The Relation between corporate governance and market value: mitigating endogeneity Problems

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ABSTRACT

This paper investigates whether the adoption of good corporate governance practices influences the market value of Brazilian firms. For this purpose, we used an unbalanced panel over the period from 2002 to 2010, composed of 233 listed nonfinancial companies, for a total of 1,110 observations. Because of endogeneity problems such as omitted variables, simultaneity and the feedback effect, we employed dynamic multiple linear regression models, estimated by the system generalized method of moments (System GMM). The results indicate that firms listed in one of the three premium corporate governance segments of the BM&FBovespa (Level 1, Level 2 and Novo Mercado) are priced higher by the market compared to firms listed in the traditional trading segment. Therefore, corporate governance has a positive effect on the market value of Brazilian firms.

Keywords: Corporate governance. Market value. Generalized method of moments.

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1 INTRODUCTION

Over the past three decades, the theme of corporate governance has gained increasing importance among academics and business leaders. Various factors have contributed to this trend. Becht, Bolton & Röell (2002) point out, among other phenomena, the corporate scandals in the United States between 2001 and 2003, which revealed the manipulation of financial statements, tax evasion and use of inside information by executives of large American companies.

More recently, the global financial crisis of 2008, triggered by problems in the American subprime mortgage market and excessively leveraged banks, corroborated the importance of improving corporate governance. According to Silveira (2010), besides excessively low interest rates and overly complex financial products, executive compensation systems linked to unsustainable results over the long run and failures of boards of directors also contributed to the crisis.

In Brazil, the liquidation by the Central Bank in the 1990s of large privately owned banks whose insolvency had been masked by fraudulent accounting heightened concern with improving corporate governance standards in the country (CARVALHO, 2002). This preoccupation was an important factor leading to the creation of three premium listing segments in terms of governance requirements by the São Paulo Stock Exchange (BOVESPA¹) in December 2000: Level I, Level 2 and Novo Mercado (New Market). Firms listed in these trading segments must have more transparent disclosure policies and provide greater protection for minority shareholders (BM&FBOVESPA, 2012).

The discussion over corporate governance starts from the hypothesis that this has an influence on firms' performance (SILVEIRA; BARROS; FAMÁ, 2006). The Brazilian and international literature contains many works that, although not conclusive, provide evidence of a relationship between better governance practices and: a) higher market value (DURNEV; KIM, 2005; BLACK; JANG; KIM, 2006; SILVEIRA; BARROS; FAMÁ, 2006; AMMANN; OESCH; SCHMID, 2011); b) better operational performance (BROWN; CAYLOR, 2004; KLAPPER; LOVE, 2004; CARVALHAL-DA-SILVA; LEAL, 2005); and c) lower cost of capital (GOMPERS; ISHII; METRICK, 2003; BHOJRAJ; SENGUPTA, 2003; SKAIFE; COLLINS; LAFOND, 2004).

¹ In 2006 the Bovespa merged with the Mercantile and Futures Exchange (BM&F) to form the BM&FBovespa.

A good part of the empirical studies have focused on a single corporate governance mechanism, mainly the ownership and control structure, such as the works of Claessens et al. (2002), Gugler, Mueller & Yurtoglu (2008) and Fahlenbranch & Stulz (2009), or the makeup of the board of directors, such as Carter, Simkins & Simpson (2003) and Wintoki, Linck & Netter (2008). Other studies have analyzed the quality of governance practices by calculating indexes that, in general, try to measure more than one external and/or internal mechanism, such as Carvalhal-da-Silva & Leal (2005), Black, Jang & Kim (2006) and Ammann, Oesch & Schmid (2011).

However, in the academic literature there is still no theoretical framework or conclusive empirical evidence on: a) the impact of governance mechanisms on corporate performance; and b) how these mechanisms are related (SILVEIRA; BARROS; FAMÁ, 2006). Moreover, a significant portion of the articles have considered corporate governance with an exogenous variable, i.e., one not determined by its mechanisms or other attributes of the firm. For this reason, authors have not attempted to control for the possible sources of endogeneity, such as omitted variables, reverse causality and the feedback effect, which can invalidate the results of this type of study (BARROS et al., 2010).

Our main objective here is to investigate the relation between the adoption of better corporate governance practices and the market value of firms. Due to the presence of endogeneity problems, we employed dynamic multiple linear regression models with an unbalanced panel of firms listed on the BM&FBovespa between 2002 and 2010, for a total of 1,110 firm-year observations. We tested six specifications with the intention of answering the following question: **Do Brazilian companies listed in premium corporate governance segments (L1, L2 and NM) have higher market value compared to firms listed in the traditional market segment?**

2 THEORETICAL FRAMEWORK

Although there is no exact definition of corporate governance, it can be understood as the set of incentive and control mechanisms intended to minimize the agency costs arising from the conflict of interests between the suppliers of resources and the managers of companies (SILVEIRA, 2010). Agency theory is based on assumptions such as the inexistence of complete contracts and the opportunistic behavior of economic agents (JENSEN; MECKLING, 1976). These can result, among others, in certain practices by managers (or controlling shareholders) placing their own benefit over those of the shareholders (or the minority shareholders). Among these are decisions by managers to grant

themselves excessive compensation, resistance to transactions that would be advantageous to the other shareholders (liquidation, mergers, acquisitions, spin-offs) and earnings management focused on short-term results (ANDRADE; ROSSETTI, 2006).

Since the formulation of agency theory, based largely on the paper of Jensen & Meckling (1976), various studies have tried to ascertain the form of the relationship between the quality of governance practices and corporate performance. Many of the empirical studies have focused on a single corporate governance mechanism, especially the makeup of the board of directors (CARTER; SIMKINS; SIMPSON, 2003; WINTOKI; LINCK; NETTER, 2008) or the ownership and control structure (CLAESSENS et al., 2002; GUGLER; MUELLER; YURTOGLU, 2008; FAHLENBRANCH; STULZ, 2009). Other studies have employed indexes to measure the quality of governance practices, covering more than one of its mechanisms (BLACK; JANG; KIM, 2006; SILVEIRA; BARROS; FAMÁ, 2006; AMMANN; OESCH; SCHMID, 2011).

Empirical studies of corporate governance are subject to econometric problems, which if not taken into consideration can lead to inadequate interpretations of the results (SILVEIRA, 2010). Among these are omitted variables, simultaneity (or reverse causality) and the feedback effect, three possible sources of endogeneity (BÖRSCH-SUPAN; KÖKE, 2002; BARROS et al., 2010).

According to Silveira (2010), the omission of variables can result in spurious correlation between the variables of interest, because a relevant variable not included in the theoretical model can simultaneously influence the governance variables and the performance variables chosen. Two variables can be mutually correlated when neither is caused by the other, both of them instead being explained by a third variable. The use of control variables and fixed effects and random effects procedures, such as in the works of Bai et al. (2004) and Carvalhal-da-Silva & Leal (2005), can attenuate this problem.

Bai et al. (2004) used control variables such as size, operating profit and indebtedness in their regression models. For a panel with 2,905 observations of Chinese corporations in the period from 1999 to 2001 they observed that firms are less valued by the market when: a) the government is the largest shareholder; and b) the CEO is also the chairman of the board.

Carvalhal-da-Silva & Leal (2005) used as a proxy for the quality of corporate governance an index composed of 15 objective binary questions regarding the ownership structure, board composition, transparency of information disclosed and shareholders' rights.

Their results, based on a panel of 133 Brazilian firms in the period from 1998 to 2002, indicated a positive and significant relation between governance practices and return on assets, but not between governance and Tobin's Q.

Another common source of endogeneity problems in studies of corporate finance is the probable simultaneous determination of several variables (BÖRSCH-SUPAN; KÖKE, 2002; BARROS et al., 2010). The adoption of better governance practices can reduce the firm's cost of capital or increase its market value (SILVEIRA, 2010). However, the better performance of a firm can make more resources available for investment in its governance system, which in turn increases its efficiency. Silveira et al. (2009) built a panel composed of 823 observations of Brazilian firms between 1998 and 2004. When they applied regressions by ordinary least squares, Tobin's Q had a positive influence on the quality of the firms' governance practices.

The problem of reverse causality can be mitigated by using instrumental variables, as in the studies of Black, Jang & Kim (2006) and Silveira, Barros & Famá (2006). However, it is hard to find a set of valid instruments because while the first assumption, of a significant correlation between the instruments and the endogenous regressor, is easily verified, the second, of no correlation between the instruments and the model's error term, is not easy to check, since the error is not directly observable (BARROS et al., 2010).

Black, Jang & Kim (2006) formulated an indicator to approximate the quality of governance practices of 525 South Korean companies, among other aspects covering stockholders' rights, the structure of the board of directors and the transparency in disclosing information. By employing regressions calculated by ordinary least squares (OLS), two-stage least squares (2SLS) and three-stage least squares (3SLS), the authors found evidence that corporate governance is able to explain the market value of the firms studied.

Silveira, Barros & Famá (2006) also applied multiple regressions estimated by OLS, 2SLS and 3SLS, to a sample of 154 Brazilian companies in 2000. As a proxy for the quality of governance practices they used an index calculated from a set of 20 objective binary questions. Their results indicated that governance quality has a positive influence on Tobin's Q and the price-to-book-value ratio and that rising market value can lead to the adoption of better governance standards by organizations (i.e., two-way causality between governance quality and valuation).

Finally, the feedback effect of the response variables to the regressors occurs when the past values of the dependent variable influence the present and/or future values of the

independent variables (BARROS et al., 2010). According to Wintoki, Linck & Netter (2008), this problem is also known as “dynamic endogeneity” in corporate finance studies and can be mitigated by the inclusion of lags of the explained variable in the regression model, as done in the generalized method of moments (GMM).

Wintoki, Linck & Netter (2008), in using fixed-effects analysis of a panel of 6,000 American companies, found a significant relationship between the structure of the board of directors and corporate performance. However, when they employed a system generalized method of moments (System GMM), size and level of board independence did not influence the return on sales or Tobin’s Q. In turn, Ammann, Oesch & Schmid (2011) analyzed 2,300 companies in 22 developed countries over the period from 2003 to 2007. They found a positive influence of governance level on market value (Tobin’s Q) when testing models estimated by fixed effects and GMM.

3 METHODS

The main objective of this article is to investigate the relation between the adoption of enhanced corporate governance practices and the market value of Brazilian companies. More specifically, we formulated the following question: **Do Brazilian companies listed in premium corporate governance segments (L1, L2 and NM) have higher market value compared to firms listed in the traditional market segment?**

For this purpose, we used a sample composed of nonfinancial companies with shares traded on the São Paulo Stock, Mercantile and Futures Exchange (BM&FBOVESPA) during the period from 2002 to 2010. The exclusion of financial institutions was due to the different accounting standards applicable to these firms, making it hard to compare the profitability and valuation metrics against those of companies in other sectors. We also excluded firms that reported negative equity in any year, since this would impair calculation of some indicators, like ROE and ROIC.

The final sample was composed of 233 firms for which all the data were available to calculate the variables in at least two years in the period analyzed. Therefore, we formed an unbalanced panel of 1,110 firm-year observations, although in the regression models the number of observations declined to 788 because of the estimation by the system generalized method of moments (System GMM). The variables were calculated from secondary data obtained from the Economática® database. The accounting values refer to the financial statements for the fourth quarter of each year, and the stock quotations are the average annual price, obtained by averaging the closing price on the last trading day of each quarter. Since

Brazilian firms typically issue more than one type of stock (e.g., common and preferred), we selected the stock with highest liquidity in the respective year to calculate some market indicators.

3.1 OPERATIONAL DEFINITION OF THE STUDY'S VARIABLES

The choice of the dependent, independent and control variables used was based on the works of Bai et al. (2004), Black, Jang & Kim (2006), Silveira, Barros & Famá (2006), Silveira et al. (2009), Ammann, Oesch & Schmid (2011) and Carvalho & Pennacchi (2012).

The variables of interest are those referring to corporate governance and the market value of the firms. As a proxy for quality of governance practices, we used the dummy variable CGQ, which takes on the value one if the firm was listed in Level 1 (L1), Level 2 (L2) or Novo Mercado (NM) trading segments of the BMF&Bovespa in the respective year, and zero otherwise. The firms listed in these segments must satisfy stricter corporate governance standards than required by law, as described by Carvalho & Pennacchi (2012):

- L1: Maintenance of a free-float of at least 25% of capital; holding of public offerings to place shares through mechanisms that favor capital dispersion to a broader range shareholders; improved disclosure of quarterly information, including the obligation to report consolidated figures and special audit review; adherence to the disclosure rules for transactions involving assets issued by the company on the part of the controlling shareholders or company management; and disclosure of shareholder agreements and stock option programs.
- L2: To be classified at Level 2, in addition to the obligations of Level 1, the firm and its controlling shareholders must adopt a broader range of corporate governance practices and minority shareholder rights: a term of two years or less for the entire board of directors, without staggered elections; disclosure of the annual balance sheet in accordance with US GAAP or IAS; granting to all holders of common shares the same price obtained by the controlling shareholders on the transfer of control of the firm and 80% (100% as of 2011) of this price for preferred shareholders (tag along); voting rights granted to preferred shares in certain circumstances such as transformation, consolidation, spin-off or merger of the firm and approval of contracts between the firm and other companies of the same group; obligation to hold a tender offer by the economic value criterion should the firm be taken private or Level 2 registration be cancelled; and requirement to resolve corporate disputes by arbitration under the auspices of the Market Arbitration Chamber of the BM&FBovespa.

- NM: Participation in the Novo Mercado requires satisfying all the criteria of Level 2 plus the requirement only to issue common shares, so that all shareholders are assured of the right to vote.

As suggested by Börsch-Supan & Köke (2002), we used two proxies for market value. The first, Tobin's Q, is hard to operationalize due to the inability to directly observe the market value of debts and replacement value of assets. Therefore, we chose the approximation proposed by Chung & Pruitt (1994: p. 72), according to which Tobin's Q can be calculated by Equation (1):

$$Q_{TOBIN} = \frac{MVC + MVP + DEBT}{\text{Total Asset}} \quad (1)$$

Where:

MVC: market value of the firm's common shares;

MVP: market value of the firm's preferred shares;

DEBT: book value of total debt (short- and long-term) minus current assets after exclusion of inventories.

The second proxy used was the enterprise value over total assets, obtained by Equation (2):

$$EV/TA = \frac{\text{Enterprise Value}^*}{\text{Total Asset}} \quad (2)$$

(*) Enterprise value = market value of total shares + short- and long-term bonds + short- and long-term loans + advances on foreign exchange contracts – cash and cash equivalents. Calculated by Economática®.

3.1.1 CONTROL VARIABLES

We also used the following control variables:

- Profitability (operational performance). We used three profitability measures: (i) return on invested capital (**ROIC**); (ii) return on equity (**ROE**); and earnings before interest, taxes, depreciation and amortization over total assets (**EBITDA/TA**), calculated, respectively, by Equations (3), (4) and (5):

$$ROIC = \left(\frac{\text{Net operating profit after taxes (NOPAT)}^*}{\text{Average Invested Capital (AIC)}^{**}} \right) \times 100\% \quad (3)$$

$$(*) \text{ NOPAT} = (\text{EBIT}) \times (1 - \text{Tr})$$

Where:

EBIT: earnings before interest and taxes

Tr: Income tax rate, which in Brazil is 34% for most companies.

$$(**) \text{ AIC} = \text{average stockholders' equity} + \text{average gross debt} ***$$

$$(***) \text{ Average of short- and long-term loans} + \text{short- and long-term bonds}$$

$$\text{ROE} = \left(\frac{\text{Net Income}}{\text{Average Shareholders' Equity}} \right) \times 100\% \quad (4)$$

$$\text{EBITDA/TA} = \left(\frac{\text{EBITDA}}{\text{Average Total Asset}} \right) \times 100\% \quad (5)$$

- Leverage (**LEV**): measured by the sum of current and long-term liabilities divided by total assets at the end of the year.
- Volatility (**VOLAT**): measured by the monthly returns of the most liquid type of stock of each firm in each year, obtained by Equation (6):

$$\text{VOLAT} = \sqrt{\frac{\sum (s_i - s_m)^2}{n-1}} \quad (6)$$

Where:

S_i : continuous monthly return of stock i ; S_m : average of the continuous monthly returns of stock i ; and $n = 12$ (one year).

- Payout index (**PAYOUT**): defined as dividends paid per share over net earnings per share at the end of the year.
- Liquidity index (**LIQ**): Calculated by the Economática[®] system for periods of 12 months, based on the trading volume of each stock, obtained by Equation (7):

$$\text{LIQ} = 100 \times \left(\frac{p}{P} \right) \times \sqrt{\left(\frac{n}{N} \right) \times \left(\frac{v}{V} \right)} \quad (7)$$

Where:

p : number of days when there was at least one trade of the stock in the period analyzed;
 P : total number of days in the period analyzed; n : number of trades of the stock in the period analyzed; N : number of trades of all stocks in the period analyzed; v : monetary value of the

trading of the stock in the period analyzed; V: monetary value of the trading of all stocks in the period analyzed.

- Capital expenditure rate (**CAPEX**): defined as capital expenditures over gross property, plant and equipment at the end of the year.

We also used annual dummy variables (YEAR), with value of one for the specific year and zero for other years, with the aim isolating the macroeconomic effects that affected the companies during the study period. They are coded in chronological order: D02 = 2002, D03 = 2003 and so on.

3.2 MODELS AND STATISTICAL TREATMENT

To ascertain whether the adoption of enhanced corporate governance practices influences the firms' market value, we employed dynamic multiple linear regression models, estimated by the system generalized method of moments (System GMM). For this purpose we used the Stata[®] 11 statistical package, applying the *xtabond2* tool of Roodman (2006, 2009).

As a proxy for market value (MV), the dependent variable, we used Tobin's Q (QTOBIN) and enterprise value over total assets (EV/TA). Equation (8) describes the general model, containing the following independent variables: first lag of the response variable (MV_{it-1}); a dummy variable for participation in one of the enhanced corporate governance trading segments (L1, L2 or NM) of the BM&FBovespa (CGQ); profitability (PROFIT: ROIC, ROE or EBITDA/TA); leverage (LEV); monthly stock return volatility (VOLAT); payout index (PAYOUT); stock liquidity (LIQ); capital expenditure rate (CAPEX); and annual dummy variables (YEAR).

$$MV_{it} = \alpha + \beta_1 MV_{it-1} + \beta_2 SGC_{it} + \beta_3 PROFIT_{it} + \beta_4 LEV_{it} + \beta_5 VOLAT_{it} + \beta_6 PAYOUT_{it} + \beta_7 LIQ_{it} + \beta_8 CAPEX_{it} + \sum_{k=1}^8 \psi_k YEAR_{kt} + \eta_i + u_{it} \quad (8)$$

In the formula, α is the intercept, which can be interpreted as the average specific effect of the set of firms, i and t represent, respectively, the firm and year, and $\eta_i + u_{it}$ represents the decomposition of the random error term ($\varepsilon_{it} = \eta_i + u_{it}$). More specifically, u_{it} is the error term of firm i in year t and η_i is the unobserved heterogeneity of the firms in the sample, to capture any unobserved characteristics of firm i that do not vary over time.

Model (8) addresses the possible sources of endogeneity that can bias the parameters obtained by the regression technique. The control variables and the term η_i have the objective of attenuating the omission of variables. The use of the first lag of the response variable

(VM_{it-1}) can control for the feedback effect. Besides this, we believe the reverse causality was mitigated by the estimation of the System GMM by means of the *xtabond2* tool of Roodman (2006, 2009), with employment of the *laglimits* (3 3) function.

4 RESULTS

Tables 1 and 2 report the descriptive statistics of the variables. Regarding the participation of the companies in the premium corporate governance segments (CGQ), note that various firms migrated to or went public by listing directly in Level 1, Level 2 or Novo Mercado just after their creation by the Bovespa in December 2000, as reported by Gorga (2008). However, the number of observations of firms with shares listed in the traditional segment (654) represents more than half of the total (1,110). Besides this, the group of companies listed in one of the special governance segments presented higher means and medians of Tobin's Q and for enterprise value over total assets than the other set of firms.

Table 1 – Descriptive statistics of the variables of interest

Statistic Variable	CGQ = 0			CGQ = 1			TOTAL SAMPLE		
	Mean	Median	Standard deviation	Mean	Median	Standard deviation	Mean	Median	Standard deviation
QTOBIN	0.89	0.78	0.60	1.12	0.93	0.68	0.98	0.84	0.65
EV/TA	0.81	0.68	0.59	1.03	0.87	0.68	0.90	0.75	0.64
N*	654			456			1110		

(*): number of observations.

Remarks: CGQ = 0 – firms listed in the traditional market segment; CGQ = 1 – firms listed in one of the premium corporate governance segments.

Regarding the total sample, the median value below 1 of Tobin's Q (as well as EV/TA) shows that the majority of observations refer to firms that if sold at that time for the price attributed by the market, would not have received enough to cover the replacement value of their assets.

Table 2 – Descriptive statistics of the control variables

Variable	Statistic	Mean	Standard deviation	1st Quartile	Median	3rd Quartile
ROIC (%)		11.09	22.61	4.96	8.90	15.23
ROE (%)		15.84	37.50	6.00	14.50	25.10
EBITDA/TA (%)		14.97	10.23	8.52	13.93	20.56
LEV (%)		57.25	18.48	45.10	58.45	69.60
VOLAT		11.05	5.50	7.50	9.70	13.20
PAYOUT		0.65	8.90	0.06	0.29	0.56
LIQ		0.43	1.29	0.002	0.03	0.32
CAPEX (%)		45.46	292.49	11.53	18.96	32.14
Number of observations = 1110.						

4.1 MARKET VALUE AND ADOPTION OF ENHANCED GOVERNANCE PRACTICES

Table 3 shows the results of the dynamic multiple linear regression models, estimated by the System GMM, to explain the market value (Tobin's Q or enterprise value over total assets). In the six equations tested, the variables QTOBIN and EV/TA were positively influenced by their lagged values (L.QTOBIN and L.(EV/TA)), at 1% significance. These results indicate inertial behavior of the firms' market value.

With respect to the independent variable of interest, CGQ obtained positive and significant coefficients at 1% in five of the six specifications employed. These results suggest that the adoption of enhanced corporate governance practices has a positive effect on market value. More specifically, these results indicate that on average the firms listed in one of the premium governance segments (L1, L2 or NM) are more valued by the market than are firms listed in the traditional trading segment.

Hence, it can be inferred that the higher market value of the firms listed in the L1, L2 and NM segments results from their adherence to higher corporate governance standards, mainly in relation to protection of minority shareholders and transparency in the disclosure of information, meaning less pronounced information asymmetry, increasing demand for their shares. This hypothesis is consistent with the results of Carvalho & Pennacchi (2012), when analyzing the impact of the migration of 38 Brazilian firms to the premium segments between 2001 and 2006. The authors used the event study method and found a positive cumulative

abnormal return of the stocks of these firms during the period around the announcement of the migration. Furthermore, the results of Carvalho & Pennacchi (2012) indicate that migration increased the trading volume of nonvoting shares of the firms, suggesting that better disclosure increases the liquidity of these shares.

Regarding the variables used as proxies for operational performance, EBITDA over total assets was significant at 1% in the two models in which it was used, while ROIC obtained a positive coefficient significant at 10% in the specification in which the dependent variable was EV/TA. An increase of 10% in the EBITDA/TA on average raised Tobin's Q by 16.72% $\{[(10 \times 0.0163811) / 0.98] \times 100\}$ and EV/Ta by 15.04% $\{[(10 \times 0.0135344) / 0.90] \times 100\}$. These results corroborate the hypothesis that the accounting performance positively influences the market value, since investors take it into consideration when faced with a tradeoff between hold, buy or sell their shares.

The System GMM does not assume normal distribution of the variables and is robust to heteroscedasticity of the error term. However, for the results of the models used to be valid, some assumptions must be satisfied. According to Arellano & Bond (1991), the System GMM requires first-order but not second-order autocorrelation in the residuals. As shown in Table 3, the Arellano-Bond test for first- and second-order autocorrelation of the residuals, respectively, rejected and accepted the null hypothesis of the absence of serial autocorrelation for all the specifications.

Another fundamental condition is that the instruments must be validated. For this, two conditions are necessary: the instruments of the models must be correlated with the contemporaneous values of the variables of each respective equation, and the instruments must be exogenous, i.e., they cannot be correlated with the contemporaneous error terms (ARELLANO; BOVER, 1995; BLUNDELL; BOND, 1998). As seen in Table 3, the Hansen test for overidentification (*J*-statistic) did not reject the null hypothesis that the instruments are valid in all the specifications, for the conventional significance levels (1%, 5% and 10%) and for the 25% level indicated by Roodman (2009). Likewise, the difference-in-Sargan/Hansen test for subsets of the instruments (*C*-statistic) in all the models also did not reject the null hypothesis that the instruments of each subgroup are exogenous, even at the 25% significance level.

Table 3 – Relationship between corporate governance and market value

	Coefficient (z/p-value)	Coefficient (z/p-value)	Coefficient (z/p-value)	Coefficient (z/p-value)	Coefficient (z/p-value)	Coefficient (z/p-value)
Model	(1)	(2)	(3)	(4)	(5)	(6)
Variable	QTOBIN	EV/TA	QTOBIN	EV/TA	QTOBIN	EV/TA
L.QTOBIN	0.8539966*** (10.52/0.000)		0.8932158*** (10.36/0.000)		0.7521919*** (10.13/0.000)	
L.(EV/TA)		0.8520768*** (12.09/0.000)		0.8875058*** (11.79/0.000)		0.7807897*** (11.47/0.000)
CGQ	0.1356389*** (2.57/0.010)	0.1681737*** (3.48/0.000)	0.1523903*** (2.64/0.008)	0.1682627*** (3.06/0.002)	0.0986846* (1.74/0.082)	0.1459282*** (2.86/0.004)
ROIC	0.004586 (1.55/0.120)	0.0048042* (1.92/0.055)				
ROE			0.0017827 (1.02/0.310)	0.0023494 (1.48/0.140)		
EBITDA/TA					0.0163811*** (4.38/0.000)	0.0135344*** (3.63/0.000)
LEV	0.0008414	-0.0003361	-0.0004744	-0.000912	0.0008647	-0.0002123

	(0.30/0.761)	(-0.14/0.890)	(-0.23/0.815)	(-0.43/0.666)	(0.32/0.752)	(-0.11/0.914)
VOLAT	-0.0060174	-0.0059379	-0.0041313	-0.0060627	-0.0020268	-0.003908
	(-1.04/0.300)	(-0.95/0.341)	(-0.68/0.495)	(-1.02/0.306)	(-0.31/0.758)	(-0.62/0.536)
PAYOUT	-0.0018836	-0.0029703	0.0020245	-0.0024696	0.0037473	-0.0029963
	(-0.19/0.846)	(-0.42/0.677)	(0.14/0.891)	(-0.42/0.672)	(0.28/0.777)	(-0.39/0.695)
LIQ	0.0017669	0.0003693	-0.0060811	-0.0074301	0.0017122	-0.0024858
	(0.20/0.842)	(0.04/0.965)	(-0.64/0.525)	(-0.73/0.468)	(0.20/0.841)	(-0.33/0.739)
CAPEX	-0.0002871	-0.0003038	-0.0003053	-0.0002584	0.0000519	-0.0001578
	(-0.63/0.530)	(-0.59/0.553)	(-0.73/0.468)	(-0.57/0.568)	(0.14/0.888)	(-0.39/0.694)
D03	-0.0402774	-0.0045393	-0.0061597	0.0121613	-0.1238979**	-0.0602593
	(-0.74/0.460)	(-0.09/0.929)	(-0.11/0.913)	(0.24/0.809)	(-2.29/0.022)	(-1.18/0.237)
D04	0.0144031	0.0287337	0.037703	0.046605	-0.0929586	-0.0386573
	(0.26/0.791)	(0.51/0.611)	(0.72/0.470)	(0.92/0.357)	(-1.61/0.107)	(-0.71/0.475)
D05	-0.0375683	-0.0024282	-0.0241747	0.0036347	-0.0804941	-0.026036
	(-0.86/0.391)	(-0.05/0.963)	(-0.57/0.571)	(0.08/0.938)	(-1.58/0.115)	(-0.55/0.584)
D06	-0.0690303	0.0028665	-0.0664866	0.0026448	-0.1087321**	-0.0057547
	(-1.41/0.159)	(0.05/0.959)	(-1.40/0.160)	(0.05/0.958)	(-2.21/0.027)	(-0.11/0.913)
D07	0.1844087***	0.2203969***	0.175724***	0.2070686***	0.1502265***	0.1955894***
	(3.33/0.001)	(3.97/0.000)	(3.18/0.001)	(3.51/0.000)	(2.63/0.008)	(3.34/0.001)

D08	-0.3728229*** (-5.06/0.000)	-0.3433441*** (-3.46/0.001)	-0.3689608*** (-5.39/0.000)	-0.3532623*** (-4.49/0.000)	-0.3957291*** (-4.58/0.000)	- 0.3568878*** (-4.46/0.000)
D09	-0.1682242*** (-4.59/0.000)	-0.0654432 (-1.53/0.127)	-0.1721771*** (-4.85/0.000)	-0.0781719** (-2.01/0.044)	-0.1429576*** (-3.34/0.001)	-0.0432382 (-1.04/0.300)
Constant	0.1666042 (0.90/0.367)	0.1682962 (1.13/0.258)	0.1936989 (1.24/0.214)	0.1831952 (1.23/0.220)	0.0464837 (0.32/0.746)	0.0690924 (0.53/0.594)
Arellano/Bond test for autocorrelation:						
1st order/AR(1) (p-value)	0.000	0.001	0.000	0.000	0.002	0.002
2nd order/AR(2) (p-value)	0.645	0.585	0.618	0.564	0.966	0.789
Hansen J test for overspecification (p-value)	0.382	0.531	0.518	0.520	0.445	0.647
Difference-in-Sargan/Hansen tests:						
Instruments in differences (excluding instruments of the System GMM) (p-value)	0.286	0.516	0.612	0.714	0.407	0.508
Instruments of the System GMM) (p-value)	0.523	0.501	0.399	0.316	0.485	0.667
Instruments of the System GMM) (excluding the standardized “IV” instruments) (p-value)	0.277	0.449	0.487	0.452	0.408	0.531
Standardized “IV” instruments “IV” (p-value)	0.858	0.742	0.539	0.681	0.556	0.877
Wald test (p-value)	0.000	0.000	0.000	0.000	0.000	0.000

R²	0.7394	0.7426	0.7304	0.7429	0.7672	0.7697
Number of instruments	104	104	104	104	104	104
Number of observations	788	788	788	788	788	788
Number of firms	233	233	233	233	233	233

The variable D10 was excluded by Stata 11 due to problems of collinearity. We used the two-step and robust commands (correction for standard errors of Windmeijer (2005)) to make the estimation more robust. Significance: ***(1%); **(5%); *(10%).

Because of the momentum conditions, even though the System GMM permits correlation between the regressors and unobserved heterogeneity (η_i), the method assumes that the form of this correlation does not change between periods (T) (steady state assumption) (ROODMAN, 2009). The validity of this condition, according to Roodman (2009), depends on the coefficient of the first lag of the response variable being smaller (in absolute value) than one ($|\beta_1| < 1.0$), which was true in all of the specifications.

To finalize, we stress that to control for the proliferation of instruments, we applied the *laglimits* (3 3) function of the *xtabond2* tool (ROODMAN, 2006; 2009). This command reduced the number of instruments used in all the models (104) so that it was substantially smaller than the number of observations (788), assuring the robustness of the results.

5 CONCLUSION

The main objective of this article was to investigate whether the adoption of enhanced corporate governance practices influenced the market value of Brazilian companies during the period from 2002 to 2010. Due to the endogeneity problems that affect corporate finance studies, such as omitted variables, reverse causality and the feedback effect, we tested dynamic multiple linear regression models, estimated by the system generalized method of moments.

The statistics indicate that better corporate governance had a positive effect on the firms' market value, as also found by Black, Jang & Kim (2006), Silveira, Barros & Famá (2006) and Ammann, Oesch & Schmid (2011). More specifically, we found that on average firms listed in the Level 1, Level 2 or Novo Mercado trading segments of the BM&FBovespa were more highly valued by the market during the study period than those listed in the traditional segment.

Therefore, it can be inferred that the higher market value of these firms resulted from adherence to practices mainly focused on protection of minority stockholders and more transparent information disclosure, such as: maintenance of a minimum free float of 25%; the launch of public offerings by mechanisms that favor dispersion of capital; stronger tag-along rights than the legal requirement (L2 and NM); consolidation and special review of balance sheets; and disclosure of information on contracts with related parties and shareholders' agreements.

The listing in one of these three segments, as pointed out by Carvalho & Pennacchi (2012), should act as a signal to the market of reduced information asymmetry, among other

factors. This reduction, in turn, at least in the market's perception, should mitigate the firm's agency costs, increasing demand for its shares consequently raising its market value.

Among the main limitations of this study, we mention the fact that the CGQ variable did not separately analyze the impact of listing in each of the three premium corporate governance segments on the firms' performance. Future studies, besides segregating companies of Level 1, Level 2 and Novo Mercado, can employ models with structural equations.

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