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The Stability-Concentration Relationship in the Brazilian Banking System[∅]

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Abstract

In this article the relation between non-performing loans (NPL) of the Brazilian banking system and macroeconomic factors, systemic risk and banking concentration is empirically tested. While evaluating this relation, we use a dynamic specification with fixed effects, using a panel data approach. The empirical results indicate that the banking concentration has a statistically significant impact on NPL, suggesting that more concentrated banking systems may improve financial stability. These results are important for the design of banking regulation policies.

Keywords: Financial fragility; Systemic risk; Banking system.
JEL Classification: G15; G21; O54

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1. Introduction

The global process of the banking industry reorganization has caused an important debate on the impact that consolidation causes on financial stability. The relation between the fragility of the banking system and competitiveness/concentration has been widely studied (Koskela and Stenbacka, 2000; Allen and Gale, 2004; Beck *et al.*, 2006; Boyd and De Nicoló, 2005). In spite of the theory that defends the idea of a trade-off between competition and stability of the banking sector, there is lack of a consensus regarding the direction of the relation, given its complexity.

In spite of the great number of theoretical and empirical contributions, the evaluation of the impact of the increase of competition, caused by the global process of reorganization of the financial systems and by the incentives and government programs, on the risks taken by the banks and on the stability continues being of great importance. Many aspects remain unexplored and this relationship is complex, because of the existence of various idiosyncratic factors such as limited liability associated with debt contracts and the nature of asymmetric information between lenders and borrowers.

Motivated by the lack of empirical studies that focus on the relation between concentration and stability and considering the relevance of that kind of research for the macro-prudential analysis of the banking sector, not to mention the relative importance of the Brazilian banking market for Latin America, this paper tests the relation between NPL of the banking system (which can be seen as a measure of financial fragility) and banking concentration, controlling results for the effects of systemic risk (measured by sovereign risk and exchange rate risk) and of macroeconomic indicators. These macroeconomic factors tend to be quite relevant for emerging countries.

The main intuition for a stability-concentration relationship is that in a more concentrated bank system, banks are able to diversify their loans improving the risk-return trade-off. The results obtained in the paper suggest that this seems to be the case in Brazil. This does not mean that from a welfare viewpoint concentrated banking systems are necessarily preferable, as increased resilience may come at the cost of less efficient intermediation.

The main contribution of this paper to the banking literature is that it presents a test of the stability-concentration relationship for Brazil. An empirical test as the one performed here is not yet present in the literature. However, we do not attempt to find what should be the optimal level of concentration or what would be the optimal number of banks in the banking system, which would require additional analysis of the stability-efficiency trade-off.

The rest of the article is structured as follows. Section 2 presents a brief review of the literature. In section 3, the methods used in the article are discussed and the sampling process is defined. The empirical results obtained are shown in section 4. Section 5 concludes the article with the final considerations and suggestions for further research.

2. Literature review

According to Beck *et al.* (2006), the theoretical forecasts on the relation between concentration and fragility of the banking system are conflicting, existing, at least, two opposed visions named concentration-stability and concentration-fragility.

In the first view, concentration-stability, some theoretical assumptions and empirical comparisons suggest that a banking system with many institutions and low concentration is more inclined to financial crisis than concentrated systems composed by few banks (Allen and Gale (2000, 2004)). According to Beck *et al.* (2006), one of the hypotheses of the relation concentration-stability is that it would be substantially easier to monitor a few banks in a concentrated banking system than supervising many banks in a less concentrated system. Following that perspective, banking supervision would be more effective and the risk of contagion, as well as of systemic crises, would be less pronounced in a concentrated market. Another basic hypothesis following that line of thought is that more competition would be associated with smaller profits, which would increase the incentives for banks to assume higher risks (risk shifting). This leads us to believe that, in less competitive systems, higher market power would lead to higher profits that, somehow, would serve as protection against adverse shocks and would increase the franchise value of the bank, reducing the managers´ and owners´ incentives to assume excessive risks and, consequently, reducing the probability of a systemic breakdown (Hellmann *et al.*, 2000; Allen and Gale, 2000). Finally, competition tends to increase the rates paid to the depositors, decreasing the banks´ margins of gain and increasing the probability of bankruptcy (Matutes and Vives, 2000).

Various other recent contributions, analyzing important factors of the relation between loan market structure and some aspects of the banking sector's performance, strengthen the case for a concentration-stability relation. One of the lines of research explores the consequences of the aspects of the adverse selection and the problem of moral hazard on market fragility. Broecker (1990) and Nakamura (1993) state that a higher level of competition may make adverse selection problems more severe when borrowers that have been rejected at one bank can apply for loans at other banks. In a different vein more market power can decrease the moral hazard problems banks face as lenders. The results of Petersen

and Rajan (1995) show that the credit market imposes constraints on the ability of lenders and borrowers to intertemporally share the surplus from investment projects, which would lead the banks in competitive markets to charge higher rates than the monopolist banks, when the firms are young.

In the concentration-stability vision, the results obtained by Beck *et al.* (2006) indicate that the occurrence of crisis is less probable in more concentrated banking markets, even after controlling for differences in regulatory policies, institutional environment, macroeconomic conditions and shocks.

The opposite vision, concentration-fragility, argues that the more concentrated the structure of the banking system, the more fragile it will be. Boyd and De Nicoló (2005) demonstrate that the standard argument of the concentration-stability vision, the one that states that market power generates higher profits and, consequently more stability, is at least incomplete, and probably false, because it neglects the effects of market power and of the costs of the loans on borrower's behavior. According to these authors, the high interest rates charged by the banks would induce the firms that take loans to assume higher risks, which would end up increasing systemic risk. Similarly, the results presented by the studies of Caminal and Matutes (2002) show that a lower degree of competition can lead to a decrease in credit rationing, higher loans and high probability of bankruptcy, even though they reinforce the idea that the relationship between market structure and banking failure is ambiguous. The basic hypotheses in the model adopted by Caminal and Matutes (2002) is that a monopolistic bank has more incentives to monitor its clients than a bank with less market power, decreasing the credit rationing of loans. Another argument (Mishkin, 1999) is that in comparison with the less concentrated systems, the more concentrated structures would receive more government subsidies, which could create a moral hazard problem (typical of supposedly "too big to fail" institutions), encouraging those banks of greater importance to assume higher risks, increasing the system's fragility.

However, there are those who defend the idea that there need not be a trade-off between lending market competition and financial fragility. Koskela and Stenbacka (2000) show that, in a model of mean-shifting investment technologies, introduction of competition in the loan market leads to lower loan rates which generate higher investments without increasing the equilibrium bankruptcy risk of borrowers.

Allen and Gale (2000) analyze the US, UK and Canadian banking systems and find evidence that more concentrated systems show less financial instability. The authors argue that: i. Small banks have greater incentives to take risky behavior; ii. Systems with large

number of small banks may have problems of coordination and monitoring, and; iii. Larger banks are inherently more stable because of their greater ability to spread risks and they are less subject to contagion when the banking sector is subjected to some external shock.

Additionally, other lines of research explore the determining factors of banking crisis, trying to find a set of early warning indicators, such as Kaminsky and Reinhart (1999) and Evans (2000), or searching for theoretical and empirical explanations for the negative events like Pesola (2005), who used panel data to analyze macroeconomic determinants for bankruptcy in the banking sectors located in Scandinavian countries, Belgium, Germany, Greece, Spain and United Kingdom, for the period between 1980 and 2002. According to the results, the high debts taken by clients combined with adverse shocks in the income and in the real interest rate contribute to increase the likelihood of bankruptcy in the banking sector.

In sum, the theoretical literature does not provide a totally unambiguous view on the relation between banking concentration and financial stability. The issue, therefore, needs to be sorted out by empirical testing. To the best of our knowledge the only paper that tests this relationship is Beck *et al.* (2006). We propose a test of this relationship by using a panel data approach to evaluate the banking concentration (in the credit market) and financial stability (which is proxied by NPL). We focus on an emerging market, Brazil, which has the most important economy in Latin America. We discuss the methodology and the data in the next section.

3. Methodology and data

We employ semi-annual data from the Balance Sheet and Income statements of Brazilian banks for the period from 2000 to 2005. Our sample includes all financial institutions that provided loans to business and/or consumers in the sample period.

Credit risk is a major source of banking risk. A high level of NPLs suggests that banks have a high credit risk, and if not managed properly may induce banking failures. Therefore, NPLs are an important macroprudential indicator that should be evaluated by regulators (together with other indicators) to assess overall financial stability.

Increases in NPLs may cause a decrease in economic activity, via the disintermediation of bank-system lending caused by the erosion of banks' profitability. Also, it may distort real economic performance via malfunctioning in the banking sector. In the case of Japan, for instance, when NPLs increased banks became reluctant to extend credit even to potentially profitable firms and also to write-off bad loans to non-profitable firms, thus

securing the survival of inefficient firms (see Inaba *et al.*, 2005) and indering the expansion of the efficient ones.

In order to test the relation between banking concentration and financial fragility, one specification could be given by:

$$NPL_{i,t} = \alpha_i + \rho MS_{i,t-k} + \delta S_{t-k} + \gamma M_{t-k} + \lambda C_{t-k} + \varepsilon_{i,t} \ , \qquad (1)$$

where NPL_i are the non-performing loans over total loans of each bank i, MS_i represents the market share of the bank in the loans market, S is a vector of factors of systemic risk (country and exchange rate risk), M is a vector of macroeconomic factors (interest rates, inflation CPI and real product growth) and C represents the banking concentration measured by the Herfindahl-Hirschman dual. We employ lagged variables (lag k) to study the information content of such measures to predict NPL.

The market share was obtained by the ratio of the total loan of each bank to the total of loans of all the banks in the sample combined.

Country and exchange rate risk are employed as proxies for systemic financial risk because they are two macroeconomic factors that are likely to affect the performance of the economy, and the quality of bank credit portfolios.

Uribe and Yue (2006) find that country spread shocks explain about 12% of business cycles in emerging economies, because business cycles in emerging market economies are correlated with the cost of borrowing that these countries face in international financial markets. Therefore, NPL are likely to deteriorate due to increases in borrowing costs (higher country spreads).

Andrade and Tabak (2001) study the Brazilian foreign exchange rate market and find a volatility risk premium. The authors argue that since the market has been short selling dollars against Brazilian reais, increases in the level of dollar-real exchange rate are associated with decreases in total market wealth and increases in volatility tend to be accompanied by decreases in market wealth. Therefore, exchange rate shocks are likely to affect the general functioning of the economy, having major effects on welfare and can be regarded as systematic.

We propose a different approach to measure banking concentration, which is an improvement upon the traditional Herfindahl-Hirschman Index (HHI). This approach employs ideas from duality theory. The idea of the dual analysis is to associate another series Y to the

series X, which represents the market, and to its HHI. This series, called the HHI-dual of X, is constructed as follows:

a) Y has the same number *n* of observations as the original series, with *m* constant observations equal to C and *n-m* observations equal to zero;

b) $\sum_{i=1}^{n} x_i = \sum_{i=1}^{n} y_i$;

c) $HHI_y = HHI_x$, or in other words, Y presents the same HHI as X.

Y represents a theoretical banking structure which preserves some properties of the original banking structure, with the advantage of being stratified into two groups: the first, the dominant group, with k banks, holds total participation of the market, and the second, composed of n-k members, who do not participate in the market. Besides this, the participation of each member of the dominant group is uniform. In this way, it is possible to quantify the percentage of the banks that dominate the segment analyzed.

Based on the assumptions above, the Herfindahl-Hirschman dual (*d*) is defined as the percentage $d = 1 - \frac{k}{n}$, which represents the fraction of the banks that do not have market participation. In other words, the fraction *1-d* of the banks that take hold of all the market. We can prove that $k = \frac{1}{HHI_x}$; therefore, $d = 1 - \frac{1}{n.HHI}$, where *n* is the number of banks and HHI is the Herfindahl-Hirschman index of the series analyzed.

The dual of the HHI (*d*) increases when the HHI increases. Therefore, d is an increasing function of the HHI. When HHI reaches its minimal value $1/n$, *d* reaches its minimum value of zero. In this case we would have that 100% of the banks take hold of the market – in other words, this market is not concentrated. The maximum value of *d* is $1 - 1/n$, reached when HHI assume its maximum value 1. Note that *d* maximum approximates itself to 1 for a great number of banks, indicating, in this case, that the market has a high degree of concentration.

Table 1 presents the evolution of the dual, of the number of banks and of the total of non-performing loans for the studied period. In this period, the number of banks that conceded loans to consumers or businesses dropped from 117 to 98.

This table demonstrates that the dual HHI (banking concentration) oscillates during the period in question, indicating a larger concentration in the year 2000. After 2003, we can notice a stabilization of the dual indicating a concentration around 10%, which can be

interpreted as 10% of the banks in the banking system take hold of all credit loans in the Brazilian credit market.

We use an unbalanced panel data set. The banks that were incorporated disappear from the sample and their figures enter in the balance sheet of the bank that has acquired them.

Table 1
Evolution of the dual, number of banks and size of non-performing loans

Period	Dual	Number of banks	NPL total (In R$ millions)
Jun-2000	0,9270	117	36.234
Dec-2000	0,9163	114	27.616
Jun-2001	0,8913	118	19.754
Dec-2001	0,8861	114	23.062
Jun-2002	0,8905	109	23.726
Dec-2002	0,8935	106	24.248
Jun-2003	0,9027	106	25.341
Dec-2003	0,9030	103	24.640
Jun-2004	0,8974	99	24.043
Dec-2004	0,8983	100	26.009
Jun-2005	0,8983	98	26.506

We take the sum of the conceded loans, classified by the levels E, F, G and H over total loans as a measure for the NPL. This ratio represents the fraction of loans that are overdue in more than 90 days.

We expect the coefficient δ to be positive, in other words, an increase in systemic risk leads to an increase in NPL (financial fragility). The signal of ρ and λ will be used to test the concentration-stability or the concentration-financial fragility relation. If the estimated coefficients are negative and statistically significant, then the evidence will suggest that the concentration-stability relation occurs in the Brazilian banking market. Three macroeconomic variables were added to the model, Selic (short term interest rate), Brazilian CPI and real GDP growth rate. Increases in the Selic and in the inflation rate should have a negative relation with the non-performing loans. The sign of the coefficient of GDP growth rate is more ambiguous. A raise in the growth rate can lead to decreases in the proportion of NPL. Even so, it is possible that, in the expansion phase of the economic cycle, banks raise the risk of the credit portfolio, which could lead to a decrease in the quality of the portfolio with an increase in the NPL.

Equation (1) can be estimated using a panel regression with fixed effects and dummy for the periods. This approach allows us to estimate the relevant parameters of the empirical model using both temporal and cross-section data. Still, the fixed effects allow controlling for non-observed heterogeneity and this is an important factor. Otherwise, the regressions could suffer the omitted variables problem. The fixed effects capture the determinants of the NPL variable, which do not suffer variations over time, that are not explicitly included in the regression (1). Overall, it is important to include a dummy variable for the semesters to consider the effects of time.

A problem of specification given in (1) consists in the absence of dynamics. It is important to include lags for the dependent variable – in order to control the effects of the persistence of the dependent variable. The dynamic specification used is:

$$NPL_{i,t} = \alpha_i + \beta NPL_{i,t-j} + \rho MS_{i,t-k} + \delta S_{t-k} + \gamma M_{t-k} + \lambda C_{t-k} + \varepsilon_{i,t} \ . \qquad (2)$$

It is not possible to estimate the specification (2) using ordinary least squares with fixed effects, as was the case in equation (1) because the introduction of the lagged variable would make the estimator inconsistent.

As a solution, the technique of dynamic panel data of Arellano and Bond – AB (1991) is used to estimate the coefficients of equation (2). To mitigate the problems caused by the heteroscedasticity, robust standard deviations are used.

In order to estimate a dynamic panel it is necessary to use the first difference to obtain the specific effects of the banks. However, the differentiation causes a bias in the lagged dependent variable's coefficient because of the correlation between the latter and the non-observed fixed effects of the residuals, which suggests the use of instrumental variables. This is done by the AB method, using lags of endogenous variables for the preceding years to t-j as instruments, generating consistent and unbiased estimators of the coefficients. Additionally, the strictly exogenous variables are used as instruments.

The next section presents the results for the estimation for the specification given in (2). The statistical significance of the lagged dependent variable reinforces its utilization and the chosen specification.

4. Empirical results

Based on Jarque-Bera statistics we rejected the null hypothesis of normality of the NPL in all periods analyzed (see Table A1 in Appendix).

Table 2 presents the results from the dynamic regression for different specifications of model (2). Since we are dealing with semi annual variables we employ $k=1$ to test for the information content of these variables in explaining NPL. We also have included a dummy for public banks, but since it is not significant in any of the specifications we do not present the results for this dummy variable.

Three specifications were tested. Column (a) presents the model where all variables were included. However, since systemic risk variables are not found to be significant we also test a specification that excludes them. In the second column (b), the variables of systemic risk were removed. The last column (c) presents the reduced model with the significant variables. The statistical significance was assessed using heteroscedastic robust standard errors estimates from the first stage in the AB method.

The Q1 and Q2 statistics correspond to the correlation test of serial correlation of first and second order, respectively, in the residuals of the model. As was expected, there is a significant correlation of first order, but there is not a correlation of second order, which is a crucial point for the validity of the instruments. The Q1 and Q2 tests correspond to the estimation values of the first stage in the AB estimation procedure. However, the qualitative results are the same for the estimation of the two stages.

The Sargan statistic (1958) of over-identifying restrictions suggests that the model is not mis-specificed, because there is no indication of correlation between the instruments and the error term. The Sargan test for estimation in the first stage tends to reject the hypotheses of overidentifying restrictions in the presence of heteroscedasticity. This way, Arellano and Bond (1991) suggest the utilization of the Sargan test in the two-stage estimation. The results of this test are also presented in the last line of Table 2.

For all specifications, the lagged dependent variable is significant, indicating persistence of NPL. The concentration coefficient measured by the Herfindahl-Hirschman dual is statistically significant in all of the specifications with a negative sign, suggesting an inverse relation between banking concentration and NPL (financial fragility).

The systemic risk variables (country and exchange rate risk) were not significant for the analyzed period. This could be consequence of the fact that the Brazilian banks are highly capitalized, which could affect the sensibility with respect to the same systemic shocks.

Table 2
Results of the dynamic regression for different specifications

Variables	(a)	(b)	(c)
NPL90 (-1)	0,6239***	0,5950***	0,5658***
	(0,1246)	(0,1269)	(0,1353)
Dual (-1)	-0,6384**	-0,7323***	-0,7957***
	(0,3244)	(0,2011)	(0,2301)
Market Share(-1)	-0,0991	-0,1149	-
	(0,1885)	(0,1748)	-
GDP (-1)	0,0048	0,0037*	0,0043**
	(0,0076)	(0,0019)	(0,0021)
CPI Inflation (-1)	-0,0023	-0,0013	-
	(0,0055)	(0,0017)	-
Selic (-1)	0,0002	-7,4E-05	-
	(0,0011)	(0,0014)	-
Exchange Rate Risk (-1)	0,0844	-	-
	(0,3276)	-	-
Country Risk (-1)	3,7E-06	-	-
	4,1E-05	-	-
Constant	0,0007	2,0E-05	-0,0005
	(0,0037)	(0,0016)	(0,0017)
F test all variables	20,81***	16,81***	13,67***
F test Part. and Concentration	4,11	14,06***	-
F test Macro	5,03	4,52	-
F test Systemic Risk	0,32	-	-
Number of Banks	119	119	119
Number of Observations	911	911	911
Q1	-9,88***	-9,67***	-9,50***
Q2	1,28	1,23	1,17
Sargan	49,85	60,34*	55,18

*, **, *** indicate significance levels of 10%, 5% e 1%, respectively.

The standard deviations are given in parenthesis.

As a robustness test, we tested the three model specifications for other two measures of banking concentration: HHI and the share of loans of the five largest banks in total loans of banks in the sample. The results are qualitatively the same.

It is worth mentioning that the period analyzed includes stress moments, including the aftermath of the bankruptcy of Banco Santos (at the time the 20th largest by assets), and episodes of banking runs in Argentina and Uruguay.

5. Conclusions

Even though there is no consensus on the effects of the process of banking consolidation on systemic stability, the empirical relation between concentration and fragility has not been widely tested.

Using unbalanced panel data, with a dynamic specification, our results demonstrate the persistence of NPL, they also indicate the existence of an inverse relation between banking concentration, measured by the Herfindahl-Hirschman dual, and financial fragility, which reinforces the concentration-stability line of research. In the present case, a higher level of stability, measured by the reduction of NPL, would be attributed to a better diversification and performance of bank portfolios.

Beck *et al.* (2006) employ a logit probability model to study the effect of bank concentration and competition on banking system fragility. Their evidence suggests that national bank concentration tends to reduce the likelihood that a country will suffer a systemic banking crisis. Furthermore, the authors suggest that concentration is measuring something else besides market power. Therefore, the claim that bank concentration enhances market power, which imply in boosting profits, which provide a buffer against adverse shocks, has to be looked with caution. From our paper we can infer that the stability-concentration relationship may be due to better diversification policies that are able to reduce banks credit risk.

In Brazil big banks possess a large branching network, which allows diversifying credit portfolios. Grossman (1994) and Calomiris (2000) have suggested that branch banking stabilizes banking systems by reducing their vulnerabilities, since banks are able to diversify their loans and deposits over a wider geographic area. Our evidence seems to be in line with this literature, since bank concentration allows large banks to improve their branching network.

Cifuentes (2004) analyzes interbanking relationships and finds that in highly concentrated systems the risk of idiosyncratic shocks spreading through the system are higher than in decentralized ones. Although our paper does not analyze the interbank market it presents a first analysis of the concentration-stability relationship and stresses the benefits of

bank concentration. More research is needed in order to understand what would be the overall effects, when interbank relationships are taken into account.

Future research can examine the channels by which loan market concentration influences the stability of the banking system. Furthermore, it could also evaluate how concentrated are banking credit portfolios, relatively to economy sectors. And how does this concentration/diversification changes with time.

References

Allen, F., Gale, D., 2000. Comparing Financial Systems. MIT Press: Cambridge, MA.

Allen, F., Gale, D., 2004. Competition and Financial Stability. The Journal of Money, Credit and Banking 36(3), part 2, 453-480.

Andrade, S.C., Tabak, B.M., 2001. Is it Worth Tracking Dollar/Real Implied Volatility? Brazilian Journal of Applied Economics 5(3), 471-489.

Arellano, M., Bond, S., 1991. Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. The Review of Economic Studies 58(2), 277-297.

Beck, T., Demirgüç-Kunt, A., Levine, R., 2006. Bank Concentration, Competition, and Crises: First Results. Journal of Banking and Finance 30(5), 1581-1603.

Boyd, J.H., De Nicoló, G., 2005. The Theory of Bank Risk Taking and Competition Revisited. The Journal of Finance 60(3), 1329-1343.

Broecker, T., 1990. Credit-worthiness Tests and Interbank Competition. Econometrica 58, 429-452.

Calomiris,C., 2000. US Bank Deregulation in Historical Perspective. The Cambridge University Press: Cambridge, MA.

Caminal, R., Matutes, C., 2002. Market Power and Banking Failures. International Journal of Industrial Organization 20(9), 1341-1361.

Cifuentes, R., 2004. Banking Concentration: Implications for Systemic Risk and Safety-net Design. In: Ahumada, L.A., Fuentes, J.R. (Eds.), Banking Market Structure and Monetary Policy, Central Bank of Chile: Santiago.

Evans, O. (org.), 2000. Macroprudential Indicators of Financial System Soundness. Occasional Paper n. 192, International Monetary Fund.

Grossman, R., 1994. The Shoe that didn't Drop: Explaining Banking Stability in the Great Depression. Journal of Economic History 54(3), 654-682.

Hellmann, T.F., Murdock, K.C., Stiglitz, J.E., 2000. Liberalization, Moral Hazard in Banking and Prudential Regulation: Are Capital Requirements Enough? The American Economic Review 90(1), 147-165.

Inaba, N., Kozu, T., Sekine, T., Nagahata, T., 2005. Non-performing Loans and the Real Economy: Japan's Experience. In: BIS papers n. 22 - Investigating the Relationship between the Financial and Real Economy.

Kaminsky, G.L., Reinhart, C.M., 1999. The Twin Crises: The Causes of Banking and Balance-of-Payments Problems. The American Economic Review 89(3), 473-500.

Koskela, E., Stenbacka, R., 2000. Is There a Tradeoff between Bank Competition and Financial Fragility? Journal of Banking and Finance 24(12), 1853-1873.

Matutes, C., Vives, X., 2000. Imperfect Competition, Risk Taking, and Regulation in Banking. European Economic Review 44(1), 1-34.

Mishkin, F.S., 1999. Financial Consolidation: Dangers and Opportunities. Journal of Banking and Finance 23(2-4), 675-691.

Nakamura, L.I., 1993. Loan Screening Within and Outside of Customer Relationships. Working Paper Series 93-15, Federal Reserve Bank of Philadelphia.

Pesola, J., 2005. Banking Fragility and Distress: An Econometric Study of Macroeconomic Determinants. Research Discussion Papers 13, Bank of Finland.

Petersen, M.A., Rajan, R.G., 1995. The Effect of Credit Market Competition on Lending Relationships. The Quarterly Journal of Economics 110(2), 407-443.

Sargan, J.D., 1958. The Estimation of Economic Relationships Using Instrumental Variables. Econometrica 26(3), 393-415.

Uribe, M., Yue, V.Z., 2006. Country Spreads and Emerging Countries: Who Drives Whom?, Journal of International Economics 69(1), 6-36.

Appendix

Table A1
Descriptive statistics for non-performing loans

Period	Mean (In R$ thousands)	Std. deviation	Skewness	Kurtosis	Jarque-Bera	p-value
Jun-2000	309,689	1,472,088	6.99	51.88	12,599	0.000
Dec-2000	242,247	1,163,193	8.62	83.31	32,048	0.000
Jun-2001	167,406	533,963	4.48	24.29	2,623	0.000
Dec-2001	202,297	612,964	4.11	20.55	1,785	0.000
Jun-2002	217,671	623,499	3.64	15.68	971	0.000
Dec-2002	228,752	672,615	4.02	18.90	1,401	0.000
Jun-2003	239,062	703,309	4.05	19.07	1,431	0.000
Dec-2003	239,224	709,834	3.77	16.62	1,040	0.000
Jun-2004	242,855	723,691	3.85	17.38	1,098	0.000
Dec-2004	260,090	762,202	3.82	17.83	1,160	0.000
Jun-2005	270,471	824,589	3.99	18.72	1,268	0.000

Table A2
Results of the dynamic regression for different specifications (with share of loans of the five largest banks in total loans - b5cred)

Variables	(a)	(b)	(c)
NPL90 (-1)	0.6248***	0.5755***	0.5565***
	(0.1247)	(0.1302)	(0.1369)
B5cred (-1)	-0.2064	-0.2885***	-0.3182***
	(0.1344)	(0.0755)	(0.0888)
Market Share(-1)	-0.0931	-0.1032	-
	(0.1949)	(0.1731)	-
GDP (-1)	0.0032	0.0030	0.0039*
	(0.0074)	(0.0019)	(0.0021)
CPI Inflation (-1)	-0.0026	-0.0001	-
	(0.0057)	(0.0017)	-
Selic (-1)	0.0000	-0.0006	-
	(0.0010)	(0.0014)	-
Exchange Rate Risk (-1)	0.0180	-	-
	(0.3285)	-	-
Country Risk (-1)	0.0000	-	-
	(0.0000)	-	-
Constant	0.0026	0.0009	0.0008
	(0.0033)	(0.0016)	(0.0016)
F test all variables	20.59***	20.03***	14.39***
F test Part. and Concentration	2.49	15.79***	-
F test Macro	2.58	3.35	-
F test Systemic Risk	0.22	-	-
Number of Banks	119	119	119
Number of Observations	911	911	911
Q1	-9.92***	-9.46***	-9.32***
Q2	1.3	1.22	1.16
Sargan	20.43	61.26**	58.72*

*, **, *** Indicate significance levels of 10%, 5% e 1%, respectively.
The standard deviations are given in parenthesis.

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