excluded from the regressions in that table.

Table 10 details several estimations of equation (1). In all specifications we include fixed effects for each different bank, quarter and year. As in Table 9, at column (1) in Table 10 we estimate equation (1) by generalized least squares (GLS) in which we include only the input prices and their interaction with the Dummy Banks which Classic, financial and nonfinancial products as independent variables. Yet in column (2)-(4) we estimate the coefficients of interest including observable bank's and market structure's characteristics.

All estimations in Table 10 show that the estimated ΔH is negative, which indicates that the market power of banks offering classic, financial and other nonfinancial products is higher of the ones which offer only classic products. The test of hypothesis with $H_0: \Delta H \geq 0$ and $H_a: \Delta H < 0$ reject H_0 at 6.0 percent in all estimations. Those results mean the banks offering classic and other nonfinancial products have greater market power than the one estimated for the banks which offer only classic products. Note that the results are robust to different specifications.

In a nutshell, the estimations in Table (8)-(10) show that banks which offer any of those product profiles hold higher market power than the ones which offer only classic products. Those results indicate that either financial or nonfinancial bank products may increase bank market power.

6. CONCLUSIONS

In this paper we investigate the competition aspects of banking multiproduct operation. Based on an extension of Panzar and Rosse (1987)'s test to the case of a multiproduct banking firm, we take advantage of a new dataset constructed to Brazilian banking conglomerates to infer the impact of conglomeration on market power. We find that banks offering classic and other bank products have substantially higher market power than the ones which offer only classic products. Different tests from Panzar e Rosse (1987) reveals that the measurement of market power is underestimated when multiproduct information is not considered.

In addition, our estimates show that banks which offer any of those product profiles hold higher market power than the ones which offer only classic products. Those results indicate that either financial or nonfinancial bank products may increase bank market power.

A potential extension of this work would be investigating the causal effects of the positive relationship between market power and the bank's decision to supply classic and other bank products.

REFERENCES

- ARAUJO, L.A., JORGE NETO, P.M., PONCE, D.S. *Competição e concentração entre bancos brasileiros*, XXXIII Encontro Nacional de Economia - ANPEC, n.7, 2005, p.561-582.
- BAER, W., NAZMI, N. *Privatization and restructuring of Banks in Brazil*, Quarterly Review of Economics and Finance, n.40, 2000, p.3-24.
- BELAISH, A. *Do Brazilian Banks compete?* International Monetary Fund, WP 03/113, 2003.
- BERG, S., KIM, M. *Bank as multiproduct oligopolies: an empirical evaluation of the retail and corporate banking markets*. Journal of Money, Credit and Banking, n.30(2), 1998, p.135-156.
- BERGER, A., DEMIRGÜÇ-KUNT, A., LEVINE, R., HAUBRICH, J. *Bank Concentration and competition: an evolution in the making*. Journal of Money, Credit and Banking, n.36, 2004, p.433-451.
- BIKKER, J.A., HAAF, K. *Competition, concentration and their relationship: an empirical analysis of the banking industry*. Journal of Banking and Finance, n.26, 2002, p.2191-2214.
- BRESNAHAN, T.F. *The oligopoly solution concept is identified*. Economic letters, n.10, 1982, p.87-92.
- BRESNAHAN, T.F., REISS, P.C. *Entry and competition in concentrated markets*. Journal of Political Economy, n.99, 1991, p.977-1009.
- CETORELLI, N. *Competitive analysis in banking: appraisal of the methodologies*. Economic Perspectives: Federal Reserve Bank of Chicago, First Quarter, 1999, p.2-15.
- CLAESSENS, S., LAEVEN, L. *What drives bank competition? Some international evidence*. Journal of Money, Credit and Banking, n.36, 2004, p.563-583.
- COCCORESE, P. *Market power in local banking monopolies*. Journal of Banking and Finance, n.33(7), 2009, p.1196-1210.

COSTA, A., DE MELLO, J.M. *Judicial risk and credit market performance: micro evidence from Brazilian payroll loans*. NBER Working Paper, n.12, 2006.

DEGRYSE, H., KIM, M., ONGENA, S. *Microeconometrics of banking: methods, applications, and results*. 1st ed. Oxford University Press: New York, 2009, 234 p.

DICK, A. *Demand estimation and consumer welfare in the banking industry*. Finance and Economics Discussion Series Paper. Board of Governors of the Federal Reserve System. 2002.

DIERICK, F. *The supervision of mixed financial services groups in Europe*. Occasional paper, European Central Bank, Frankfurt, n.20, 2004.

FREIXAS, X., LÓRÁNTH, G., MORRISON, A. *Regulating financial conglomerates*. Journal of Financial Intermediation, n.16, 2007, p.479-514.

LAU, L.J. *On identifying the degree of competitiveness from industry price and output data*. Economics Letters, n.10, 1982, p.93-99.

LUCINDA, C. *Competition in the Brazilian loan market: an empirical analysis*. Estudos Econômicos, n.40, 2010, p.831-858.

MILBOURN, T., BOOT, A., THAKOR, A. *Megamergers and expanded scope: theories of bank size and activity diversity*. Journal of Banking and Finance, n.23, 1999, p.195-214.

MURRAY, J., WHITE, R. *Economies of scale and economies of scope in multiproduct financial institutions: a study of British Columbia Credit Unions*. Journal of Finance. n.38, 1983, p.887-901.

NAKANE, M., WEINTRAUB, D.B. *Bank privatization and productivity: evidence for Brazil*. Journal Banking and Finance, n.29, 2005, p.2259-2289.

NESS JR, W.L. *Reducing government bank presence in the Brazilian financial system – why and how*. Quarterly Review of Economics and Finance, n.40, 2000, p.71-84.

PANZAR, J., ROSSE, J. *Testing for “monopoly” equilibrium*. The Journal of Industrial Economies, XXXV,n.4, 1987, p.443-456.

APPENDIX

Table 1 - Financial Products

Classic Bank Products	Other Bank Products	
	Other Financial Bank Products	Other Non Financial Bank Products
Corporate loans	Broker	Insurance
Working capital	Interbank credit	Life Insurance
Credit Cards	Market Trades (currency, money, etc)	Capitalization Bonds
Personal loans		Other Insurance

Table 2 - Banks and Financial Products

Description	Number of Banks
All Banks	74
Ownerwhip	
Private Banks	70
Public Banks	4
Capital Origin	
National Banks	65
Foreign Banks	9
Bank Products (Classic and Other Bank Products)	74
Only Classic Bank Products	52
Classic and Other Bank Products	22
Bank Products (Classic, Other Financial and Non Financial Bank Products)	74
Only Classic Bank Products	52
Classic Products and	22
only Financial Bank Products	11
only Non Financial Bank Products	1
all types of bank products	10

Table 3 - Description Characteristics: Bank Characteristics and Market Concentration - All Banks

Variable	Obs.	Mean	Std. Dev.	Min	Max
Panel A - Bank Characteristics					
Dummy Private Bank	2219	0.94	0.25	0	1
Dummy Brazilian Bank	2219	0.90	0.30	0	1
Dummy Banks with other Bank Products	2219	0.22	0.42	0	1
Dummy Banks with other Financial Products	2219	0.22	0.41	0	1
Dummy Banks with other Non Financial Products	2219	0.12	0.32	0	1
Total Assets (price index Q12001=1)	2219	10500000	42200000	277	403000000
Total Bank Products Revenue (price index Q12001=1)	2219	382254	1494794	0	17100000
Labor Cost (Wage) = TotalPayoll/Total Assets	2219	0.045	0.056	0.000	0.584
Cost of Capital = Total Capital Expenditure / Total Assets	2219	0.200	0.667	-0.723	29.552
Cost of fixed capital = Total Fixed Capital/Total Assets	2219	0.205	0.776	0.000	11.873
Provision = Provision for doubtful accounts/ Shareholder Equity	2219	0.009	0.018	-0.060	0.240
Profitability = Total Profits / Shareholder Equity	2219	0.032	0.116	-2.485	1.818
Market Share (assets)	2219	0.022	0.069	0.000	0.496
Market Share (revenue)	2219	0.022	0.067	0.000	0.497
Panel B - Market Concentration					
HHI (revenue)	2219	0.232	0.041	0.15	0.35
HHI (assets)	2219	0.245	0.037	0.19	0.39
PanelC - Time Dummies					
Quarter - Dummies					
1st Quarter	2219	0.248	0.432	0	1
2nd Quarter	2219	0.245	0.430	0	1
3rd Quarter	2219	0.254	0.435	0	1
4th Quarter	2219	0.253	0.435	0	1
Year - Dummies					
2001	2219	0.080	0.271	0	1
2002	2219	0.082	0.274	0	1
2003	2219	0.081	0.273	0	1
2004	2219	0.082	0.274	0	1
2005	2219	0.089	0.284	0	1
2006	2219	0.098	0.298	0	1
2007	2219	0.106	0.308	0	1
2008	2219	0.120	0.325	0	1
2009	2219	0.095	0.293	0	1
2010	2219	0.055	0.228	0	1
2011	2219	0.055	0.228	0	1
2012	2219	0.058	0.233	0	1

Table 4 - Relevant Market, Market Concentration and Bank Products

Relevant Market and Bank Products	Market Concentration: Average Market Share and HHI			
	Market Share (assets) Average	Market Share (revenue) Average	HHI (assets)	HHI (revenue)
Banks supplying				
Classic Products	0.028	0.028	0.182	0.154
Classic and Other Bank Products	0.073	0.073	0.285	0.275
Classic and Other Financial Products	0.157	0.157	0.363	0.324
Classic and Other Non Financial Products	0.137	0.137	0.310	0.310

Table 5 - Mean Difference Test - Banks – Only Classic versus Other Banks

Variable	Banks supplying		t-test*	
	Classic and Other Bank Products	Only Classic Bank Products	t-statistics	p-value***
Panel A - Market Share and Bank Size				
Market Share (assets)	0.07	0.01	18.23	0.000
Market Share (revenue)	0.07	0.01	19.05	0.000
Total Assets (price index Q12001=1)	43600000	1039240	21.73	0.000
Total Bank Products Revenue (price index Q12001=1)	1593522	37179	22.59	0.000
Panel B - Other Characteristics				
Dummy Private Bank	0.71	1.00	-26.72	0.000
Dummy Brazilian Bank	0.94	0.89	3.22	0.001
Labor Cost (Wage) = TotalPayoff/Total Assets	0.09	0.03	19.86	0.000
Cost of Capital = Total Capital Expenditure / Total Assets	0.36	0.16	5.94	0.000
Cost of fixed capital = Total Fixed Capital/Total Assets	0.23	0.20	0.75	0.451
Provision = Provision for doubtful accounts/ Shareholder Equity	0.00	0.01	-5.03	0.000
Profitability = Total Profits / Shareholder Equity	0.05	0.03	3.33	0.001
Number of Observations	492	1727		

Table 6 - Mean Difference Test - Banks Supplying Classic, Financial and Non Financial Bank Products versus other Banks

Variable	Banks supplying Classic and All other Bank Products	Other banks	t-test*	
			t-statistics	p-value***
Panel A - Market Share and Bank Size				
Market Share (assets)	0.13	0.01	31.02	0.000
Market Share (revenue)	0.13	0.01	31.57	0.000
Total Assets (price index Q12001=1)	81300000	1370592	35.47	0.000
Total Bank Products Revenue (price index Q12001=1)	2918683	55847	36.14	0.000
Panel B - Other Characteristics				
Dummy Private Bank	0.72	0.96	-15.90	0.000
Dummy Brazilian Bank	0.97	0.89	3.83	0.000
Labor Cost (Wage) = Total Payoll/Total Assets	0.10	0.04	18.22	0.000
Cost of Capital = Total Capital Expenditure / Total Assets	0.36	0.18	4.11	0.000
Cost of fixed capital = Total Fixed Capital/Total Assets	0.33	0.19	2.79	0.005
Provision = Provision for doubtful accounts/ Shareholder Equity	0.00	0.01	-3.62	0.000
Profitability = Total Profits / Shareholder Equity	0.05	0.03	2.23	0.026
Number of Observations	253	1966		

Table 7

In all columns below the dependent variable is the natural logarithm of the financial revenue. The unit price paid by the public body is deflated by the monthly official price index (IPCA=1 in 2001Q1).

Dependent Variable: In (Revenue)

	(1)	(2)	(3)	(4)
In (wage)	-0.194 (0.123)	-0.197 (0.122)	-0.196 (0.121)	-0.196 (0.122)
In (cost of capital)	0.334*** (0.053)	0.356*** (0.060)	0.356*** (0.060)	0.356*** (0.060)
In (cost of fixed capital)	-0.012 (0.044)	-0.011 (0.045)	-0.011 (0.045)	-0.011 (0.045)
In (wage)*Dummy Banks with Classic and other Bank Products	-0.134 (0.147)	-0.134 (0.141)	-0.134 (0.141)	-0.132 (0.141)
In(cost of capital)*Dummy Banks with Classic and other Bank Products	-0.032 (0.079)	-0.050 (0.082)	-0.050 (0.082)	-0.051 (0.082)
In(cost of fixed capital)*Dummy Banks with Classic and other Bank Products	-0.114 (0.089)	-0.104 (0.089)	-0.104 (0.089)	-0.104 (0.089)
Controls				
Provision Rate		-1.662 (1.968)	-1.651 (1.967)	-1.629 (1.979)
Profitability		1.493*** (0.306)	1.498*** (0.304)	1.494*** (0.302)
Market Share (assets)			-0.178 (0.503)	-0.166 (0.510)
HHI (assets)				-0.851 (0.994)
H-Statistics (Panzar and Rosse)				
Standard H	0.128	0.128	0.128	0.128
ΔH	-0.281	-0.288	-0.288	-0.289
Adjusted H = Standard H + ΔH	-0.153	-0.160	-0.160	-0.161
ΔH-Statistics				
Estimated ΔH	-0.281	-0.288	-0.288	-0.289
Standard Deviation ΔH	0.166	0.159	0.159	0.159
Degrees of Freedom	71	71	71	71
p-value Test - Ho: $\Delta H \geq 0$, Ha: $\Delta H < 0$	0.047	0.037	0.037	0.037
Confidence Interval (95%)	-0.557/- 0.004	-0.553/- 0.023	-0.553/- 0.023	-0.554/- 0.023
Observations	1,998	1,998	1,998	1,998
R-Square	0.360	0.416	0.416	0.416
Fixed Effects				
BankFixed-Effect	Yes	Yes	Yes	Yes
Month Fixed-Effect	Yes	Yes	Yes	Yes
Year Fixed-Effect	Yes	Yes	Yes	Yes

Robust standard errors in parenthesis.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 8

In all columns below the dependent variable is the natural logarithm of the financial revenue. The unit price paid by the public body is deflated by the monthly official price index (IPCA=1 in 2001Q1). The Banks supplying Classic and only nonfinancial products are exclude from those regressions in this table.

Dependent Variable: ln (Revenue)

	(1)	(2)	(3)	(4)
ln (wage)	-0.193 (0.123)	-0.196 (0.122)	-0.196 (0.121)	-0.196 (0.122)
ln(cost of capital)	0.334*** (0.053)	0.356*** (0.060)	0.355*** (0.060)	0.356*** (0.060)
ln(cost of fixed capital)	-0.013 (0.044)	-0.012 (0.045)	-0.011 (0.045)	-0.012 (0.045)
ln (wage)*Dummy Banks with Classic and Financial Bank Products	-0.132 (0.148)	-0.132 (0.142)	-0.132 (0.142)	-0.130 (0.142)
ln(cost of capital)*Dummy Banks with Classic and Financial Bank Products	-0.036 (0.080)	-0.054 (0.083)	-0.054 (0.083)	-0.055 (0.082)
ln(cost of fixed capital)*Dummy Banks with Classic and Financial Bank Products	-0.116 (0.089)	-0.105 (0.089)	-0.105 (0.089)	-0.105 (0.089)
Controls				
Provision Rate		-1.624 (1.969)	-1.614 (1.968)	-1.592 (1.979)
Profitability		1.494*** (0.306)	1.499*** (0.304)	1.495*** (0.302)
Market Share (assets)			-0.180 (0.502)	-0.168 (0.510)
HHI (assets)				-0.832 (0.996)
H-Statistics (Panzar and Rosse)				
Standard H	0.128	0.126	0.127	0.126
ΔH	-0.283	-0.291	-0.291	-0.290
Adjusted H = StandarH +deltaH	-0.155	-0.165	-0.164	-0.164
ΔH-Statistics				
Estimated ΔH	-0.283	-0.291	-0.291	-0.290
Standard Deviation ΔH	0.166	0.159	0.159	0.159
Degrees of Freedom	70	70	70	70
p-value Test - Ho: $\Delta H \geq 0$, Ha: $\Delta H < 0$	0.046	0.036	0.036	0.036
Confidence Interval (95%)	-0.559/- 0.007	-0.556/- 0.026	-0.557/- 0.026	-0.556/- 0.025
Observations	1,988	1,988	1,988	1,988
R-Square	0.361	0.417	0.417	0.417
Fixed Effects				
BankFixed-Effect	Yes	Yes	Yes	Yes
Month Fixed-Effect	Yes	Yes	Yes	Yes
Year Fixed-Effect	Yes	Yes	Yes	Yes

Robust standard errors in parenthesis.

*p<0.05, ** p< 0.01, ***p<0.001

Table 9

In all columns below the dependent variable is the natural logarithm of the financial revenue. The unit price paid by the public body is deflated by the monthly official price index (IPCA=1 in 2001Q1). The Banks supplying Classic and only financial products are exclude from those regressions in this table.

Dependent Variable: ln(Revenue)				
	(1)	(2)	(3)	(4)
ln (wage)	-0.197 (0.123)	-0.200 (0.122)	-0.198 (0.121)	-0.198 (0.122)
ln(cost of capital)	0.333*** (0.053)	0.355*** (0.061)	0.355*** (0.061)	0.355*** (0.061)
ln(cost of fixed capital)	-0.013 (0.044)	-0.012 (0.045)	-0.011 (0.045)	-0.012 (0.045)
ln (wage)*Dummy Banks with Classic and NonFinancial Bank Products	-0.252 (0.180)	-0.181 (0.174)	-0.173 (0.177)	-0.171 (0.176)
ln(cost of capital)*Dummy Banks with Classic and NonFinancial Bank Products	0.050 (0.070)	0.036 (0.078)	0.036 (0.078)	0.033 (0.075)
ln(cost of fixed capital)*Dummy Banks with Classic and NonFinancial Bank Products	-0.077 (0.053)	-0.094 (0.055)	-0.099 (0.057)	-0.098 (0.057)
Controls				
Provision Rate		-1.643 (2.032)	-1.618 (2.027)	-1.600 (2.038)
Profitability		1.489*** (0.311)	1.500*** (0.310)	1.497*** (0.308)
Market Share (assets)			-0.413 (0.433)	-0.400 (0.439)
HHI (assets)				-0.879 (1.098)
H-Statistics (Panzar and Rosse)				
Standard H	0.123	0.121	0.124	0.123
ΔH	-0.279	-0.240	-0.236	-0.236
Adjusted H = StandarH +deltaH	-0.156	-0.119	-0.112	-0.113
ΔH-Statistics				
Estimated ΔH	-0.279	-0.240	-0.236	-0.236
Standard Deviation ΔH	0.158	0.154	0.157	0.157
Degrees of Freedom	61	61	61	61
p-value Test - Ho: $\Delta H \geq 0$, Ha: $\Delta H < 0$	0.041	0.062	0.069	0.069
Confidence Interval (95%)	-0.544/- 0.015	-0.497/0.017	-0.497/0.026	-0.498/0.026
Observations	1,786	1,786	1,786	1,786
R-Square	0.394	0.454	0.454	0.455
Fixed Effects				
BankFixed-Effect	Yes	Yes	Yes	Yes
Month Fixed-Effect	Yes	Yes	Yes	Yes
Year Fixed-Effect	Yes	Yes	Yes	Yes

Robust standard errors in parenthesis.

*p<0.05, ** p< 0.01, ***p<0.001

Table 10

In all columns below the dependent variable is the natural logarithm of the financial revenue. The unit price paid by the public body is deflated by the monthly official price index (IPCA=1 in 2001Q1). The Banks supplying Classic and only financial or only non financial products are exclude from those regressions in this table.

Dependent Variable: ln(Revenue)				
	(1)	(2)	(3)	(4)
ln (wage)	-0.197 (0.123)	-0.199 (0.122)	-0.198 (0.121)	-0.198 (0.122)
ln(cost of capital)	0.333*** (0.053)	0.355*** (0.061)	0.354*** (0.061)	0.355*** (0.061)
ln(cost of fixed capital)	-0.013 (0.044)	-0.012 (0.045)	-0.012 (0.045)	-0.012 (0.045)
ln (wage)*Dummy Banks with Classic, Financial and NonFinancial Bank Products	-0.256 (0.179)	-0.185 (0.174)	-0.177 (0.177)	-0.175 (0.176)
ln(cost of capital)*Dummy Banks with Classic, Financial and NonFinancial Bank Products	0.044 (0.069)	0.029 (0.077)	0.029 (0.077)	0.026 (0.075)
ln(cost of fixed capital)*Dummy Banks with Classic, Financial and NonFinancial Bank Products	-0.078 (0.054)	-0.094 (0.056)	-0.099 (0.057)	-0.098 (0.058)
Controls				
Provision Rate		-1.608 (2.033)	-1.583 (2.029)	-1.566 (2.039)
Profitability		1.490*** (0.311)	1.501*** (0.309)	1.497*** (0.308)
Market Share (assets)			-0.413 (0.433)	-0.400 (0.439)
HHI (assets)				-0.856 (1.100)
H-Statistics (Panzar and Rosse)				
Standard H	0.123	0.121	0.122	0.122
ΔH	-0.290	-0.250	-0.246	-0.247
Adjusted H = StandarH +deltaH	-0.167	-0.129	-0.124	-0.125
ΔH-Statistics				
Estimated ΔH	-0.290	-0.250	-0.246	-0.247
Standard Deviation ΔH	0.157	0.154	0.156	0.156
Degrees of Freedom	60	60	60	60
p-value Test - Ho: $\Delta H \geq 0$, Ha: $\Delta H < 0$	0.035	0.054	0.060	0.060
Confidence Interval (95%)	-0.553/- 0.027	- 0.507/0.006	- 0.507/0.015	- 0.507/0.015
Observations	1,776	1,776	1,776	1,776
R-Square	0.395	0.455	0.455	0.456
Fixed Effects				
BankFixed-Effect	Yes	Yes	Yes	Yes
Month Fixed-Effect	Yes	Yes	Yes	Yes
Year Fixed-Effect	Yes	Yes	Yes	Yes

Robust standard errors in parenthesis.

*p<0.05, ** p< 0.01, ***p<0.001