THE IMPACTS IN THE CAPITAL STRUCTURE OF BRAZILIAN COMPANIES DURING PERIODS OF CRISES

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ABSTRACT

The capital structure, the way the company decides to finance its investments, is one of the most discussed topics in corporate finance. In recent decades, the development of the theory of capital structure was significant. There are several studies that seek the determinants of capital structure of companies. Most studies use variables such as size, asset tangibility, profitability, risk, etc. Therefore, this paper proposes to investigate how economic indicators affect the capital structure of Brazilian open-capital companies in times of economic crisis. For this, the descriptive analysis was used. The sample comprised 83 companies which presented quarterly data from 1995 to 2007 of the indicators used in this study. It was concluded that there is significant evidence on the correlation between the capital structure and the economic indicators: exchange rates and interest. However, the correlations between inflation and capital structure were less significant.

***Keywords**: Capital Structure. Economic Context. Macroeconomic Indicators. Descriptive Analysis*

1. INTRODUCTION

To finance its operations, a company can opt for its own capital, a third-party capital, short term capital, long term capital, capital from internal sources or external sources. Those variables define the nature of the asset financing of a company.
In order to define the mix between the own capital and the third-party capital, the companies take into account internal and external factors. Factors such as risk, kind of good or service offered, quality of its assets, growth opportunities and company size are internal factors which can influence the decision of the company when choosing its capital structure. Besides these factors, the interest rate practiced in the market, the development of the financial and money markets and the economic stability are external factors and also important in defining the capital structure of a company.

The traditionalist theory, valid until the mid-20th century, defends the existence of a great capital stucture which maximizes the value of the company. However, the modern theory, which started with the work of Franco Modigliani and Merton H. Miller in 1958, defends, in a tax-free economy, the indiference of the capital structure in the company´s value.

Even with the wide literature regarding the capital structure, little can be concluded. There are several questions concerning this theme, such as: Is there a great capital structure which maximizes the company´s value?; Which factors do the companies use to choose their capital structure?

Therefore, this work aims to verify how the economic indicators affect the capital structure of the open capital companies in Brazil in periods of economic crises.

2. LITERATURE REVIEW

Famá et al. (2001) developed an empirical study similar to the one done by M&M - Modigliani and Miller (1958) and aimed to verify if the result of Modigliani and Miller would be confirmed with the present data diferentiating by the use of CAPM (*Capital Asset Pricing Model*) to estimate the cost of the company´s own capital. For that, Famá et al. (2001) used data of companies in the electrical and oil sectors of the U.S.A and Latin America. They concluded that the results did not confirm the model proposed by

Modigliani and Miller in 1958,because with the presence of the corporate income tax, the gearing became profitable, reducing the average cost of capital.

The introduction of the income tax as an important factor in the definition of the capital structure was confirmed by M&M, in an after study to the one used by Famá et al. (2001), therefore, from the study of M&M (1963), studies started to use the fiscal benefit as an important factor for the definition of the capital structure.

Perobelli and Famá (2002), aiming to verify the inducing factors of indebtedness for the Brazilian companies, reached the conclusion that, in Brazil, the degree of short-term indebtedness and the size and asset growth factors present negative relation, suggesting that companies of smaller size have greater propension to the short-term indebtedness, while companies with growth perspective tend to make less use of the mechanisns of short-term financing. They also concluded that the profitability and the short-term indebtedness degree are negatively related, indicating that companies with high rotation tend to be less indebted in the short term than low-rotation companies.

With similar objectives to Perobelli and Famá (2002), Brito et al. (2007) sought to identify the main determinant factors about the way the biggest companies operating in Brazil finance themselves. The authors used, as a database, the financial demonstratives of the 500 biggest companies operating in the country according to the yearly sales revenue criteria. The variables used were:

- Dependent Variables: Current Liabilities/Total Asset, Long-term Liabilities/Total Asset, Current Liabilities + Long-term Liabilities/Total Asset and Current Liabilities + Long-term Liabilities/ Equity

- Independent Variables: Profitability (Net Profit/ Equity), risk (Standard Deviation of Profitability), Size (Ln Sales), Immobilization (Permanent Asset/Total Asset), growth (sales/sales(t-1)) and the last variables used were if the company has or not open capital

With the statistic technique of multiple linear regression, the authors concluded that the variables (risk, size, composition of the assets and growth) are determinant factors in the capital structure of the companies, while profitability and type of capital are not relevant in the decision of the company´s capital structure.

Valle and Silva (2008) sought to evidence differences in the indebtedness of Brazilian and American companies and their main determiners. At first, the authors analysed the company´s indebtedness of both countries comparing the short-term indebtedness level, the long-term indebtedness level and the total indebtedness level. They concluded that the American companies are financed mainly by long-term debts, whereas in Brazil, the prevailing kind of indebtedness is the short-term one. In a second moment, the authors sought to evidence the company´s indebtedness determiners of both countries.   They used as explicative variables the company´s size, length of assets, tangibility of assets, intangibility of assets, profitability, fiscal economy which does not come from debt, dummy of the US, sector dummies and year dummies. The authors concluded that companies with greater proportion of tangible assets tend to have greater total and long-term indebtedness and more profitable companies and with greater fiscal economies which do not come from debts show lower level of total and long-term indebtedness.   .

Famá and Melher (1999) analysed the capital structure of the 50 companies which presented greater net profit and the 50 companies that presented the greatest net loss, both cases in Latin America. They searched, through statistical analysis of correlation, evidence of relation between the results and the capital structure. Among the results obtained by the authors, we can highlight that more-profitable companies tend to be more careful when it comes to indebtedness level.

Medeiros and Daher (2008) afirm that the *Static Tradeoff Theory* and the *Pecking Order Theory* compete among themselves for the explanation of the capital structure of the companies, therewith, they tried to explain, applying econometric methods and the data methodology in panel, which of the two theories explains the capital structure of Brazilian companies. For the data analysis, the authors used a sample of 420 non-finance companies with stocks listed at the Bovespa and SOMA stock markets.

We can even contextualize the Brazilian political-economical scenary after redemocratization. The period between the second half of the 80´s and the first half of the 90´s was marked by an unsucessfull set of

attempts to stabilize the inflation, of redemocratization and stagnation. In this context, the Plano Real, a program of stabilization which ended with the 30 years of indexation of the Brazilian economy, was launched.The Plan was originally divided in three stages: the first one consisted in the fiscal adjustment, that means, balance in the government accounts; the second one aimed to create the URV (Unidade Real de Valor – Real Value Unity) which had as objective the removal of the inertial component of the inflation, that is, "to zero the inflationary memory"; and finally, the third stage of the plan which consisted in the implantation of the currency, the Real, by means of a set of measures, such as the ballasting of the domestic monetary offer in currency reserves.   (GIAMBIAGI et al., 2005)

Due to the way the plan was implanted, it could accomplish its main goal: the inflation control. However, to meet the inflation targets, the government kept high interest rates and, besides this, for the maintenance of the valorization of the real front to the dollar (by means of exchange rate regimes), the government accepted continued defits in the balance of trade, substantially decreasing the exchange reserves forcing the devaluation of the real front to the dollar, what happened in December, 1998 (in the end of December, the dollar was priced at R\$ 1.21 and in the end of February of 1999, it reached R\$ 2.06), right after the reelection of the president at the time, Fernando Henrique Cardoso, with the adoption of the fluctuation exchange.

Another important factor which can be mentioned in the economic stabilization period was the election of the former president, Luiz Inácio Lula da Silva, in the end of 2002, given to the unsafeness caused by the fear that the alterations in the economic policy could unstabilize the economy and, therewith, the how effort of the previous government would have been in vain. Hence, this unsafeness caused by the change of government made the accumulated inflation in the electoral semester go up to 8.20%, almost the double of the same period in the year before, which was of 4.29%. Moreover, the exchange rate had its after-Plano Real historical peak of 3.89% right before the elections of 2002 (it was 2.71 in October, 2001).

3. METHODOLOGY

To reach this aim, it will be used the descriptive analysis method seeking to relate the data of the open-capital companies of Brazil with the economic indicators: inflation, interest and exchange rate.

It was used the data of 83 open-capital companies of Brazil which presented the data during the whole period analysed. The data were obtained in the Economatic System. The economic indicators used for the analysis were inflation, interest and exchange rate. The interest and the exchange rates were taken at the Ipeadata site and the inflation at the site of the IBGE.

The methodology used will be the descriptive data analysis, making use of appropriate economic indicators and capital structure and simple and multiple linear regression equations will be generated among the dependent and independent variables according to the following equation:

$$Y = \beta_0 + \beta_1 X$$
$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$$

As dependent variables, the capital structure indicators will be used and as independent variables, economic indicators will be used. To determine the significancy of the estimated coefficient, the analysis of the p-values of the t-Student tests will be used, that is, if the p-value is below 5%, then the coefficient is significant.

4. ANALYSIS OF RESULTS

In the Exgtt-PL and DivBr-PL indicators, a significative growth is observed, not only in the average, but also in the standard deviation during the periods of stabilization, unstability and Lula risk. This fact suggests that these indexes are more sensitive to the finance indicators according to what is observed in table 1.
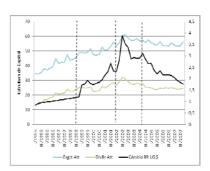
TABLE 1: AVERAGE OF THE CAPITAL STRUCTURE INDEXES SEPARATED BY PERIODS.

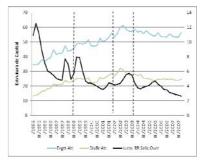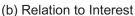| Variables	Stabilization		Exchange Rate Unstability		Lula Risk		Stability	
	Average	Standard Deviation	Average	Standard Deviation	Average	Standard Deviation	Average	Standard Deviation
Exgtt-Att	40,24	4,10	50,42	3,08	58,81	1,61	55,04	1,53
DivBr-Att	18,98	3,49	25,34	1,93	29,20	2,01	24,92	1,13
Exgtt-PL	93,35	16,99	148,08	30,03	224,69	47,05	175,27	10,78
DivBr-PL	44,04	11,04	72,26	13,14	110,20	27,40	80,43	6,09

Source: Economática

Analyzing pictures 1 (a) and 2 (a), a strong correlation between the Exchange rate and capital structure can be observed, what can be explained by the high concentration of debt in foreign currency of the Brazilian companies. This fact happens, mainly, during the periods of the Exchange unstability and the Lula Risk. However, in the period of stability, the Exchange suffers a significant reduction not followed in the same proportion by the capital structure of the companies, generating evidence of the existance of another variable to explain such a fact. It is also possible to observe, in these graphs, a higher sensibility of the Exgtt-PL and DivBr-PL indexes in relation to the exchange variables.
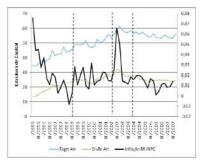
PICTURE 1: GRAPHS OF THE RELATIONS BETWEEN THE EXGTT-ATT AND DIVBR-ATT INDICATORS AND THE MACROECONOMIC VARIABLES

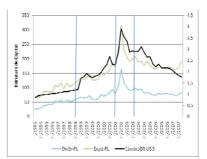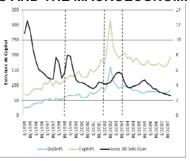(a) Relation to Exchange Rate   (b) Relation to Interest   (c) Relation to Inflation
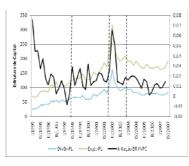
Source: Economática, IPE e IBGE

A significant relation between the indexes of capital structure and the variation of the inflation can be observed, mainly in the Lula-risk period and in the stability period. An assumption for this event can be the correlation between the exchange rate and the inflation, which has already been mentioned, the inflation being indirectly affected by the exchange rate. However, comparing the pictures 1 (a) and 2 (a) to the graphs 1 (c) and 2 (c), we can see that during the period of stabilization, the Exchange rate was kept stable, on the other hand, the capital structure followed the variations of the inflation, which creates an evidence that in spite of the inflation being influenced by the exchange, the capital structure also suffers the influence of inflation variations.

PICTURE 2: GRAPHS OF THE RELATIONS BETWEEN THE DIVBR-PL AND EXGTT-PL INDICATORS AND THE MACROECONOMIC VARIABLES

(a) Relation to Exchange Rate   (b) Relation to Interest   (c) Relation to inflation

Source: Economática, IPE and IBGE – Elaborated by the authors

Just like it happened to the exchange rate and the inflation, the interests followed a tendency of stabilization, being that during the periods of stabilization and exchange rate unstability, the interests suffered high oscillations, and during the periods of the Lula risk and stability, the oscillations were smaller and, as time went by, they suffered a gradual reduction.

In the pictures 1(b) and 2(b), a negative correlation, most of the time, between the interests and the capital structure, can be observed. This correlation, however, was already expected since the lower the interests, the greater the tendency of a company run into debt is.

According to what is exposed in the methodology, only the regressions which showed p-value below 5% were considered significant. A positive beta of 57.69 was found in the regression between Exgtt-PL and Exchange rate demonstrating that in nominal values, the indebtedness of companies suffers strong influenceof the Exchange rate, having a R² of 0.86. As it was said before, this can have happened due to the high concentration of debt in foreign currency of the companies analysed.

In terms of interests, the independent variable interest showed up, as expected, significant in relation to the indebtedness of the companies (Exgtt-Att) because the lower the interests, the greater the tendency of the company run into debt, what can explain the negative beta 2.39 and a R² 0.49.

Besides, four multiple regressions were made making use of each one of the indebtedness indexes as dependent variables and exchange rate, inflation and interests as independent variables. It can be obeserved that the R^2 is above 0.8 in every regression. The variable: exchange rate is significant using any indebtedness index as dependent variable. However, inflation is significant only in the regressions which used total claimability on the Asset and Gross Debt on the Asset as dependent variables. Finally, as for the interest, the coefficients are negative (as expected, since the lower the interests, the greater the indebtedness) and not significant at 5% only when we use Total Claimability on the Equity as dependent variable.

4. CONCLUSIONS

The present work aimed to, with the use of descriptive analysis methodology, seek evidence of the relation between macroeconomic indicators and the indebtedness indexes of the open-capital companies of Brazil during the periods of economic crises.

Therefore, the analysis performed by this work suggests that the capital structure of open-capital companies of Brazil is significantly influenced by the exchange rate, however, in relation to the interests, the influence is less significant and in relation to the inflation, the influence is distinct.

Another relevant evidence which could be observed is that with the economic stabilization shown by the exchange rate, inflation and interest indexes, the companies started to increase their indebtedness levels. Thus, in the period after the inflation control, the companies showed increase in their indebtedness levels

which was followed in almost the whole period by the exchange rate; however, in the stability period, the exchange rate showed a hard fall and was not followed in the same prportions by the capital structure.

Besides, it was observed that the capital structure is positively correlated to the exchange rate, mainly during the periods of the exchange rate unstability and the Lula risk. An explanation for this can be the fact that the Brazilian companies are, in part, financed by foreign capital, however, as previously mentioned, during the period of stability, the reduction of the exchange is significant and the indebtedness of the companies does not follow in the same proportion, being characterized a possible actual increase in the company´s indebtedness.

Concerning the inflation, the relation follows the same tendency of the exchange rate. Nevertheless, even accepting the assumption that the inflation is influenced by the exchange rate and that part of the relation between the capital structure and the inflation can be also explained by the exchange rate, there are evidences that the capital structure is also influenced by the inflation. This hypothesis can be explained mainly during the periods of stabilization and stability, when the exchange rate does not show significant variations and the capital structure follows the inflation variation. For the interests, as there is a negative correlation between the interests and the capital structure indicators, besides being expected that the lower the interests, the greater the indebtedness of the companies, part of the increase of the indebtedness of the companies during the period analysed can be explained not only by the reduction of the interests, but also by their stabilization.

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