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BANKING CONCENTRATION, INTEREST RATES, AND GROWTH IN BRAZIL

Abstract:

Between 1995 and 2014 Brazil's financial system total asset increased from US\$ 650 billion, to US\$ 3.1 trillion. A growth of 377%. In the same period, the five largest banks bounced from an average loss of US\$ 1 billion in 1995 to an average profit of US\$ 25.5 billion in 2014. High interest, for enterprises and individuals, have been a major obstacle to the growth of the country. In the last twenty years, average GDP growth in Brazil was 2.6% p.a. This result is meaningfully lower than other developing nations.

The objective of this paper is to understand this contradiction between Brazil's financial system and other segments of the economy, and find answers, opportunities, possibilities, and solutions, which allow Banks to operate at a lower cost, leveraging the economic development of the country.

Keywords:

banking concentration, interest rates, brazil, growth, GDP

JEL Classification: E40, E44, E62

INTRODUCTION

Brazil suffered a long process of inflation and hyperinflation, from 1980 until the beginning of the 1990's. From heterodox to orthodox plans to control inflation, most were based on super high interest rates and recession. The result was innocuous until Plano Real (Real Plan – BRL Plan), in 1994.

With the end of inflation and *float* gains, there was the failure of dozens of financial institutions. This accelerated the banking concentration process that had already begun in the country, and modernized the financial system in the last 20 years.

Brazil offers a sophisticated financial system; its management, investment in technology, and product distribution capacity are similar to that of highly developed countries.

Despite this modernization, the country operates with one of the highest interest rates in the world, and the banking industry is dominated by few, immense, conglomerates. They concentrate retail operations and investment banking, insurance, securities, brokerage firms, lottery, and even automotive consortium.

Big conglomerates, led by banks, were able to penetrate vertically and horizontally in all segments of Brazilian financial market, through the expansion of their distribution channels. This process initiated through bank branches, and little by little they integrated retail bank operations, as well as insurance, brokerage, investment banking, credit cards, ATMs, and so on. It was at first conducted through direct data channels with big customers, and then, through the Internet, with all kinds of customers, small, medium, or big. Presently it advances with impressive speed in mass payments through phones and pads (electronic equipment), connected on public or private networks.

Despite all sophistication and modernity of the system, access to financial systems in the country has very high costs, preventing companies from other sectors of the economy, from leveraging resources and having costs compatible to those from international markets.

METHODOLOGY AND SOURCES

In order to achieve its objectives, the methodology of this paper is deductive and quantitative.

The main used sources were:

1. Time Series, available through Banco Central do Brasil (Brazilian Central Bank): banks and financial institutions balance sheets, interest rates, and

other aggregates published by the institution on its web page www.bcb.org.br.¹

2. Inflation, GDP, and further economic aggregates collected by IBGE – Instituto Brasileiro de Geografia e Estatística.
3. Audited financial statements and other reports submitted by banking conglomerates to Comissão de Valores Mobiliários (CVM – Brazilian SEC), as well as time series and studies from Superintendência de Seguros Privados (Superintendency of Private Insurance).

The present article was divided into six parts: (1) to gauge the level of bank concentration in Brazil, through both Concentration Ratio and Herfindahl-Hirschman² Index; (2) to measure banks' scale gains (economies of scale); (3) to correlate bank concentration with interest rates, to evaluate if banks transferred part of scale gains to clients; (4) to correlate scale gains with spreads and net margin of banks; (5) to correlate spreads, Selic³ (short-term interest rate) and bank's net margin; (6) conclusion.

RESULTS

1. Bank concentration between 1995 and 2014.

Between 1995 and 2014, the bank concentration process was so big that it may be observed without statistics, as shown on Graph 1 – Growth of Total Asset on National Financial System (NFS). It is visible that the asset growth of the twenty largest banks determines the slope⁴.

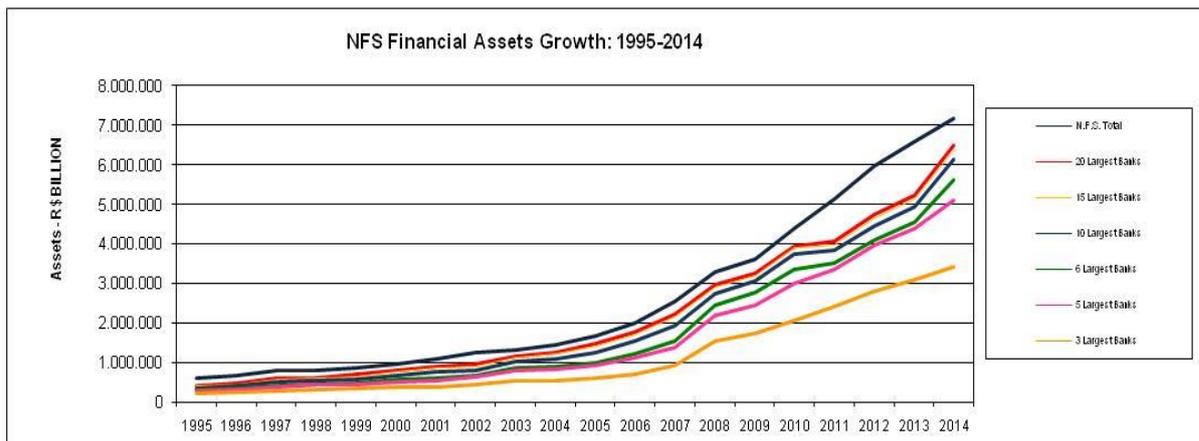
Graph 1. Growth of Financial Assets in the NFS between 1995 and 2010.

¹ The main database can be found in the report "50 largest banks and the consolidated domestic financial system", at www.bcb.gov.br, Banco Central do Brasil webpage. Having access to this information for the first time might give one the impression that the series refers only to the "50 largest banks". In reality, as the database initially collected this many institutions, it is still known as such by users.

² The CR, Concentration Ratio, considers the market share of two, three, four, or more companies in relation to the sector's total. HHI, Herfindahl-Hirschman Index, (Hirschman, 1945; Herfindahl, 1950), is used for the same purpose, but allows to compare different concentration intervals. Their analysis is available in the full study.

³ Benchmark interest rate paid on government debt

⁴ Although the correlation is visible, the author calculated the statistic correlation, and it confirms the observation, since the R2 between growth of the 20 largest banks and NFS total shows great grip.

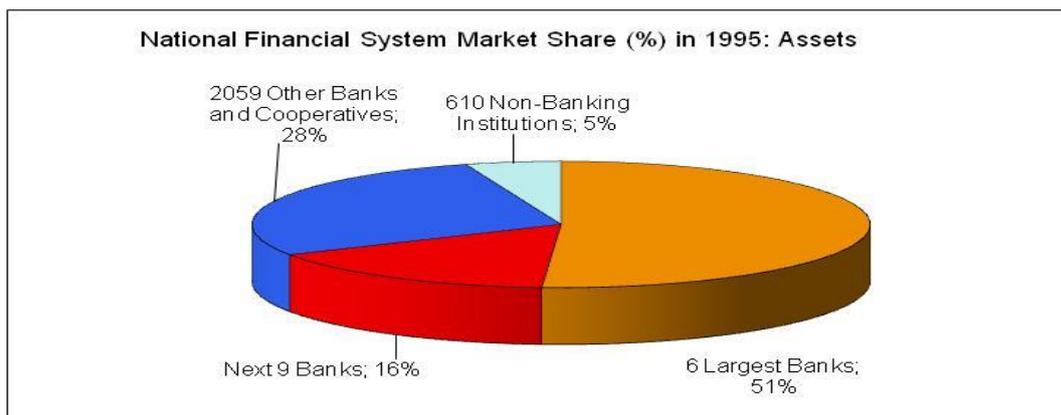


Source: Banco Central do Brasil. Developed by the author.

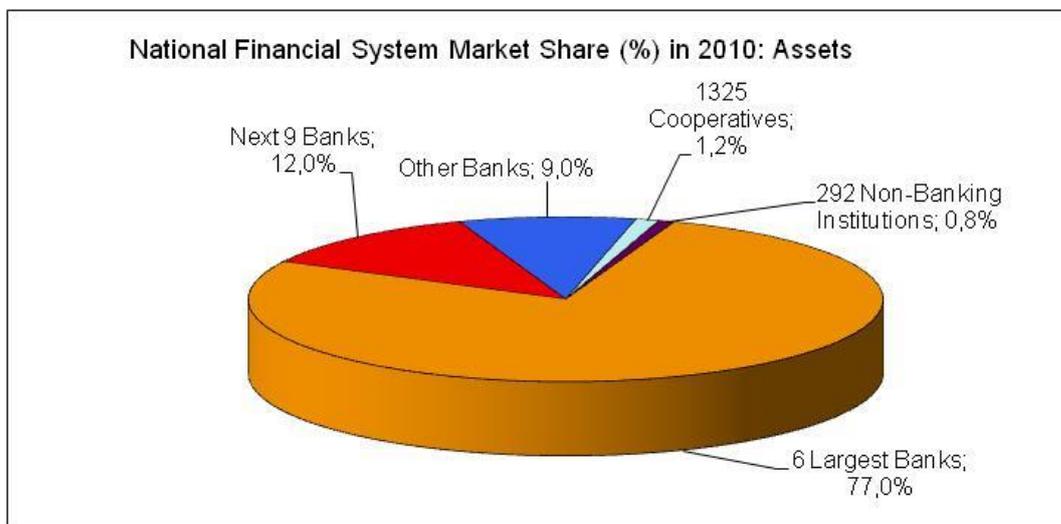
The asset growth, in this twenty-year period, was extremely high. It started at the R\$ 500 billion level and increased to R\$ 4.5 trillion in 2010, and R\$ 7,4 trillion in 2014.

In this accelerated growth process, the relative participation of institutions that integrate the NFS was uneven. The six largest banks, which had already a high market share – approximately half – expanded to more than eighty percent. The other categories, composed of the ten, fifteen, and twenty largest banks, also had relative gain. Meanwhile, there was an expressive reduction of small banks and other institutions, such as credit cooperatives and brokerage firms, as observed on graphs 2, 3 and 4.

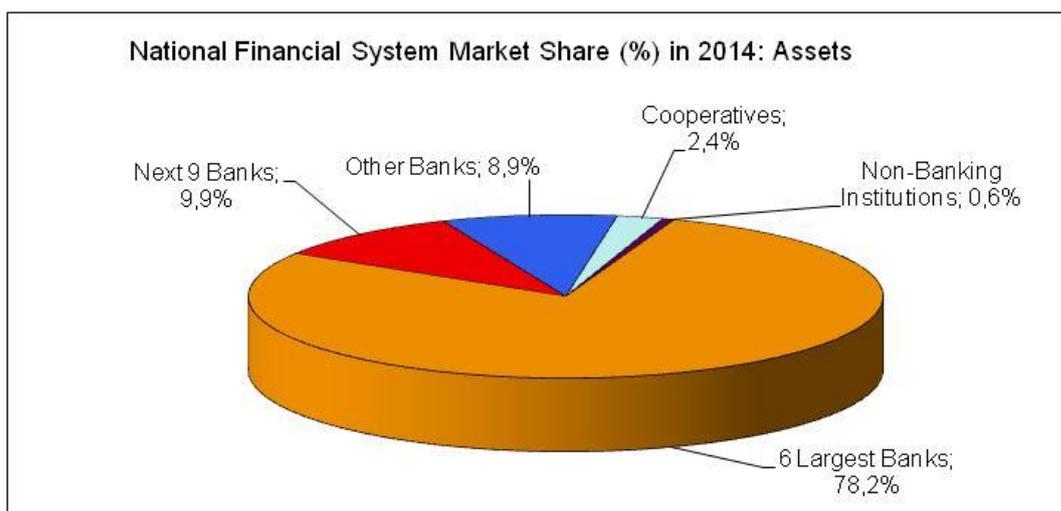
Graph 2. National Financial System Market Share in 1995: Assets



Graph 3. National Financial System Market Share in 2010: Assets



Graph 4. National Financial System Market Share in 2014: Assets



Source: Banco Central do Brasil. Developed by the author.

2. Banking System Scale Gains.

After the end of hyperinflation – in 1994 – a strong monetization of the economy occurred, and banks expanded credit, which grew from 36.8% of GDP in 1995, to 46.4% of GDP in 2010, and 58,9% in 2014.

Banks were efficient in the transition process to a stable economy, increasing their loans and total assets almost continuously over the whole period. At the same time, they reduced administrative and management costs with computerization of processes.

Table 1 shows Total Asset, Number of Employees, and Number of Bank Branches from 1995 to 2010, when the economies of scale were more intense.

As it may be noticed, scale gain was big. Total assets per bank branch, which was of R\$ 33.5 million in 1995, increased to R\$ 221.1 million, by the end of the period. Total asset per employee, which was of R\$ 0.9 million in 1995, increased to R\$ 7.2 million in 2010.⁵

Table 1. Scale Gain & Productivity of the Financial System, between 1995 and 2010.

In R\$ Million								
	Total Asset	Nº of Empl.	Nº of Br.	T.A./ nº Empl.	T.A./Br.	Dólar	T.A.(US\$)/fun	T.A.(US\$)/Ag
1995	598.379	662.604	17.851	0,9031	33,52	0,973	0,93	34,45
1996	682.839	586.310	16.971	1,1646	40,24	1,039	1,12	38,73
1997	811.042	547.353	16.690	1,4818	48,59	1,116	1,33	43,54
1998	803.880	519.324	16.189	1,5479	49,66	1,209	1,28	41,07
1999	859.275	503.359	16.373	1,7071	52,48	1,789	0,95	29,34
2000	962.677	517.290	16.638	1,8610	57,86	1,955	0,95	29,60
2001	1.086.000	497.718	17.179	2,1820	63,22	2,320	0,94	27,25
2002	1.252.028	499.588	17.519	2,5061	71,47	3,533	0,71	20,23
2003	1.331.541	493.397	17.213	2,6987	77,36	2,889	0,93	26,78
2004	1.450.626	508.162	17.640	2,8547	82,24	2,654	1,08	30,99
2005	1.674.624	522.682	18.076	3,2039	92,64	2,341	1,37	39,57
2006	1.997.736	538.946	18.562	3,7067	107,63	2,138	1,73	50,34
2007	2.559.108	555.609	18.614	4,6060	137,48	1,771	2,60	77,63
2008	3.295.992	564.541	19.182	5,8384	171,83	2,337	2,50	73,52
2009	3.610.296	569.524	20.081	6,3391	179,79	1,741	3,64	103,27
2010	4.385.829	605.580	19.836	7,2424	221,10	1,666	4,35	132,72

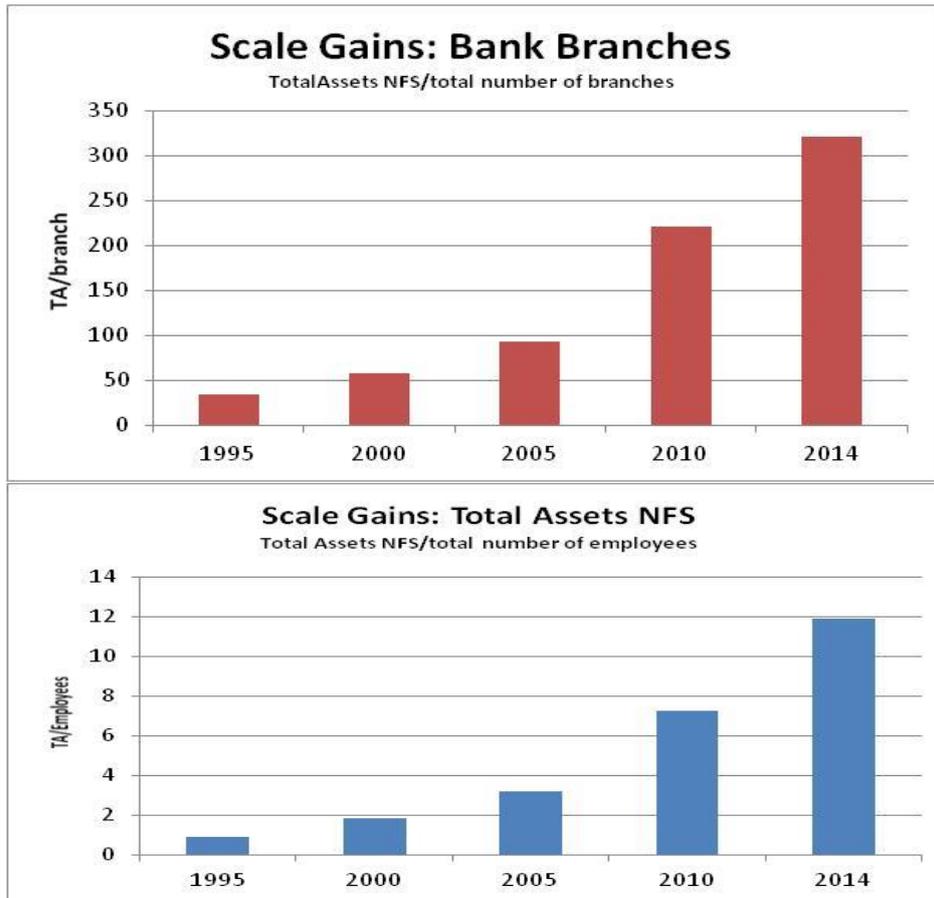
Abbreviations: T.A.: Total Asset; Br.:Branches; Empl.: Employees.

Source: Banco Central do Brasil. Developed by the author.

From 2011 to 2014, productivity gain from banks was smaller, due to most administrative processes getting automated in previous years. Nevertheless, economies of scale kept happening, as observed in figures 5 and 6.

⁵ In percentage, employees' productivity increased more than 600% from 1995 to 2010. In the same period, the scale gain from bank branches was over 500% in *nominal terms*. Nonetheless, deflating assets by the official rate of inflation IPCA- Extended Consumer Price Index from IBGE- Brazilian Institute of Geography and Statistics, increase in productivity continue attractive: deflating, scale gain by employee was 212%, and per bank branch was 157%.

Graphs 5 and 6. Economies of Scale.



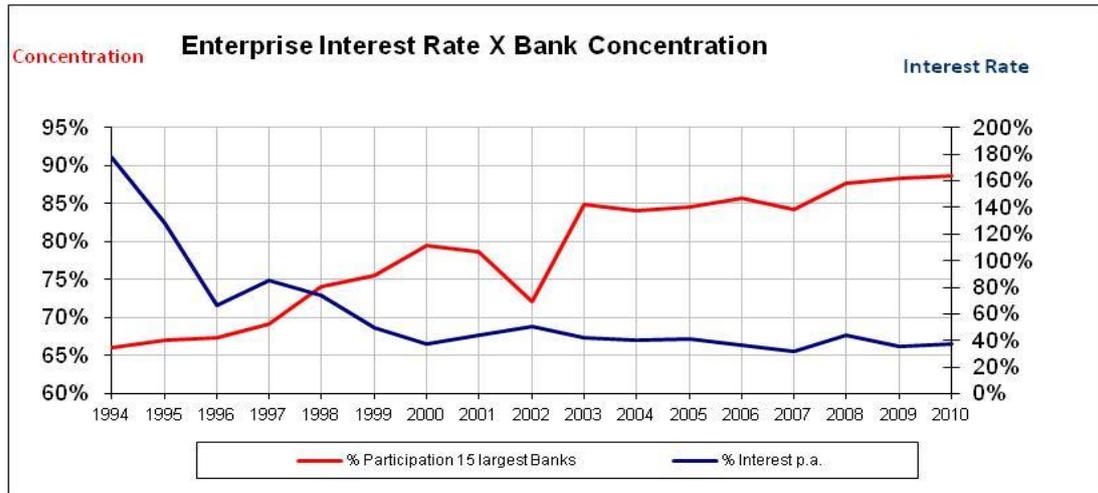
Abbreviation: NFS: National Financial System
Source: Banco Central do Brasil. Developed by the author.

3. Correlation between Bank Concentration and Interest Rates for Companies

Figure 7 shows negative correlation between indexes of bank concentration and interest rates for working capital between 1994 and 2010. This confirms Scale Theory (Stiegler et al)⁶, which predicts fall in interest with bank concentration, due to banks transferring part of their scale gains to clients.

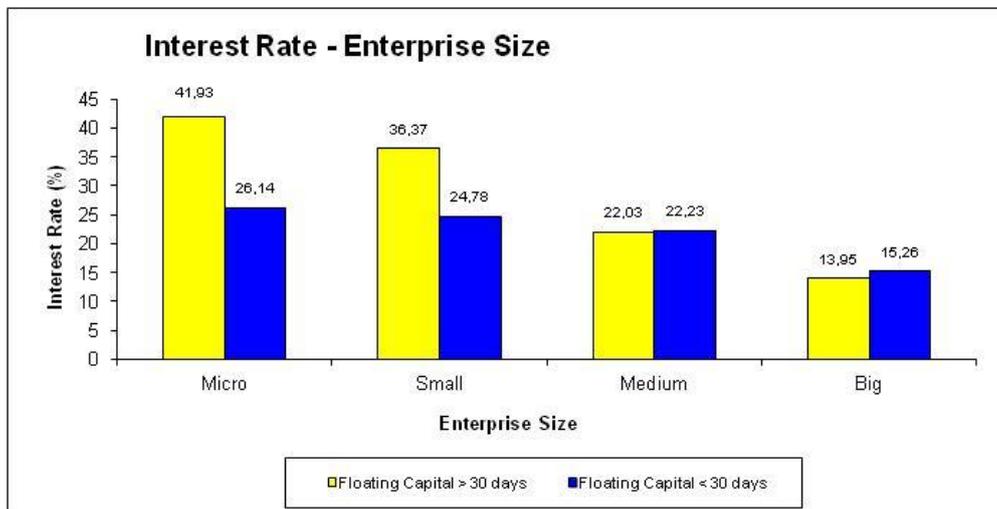
⁶ Stiegler, 1968; Demsetz, 1973, et all.

Graph 7. Interest rates for companies and bank concentration between 1995 and 2010



Correlation: -0,7614361, Y= Bank Concentration: Ind. Var., X= Interest Rate: Dep. Var.
 Regression: R – mult.: 0,761436; R2: 0,579785.
 Source: Banco Central do Brasil. Developed by the author.

Interest rates dropped from almost 200% p.a., in 1995, to less than 40% p.a. in 2010. Between 2011 and 2014 average interest rates for companies kept being reduced. However, they are still very high, as can be seen in figure 8.



4. Correlation between Scale Gains and Spreads

Considering that the difference between interest practiced in Brazil and internationally are immense, its *spread*⁷ was decomposed, and then the correlation with economies of

⁷ As spreads are the difference between the cost of funding and investment, they ultimately are what really set the profitability of banks. Considering that, the correlation between *spreads and scale gains* indicates if banks, effectively transferred part of their gains to their clients.

scale was calculated, in order to find eventual distortions on its composition, which could justify such difference.

Table 2 shows *spread* evolution in percentage points, between 2001 and 2010. In the period, there was a drop tendency, which oscillated as a result of a bigger demand for credit, as may be seen with the rate escalating in 2008, during subprime⁸ crisis, and dropping once again on upcoming years, when external credit for Brazilian companies normalized.

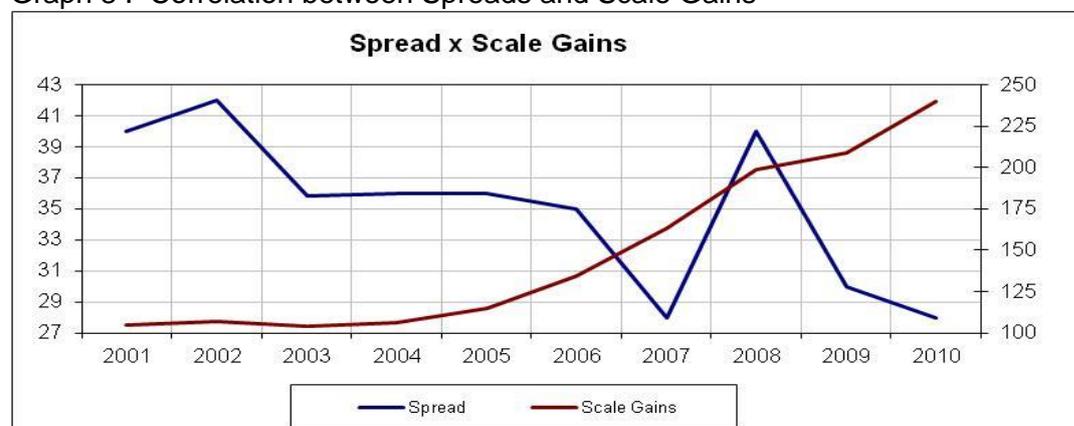
Table 2. Uptake (Funding) & Application (Investment) Rates, Spread and Net Margin, in % per year.

YEAR	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Application Rate	60,21	70,13	57,34	53,11	53,33	47,31	40,18	52,91	40,32	39,7
Uptake Rate	20,26	27,67	21,57	17,55	16,93	12,55	11,78	12,93	10,51	11,83
Total Spread	39,95	42,46	35,77	35,56	36,4	34,76	28,4	39,98	29,81	27,87

Source: Banco Central do Brasil. Developed by the author.

The trend in spreads drop is even more clear in graph 8, which presents an inverse correlation between spreads series and scale gains. *This confirms the hypothesis of the Scale Theory, also in relation to spreads.* Videlicet, economies of scale allowed banks to operate with smaller spreads.

Graph 8 . Correlation between Spreads and Scale Gains



Correlation: -0,61402461, Y= Spread: Ind. Var., X= Scale Gains: Dep. Var.

Regression: R – mult.: 0,614024612; R2: 0,37702622.

Source: Banco Central do Brasil. Developed by the author.

Notwithstanding, by observing the evolution of net margin⁹ on graph 9, constructed from table 3, it is clear that banks *only transferred part of their net margin*

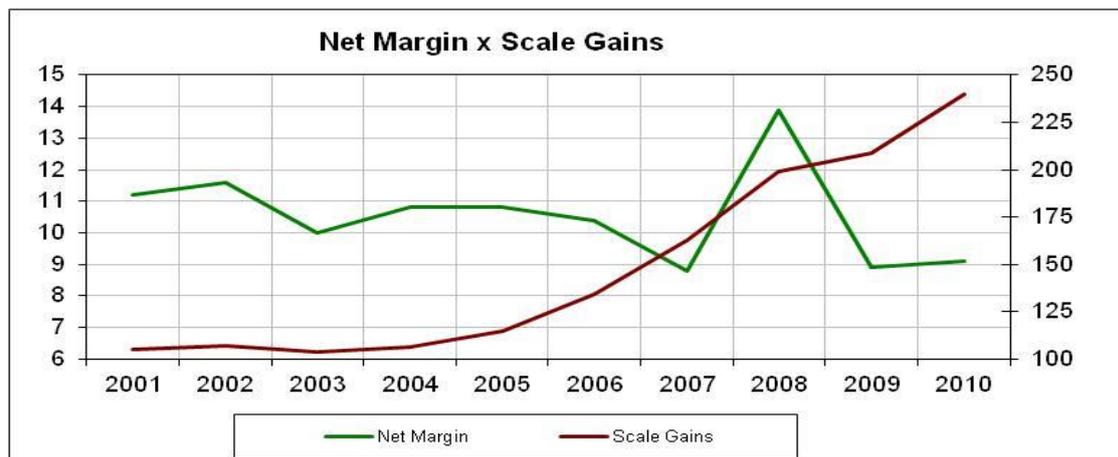
⁸ Due to sub prime crisis in 2008, credit offer to Brazilian companies in the international market reduced drastically and abruptly, augmenting demand for money in the domestic market.

⁹ The table was constructed having each year's spread as base 100 discounted in percentage the costs that affect spread, until net margin was reached.

from spreads to clients, until 2007, indicating that – besides oscillations in credit offer and demand – other variables made spread net margin inflexible.

YEAR	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Administrative Cost	5,27	8,1	6,56	7,26	7,06	6,22	5,15	4,06	4,25	3,5
Non-Compliance	12,94	12,34	9,52	8,64	10,04	10,61	8,07	10,68	9,12	8,01
Obligations + Allowance + FGC	4,87	4,4	4,3	3,34	2,94	2,13	1,83	2,09	1,57	1,14
Gross Margin	16,87	17,62	15,39	16,32	16,36	15,8	13,34	23,15	14,88	15,22
Direct Tax	5,67	6,06	5,4	5,56	5,57	5,38	4,55	9,28	5,95	6,1
Net Margin	11,2	11,56	9,99	10,76	10,79	10,42	8,79	13,87	8,92	9,12

Graph 9. Net Margin x Scale Gains



Correlation: -0,21709525, Y= Net Margin: Ind. Var., X= Scale Gains: Dep. Var.

Regression: R – mult: 0,217095254; R2: 0,047130349;

Source: Banco Central do Brasil. Developed by the author.

Confronting tables 2 and 3, as well as presented graphs, it is observed and concluded that:

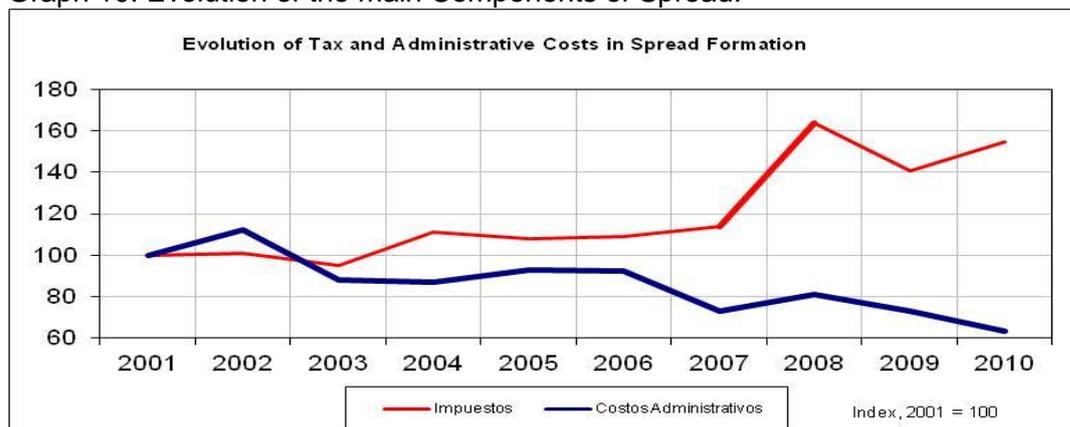
1. From 2000 to 2010, net margin of banks decreased slightly, from 11.2% p.a. in 2000 to 9.12% p.a. in 2010.
2. On the other hand, net margin obtained by decomposing spread (base 100) shows that bank margin in the period oscillated between 28-32% of spread.
3. Nonetheless, in the same period banks were able to reduce costs under their control (non-compliance and administrative costs) from 45.6 to 31.3% of spread. A meaningful increase of banking efficiency.
4. Still, in the same period direct tax increased from 14.1 to 21.89% of *spread*.
5. In short, **simultaneous to the increase in financial efficiency, occurred a strong increase of taxes** that are included on interest rates
6. Therefore, if net margin oscillated around 30% and taxes increased from 14% to 22% *and even so interest and spreads dropped, banks transferred to its clients (and to the government) a significant part of the gain obtained with economies of scale.*

The conclusion thus is that **the augmentation of tax is the main variable (or one of the main ones) that prevents a more intense reduction on interest**, since every time banks manage to reduce their administrative costs (in general fixed costs that get reduced when scale increases) *government raises tax, inhibiting banks to boost margin and transfer part of their gains to clients.*

In pursuance of making this conclusion even more clear, graph 10 was elaborated. It presents the evolution of the main spread components. As it may be observed, for every reduction on administrative costs (and non-compliance provision), there was tax increase. The series was formulated making the numbers from table 3, year 2001, as base 100.

As noticed, increase in tax usually happen after every reduction in administrative costs, demonstrating rational action of expansion in tax burden.¹⁰

Graph 10. Evolution of the main Components of Spread.



Correlation: -0,69816272, Y= Tax: Ind. Var., X= Administrative Costs: Dep. Var.

Regression: R – mult.: 0,698162723; R2: 0,487431188;

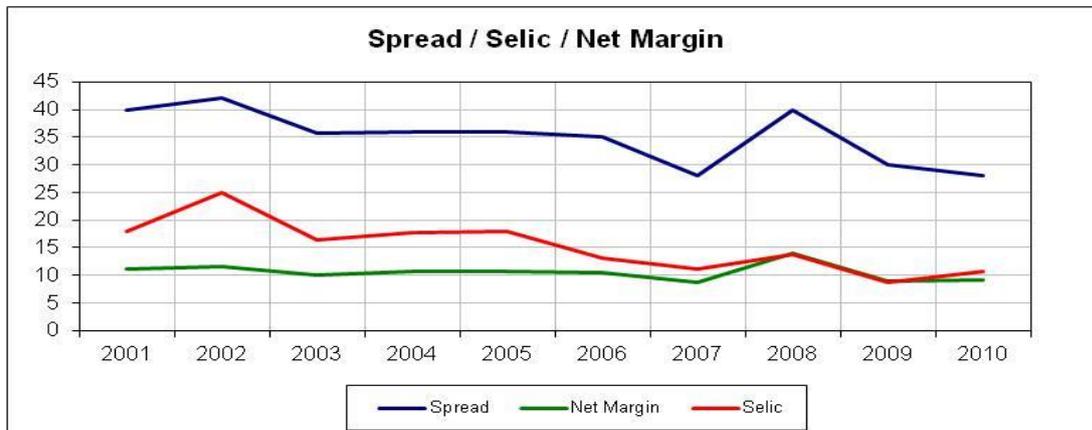
Source: Banco Central do Brasil. Developed by the author.

Considering the above, it was concluded that other factors could also be influencing this investigation. Other variables were chased, and throughout the study it was found a very high correlation between short-term interest rate, denominated as Selic, which is the base rate to pay government debt.

¹⁰ Inverse correlation found between the reduction of banking costs and the increase in tax burden is very strong, of – 0.70, as noted on regression analysis.

5. Correlation between Spreads, Selic (basic interest rate) and spread net margin.

Figure 11 presents the evolution of spreads, Selic, and net margin.



Results show that Selic is the market floor – what should actually occur, according to economic theory and market experience. However, in Brazil, its influence is a lot stronger than in other markets, since it remunerates all overnight transactions. In other words, most demand deposits in the banking system are remunerated, due to software developed during Brazilian hyperinflation period that allows automatic application on government debt.

CONCLUSION

The main findings of this study are:

1. In Brazil, most of bank's economies of scale, in the bank concentration process in the last twenty years, were and still are appropriated by government, by increasing tax over financial operations.
2. On the other hand, the country pays an extremely high real interest rate over government debt, which is largely financed on *overnight*, by (very) short-term deposits, which could have zero cost, or next to zero, for the payment of debt interest.
3. Banks monetize on net margin left by *spread*. Therefore, they can not do without this margin, for the survival of the business itself. Given that, any and all increase in direct tax, which compress net margin, are transferred to interest rate, through spread increase. Such manoeuvre is possible due to *potentiality of the financial system to invest its surpluses on government debt overnight for an attractive interest rate*.
4. At last, and most importantly, for as much as the country keeps direct tax over financial operations and the high interest paid on overnight for Brazilian government debt are maintained, the country will continue to live with extremely

high interest rates. Such outline prevents financial leverage for non-financial institutions that take credit on the country's banking system.

SECONDARY DATA

BANCO CENTRAL DO BRASIL. "50 maiores bancos e Consolidado do Sistema Financeiro Nacional". Available at <http://www4.bcb.gov.br/top50/port/top50.asp>, access in March 20, 2015.

BANCO CENTRAL DO BRASIL. Anuários do Banco Central do Brasil – 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2014.

BANK FOR INTERNATIONAL SETTLEMENTS (BIS). Report on Asset Securitization Incentives, Basle, available at www.bis.org

FUNDAÇÃO GETULIO VARGAS. Consumer Price Index, from january/1995 to december/2010.

INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA. National Wide Consumer Price Index (IPCA), released by Instituto Brasileiro de Geografia e Estatística (IBGE), from january/1995 to december/2010.

SUMA ECONOMICA. Real Interest Series for companies in Brazil, United States and England; from 1995 to 2010.

FINANCIAL STATEMENTS

COMISSÃO DE VALORES MOBILIÁRIOS (CVM). Balance Sheets and Financial Statements of Banks, from 1988 to 2010.

BIBLIOGRAPHY

AKHAVEIN, J.D.; BERGER, A.N.; HUMPREY, D.B. (1997). "The effects of megamergers on efficiency and prices; evidence from a bank profit function". *Review of Industrial Organization*, v.12, p. 95-130.

ALHADEFF, D.A. (1954). *Monopoly and Competition in Banking*. Berkeley: University of California Press.

ALLEN, F; SANTOMERO, A.M. (1997). "The Theory of Financial Intermediation". *Journal Of Banking And Finance*, 21, p. 1461-1485.

ANDERSON, S. R. (2007). "Time-Driven activity-based costing: A simpler and more powerful path to higher profits", *Harvard Business School Publishing*.

BERGER, A.N.; DEMSETZ, R.S.; STRAHAN, P.E. (1999). "The consolidation of the financial services: causes, consequences and implications for the future". *Journal of Banking and Finance*, v.23 (2), p. 135-94.

BERGER, A.; HUMPHREY, D., (2000). "Efficiency of Financial institutions international survey and directions for future research". In: Harker, P.; Stavros, Z. (Org.). *Performance of Financial Institutions: efficiency, innovations, regulation*, Cambridge University Press.

CANOVA, F. (2007), "Methods for applied macroeconomic research", *Princeton University Press*.

CASU, B.; MOLYNEUX, P. (2001). "Efficiency in European banking.", In: Goddard, J.; Molyneux, P; Wilson, J. *European banking; efficiency, technology and growth*. Chichester; John Wiley & Sons Ltd.

CLAESSENS, S.; DEMIRGÜC-KUNT, A.; HUIZINGA, H.; (2001). "How does foreign entry affect domestic banking markets?" *Journal of Banking Finance*, v. 25, n. 5, p. 891-911.

DEMIRGÜC-KUNT, A.; HUIZINGA, H.; (1999). "Determinants of commercial bank interest margins and profitability: some international evidence." *World Bank Economic Review*, n. 13, p. 379-408.

DEMIRGÜC-KUNT, A.; LAEVEN, L. LEVINE, R. (2004). "Regulations, market structure, institutions, and the cost of financial intermediation." *Journal of Money, Credit, and Banking*, v. 36, n. 3, p. 593-622.

European Central Bank: The Smets-Wouters (2003). *Model*. Available: http://www.ecb.int/home/htm/researcher_swm.en.html.

JAFEE, D.M.; STIGLITZ, J. (1990). "Credit rationing." In: Friedman, B.M. e Hahn, F.H. (Eds.). *Handbook of Monetary Economics*, vol. II. Amsterdam: North Holland, p. 837-88.

KEYNES, J.M. (1930). *A Treatise on Money*. London: Macmillan.

_____. (1936). *The general theory of employment, interest and money*. Nova York: Harcourt.

_____. (1937a). "Alternative theories of the rate of interest". *Economic Journal*, junho.

_____. (1937b). "The 'ex-ante' theory of the rate of interest". *Economic Journal*, dezembro.

_____. (CW). (1980) .*The Collected Writings of John Maynard Keynes*. Londres: Macmillan. The volumes of the collection are quoted with note CW, followed by their numbers.

LUCAS Jr, R.E.; SARGENT, T.(1984). "Rational Expectations and Econometric Practice." University of Minnesota Press, fourth edition, Minneapolis.

MINSKY, H. (1982) *Can 'It' Happen Again?* Nova York, Armonk: M.E. Sharpe.

_____. (1996). *Stabilizing an Unstable Economy*. New Haven: Yale University Press.

NAKANE, M. (2003). "Competência e *spread* Bancário; uma revisão da evidência para o Brasil." In: Banco Central do Brasil, "Economia Bancária e Crédito – Avaliação de 4 anos do Projeto Juros e *Spread* bancário", December 2003, VI p. 58-67.

SIQUEIRA, Alexis Cavichini T. De (2007). *A História dos Bancos no Brasil: das*