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***Ownership structure  
and firm value in Brazil***

***Estructura de propiedad  
y valor de las empresas  
en Brasil***

**ABSTRACT**

This paper examines the relationship between ownership structure and firm value, modeling the ownership structure as an endogenous and multi-dimensional variable. For this purpose, the model developed by Demsetz and Villalonga (2001) is applied to a sample of Brazilian firms listed in Bovespa between 2006 and 2008. The results show that firm value can affect the concentration of ownership structure, but not vice-versa. But an extended model, which added the deviation between the concentration of control and cash flow rights, indicates that ownership structure can affect firm value when there is potential for expropriation of minority shareholders by controlling shareholders.

*Key words:* Ownership structure, firm value, corporate governance.

**RESUMEN**

Este trabajo examina la relación entre la estructura de la propiedad y el valor de la empresa. Para tal efecto se modela la estructura de propiedad como una variable endógena y multidimensional y se aplica el modelo desarrollado por Demsetz y Villalonga (2001) a una muestra de firmas brasileñas cotizadas en la Bovespa entre 2006 y 2008. Los resultados muestran que el valor de la empresa puede afectar la concentración de la estructura de propiedad, pero no a la inversa. Sin embargo, un modelo extendido, que añade la desviación entre la concentración del control

y los derechos de flujo de efectivo, indica que la estructura de propiedad puede afectar el valor de la empresa, cuando existe la posibilidad de expropiación a los accionistas minoritarios por parte de los accionistas de control.

*Palabras clave:* estructura de propiedad, valor de las empresas, gobierno corporativo.

## 1. INTRODUCTION

Based on a steady economy and solid regulatory framework, the Brazilian capital market has shown an enormous development in recent years, mainly reflected in the IPO of several companies. This new phase of the Brazilian capital market may modify the traditional corporate ownership environment in Brazil, from concentrated to diffuse control, often without a controlling shareholder, and thus increasing the influence of managers.

According to the theoretical framework initiated by Berle and Means (1932), the diffuseness of ownership leads to a reduction in shareholder control over managers, and as their interests are not always aligned, resources may not be allocated in order to maximize the value of the company. Later, the theory that ownership structure can affect the firm value was questioned by Demsetz (1983), who argued that the decision to turn to a diffuse ownership structure, if made by the shareholders, should maximize shareholder's value.

Brazil has a long history of weak institutional framework and high concentration of control rights. Thus, many authors state that the most troubled agency conflict in Brazil is between the controlling and minority shareholders rather than between shareholders and managers, which is more usually found in countries of Anglo-Saxon origin. However, the problem of agency indicates that both conflicts may reduce the firm value. This finding cannot be proven yet because of the limited empirical work done with Brazilian data, which did not test these two possible relationships.

The objective of this study is to investigate whether there is evidence of a systematic relation between ownership structure and firm value in the context of a developing capital market, such as found in Brazil. First, it explores the relationship between outside shareholders and inside shareholders (managers), applying the model suggested by Demsetz and Villalonga (2001) in a sample of 192 companies listed on Bovespa between 2006 and 2008. Next, in order to analyze the agency problem between controlling and minority shareholders, the original model developed by Demsetz and Villalonga (2001) is extended with the introduction of the third dimension of ownership structure, which is the difference between the control rights and cash flow rights, and a variable of protection for minority shareholders, the tag along right (outside Brazil, the Tag Along right is also known as Mandatory Bid Rule, and asserts that the minority shareholder have the right to receive at least a given percentage of the price paid for controlling shareholders in case of selling a control stake).

This study seeks to add to the limited evidence regarding the agency problem in Brazil, where no study has applied the Demsetz and Villalonga model. This paper also aims to contribute

to the international literature with the introduction of the third dimension of ownership structure mentioned above. To our knowledge, no prior study has treated the corporate control problem this way.

## **2. LITERATURE REVIEW**

The agency theory was formalized by Jensen and Meckling (1976), asserting that the ownership structure can affect firm value. That would happen in a positive way through the alignment of interests effect, when the increase in the manager's share in the ownership structure reduces its perverse incentives to maximize their non-pecuniary benefits, and in a negative way through the entrenchment effect, when the manager controls a share of the company ownership significant enough to be able to expropriate other shareholders. For instance, the manager can establish a salary too high for himself, pay or receive transfer prices for the company beyond the market value, use the assets or cash position for personal gain (such as a collateral for personal transactions) or allocate resources to investment projects that reduce his own risk, but do not maximize the firm value.

The theory that the ownership structure is determined exogenously to the specific characteristics of the firm was questioned by Demsetz (1983). Arguing that this is an endogenous outcome of a maximizing value process, which depends on more issues than just the alignment of interest and entrenchment effects, the author separates the ownership structure from firm value. A more concentrated or diffuse structure, if established by the shareholders themselves, should be the structure that maximizes shareholders' value, as they would not agree to undergo to a new ownership structure that reduces the value of their shares.

According to Demsetz's (1983) theory, the ownership structure reflects the influence from different groups of shareholders. The ownership structure that emerges is an endogenous outcome of competitive selection in which many costs and benefits are balanced to arrive at an equilibrium organization of the firm. The agency and monitoring costs should be overcome by the benefits generated by a more diffuse structure, such as a reduction in the cost of capital and risk of the original shareholder, as it reduces their concentration of wealth.

Furthermore, Demsetz (1983) and Fama and Jensen (1983) also argue that managers will always be pressured to perform well, either through the labor market, capital market or product market, regardless of the fraction of shares they hold. Consequently, no systematic relationship between ownership structure and firm value is to be expected.

Several empirical studies on this subject have been conducted and the findings diverge. Demsetz and Villalonga (2001) attribute this discrepancy to the difficulty of measuring the concentration of ownership, to the different measures used to assess the effect of the same variables, and to the issue of endogeneity, as can be seen in Welch (2003).

The pioneering study was conducted by Demsetz and Lehn (1985). They treat the ownership structure endogenously and do not find a relationship between this variable and the profit rate. Ignoring the issue of endogeneity, empirical studies such as that led by Morck, Shleifer and Vishny (1988) and McConnell and Servaes (1990) find, respectively, a

non-monotonic linear relationship and an inverted U relationship between firm performance and ownership structure. According to these authors, these results are derived from the interaction between the interest alignment and entrenchment effects, and therefore the ownership structure can affect firm value.

Other studies make use of specifications derived from those of Demsetz and Lehn (1985), Morck, Shleifer and Vishny (1988) and McConnell and Servaes (1990), especially Hermalin and Weisbach (1991), Himmelberg, Hubbard and Palia (1999) and Holderness, Kroszner and Sheehan (1999). A third class of econometric specification is the simultaneous equations models, introduced by Loderer and Martin (1997) and Cho (1998), who consider the ownership structure endogenously.

Demsetz and Villalonga (2001) use a simultaneous equations framework and suggest that the ownership structure should be treated as an endogenous and multidimensional variable. Such a structure would be more appropriate to represent the conflict of interest of two different groups of shareholders: investors (outside shareholders) and managers (inside shareholders). Their results with OLS, which does not consider the endogeneity of ownership structure, suggest that the firm's performance is always dependent on at least one of the measures of ownership. However, regressions using the method of Two Stages Least Squares (2SLS), which considers the endogeneity of ownership structure, indicate that none of the ownership measures is statistically significant to explain variations in performance. The authors argue that this result is consistent with the view that ownership structure, whether concentrated or diffused, is established to maximize the firm value, considering the costs and benefits of diffuse structure.

Applying this methodology, Welch (2003) achieves similar results in a sample of Australian companies. With a sample of Turkish companies, Gonenc (2004) obtains evidence that the firm value affects ownership structure but not vice versa. But Kapopoulos and Lazareto (2006) collect evidence that both the fraction of managers' shares and the fraction of major shareholders' shares (at least 5% of shares) positively influence the firm value. By introducing a way to analyze the interaction between two different dimensions of the ownership structure, the model developed by Demsetz and Villalonga (2001) has proved to be adequate to investigate the agency conflicts, and will therefore be applied in this study.

### **3. CORPORATE GOVERNANCE AND THE BRAZILIAN CONTEXT**

Corporate governance mechanisms are economic and legal institutions that enable the capital providers to guarantee the return of their investments, reducing the scope of expropriation that managers have on investors, or major shareholders have over the minor ones. This scope is reduced by complex contracts, such as shareholder agreements and incentives to enhance performance, by monitoring, by exercising the right to vote, and through the concentration of ownership structure.

However, these mechanisms may be incomplete, expensive or difficult to execute, creating space for the controlling shareholders to expropriate the others, thereby obtaining

private benefits of control. Besides the possibility of expropriation mentioned above as the entrenchment effect, Dick and Zingales (2002) and Burkart and Lee (2007) also quote as private benefits of control: (i) psychological value and prestige that some investors attribute to being in control; (ii) consumption of goods at work; (iii) establishment of transfer prices or sale of assets at prices that benefits another company in which the controller also has interest; (iv) benefits generated by the acquired information, confidential or not, whether about the company or potential business opportunities related to the company.

Besides that, control also imposes costs, such as the concentration of capital, loss of reputation if the company does not perform well, and legal liabilities. But these are usually outweighed by their benefits, as evidenced by the premium that shares with voting rights have on the non-voting shares. It usually happens when the voting right is significantly higher than the cash flow right - a very common situation in Brazil. In a study based on 412 control transactions in 39 countries in 1999 and 2000, Dick and Zingales (2002) conclude that the average premium for control is 14%, ranging from -4% in Japan to 65% in Brazil.

Besides the significant deviation between the control and cash flow rights, the Brazilian case is also interesting because of the institutional change in corporate governance practices. The Corporate Law was created in 1976 (Law 6.404/1976) and has undergone major changes in 1997 (Law 9.457/1997) and 2001 (Law 10.303/2001). The original law allowed the issuance of shares with voting rights (up to 2/3 of the shares) and non-voting rights. Thus an investor could hold the control with only 16.7% of total capital. The law required tag along rights only to shareholders with voting shares. This law was amended in 1997, during the privatization process, and removed the requirement of the right to tag along.

A new change was made in 2001, especially (i) the return of the right to tag along with at least 80% of the price paid to controlling shareholders, but applied only to the shareholders with voting rights; (ii) reduced the maximum proportion of shares without voting rights to 2/3 to 1/2; (iii) set out some compensations to the shareholders without voting rights (most companies have opted to keep the additional dividend of 10%). Although these changes were in the direction of a stronger corporate governance framework, it can be seen that the right to tag along has never been imposed on shareholders without voting rights.

Also in 2001 the Sao Paulo Stock Exchange (Bovespa) launched three special segments of corporate governance, designed to shares of companies committed to corporate governance standards beyond those required by the Corporate Law and by the Securities Exchange Commission (CVM). Level 1 requires additional practices regarding the disclosure of the information. Level 2 requires governance practices included in Level 1 and others, for instance the right to tag along 100% to ordinary shares (with voting rights) and 80% to preferred shares (non-voting). And the New Market Level imposes the requirements of Level 2, and the additional requirement that the company's capital is formed only by one class of shares, thus imposing the principle one share, one vote.

The principle one share, one vote is defended by the argument that the right of residual control should belong to the shareholder because they own the rights to residual cash flow and therefore are more interested in maximizing the firm value. And the voting power must match the economic incentives, i.e., the shareholder must have voting power proportional to their

risked capital in the company. On the other hand, the theory of incomplete contracts justifies the non-symmetrical allocation of control and cash flow rights with the argument that even sophisticated contracts are technologically unable to predict and specify all future actions and events of the company, and therefore the firm must have an individual with residual power of decision for those moments when there is no consensus on the appropriate decision. Although the principle one share, one vote is frequent in companies listed in developed countries (Burkart & Lee, 2007), its violation is also very common outside the stock markets. The most common form of these deviations is the issuance of two classes of shares, pyramid structures and cross-ownership, or through complex contracts as the Shareholders Agreements. These structures are difficult to measure and therefore empirical studies have difficulty in including them. So far, the debate surrounding whether the null deviation of rights is beneficial is still inconclusive.

#### 4. EMPIRICAL BRAZILIAN EVIDENCE

Brazilian empirical studies have focused much effort on the issue of control and ownership concentration, but those studies have not investigated in an extensive and definitive manner how the concentration of ownership structure, the deviation of rights and the protection of minority shareholders can influence the firm value.

Silva, Lapagesse, Aloy and Leal (2000) found that Brazilian companies typically have a high degree of concentration of voting capital, usually being controlled by up to three major shareholders. They also found that the controlling shareholders invest, on average, more than the minimum necessary to maintain control of the companies, which suggests that there are private benefits of control through the expropriation of minority shareholders. Da Silva and Leal (2003) found that higher concentration of voting rights is associated with companies of less value, while the higher concentration of cash flow rights is associated with companies of more value. These relationships, however, have very low statistical significance. Rogers, Dami, Ribeiro and Sousa (2007) applied a model derived from Demsetz and Lehn (1985) and found no evidence that the ownership structure affects the value and performance.

Aldrighi and Neto (2005) showed that the issuance of shares without voting rights is a financing alternative widely used by Brazilian companies: the average cash flow rights concentration of the main shareholder is 53%, while the voting rights concentration is 77%, which implies a deviation of rights of 24%. Finally, Saito and Silveira (2008) studied the effect of the right to tag along in the prices spread between voting and non-voting shares in Brazil between 1995 and 2006. Their empirical results suggested that the institutional changes above mentioned have significant influence on the price spread. In particular, the protection imposed by the right to tag along decreases the price spread, suggesting that ownership structure can influence the firm value in Brazil.

## 5. HYPOTHESIS, ECONOMETRIC MODEL AND ENDOGENEITY TEST

The aim of this study is to investigate whether there is evidence of a systematic relationship between the value and ownership structure of firms in Brazil. Considering that the Brazilian market has a high concentration of ownership structure and a significant deviation of rights, it is possible that the agency problem occurs between outside shareholders and managers and/or between controlling and minority shareholders. The model developed by Demsetz and Villalonga (2001) is suitable to model this situation because, in addition to modeling the structure of ownership as an endogenous process of maximizing value, it also allows the inclusion of more dimensions of ownership structure (such as the deviation of rights) and institutional variables (such as the protection of minority shareholders). This study also makes a formal endogeneity test, not performed by the authors mentioned above.

Tobin's Q (Q) is used as a measure of value and performance of the firm, which has frequently been used in this type of study. Tobin's Q is a forward-looking measure, based on the evaluation of investors about the growth and profitability of the firm, and thus influenced by the market mood and accounting practices. It represents the excess value to the replacement value. Two variables will be used to measure the ownership structure: LMH, the logistic transformation of the fraction of shares held by company managers, and LTOP3, which is the logistic transformation of the fraction of shares owned by the three largest shareholders. In both measures, we consider the total outstanding shares (shares with and without voting rights). The logistic transformation is used to smooth the asymmetric distribution of these variables.

The effect of LMH and LTOP3 on Q is uncertain. The agency theory says that the higher the concentration of shares in the outside shareholders, the more effective is the monitoring of the management. The increase of LMH is more uncertain, because it is not known if the interest alignment effect dominates the entrenchment effect or vice versa. As argued by Demsetz (1983) and Demsetz and Lehn (1985), in equilibrium, the ownership structure is determined endogenously as the result of decisions that reflect the influence of different groups of stakeholders. A more concentrated or diffused structure, if established by the shareholders themselves, should be the structure that maximizes shareholder's value. Thus, when treated endogenously, it is expected that the ownership structure does not influence the firm value. So there is no definition of the sign and significance of these variables *a priori*. One of the objectives of this study is to clarify this relationship. We will therefore test the following hypothesis:

H<sub>1</sub>: The ownership structure is not systematically related to the firm value.

The causality direction in the relationship between the ownership structure and firm value is also not clear. Factors such as inside information, performance-based compensation and management buyouts indicate that the firm value may affect the ownership structure as much as the latter may affect the firm value. So we test the following hypothesis:

H<sub>2</sub>: The firm value may affect the ownership structure.

Demsetz and Villalonga (2001) question which variable should be more strongly endogenous: LMH or LTOP3. They assume that LMH is more endogenous, because of stock



options plans and the greater access to confidential information. They empirically confirm that none of the two measures of ownership structure can affect the firm value, but the effect of firm value is much higher on the fraction of shares owned by the managers. The concentration of ownership structure in Brazil makes this assumption extremely important, and therefore we test the following hypothesis:

H<sub>3</sub>: The concentration of ownership by major shareholders is more strongly endogenous than the concentration of ownership by managers.

To investigate these hypotheses the following models of simultaneous equations developed by Demsetz and Villalonga (2001) and estimated by 2SLS will be used:

$$\begin{aligned} Q &= \alpha_1 + \beta_1 LMH + \beta_2 LTOP3 + \beta_3 COM + \beta_4 CAPEX + \beta_5 DEBT + \beta_6 U + \beta_7 F + \beta_8 GOV + e_1 \\ LMH &= \alpha_2 + \beta_9 Q + \beta_{10} MKTR + \beta_{11} SE + \beta_{12} ASSET + \beta_{13} DEBT + \beta_{14} U + \beta_{15} F + \beta_{16} GOV + e_2 \end{aligned} \quad (1)$$

$$\begin{aligned} Q &= \alpha_1 + \beta_1 LTOP3 + \beta_2 LMH + \beta_3 COM + \beta_4 CAPEX + \beta_5 DEBT + \beta_6 U + \beta_7 F + \beta_8 GOV + e_1 \\ LTOP3 &= \alpha_2 + \beta_9 Q + \beta_{10} MKTR + \beta_{11} SE + \beta_{12} ASSET + \beta_{13} DEBT + \beta_{14} U + \beta_{15} F + \beta_{16} GOV + e_2 \end{aligned} \quad (2)$$

In both systems, the first equation (firm value equation) describes the firm value (measured by Tobin's Q), in function of the two dimensions of ownership structure, LMH and LTOP3, but each system varies which of the two dimensions is treated as the endogenous variable. The control variables in the equation are COM, CAPEX, DEBT, U, F and GOV. The second equation (equation of the ownership structure) of each system describes the portion of the ownership structure treated as endogenous (TOP3 or LMH) according to the firm value and control variables MKTR, SE, ASSET, DEBT, U, F, and GOV. All these independent variables were also included in the original Demsetz and Villalonga (2001) model. The following paragraphs explain the reason for including these control variables and their expected behavior. A detailed definition and source of all variables can be found in Table 1, their descriptive statistics in Table 2 and their correlations matrix in Table 3.

The COM and CAPEX variables are proxies for the investment in intangible assets, and therefore a measure of how the Q can be distorted by the fact that its denominator can potentially omit this variable. Demsetz and Villalonga (2001) use the cost of advertising and research and development. However, given that the Brazilian accounting standard does not require disclosure of such information, the commercial expenses (COM) were adopted as a proxy for this information. The denominator of Q can also be distorted due to the use of depreciation rates based on the life of the assets and not to its physical wearing. The variable CAPEX is also used to control this effect in the first equation. It is expected that both variables have positive and significant relationships with Q.

The variable DEBT controls the effect of leverage on firm value, but this effect is uncertain: the Pecking Order Theory foresees a negative relationship, but with the effect of taxes, the addition of debt can reduce the cost of capital of the company and thereby increase its value, as stated by the Modigliani-Miller Propositions. Financial leverage also provides a

measure of monitoring exercised by creditors and risk rating agencies, which may reduce the need for concentration of outside shareholders. If the creditors add monitoring capability to the firm, its presence also discourages attempts to strengthen the management through increased concentration of ownership. Therefore, it is expected that DEBT has a negative and significant relationship with the two dimensions of ownership structure.

**Table 1**  
*Variables definition.*

Variable	Definition	Source
ASSET	Natural logarithm of total assets average during the period 2006 to 2008	Economatica
CAPEX	Average of annual capex divided by annual net revenue, in the period 2006 to 2008	Economatica
COM	Average annual commercial expense divided by annual net revenue, in the period 2006 to 2008	Economatica
DEBT	Average total gross debt (short-term + long-term) divided by total assets, in the period 2006 to 2008	Economatica
DEV	= $LTOP3\_ON - LTOP3$	
F	Dummy variable with value 1 if the firm belongs to the sectors of banks and similar, or 0 otherwise. NAICS classification.	Economatica
GOV	Dummy variable with value 1 if the largest shareholder of the firm is any kind of government instrument, 0 otherwise	Economatica
LMH	= $\ln[MH/(1-MH)]$	
LTOP3	= $\ln[TOP3/(1-TOP3)]$	
LTOP3_ON	= $\ln[TOP3\_ON/(1-TOP3\_ON)]$	
MH	Fraction of the total shares held by the board of directors, executives, and tax, advisory and technical committees, in December of each year. Average for the period of 2006 to 2008	CVM
MKTR	Market risk measured by Beta obtained from a regression of monthly stock returns on monthly market returns, from January 2003 to December 2008 or, for companies listed since 2004, from the IPO date to December 2008.	Bloomberg
Q	Tobin's Q. The numerator of Q is the market value of shares at the end of each year plus the book value of debt of short and long term at the end of each year. The denominator is the book value of total assets at the end of each year. Average for the annual period from 2006 to 2008	Economatica
SE	Standard deviation of Beta regression used to obtain MKTR	Bloomberg
TAG_ALONG	Dummy variable with value 1 if the firm is committed with the right to tag along, or 0 otherwise	BOVESPA
TOP3	Fraction of shares held by the three largest shareholders in December of each year. Average for the period 2006 to 2008	Economatica
TOP3_ON	Fraction of voting shares held by the three largest shareholders in December of each year. Average for the period 2006 to 2008	Economatica
U	Dummy variable with value 1 if the firm belongs to the following regulated sectors: electricity, water and sewage, telecommunications and transport, or 0 otherwise	Economatica

Regarding the second equation, it is expected that the concentration of ownership can be influenced by measures of market and specific risk, MKTR and SE respectively. SE measures the investor's risk in allocating a large part of his wealth to just one company. Additionally, Demsetz and Villalonga (2001) argue that these variables also measure the potential for profit caused by insider information. A stock which price varies little offers few opportunities for managers to take advantage of inside information. Higher values of MKTR and SE indicate the best profit opportunities. These variables are also related to the profitability of an improved monitoring by outside shareholders: firms operating in unstable environments need more attention from outside investors, to ensure that managers are making the right decisions in rapidly changing conditions. This extra attention requires a greater concentration of ownership by outside shareholders to avoid small investors' free ride. It seems likely that the risk affects the ownership structure, but the direction of causality is unclear.

**Table 2**  
*Descriptive statistics.*

	Average	Standard deviation	1st Quartile	Median	3rd Quartile	Observations
ASSET	14,521	1,942	13,114	14,476	15,738	192
CAPEX	0,137	0,280	0,022	0,073	0,175	192
COM	0,081	0,082	0,009	0,060	0,124	192
DEBT	0,314	0,240	0,164	0,278	0,389	192
DEV	0,234	0,268	0,000	0,142	0,442	192
MH	0,088	0,188	0,000	0,002	0,056	192
MKTR	0,769	0,396	0,558	0,736	0,951	192
PRATE	0,129	0,354	0,053	0,132	0,231	192
Q	1,033	0,765	0,513	0,923	1,331	192
SE	0,325	0,331	0,172	0,240	0,380	192
TOP3	0,611	0,208	0,444	0,598	0,785	192
TOP3_ON	0,758	0,206	0,617	0,794	0,940	192

**Table 3**  
*Correlations matrix.*

	ASSET	CAPEX	COM	DEBT	DEV	MH	MKTR	Q	SE	TOP3	TOP3 ON
ASSET	1	0,11	-0,23	0,29	0,14	-0,31	0,29	-0,18	-0,22	-0,02	0,04
CAPEX		1	0,02	-0,04	-0,04	-0,02	0,03	0,11	-0,04	-0,05	-0,02
COM			1	-0,29	-0,02	0,26	-0,14	0,28	-0,00	-0,12	-0,20
DEBT				1	-0,02	-0,12	0,06	-0,16	-0,10	0,03	-0,02
DEV					1	-0,01	-0,03	-0,18	-0,15	-0,52	0,21
MH						1	-0,25	-0,04	0,08	-0,17	-0,21
MKTR							1	-0,04	0,31	-0,13	-0,15
Q								1	-0,16	-0,06	-0,20
SE									1	0,15	0,05
TOP3										1	0,66
TOP3_ON											1

ASSET is used as a measure of company size. The larger the firm, the greater the capital required in order to have a certain fraction of the firm. Given the restriction of capital, it is expected that shareholders are able to obtain larger pieces of smaller firms. So, it is expected that this variable will be negatively related to the concentration of ownership structure.

The dummy variables U and F control for the possible spurious correlation caused by the effects of specific industries (utilities and banks, respectively). They represent sectors of the economy regulated by the government, which limits the managers' freedom and can be interpreted as a subsidized monitoring (Demsetz & Lehn, 1985). This changes the manager's advantage to concentrate the ownership of the firm, compared to firms in unregulated sectors, and therefore it is expected that U and F are significant and with negative sign in the equation of ownership structure. The variable GOV is used to control the influence the government imposes on state enterprises, because they can, besides other differences, pursue social goals.

Focusing on the Brazilian environment, it has been stated that the ownership structure of Brazilian companies is characterized by the large difference between the control and cash flow rights, and that this fact may reduce the firm values. Is it possible to believe that the deviation of rights also affects the ownership structure. Shareholders with greater levels of control can allow managers to hold a greater share in the ownership (either through acquisition on the stock market, or more aggressive stock options) because the probability of a management buyout is smaller. It was also argued that the introduction of the right to tag along can influence the firm value, by protecting the rights of minority shareholders in takeover bids for control. Saito and Silveira (2008) found evidence that the right to tag along can reduce the premium between voting and non-voting shares, thus affecting the firm value. We will therefore test the following hypotheses:

H<sub>4</sub>: The deviation between control and cash flow rights is negatively related to firm value, and positively related to the concentration of ownership structure.

H<sub>5</sub>: The right to tag along is positively related to firm value.

In order to test these hypothesis, two control variables will be added to model: DEV, defined as the difference between the logistic transformation of the concentration of the three largest shareholders considering only the outstanding voting shares, and the logistic transformation of the concentration of the three largest shareholders considering total outstanding shares; and TAG\_ALONG, a dummy with value 1 if the company grants the right to tag along. These variables will be incorporated into the two systems of equations specified above, generating the systems of equations defined below:

$$Q = \alpha_1 + \beta_1 LMH + \beta_2 LTOP3 + \beta_3 COM + \beta_4 CAPEX + \beta_5 DEBT + \beta_6 U + \beta_7 F + \beta_8 GOV + \beta_9 DEV + \beta_{10} TAG\_ALONG + e_1 \quad (3)$$

$$LMH = \alpha_2 + \beta_{11} Q + \beta_{12} MKTR + \beta_{13} SE + \beta_{14} ASSET + \beta_{15} DEBT + \beta_{16} U + \beta_{17} F + \beta_{18} GOV + \beta_{19} DEV + e_2$$

$$Q = \alpha_1 + \beta_1 LTOP3 + \beta_2 LMH + \beta_3 COM + \beta_4 CAPEX + \beta_5 DEBT + \beta_6 U + \beta_7 F + \beta_8 GOV + \beta_9 DEV + \beta_{10} TAG\_ALONG + e_1 \quad (4)$$

$$LTOP3 = \alpha_2 + \beta_{11} Q + \beta_{12} MKTR + \beta_{13} SE + \beta_{14} ASSET + \beta_{15} DEBT + \beta_{16} U + \beta_{17} F + \beta_{18} GOV + \beta_{19} DEV + e_2$$

Finally, we will test the following hypothesis:

H<sub>6</sub>: The ownership structure is endogenously determined.

From the econometric perspective, the endogeneity of ownership structure means that in a regression of the dependent variable firm value in terms of explanatory variables such as ownership structure, they will be correlated to the residuals of an OLS regression. The correlation of an explanatory variable with the residual, in turn, indicates that there may be reverse causality. That is, the firm value may also influence the ownership structure. Therefore, using OLS to estimate a model with endogenous variables leads to biased and inconsistent coefficients measures, and the error is also measured in a biased way. Thus it is not possible to make inferences on these coefficients and to interpret the regression in a causal manner. This provides motivation for estimating systems of equations (1) to (4) by 2SLS. It is also important to notice that even if the variable suspected to be endogenous is exogenous, the 2SLS produces consistent, but less efficient estimators (higher standard errors).

To test the hypothesis of endogeneity of LMH and LTOP3, the procedure of Durbin-Wu-Hausman (DWH) will be conducted for each system estimated in order to test whether a correlation exists between the supposedly endogenous variable and the error of the structural equation specified in the system. As other explanatory variables are, in theory, uncorrelated with the error of the reduced equation (obtained in the first stage of the test), the supposedly endogenous variable is not correlated with the error of the reduced equation if, and only if, the error of the reduced equation is uncorrelated with the error of the structural equation. If we reject the hypothesis that the error of the reduced equation does not affect the structural equation, it can be inferred that the variable in the matter is endogenous and the model must be estimated by 2SLS.

Alternatively, Hausman (1978) suggests comparing the estimates produced by OLS and 2SLS, as both are consistent if all variables are exogenous. If the differences are significant, then there is endogeneity. In fact, the visual comparison between the results of OLS and 2SLS was the methodology used by Demsetz and Lehn (1985), Demsetz and Villalonga (2001), Welch (2003) and Kapopoulos and Lazareto (2006). This study will follow the formal test DWH explained above for each set of systems.

The sample used in this study comprises 192 companies listed on Bovespa. Data was collected for these companies from 2006 to 2008 (including the latter), so the sample is composed of all firms that had all the necessary information within three years of sampling. In order to replicate the Demsetz and Villalonga (2001) model closely, the averages used are based on data from December of each year.

Four different sources of data were used. MH was collected from the Consolidated Form of Negotiation of Management and Related Parties, according to Article 11 of the Brazilian Securities and Exchange Commission (CVM) Instruction n. 358/2002 (Formulário Consolidado de Negociação de Administradores e Pessoas Ligadas, from the original in Portuguese). MKTR and SE were collected from Bloomberg, and TAG\_ALONG from Bovespa. All other variables were collected from Economática, a well known database that consists of historical data from publicly traded companies in Latin America, including, among others, financial statements, names and holdings of shareholders, and stock prices.

This sample can be considered representative of the Brazilian stock market. The 192 companies in the sample represent about half of the companies listed on the Bovespa between 2006 and 2008 and 82% of its market capitalization. The sub-sample of companies that make up the theoretical portfolio index (Ibovespa) contains more than 76% of the companies in this portfolio, and 80% of their influence in the index.

In line with other Brazilian studies, we found evidence of high concentration of ownership. On average, the largest shareholder holds 42% of the total shares and 57% of the voting shares, which characterizes a situation of control. More than half of the companies in the sample are controlled by only one shareholder. The largest five shareholders concentrate 66% of total shares and 80% of the voting shares. On average, the large shareholder holds a larger fraction of voting shares than their total stake in the company. Comparing this sample with the results obtained by Silva *et al.* (2000), Da Silva and Leal (2003) and Aldrighi and Neto (2005), it can be affirmed that the concentration of ownership structure has declined over the past decade, but remains at a high level. The average deviation of rights has also decreased: 14.7% for the three largest shareholders.

## 6. RESULTS

Table 4 shows the 2SLS results for all systems of equations. In general, the models tested achieved a reasonable level of adjustment and in line with those obtained in similar studies. Systems (1) and (3) consider the managers ownership concentration as an endogenous variable, and systems (2) and (4) consider the concentration of ownership by the largest shareholders as being endogenous.

Starting with the control variables, it can be observed that the variable COM is positive and significant in all models tested, as expected. CAPEX has always been positive but significant only in systems (1) and (2). DEBT was significant only in the system (3), negatively affecting the concentration of managers' shareholdings and showing that the presence of creditors discourages the strengthening of managers.

Regarding the risk variables, the measure of specific risk SE was always positive but never statistically significant. Demsetz and Villalonga (2001) and Welch (2003) obtained similar results. Market risk measure, MKTR, always appears significant and with negative sign (except in the system (3)), as Welch (2003) but against Demsetz and Villalonga (2001). This result indicates that MKTR significantly influences the two dimensions of concentration of

**Table 4**  
Regression results.

Dependent variable	System of equations (1)		System of equations (2)		System of equations (3)		System of equations (4)	
	Q	LMH	Q	LTOP3	Q	LMH	Q	LTOP3
LMH	0,0396 (1,3119)		-0,0027 (-0,2002)		0,0432 (1,5022)		0,0010 (0,0713)	
LTOP3	-0,0604 (-0,3631)		0,1865 (0,6459)		-0,2568 (-1,3471)		0,4312 (0,5817)	
Q		29,001 * (1,9273)		-0,0469 (-0,4306)		3,4758 *** (2,7185)		-0,2850 *** (-3,1852)
COM	24,839 *** (3,5411)		2,8153 *** (4,1661)		2,2462 *** (3,3361)		2,7861 *** (3,9224)	
CAPEX	0,3307 * (1,7020)		0,3557 * (1,8722)		0,2161 (1,1477)		0,2395 (1,2615)	
DEBT	0,3385 (1,2084)	0,2229 (0,1132)	0,3545 (1,3022)	0,0813 (0,5752)	0,3637 (1,3544)	-4,8254 *** (-4,9287)	0,3404 (1,2514)	0,1761 (1,3573)
MKTR		-1,7959 * (-1,7107)		-0,1337 * (-1,7744)		-1,6150 (-1,5387)		-0,1413 ** (-2,0540)
SE		0,0349 (0,0266)		0,1264 (1,3419)		0,4549 (0,3463)		0,0056 (0,0641)
ASSET		-0,5645 ** (-2,1617)		-0,0344 * (-1,8316)		-0,6886 *** (-2,7143)		-0,0229 (-1,3741)
U	0,1935 (0,8704)	-5,5442 *** (-5,9309)	-0,1560 (-0,9404)	0,335 *** (5,0005)	0,2311 (1,0883)	-4,8254 *** (-4,9287)	-0,1588 (-0,9480)	0,2115 *** (3,3001)
F	-0,5670 ** (-2,0640)	0,7768 (0,3647)	-0,6943 ** (-2,5556)	0,2100 (1,3705)	-0,6293 ** (-2,3871)	2,1495 (0,9889)	-0,7399 *** (-2,7971)	-0,1278 (-0,8833)
GOV	-0,1713 (-0,8473)	-0,4587 (-0,3258)	-0,2414 (-1,2646)	0,0026 (0,0254)	-0,1834 (-0,9474)	-0,3082 (-0,2216)	-0,2704 (-1,4426)	-0,0751 (-0,8193)

**Table 4** (continued)  
Regression results.

Dependent variable	System of equations (1)		System of equations (2)		System of equations (3)		System of equations (4)	
	Q	LMH	Q	LTOP3	Q	LMH	Q	LTOP3
DEV					-0,8269 *** (-3,6704)	4,7027 *** (2,9049)	-0,2897 (-0,5491)	-0,8212 *** (-7,6233)
TAG_ALONG					0,2318 ** (2,0498)		0,4115 ** (2,0545)	
Constant	0,6652 (0,6894)	0,8722 (0,1936)	1,7142 (0,7961)	-4,6783 *** (-14,409)	-0,1976 (-0,1906)	0,4729 (0,1138)	2,9370 (0,7904)	-4,3237 (-15,502)
Adjusted R2	0,0941	0,2062	0,1441	0,1559	0,1708	0,1826	0,1622	0,2780
SE of Regression	0,7292	4,9037	0,7088	0,3519	0,6976	4,9760	0,7012	0,3254
SSR	97,30	4,400	91,93	22,66	88,08	4,506	89,00	19,27
N	192	192	192	192	192	192	192	192
Endogeneity Test: Ho: $\delta = 0$ Reduced Equation:	$Y = \beta_0 + \beta_1 COM + \beta_2 CAPEX + \beta_3 DEBT + \beta_4 U + \beta_5 F + \beta_6 GOV + \beta_7 MKTR + \beta_8 SE + \beta_9 ASSET + v$							
Structural Equation:	$Q = \beta_0 + \beta_1 LMH + \beta_2 LTOP3 + \beta_3 COM + \beta_4 CAPEX + \beta_5 DEBT + \beta_6 U + \beta_7 F + \beta_8 GOV + \delta v + u$							
$\delta$	Y = LMH		Y = LTOP3		Y = LMH		Y = LTOP3	
t-statistic	-0,0791	-0,2998	-0,0691	-0,5514	-0,0691	-0,5514	-0,0691	-0,5514
P-value	-1,8364	-0,3688	-1,8135	-0,4394	-1,8135	-0,4394	0,0714	0,6609

Note: t-statistics are included in parentheses below coefficient values. \*Significant at the 10% level; \*\*Significant at the 5% level; \*\*\*Significant at the 1% level. SE of Regression: standard error of regression, a measure of the residuals' variance. SSR: sum of squared residuals.



ownership, but more strongly the largest outside shareholders. It also indicates that the higher market risk, the smaller the concentration of ownership, and it promotes the statistical evidence of high concentration of ownership in Brazil.

The ASSET variable was always negative, considerably reducing the ownerships of managers and outside shareholders, but it loses significance in the system (4). This result is consistent with Berle and Means (1932): companies that are seeking greater economies of scale face capital constraints and need outside investors, thus they have a more diffused capital basis. Managers also cannot concentrate large portions of the capital.

Regarding the dummy variables, U was not significant in the firm value equation, as expected. In the ownership structure equation, it was always significant, but with opposite signs. When considering LMH as endogenous, it obtained a negative sign, showing that the subsidized monitoring carried out by regulation imposes barriers to managers' freedom and therefore they have less incentive to concentrate capital. This same theory should be applied to concentration of ownership by the largest shareholders. However, the results show the opposite. This may be a consequence of the high cost of capital in Brazil and the need to concentrate the investment in regulated companies. In some industries such as airlines, the legislation does not allow, for example, foreign investors to exceed a certain percentage of the shares, which forces the concentration of ownership on Brazilian investors.

Surprisingly, F did not affect the ownership structure significantly in any model tested. However, it was always significant and with negative sign in the firm value equation. Apparently, banks generate less value in excess to their assets when compared to what other companies generate. But this result may be a consequence of the regulatory framework, as banks must mark-to-market an important part of their assets. The variable GOV, unexpectedly, did not show a significant impact on any of the dimensions of ownership structure or the firm value, though it always appears as negative in the latter's equation.

Turning attention to systems (3) and (4) only, it can be observed that the variable TAG\_ALONG influences the firm value in a positive and significant way in the two models. In the firm value equation, the third dimension of ownership structure, the variable DEV, was significant and had a negative sign: firms with higher deviation of rights, i.e., greater concentration of control rights than cash flow rights, has less value than other companies. Together, these two variables may represent the feeling of uncertainty of the minority investor with regard to the possibility of being expropriated, and the greater the uncertainty, the higher the claims for returns, and therefore the minority shareholder hands their doubts back to the firm value.

Regarding the ownership structure, DEV showed a positive and significant relationship with LMH, indicating a possible overlap between managers and investors in companies with higher deviation of rights, or the greater freedom given to managers in companies where there is higher deviation of rights (and therefore the investor feels more protected from the threat of a management buyout). The influence of this variable on LTOP3 is negative, showing that in an environment of weak legal protection such as Brazil, the investor prefers to first ensure their participation in the company's control, and then establish their share of dividends.

The most relevant question of this study has not been fully answered: if there is no systematic relationship between ownership structure and firm value. The variable DEV showed

that one of the dimensions of ownership structure may, in fact, influence the firm value. But the concentration of ownership structure, either by managers or by outside shareholders, showed no significant influence on firm value in any model.

In other words, there is clear evidence that, in Brazil, the firm value is not influenced by the absolute value of concentration of ownership, but is affected by the deviation of rights caused by the asymmetry between the concentration of voting rights and concentration of cash flow rights.

As to the possibility of the firm value influencing the concentration of ownership structure, it is observed that the variable  $Q$  is significant and positive in all models that consider endogenous LMH, showing that managers have more incentive to concentrate the ownership of companies with higher value, for example, holding shares from more aggressive programs of stock plans. The influence of  $Q$  on LTOP3 is negative in system (4), which shows that monitoring by large investors may not be so effective. Together with the endogeneity test, these results support the theory defended by Demsetz (1983), that the ownership structure is the result of a more complex process aimed at maximizing shareholder value, not only at minimizing the agency cost.

Last, but not least, the endogeneity test DWH. As it was described before, Demsetz's (1983) theory considers the ownership structure as an endogenous outcome of a maximizing value process, and the Demsetz and Villalonga (2001) model, when estimated through 2SLS, accounts for endogeneity. So, in order to confirm the results obtained, one must consider the DWH test.

The bottom part of Table 4 shows the reduced and structural equations used in the DWH test, and below it, the test results when LMH is considered an endogenous variable (column  $Y = LMH$ ) and when LTOP3 is considered an endogenous variable (column  $Y = LTOP3$ ). With the significance level of 10%, a consistent finding in all models was achieved: it rejects  $H_0$  when LMH is endogenous and does not reject  $H_0$  when LTOP3 is endogenous. It follows that we can consider the concentration of ownership by managers an endogenous variable, but not the concentration of the largest shareholders. This result is in line with that obtained by Demsetz and Villalonga (2001).

Some robustness tests were performed, but not displayed here to save space. First, this sample was used to estimate models that consider the ownership structure as exogenous, such as those developed by Morck, Shleifer and Vishny (1988) and McConnell and Servaes (1990). The signals obtained were inverse to those indicated by these authors, and few variables were significant in the piecewise linear regression case. These results show that models that consider the ownership structure as exogenous fail to explain the relationship between ownership structure and firm value in Brazil.

Other robustness tests consisted of replacing the variables LMH and LTOP3 by the fraction of shares with the voting right only. There was no significant change in results. Tests were also performed on a sub-sample of 127 non-regulated companies. Main results are (i) the variable  $Q$  behavior, which became non-significant, (ii) DEBT favorably influenced  $Q$  on all systems and (iii) adjusted  $R^2$  decreased. The DEBT result can be explained by the exclusion of

banks from the sample (the measure of financial leverage of banks was different from the other companies, due to the nature of banks. Thus, the measure used may not be appropriate).

A third test of robustness was to replace Tobin's Q by the rate of return on the book value of equity (ROE). In this case, many of the results were changed and the model has significantly lost its explanatory power, with adjusted R2 minor than 0.5%. It can be concluded that, in line with other studies of finance, the use of Tobin's Q is preferable to ROE.

Also, various configurations of the Demsetz and Villalonga (2001) model were tested, treating the variable DEV endogenously and as the dependent variable in the equation of ownership structure. The results show that this specification is not appropriate, as confirmed by the DWH test, which does not reject the null hypothesis that this variable should be treated exogenously.

## 7. CONCLUSION

The sample of Brazilian companies showed that the firm value can be affected by ownership structure, but not simply by the absolute level of concentration. What influences the firm value, in a negative way, is the deviation between control rights and cash flow rights. This result was obtained by adding a new dimension of ownership structure, i.e., the deviation of rights, which, to our knowledge, has not been considered in prior studies of the ownership structure and firm value relationship. Even by controlling for the effect of the right to tag along, the existence of private benefits of control leads the minority shareholder to discount the potential of expropriation from the firm value. These results can be attributed to the historically weak institutional framework and high concentration of control rights that is still present in the Brazilian capital market, and it is in accordance with the evidence obtained by Da Silva and Leal (2003), Saito and Silveira (2008) and with the conviction of many market players that, in Brazil, the main agency conflict happens in the relationship between controlling and minority shareholders, and not between shareholders and managers. Consequently, this study shows that companies listed on the New Market segment of Bovespa, which ensures the null deviation of rights, aggregate more value for their shareholders.

Evidence of the reverse causality has also been collected, i.e., that firm value can influence the ownership structure. This evidence had already been flagged by Loderer and Martin (1997), Cho (1998), Demsetz and Villalonga (2001) and Gonenc (2004). The results obtained with the Brazilian sample indicate that firms with higher value tend to concentrate the ownership on managers, and less on the outside investors.

In line with the results of Demsetz and Lehn (1985), Demsetz and Villalonga (2001), Welch (2003) and Gonenc (2004), but against the results of Morck, Shleifer and Vishny (1988) and McConnell and Servaes (1990), the empirical results obtained show that the concentration of the ownership structure does not influence the firm value. The difference between the results can be attributed to modeling the structure of ownership, which treated endogenously in the first group of authors and exogenously in the second. The formal endogeneity test DWH, not

performed by these authors, demonstrated that the concentration of ownership by managers should be treated endogenously.

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