The Effects of Mergers and Acquisitions on the Stock Performance: Evidence from the Brazilian Stock Market

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Abstract

The purpose of this article is to investigate the effects of mergers and acquisitions on the stock performance of acquiring companies traded on the Brazilian Stocks (BM&FBovespa). To that end, we evaluated the cumulative abnormal returns in order to measure their performance in the short and long term after the announcement date of the transaction. Three forms of payment for acquisitions are considered in this study: money, stock, and cash and stock. For 709 transactions studied, the results show that the acquisitions in a bull market bring different returns than those in a bear market. In addition, we note that the market behavior as well as the form of payment influences the return on investment of the acquiring company.

Keywords: Mergers; Acquisitions; Return; Stock Market.

1. Introduction

The period since 2000 has been marked by profound changes related to the participation of foreign companies in the Brazilian market, the growth of large national groups through mergers and acquisitions (M&A), and cycles of economic growth accompanied by expanding household consumption interspersed with contagion from international crises. These changes have had an important reflection in the capital market, influencing the prices of shares and thus firms' market value. Therefore, deep knowledge of the market dynamics combined with good planning and strategy is essential for the growth of companies. This study investigates the subject of mergers and acquisitions in the context of the capital market and analyzes the ideal conditions for these deals, from the standpoint of market fluctuations and forms of payment used in the transactions. This information can help firms make decisions about M&As in the Brazilian market, including their timing. Hence, the aim of this article is to shed light on these matters by empirically examining the following question: Do deals announced during bull markets bring different returns than those announced during bear markets? More specifically, we are interested in assessing if M&A transactions have effects on the return of the acquiring firms both in the short and long run and with different market scenarios and forms of payment. Using trading and stock price data and the performance of the price/earnings ratio[1], we compare the results with those obtained from transactions carried out during bull/bear markets, using as a sample the M&A transactions in Brazil. We also consider three forms of payment: money, stocks and a combination of the two.

A large body of academic literature exists on whether mergers and acquisitions really produce the gains the acquiring firms expect to obtain from a process that is often complex and costly, as well as how the characteristics of the transaction and the firms involved explain the success or failure of the deal in terms of generating value for shareholders. In these respects, we can mention the works of Rhodes-Kropf and Viswanathan (2004), Loughran and Vijh (1997), Shleifer and Vishny (2003), Goel and Thakor (2010), Bouwman et al. (2009), Antoniou and Zhao (2008), Habibe (2006), De Camargos and Barbosa (2007) and Batista and Minardi (2011). In a study of the American market, Rhodes-Kropf and Viswanathan (2004) argued that the deals carried out in periods of high valuation are subject to greater influence of market conditions than those undertaken in down market conditions. The authors studied the influence of valuation errors (bidding and target firm) on the level of M&A activity. The results indicated that the level of activity in the merger market is positively correlated with short-term valuation deviations and that the form of payment has a strong influence on this relation, with this being greater when payment is in stocks. Loughran and Vijh (1997) examined the returns

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[1] Ratio between the stock price (equal to the firm's market value divided by the total number of shares issed) and the earnings per share. It indicates a temporal relation between the stock value and how much this can aggregate value to shareholders in the future.

of a sample of 947 firms listed on the New York Stock Exchange (NYSE) during 1970-1989. They found that the long-term performance of acquiring firms that used shares as a form of payment was inferior to the performance of those using cash. Besides this, they demonstrated that cash tender offers earned significantly positive excess returns in the long run, while deals paid with shares had negative returns. Shleifer and Vishny (2003) modeled the impact of market valuation on acquisition decisions, the payment method, performance of the acquiring firm and the occurrence of merger waves. The authors considered two firms in the analysis with stocks of capital and market valuation of shares measured by unit of capital. They concluded that firms with overvalued equity capital are able to make acquisitions and grow, while those with a history of devaluation of their capital become targets of M&A processes. Since when payment is in cash, the acquiring firms have cash to spare, it can be employed in M&A transactions. This agrees with our finding that better long-term returns are obtained for cash transactions.

Goel and Thakor (2010) demonstrated that mergers carried out during upward market movements involve smaller synergies than those that occur during downward movements. To identify the movements, they used the price/earnings ratio of the S&P500[2] and the book value/market value ratio. They concluded that merger waves are more likely in rising markets than in falling ones. Therefore, the acquisitions realized during rises bring smaller returns for the acquiring firms in relation to those carried out during falling markets. Bouwman et al. (2009), based on a sample of 2,944 acquisitions announced in the United States in the period from 1979 to 2002, examined the stock returns of the acquiring firms when the market was booming in relation to those announced when the market was depressed. For this purpose, they divided the sample into periods of high, neutral and low market valuation and compared the performance of firms that announced acquisitions in these different market circumstances. As a measure of operational performance, they evaluated the acquisition and the performance of the shares as a way to ascertain if the initial market reaction is compatible with the stock performance in the short and long run. They found that in the short run, the returns are not significantly negative for acquisitions initiated during high markets, but are significantly negative for those announced while markets were depressed, and the difference between the two was also significant. According to Antoniou and Zhao (2008), the announcement of a merger sends an important signal to the stock market, since it reveals information to the market about the target firm, the bid and the synergy envisioned, and the market reacts immediately to the announcement. If some firms are mistakenly valued before the announcement, the market will react and revalue the company in function of the perception of the deal, possibly viewing the deal as a value destroyer.

For the Brazilian market, Habibe (2006) analyzed the price behavior of firms involved in acquisitions, before and after the announcement of the intention to buy. The period of analysis was the day of the announcement, irrespective of whether the transaction was a success, failure or still in the negotiation phase. The author calculated the market value of each firm for three situations: the value of the day before the announcement, the value at the end of the announcement day and the expected value of the company if there had not been any announcement. The results showed that the target firms produced high abnormal returns, while for the acquiring firms the returns were statistically near zero. Also in Brazil, De Camargos and Barbosa (2007) analyzed the abnormal return of shares at the time of disclosure of the deal, from the perspective of value creation for stockholders. To calculate the abnormal return they used a reference index of the Brazilian stock market. They tested the hypothesis of value creation for stockholders by comparing the averages for the periods before and after date zero (announcement of the deal). They concluded that in an efficient capital market, the stock price upon disclosure of an M&A deal should incorporate investors' expectations about future results. Later, De Camargos and Barbosa (2009) found that M&A transactions that happened in Brazil between January 1996 and December 2004 provided operational synergies for the firms and led to increases in the market values of the companies studied. To summarize the empirical results regarding M&A activity in Brazil, these authors explained that: (i) the stockholders of acquired firms obtain substantial gains in the short run when the transaction is successful, and these gains are apparently greater in acquisitions than in mergers; (ii) the stockholders of the acquiring firms realize very small gains from acquisition of control, on average 4%; (iii) the rate of return to shareholders of the target firms in unsuccessful mergers is negative; and (iv) the average general profitability for shareholders in unsuccessful acquisitions and mergers is equal. Batista and Minardi (2011) studied M&A cases by the relation between the performance of the shares of the buyers and the valuation level of the market in the month when the deals were announced. Using cumulative abnormal returns of shares listed on the BM&FBovespa between 1993 and 2007, they found evidence that in the Brazilian market M&As in general have a negative long-term return, and transactions occurring during periods of overvalued stocks do not perform worse than those carried out in moments of undervalued stocks.

From these studies it can be noted that although M&A transactions occur frequently in the capital market, the effects are not always positive to create wealth for stockholders, both of the acquiring and target

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[2] An American stock market index that consists of stocks of 500 firms chosen according to market size, liquidity and representation.

firms. Furthermore, the study of mergers and acquisitions is still incipient in Brazil. Therefore, this study contributes with an empirical approach, using the returns of the acquiring firms and comparing them with the stock prices and market behavior, considering a large number of deals that have occurred in Brazil.

In response to the question posed about the difference between acquisitions, our investigations showed that during the period studied: a) acquisitions paid in shares obtained better returns in the short run than in the long run; b) in high markets, better returns were obtained from acquisitions paid in shares in the short run, while acquisitions in cash were the best option in the long term; c) the results found for Brazil are consistent with those presented by Bouwman et al. (2009); d) over the short term, the returns from acquisitions in cash during bull markets were near zero for the acquiring firms; and e) in acquisitions paid in cash during bull markets, the returns over the long run were also near zero.

This work contributes to the study of mergers and acquisitions in Brazil by analyzing, based on the premises presented by Bouwman et al. (2009), the relation between the return of the shares of acquiring firms and the performance of the stock market. As demonstrated in the American study, the market value of firms at the time the deal is initiated, is correlated with the performance of the acquiring firm's shares. Consequently, acquisitions carried out during periods of bull markets produce smaller returns than those occurring during periods of depressed markets, a finding corroborated in our study of Brazil. Finally, it fills a gap in the national literature by analyzing the returns in the short and long run along with the form of payment, as well as the relation of the returns with the market's overall performance.

The article is organized into four sections, besides this introduction. Section 2 describes the methodology, section 3 presents the database and results of the analysis, and section 4 presents our conclusions.

2. Methodology

2.1 Classification of the market periods

To examine if mergers and acquisitions announced during periods of strong stock markets bring different returns than those during weak markets, it is necessary to classify market periods. According to Bouwman et al. (2009), in each month the market can be classified as having high, neutral or low average valuation based on the price/earnings ratio (P/E) after removing its trend bias[3]. The price/earnings ratio is an indicator of the return/growth of an investment to the stockholders, and according to Basu (1977) it can be calculated by dividing the market price per share (PS) and the annual earnings per share (EPS) of the firm. It should be compared with firms in the same sector or market. Based on this result, the market periods can be classified as having low or high valuation. So, we classified each month as above (below) the average if the P/E of the market in this month was above (below) the average of the past five years. In the third place, we calculated the quartiles of the sample, with the months below the first quartile being classified as having weak markets (low valuation) while the months above the third quartile were considered as having strong markets (high valuation), and the months between these two quartiles were classified as neutral.

2.2 Announced returns – short term

Based on the method used by Brown and Warner (1985), we employed the modified market model to estimate the abnormal returns and calculated the abnormal daily returns, as described by equation (1), subtracting the return of the benchmark index from the return of the company under analysis. We used this method because in the unmodified market model, the sample can contain s single acquirer more than once, depending on the number of acquisitions that occurred, which can bias the result.

$$AR_{it} = R_{it} - R_{Mt} \qquad (1)$$

Where AR_{it} is the abnormal return of firm i on date t, R_{it} is the daily return of the shares of firm i on date t, and R_{Mt} is the return of the benchmark index on date t, in this case the Ibovespa[4]. We calculated the

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[3] The removal of the P/E trend consists of eliminating its linear trend, so as only to show the absolute variations in values and permit identification of potential cyclical patters. This involves estimating the equation: $PE_E = \beta_0 + \beta_1 t + \varepsilon$, where PE_E is the ratio P/E , β_0 and β_1 are the coefficients and t is the time. By using the ordinary least squares method, in incremental moving windows, the detrended P/E series is obtained in the following form: $PE_E - \hat{\beta}_0 - \hat{\beta}_1 t$.

[4] We adopt the comparison with the market and use the Bovespa index (Ibovespa) because it is the most important stock market performance indicator in Brazil.

abnormal returns for an event window of three days around the announcement date (from one day before the event to one day afterward). The cumulative abnormal return (CAR), as described in equation (2) below, is calculated by the sum of the abnormal returns over the three-day window period.

$$CAR_{i,t} = \sum_{t=1}^{T} AR_{it} \qquad (2)$$

2.3 Announced return – long term

To examine the long-run abnormal return, we used the buy-and–hold abnormal return (BHAR) model proposed by Barber and Lyon (1997), in which the long-term abnormal return is calculated as the difference between the return of a stock purchased on determined date (maintaining the position until the end of the period chosen for analysis) and the return of the reference index. This index can be composed of the shares of a firm or set of firms in the same sector, or be a market index. In our case, we also chose the Ibovespa to calculate the daily return of the stocks in a two-year interval after the announcement date of the acquisition. The long-term abnormal returns (BHAR) are found by the following formula:

$$BHAR_{it} = \prod_{t=1}^{T}(1 + R_{it}) - \prod_{t=1}^{T}(1 + R_{Cit}) \qquad (3)$$

Where R_{it} is the monthly return of firm i, R_{Cit} is the monthly return of the reference index and t represents the two-year horizon after the deal.

2.4 Hypothesis testing

To analyze the short- and long-run returns, as well as the respective periods of classification as high, neutral or low market valuation, we calculated the means of the daily returns of the stocks, as described by formulas (4) and (5) below:

$$CAR_{mean} = \frac{\sum_{t=1}^{T} AR_{it}}{n} \qquad (4)$$

Where $\sum_{t=1}^{T} AR_{it}$ is the cumulative abnormal return (CAR) and n is the number of observations of the sample.

$$BHAR_{mean} = \frac{\sum_{t=1}^{T} BHAR_{it}}{n} \qquad (5)$$

Where $BHAR_{it}$ is the monthly abnormal long-term return of firm i in t months and n is the number of observations of the sample.

The statistical tests consisted of verifying: a) whether the average short- and long-term returns were significantly positive; and b) if these return, in the different valuation periods and forms of payment, had significant differences from their corresponding mean values. For the short run, we applied the Student t-test, according to Ma and Pagan (2009):

$$t = \frac{CAR_{mean} - \mu}{\sigma / \sqrt{n}} \qquad (6)$$

Where μ is the mean, σ is the standard deviation of the sample and n is the number of observations. For the t-statistic, we assumed as the null hypothesis $H_0: \mu \leq 0$ and $H_1: \mu > 0$, with significance of 5%.

In relation to the long run, Barber and Lyon (1997) documented in their study that over this horizon, the distribution of the abnormal returns has positive slope and this positive asymmetry leads to a negatively biased t-statistic. To eliminate the asymmetry bias when the long-run abnormal returns were calculated for the BHAR reference portfolios, the authors proposed the bootstrapped skewness-adjusted t-statistic model. This statistic was developed by Lyon, Barber and Tsai (1999), based on the argument that if the distribution of the BHAR values has positive slope, the inference should not be based on the supposition of normality. Instead, the skewness-adjusted statistical test should be applied, beginning with the critical values, to extract the statistical inference. This statistic is given by the following formula:

$$t = \sqrt{n}\left(S + \frac{1}{3}\hat{\gamma}S^2 + \frac{1}{6n}\hat{\gamma}\right) \qquad (7)$$

Where:

$$S = \frac{\overline{BHAR}}{\sigma(BHAR)} \quad \text{and} \quad \hat{\gamma} = \frac{\sum_{i=1}^{n}(BHAR_i - \overline{BHAR})^3}{n\sigma(BHAR)^3} \qquad \text{(8) and (9)}$$

With $\hat{\gamma}$ being an estimator of the coefficient of asymmetry, n the sample size, σ the standard deviation and $\sqrt{n}S$ the conventional t-statistic. According to Sutton (1993), bootstrapping should be utilized for the t-test when the main distribution is asymmetric, because it reduces the probability of type I error in cases where the t-test has a high rate of this error type, besides being a more powerful technique. Applying bootstrapping to a test statistic involves removing X samples of size Y from the original sample. The skewness-adjusted t-statistic is calculated for each of these X samples and the critical values are calculated based on the transformed statistic. Following Lyon, Barber and Tsai (1999), for bootstrapping purposes we employed the entire sample and used 10,000 replications starting from the original sample, which in our case consisted of the abnormal returns distributed in the following conditions: all the acquisitions paid in cash, shares, and cash and shares, as well as the situations of high, neutral and low market valuation. From these 10,000 replications, we computed the critical values ($t_{c\,inf}$, $t_{c\,sup}$) for the transformed t-statistic (t_{sa}^b) and assumed the null hypothesis $H_0: \mu \leq 0$ and $H_1: \mu > 0$. The level of significance of the test statistic was 5%. The critical values to reject the null hypothesis satisfy the following equation:

$$Pr[t_{sa}^b \leq t_{c\,inf}] = Pr[t_{sa}^b \geq t_{c\,sup}] = \frac{\alpha}{2} \qquad (10)$$

To test the difference between means, we applied the method used by Bouwman (2009), as below:

$$t = \frac{CAR_{mean,i} - CAR_{mean,j} - \mu}{\sigma_i / \sqrt{n_i} + \sigma_j / \sqrt{n_j}} \qquad (11)$$

$$t = \frac{\overline{BHAR_\iota} - \overline{BHAR_J} - \mu}{\sigma_i / \sqrt{n_i} + \sigma_j / \sqrt{n_j}} \qquad (12)$$

Where σ is the standard deviation of the sample, n is the number of observations, and i and j are different samples. We assumed as the null hypothesis $H_0: \mu_i - \mu_j \geq 0$ with corresponding $H_1: \mu_i - \mu_j < 0$. The variances were not equal and the samples were independent. To assess the level of dispersion of the data, we employed the standard deviation (SD) and the coefficient of variation (CV), which is obtained by the ratio between the standard deviation and the mean. We considered the data to have low dispersion for CV values lower than 0.20 and high dispersion for values above 0.20.

2.5 Collection, treatment and analysis of the data

Our database consists of 4,276 M&A transactions announced in Brazil between January 2000 and August 2014. The data were obtained from Bloomberg and the details of each deal were the ticker code, announcement date, name of the two firms, value of the transaction, form of payment and status of the deal. The reference for the transaction was the date of announcement to the market. Regarding form of payment, we found that during the reference period, of the 709 transactions considered (from applying a filter), 568 (80.1%) involved money, 100 (14.1%) were paid in shares and 41 (5.8%) involved cash and stocks. The initial sample consisted of the daily stock prices of the acquiring firms in the three days around the event (announcement date) and during the ensuing two years. In the first case we calculated the daily return while in the second we calculated the monthly returns since the announcement date, considering an interval of 21 business days per month. Therefore, we constructed a base of 24 months of observed stock returns of the acquiring firms. We performed the same calculations for the reference index (Ibovespa). We also adopted some criteria to refine the sample. First, we considered the transactions involving publicly traded acquiring firms, with shares listed on the São Paulo Stock Exchange (BM&FBovespa). Then we extracted the transactions without trading value reported. From this base, we adopted the following conditions for the sample:

- Value of the deal higher than R$ 1 million;

- Form of payment in cash, shares or cash and shares (mixed);

- Preferred shares (PN);

- Status of the deal "Completed".

Since our objective is to verify the short- and long-term effects on the performance of the shares of the acquiring firms, for the short-run calculations we used the stock prices on the three days around the announcement date (from one day beforehand to one day afterward). We excluded from the sample transactions where the firms did not have shares traded on those days. For the long-run calculations, we used the stock prices available for two years as of the announcement date. This sample was composed of the same M&A transactions as over the short term. To depict the long-run effects, we used the M&A transactions occurring up to August 2012, to observe the stock price behavior until August 2014. The final sample consisted of 709 transactions, distributed as shown in Figure 1(a). Note that in the period from 2007 to 2012 there was a substantial increase in the number of mergers and acquisitions in relation to the 2000-2006 period. The weighted average of the value of the deals between 2000 and 2006 was R$ 18.3 billion, while it was R$ 68.3 billion for the years from 2007 to 2012. We used the weighted average because 2012 only includes the first eight months, due to our cutoff point two years later for the long-term analysis.

Figure 1 - Statistics on mergers and acquisitions in Brazil.

(a) - Number of mergers and acquisitions in Brazil
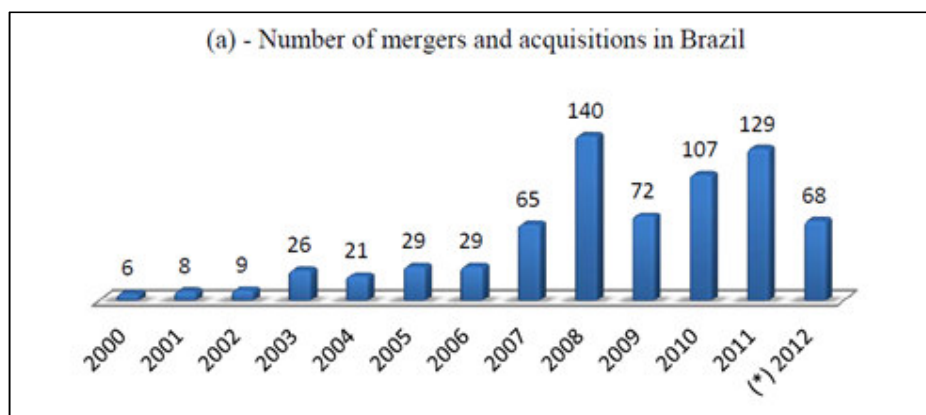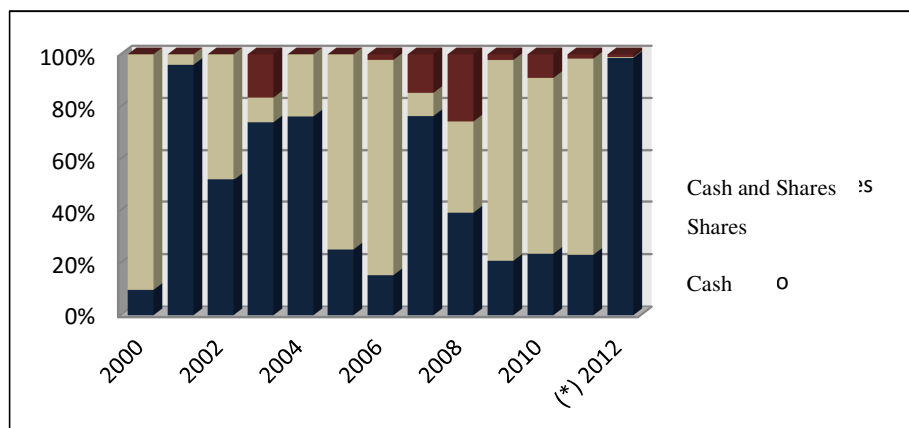
Note: (*) Data to August.
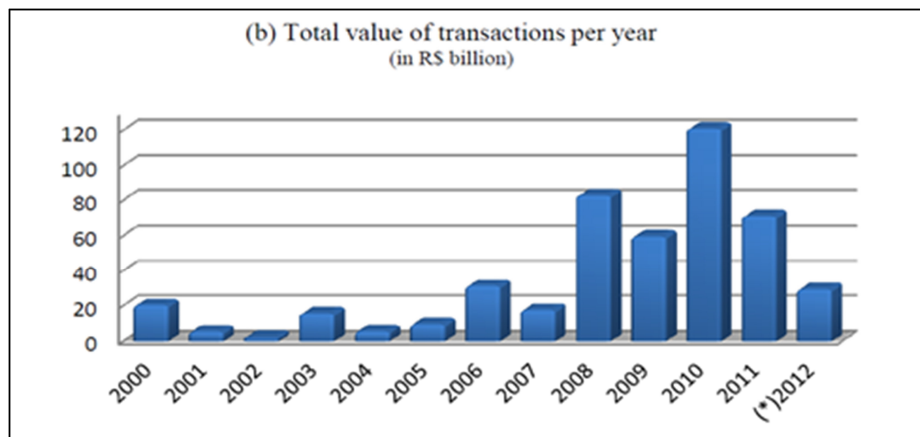
Note: (*) Data to August.

Starting in 2000, Brazil went through a productive and financial reorganization, the fruit of liberalization of the economy and global economic growth (De Camargos and Barbosa, 2007). The evolution of the value of M&A transactions over the years is shown in Figure 1(b). We highlight the volume of deals in 2008, which was marked by the global financial crisis. Nevertheless, in Brazil several high-value deals occurred that year, particularly the merger of the BM&F with the Bovespa and the merger of two of the largest five banks in the country. In relation to 2010, 60% of the total corresponds to a single deal, one of the largest in the market to that date, involving an oil company. Regarding the form of payment, of the 709 transactions, 568 (80.1%) were in cash, 100 (14.1%) in shares and 41 (5.8%) in cash and stocks. Figure 2 depicts the yearly behavior.

Payment in money is the most common and traditional form used in M&A transactions. This was the form used the most in 2001, 2003, 2004, 2007 and 2012. However, we highlight that payment in shares was predominant in 2000, 2005, 2006, 2009, 2010 and 2011.

Figure 2 – Distribution of the form of payment of mergers & acquisitions.

Note: (*) Data to August.

3. Results

3.1 Classification of the markets

Figure 3 shows the classification of the market periods by valuation levels. Half of the months were classified as neutral, with bull and bear markets accounting for the other half in equal proportions. From January 2000 to August 2012, there were 38 months with high valuation, 76 neutral months and 38 high months. There

was a particularly steep decline starting in March 2008, culminating with the low point in October 2008, followed by steady recovery until February 2010.

Figure 3 – Classification of the periods by market valuation.
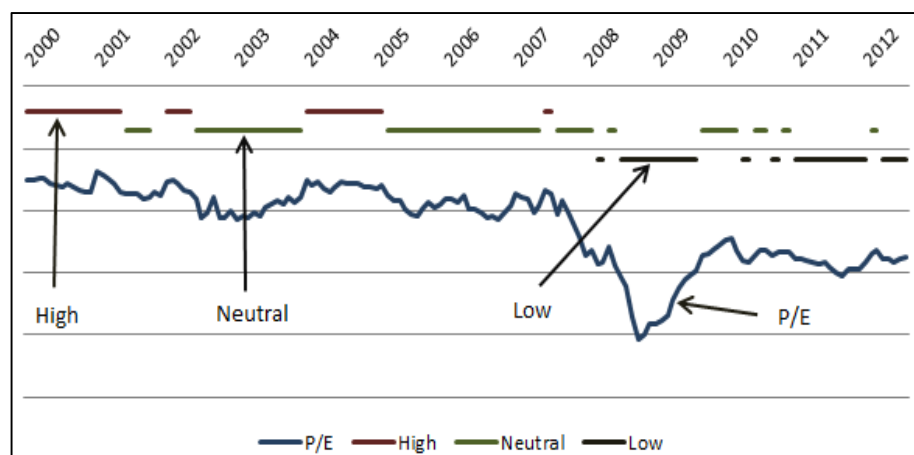
Notes: - The horizontal line segments represent the periods classified as high, neutral and low;
      - The P/E ratio is the difference between the detrended P/E and mean P/E;
      - The actual mean P/E is the moving average of the P/E for the past five years.

According to the classification of the market conditions considered here, we can establish the list of the number of deals that happened during the periods. Table 1 shows that 357 (50.35%) of the 709 transactions were carried out in low periods, 319 (44.99%) in neutral periods, and only 33 (4.65%) in high market valuation periods.

Table 1 – Valuation periods and number of transactions.

Year	All	Low	%	Neutral	%	High	%
2012	68	49	72.1%	19	27.9%	0	0%
2011	129	129	100%	0	0%	0	0%
2010	107	26	24.3%	81	75.7%	0	0%
2009	72	40	55.6%	32	44.4%	0	0%
2008	140	113	80.7%	27	19.3%	0	0%
2007	65	0	0%	64	98.5%	1	1.5%
2006	29	0	0%	29	100%	0	0%
2005	29	0	0%	28	96.6%	1	3.4%
2004	21	0	0%	0	0%	21	100%
2003	26	0	0%	26	100%	0	0%
2002	9	0	0%	9	100%	0	0%
2001	8	0	0%	4	50%	4	50%
2000	6	0	0%	0	0%	6	100%
TOTAL	**709**	**357**	**50.35%**	**319**	**44.99%**	**33**	**4.65%**

(*) Data to August.

The increase in the number of M&A deals in Brazil ironically started in 2008, the start of the global crisis, reflected in the high percentage of transactions occurring during market slumps (50.35%), since the stock market indexes fell drastically all over the world. However, until 2007, the transactions carried out during bull market periods, a total of 33, accounted for 17% of the 193 M&A deals in this period.

In terms of the deals, Table 2 shows the distribution by form of payment (money, shares and money & shares), as well as by market classification (high, neutral and low valuation). It also reports the average values, the median and percentages regarding the value of the transactions and total number of deals. It can be seen that 61.55% of the total amount paid occurred during low market periods, 31.95% in neutral periods and 6.51% in

high market valuation periods. Acquisitions in shares represented 56.67% of the deals, followed by cash, with 34.68% and money & shares with 8.64%. Although corresponding to more than half of the value of the acquisitions, payment in shares was not common when measured by number of deals, accounting for only 14.10% of the total, while 80.11% of the transactions were paid in cash. In this context, transactions involving higher values tended to be paid by issuing or exchanging shares, so that the acquiring firms did not need to rely on cash reserves, which could have caused negative financial impacts on the acquiring firm.

Comparison of the periods of high, neutral and low market valuation reveals that this factor had little effect on the acquiring firms' decisions regarding form of payment, since the percentages of payment in cash in relation to the number of deals are very near, at 75.76%, 78.68% and 81.79%, respectively.

Measured by value of the transactions, payment in shares was the leading choice, regardless of a high or low market, a fact reflected in the percentages of 64.67% and 65.57%, respectively. This indicates that the choice of payment form is more closely related with the amount involved instead of the market behavior.

Table 2 – Classification of the transactions by types of payment and values.

Acquisitions	Number of acquisitions	Average value of the transactions (R$ million)	Median value of the transactions (R$ million)	Total value of the transactions (R$ million)	% by value of the transactions	% by number of the transactions
All	709	669	72	474,415	100%	100%
In high markets	33	1,715	1,029	30,874	6.51%	4.65%
In neutral markets	319	2,196	898	151,558	31.95%	44.99%
In low markets	357	7,684	2,771	291,983	61.55%	50.35%
In cash	568	290	56	164,538	34.68%	80.11%
On shares	100	2,689	606	268,868	56.67%	14.1%
In cash & shares	41	1,000	188	41,010	8.64%	5.78%
In high markets in cash	25	779	485	10,906	35.33%	75.76%
In high markets in shares	8	3,328	1,478	19,968	64.67%	24.24%
In high markets in cash & shares	0	-	-	-	-	-
In neutral markets in cash	251	1,224	462	79,547	52.49%	78.68%
In neutral markets in shares	48	1,915	741	57,435	37.9%	15.05%
In neutral markets in cash & shares	20	1,121	641	14,576	9.62%	6.27%
In low markets in cash	292	1,950	981	74,084	25.37%	81.79%
In low markets in shares	44	8,325	2,263	191,465	65.57%	12.32%
In low markets in cash & shares	21	1,762	145	26,434	9.05%	5.88%

3.2 Hypothesis testing

3.2.1 *Short run*

We tested whether the means of the cumulative abnormal returns (CAR) were significantly positive and brought gains to the acquiring firm. The results are shown in Table 3. In panel A, considering all the transactions in the sample (709), the mean abnormal return for all the deals was 0.38%. In the acquisitions paid in cash, the mean return was 0.01%, while in those paid with shares, the return was 1.92%, followed by mixed payment (money & shares) with 1.73%. The results do not reject the null hypothesis. Therefore, the returns were significantly positive. With respect to the coefficient of variation, there was large dispersion for the acquisitions in cash. This can be explained by the existence of transactions producing very low and/or high returns in relation to the average, a not uncommon pattern in the stock market.

With respect to panel B, which only considers acquisitions carried out during bull markets, the average return of all the deals was -0.29% and for acquisitions in cash it was -0.80%. But in this case, the results also were not significant. When considering the coefficient of variation calculated based on the standard deviation, the returns for cash acquisitions are near zero, a fact already verified for panel A. Once again, acquisitions in cash obtained significant returns with low dispersion, with mean of 1.29% and CV of 0.04. In the period analyzed, there were not M&A deals paid in cash and shares.

Panel C, which covers the neutral scenario (situations not characterized as high or low markets), the return on cash acquisitions was -0.16%, in contrast to a return of 1.10% for payment in shares and 3.27% for payment in cash and shares. This value is significant is significant when compared with the sample of 319 transactions in this scenario, where the total average return was 0.25%.

The acquisitions that took place during weak markets, represented by panel D, did not present significantly positive returns, with an average of 0.56%, although this was higher than in the other scenarios. The same can be said for acquisitions in cash (0.23%) and shares (2.92%) when compared with the previous scenarios. The coefficient of variations showed small dispersion for the returns, with the exception of the cash purchases (CV = 0.35), a result that is in line with the findings for the previous scenarios.

Table 3 – Cumulative abnormal returns (CAR) – three days.

	All		CASH		SHARES		CASH & SHARES	
	Number	CAR	Number	CAR	Number	CAR	Number	CAR
Panel A: all acquisitions								
All	709		568		100		41	
Mean		0.38%		0.01%		1.92%		1.73%
t-statistic		1.02		0.03		1.27		1.75
Standard deviation		0.1		0.09		0.15		0.06
Coeff. variation		0.26		7.12		0.08		0.04
Panel B: acquisitions during high market valuation periods								
All	33		25		8		0	
Mean		-0.29%		-0.80%		1.29%		-
t-statistic		-0.44		-1.24		0.7		-
Standard deviation		0.04		0.03		0.05		-
Coeff. variation		0.13		0.04		0.04		
Panel C: acquisitions during neutral market valuation periods								
All	319		251		48		20	
Mean		0.25%		-0.16%		1.10%		3.27%
t-statistic		0.37		-0.24		0.41		0.06
Standard deviation		0.12		0.1		0.19		0.07
Coeff. variation		0.48		0.66		0.17		0.02
Panel D: acquisitions during low market valuation periods								
All	357		292		44		21	
Mean		0.56%		0.23%		2.92%		0.26%
t-statistic		1.25		0.49		1.62		0.25
Standard deviation		0.08		0.08		0.12		0.05
Coeff. variation		0.15		0.35		0.04		0.18

Note: The chart shows the percent values corresponding to the cumulative abnormal returns (CAR) of three days for all the acquisitions during high, neutral and low market valuation periods, as well as the number of deals. The CAR for each firm was calculated over the days (–1, 0,+1), where day 0 is the date the deal was announced. The t-statistic at 5% significance considered H_0: $\mu \leq 0$ and H_1: $\mu > 0$ for significance of 5%. In this case, H_0 represents the mean of the negative or near-zero abnormal returns and H_1 the mean of the significantly positive returns. To check the dispersion of the data, we used the standard deviation and coefficient of variation, by which CV>0.20 corresponds to large dispersion.

We also tested the difference between the means of the short-term abnormal returns, considering the different market scenarios and payment forms, with the objective of ascertaining if the returns were significantly different in each group. The level of significance considered was 5%. The results of the difference of means test are reported in Table 4.

Item A shows the difference between the average return of all the deals that occurring in high market periods and the return of all the transactions during low market periods. The difference is -0.85%, and according to the statistical test result, the null hypothesis could not be rejected. This indicates that better returns were obtained during low market periods.

In item B, the focus is the difference between the average abnormal returns involving all the transactions regarding the form of payment in money or shares. The difference between the means is -1.90% and according to the statistical test, the null hypothesis again was not rejected. In the general result, better returns were obtained from acquisitions in shares.

Item C evaluates the average returns of acquisitions carried out in high and low market periods, considering only payment in cash. The result is similar to that for all the transactions (item A), so during the study period, higher returns were obtained from acquisitions in cash in low market periods.

Finally, item D reports the results of the same test as in item C, but considering payment in shares.

Table 4 - Test of the difference of means – short run.

DIFFERENCE BETWEEN MEANS (3 DAYS)		
A) (All): Acquisitions in high markets - Acquisitions in low markets	(-0.29) - (0.56) =	-0.85%
	t-statistic	-1.065
B) (All): Acquisitions in cash - Acquisitions in shares	(0.01) - (1.92) =	-1.90%
	t-statistic	-1.220
C) (Money): Acquisitions in high markets - Acquisitions in low markets	(-0.80) - (0.23)=	-1.03%
	t-statistic	-1.286
D) (Shares): Acquisitions in high markets - Acquisitions in low markets	(1.29) - (2.92) =	-1.63%
	t-statistic	-0.633

Note: The chart presents the differences between the means of the cumulative abnormal returns (CAR) for three days for all acquisitions in the high and low market valuation scenarios, as well as those paid in cash & shares. The t-test statistic for the difference of means considered the following hypotheses: $H_0: \mu_i - \mu_j \geq 0$ and $H_1: \mu_i - \mu_j < 0$, at 5% significance.

3.2.2 Long Run

We tested whether the means of the abnormal returns over the long run (BHAR) were significantly positive and represented gains for the acquiring firms. The results are shown in Table 5. Again, panel A considers all the transactions (709). The mean abnormal return over the years studied was 3.38%, and was significantly positive. In the acquisitions paid in cash, the average return of 6.45% was significant. For acquisitions in shares, the average return was -7.44%, causing non-rejection of the null hypothesis, thus meaning no gains for the acquiring firms, a scenario similar to that of acquisitions in cash & shares, where the return was -12.74%.

With relation to acquisitions carried out in high market periods, depicted in panel B, the total set of acquisitions in the long term presented average return very near zero (0.08%). In this scenario, the acquisitions in money, with average return of -1%, and in shares, with average return of 3.48%, were not significantly positive, since the null hypothesis was not rejected. Therefore, the bull market scenario did not bring significant gains for the buyers. In the period analyzed, there were no M&A transactions with payment in cash & shares. Considering the standard deviation and coefficient of variation, the dispersion was low, except for the acquisitions in cash, where the volatility was high.

For panel C, consisting of acquisitions carried out in neutral market valuation periods, the return was -3.77%. In cash acquisitions, the return was very near zero (0.05%). In the cases of acquisitions in shares and cash & shares, the returns were significantly negative, at -14.09% and -26.96%. In all these situations, we did not reject the null hypothesis, meaning that the returns were negative or near zero for the acquisitions in cash. Consequently, the neutral valuation scenario did not produce gains, but rather losses, for acquisitions utilizing shares and cash & shares.

The acquisitions occurring in low market periods, depicted in panel D, accounted for the largest number of deals made, with a total of 357, for which the average return was 10.07%, while the acquisitions in cash

presented average return of 12.58%, in both cases significantly positive. In contrast with these percentages, the acquisitions in shares presented average return of -2.16% and in cash & shares, 0.80%. Again, the acquisitions in cash were highly dispersed, which influenced the result of the sample for acquisitions in low market periods. In contrast, the acquisitions using shares demonstrated low dispersion. Thus, during depressed market periods, acquisitions in cash produced the best average return for the acquiring firms.

Table 5 – Abnormal Long-Term Returns (BHAR) – two years.

	ALL		CASH		SHARES		CASH & SHARES	
	Number	BHAR	Number	BHAR	Number	BHAR	Number	BHAR
Panel A: all acquisitions								
All	709		568		100		41	
Mean		3.38%		6.45%		-7.44%		-12.74%
t-statistic		1.55		2.65*		-1.26		-1.47
Standard deviation		0.06		0.11		0.56		0.5
Coeff. variation		0.02		0.02		0.08		0.04
Panel B: acquisitions during high valuation market periods								
All	33		25		8		0	
Mean		0.08%		-1.00%		3.48%		-
t-statistic		0.01		-0.06		0.15		-
Standard deviation		0.02		0.61		0.06		-
Coeff. variation		0.02		0.61		0.02		-
Panel C: acquisitions during neutral valuation market periods								
All	319		251		48		20	
Mean		-3.77%		0.05%		-14.09%		-26.96%
t-statistic		-0.9		0.49		-1.52		0.09
Standard deviation		0.52		0.03		0.58		0.45
Coeff. variation		0.14		0.52		0.04		0.02
Panel D: acquisitions during low valuation market periods								
All	357		292		44		21	
Mean		10.07%		12.58%		-2.16%		0.80%
t-statistic		3.11*		3.41*		-0.27		0.93
Standard deviation		0.16		0.2		0.52		0.02
Coeff. variation		0.14		0.52		0.04		0.02

Note: The chart presents the percent values corresponding to the long-term cumulative abnormal returns (BHAR) for two years for all the acquisitions during the high, neutral and low market valuation periods, as well as the number of transactions. The BHAR for each firm was calculated over the two years after the acquisition date. The bootstrapped skewness-adjusted t-statistic was applied to test H_0: $\mu \leq 0$ and H_1: $\mu > 0$ at significance of 5%. In this case, H_0 represents the mean of the abnormal negative or near-zero returns and H_1 the mean of the significantly positive returns. The asterisk (*) in the chart represents significant values. To check the dispersion of the data, we applied the standard deviation and coefficient of variation, for which CV>0.20 corresponds to large dispersion.

We tested the difference between means of the abnormal long-term returns, considering the different forms of payment, with the objective of ascertaining if the returns were significantly different. The level of significance was 5%. The results for the test of difference of means are reported in Table 6.

Table 6 - Test of differences between means – long run.

DIFFERENCE BETWEEN MEANS (2 YEARS)		
A) (All): Acquisitions in high markets - Acquisitions in low markets	(0.08) - (10.07)=	-9.99%
	t-statistic	-0.906
B) (All): Acquisitions in cash - Acquisitions in shares	(6.45) - (-7.44) =	13.88%
	t-statistic	2.264
C) (Cash): Acquisitions in high markets - Acquisitions in low markets	(-1.0) - (12.58) =	-13.59%
	t-statistic	-1.065
D) (Shares): Acquisitions in high markets - Acquisitions in low markets	(3.48) - (-2.16) =	5.64%
	t-statistic	0.239

Note: The chart presents the differences between the means of the cumulative abnormal returns (BHAR) for two years for all the acquisitions in the high and low market valuation scenarios, as well as those with payment in cash & shares. The t-statistic for the difference of means considered as hypotheses: $H_0: \mu_i - \mu_j \geq 0$ and $H_1: \mu_i - \mu_j < 0$, at 5% significance.

Table 7 - Summary of the results for the short and long terms.

a) Short Term

		Highest Return	Lowest Return
Scenario	All	Shares	Cash
	High	Shares	Cash
	Neutral	Cash&Shares	Cash
	Low	Shares	Cash
Form of Payment	Cash	Low	High
	Shares	Low	High

b) Long Term

		Highest Return	Lowest Return
Scenario	All	Cash	Cash&Shares
	High	Shares	Cash
	Neutral	Cash	Cash&Shares
	Low	Cash	Shares
Form of Payment	Cash	Low	High
	Shares	High	Low

Item A shows the difference between the average return of all acquisitions that occurred in high market intervals and the average return of all the deals carried out during low market periods. The difference of the means was -9.99%, and according to the test statistic, we did not reject the null hypothesis. This indicates that higher returns were obtained from deals done in depressed market periods.

In item B, the focus is on the difference between the average abnormal returns involving all the transactions regarding payment in money or shares. The difference between the means was 13.88% and according to the test statistic, we rejected the null hypothesis. Therefore, better returns were obtained from cash acquisitions.

In item C, we evaluate the average returns of the deals carried out in high and low market scenarios, considering only payment in money. The result is similar to that for all the transactions (item A), so higher returns were obtained from cash acquisitions during depressed market periods.

Finally, in item D we apply the same test as in item C, but considering the deals with payment in shares.

4. Conclusion

The objective of this study was to verify the effects of mergers and acquisitions in Brazil on the performance of the shares of the acquiring firms. For this purpose, we evaluated the short- and long-term abnormal returns as of the announcement date of the transaction, also considering the forms of payment.

In the short run, considering form of payment, the acquisitions paid with shares obtained the best returns. Regarding the underlying market scenario, the transactions carried out in periods of low market valuation produced the best returns, in contrast to the evidence from the United States. In this context, the better result from deals paid in shares can be explained by the fact that the acquisitions in cash brought negative effects by depleting the acquiring firms' cash reserves. This was reflected in the short-term results, where the effect is incorporated in the share price of the firms involved in the deal. This consequence is predicted by the valuation theory and the idea of asymmetric information.

Over the long run, considering the form of payment, the cash acquisitions obtained the best returns. With respect to the market valuation scenario, the transactions carried out in bear market intervals produced the best returns. Thus, in this respect the result for Brazil is similar to that found by other authors for the United States. The effects of using cash in acquisitions typically dissipate in the long run, since firms recompose their cash flow through new contracts and business activities, for example. The reduction of costs and expenses due to the synergies generated in general also bring benefits to the financial results of the buyer, reflected in the performance of its shares, in line with the theory of efficiency. When the market is depressed, the prices of shares become more attractive to potential buyers, under the perspective of growth over the long term. Therefore, the acquirer can obtain gains from the higher market valuation of the shares of the acquired company, also with a positive effect on the buyer's financial result.

Our analysis of the opportunity for M&A transactions considering high and low market valuation periods as well as different forms of payment and durations (period for return on the investment) is a differential of this study. The results show that during bull market periods in Brazil, the best returns are generated by acquisitions in shares in the short run, while during bear market intervals, cash acquisitions are the best long-term option. For a better understanding of the subject, we suggest evaluating the premium for control (how much extra a buyer pays for gaining control of the target firm) and the influence of this on the stock price, as well as examination of the effects of buying a listed company and then taking it private (bias in the buyer's strategy).

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