Capital Structure Determinant's of Brazilian and North American Banks

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Abstract

The works related to the capital structure of banks consider the minimum regulatory capital requirements, established by the Basel agreements, as its main determinant. However, recent studies suggest that standard determinants - size, profitability, growth opportunity, tangible assets and dividend payments - also have the explanatory power of financial leverage of banks with commercial portfolio. Besides these, this work included the executive compensation program - based on stocks and options - as a determinant of capital structure of Brazilian and North American banks, during the last international systemic crisis (2007-2010).As a result, it was found that, in addition to the risk of assets and deposit insurance, the variables related to the traditional theory of capital structure, such as size, opportunity for growth and dividend payment also contribute to the determination of the level of leverage of banks.

Key words: *Commercial banks, capital structure determinant's, executive compensation program.*

1.Introduction

Since the critical article of Modigliani and Miller - MM (1958), which states that in a world without any type of attrition the value of a company is not affected by its capital structure, experts are seeking to identify what would be the determinant factors or attritions that explain the level of financial leverage of the companies. Nonetheless, up to the latest systemic crisis unleashed from the subprime crisis, the financial literature pointed out the regulatory requirements - Basel Agreements I (Basel I, 1998) and II (Basel II, 2004) and deposit insurance - as the main factors in defining bank capital structure. (Harding, Liang, Ross, 2006; Mishkin, 2000; Miller, 1995). Until then, it was believed that said requirements were sufficient to keep the balance or the financial solvency of these institutions and of the market as a whole.

The Bank for International Settlements (BIS) defines a minimum level of capital - capital stock, capital reserves, profit reserves, other reserves and accumulated profits and losses - of 8% on total assets, pondered for the risk to commercial banks. However, in Brazil, the Central Bank (Bacen) has established a minimum percentage of 11%. It so happens that the 20 largest Brazilian banks - in the order of their total assets - displayed an average Basel rate higher than 17% in March of 2010, while the 20 largest banks in the world - according to their own capital stock - showed an average Basel rate close to 14% at the end of 2009 (Fraga, 2010).

These facts indicate the existence of a "buffer" or overage of capital above the minimum requirements defined by Basel, which could not preclude the sequence of failures of North American and European financial institutions. Thus, we could understand that the Basel Agreements have to be considered as one of the attritions that does away with the market reality in MM's irrelevance proposition; nonetheless, they should not be seen as the main determinant factor in the capital structure of banks.

On the contrary, recent evidence suggests that determinant standards of capital structure, until then applied only to nonfinancial companies, also hold the power to explain the level of financial leverage of banks at book and market values. Said studies have been performed either for banks in developed countries (Gropp, Heider, 2010; Brewer III, Kaufman, Wall, 2008; Kleff, Weber 2008), as well as for countries under development, including Brazil (Çağlayan, Şak, 2010; Romdhane, 2010; Ahmad, Ariff,Skully, 2009; Octavia, Brown, 2008; Salawu,Awolowo, 2007).

Even before the abovementioned systemic crisis, a determinant factor has become a special highlight in the definition of performance (Doucouliagos, Haman, Askary, 2007) and bank leverage (Barton, Laux, 2010; Bhagat, Bolton, 2011), as well as in the capital structure of enterprises (Mehran, 1992; Smith, Watts, 1982 and 1986; Jensen,Meckling, 1976), which is the compensation program for executives, based on securities and options. Following the theory of securities pricing, an increase in volatility of securities makes them more valuable. Therefore, in view of their convexity effect, the options encourage the managers to undertake risks. In order to face their needs of investment, the managers end up incurring more debt, thus increasing company risk. As a result, these studies have verified that there is a positive and statistically meaningful relationship between the level of financial leverage and the component of securities and options of the executive compensation program. Still, with the crisis, it has been observed that the policy of executive compensation in financial institutions, based on securities and options, was linked to the short term outcomes, not taking into account long term risks. Riskier investments and with short term return expectation demanded a higher level of debt.

Based on the above described problem, this working paper has the main objective of checking if the capital structure determinant's of nonfinancial companies, during the systemic crisis period, among them the executive compensation program, based on shares and options, also carry the power of explaining the level of financial leverage of banks - at book value and market value, as well as asset risk and deposit insurance. Concerning the secondary objectives, they consist of identifying possible differences of significance between the determinants of capital structure of banks in Brazil and USA, as well as differences in the descriptive statistics of some variables, such as regulatory minimum capital buffer, capital composition – funding by deposit and non-deposit transactions and executive compensation program. For that matter, the following main alternative hypotheses are tested:

H1:   The determinant standards of nonfinancial corporate capital structure carry meaningful explanatory power on banking leverage;

H2:   Asset risk taking carries meaningful explanatory power in banking leverage;

H3:   The deposits carry a meaningful explanatory power in banking leverage.

The variables asset risk-taking and volume of deposits are included in the regression model as proxies in the measurement of minimum capital requirements defined by Basel Agreements. The asset risk-taking in banks is formed by credit, market and operating risks, representing those foreseen by the Basel II Agreement and which, therefore, should be captured by the effect of minimum required capital risk adjustment. On the other hand, the variable deposit is represented by the percentage of volume of fundraising performed through deposits on all bank assets. Since these operations are insured by special funds - Credit Guarantee Fund (FGC) and Federal Deposit Insurance Corporation (FDIC) - they should increase the assets risk and, therefore, the level of financial leverage in banks, providing more emphasis on the need of Basel Agreements.

Thus, the alternative hypotheses related to capital standards determinants, as well as the macroeconomic factors, are:

H4:   The larger the bank, the larger its level of financial leverage;

H5:   The higher the bank's profitability, the lower its level of financial leverage;

H6:   The greater the growth opportunity, the lower its level of financial leverage;

H7:   The larger the tangible assets as bank guarantee, the higher its level of financial leverage;

H8:   The greater the bank's dividend payment, the lower the level of financial leverage;

H9:   The greater the bank's executive compensation, the higher its level of financial leverage;

H10:   The better the macroeconomic indicators, the higher the banks' level of financial leverage.

The banks' financial leverage variable for alternative hypotheses H1 through H10, refers either to their book value, as well as to their market value. These analyses are carried out for Brazilian and North American commercial banks.

1. Theoretical Reference

According to Kwan (2009), banks and other financial institutions are specialized businesses, whose capital structure is affected by a series of financial industry conditions, such as government regulations and access to federal government security instruments, which include deposit insurance. Merton (1977) defined the deposit insurance models as a sales option, which offers banks the right of selling their assets to the insurer of their deposits - FDIC or FGC - at a current price similar to the nominal value of their deposits. According to the theory of option pricing, the amount of the deposit insurance increases with the rising of risk level of bank assets and of their current price. Consequently, the banks end up having an incentive to maximize the value of their deposit insurance, undertaking more risks and employing less own capital. To this extent, we have that either the asset risk taking, as well as the deposits, carry a meaningful explanatory power in the level of bank leverage (H2 and H3).

With regards to the determining standards of the capital structure, the size may be considered as a proxy of the opposite of probability of bankruptcy. It means to say that according to the theory of bankruptcy costs, large companies normally are more diversified than small ones. In this way, they are less subject to financial difficulties, which enables them to carry lower bankruptcy costs. As a result, their debt capacity is larger than small companies (Brito, Corrar,Batistella, 2007). In the case of Banks, Brewer III, Kaufman and Wall (2008) and Kleff and Weber (2008) believe that larger financial institutions enjoy better facility

in accessing the capital market (external capital) due to lower transaction costs. This fact enables them a higher financial flexibility and, therefore, lower need of keeping overage of regulatory capital (above the levels defined by the Basel Agreements) in relation to smaller banks. Therefore, considering the above, we expect a positive relationship between the size of the bank and its level of debt (H4).

Recent studies on the dynamic model of the trade-off theory indicate that leverage is negatively related to company profitability. In fact, going opposite to the pecking order theory, according to Berger *et al* (2008), after analyzing 666 North American banks with stock exchange securities between 1992 and 2006, the authors verified that despite the abnormal volume of accumulated profits during that period, the banks were seeking to increase, evermore, their percentage of own capital via issuance of new securities.Brewer III, Kaufman and Wall (2008) and Kleff and Weber (2008) also arrived at similar result; that is, for them, the greater the profitability of banks, the greater the capacity of increasing their own capital through accumulation. This being the case, considering the above, it is expected that there is a negative relationship between the profitability level of the bank and its level of debt (H5).

On the other hand, following the static trade-off theory, the distribution of profits varies positively with growth opportunities; that is, keeping the profitability constant, the companies with greater investment opportunities - more profitable - pay more dividends and, therefore, have greater opportunities of investment - more profitable - pay more dividends, and, therefore, have lower accounting leverage (Futema, Basso, Kayo, 2009; Gropp,Heider, 2010; Kleff, Weber, 2008). Hence, the larger the growth opportunity, the lower the bank's level of financial leverage (H6)

The theory of bankruptcy costs considers that the nonfinancial enterprises that hold available tangible assets, such as real estate, machinery and equipment, may offer them to the creditors as debt guarantee. As an outcome, they enjoy greater debt capacity, since these assets may be sold in case of insolvency, thus reducing bankruptcy costs (Frank,Goyal, 2009; Brito, Corrar,Batistella, 2007). Nonetheless, in the case of financial institutions, the relationship between tangible assets and leverage varies as a result of the country's development level. In the case of developed countries, this relation is positive; while for developing countries, it is negative. In the latter case, apparently the increase in tangible assets reduces the value of banks in issuing new debt (Çağlayan,Şak, 2010; Gropp, Heider, 2010; Octavia, Brown, 2008). Although theoretical and empirical studies find support for the existence of negative and positive signs among tangible assets as a guarantee and level of bank leverage; in this work, the hypothesis considered is that the greater the bank's level of tangible assets, the greater its level of financial leverage (H7).

According to Myers (1984) in the static trade-off model, the companies adjust the payment of dividends toward their compensation goals, that is, they seek such level, as well as they seek the best level of debt. The author states that reducing the payment of dividends is a defensive measure in a period of financial hardship; therefore, paying dividends is not attractive or recommendable for companies with lower profitability and highly leveraged (Bastos, Nakamura, 2009; Futema, Basso, Kayo, 2009; Frank,Goyal, 2008). Furthermore, following the pecking order theory, the companies prefer internal financing to external. Being such, Frank and Goyal (2009) and Gropp and Heider (2010) conclude that enterprises and banks that pay dividends are more profitable and, therefore, less leveraged. As proposed above, we infer that the hypothesis of distribution of dividends is negatively related with the bank's level of financial leverage (H8).

According to the agency's theory, compensation programs (Sousa,Krauter, 2010; Krauter, 2009; Smith, Watts, 1982 and 1986), the acquisition of securities by the managers (Jensen,Meckling, 1976) and monitoring of executives (Fama, Jensen, 1983; Mehran, 1992) lessen the conflict between stockholders

and managers, upon aligning the interests between both sides, through the increase in financial leverage, risk and wealth.

Up to the moment, the analysis of the relationship between the level of debt and compensation programs would be restricted to nonfinancial companies. However, more recent studies like those of Bolton, Mehran and Shapiro (2010) substantiated that, on average, while North American nonfinancial companies carry a level of debt of approximately 47% of their capital structure, for financial institutions this percentage is at about 90%, while for investment banks this amount reaches 95% (Bhagat, Bolton, 2011). This high level of financial leverage stems from the fact that the debt in banks is not subsidized by deposit insurance or other implicit redeeming guarantees, opposite to nonfinancial companies. This way, the maximization of banks' stockholders value involves the hiring of executives who do not disgust risk and who, therefore, have to be compensated for that. As manifested above, we derive that, the greater the compensation of bank executives - based on securities and options - the greater their level of financial leverage (H9).

Conclusively, according to Octavia and Brown (2008) and Gropp and Heider (2010), another characteristic feature equally relevant to the banking industry refers to the effect of procyclicality of macroeconomic indicators, such as the growth in Gross Domestic Product, volatility of market return and inflation. The procyclicality effect in the banks' capital structure suggests that these carried more capital during periods of dismal economic performance. This fact stems from the increase in probability of losses and consequent bankruptcy, as a result of a considerable increase in risk of their operations. Therefore, we expect a positive relation between macroeconomic indicators and the level of bank financial leverage (H10).

2.Methodology

The population of interest in this study relates to Brazilian and North American banks. In the case of Brazil, it is formed by 158 multiple, commercial banks and the Federal Savings and Loans Bank (CEF – CaixaEconômica Federal). In the USA, the commercial banks that hold more than US$ 300 million in consolidated assets, totalize 1,753 banks. Both values refer to the base date of 12/31/2009. Therefore, the initial sample considers the 100 larger banks with commercial portfolios - using the criterion of total assets on 12/31/2009 - totaling 200 banks, during the years 2007 to 2010. However, in the case of Brazil, of these 100 larger banks, only 19 are listed at Securities Comission (CVM) and carried securities regularly negotiated at São Paulo Stock Exchangeand Brazilian Mercantile & Futures Exchange (BMF&BOVESPA) in 2009. With regards to the USA, most financial institutions carry publicly-held capital stock. However, considering the full release of all data and for all years between 2007 and 2010, up to the end of the phase of data survey, the final sample contemplates 15 Brazilian banks and 24 North American banks, totaling 156 observations. It is worth mentioning that even after a considerable reduction in size, the final sample still represents 60% of total assets.

The secondary data of this work's sample have been obtained through sites of public and private institutions at Central Bank of Brazil, Federal Reserve, Institute for Applied Economic Research (Ipea), CVM, BMF&BOVESPA, Yahoo Finance and Comdinheiro, as well as from international private bases made available by the Columbia University - Orbis and Osiris of Van Dijk Bureau, Thompson One Banker of Thomson Financial and ExecuComp from Standard & Poor's.

The verification or not of the hypotheses in this working paper was accomplished through multivariate linear regression tests - cross section model with pooled data. The variables used in performing these tests are introduced in (*Table 1*)

3. Analysis of Results

Table 2 aims at comparing the arithmetical averages between 2007 and 2010, of Brazilian and North American bank samples. It stands out that the USA hold the larger averages for the leverage variables at book value (ALAVC), size (TAM), growth opportunity (VMC), risk (RISC), fund raising through book value deposits (VCDP) and market value (VMDP) and executive compensation (COMP). In the case of Brazil, it holds the larger averages for leverage variables at market value (ALAVM), profitability (LUCR), guarantees (GAR), payment of dividends (DIV), fund raising of book value of non-depository (VCNDP) and of market value (VMNDP) GDP growth (PIB) and market return (RM). *(Table 2)*

Still on the comparison between Brazilian and North American banks, it is important to point out the following main differences between them. In the case of North American banks, since the subprime loans were hardly settled, they insured them, allowing the sale of part of their credit risk to other banks and investors, contaminating other developed countries (Savoia*et al*, 2010). Consequently, as the risk of these credits was out of their balance sheets, the banks would be able to grant higher volume of real estate loans, based on their capital, without compromising their Basel levels (Alberini,Boguszewski, 2008). Such fact contributed to the increase in bank profits and, as a consequence, to the valuation of compensation packages to their executives.

Nevertheless, this strategy ended up originating the systemic crisis that had its inception in 2007. The federal government reacted in various forms along this process, having also supported the financial institutions directly in 2008, through the creation of the Troubled Asset Relief Program (TARP). In its initial version, this package released US$ 700 billion for the acquisition of subprime mortgages from the financial institutions with problems. Said amount was later used to inject capital in bank institutions (Mishkin, 2010). This action, despite removing the troubled assets from the balance sheet of financial institutions, these assets were an alternative form of making capital investments in the financial institutions, thus creating some leeway for the banks. The intention was to free the channels that had been blocking credit markets. However, the expected effects of the new measures did not materialize. The banks chose to increase their own capital reserves, instead of performing new credit operations (Junior,Filho, 2008).

In the case of Brazilian banks, they did not have external derivatives supported with subprime and other securities, since the investments in federal public securities, remunerated by the Selic rate (Brazil's prime rate), have always offered higher profitability. This fact mitigated the impact of the systemic crisis in the country. Furthermore, it is worth pointing out that in the year 2009, the public banks were the ones that started an anti-cycle movement of the effects of the systemic crisis in Brazil, granting more credit than the private institutions. According to Bacen, in 2009, the public banks were responsible for 41.4% of credit grants, while the private institutions represented 40.4% (BancoCentral do Brasil, 2010).

With regards to regression tests, their objective consists of verifying the joint influence of all independent variables in relation to the level of financial leverage, at book value (ALAVC) and at market value (ALAVM) on Brazilian and North American bank samples. The data obtained each year, between 2007 and 2010, have been grouped in pool form. In order to carry out the analysis of regression tests, first of all, it was necessary to obtain a proper model in its functional form. For that matter, tests were carried out on the following assumption of the models: normality and homoscedasticity of residues, linearity of coefficients and absence of multicollinearity of the independent variables. From the results obtained through auxiliary regression for the non-linearity test (quadratic terms) we identified the independent variables that were not linear. In this case, said variables had their squares inserted in the model.

In the case of Brazilian banks, Table 3 indicates that the model whose dependent variable is financial leverage at book value (ALAVC) it kept its global significance (p-*value* F < 5%) and that the adjusted determination coefficient is 83%. The significant explanatory variables, size (TAM) payment of dividend (DIV), risk (RISC) and book value of deposits (VCDP) hold coherent signals with the theory, besides the variable of control market return (RM). On the variable, growth opportunity (VMC) its positive relationship with financial leverage at book value (ALAVC) is due to a possible over appraisal of security prices. In effect, the price average of Brazilian securities almost tripled between the years 2008 (US$ 3.35) and 2009 (u$ 9.14), having kept a bullish trend in 2010 (U$ 10.96). Therefore, as suggested by the pecking order theory, a greater level of asymmetry in information between bank managers and the market, results in more debt issuances.

On the other hand, the variable, executive compensation (COMP) its convex function indicates that, up to the minimum level of compensation of 10.69 (amount corresponding to the natural logarithm of the total amount, deflated , of the executive compensation), the higher the amount of compensation, the lower the level of financial leverage, displaying an inversion of this relation after that point. The banks that are found at the right of this point are those that hold higher size and better policies of compensation of their executives - ex.: Itaú, Bradesco, etc.

In relation to the macroeconomic factors (GDP growth and market return), considering their role in the financial system, they may reflect the environment in which the banks operate. According to Basel I and II on capital requirements, the banks are subject to the effects of procyclicity of macroeconomic indicators. Said effect suggest that they carry more of own capital during a drop in the economy. This occurs due to the increase in probability of breaking and default in their credit operations, which increases their risk.Thus, we expect that the better the performance of macroeconomic factors, the lower the level of own capital and the greater the level of financial leverage of banks.

However, the negative sign in GDP growth calls for an opposite reality, in which the banks behave in an anti-cyclical manner, that is, when macroeconomic indicators pointed to a worsening in the market, instead of banks increasing their share in own capital, they increased their proportion of third party capital. In effect, the quadratic and convex function of variable GDP growth indicates that up to the minimum point of 3%, which occurred only in year 2009, with a decrease of 1%, there was in fact an increase in the level of financial leverage at book value (ALAVC). Nonetheless, from this minimum, which occurred for the other years, this relation was inverse. *(Table 3)*

Table 4 displays the results related to the dependent variable: financial leverage at market value (ALAVM) for Brazil. The model keeps global significance (*p-value* F < 5%), the adjusted determination coefficient is of 85%. The meaningful explanatory variables: size (TAM), growth opportunity (VMC), payment of dividend (DIV), risk (RISC) and market value of deposits (VMDP) carry coherent signals with the theory, besides the variable market return control (RM).

Similar to the model with financial leverage at book value (ALAVC), the variables executive compensation (COMP) and GDP growth carry quadratic functions. In the case of compensation, its minimum point has been displaced from 10.69 to 10.76 amount corresponding to the natural logarithm, total deflated, of executive compensation), and the banks at its right are those already mentioned. In relation to the variable GDP growth, its values are the same for both models. *(Table 4)*

In the case of North American banks, Table 5, whose dependent variable is the leverage at book value (ALAVC), indicates that the model keeps global significance (*p-value* F < 5%), the adjusted determination

coefficient is 73%. The meaningful explanatory variables, size (TAM), payment of dividend (DIV) and risk (RISC) carry coherent signals with the theory, besides the variable of control, market return (RM).

Such as with Brazil, the variable growth opportunity (VMC) carries positive relationship with leverage at book value (ALAVC). In this case, there was also a possible over appraisal of the price of securities. The average prices increased from US$ 35.79 to US$ 55.68 between 2007 and 2008, being reduced to US$ 26.79, in 2009, with slight recovery to US$ 29.04 in 2010. Furthermore, the variable growth opportunity (VMC) is quadratic and concave. Up to the maximum level of growth of 1.25 (amount corresponding to the ratio between the market and book value of bank assets), the larger the opportunity, the greater the level of financial leverage, and there is an inversion of this relationship after that point. In the analyzed sample, only the Hancock Bank is above this maximum point for the years 2007 and 2008, thus characterizing a situation of exceptionality.

On the variable risk (RISC), it also has a quadratic function, although this function is convex. This means to say that up to the minimum point of 0.18 (value corresponding to the annualized standard deviation of daily market returns), the greater the RISC, the lower the level of financial leverage, and there is an inversion of this relation after that point. It is worth pointing out that most cases carry negative relationship, and there are only 2 banks in the sample whose relationship is positive for year 2009, which are Wells Fargo and Bank of Mellon. Furthermore, the negative coefficient of risk is in agreement with the theory of corporate finances, being equally compatible with Basel requirements.

The last variable that has a quadratic function in this model refers to the book value of deposits, being convex, similar to risk, that is, up to the minimum point 0.77 (value corresponding to the ratio between book value of all deposits and bank assets), the greater the book value of deposits (VCDP), the lower the level of financial leverage at book value (ALAVC), and there is an inversion of this relationship after that point. This negative relationship occurred, specifically for some banks during the years 2007 and 2008, among them, JP Morgan and Citibank. That means to say that for that period, the stimulus of deposit insurance for the increase in financial leverage at book value did not come true. This situation of exceptionality points to the fact that deposit insurance did not help in defining the capital structure of banks, in this case, being the opposite of what the regulatory requirements suggest.

The negative sign in the variable executive compensation (COMP) stems from the situation of exceptionality of the crisis period. The leverage at book value (ALAVC) was kept constant between the years 2007 and 2009 (approximately 90%), while the compensation average fell about 34% during that period. Only from the year 2010 there was the inception of process of recovery of executive compensation.

On the negative sign of the variable GDP growth, it did not grow or it was negative between 2008 and 2009, where the 2007 and 2010 values were positive (about 2%). Whereas, in this same period, the leverage at book value kept constant, around 90%. That means to say that, opposite to the expected, the unfavorable indicators of economy did not stir a reduction in the level of leverage of banks and/or an increase in their own capital, contrary to the expectation of Basel I and II Agreements on the effects of procyclicity of banks. *(Table 5)*

Table 6 indicates that for North American banks, whose dependent variable is leverage at market value (ALAVM), the model keeps global significance (*p-value* F <5%), the adjusted determination coefficient is 92%. The meaningful explanatory variables size (TAM), growth opportunity (VMC), payment of dividend (DIV), risk (RISC), market value of deposits (VMDP) carry coherent signals with the theory, besides the market return control variable (RM).

With regards to the risk variable (RISC) it carries a convex quadratic function, with equal value of minimum point to the leverage model at book value (Table 5). It means to say that up to the minimum point of 0.18 (value corresponding to the annualized standard deviation of daily market returns), the greater the risk, the lower the level of financial leverage, and there is an inversion of this relationship after that point. The banks that are situated at the right of that point are the same, Wells Fargo and Bank of Mellon, for 2009. Furthermore, the negative coefficient of risk is in agreement with the theory of corporate finances, being equally compatible with the Basel requirements. On the variable GDP growth, the results and justifications are similar to the leverage model at book value *(Table 6)*

4. Conclusion

Up to the systemic crisis (2007-2010), the theme of capital structure of banks was dealt with, basically, taking into account the effects of Basel Agreements, as well as the specific characteristics of fund raising through deposits.Said operations, for holding government guarantees, stimulated the assumption of higher risk level of assets and generated a consequent need of increasing the level of banks' own capital.

However, after the bankruptcy and the financial difficulties faced by some of these institutions, other studies started to analyze the influence of determining standards of capital structure in financial institutions. Works like those of Octavia and Brown (2008) and of Gropp and Heider (2010), indicate that, in the case of banks that carry a buffer of own capital over the minimum established by the Basel Agreements, explanatory variables such as size, profitability, growth opportunity, guarantees, payment of dividends and assets risk, as well as of control, such as actual GDP growth and market return, are equally relevant in defining the capital structure of banks.

On the other hand, even before the mentioned systemic crisis, studies like those of Barton and Laux (2010) and Bhagat and Bolton (2011) already pointed to a policy of executive compensation, as being a significant variable in the understanding of the level of financial leverage of banks. Accordingly, this work has the main objective of verifying whether the determinant standards of capital structure bear a meaningful explanatory power in the leverage of banks, in addition to the variables related to the Basel Agreements, such as assets risk and deposit insurance.

Therefore, the population of interest on this working paper relates to banks that carry commercial portfolios in Brazil and in USA. The final sample is formed by 15 Brazilian and 24 North-American banks, corresponding to 156 observations, during the period of 2007-2010. The methodology used consisted of multiple linear cross section regression tests. From the results presented in item 4, Table 7 synthesizes the variables and hypotheses verified by this work. (*Table 7)*

From the results of regression analyses, it was verified that the main alternative hypothesis H1 - the determining standards of capital structure, carries a significant explanatory power in leveraging the book value and market value of banks. On the independent variable asset risk taking, its negative relationship with the dependent variables, leverage at book value and market value, indicates that the more volatile the bank assets are, they tend to contract less debt or to increase their participation in own capital. On one hand, this result is consistent with the argument that the asset risk taking captures the effects of the adjustments of minimum regulatory capital of banks, defined by the Basel Agreements. On the other hand, this negative relationship may be interpreted in terms of the traditional capital structure theories, such as agency cost and static trade-off. More risky assets may reflect the effect of "asset substitution" stimulated by the stockholders - agency cost. However, banks with more risky assets may be associated with a higher

probability of bankruptcy. Both arguments lead to the decision of banks to reduce their level of financial leverage.

On the variable GDP growth, it is important to emphasize that it is meaningful for both countries, either in relation to the leverage at book value (ALAVC), as well as at market value (ALAM). Nonetheless, its negative sign is the opposite of the expected by the Basel I and II Agreements. Said sign indicates that the banks behaved in an anti-cyclical manner, that is, the worse was the macroeconomic environment, the lower the share of own capital, and the larger proportion of third party capital in the banks.

This perception of an antagonistic behavior of banks was captured by the Basel III (BASEL III) Agreement, which will be effective from 2013, through the countercyclical buffer, that may vary between 0% and 2.5%. Said buffer aims at protecting the banking sector in periods of excessive growth, from the availability of credit associated to the potential accumulation of systemic risk, that is, it is expected that the better the performance of macroeconomic indicators, the higher proportion or own capital in banks and, consequently, a lower level of financial leverage.

With regards to the variable executive compensation program, it was meaningful for the regression models, whose dependent variable is the leverage at book value and at market value, in Brazil, as well as for the financial leverage at book value, in the USA. In the case of Brazilian banks, the positive sign of quadratic variable ($COMP^2$), and negative of the linear variable (COMP) indicates that the function is convex, whereas only banks Itaú and Bradesco are situated right of their minimum point. This fact implies that hypothesis H9 - The higher the compensation of bank executives, the higher its level of financial leverage, is applicable only to larger size banks and/or with better policies of compensation of their executives. On its turn, with regards to North American banks, we find that the negative relationship between the executive compensation program and the leverage at book value stems from the low salaries at the time, which they only started their recovery process from 2010. Furthermore, its insignificance in relation to the variable leverage at market value (ALAVM), is due to the random price of securities, which affected in an improper way the policy of compensation of banks. The component of higher relevance in the compensation program of North American bank executives is based on securities and options (68.80%).

Finally, it is worth pointing out that this work does not propose to exhaust the covered subject and to draw final conclusions; whereas, it displays only the intention of better understand the determinant factors in the capital structure of financial institutions, and to raise a higher interest on this industry, from the people who propose to work and to develop this segment. Furthermore, considering the relevance that the theme policy of executive compensation carries, either in Brazil, as well in other countries, it is suggested the accomplishment of future studies that address questions related to the diversification of compensation of managers, since compensatory incentives - such as purchase options - lead them to assume more favorable postures to risk as a result of the maximization of their utility function.

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Table 1 – Variables used by statistical tests

Initials	Name	Description	Formula
ALAVC	Financial leverage at book value	Corresponds to the percentage of financial leverage's book value or of bank's current liabilities	$ALAVC = 1 - \dfrac{VCPL}{VCA}$
ALAVM	Financial leverage at market value	Corresponds to the percentage of market value of bank's financial leverage	$ALAVM = 1 - \dfrac{VMPL}{VMA}$
TAM	Size	Corresponds to the natural logarithm of the bank's size, obtained through the book value of all assets, deflated by the Consumer Price Index (CPI) number, based on 2010 figures	$TAM = Ln(VCA)$
LUCR	Profit	Corresponds to the bank's profitability percentage	$LUCR = \dfrac{LAIR + InterestExpenses}{VCA}$
VMC	Growth Opportunity	Corresponds to the percentage between market value and book value of total bank assets	$VMC = \dfrac{VMA}{VCA}$
GAR	Guarantees	Corresponds to the percentage of guarantees in relation to the book value of all bank's assets	$GAR = \dfrac{ATT}{VCA}$
DIV	Payment of dividends	Corresponds to the percentage between the book value of payment of dividends and total bank's assets	$DIV = \dfrac{DIV}{VCA}$
COMP	Executive Compensation Program	Corresponds to the natural logarithm of executive compensation, deflated by the CPI index number, based on 2010 figures	$COMP = Ln(COMP)$
RISC	Risk	Corresponds to the assets' risk	$RISC = \left[VOL_{ano} \ x \left(\dfrac{VMPL}{VMA} \right) \right]$
VCDP	Book value of deposits	Corresponds to the percentage of book value of deposits	$VCDP = \dfrac{TDP}{VCA}$
VMDP	Market value of deposits	Corresponds to the percentage of market value of deposits	$VMDP = \dfrac{TDP}{VMA}$
VCNDP	Book value of non-depository	Corresponds to the percentage of book value of non-depository	$VCNDP = ALAVC - VCDP$
VMNDP	Market value of non-depository	Corresponds to the percentage of market value of non-depository	$VMNDP = ALAVM - VMDP$
PIB	GNP Growth	Corresponds to the percentage of annual growth of GNP in Brazil and of Gross Domestic Product (GDP) in the USA	

RM	Market Return	Corresponds to the annualized standard deviation of the national index of market return, being represented by the Ibovespa indices in Brazil and S&P500 in the USA.

In which:

ATT: Tangible Assets = Securities or commercial papers such as cash on hand + federal treasury bills + certificates of bank deposits + all other papers and securities + fixed assets

COMP: Executive compensation = fixed salary + variable compensation + post-employment benefits + benefits for termination of office position + compensation based on securities and options + (number of securities of shares directly or indirectly held x quotation on 12/31.)

LAIR: Profits before income tax

TDP: Total of deposit operations

VCA: Book value of total assets

VMA: Market value of assets = VCPE + VMPL

VCPE: Book value of total liabilities

VCPL: Book value of net worth

VMPL: Market value of net worth = Number of securities x quotation on 12/31

VOL_{ano}: Standard deviation of daily return on securities x $\sqrt{252}$, where 252 = approximate number of business days in one year

Table 2 – Comparison between arithmetic averages in Brazilian and North American banks

Variables	Brazil	USA	Difference (USA - Brazil)
ALAVC	0.861	**0.896**	0.034
ALAVM	**0.899**	0.885	(0.015)
Own capital buffer	0.029	0.024	(0.004)
TAM US$ thousand	65343100	**273258000**	207914900
LUCR	**0.092**	0.018	(0.073)
VMC	0.960	**1.018**	0.058
GAR	**0.511**	0.424	(0.088)
DIV	**0.008**	0.004	(0.003)
RISC	0.046	**0.058**	0.012
VCDP	0.606	**0.818**	0.212
VMDP	0.633	**0.809**	0.175
VCNDP	**0.256**	0.078	(0.178)
VMNDP	**0.266**	0.076	(0.190)
COMP *per capita* US$ thousand	5531	**16263**	10732
GDP Growth	**0.045**	0.005	(0.040)
RM	**0.328**	0.256	(0.071)

Table 3 – Brazilian bank regression test for the dependent variable financial leverage at book value
(ALAVC) – Stepwise Method

MQO, using the observations 1-60 / Dependent Variable: ALAVC

Standard errors robust to heteroscedasticity, HC0 variant

	Coefficient	StdError	ratio-t	p-value	
const	0.579701	0.124089	4.6717	0.00002	***
TAM_LN	0.0078032	0.00222003	3.5149	0.00096	***
VMC	0.336885	0.109711	3.0707	0.00348	***
DIV	-3.83447	0.966024	-3.9693	0.00024	***
RISC	-0.530042	0.108812	-4.8712	0.00001	***
VCDP	0.122337	0.0304345	4.0197	0.00020	***
COMP_LN	-0.054314	0.0126351	-4.2987	0.00008	***
Cresc_PIB	-2.56158	0.777467	-3.2948	0.00183	***
RM	0.23527	0.0648327	3.6289	0.00068	***
sq_COMP_LN	0.00254126	0.000615934	4.1259	0.00014	***
sq_Cresc_PIB	41.8243	12.7374	3.2836	0.00190	***
R-square		0.863913	R-adjusted square		0.836140
F(10, 49)		60.06509	P-value(F)		5.16e-24

Note: (**) and (***) reflect significance at the 5% and 1% level, respectively

Table 4 – Regression test of Brazilian banks for the dependent variable leverage at market value
(ALAVM) - Stepwise Method

MQO, using the observations 1-60 / Dependent Variable: ALAVM

Standard errors robust to heteroscedasticity, HC0 variant

	Coefficient	Std Error	ratio-t	p-value	
const	1.36327	0.128161	10.6372	<0.00001	***
TAM_LN	0.00683033	0.00215168	3.1744	0.00259	***
VMC	-0.456562	0.0993223	-4.5968	0.00003	***
DIV	-3.79068	1.00836	-3.7593	0.00045	***
RISC	-0.508915	0.119188	-4.2698	0.00009	***
VMDP	0.110554	0.0277899	3.9782	0.00023	***
COMP_LN	-0.048332	0.0134224	-3.6008	0.00074	***
Cresc_PIB	-2.58064	0.836214	-3.0861	0.00333	***
RM	0.252123	0.070061	3.5986	0.00074	***
sq_Cresc_PIB	42.4292	13.6512	3.1081	0.00313	***
sq_COMP_LN	0.00224513	0.000652887	3.4388	0.00120	***
R-square		0.875012	R-square adjusted		0.849505
F(10, 49)		34.12583	P-value(F)		1.10e-18

Note: (**) and (***) reflect significance at the 5% and 1% level, respectively

Table 5 – Regression test of North American banks for the dependent variable leverage at book value
(ALAVC) – Stepwise Method
MQO, using observations 1-96 / Dependent Variable ALAVC

	Coefficient	Std Error	ratio-t	p-value	
Const	1.1527	0.472388	2.4402	0.01678	**
TAM_LN	0.00813783	0.00174338	4.6679	0.00001	***
VMC	1.89309	0.382921	4.9438	<0.00001	***
DIV	-0.583367	0.264665	-2.2042	0.03025	**
RISC	-0.926403	0.142901	-6.4828	<0.00001	***
VCDP	-3.82876	1.13959	-3.3598	0.00118	***
COMP_LN	-0.00577382	0.00222013	-2.6007	0.01099	**
GDP growth	-0.502118	0.110612	-4.5395	0.00002	***
RM	0.0935991	0.0210888	4.4383	0.00003	***
sq_RISC	2.60233	0.636056	4.0913	0.00010	***
sq_VMC	-0.756553	0.18	-4.2031	0.00007	***
sq_VCDP	2.49697	0.70616	3.5360	0.00066	***
R-square	0.763266		R-square adjusted	0.732265	
F(11, 84)	24.62081		P-value(F)	8.21 and-22	

Note: (**) and (***) reflect significance at the 5% and 1% levels, respectively

Table 6– Regression test of North American banks for the dependent variable leverage at market value
(ALAVM) - Stepwise Method
MQO, using observations 1-96 / Dependent Variable: ALAVM

	Coefficient	Std. Error	ratio-t	p-value	
const	1.05468	0.0982612	10.7335	<0.00001	***
TAM_LN	0.00451492	0.00142691	3.1641	0.00214	***
VMC	-0.375473	0.0402695	-9.3240	<0.00001	***
DIV	-0.671557	0.290942	-2.3082	0.02336	**
RISC	-0.997397	0.158026	-6.3116	<0.00001	***
VMDP	0.190129	0.0525567	3.6176	0.00050	***
GDP Growth	-0.474269	0.121358	-3.9080	0.00018	***
RM	0.10355	0.0233745	4.4300	0.00003	***
sq_RISC	2.72325	0.708301	3.8448	0.00023	***
R-square	0.924904		R-square adjusted	0.917999	
F(8, 87)	133.9405		P-value(F)	1.53 and-45	

Note: (**) and (***) reflect significance at the 5% and 1% levels, respectively.

Table 7 – Alternative Hypotheses confirmed from multiple regression tests for Brazil and the USA

Alternative Hypotheses		Brazil		USA	
Dependent Variables		**ALAVC**	**ALAVM**	**ALAVC**	**ALAVM**
H2	The asset risk taking carries significant explanatory power in the financial leverage of banks	X	X	X	X
H3	The deposits carry significant explanatory power in the financial leverage of banks	X	X	Opposite sign	X
H4	The greater the bank size, the higher its level of financial leverage	X	X	X	X
H5	The greater the profitability of the bank, the lower its level of financial leverage	Excluded			
H6	The greater the growth opportunity, the lower its level of financial leverage	X	X	Opposite sign	X
H7	The greater the tangible assets as bank guarantee, the greater its level of financial leverage	Excluded			
H8	The greater the bank's dividend payment, the lower the level of financial leverage	X	X	X	X
H9	The greater the banks executive compensation, the higher the banks level of leverage	X	X	X	Excluded
H10	The better the macroeconomic indicator of GDP growth, the higher the level of banks' financial leverage.	X	X	X	X
H10	The better the market return macroeconomic indicator, the higher the level of financial leverage of banks.	X	X	X	X