Regulaciones Prudenciales, Reestructuración y Competencia: El Caso de la Industria Bancaria Argentina

Tamara Burdisso / Laura D'Amato
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Investigaciones Económicas
**Banco Central
de la República Argentina**

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Authors : Tamara Burdisso and Laura D'Amato

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Abstract

The Argentine banking industry has experienced a deep restructuring process since the beginning of Convertibility, when the industry was opened to competition and new prudential regulations were put in place in order to improve its solvency. Jointly with a dramatic increase in banking output, prompted by macroeconomic stability, the number of firms operating in the industry declined significantly.

We analyze the extent to which this restructuring process has reduced the level of competition in the industry and we investigate the effects of regulations on bank profitability. Using panel data we try to explain the differences in profitability among the 20 largest retail banks. We construct concentration as well as market share indices by banks, to determine the degree of competition they face in local markets. Efficiency measures are also included as determinants of bank profitability in order to test if differences in profitability are due to these differences rather than to market power or concentration.

The results indicate that there is no evidence of market power in the retail-banking sector. Regarding concentration, in the more populated areas of the country, were financial markets are more developed, the degree of concentration is very small. Given this result, the finding that banks whose business is mainly located in these areas earn lower profits, is an indication that the degree of competition in these areas is high. It is also true that the most X-Efficient banks mainly operate in more populated and developed areas. On the contrary, in the less populated areas, where financial markets are poorly developed, concentration is higher and banks that operate mainly in those markets earn higher profits and are less efficient. Finally, while banks with higher liquidity as determined by their liability structure earn lower profits, the effects of capital requirements on profitability are not clear.

Authors' e-mail addresses: tburdisso@bcra.gov.ar and ldamato.@bcra.gov.ar

Prudential regulations, restructuring and competition: the case of the Argentine Banking Industry

1.Introduction

The Argentine banking industry has experienced a deep restructuring process since the beginning of Convertibility Plan, when the industry was opened to competition and new prudential regulations were put in place in order to improve solvency and reduce vulnerability to systemic liquidity shocks. Jointly with a dramatic increase in banking output, prompted by macroeconomic stability, the number of firms operating in the industry declined significantly. This process was accelerated by the banking crisis that followed the Mexican devaluation of December 1994, the so-called 'Tequila Crisis'.

The new regulations proved to be extremely useful in strengthening the Argentine financial system and reducing its exposure to external shocks. This was shown by its remarkable performance during the recent sequence of financial crisis that affected international financial markets: the Asian Crisis of mid 1997, the Russian crisis of August '98 and the recent events in Brazil.

But from the microeconomic point of view, a debate has emerged about the extent to which this restructuring process, prompted by an extraordinary increase in banking activity and the new regulatory framework, could reduce the degree of competition in the industry, thus imposing welfare costs. If the reduced number of firms operating in the system were able to exercise market power, they might earn supernormal profits and set prices higher than these prevalent in a competitive environment. However, is concentration necessarily associated to less competition?

The discussion about the relationship between concentration is part of a large debate in the banking literature and the empirical results about this topic for developed financial system are not conclusive. There are at least two main opposing hypotheses that can be distinguished. According to one, the finding of a strong relationship between measures of concentration or market share is an evidence of some type of market imperfection in the industry[1]. A strong relationship between concentration and profitability can be considered evidence that concentrated markets allow firms to exert market power and set higher prices that in a competitive environment. This is referred to as the 'structure -conduct - performance hypothesis' (SCP). A related hypothesis associates higher profits with higher market shares as evidence of monopolistic competition in the industry. This is known as the ' market power hypothesis' (MP).

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[1]For a more detailed discussion of the different hypothesis in this debate, see for example Gilbert (1984) Smirlock (1985), Shaffer (1989, 1993 and 1994) Hannan (1991) Berger (1995) and Goldberg and Rai (1996).

The most recent literature has emphasized that a positive relationship between profitability and either concentration or market share can also be an indication that firms with superior management or production technology, or firms that produce at more efficient scales, earn higher profits.

In the Argentine case, the recent literature on bank efficiency has given evidence of the presence of increasing returns to scale for the average banking firm[2]. There is also evidence of a large degree of X-inefficiency in the industry, as shown by Vincens and Rivas (1994), Dick (1996) and Burdisso et. al. (1998). But the relationship between profitability, market structure and efficiency has not been addressed.

Our objective here is to contrast the two mentioned hypotheses: competitive imperfections vs. efficiency in the Argentine banking system as an explanation of the differences in profitability between banks. With this purpose we study the relationship between profitability, competition and efficiency for the 20 largest banks of the system for the period 1996-1998. We focus on this group because it is within it that the main changes in the industry have occurred during recent years. Nearly all of them have participated in a merger or acquisition process or have been acquired by a foreign financial institution.

To measure the effects of concentration we construct concentration indices for each particular bank, in order to have a good measure of the degree of concentration they face in local markets. Market share indices are constructed following the same methodology. Those indices are included in a profit equation to determine the relevance of the SCP and the MP hypothesis respectively.

Cost efficiency is measured using different efficiency ratios, such as average labor productivity and output by branch. An X-efficiency measure, resulting from the estimation of a cost function is also included in the profit equation.

In addition we also want to consider the effects that the new banking prudential regulations have had on bank profitability. Important changes in prudential regulations were implemented since 1992 aimed at strengthening the solvency and the systemic liquidity of the banking sector. In particular, capital requirements for counterpart as well as market risk were introduced to ensure the solvency of financial institutions. Among the rules aiming to improve systemic liquidity, liquidity requirements are particularly relevant[3]. Bank regulations, obviously beneficial form the point of view of depositors and the economy as a whole in terms of financial stability, potentially could affect individual banks' profitability. As we are trying to understand the behavior of profitability between banks, we must take into account the effects of regulations on bank profits. With this purpose individual measures of both regulations are included to help to explain individual bank profitability.

The paper is organized as follows: section 2 describes the debate in the literature; section 3 describes the main prudential regulations and their impact on banks behavior; section 4

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[2]While Dick (1996), Burdisso (1997) Burdisso et al. (1998) find increasing returns to scale for the average firm, Streb and D´Amato (1997) discuss the problem of distinguishing between observed and potential output when measuring returns to scale. They find that while in 1993 the banking industry operated with constant returns to scale in the long run, average excess capacity was considerably large.

[3] A detailed description of the main regulations introduced since 1991 can be found in "Main Features of the Regulatory Framework of the Argentina Financial System" B.C.R.A (1998).

consists in a brief description of the evolution of the performance of the 20 largest retail banks; in section 5 concentration and market share measures are described; and in section 6 the empirical evidence is presented. Finally, section 7 concludes.

2. Profitability, market structure and efficiency. The debate in the literature

The relationship between profitability, market structure and efficiency has been extensively discussed in the banking literature.

There are two main hypotheses that try to explain differences in profitability between banks. According to one, a positive relationship between profits and measures of market structure is an indication of the presence of some type of market imperfection. The other relates higher profits with either superior management or a more efficient scale.

In the literature that relates higher profits to concentration, the most traditional view is the 'Structure-Conduct Performance Hypothesis', which asserts that firms operating in concentrated markets have the ability to set prices that are less favorable to consumers, and is reflected in higher profits[4].

This hypothesis has been challenged by both, empirical and theoretical studies. Gilbert (1984) reviews a large number of concentration studies for the US and finds mixed results. He also stresses important shortcomings of these empirical studies, such as the absence of control variables taking into account the effects of barriers to entry into banking markets and regulations such as ceiling interest rates, or the importance of the spatial dimension when determining the relevant market in which to analyze concentration. Another weakness of these studies, stressed by Demsetz (1973), Peltzman (1977) and Brozen (1982) is that a positive relationship between profits and concentration could reflect differences in efficiency rather than a collusive behavior of firms operating in concentrated markets.

From the theoretical point of view the contestable markets literature[5] has challenged the SCP hypothesis by stressing that competitive pricing could appear in any market, independently of the number of firms operating in it if a new firm entering the industry offers the same services at lower prices. Thus, both the empirical and the theoretical studies, suggest that the relationship between profits and concentration is not direct.

Another possible source of differences in bank profits related to market structure is the presence of monopolistic competition in the banking industry. Product differentiation can allow firms with large market share to exert market power and earn supernormal profits, the so-called Market Power Hypothesis (MP). If imperfect competition is the prevalent market structure, one could expect a positive relationship between market share and profits[6]. The problem is that without controlling for an efficiency measure this relationship could be misleading, since differences in market share may be due to differences in management quality or efficiency in scale.

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[4] For a good review of the literature see for example Gilbert (1984) and Smirlock (1985).
[5] See Shaffer (1994) and Baumol Panzar and Willig (1982).
[6] See Smirlock (1985).

The most recent literature has incorporated these shortcomings of both the SCP and the MP hypotheses by explicitly including efficiency as a source of differences between bank profits[7], although previously Demsetz (1973) and Peltzman (1977) had claimed that causation could run from performance to structure. That is, firms that can deliver superior products or operate at lower costs could potentially drive out other firms from a competitive market. Their argument is that differences in firm-specific efficiencies within markets create unequal market shares and high levels of concentration (the Efficiency-Structure Hypothesis, ES). In this context higher profits could be the result of economies of scale (scale-efficiency version of ES, referred as ESS) or superior performance by those firms (X-efficiency version of ES, referred as ESX).

Berger (1995) contrasts the four hypotheses, SCP, MP, ESX and ESS for the US banking industry in a reduced form of a model for bank profitability. He also remarks that a negative relationship can be found between concentration or market share and efficiency, and this could be the case of rural or poorly developed financial markets, where banks might operate at less than efficient scale, or have poorer management or poorer quality of other resources. As we will discuss later, this seems to be the case for rural or not very populated urban areas in Argentina, where financial markets are less developed.

With respect to regulations, the traditional view is that they can increase potentially concentration and thus reduce competition in financial markets, as stressed for example by Gilbert (1984), with respect to branch restrictions in the US or capital requirements, which could lead to a more concentrated banking industry. Nevertheless, there is evidence that in the case of emerging economies like Argentina, the imposition of higher capital requirements can lead to higher competition[8], mainly because it forces less profitable firms to exit the industry. Since the remaining firms are forced to compete by reducing prices rather than by product differentiation, the degree of competition increases.

3. Convertibility, Financial Reform and the banking industry

The performance of private banks in Argentina has radically changed during the'90s. Within this period significant changes occurred in the industry. The macroeconomic stability brought by the Convertibility scheme and the reforms that were put in place jointly with the new monetary regime led to rapid growth in monetization. The ratio of M3 to GDP increased from 5.6% in 1990 to 18.9% in 1994 and to 26.1% in 1998. This implied a significant increase in banking output. Given that the size of the banking sector continues to be small, relative to the real economy, this expansion is expected to continue in the following years.

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[7] See Berger (1995).

[8] Schardrgosky and Sturzenegger (1998) studied a sample of industrialized as well as emerging economies and found that an increase in capital requirements has a negative effect on spreads for emerging economies while it has no effect for industrialized economies. These results are consistent with the intuition of their model, in which product differentiation in the form of spatial competition prevails in the banking industry. In this context, tighter regulations, in spite of increasing concentration lead to more competition, by generating more similarities between banks.

A very deep process of financial reforms has taken place since 1992. While the system was completely opened to the entrance of domestic as well as foreign financial institutions, allowing for more competition in the industry, strong prudential regulations, aiming to ensure the solvency of financial institutions and reducing the vulnerability of the system to external shocks, were introduced by the Central Bank. The main change related to regulations regarding solvency was the introduction of capital requirements. It imposes requirements to counterpart as well as to market risk, following in general the Basle Committee recommendations, adapted to the peculiarities of the Argentine banking industry. In particular, capital standards regarding counterpart risk were set at a higher rate than the 8% recommended by the Basle Committee and an interest rate factor that penalizes the higher counterpart risk associated with higher interest rates was also introduced[9].

Within a Currency Board scheme, with a limited role of Lender of Last Resort for the Central Bank and deliberately limited deposit insurance scheme, it was crucial for the stability of the Argentine banking system to develop a strong liquidity policy. Liquidity requirements are a main pillar of this policy. Their main characteristics are that they apply to a broad measure of bank liabilities, they are remunerated and the requirement rate increases as the residual maturity of the corresponding liability decreases. They were introduced at the end of 1995, partially substituting traditional reserve requirements until they completely replaced them.

As mentioned in the introduction, the number of private financial institutions significantly decreased, form 132 private banks in 1993 to 98 in 1998. The restructuring process was accelerated by the 'Tequila Crisis' of 1995. During this episode and its aftermath many financial institutions were affected by the systemic liquidity crisis, and went into a process of restructuring. But the fall in the number of financial institutions was not followed by an increase in average profits. On the contrary, a declining trend on average profitability accompanied the fall in the number of financial institution (Figure 1).

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[9] Capital requirements are currently 11.5% in Argentina, 3.5 points over the 8% suggested by the Basle Committee, which in 1988 set forth certain minimum capital standards required to ensure the stability of financial systems.

Figure 1: Profitability and Number of Private Banks
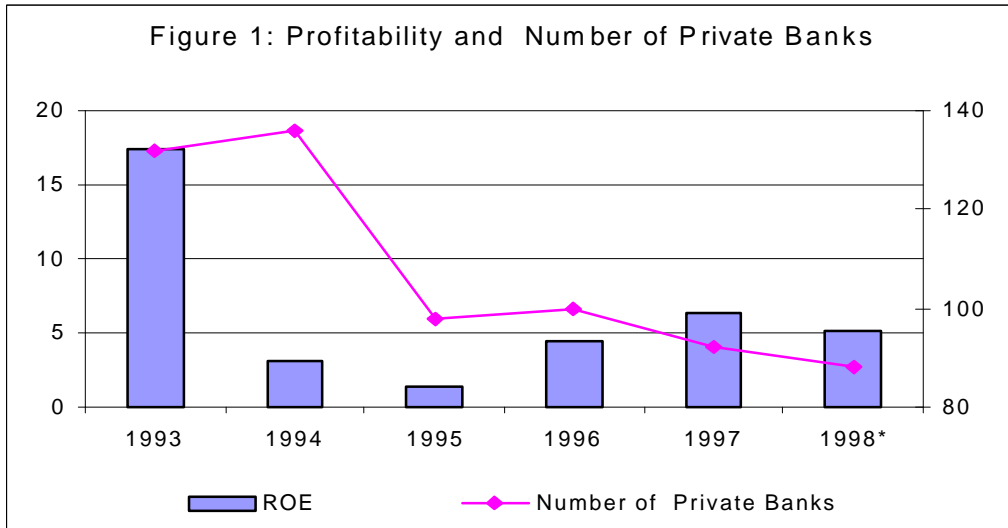
4. Profitability, concentration and efficiency for the 20' largest banks. A brief descriptive analysis

An analysis of bank profitability is conducted here for the 20 largest banks of the system. As pointed out above, the reason to concentrate the analysis on this group is that this is where the dynamics of the restructuring process mainly occurred.
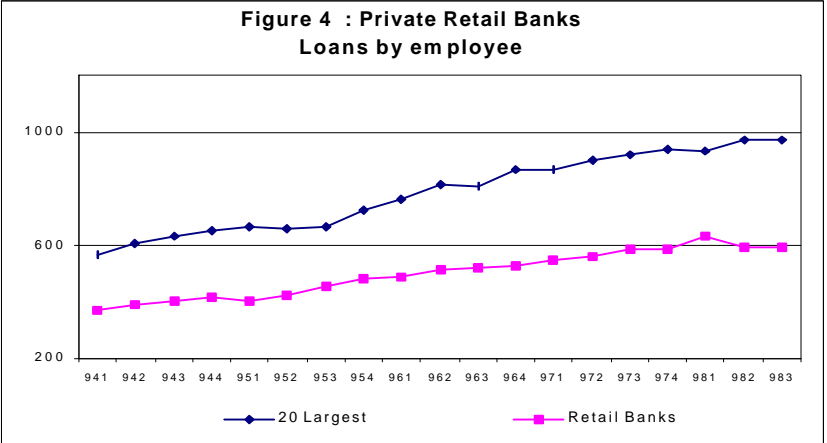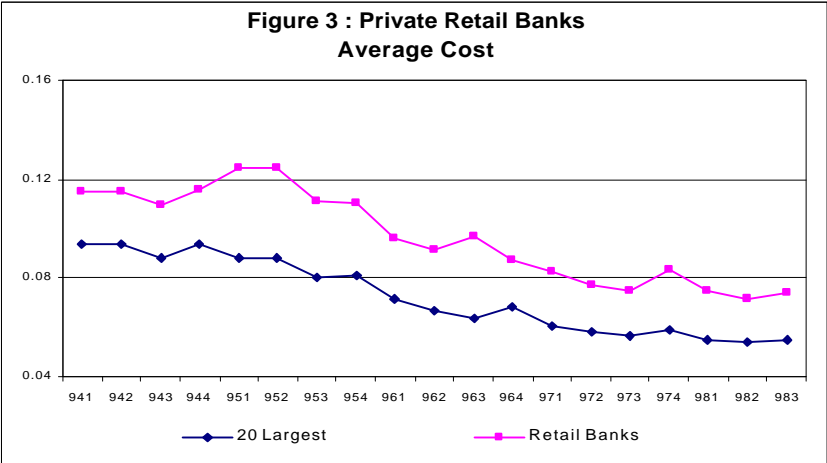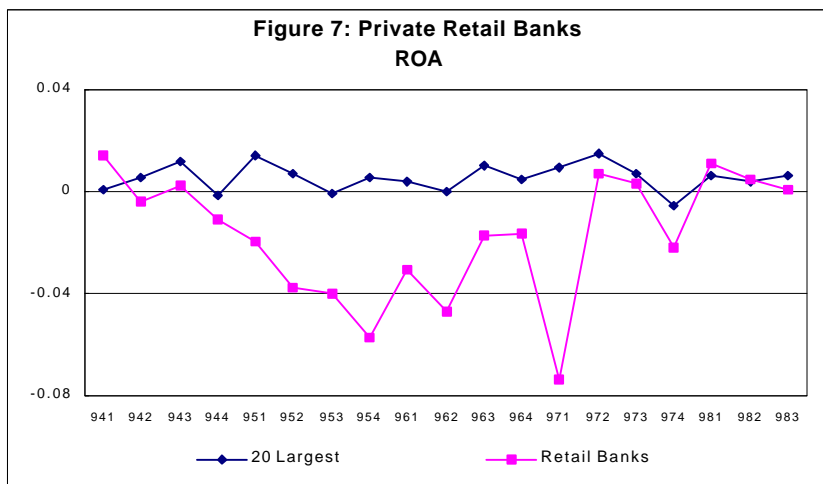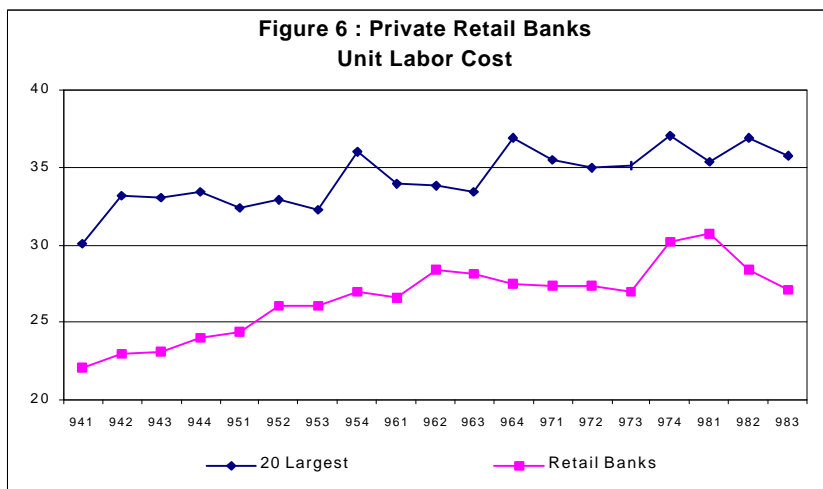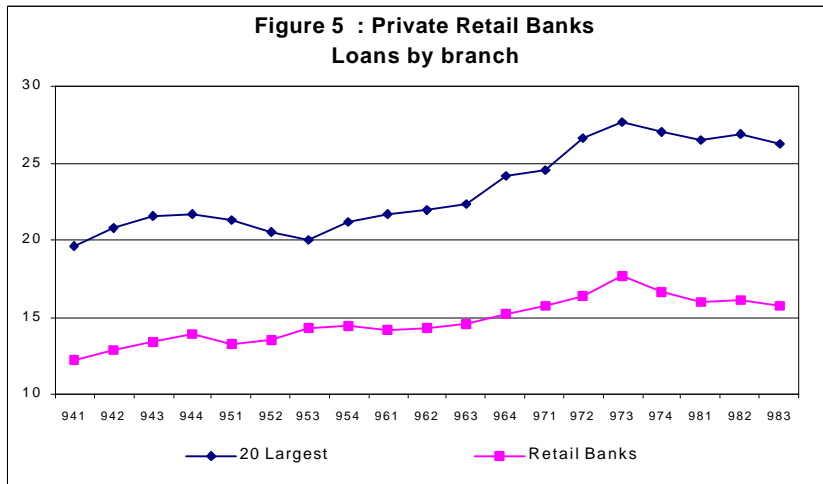

Figure 2: Private Retail Banks
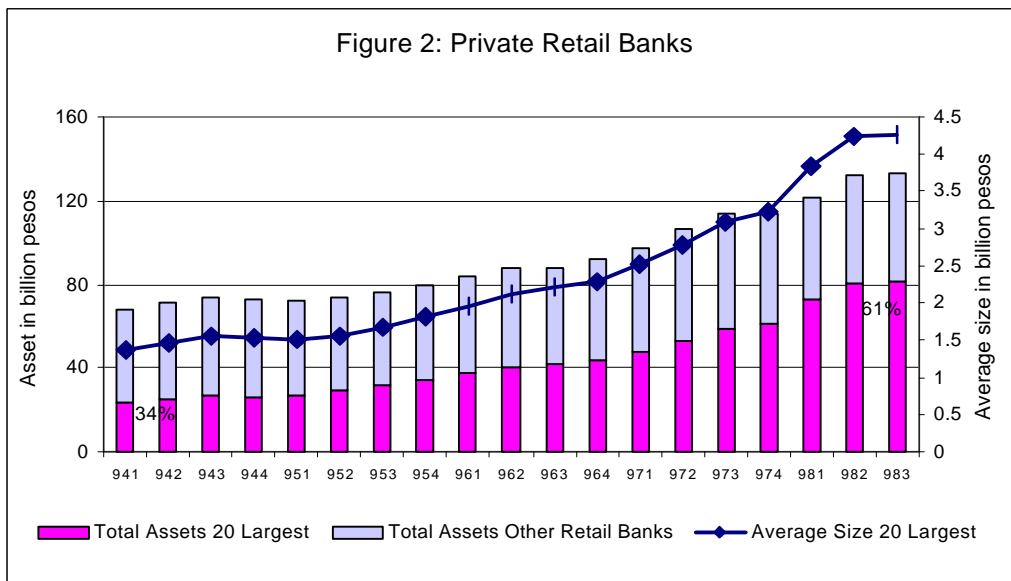
What has been the behavior of the 20 largest retail banks within this period of restructuring, relative to total retail banks? According to the conventional indicators, the performance of the 20 largest retail banks has been remarkably superior to the performance of total retail banks.

Total assets of the 20 largest grew from U$S 23 billions in 1994 too nearly U$S 80 billions in 1998, an expansion of 250 %, as against 100 % for total retail banks. This implied a significant increase in their market share, which grew form 34% in 1994 to 61% in 1998 (see Figure 2). At the same time the average size of the 20 largest increased from U$S 1300 millions in 1994 to U$S 4266 millions in 1998. Their strategy seems to have been consistent with the empirical evidence of increasing returns in the industry, in the sense that they have tried to exploit them by expanding their operation scale.

This expansion on the operation scale has been based on a rapid increase in the number of branches, probably reflecting an important effort to gain market share by being nearer to their costumers.

Jointly with this expansion in size, the 20 largest have also increased their operating efficiency, if measured by average costs, as the ratio of total operating costs to total output, average labor productivity (Loans by employee), or total loans by branch. As shown in Figures 3, 4 and 5, their performance has been remarkably better than the average performance of total retail banks. Only their average labor costs have been systematically higher than the average labor costs for total retail banks, although this differences may be reflecting a substantially more qualified labor-mix in the 20 largest retail banks (see Figure 6).

Figure 3 : Private Retail Banks
Average Cost

Figure 4 : Private Retail Banks
Loans by employee

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Figure 5 : Private Retail Banks
Loans by branch

Figure 6 : Private Retail Banks
Unit Labor Cost

**Figure 7: Private Retail Banks**
ROA

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At the same time, it is interesting to observe the very different pattern followed by profits of the 20 largest compared to all retail banks. During the 1994-1998 period, the average profitability of the 20 largest, measured by the ratio of profits to total assets (ROA), remained relatively low and stable, but positive in general, even during the Tequila Banking Crisis of 1995 (Figure 7). On the contrary average profitability of total retail banks was much more volatile and in general negative, particularly during the Tequila Crisis and its aftermath.

How did the 20 largest behave whit respect to regulations compared to total retail banks? We consider here capital requirements as the main regulation regarding solvency and liquidity requirements as the one related to systemic liquidity.

The period of analysis was restricted to 1996-1998 mainly because in the case of liquidity requirements, the regulation was not completely implemented until 1996.

To measures the behavior of banks with respect to capital we constructed two indicators, a ratio of the excess compliance to the capital requirement and a ratio of capital requirement to total assets.

Figure 8 presents the evolution of the first ratio for the 20 largest and for total retail banks indicating a different pattern for the 20 largest with respect to total retail banks. In both cases the regulation seems to be not binding. But while for the 20 largest the excess was higher at the beginning and decreased significantly over time, the opposite occurs on average to total retail banks, that have been systematically increasing their excess over legal requirements.

Figure 8 :Excess Compliance as a % of The Capital Requirement
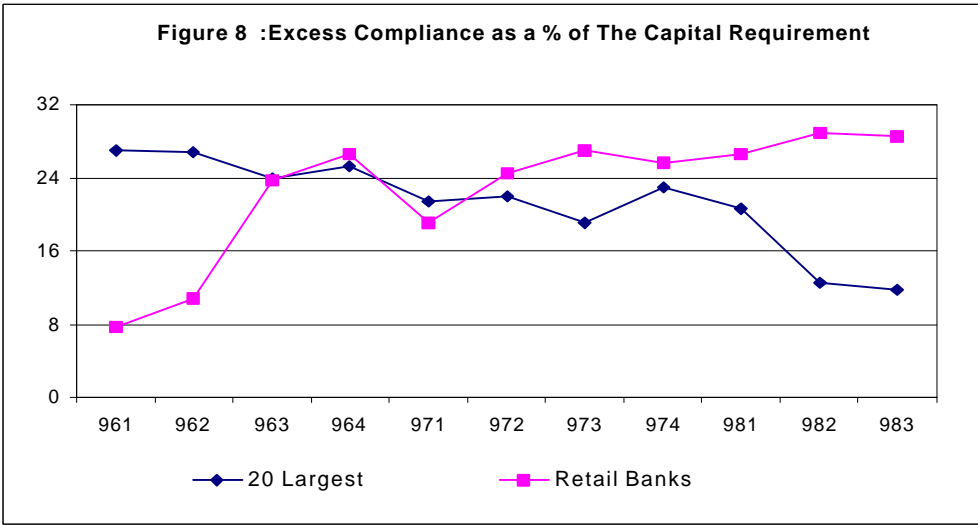
With respect to liquidity regulations we constructed a ratio of the excess of liquidity relative to legal requirements and a ratio of legal requirements to liabilities. The liquidity requirements were increased over the period of analysis and currently represent 21% of total deposits. In this case the behavior of the 20 largest does not differ too much from that of

total retail banks. In both cases the excess over compliance decreases over time, but the excess compliance was considerably lower for the 20 largest than for total retail banks.

Summing up, it seems that the largest retail banks have increased their size, gained market share and improved their efficiency. But these gains have not been accompanied, on average, by an increase in their profitability.

5. Measures of Concentration and Market share for individual banks' relevant markets

The most conventional measure of market concentration is the Herfindahl index (HHI). Although widely used, this aggregate measure has important limitations, in particular in industries where the spatial dimension is relevant and competition occurs in local markets. This seems to be the case of the retail banking industry as it has been stressed by Williamson (1987), Besanko and Thakor (1991), Chiappori et a. (1995) and recently for the Argentine case by Schargrodsky and Sturtzenegger (1998). The empirical evidence presented in the last section also suggest that retail banks strategy has relied on spatial expansion through the opening of new branches that allow them to be closer to their potential clients.

Consequently, in order to have a better assessment of the degree of competition banks really face, and also to have a relevant individual measure of their true market share, we constructed individual market share (LMS) and concentration (HHI) indices, following the methodology used by Berger (1995). These indices could be a much more accurate measure of the local concentration and or market share. For example suppose that there are only two local markets and two banks, each one having a 100% market share of each market. According to the conventional measure the market share of each bank is 50%, while the local market measure is equal to 100%.

Given these shortcomings of the conventional measures, indices for market share and concentration in local markets were constructed for deposits and loans according to the following definitions[10]:

Suppose that there are n banks and m provinces, and given that

$$T_j = \sum_{i=1}^{n_j} B_{ij}$$

were B_{ij} are total deposits (loans) of bank i in province j and T_j are total deposits (loans) in province j, then market share of bank i in province j is given by

(1)

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[10] We consider each Argentine province as a local market. Even though it could be interesting to look at more restricted local markets, we believe those localization decisions on part of the banks are mainly taken at regional or, as much, provincial levels.

$$MshareB_{ij} = \frac{B_{ij}}{T_j}$$

A Herfindahl index of deposits (loans) concentration can also be constructed for each j province:

(2)

$$Herf_j = \sum_{i=1}^{n_j} \left(\frac{B_{ij}}{T_j} \right)^2$$

Finally, individual market share and concentration indexes can be constructed for each bank, defined as

(3)

$$MshareB_i = \sum_{j=1}^{m} \frac{B_{ij}}{B_i} * \frac{B_{ij}}{T_j}$$

(4)

$$Herf_i = \sum_{j=1}^{m} \frac{B_{ij}}{B_i} * Herf_j$$

Following this methodology indices for deposits and loan were calculated for the period 1996-1998[11].

As expected, the conventional Herfindhal index is very far from being a good measure of the degree of concentration faced by each particular. It can be seen form Figure 9, in which the individual LHHI as well as the HHI are depicted, that differences in the LHHI between banks are undoubtedly very large.

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[11] Calculations were made for the period 1996-1998 because of restrictions in the availability of information about loans and deposits by province.

Figure 9: Local markets HHI vs.HHI - Loans 1998.I
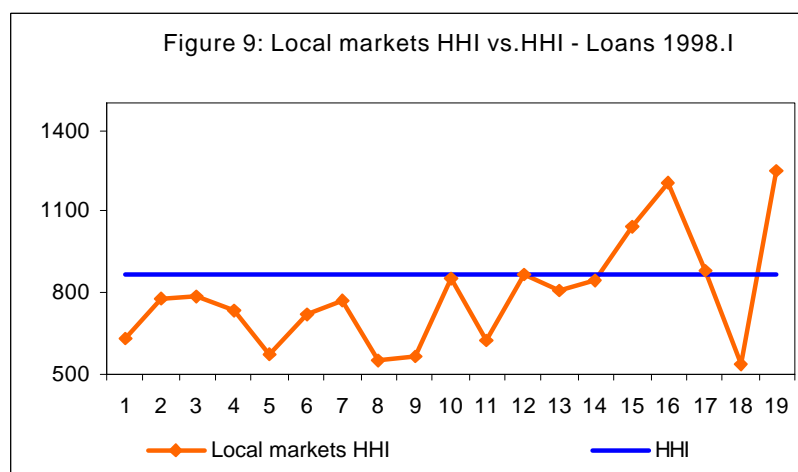
When considering the spatial dimension, very interesting findings appeared. As shown in Figure 10 the divergence between local markets is very important. In the most populated areas such as Buenos Aires city, 'Gran Buenos Aires' ('Buenos Aires' suburbs), 'Santa Fe' and 'Mendoza', where the most important urban conglomerates are located, the degree of concentration is very small. An interesting exception is Córdoba where the degree of concentration is significantly higher than in the other main provinces or districts. On the contrary, less developed provinces show much higher concentration. Extreme cases are the provinces of La Pampa, La Rioja or Catamarca, where the public provincial banks or recently privatized banks are nearly the only ones operating. In those cases concentration in remarkably higher than in the rest of the provinces. Thus, higher concentration, in the Argentine case, seems to be the result of poorly developed local markets, coexisting with urban developed markets in which the degree of concentration is much lower.
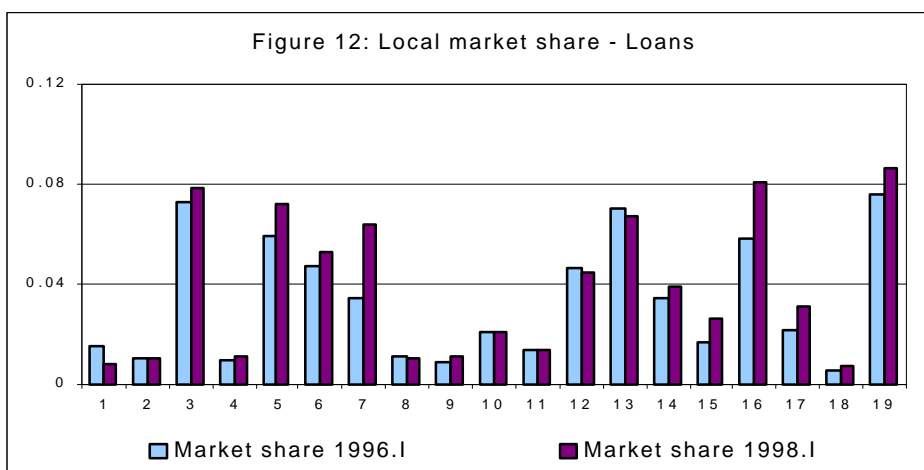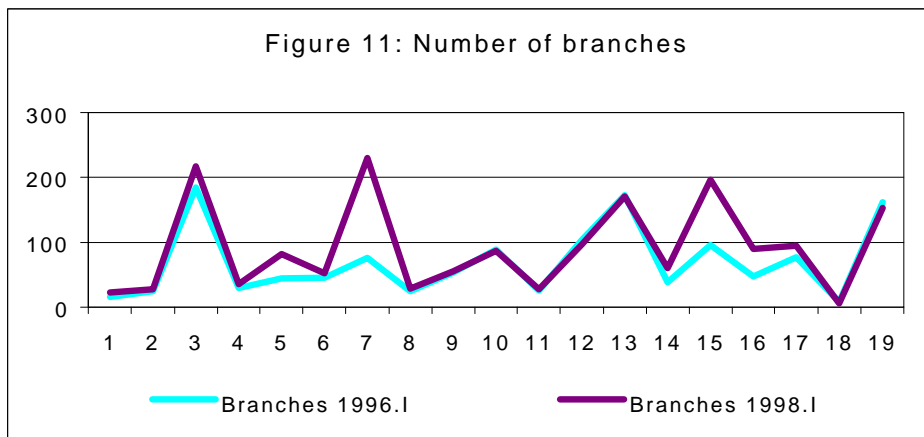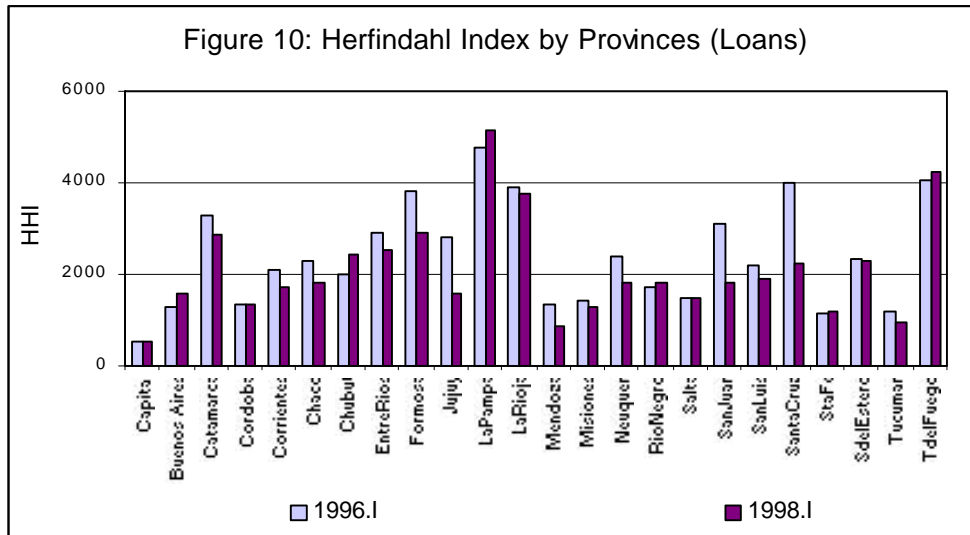
Another finding was that by looking at the evolution of concentration, in almost all the provinces in which the Provincial Public banks were privatized, we noted that the degree of concentration decreased (see Figure 10)[12].

With respect to the individual market share indices, it can be observed from Figure 11 and 12[13] that those banks that opened new branches (or bought the ones of another bank), gained market share. Consequently, the strategy of expanding operation scale by opening new branches seems to be successful in increasing market share, according to the high and very significant correlation between both variables[14]. The question now is wether this increase in market share necessarily implies a price setting behavior of banks that is less favorable to consumers.

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[12] It can be seen form Figure 10 that in 14 of the 17 provinces where the provincial bank was privatized, the HHI index fell between 1996.I and 1998.I.

[13] The banks are presented in an arbitrary order.

[14] The Spearman correlation between market share and branches is 71%, and significant at less than the 1% level.

Figure 10: Herfindahl Index by Provinces (Loans)

Figure 11: Number of branches

Figure 12: Local market share - Loans

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6. The empirical analysis

To test the different hypotheses about the relationship between market share and concentration, we estimated an equation for individual bank profitability using panel data.

We used a restricted measure of profitability (PROFIT), which includes only net income related to the intermediation activity of banks (net interest income and fees) and does not take into account charges related to non-recoverable[15]. The equation was:

(5)

$$p_{it} = a_0 + b_{it} Herf_{it} + d_i Mshare_{it} + \sum_{k=1}^{m} e_k Effic_{it} + gX - eff_i +$$

$$\sum_{k=1}^{m} h_k Kreg_{it} + \sum_{k=1}^{m} l_k Liqreg_{it} + \sum_{k=1}^{m} j_k Cntrl_{it} + u_{it}$$

$$k=1,...m \qquad i=1,....N \text{ and } t=1,....T$$

where p is our profit measure. *Herf* is the individual Herfindahl index, calculated as explained in section 4, *Mshare* is the market share index for each bank, also calculated with the methodology explained above. *Effic* is a set of different efficiency measures like labor productivity (LPROD) and output by branch (OUTP/BRNCH). *KReg* relates to the capital requirement ratios: excess of compliance over capital (EXCC) requirements and requirements over assets (RQR/ASSETS). *Liqreg* includes the two variables considered to measure the effects of the liquidity requirements on profits, the excess of compliance over the requirement as a proportion of the requirement and the ratio of requirement to liabilities. *Cntrl* denotes a set of control variables, like a dummy variable for foreign banks (FRGN), a variable which controls for loans quality, which is the ratio of colaterallized loans to total loans (COLOANS), and the interest rate on deposits.

With respect to the X-efficiency measure, we obtained it from the estimation of a costs translog function, using a methodology which is close to the DFA approach, but takes advantage of the panel data technique to obtain an efficiency measure for each bank[16]. We followed the intermediation approach, in which loans are bank output and deposits are considered as inputs. Thus, we included in our estimation two variable inputs (labor and deposits) and capital as a fixed factor measured by the number of branches.

Our sample consists of quarterly data for the 20 largest retail banks during the period 1996.I-1998.II.

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[15]Some items were excluded from the profit measure because they showed an extremely erratic behavior, which made impossible to find any systematic relationship with the explanatory variables.

[16] Burdisso et al. (1998) calculate X-efficiency using the panel data technique its DFA approach and discuss its convenience compared the DFA approach. They argue that panel data is the adequate technique, since it was designed to capture non-observable effects, which is the case of X-efficiency.

Given the fact that X-efficiency is a factor that varies across individuals but not over time, we were not able to estimate a fixed effect model. So, equation 5 was first estimated using a two way random effect model [17].

$$u_{it} = \boldsymbol{m}_i + \boldsymbol{l}_t + v_{it}$$

$$i=1,....,N \qquad t=1,....,T$$

where μ_i denotes the unobservable individual effect v_{it} is the remainder stochastic disturbance term.

A general model, including all variables, was first estimated. After further simplifications, we arrived to a final model, presented in Table 1.

The results are particularly interesting but have to be interpreted very carefully. First, market share is not significant, indicating that the 'market power hypothesis' is to be no relevant in the case of Argentina Banks with higher market share are not necessarily able to set higher prices.

First, we were able to capture all the individual effects through our explanatory variables. As it was not possible to estimate a random time effect[18] (no positive estimated component was found), we estimated equation 5, using OLS. Dummy variables were incorporated to control for time effects.

The market concentration measure is positive and very significant. This suggests that banks that mainly operate in concentrated local markets earn higher profits. But bringing back the findings presented in section 5, the less populated and developed financial markets (provinces) are the ones that show higher degrees of concentration. Consequently concentration seems to be a phenomenon more related to poorly developed, financial markets, as pointed by Berger (1995), rather than to market imperfections. A way to confirm this intuition was to construct an empirical measure of local market development[19], using the same methodology applied to construct local markets as well as concentration indices by bank.

As can be seen in Figure 13, our intuition was confirmed by the very strong correlation between our measure of local market development and local market concentration (the Spearman correlation between both variables is –0.86%).

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[17] For computational reasons we were not able to estimate a two-way random model, so we are not controlling for a probably remaining time effect. This is a limitation that has to be addressed in further versions of this paper.

[18] We used the software LIMDEP. We were not able to estimate the random time effect because the program did not find estimate component.
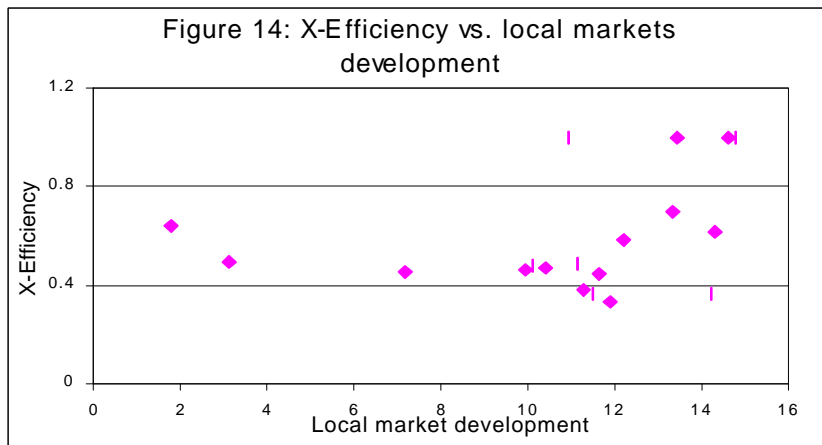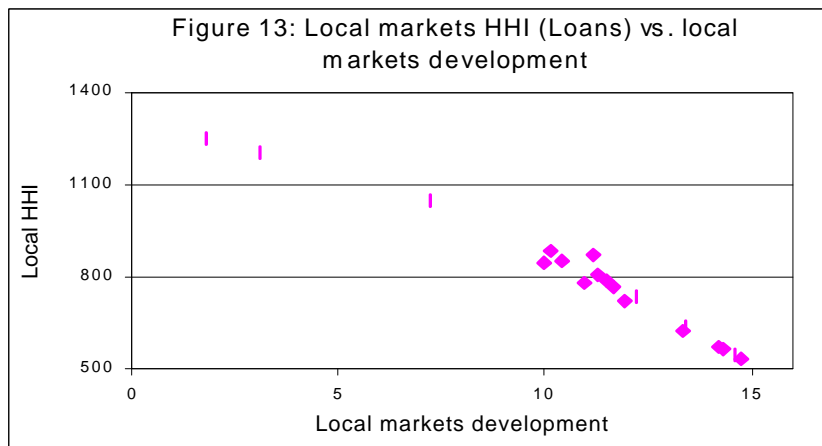
[19] We measure the degree of development of the financial markets in each province by per capita total deposits. Our measure of local market development by bank was constructed as a weighted average of this measures by province, where the weights are the proportion of total deposits of each bank in each province.

Table 1

Dependent Variable: PROFITS   Mean=2.141   Std.Dev.=1.403

PROFITS=(Service income margin + Net interest income - Operating Costs) /Assets

	Unrestricted Model	Restricted Model
LMS Loans	-0.0048	-
	(0.898)	
LHHI Loans	0.0022	0.0021
	(0.000)	(0.000)
Capital requirements / Assets	0.5634	0.5330
	(0.000)	(0.000)
Excess compliance K/ Requirem.	0.0017	-
	(0.638)	
Liquidity requirements / Liabilities	-0.2452	-0.2229
	(0.000)	(0.000)
Excess compliance L/ Requirem.	-0.0310	-0.0295
	(0.017)	(0.020)
X-efficiency	-2.5855	-2.3144
	(0.000)	(0.000)
Deposit interest rate	-0.5798	-0.6081
	(0.000)	(0.000)
Unit labor cost	-0.0049	-
	(0.607)	
Assets per branch	0.2385	0.3805
	(0.241)	(0.021)
Branches	-0.0012	-
	(0.451)	
Non-performing loans	-0.0168	-
	(0.259)	
Average labor productivity	0.0984	-
	(0.473)	
Step dummy foreign	-0.4900	-0.4651
	(0.003)	(0.001)
Dummy for 1996	-0.7753	-0.6322
	(0.001)	(0.001)
Dummy for 1997	-0.8684	-0.7959
	(0.000)	(0.000)
Constant	4.1554	3.8074
	(0.000)	(0.000)
Observations	209	209
Parameters	17	11
Sum of squares	115.251	117.160
LM Test (Breuch-Pagan)	0.530	0.810
	(0.467)	(0.368)
Std. Deviation	0.775	0.769
Adjusted R2	0.695	0.699

Figures in parenthesis are p-values

Figure 13: Local markets HHI (Loans) vs. local markets development

Figure 14: X-Efficiency vs. local markets development

With respect to efficiency, the X-efficiency measure is negatively related to profits, indicating that more X-efficient banks earn lower profits[20]. As can be seen from Figure 14 the most X-efficient banks are the ones that mainly operate in the most developed local market[21]. As pointed by Berger this result could appear if concentration occurs in poorly developed financial markets. Banks operating there could probably have low quality management or use resources of poor quality.

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[20] To check if our efficiency measure, obtained from the estimation of a cost function could introduce some noise in the profit equation, we estimated our unrestricted model as a two way fixed effect model excluding the X-effciency measure. We then correlated the obtained fixed effects against our X-efficiency measure. and the Spearman correlation between the them was 0.77, indicating that both methods, yield similar results.
[21] The Spearman correlation between the X-efficiency measure and our measure of local market developement is 0.55.

Thus, the results suggest that conditions for consumers are more favorable in the more populated areas of the country, were financial markets are significantly more developed.

Regarding other measures of efficiency, only output by bank is significant and negatively related to profitability, indicating a lower degree of capacity utilization in less developed and more concentrated local markets.

With respect to regulations, we found that the excess compliance ratio in the case of capital requirements was not significant. On the contrary, the ratio of capital requirements to total assets is very significant and positive, indicating that banks that have to comply with higher capital requirements relative to their assets, earn higher profits. A possible explanation for this result is that this ratio is a measure of the credit portfolio risk of banks rather than a measure of the effect of capital requirements on profits, since capital requirements increase as banks invest in more risky assets.

Excess compliance with liquidity requirements was significant and negative as well as the ratio of liquidity requirements to liabilities. Those banks that, according to their liability structure, must maintain higher liquidity ratios earn lower profits. This result seems to be reasonable since liquidity requirements have to be met with very liquid and non-risky foreign assets.

The time dummy variables reflect adequately the behavior of banks' profits during the period of analysis. Profits were lower in 1996 relative to 1998 and even lower in 1997, probably due to the effects of the Asian Crisis.

Summing up, the results show that there is no evidence of market power associated with increasing market shares. They also indicate that in the more developed and highly populated urban areas, market concentration is lower and banks that mainly operate in those markets earn lower profits, giving evidence of more competition in these markets. We also found that the X-efficiency of those banks is higher. In less populated areas of the country, the degree of concentration is higher and banks whose business is located in those areas earn higher profits. Those banks are also less efficient. Finally, while liquidity requirements seem to have a negative effect on profits, the effects of capital requirements on profitability are not clear.

7. Conclusions

This paper is an attempt to evaluate the effect the restructuring process developed in the Argentine banking industry system since the beginning of Convertibility, when the system was opened to competition and a new regulatory framework was put in place.

We try to explain the differences in profitability for the largest 20 retail banks of the system using panel data analysis. Individual bank concentration as well as market share indicators for local markets are constructed and then introduced in the profit equation. A measure of X-efficiency is also incorporated as well as other conventional efficiency measures. The effects of the new prudential regulations on bank profitability are also considered.

First, the results indicate that there is no evidence of market power in the retail-banking sector. Second, we find that in the more populated areas of the country, were financial markets are more developed, the degree of concentration is very small. Banks that mainly operate in these areas earn lower profits, indicating that the degree of competition is higher in their relevant markets. It is also true that the most X-Efficient banks operate in those markets. On the contrary, banks that mainly operate in areas where financial markets are less developed earn higher profits and are less efficient. Finally, while banks subject to higher liquidity requirements because of their liability structure earn lower profits, the effects of capital requirements on profitability are not clear.

To conclude, we found that while concentration and limited competition are related to poorly developed local markets, on average competitive behavior prevails.

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