The accounting choice issue and the M&A activity

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Abstract - This study addresses the issue of the accounting choice as a possible determinant of mergers & acquisitions (M&A) activity. The accounting choice has value implications, and managerial discretion can be used to meet financial reporting objectives (see e.g. Watts & Zimmerman, 1990). On the other hand, despite the existence of a wide empirical and theoretical research, the literature still lacks a convincing overall theory concerning M&A occurrence. Nevertheless, the overall evidence suggests that some macroeconomic variables are associated with the timing of M&A. This paper studies whether accounting choice developments can affect M&A activity together with macroeconomic, time, and several M&A endogenous variables. The findings show a significant positive relationship between M&A activity and stock market prices, and also several significant associations between M&A and other endogenous and exogenous explanatory variables, but no relationship between accounting choice and M&A activity.

EFM classification: 710, 160, 200

Keywords: Mergers, Acquisitions, Business combinations, Time series, U.S.A.

1. Introduction

Usually managers have discretion in the application of the generally accepted accounting principles (GAAP). The set of accounting procedures within which managers have discretion is commonly known as the "accepted set." (Watts & Zimmerman, 1990). According these authors, the managerial discretion over the accounting method choice is expected to vary across firms with the variation in the costs and benefits of restrictions (enforced by external auditors) which will produce the "best" or "accepted" accounting principles. The managerial discretion can be used to meet financial reporting objectives. Moreover, the achievement of objectives benefits managers whose compensation is tied to financial information. Whether shareholders benefit from managerial discretion and whether the benefits outweigh the costs is not such a clear matter (Fields et al., 2001).

The accounting choice has value implications. Several studies have found that both acquirer and target companies select an accounting method based upon certain financial and non-financial characteristics (Davis, 1990). The percentage of insiders' ownership, accounting-based compensation plans, leveraged-based lending agreements, the company size and some other specific characteristics determine which accounting method is selected (Dunne, 1990). For instance, managers at companies with compensations based upon earnings favoured pooling of interest method because it benefited earnings and return on investment (Aboody et al., 2000; Gagnon, 1967).

Two traditional methods are used to account for business combinations: the purchase method (purchase) and the pooling of interests method (pooling). The literature focused on the pooling-purchase choice is relatively large. It may be worth briefly reviewing some of it. Many studies documented that the short-window announcement returns are lower for pooling firms than for purchase firms (Davis, 1990; Hong et al., 1978; Martinez-Jerez, 2001). It has been also found that pooling firms willingly incur significant costs to achieve the desired financial reporting outcome (Ayers et al., 2002; Lys & Vincent, 1995; Weber, 2004). Other studies pictured that pooling method results in mechanical effects on companies' financial statements and on the analysis of the financial statements (Jennings et al., 1996; Vincent, 1997).

Discussions about business combinations easily generate controversies because they may lead to dramatic changes to the financial statements. When the prohibition of use of pooling was discussed in the U.S in late 1990's, many companies and professional boards strongly disagreed because they were concerned with managing cash flows over earnings per share (EPS) and therefore they were afraid of goodwill and amortization charges. They argued that many M&A deals would not be possible do complete without pooling (e.g. major deals involving enormous companies with large goodwill and other intangible assets balances). Therefore, the M&A activity and the economy could suffer from this potential constraint.

Pooling worked has an accounting option and that was an advantage for certain companies and some sectors. It represented also an opportunity for creative accounting. However, the pooling benefits had inherent some relevant costs. Companies often consumed "substantial resources" structuring transactions merely to meet the requirements of pooling (Linsmeier et al., 1998), spending massive fees with legal and financial advisors. This concern could even lead to put the formal aspects over the corporate strategy – a mistake at M&A level.

Despite some disagreements, pooling was banned in the U.S.A. - 1 July 2001 - and also at international level, as the International Accounting Standards Board (IASB) followed in 2004 the initiative of its American counterpart, the Financial Accounting Standards Board (FASB). Another innovation brought by FASB and also followed by IASB, was the replacement of purchased goodwill amortization by impairment tests.

2. The M&A phenomenon

Why M&A occurs continues to be a phenomenon not fully understood. Despite all efforts made, previous researchers have been unable to reach a consensus about the theoretical framework that underlies M&A activity and its wave pattern.[1] In fact,

[1] The finding that M&A occurs in waves seems to be indisputable as almost all authors admit it (e.g. Andrade & Stafford, 2004; Barkoulas et al., 2001; Gort, 1969; Harford, 2005; Mitchell & Mulherin, 1996; Nelson, 1959; Rhodes-Kropf et al., 2005; Stigler, 1950; Weston et al., 2004). Only Shughart II & Tollison (1984) were unable to recognize it, generating afterwards replies from Golbe & White (1988) and Town (1992).

despite the existence of a wide empirical and theoretical research, the literature still lacks a convincing overall theory, presenting many partial explanations instead.[2]

Some literature attempts to explain overall M&A activity using a neoclassical approach (See e.g. Andrade et al., 2001; Andrade & Stafford, 2004; Gort, 1969; Harford, 2005; Mitchell & Mulherin, 1996; Sudarsanam, 2003; Weston et al., 2004), arguing that merger waves result from shocks, such as technological innovations or deregulation, to an industry's environment (Harford, 2005), while other authors believe that M&A waves occur as a result of temporary stock market misevaluation (e.g. Dong et al., 2006; Rhodes-Kropf et al., 2005; Rhodes-Kropf & Viswanathan, 2004; Shleifer & Vishny, 2003).[3] This second approach, commonly labelled behavioural, is built on theoretical and empirical research which has observed a positive statistically significant correlation between aggregate share valuations and merger activity (Beckenstein, 1979; Becketti, 1986; Golbe & White, 1988; Guerard, 1985; Markham, 1955; Melicher et al., 1983; Nelson, 1959; Steiner, 1975; Weston, 1953).[4] Beyond the mainstream approaches, there are also other attempts using other different arguments.[5] In terms of the type of data utilised, several empirical studies have tested the wave pattern using aggregate industry data (e.g. Barkoulas et al., 2001; Becketti, 1986; Golbe & White, 1993; Melicher et al., 1983; Mueller, 1980; Town, 1992), while others studied this phenomenon at industry (e.g. Andrade et al., 2001; Eis, 1969; Gort, 1969; Harford, 2005; Mitchell & Mulherin, 1996), or at institutional levels (e.g. Auster & Sirower, 2002).

The overall evidence suggests that some macroeconomic variables are associated with the timing of M&A. The activity is procyclical, as generally it leads slightly the business cycle (see e.g. Golbe & White, 1988; Nelson, 1959; Steiner, 1975; Weston et al., 1990). According to Weston (1990), the activity is also approximately coincident with share price movements. Several authors find that share prices lead the M&A activity (e.g. Nelson, 1959), while others conversely conclude that M&A activity lags

[2] e.g. for more than twenty years that Brealey et al. (1984; 1996; 2006) continue to select the occurrence of M&A waves as one of the ten most relevant currently unsolved problems in finance.
[3] Market misvaluation can be defined as the discrepancy between the market price and a present measure of the fundamental value (Dong et al., 2006).
[4] The wide existent literature is quasi unanimous about it.
[5] e.g. Holmstrom & Kaplan (2001) focus on the role of corporate governance in the occurrence of M&A waves.

the stock market movements (e.g. Melicher et al., 1983).[6] This divergence of findings may be explained by the time spent between the beginning of the negotiations and the accomplishment of the deal. Halpern (1973) and Mandelker (1974) find this period to be on average about six months. Therefore Melicher et al. (1983), who evaluate share prices changes to precede M&A completed deals by one quarter, conclude that M&A negotiations lead share price movements by about one quarter.

Another stream of literature has studied the market effects of the existence of two different accounting methods for business combinations: the purchase method and the pooling of interests method. Several studies suggest that firms involved in M&A deals select an accounting method based upon certain financial and non-financial characteristics (e.g. Davis, 1990; Dunne, 1990). It has also been documented that managers prefer pooling and that pooling firms willingly incur significant costs to achieve the desired financial reporting outcome (Aboody et al., 2000; Ayers et al., 2002; Lys & Vincent, 1995; Robinson & Shane, 1990; Walter, 1999; Weber, 2004). Despite the preference for pooling however, empirical evidence supports market efficiency, which means that M&A is valued the same regardless the pooling versus purchase adoption (e.g. Davis, 1990; Hong et al., 1978; Lindenberg & Ross, 1999; Vincent, 1997).[7] Nevertheless, existent literature also revealed that pooling results in mechanical effects on companies' financial statements and on the analysis of the financial statements (Jennings et al., 1996; Vincent, 1997).

The replacement of the purchased goodwill amortization method by impairment tests may also have an impact on M&A activity. The research findings indicate that the market reacts negatively to the amortization of goodwill by purchase firms (e.g. Ayers et al., 2002; Hopkins et al., 2000). Not surprisingly, several authors (e.g. Robinson & Shane, 1990) find that a higher bid premium, enhancing the size of the potential goodwill, increases the likelihood of pooling (Weston et al., 2004). Nevertheless, share prices should not decline significantly for companies with one-time impairment write-offs**,** unless they become habitual (Hopkins et al., 2000).

[6] According to Mueller (1980), in West Germany, during the 1960s M&A activity lagged share prices. However, in the 1970s M&A activity tended to lead share prices and other aggregate measures, such as GDP and gross fixed investment.

[7] Nevertheless, according to Hopkins et al. (2000), analysts' valuations were lowest when a company adopted purchase method and amortized goodwill.

Supported by the empirical findings presented above, the first hypothesis to be tested is exhibited below in the null form:

Hypothesis 1

The FASB new pronouncements have had no impact on the M&A activity, as its evolution is rather explained by other factors, such as financial, economical, or behavioural ones.

The analysis of the results of this first hypothesis provides evidence about any impacts on the M&A activity from the abolishment of pooling of interests and the replacement of purchased goodwill amortization by impairment tests. Therefore, this hypothesis tests the appropriateness of FASB's new rules, in the scope of the desired neutrality of the accounting standards. The testing also documents the influence of economical, financial and time factors to the pattern of M&A occurrence.

The impossibility of rejecting this hypothesis would suggest that M&A activity is unrelated to FASB changes and is rather driven by financial, economical, time, or other factors. Conversely, rejection of hypothesis number one would suggest that FASB new pronouncements had produced a significant impact to M&A market participants and failed to minimize any possible economic effects. In this case, the other two possible hypotheses, called alternative hypotheses, are that the M&A activity benefited from the accounting changes, and that M&A activity did not benefit from the accounting changes.

3. M&A withdrawal

A substantial number of announced M&A deals are never completed. For example, Pickering (1978) reports a 14 % abandonment rate, while Muehlfeld et al. (2006) estimates it to be as high as 27 %. In the period in between 2000 and 2002, the rate of deals announced but not completed in the U.S.A. was 20 %.[8] This fact is relevant,

[8] Author estimation (*source:* Thomson Financial, 2006).

because M&A can be very expensive, so can its abandonment, since firms need to allocate significant resources while planning and preparing a deal.

The literature concerned with the study of M&A abandonment causes is scarce. The majority of the studies focus on the post-M&A period analysis; only a few are concerned with the analysis of the pre-completion phase and M&A cancellations.[9] Muehlfeld et al. (2006) point out a major difficulty related to this type of analysis: "Decision-making processes at the pre-completion stage are largely unobservable to financial markets and difficult to capture based on accounting data." Despite the non-existence of a global theory, existing literature provides some evidence to help explain these occurrences. The explaining factors are mainly related with the type and way of concretization of the M&A deal. Bidder and target firms' characteristics and attitudes also play key roles.

Dodd (1980) emphasizes that M&A bids and proposals are subject to discretional decision from the management. The target firm's shareholders delegate the decision to the management, but hold the power to vote after their recommendations have been made following M&A proposals. Nevertheless, the management has the power to decline any friendly M&A proposal without presenting it to the shareholders. According to Davidson III et al. (2002), this power can be regarded as a safeguard to the firm, insuring that the M&A is adequate (Franks & Mayer, 1996), but conversely it can also be perceived as an instrument of protection for the management, used with the purpose of avoiding the loss of their own positions in the target firm as a consequence of a successful takeover, at shareholders expense (Karpoff et al., 1996). Consequently, cancelled M&A often reflect an agency theory issue, where the interests of the management did not coincide with the interests of the shareholders (Davidson III et al., 2002).

Concerning the bidder's attitude, Holl & Kyriazis (1996) point out that hostile takeovers are more likely to meet resistance from target firms. Often negotiations that started friendly end up in disagreements. This makes transactions more costly and increases the likelihood of a bid cancellation. If a bid is considered friendly one could expect it to be

[9] As exceptions see e.g. Asquith (1983), Wong & O'Sullivan (2001), Davidson III et al. (2002).

less dependent upon negotiations to be successful, as it would be less susceptible to face resistance from the target firms' management (Wong & O'Sullivan, 2001).

Wong & O'Sullivan (2001) also suggests that the method of payment can also help explain M&A abandonment. Cash is easy to value and makes the bid more attractive to the target firms' management and shareholders. Consequently, its use increases the possibility of completion, since it reduces the prospects of disagreements between participants during the negotiations.

In an unprecedented effort, between 1996 and June 2001, FASB issued four documents for public comment[10], held over sixty public meetings, conducted public hearings and visits, and analysed and discussed more than five hundred comment letters (FASB, 2001). Although accounting practitioners and academicians in general supported purchase as the single method for M&A accounting, many firms disagreed, however, vigorously opposing the pooling ban. For example, Dennis Powell from Cisco Systems, warned about the potential negative effects on the U.S.A. economy[11], while Jim Barksdale, former CEO of Netscape, declared: "AOL/Netscape merger would not have occurred if pooling had not been an option".[12]

Considering the current evidence and the objectives of the present study, it becomes possible to test another general hypothesis, stated in the null form:

Hypothesis 2

The FASB new pronouncements have had no impact on the number of M&A withdrawn, as its occurrence is rather explained by other factors, such as financial, economical, or different patterns of firms and deals.

If M&A deals, which were previously intended and structured to pool, cannot qualify anymore to pooling of interests, one could expect an increase on the number of M&A withdrawn, as a consequence of FASB's new pronouncements. This is the main suggestion underlying the hypothesis stated above. Due to the limited amount of

[10] Including a Exposure Draft (1999) and a Revised Exposure Draft (2001).

[11] *Prepared Testimony of Mr. Dennis Powell Vice President and Corporate Controller Cisco Systems*, 2000.

[12] *Prepared Testimony of Mr. James Barksdale Partner The Barksdale Group*, 2000.

available evidence, hypothesis two goes beyond the findings of the existent literature as it additionally includes economical, financial, and time variables as potential explaining factors of M&A deals cancellations. Like hypothesis one, this hypothesis will test, as well, the appropriateness of FASB changes in the scope of the desired neutrality of the accounting standards.

Not rejecting hypothesis number two would suggest that the phenomenon of withdrawn M&A deals is unrelated to the FASB changes and is rather explained by economical, financial, business conditions, or other factors. In opposition, the rejection of the hypothesis would imply the acceptance of the alternative hypothesis that FASB's new pronouncements led to an increase of M&A deals cancellations. Although not so feasible, from a pure theoretical point of view one could also hypothetically admit the other alternative hypothesis: that FASB's new pronouncements resulted in a decrease of M&A deals cancellations.

4. Sample

A transaction recorded at the Thomson's SDC online database of M&A is included in the sample if it satisfies the following criteria:
(1) The transaction is either a merger, acquisition, LBO, or a tender offer that may lead to a change in the control of the target firm.
(2) The deal was announced during the period from 1 January 2000 until 31 December 2002.
(3) The M&A was successfully completed, or formally withdrawn.

[*Please insert Table 1 about here*]

Table 1 summarises the sample construction. The sample comprises announced deals involving U.S.A. target firms during the period between 2000 and 2002. According to SDC Platinum, during this period a total of 24,670 M&A deals, with a disclosed dollar value of 3.15 trillion, were announced. The selection process resulted in the elimination of 4,006 deals, which were pending, or unconfirmed (intended, rumoured, etc). The value of these exclusions is significantly less important, it totals about 35 thousand millions of dollars. The final sample consists of 19,758 completed transactions and 906 withdrawn deals, with total dollar values of 2.7 trillion and 0.378 trillion, respectively.

5. Research Design and Methodology

5.1. M&A activity during the 2000-2002 period

In order to find any potential effects on the M&A activity as a consequence of the changes on the accounting regulations, one cannot choose to have a very short period of few days, like many studies on M&A returns, because the effects can last for several months. On the other hand, nor can one choose to have a long period, like studies on M&A waves which necessarily make long term analyses, as such effects may be totally diluted in such large periods. Consequently, the study has a middle range period of analysis: three years, from 2000 to 2002.

During the triennial period started in 2000, the overall M&A activity, for both announced and withdrawn deals, was of a global downward trend. The M&A activity peaked in between around 1998 (Thomson Financial, 2006) and 2000 (Mergerstat, 2003), depending on the database taken into account. On 14 January 2000, the Dow Jones index started a 33-month slide, and eight weeks later NASDAQ would follow in its steps. In 2000, it was not only the stock markets that started a bearish period, since the positive economic cycle and the M&A activity were fading as well. The M&A activity slide reached then a bottom by the time of the September 2001 terrorist attacks. Following the disruption caused by the 9/11 events, the activity started a stagnation period that would prevail until the end of 2002.

weekends analysis:

The M&A activity during weekends can be accounted as non-existent to residual. For example, in the weekend before the event -1 July 2001, the date when pooling was prohibited in the U.S.A - not even a single announcement has been made. This situation led to the elimination of weekends from the sample to be used in the model using daily data. Nevertheless, the weekend of the effectiveness date reveals an abnormal activity. During this specific weekend, the M&A activity was as high as in an ordinary weekday and nothing has been found in the M&A pattern of activity that could be used to justify such a high level.

[*Please insert Figure 1 about here*]

The abnormal activity in the -1/+1 event day window is made visible at Figure 1. In 2001, a total 176 deals were announced during the 52 weekends, with more than one third being announced during a single weekend, the event one, with 21 deals in 30th June, Saturday, and 39 deals in 1st July, Sunday. Although these figures benefited from the coincidence of several positive factors, such as the 'end-and-beginning-of-the-month phenomenon', it seems obvious that any global justification for such an high level of activity in a single weekend needs to include the effectiveness of the new accounting standards as an explaining factor.

In fact, the effects directly related to the specific M&A pattern of activity can only serve as a partial explanation. As an example, one can take the second busiest weekend in 2001, which matches the end of the second quarter and the beginning of the third quarter. That weekend produced 20 deals, equally distributed by Saturday and Sunday, which, by one hand, contrasts with the mere three deals average for weekends during the sample period, but, on the other hand, totals only one third of the activity registered during the event weekend. In addition, apart the event weekend, during the 2000-2002 period, the maximum number of announcements in a single weekend day was on 1 July 2000, Saturday, with 21 deals, at a time when the M&A activity was notably stronger.[13]

It is arguable that abnormal activity occurred around the event weekend. The M&A pattern of activity, with its own particular effects, only provides a partial explanation. Therefore, it is understandable that the effectiveness of the new standards had an immediate positive impact to the M&A activity. An analysis of the eight weeks around the event day also suggests that such positive impact seems not to be limited only to the weekend event, as it is likely to have been spread onto the immediate surrounding weekdays. It is possible then to conclude that little impact has been made and one could estimate it as a maximum of just a few dozen deals in a three days event window (-3,+3). These figures reveal the existence of an impact in the immediate term, albeit a

[13] The weekend of the 1st and 2nd July, totaled 21 deals versus the 60 deals of the event weekend.

somewhat irrelevant one. However, one can question whether the impact was made long-lasting, affecting M&A activity in the middle term.

5.2. Model development

Although the current research is based on existing theory, it presents nevertheless some singular characteristics and poses research questions that find no parallel in the literature that has been reviewed. The present study has the specific purpose of investigate the existence of any impact on M&A activity as a consequence of the new FASB's business combinations standards, which abolished pooling and replaced purchased goodwill amortization by impairment tests. This is in contrast to studies on M&A waves, which try to verify the existence of waves; studies on M&A returns, which use the CAR methodology and are focused on the measurement of market returns provided by announcements; or studies on M&A accounting, which typically look for the pooling versus purchase question, or other issues concerning purchased goodwill amortization versus impairment. It is, therefore, not possible to find any adequate model in the M&A literature, as well any methodology susceptible of being adopted in a straight way. Nevertheless, the existent literature provided interesting methodological bases and critical findings that helped to develop the current research.

Since a suitable theory and model are missing, the use of a regression-based model is highly recommendable, as it may work as an excellent predictor. Nevertheless, in order to obtain a valid response from the values of the regressors, it is necessary to prepare a model carefully fitted from a large sample. Although models with few observations appear to have more predictive power, since using small amounts of data means less possible abnormal circumstances introduced in the model, they are more likely to suffer from several methodological issues, which include biased findings. This is why besides models based on monthly and weekly data, a model has also been prepared using daily data, since it provides more observations, therefore improving statistical interpretation, and reinforcing the accuracy of the parameter estimates.

The data aggregation used in the current study carries some issues related with the use of time series. Time series include cycle, seasonality, trend, and randomness. Cycles are usually reflected only in larger data aggregation periods, such as quarterly or yearly ones. In the present study, specific patterns resembling somewhat a cycle-behaviour are to be treated with dummy variables.[14] Seasonality is also to be treated with dummy variables. This leaves trend and randomness. The magnitude of randomness diminishes as the level of aggregation increases. Monthly data is less random than weekly data, since by averaging thirty days more randomness is eliminated than averaging only seven days. Conversely, as randomness decreases the trend included in data become more notorious. In daily data, randomness dominates while trend is absent or insignificant (Makridakis et al., 1998: 536). In this case, simple smoothing is preferred to other more complex procedures, such as Holts's and Winters's methods. Nevertheless, it has been decided to use M&A data as raw as possible to avoid any misrepresentation. Instead of transforming original data, dummy, adjustment, and lagged variables are used to deal with trend and randomness. Any remaining trend is to be treated using polynomials.

Following the information revolution, the markets became more efficient. Greater efficiency means that markets behave increasingly like random walks. Makridakis et al. (1998) point out that this makes it impossible to predict the turning points using statistical methods. They also note that unpredictable, insignificant events could trigger turning points, just like the 'butterfly effect' in chaos theory, an extreme example, where it is suggested that the air displaced by a flying butterfly in a tropical forest can instigate a major hurricane a week or two later. Additionally, psychological effects are present in business and economics, and they have proved to be highly influential on the markets. Unpredicted sudden raises and crashes are often more related to human behaviour than to business and economic events, making analysts to label this type of behaviour as an 'irrational' one.

If randomness dominates in a time series, it is then possible that a simple random walk model, or other naïve model, will have a predictive power similar to the complex explicative models. This may not happen for all M&A markets worldwide, but it is more likely to be true for the U.S.A. market, which is historically the most dynamic and efficient one. It is not surprising then that some literature claims that random walk hypothesis describes better the M&A activity (e.g. Chowdhury, 1993; Shughart II &

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[14] Dummy variable, or indicator variable, is a binary variable, which assumes value one or zero. It is commonly utilized to measure qualitative events.

Tollison, 1984), although a substantial number of authors disagree, particularly those who have confirmed the existence of M&A waves (see e.g. Golbe & White, 1993; Town, 1992). The present study presents different purposes and uses different data aggregations from the literature referred above, which makes possible to assume the random walk hypothesis. The M&A market has certainly a lower level of efficiency when compared with stock markets. Nevertheless, M&A and stock markets are closely bonded and they do share many characteristics. Moreover, these characteristics become more visible whenever data aggregation is lower, which is the case here.

The use of a low level of data aggregation leads to an additional issue, concerning the diversity of exogenous explicative factors that can be employed. The number of different types of daily, weekly, and monthly data available and feasible to relate with M&A activity is limited, which therefore reduces the number of explicative variables possible to be considered. For example, GDP data is only available quarterly and the adoption of extrapolation techniques is not trustworthy. To mitigate the impact of this constraint to the model development, the pattern of the M&A activity has been researched in depth, resulting in a relatively higher weight of endogenous explicative factors, due to that lack of exogenous variables, particularly on the models using daily and weekly data.

Finally, many model-selection methods are available to help with the specification of the models. These possibilities include: methods to select models with the highest value of R^2, or highest value of adjusted R^2; stepwise regression; or other measures such as Mallow's C_p statistic, Akaike's Information Criterion (AIC) statistic, and Schwarz Bayesian Information Criterion (BIC), amongst others. These procedures and many other model-selection methods are widely reviewed in the literature (see e.g. Brockwell & Davis, 1996; Draper & Smith, 1981; Hocking, 1976; Judge et al., 1988).

Stepwise regression is a method that makes it possible to select the relevant explanatory variables from a set of candidate variables. This procedure includes different approaches, such as stepwise forward regression, or stepwise backward regression (see e.g. Draper & Smith, 1981). The stepwise forward regression method begins with no variables in the model, and then starts adding variables, while the stepwise backward regression method begins with all variables in the model and then starts eliminating variables. Both methods have several variations.

The use of stepwise regression in the present study is justified by two main reasons. The first reason is a consequence of the lack of explanatory variables, which has led to the inclusion of similar variables in the long list of variables that could possibly figure in the final models. A selection of the most significant variables is therefore needed. The other reason is directly related with the main purpose of the research: to test if the 'event' variables have any predictive value in the model. If they do not, then it will mean that the effect of the accounting changes to the M&A activity was not statistically significant.

Among the diverse stepwise approaches, it is the backward elimination that has been selected. In the statistical software package SAS 9.1, the backward elimination procedure starts by calculating the F statistics for a model, including all of the independent variables. Then the variables are deleted from the model one by one until all the variables remaining in the model produce F statistics significant at the level specified by the user (0.10 level by default). At each step, the variable presenting the smallest contribution to the model is deleted.[15] This procedure is also followed by other statistical software packages.

In summary, several models have been developed in order to test the research hypothesis, but under diverse constraints, namely the lack of explicative variables available to be tested. This has led to the development of models that combine multiple regression with time series. Moreover, variables backward selection procedure has been employed with two goals: in the first instance, to assess the potential significance of the event variables, and in the second, to fit the model. This order of priorities is justified by the main objective of the present study, which is to assess the potential effects on M&A from the accounting changes, rather than to study the exact explicative factors or the trends surrounding the M&A activity itself. Nevertheless, because a model with enough predictive power is a *sine qua non* condition for validating its outcomes, none of the factors concerning the M&A activity can be disregarded.

[15] Described procedure adapted from Statistical Analysis System, SAS 9.1 "Help and Documentation", SAS Institute, Inc.

5.3. Variable definitions and predictions

The process of constructing the variables is drawn largely on the literature on M&A and on the analysis of the M&A pattern during the period of study.

dependent variables:

In the present research, M&A activity, or its pattern, includes announced deals, represented by the dependent variable *MA*, and withdrawn deals, represented by dependent variable *WITH*. Models using *MA* variable have been conceived to test hypothesis one, while the model using *WITH* variable has been designed to test hypothesis two.

exogenous explanatory variables:

As mentioned earlier, many factors are likely to contribute to the understanding of the pattern of M&A activity. Movements on stock markets prices, interest rates, GDP, or industrial production are examples of such explanatory factors (see e.g. Becketti, 1986; Golbe & White, 1988; Melicher et al., 1983; Weston et al., 1990). Time-related factors, such as time, seasonality, trading day variation, holiday effects and other factors, such as interventions, are also related to M&A activity. Information about the long list of exogenous explanatory variables that will be subject to the stepwise backward elimination is as follows.

The S&P 500 Composite index has been selected as a proxy for stock prices indexes. More precisely, the S&P 500 Composite – default datatype (PI), which is the default Datastream data type for equity indices, has been utilized. As a proxy for interest rates, it has been selected the US Federal Funds (effective) – Middle Rate.[16]

In the case of models using monthly and weekly data, two different approaches were considered for both stock prices and interest rates variables. These approaches arose from the possibility of choosing from closing values of the last trading days of the week

[16] According to Datastream, the federal funds rate is the interest rate at which depository institutions lend balances at the Federal Reserve to other depository institutions overnight. The daily effective federal funds rate is a weighted average of rates on trades through New York brokers. Rates are annualized using a 360-day year or bank interest.

and month, versus using weekly and monthly average values. To avoid any misjudgement, two types of variables were constructed for stock prices and interest rates: one uses closing values, while the other one uses monthly or weekly average values. The two types were therefore included in the initial models, being the selection of the most adequate ones entrusted to the stepwise backward elimination regression procedure.

Other three explanatory variables were employed, but only on models using monthly data:

(i) industrial production, more precisely, the U.S. Federal Reserve Board's industrial production index, which measures the real output of manufacturing, mining, and electric and gas utilities industries. The data provided is seasonally adjusted, but it is only available monthly;

(ii) GDP, also seasonally adjusted at annual rates, but with estimates available only quarterly. A monthly interpolation was initially considered, but later withdrawn, since this procedure is not reliable, as experts in general recognize. Therefore, this variable is kept constant during the term following the latest quarterly GDP value available; and, finally,

iii) alongside with the stock prices index variable, a market capitalization variable was also included. This variable is made from the sum of monthly market capitalization of all companies listed at U.S.A. stock markets: New York Stock Exchange (NYSE), NASDAQ, and AMEX.[17]

In terms of variables predictions, there is a broad consensus within the literature about a positive relationship between M&A activity and movements on stock prices (e.g. Beckenstein, 1979; Guerard, 1985; Markham, 1955; Nelson, 1959; Steiner, 1975), and between M&A activity and business cycle/GDP (e.g. Golbe & White, 1988; Nelson, 1959; Steiner, 1975; Weston et al., 1990). For industrial production, the majority of

[17] The following abbreviations are to be used in the models: *SP500* for stock prices index measured by closing values and *SP500 Av* if measured by average values, *MKTC* for market capitalization, *Fed* for interest rates measured by end of period values and *Fed Av* if measured by average values, *IP* for industrial production, and *GDP* for gross domestic production.

literature found a positive relationship with M&A activity (e.g. Gort, 1969; Markham, 1955; Mitchell & Mulherin, 1996), but some found that relationship to be weak (Melicher et al., 1983; Nelson, 1959), to non-existent (Guerard, 1985; Weston, 1953). For interest rates, the majority of studies found a negative relationship (e.g. Becketti, 1986; Golbe & White, 1988; Melicher et al., 1983), but conversely some authors found a positive relationship (e.g. Beckenstein, 1979), even if a non-significant one (Steiner, 1975).

In respect to the expected signs, positive signs are expectable from stock market indexes and capitalization variables, as well from GDP and industrial production variables. For interest rates, the literature findings are not unanimous, therefore one can admit both positive and negative signs. A negative sign would be more expectable however, because a decrease on interest rates should theoretically favour M&A activity, as debt becomes more attractive to finance deals. Nevertheless, between 2000 and 2002, the interest rates suffered several major cuts, consequently during this period M&A activity and interest rates are positively related.

time and endogenous explanatory variables:

It has been previously discussed that endogenous factors play an important role in the study of M&A activity whenever the period of analysis is small and data aggregation is low. Seen as essential to capture the pattern of M&A through time, some time and polynomial variables were included in the long list of variables. Regression models often include linear and higher order polynomials (Makridakis et al., 1998: 610). Accordingly, a time variable, called period or *Per*, which assumes values equal to the times of observation, and *Per_2*, and *Per_3* variables, which equal *Per* squared and *Per* cubic respectively, were added. The selection of *Per* variable would result in the inclusion of a linear time trend in the regression models, while the selection of *Per_2* and *Per_3* would involve polynomials of order two and three, respectively. Since the number of announced and withdrawn M&A deals decreased in the period of study, a negative value is expected for *Per* variable.

An in-depth analysis of the moves of M&A activity on a daily basis during the period 2000-2002, makes it possible to conclude that stock market's calendar proves to be influential, given that:

(i) announcements are unusual during non-trading days. Weekends and holidays are particularly poor in announcements, often with none or with just a single record;[18]

(ii) reduced trading days affect the M&A activity in a negative way. This negative impact may be reinforced in the case of four-day weekends, when trading floors close early on the Monday preceding the holiday placed on a Tuesday, or, on the other hand, when the market closes early on the Friday following a holiday placed on a Thursday;

(iii) holiday seasons also affect negatively the M&A activity. It is the case of Christmas season, which has at least two non-trading days - Christmas Day and New Year's Day - and a possible half-day trading session if Christmas Eve is placed in a weekday, as other possible market special closures;

(iv) a concentration of announcements is likely to occur following a holiday placed in the beginning of the week, a long weekend, or a holiday season period. In opposition, that concentration is likely to be brought forward in anticipation of flat calendar periods; and, finally,

(v) unpredictable events may affect the normal markets operation and the M&A activity. It was the case of the terrorist attack on the World Trade Center (WTC). Following the attack, the New York stock markets were closed from 11 to 14 September 2001. One year later, on 11 September 2002, the NYSE opening was delayed until 12:00 noon out of respect for the memorial events commemorating the first anniversary of the attack on the WTC.

To handle the issues brought by the stock market's calendar and events, several actions were taken and new explanatory variables were added to the models. Weekends were removed from the model using daily data, while holidays were kept, but treated instead with a dummy variable *Hol*, which takes value one, if a holiday is a non-trading day, or

[18] The variance on the number of announcements is high during non-trading days. The reduction on the number of announcements is generally lower on holidays than on weekends, although specific holidays, such as Thanksgiving Day and Christmas, record a very low activity, which is usually zero on Christmas Day. Regarding weekends, announcements are more likely to occur in Saturdays than in Sundays. From a total of 157 weekends, i.e. 314 Saturdays and Sundays, during the period 2000-2002, only 169 days, 102 Saturdays and 67 Sundays, had announced deals.

zero, otherwise. Another dummy variable, *HS_Ext*, was added to the model using daily data to account for the effect of reduced trading days, holiday seasons, and extraordinary events. Finally, an adjustment variable, number of trading days or *TD*, was added to the models using monthly and weekly data. This categorical variable accounts for the total number of trading sessions during a month or a week. An ordinary trading day accounts for one, while a half-day trading session only totals 0.5.[19] In terms of expected signs, negatives ones are expected for *Hol* and *HS_Ext*, since they affect negatively the M&A activity, while a positive one is expected for *TD*, since the number of M&A deals announced and withdrawn is likely to be positively related to the total number of trading days during a week, or a month.

Stock markets and M&A activity share interesting seasonal patterns, such as:

(vi) a concentration of announcements is likely to occur in the first days of the month. This tendency to peak may be reinforced whenever a new quarter begins. These patterns are consistent with the 'first-trading-day-of-the-month phenomenon', which consists in a tendency for higher movements in the U.S. stock markets in the first days of the month (Hirsch, 2004: 62) [20], and with the finding that in recent years the first month of quarters is the most bullish in Dow Jones industrials and S&P 500 (Hirsch, 2004: 74).[21] Typically, the peak of M&A deals happens in the first trading day of the month. If the first day of the month is a non-trading day, or if a holiday is placed in the first days of the month, the peak may be then brought forward to the last days of the previous month, or may be split between the last and the first days of the month. Since announcements may occur in both non-trading and trading days, it seems therefore more appropriate to label this positive effect on M&A activity as an 'end-and-beginning-of-the-month

[19] Instead of using a dummy variable, the adjustment could be done directly in the dependent variables, dividing the number of M&A deals, or withdrawn deals in case of hypothesis two, by the number of trading sessions. However, the trading day dummy variable provided better results than the ones obtained by the adjustment of the dependent variables. Additionally, the use of a dummy variable has the advantage of avoiding the transformation of depending variables, keeping therefore M&A data raw.
[20] For example: in the first day of January 2000, a Saturday, 17 deals were announced. This number of announcements is abnormal for a Saturday and can only be justified by a coincidence of positive effects such as the 'end-and-beginning-of-the-month phenomenon', and the beginning of a new quarter which is, cumulatively, the beginning of a new year. In the day after, a Sunday, the M&A activity returned to normal, since not even a single deal was announced, which is normal for a weekend day.
[21] According to Hirsch (2004: 62), from 2 September 1997, to 1 July 2004, the Dow Jones index gained 2711.74 points. The 83 first days of the month accounted for a total 3559.06 Dow points, while the remaining 1635 days recorded a total negative 847.32 points.

phenomenon', since the change of month may take place during a non-trading day, be it a weekend, a holiday, or as a consequence of an extraordinary event; and,

(vii) the majority of announcements occur in the beginning of the week, while Friday is the weekday with fewest announcements. This behaviour is also in line with the stock markets recent pattern. According Hirsch (2004: 132), based on S&P 500 index, between 1952 and 1989, Monday was the worst trading day of the week, in opposition to Friday. However, a reversal occurred in 1990, when Monday became the most consistently powerful day of the week for the Dow Jones index, except for 2001 and 2002. Additionally, from 1992 to 2004, the bulk of Dow Jones index gains were made in the first two days of week, while Friday was the worst weekday.

It is important to mention that seasonality, holiday effects, trading day variation, and other calendar issues, are often interrelated. Whenever two or more factors occur simultaneously, the effects may result cumulative or dilutive. For example: in year 2000, the 4 July was celebrated at a Tuesday, which resulted in a four-day weekend, since this holiday is a non-trading day. In this case, much of the 'end-and-beginning-of-the-month phenomenon' was brought forward to the last day of June, a Friday, with 68 announcements, while the first day of July, a Saturday, also had an abnormal activity of 21 announcements.[22] These figures are not only justified by the dilution of the 'end-and-beginning-of-the-month phenomenon', but also by the activity of the first two week days of July which has also been brought forward. In fact, Monday, 2 July, which was a half day trading section, has had only fifteen announcements, while the following Tuesday, a holiday and non-trading day, has had a mere two announcements.

To handle seasonality, and some of the previously described calendar effects, an *E_BoM* variable, which signals the 'end-and-beginning-of-the-month' phenomenon, was added to the models using weekly and daily data. This dummy variable has value one on the days and weeks whenever the effect is visible, and zero value whenever not. A positive sign is expected for this variable.

[22] The number of announcements in 30 June 2000 was the higher on an event window of several months. The number of announcements in 1 July was also exceptional for a Saturday.

Seasonal dummy variables were also included, in all models. These variables assume that the seasonal effect is unchanged year after year. Variables representing months, weeks, and weekdays, were added to the different models. For example, in models using monthly data, a *Jan* variable assumes value one if the month is January, and zero otherwise. To avoid perfect multicollinearity among the different subsets of seasonal dummy variables, which would make it impossible to compute the regression solution, one dummy variable has been left for each subset. Accordingly, *March* in monthly data models, *Week5* in weekly data model[23], and *Monday* in daily data model, have been left from the long list of variables.[24] As a result, eleven variables representing months, four variables representing weeks, and another four variables representing weekdays, were added to the long list of variables of the models using monthly, weekly, or daily data, respectively.

intervention variables:

To control whether FASB's new M&A accounting rules have had a significant impact on the M&A activity, two event dummy variables were created. These two variables of interest were added with the purpose of detect any potential effects surrounding the interventions caused by FASB actions. An intervention takes place when there is some external influence at a particular time, which affects the dependent variable (Makridakis et al., 1998: 271). In the present research, these variables are also referred as "event", or "target", variables.

In 14 February 2001, FASB published a revised exposure draft, which contained the final proposals for a new M&A accounting. That document confirmed the tentative decision on a ban on pooling of interests, first announced in 6 December 2000, and introduced the replacement of purchased goodwill amortization charges by impairment tests. The new proposals could result in an anticipation of M&A activity, with the purpose of avoiding the new accounting rules that would be enforced in the summer. To capture this possible effect, a dummy variable has been prepared, *Event_ED*, with zero

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[23] "*Week5*" variable has value one in the last week of a month, only if that month has five Thursdays. In some cases, "*Week5*" variable includes the first day of the following month. Since this variable is not as consistent as the remaining seasonal dummies in the model using weekly data, it has been chosen to do not include it in the long list of variables.
[24] Seasonal dummy variables in models using monthly data: *Jan*, *Mar*, *Apr*, *May*, *Jun*, *Jul*, *Aug*, *Sep*, *Oct*, *Nov, Dec*; weekly data: *Week1*, *Week2*, *Week3*, *Week4*; and daily data: *Tue*, *Wed*, *Thu*, *Fri*.

value before the 14 February 2001 and value one after this date.[25] Since the present research is not focused on immediate reactions, such as studies on M&A that use CAR methodology, but conversely on durable effects, the reaction to the 6 December 2000 announcement was ignored.

Following the revised exposure draft, in June 2001 FASB issued two standards: FAS 141, effective 1 July 2001, and FAS 142, effective 16 December 2001. Although FAS 142 has been made effective only in December, the document states that goodwill acquired in business combinations after June 30, 2001 shall not be amortized. Therefore, in practical terms, it can be asserted that both standards produce effects since 1 July 2001. To capture any possible effects resulting from the effectiveness of FASB's standards, a dummy variable *Event*, with zero value before 1 July 2001 and value one after, was added to the long list of variables.

lagged variables:

Finally, *MA_lag* and *WITH_lag*, lagged variables by one period of dependent variables *MA* and *WITH* have been included to handle residuals' autocorrelation.[26] This resulted in a reduction of one observation in the total of observations used in the models.

5.4. Construction of metrics

Following multiple regression with time series and variable selection methodology, as described in the literature by authors such as Makridakis et al. (1998), the models have been designed in order to capture the impact of the accounting changes on the number of announced deals and on the level of withdrawn deals. The models combine the characteristics of an explanatory model, concerning the explanatory variables, with time series, where there is an attempt to capture importance of the time factor over time. Random walk hypothesis is assumed and it is used to address the non-stationary data issue.

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[25] This variable is not used in the models using monthly data, since the announcement date is not placed next to the end, or the beginning, of the month.

[26] These lagged variables are shown in the equations as MA_{t-1} and $WITH_{t-1}$.

Several non-linear relationships and linear transformations have been employed in the initial stage of the models development. Nevertheless, it has been discovered that polynomials would assure a better model fitting, given their superior balance between a high predictive power, and the fulfilment of the required conditions for models validation.

models developed to test hypothesis one:

Three sets of models, using monthly, weekly, and daily data, were prepared using the same foundations in order to examine the association between M&A activity and a large set of variables, from which the event ones assume a particular interest. The main model, hereafter called the basic model, for time period *t*, and with β_k, δ_l, λ_i, ζ_p, and ξ, regression coefficients, can be exhibited as

$$MA_t = \alpha + \sum_{j=1}^{3} \beta_j Per_t^j + \sum_{l=1}^{m} \delta_l Exog_{l,t} + \sum_{i=1}^{n} \lambda_i Endog_{i,t} + \sum_{p=1}^{2} \zeta_p Event_{p,t} + \\ + \xi MA_{t-1} + \varepsilon_t \quad (1)$$

where:

MA_t	is the number of M&A deals announced,
Per_t^j	is the time variable, with $j = 1$ if linear, and with $j = 2, 3$ if quadratic, or cubic,
$Exog_{l,t}$	are the *m* exogenous explanatory variables, such as stock market and economic factors,
$Endog_{i,t}$	are the *n* endogenous explanatory variables, related to M&A activity and seasonality,
$Event_{p,t}$	are two dummy variables developed to control FASB's pronouncements effects,
MA_{t-1}	is a lagged variable, which lags the dependent variable MA_t by one period, and
ε_t	is the error term.

From the basic model, a model using monthly data can be specified as

$$MA_t = \alpha + \sum_{j=1}^{3} \beta_j Per_t^j + \sum_{i=1}^{11} \delta_i Month_{i,t} + \sum_{l=1}^{2} \lambda_l SP500_{l,t} + \sum_{m=1}^{2} \zeta_m Fed_{m,t} + \omega\, IP_t + \\ + \phi\, MKTC_t + \gamma\, GDP_t + \varphi\, TD_t + \theta\, Event_t + \xi\, MA_{t-1} + \varepsilon_t \quad (2)$$

where:

MA_t	is the monthly number of M&A deals announced,
$Month_{i,t}$	are eleven dummy variables representing the months of a year, with $i = 1$ to 11, representing the months from March to January, respectively,
$SP500_{l,t}$	are two stock prices index variables, measured by average and closing values of a month,
$Fed_{m,t}$	are two interest rates variables, measured by average and last values of a month,
IP_t	is a monthly industrial production variable,
$MKTC_t$	is a monthly market capitalization variable,
GDP_t	is a quarterly GDP variable,
TD_t	is a variable that accounts for the number of trading days during a month, and
$Event_t$	is a dummy variable created to capture the potential effect from FASB's standards.

while a model using weekly data can be presented as

$$MA_t = \alpha + \sum_{j=1}^{3} \beta_j Per_t^j + \sum_{i=1}^{4} \delta_i Week_{i,t} + \sum_{l=1}^{2} \lambda_l SP500_{l,t} + \sum_{m=1}^{2} \zeta_m Fed_{m,t} + \\ + \phi\, E\_BoM_t + \varphi\, TD_t + \theta\, Event_t + \psi\, Event\_ED_t + \xi\, MA_{t-1} + \varepsilon_t \qquad (3)$$

where:

$Week_{i,t}$ are four dummy variables representing the weeks in a month, with i = 1 to 4, representing the first four weeks in a month,

$SP500_{l,t}$ are two stock prices index variables, measured by average and closing values of a week,

$Fed_{m,t}$ are two interest rates variables, measured by average and last values of a week,

E_BoM_t is a dummy variable added to capture calendar and seasonal effects,

TD_t is a variable that accounts for the number of trading days during a week, and

$Event\_ED_t$ is a dummy variable constructed to capture the potential effect from the ED that preceded FASB's standards.

and finally, a model using daily data can be estimated as

$$MA_t = \alpha + \sum_{j=1}^{3} \beta_j Per_t^j + \sum_{i=1}^{4} \delta_i Weekday_{i,t} + \lambda\, SP500_t + \zeta\, Fed_t + \varphi\, Hol_t + \\ + \varpi\, HS\_Ext_t + \phi\, E\_BoM_t + \theta\, Event_t + \psi\, Event\_ED_t + \xi\, MA_{t-1} + \varepsilon_t \qquad (4)$$

where:

$Weekday_{i,t}$ are four dummy variables representing the weekdays, with i = 1 to 4, representing Monday to Thursday, respectively,

$SP500_t$ is a stock prices index variable, measured by daily closing values,

Fed_t is a daily interest rates variable,

Hol_t is a dummy variable which signals a non-trading day, and

HS_Ext_t is a dummy variable that captures the impact of reduced trading days, holiday seasons, and extraordinary events.

withdrawn M&A model utilised to test hypothesis two:

A single model using monthly data has been developed to test hypothesis two. Its form is identical to the basic form of the model used to test hypothesis two, as shown in equation (1). However, as dependent variable, it uses the number of withdrawn M&A deals, instead of the number of announced deals, which, in this model, has been added as an explanatory variable. Equation (5) replicates the monthly announced M&A deals model, as exhibited in equation (2), but regresses the number of withdrawn M&A deals instead

$$WITH_t = \alpha + \sum_{j=1}^{3} \beta_j Per_t^j + \sum_{i=1}^{11} \delta_i Month_{i,t} + \sum_{l=1}^{2} \lambda_l SP500_{l,t} + \sum_{m=1}^{2} \zeta_m Fed_{m,t} + \\ + \phi\, MKTC_t + \gamma\, GDP_t + \omega\, IP_t + \varphi\, Trad_t + \rho\, MA_t + \phi\, Event_t + \\ + \xi\, WITH_{t-1} + \varepsilon_t \qquad (5)$$

where:

$WITH_t$ is the monthly number of M&A deals withdrawn, and

$WITH_{t-1}$ is a lagged variable, which lags the dependent variable $WITH_t$ by one period.

5.5. Descriptive statistics for M&A activity

Table 2 shows descriptive statistics for unadjusted and non-dummy variables for the whole period of study. Descriptive statistics for variables employed in the models using monthly data are shown in Panel A. Apart interest rates variables, *FED* and *FED Av*, all variables present low values of standard skewness and standard kurtosis. *IP* and *GDP* have had a steady progress during the period of study, and therefore present the smallest coefficients of variation, while *FED* variables exhibit the highest values. In terms of dependent variables, *WITH* presents a higher coefficient variation than *MA*, situation that can be regarded has natural, due to the reduced number of M&A cancellations, if compared to the number of M&A announcements. The distribution shown by quartiles also seem normal for all variables, although *FED* variables present lower and upper quartiles very close to minimum and maximum values, respectively. A further analysis of the histogram and the density trace for this variable revealed a double top, i.e., a high concentration of observations around 2 % and 6 %, respectively.

[*Please insert Table 2 about here*]

The situation of the interest rates is a particular one, as the Federal Reserve, the central bank of the U.S.A., commonly referred as "Fed", was very active, in terms of monetary policy, during 2001 and 2002. The US economy was in risk of recession and, in 2001, the Fed started to cut aggressively the interest rates. If the average interest rates were above 6 % in 2000, by the end of 2001 they were lower than 2 %. In 2002, the interest rates would suffer further reductions, remaining at historically low levels.

Panel B exhibits descriptive statistics for variables employed in the model using weekly data. The analysis is similar to the one made for Panel A. However, some descriptive statistics deserve particular attention. Except for *MA*, the values of standard kurtosis are outside the range of -2 to +2 for all variables. This range departure is also true for *MA*, but only in terms of skewness. This situation suggests possible departures from normality, since whenever kurtosis and skewness values are outside the range, there is a greater possibility of invalidation of the statistical tests in respect of standard deviation. On the other hand, this situation can be regarded as normal, since weekly data is significantly more random than monthly data. Therefore, variables exhibiting signs of a possible departure from normality, as a result, for example, of asymmetric distributions, are expectable, since extreme observations became more evident in weekly data sets. Finally, in terms of coefficients of variation, it has increased for *MA*, while *FED* continued to exhibit the highest coefficient.

Descriptive statistics for variables employed in the model using daily data are presented in Panel C. This panel is divided in sections (1) and (2). Section (1) presents descriptive statistics for the whole period, while section (2) is centred on the analysis of the periods that preceded and followed the effectiveness date of the new accounting rules.

In terms of descriptive statistics for the whole period, and comparing with the values of the statistics previously examined, a further deterioration has been registered. The coefficient of variation for *MA* has increased, and almost all values of kurtosis and skewness are outside the range. An expected outcome, as if weekly data were more random than monthly data, it would be for daily data to be on the extreme side of randomness.

The observation of descriptive statistics for the period -391 to +391 days around 1 July 2001, shown in section (2), reveals better indicators for the period preceding the effectiveness of the new accounting rules. In 2001, uncertainty ruled over U.S.A. markets and economy, and turbulence increased with the September 11 terrorist attacks. In addition to volatility, post event figures for M&A activity, stock prices indexes, and interest rates, were significantly lower. Consequently, the coefficients of variation increased for all variables, *post eventum*. This increase was particularly noteworthy for interest rates, as result of the previously described Fed policy. A minimum and maximum value of interest rates of 3.68 % and 7.03 % before 1 July 2001 compares with rates in between 1.15 % and 3.89 % afterwards.

6. Results

6.1. Univariate analysis

Table 3 presents Pearson and Spearman correlation coefficients for several variables taken from the long list. Correlation coefficients estimate the strength of the linear relationship between the variables. The correlation coefficient ranges between -1 and +1, representing -1 a perfect negative linear relationship, while, conversely, +1 indicates perfect positive linear relationship. Coefficient values around zero value indicate absence of linear relationship between variables. P-values, which test the statistical significance of the estimated correlations, are exhibited in italic in Table 4. P-values below 0.05 represent statistically significant non-zero correlations at the 95 % confidence level. Unlike Pearson coefficients, Spearman correlation coefficients are measured from ranks of data values rather than from data values themselves. As a result, Pearson coefficients are more sensitive to outliers than Spearman coefficients.

[*Please insert Table 3 about here*]

A Pearson/Spearman correlation matrix of coefficient estimates for non-dummy variables using monthly data is shown in Panel A. Apart coefficients for pairs of variables involving *TD*, all correlations are significant at the 95 % confidence level.[27] The only significant correlation for *TD*, at the 95 % level, is with *MA*, if measured by Pearson correlations only. *TD* is also the variable with the lowest correlation coefficients. This may be justified by the specific nature of this variable, which has the characteristics of an adjustment variable, and consequently does not share the attributes of the exogenous explanatory variables considered in the long list of variables.

Dependent variable *MA* presents higher correlation coefficients with explanatory variables, than dependent variable *WITH*. Explanatory variables related to stock markets indexes and capitalization, *SP500*, *SP500 Av*, and *MKTC*, are the ones who present the highest correlations with the dependent variables, *MA* and *WITH*.

In terms of overall correlations between independent variables, the highest coefficient values belong to variables that share similar features. It is the case of quasi-identical pairs of variables, *FED* and *FED Av*, and *SP500* and *SP500 Av*, which are measured by final and average monthly values, and therefore share the same basis of construction. It is also the case of stock markets variables, which include stock prices index variables, *SP500*, and *SP500 Av*, and market capitalization variable, *MKTC*, because they share

[27] More precisely, except for *TD*, all pairs present statistically significant non-zero correlations at the 99 % confidence level.

the same nature. Finally, time variables, *Per*, *Per_2*, and *Per_3*, are linearly related and therefore present high mutual Pearson correlation coefficients. Spearman correlations capture the linear dependence between variables in a different way. For the pairs of time variables, Spearman correlation coefficients assume +1 value, indicating, as expected, a perfect positive linear relationship between the variables.

A similar scenario is made visible in Panel B, where mutual correlations for non-dummy variables to be tested in the model using weekly data are shown. All pairs of variables present statistically significant non-zero correlations at the 99 % confidence level, except for mutual correlations involving *TD*. The only significant correlation involving *TD* is with *MA*, as it is also a non-zero correlation statistically significant at the 99 % confidence level, if measured by Pearson correlations, and still significant, but at the 95 % confidence level, if measured by Spearman correlations. Exogenous explanatory variables, stock prices index and interest rates, continue to present high correlation coefficients, as time variables as well. As in Panel A, in terms of overall correlations, the highest coefficient values belong to subsets of variables that share the same nature, have identical basis of construction, or are in linear dependence.

As Panel B, Panel C shows correlation coefficients for variables employed in models developed to test hypothesis one, but using daily observations. Correlation coefficients for dummy variables are also shown, except for weekday's dummy variables.

Every pair of non-dummy variables presents statistically significant non-zero correlations at the 99 % confidence level, while dummy variables only present statistically significant correlations with dependent variable *MA*. The correlation coefficients, which values have been reduced from monthly variables to weekly variables, suffered a further reduction, as expected. Nevertheless, exogenous explanatory variables and time variables continue to present significant correlation coefficients, as dummy variables as well. The correlation of dummy variable *E_BoM* and dependent variable *MA* constitutes a good example, as it presents a Pearson correlation coefficient similar to the ones presented by pairs of *MA* and non-dummy variables, namely, *SP500*, *FED*, and period.

The results obtained from univariate analysis corroborate, in general, the variables predictions and the theory that has been discussed previously. *GDP* variable is the only exception, as a positive correlation with *MA* would be expectable. However, *GDP* variable is constructed using quarterly data, while *MA* is based on daily data. Additionally, it has been referred that M&A activity is procyclical, as generally it leads the business cycle (see e.g. Golbe & White, 1988; Nelson, 1959; Steiner, 1975; Weston et al., 1990). Finally, the period subject to analysis is short. As a result from the combination of these situations, a possible lag between M&A activity and GDP may have passed unobserved, as the amount of elapsed time may have been insufficient to capture the lag in a comprehensive way. The contradictory outcome that has been discovered may be therefore justified by particular circumstantial conditions related to business cycle and to M&A activity, which resulted in an occasional occurrence of opposite trends, during a short period. It is feasible to admit this possibility, knowing that M&A waves and business cycles lengths are often long, and that a lag of several months may exist between these two different series. In resume, it may be simply the case of a cutting point which captured the moment when only one of the variables inverted the trend. In any case, an in depth examination of the reasons behind this possible contradiction is not relevant for the present research. In addition, *GDP* variable has not been selected by any model, following the backward elimination procedure that has been applied to the long list of variables. Consequently, any risk of model misspecification as a result of *GDP* inclusion is null.

6.2. Multivariate analysis

Table 4 presents the regression models outputs, and related conformity tests results as well, for the models designed to test the research hypotheses. In Panels A, C, and D are shown the outputs for equations (2), (3), and (4), respectively. All these models were constructed with the purpose to test hypothesis one. Concurrently, Panel B exhibits the output for equation (5), which has been conceived to test hypothesis two. Stepwise regression, with backward elimination, has been employed in all models, resulting in every variable left in the models to be significant at least at the 0.05 level.

[*Please insert Table 4 about here*]

models used to test hypothesis one:

As mentioned above, Panel A presents the results for the model constructed to test hypothesis one, using monthly data. From the twenty-four variables initially considered, only eight have been selected for the final model, as a consequence of the backward elimination of sixteen variables. *Fed* and *Per_3* variables are significant at the 0.05 level, while the remaining selected variables are also significant at the 0.01 level.

In terms of analysis of variance, *F*-ratio computed from ANOVA table is 68.49, with a p-value less than 0.05, therefore indicating a statistically significant relationship between the selected variables at the 95 % confidence level.

The R-Squared statistic is 0.9546, which indicates that the final model explains 95.4 % of the variability in MA. Nevertheless, this statistic is not shown in Panel A, because the adjusted R-squared statistic is more suitable for comparing models with different numbers of independent variables. In this model, the R-squared adjusted for degrees of freedom is 94.07 %. The standard error of the estimate presents a standard deviation of the residuals of 28.05, while the mean absolute error (MAE), which measures the average value of the residuals, is 19.33.

Regression with time series involves several issues that need to be addressed. For example, it is necessary to examine a possible lack of independence in the residuals (see e.g. Makridakis et al., 1998: 263). The Durbin-Watson (DW) is a classic statistical test, used to detect the presence of autocorrelation in the residuals from a regression analysis. The reference value for this statistic is two. In this case, DW statistic is 2.071, and the p-value is 0.29, which is greater than 0.05. Therefore, there is no indication of serial autocorrelation in the residuals at the 95 % confidence level.

Although not exhibited in Table 4, it is worthwhile to mention that estimated autocorrelations and partial estimated autocorrelations, between values of residuals at various lags, were also analysed. The examination of autocorrelations in residuals is critical to check whether the time series may not well be completely random. In time series, random numbers are often referred as noise. In estimated autocorrelations, the lag *k* autocorrelation coefficient measures correlations between values of residuals at time t and time t-k. For the model in analysis, the estimated autocorrelations coefficients are contained within the 95 % probability limits for the twenty-four lags, meaning that none of the autocorrelations coefficients is statistically significant at the 0.95 level. This outcome indicates that the time series may well be completely random, being equivalent to a white noise series.

Partial autocorrelations can be used to measure the degree of relationship between lagged variables, Y_t and Y_{t-k}, when the effect of other time lags is removed, helping to determine the order of autoregressive model needed to fit the data. It has been previously mentioned that the long list of variables includes, for every model, a lagged dependent variable, by one period. the lag k partial autocorrelation coefficient measures correlations between values of residuals at time t and time t+k, having previously accounted for the correlations at all lower lags. As in estimated autocorrelations, in this model all partial autocorrelations are contained in the 95 % probability limits as well. Therefore, the twenty-four partial autocorrelations coefficients are not statistically significant at the 95.0% confidence level.

Concurrently, tests for randomness of residuals were also performed. This kind of tests is used to examine whether residuals consist in a random sequence of numbers. Three tests were run, although Table 4 exhibits the results for Box-Pierce test only: i) the first test counts the number of times that the residuals sequence was above or below the median. In this case, the number of runs was twenty, versus an expected number of eighteen. The large sample test statistic Z is 0.5224; ii) the second test counts the number of times the residuals sequence rises or fall. The number of runs up and down was twenty-three, which matches with the expected number of runs up and down. Test statistic Z value is 0.5224; and finally, iii) Box-Pierce test which is based on the sum of squares of the first twenty-four autocorrelation coefficients.[28] Every p-value for the three tests performed is greater than 0.05, therefore the hypothesis that the series is random at the 95 % or higher confidence level cannot be rejected.

Additional tests were also performed to examine the normality of residuals. These tests are commonly used to find whether residuals can be adequately modelled by a normal

[28] Tests descriptions made from Statgraphics's tests reports and user's guide (2006).

distribution. According to Statgraphics's tests reports and user's guide (2006): i) chi-squared test divides the range of residuals into sixteen equally probable classes and compares the number of observations in each class to the number expected based on the fitted distribution; ii) Shapiro-Wilk W test is based upon comparing the quantiles of the fitted normal distribution to the quantiles of the data; iii) standardized skewness test examines for lack of symmetry in the data; and finally, iv) standardized kurtosis test examines the distributional shape, which may be either flatter or more peaked than a normal distribution. The p-values obtained for the tests are all greater than 0.05, therefore the hypothesis that residuals comes from a normal distribution cannot be rejected at the 95 % confidence level. Goodness-of-fit tests for residuals were also performed: v) Kolmogorov-Smirnov (K-S) test computes the maximum distance between the cumulative distribution of residuals and the cumulative distribution function (CDF) of the fitted normal distribution. In this case, that maximum distance is 0.0816716; while vi) Kuiper V test compare the distribution function to the fitted CDF in a different way. The p-values of K-S test, modified Kolmogorov-Smirnov D (K-S D) test, Kuiper V test, and modified Kuiper V test, are also all greater than 0.05, which, consequently, corroborates the previous indication of not rejecting the hypothesis that residuals come from a normal distribution with 95% confidence.

In Panel C are shown the regression outputs for the model using weekly data. The stepwise backward regression procedure resulted in the elimination of seven variables from the initial sixteen. Nine variables have been therefore selected for the final model. Every variable that was selected is significant at the 95 % confidence level, and only *FED* and *Week3* are not significant at the 99 % level as well. The construction of ANOVA table provided a *F*-ratio value of 49.60, with a p-value inferior to 0.05, which indicates the existence of a statistically significant relationship between the variables at the 95 % confidence level.

The adjusted R-squared statistic indicates that the fitted model explains 73.95 % of the variability in *MA*. The standard deviation of the residuals is 17.32, while the mean absolute error of the residuals is 13.40. The comparison of these statistics with the ones from the model using monthly data, allows one to observe a decrease on the predictive power of the model, as adjusted R-squared value has decreased. On the other hand, a reduction was recorded on the average value of the residuals and on the standard deviation of the residuals.

Durbin-Watson statistic was used to test whether there is any significant correlation in residuals. In this model, its value is 1.808. The p-value for DW statistic is 0.11729, value greater than 0.05, which therefore indicates the inexistence of serial autocorrelation in the residuals at the 95 % confidence level. In terms of estimated autocorrelations for residuals, all twenty-four coefficients are contained in between the 95 % probability limits. Since the autocorrelations are not statistically significant at the 0.95 level, the time series are likely to be completely random.

As for the model using monthly data, three tests for randomness of residuals were performed for the model using weekly data. Runs above and below median test has a statistic Z value of 0.4042; runs up and down test has a statistic Z value of 1.2455; and Box-Pierce test exhibits the value of 23.701. All the p-values for performed tests are greater than 0.05. Consequently, the hypothesis that the series of residuals is random at the 95 % confidence level cannot be rejected.

Except for Shapiro-Wilk W test, all tests performed to examine the normality of residuals and the goodness-of-fit tests for residuals: chi-squared test, standardized skewness, standardized kurtosis, Kolmogorov-Smirnov test, modified K-S D test, Kuiper V test, and modified Kuiper V test, present p-values greater than 0.05. Since p-value for Shapiro-Wilk W test is only greater than 0.01, the hypothesis that residuals comes from a normal distribution can be rejected at the 95 % confidence level, but cannot be rejected at the 99 % level. The lower p-value obtained for Shapiro-Wilk W test can be regarded as normal. Whenever weekly or daily data is used, departures from normality become a normal situation. For example, Marais (1984) found that weekly residuals from CAR may deviate from normality with respect to skewness and kurtosis. In fact, a few outliers can be enough to deviate a series from normality. It is important to point out that the results presented at Table 4 include outliers, since its removal has been made at the sensitivity analysis stage only.

Finally, Panel D exhibits the statistical outputs for the model using daily data. From the initial fifteen variables, only four were removed: *FED*, *Per_3*, *Event*, and *Event_ED*.

All weekdays and remaining endogenous explanatory dummy variables were selected. The lagged dependent variable, *MA_lag*, was also selected. Every variable that has been selected is significant at the 95% and 99 % confidence level. The *F*-ratio from analysis of variance is 95.34. Since its p-value is less than 0.05, there is a possible statistically significant relationship between the variables at the 95 % confidence level.

The variability of *MA* is explained in 57.08 % by the final model. Alongside with the decrease on the adjusted R-squared statistic, it has been also observed a further reduction on the standard deviation of the residuals, from 17.32 to 6.69, and on the MAE of the residuals, from 13.40 to 5.16.

The DW statistic assumes value 2.006, with a p-value of 0.46. Since the p-value is greater than 0.05, there is no indication of a significant serial autocorrelation in the residuals at the 95 % level. In terms of estimated autocorrelations for residuals, three of the twenty-four autocorrelations coefficients are statistically significant at the 95 % confidence level, suggesting that the time series may not be entirely random. Nevertheless, when probability limits are eased to 99 %, none of the autocorrelations coefficients are statistically significant, indicating, in opposition, that the time series may well be completely random, but only at a lower confidence level.

As for statistical tests concerning the randomness of residuals, two of the performed tests have a p-value greater than 0.05. It is the case of runs above and below median test, and runs up and down test. However, Box-Pierce test presents a p-value which is only greater than 0.01. Consequently, it can be rejected the hypothesis that the series is random at the 95 % confidence level. Since the three tests are sensitive to different types of departures from random behaviour, failure to pass any test suggests that the time series may not be entirely random. Nevertheless, since the Box-Pierce test is still greater than 0.01, the hypothesis that the series is random cannot be rejected at the 99 % confidence level.

In terms of goodness-of-fit tests for residuals, which includes diverse tests, such as the previously used Kuiper V and K-S tests, given that the smallest p-value amongst the tests run is greater than 0.05, the hypothesis that residuals comes from a normal distribution with 95 % confidence cannot be rejected. This conclusion is corroborated by other tests for normality for residuals, such as chi-squared and Shapiro-Wilk tests, which have a p-value higher than 0.05 as well. Nevertheless, skewness and kurtosis Z-score's exhibit very low p-values. Consequently, it can be rejected the idea that residuals comes from a normal distribution with 95% confidence. As mentioned before, the low p-values presented by standardized skewness and kurtosis match with the situation portrayed by authors such as Marais (1984). It is important to recall that departures from normality are common whenever weekly or daily data is used, and, concurrently, outliers are likely to be kept in the models.

model used to test hypothesis two:

Panel B presents the estimation and tests results for equation (5). Since the model has been developed in order to test hypothesis two, it uses *WITH* as dependent variable. From the initial twenty-six monthly variables, eleven have been selected for the final model, in detriment of other fifteen, which have been eliminated following the backward elimination procedure. *Oct* and *TD* variables are significant at the 95 % level, while the remaining variables are also significant at the 99 % level. The ANOVA *F*-ratio is 20.80, and the p-value is less than 0.05, indicating a statistically significant relationship between the variables at the 95 % confidence level.

The adjusted R-squared statistic indicates that the model as fitted explains 83.97 % of the variability in the number of withdrawn M&A deals. In respect to residuals, the standard deviation is 3.0221, and the MAE is 2.0852.

Durbin-Watson statistic is 2.28, with a p-value 0.51. Since DW p-value is greater than 0.05, there is no indication of the existence of serial autocorrelation in the residuals at the 95 % confidence level. In terms of estimated autocorrelations for residuals, all coefficients are contained in between the 95 % probability limits. Since the autocorrelations are not statistically significant at the 0.95 level, the time series may well be equivalent to white noise series.

In addition, the three tests for randomness of residuals which were performed in previous models, present for this model p-values greater than 0.05. Therefore, it cannot be rejected the hypothesis that the series of residuals is random at the 95 % confidence level.

Finally, all tests performed for the normality and goodness-of-fit tests for residuals, Kuiper V, K-S, K-S D, chi-squared, Shapiro-Wilk W, skewness and kurtosis Z-scores, resulted in p-values greater than 0.05. Accordingly, the hypothesis that residuals comes from a normal distribution cannot be rejected at the 95 % confidence level.

6.3. Sensitivity analysis

The analysis of statistical tests for all models did not raise relevant statistical issues, concerning any possible models misspecification. During the early stage of models development, weekends were removed from daily data series, to address the issue of autocorrelation in the residuals. Observations from other non-trading days, resulting from holidays and extraordinary events, were left in the models and treated with specific dummy variables. The same treatment was given to reduced trading days.

The results obtained from ancillary regressions used to measure the effects of specific extreme observations, alternative event windows, and alternative significance levels, corroborate the main models outputs. They also corroborate the finding that the event variables are insignificant at the 95% confidence level.

7. Conclusions

The findings show a significant positive relationship between M&A activity and stock market prices, and also several significant associations between M&A and other endogenous and exogenous explanatory variables, but no relationship between accounting choice and M&A activity.

The intervention variables were not selected by any model constructed to test the research hypothesis. Several sensitivity analyses, which included the examination of the possible effects of extreme observations, non-trading days and reduced trading days; and also assuming alternative event windows, and alternative significance levels, were also carried out, with no implications on the main findings. The analysis of the impact of possible outliers and influential points did not resulted in any chance on the research findings as well.

Since the event variables were not able to reach even the 90% level of confidence threshold, the research hypotheses cannot be rejected. Therefore, the findings indicate that the effectiveness of the new accounting standards did not have any significant impact on the M&A activity in the U.S.A., during the period subject to examination. Financial markets conditions, time, and other M&A endogenous factors, proved more influential than the changes in the accounting for business combinations in respect to the pattern of M&A activity. This conclusion is consistent with the existing literature which argues that the market is able to assess the underlying economics of the transaction, regardless the accounting treatment (Davis, 1990; Hong et al., 1978; Lindenberg & Ross, 1999; Vincent, 1997).

Finally, our findings prove that the compromise achieved between the FASB and the different lobbies, particularly from IT and banking industries, did not harm the US economy, since the M&A activity was not affected. Moreover, the present findings have implications for several existing national sets of accounting standards which continue to allow the use of pooling of interests method and the amortization of purchased goodwill. This is the case in many countries in the Europe which have a dual accounting system, based on the fourth and the seventh directives of the European Council, and on the IASB standards that were recently endorsed by the EU. While IFRS 3 follows the main guidelines of FASB standards, many of the existent national sets of GAAP in Europe keep allowing pooling of interests and purchased goodwill amortization. We therefore argue that national European standard setters should follow IASB GAAP to enhance comparability among European companies involved in M&A deals.

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Table 1 Sample description

Deal Status		Number of Deals		Value ($ Millions)[a]
2000-2002 announced M&A deals in U.S.A			24,670	3,151,924.6
Less	Intended	(77)		(2,573.2)
	Intended Acquisition Withdrawn	(7)		(1,391.0)
	Partially Completed	(7)		(335.5)
	Discontinued Rumour	(17)		(0.0)
	Rumoured	(54)		(0.0)
	Seeking Buyer Withdrawn	(23)		(0.0)
	Seeking Buyer	(240)		(0.0)
	Pending	(3,581)	(4,006)	(34,981.2)
Total sample size			**20,664**	**3,112,643.70**
Completed deals			19,758	2,734,269.7
Withdrawn deals			906	378,374.0
Final Sample			**20,664**	**3,112,643.70**

[a]Total deal value, including Net Debt of Target. Total amounts only for deals where value information is available.
Source: Thomson Financial (2006).

Table 2 Descriptive statistics for unadjusted and non-dummy variables

Panel A: Monthly Data (36 months)

	MA	*WITH*	*SP 500*	*SP 500 Av*	*FED*	*FED Av*	*IP*	*GDP*	*MKTC*
Average	548.833	25.1667	1198.02	1205.24	3.95806	3.94537	1.01143E6	9918.82	14184.5
Median	519.5	24.0	1185.78	1187.69	3.885	3.86412	1.00695E6	9896.8	14081.7
Standard deviation	117.881	8.99365	199.342	197.325	2.09499	2.06975	20035.7	111.09	1972.17
Coeff. of variation	21.4785%	35.7364%	16.6393%	16.3722%	52.9297%	52.4602%	1.98094%	1.12%	13.9037%
Standard error	19.6468	1.49894	33.2237	32.8874	0.349165	0.344959	3339.29	18.5151	328.696
Minimum	323.0	11.0	815.28	854.631	1.16	1.24182	979061.0	9695.6	10254.7
Maximum	810.0	44.0	1517.68	1485.46	6.86	6.79818	1.04231E6	10095.8	17665.4
Range	487.0	33.0	702.4	630.827	5.7	5.55636	63247.0	400.2	7410.75
Lower quartile	467.0	19.0	1063.46	1078.03	1.82	1.75746	996291.0	9859.5	12987.1
Upper quartile	633.5	31.0	1380.43	1388.49	5.965	6.00192	1.03177E6	10004.5	15966.5
Stnd. skewness	1.53604	0.895424	-0.376738	-0.527423	0.193474	0.131409	0.269365	-0.000039364	-0.333135
Stnd. kurtosis	-0.423218	-0.60315	-1.25989	-1.325	-2.13074	-2.18567	-1.53519	-0.255029	-0.975409

Panel B: Weekly Data (156 weeks)

	MA	*SP 500*	*SP 500 Av*	*FED*	*FED Av*
Average	126.263	1203.95	1205.78	3.91301	3.94314
Median	120.0	1190.38	1192.39	3.87	3.836
Standard deviation	33.8761	196.854	196.87	2.03157	2.03892
Coeff. of variation	26.8298%	16.3507%	16.3272%	51.9182%	51.7081%
Standard error	2.71226	15.761	15.7622	0.162655	0.163244
Minimum	46.0	800.58	799.966	1.18	1.212
Maximum	254.0	1527.45	1512.99	6.86	6.702
Range	208.0	726.87	713.028	5.68	5.49
Lower quartile	102.5	1084.8	1084.54	1.74	1.763
Upper quartile	150.5	1376.1	1382.44	5.955	6.007
Stnd. skewness	2.7034	-0.993522	-1.06723	0.241791	0.205342
Stnd. kurtosis	1.74867	-2.53873	-2.61851	-4.38119	-4.41687

Table 2 Descriptive statistics for unadjusted and non-dummy variables (continued)

Panel C (1): Daily Data (782 days)				Panel C (2): Daily Data pre & post 1st July 2001					
	MA	***SP 500***	***FED***	***MA pre***	***MA post***	***SP500 pre***	***SP500 post***	***FED pre***	***FED post***
Nr of days	782	782	782	391	391	391	391	391	391
Average	24.6	1204.94	3.93611	28.6	20.6	1368.91	1040.97	5.82414	2.04808
Median	23	1188.45	3.845	28	20	1383.62	1083.82	5.99	1.76
Standard deviation	10.2146	197.366	2.0388	10.4679	8.17375	100.936	117.933	0.809369	0.722095
Coeff. of variation	41.437%	16.3797%	51.7974%	36.4986%	39.6371%	7.37342%	11.3292%	13.8968%	35.2572%
Minimum	0	776.76	1.15	0	0	1103.25	776.76	3.68	1.15
Maximum	78	1527.45	7.03	78	65	1527.45	1234.45	7.03	3.89
Range	78	750.69	5.88	78	65	424.2	457.69	3.35	2.74
Lower quartile	18	1083.82	1.76	21	15	1298.35	916.07	5.48	1.71
Upper quartile	30	1383.62	5.99	35	25	1452.42	1138.65	6.5	2.04
Stnd. skewness	9.07782	-2.28216	0.504284	5.50464	5.90779	-4.50505	-3.30858	-8.5428	11.8291
Stnd. kurtosis	11.1744	-5.83231	-9.76242	7.76695	10.8999	-2.25113	-4.84516	0.592472	3.8041

Table 3 Pearson/Spearman correlation matrixes for coefficient estimates

Panel A: Monthly observations

	MA	***WITH***	***SP500***	***SP500 Av***	***FED***	***FED Av***	***IP***	***GDP***	***MKTC***	***Per***	***Per_2***	***Per_3***	***TD***
MA		0.7390	0.8194	0.8021	0.8004	0.7671	0.7968	-0.6926	0.8227	-0.8216	-0.7114	-0.6185	0.3454
		0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0001*	*0.0391*
WITH	0.7098		0.7521	0.7659	0.7075	0.6765	0.6920	-0.6163	0.7489	-0.7363	-0.6766	-0.6213	0.1513
	0.0000		*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0001*	*0.0000*	*0.0000*	*0.0000*	*0.0001*	*0.3783*
SP500	0.8384	0.7501		0.9885	0.9065	0.9024	0.7115	-0.8552	0.9894	-0.9464	-0.9379	-0.8978	0.0971
	0.0000	*0.0000*		*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.5731*
SP500 Av	0.8311	0.7582	0.9876		0.9163	0.9104	0.7150	-0.8634	0.9721	-0.9543	-0.9487	-0.9105	0.0576
	0.0000	*0.0000*	*0.0000*		*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.7384*
FED	0.8000	0.6944	0.8879	0.9019		0.9933	0.8562	-0.7906	0.8565	-0.9396	-0.9139	-0.8492	0.1069
	0.0000	*0.0000*	*0.0000*	*0.0000*		*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.5350*
FED Av	0.7995	0.6550	0.8947	0.9017	0.9539		0.8496	-0.7816	0.8509	-0.9292	-0.9133	-0.8526	0.0744
	0.0000	*0.0001*	*0.0000*	*0.0000*	*0.0000*		*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.6665*
IP	0.7727	0.6702	0.6963	0.7066	0.7681	0.7596		-0.4755	0.6615	-0.7264	-0.6184	-0.5040	0.1189
	0.0000	*0.0001*	*0.0000*	*0.0000*	*0.0000*	*0.0000*		*0.0034*	*0.0000*	*0.0000*	*0.0001*	*0.0017*	*0.4899*
GDP	-0.7049	-0.6276	-0.8645	-0.8846	-0.8568	-0.8311	-0.5600		-0.8455	0.9303	0.9207	0.8968	0.0401
	0.0000	*0.0002*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0009*		*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.8162*
MKTC	0.8301	0.7342	0.9848	0.9735	0.8503	0.8541	0.6438	-0.8373		-0.9146	-0.9062	-0.8705	0.1315
	0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0001*	*0.0000*		*0.0000*	*0.0000*	*0.0000*	*0.4447*
Per	-0.8273	-0.7209	-0.9403	-0.9418	-0.9229	-0.9009	-0.6862	0.9411	-0.9094		0.9700	0.9195	-0.0256
	0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*		*0.0000*	*0.0000*	*0.8821*
Per_2	-0.8273	-0.7209	-0.9403	-0.9418	-0.9229	-0.9009	-0.6862	0.9411	-0.9094	1.0000		0.9862	-0.0107
	0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*		*0.0000*	*0.9508*
Per_3	-0.8273	-0.7209	-0.9403	-0.9418	-0.9229	-0.9009	-0.6862	0.9411	-0.9094	1.0000	1.0000		0.0035
	0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*		*0.9837*
TD	0.2666	0.0840	0.0535	0.0306	0.1244	0.1137	0.0216	0.0173	0.0513	-0.0133	-0.0133	-0.0133	
	0.1148	*0.6192*	*0.7514*	*0.8563*	*0.4616*	*0.5010*	*0.8982*	*0.9187*	*0.7614*	*0.9373*	*0.9373*	*0.9373*	

Upper-right cells and lower-left cells diagonal represent Pearson and Spearman correlation coefficients, respectively.
P-Values in italic.
Only non-dummy variables are exhibited.
36 monthly observations.

Table 3 Pearson/Spearman correlation matrixes for coefficient estimates (continued)

Panel B: Weekly observations

	MA	***SP 500***	***SP 500 Av***	***FED***	***FED Av***	***Per***	***Per_2***	***Per_3***	***TD***
MA		0.6395	0.6397	0.6201	0.6161	-0.6681	-0.5792	-0.5065	0.2886
		0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0003*
SP 500	0.6682		0.9954	0.8943	0.8950	-0.9425	-0.9360	-0.8975	0.0375
	0.0000		*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.6420*
SP 500 Av	0.6710	0.9935		0.9010	0.9003	-0.9458	-0.9398	-0.9011	0.0425
	0.0000	*0.0000*		*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.5983*
FED	0.6266	0.8864	0.8910		0.9975	-0.9302	-0.9123	-0.8497	0.0591
	0.0000	*0.0000*	*0.0000*		*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.4639*
FED Av	0.6299	0.8815	0.8823	0.9803		-0.9282	-0.9114	-0.8492	0.0403
	0.0000	*0.0000*	*0.0000*	*0.0000*		*0.0000*	*0.0000*	*0.0000*	*0.6177*
Per	-0.6797	-0.9388	-0.9399	-0.8998	-0.8947		0.9686	0.9172	-0.0407
	0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*		*0.0000*	*0.0000*	*0.6143*
Per_2	-0.6797	-0.9388	-0.9399	-0.8998	-0.8947	1.0000		0.9861	-0.0279
	0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*		*0.0000*	*0.7292*
Per_3	-0.6797	-0.9388	-0.9399	-0.8998	-0.8947	1.0000	1.0000		-0.0193
	0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*		*0.8112*
TD	0.1950	0.0234	0.0302	0.0834	0.0322	-0.0325	-0.0325	-0.0325	
	0.0152	*0.7711*	*0.7067*	*0.2991*	*0.6882*	*0.6857*	*0.6857*	*0.6857*	

Upper-right cells and lower-left cells diagonal represent Pearson and Spearman correlation coefficients, respectively.
P-Values in italic.
Only non-dummy variables are exhibited.
156 weekly observations.

Table 3 Pearson/Spearman correlation matrixes for coefficient estimates (continued)

Panel C: Daily observations

	MA	*SP500*	*FED*	*Per*	*Per_2*	*Per_3*	*Hol*	*E_BoM*	*HS_Ext*
MA		0.4104	0.4027	-0.4307	-0.3694	-0.3202	-0.3032	0.3926	-0.2162
		0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*
SP500	0.4304		0.8965	-0.9435	-0.9371	-0.8981	0.0100	0.0032	-0.0506
	0.0000		*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.7791*	*0.9279*	*0.1571*
FED	0.4240	0.8819		-0.9271	-0.9096	-0.8469	-0.0036	0.0141	-0.0532
	0.0000	*0.0000*		*0.0000*	*0.0000*	*0.0000*	*0.9206*	*0.6940*	*0.1369*
Per	-0.4371	-0.9387	-0.8941		0.9683	0.9166	-0.0021	-0.0004	0.0563
	0.0000	*0.0000*	*0.0000*		*0.0000*	*0.0000*	*0.9528*	*0.9917*	*0.1153*
Per_2	-0.4371	-0.9387	-0.8941	1.0000		0.9860	-0.0037	-0.0004	0.0524
	0.0000	*0.0000*	*0.0000*	*0.0000*		*0.0000*	*0.9178*	*0.9921*	*0.1431*
Per_3	-0.4371	-0.9387	-0.8941	1.0000	1.0000		-0.0045	-0.0004	0.0502
	0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*		*0.8996*	*0.9915*	*0.1602*
Hol	-0.2693	0.0082	-0.0200	-0.0021	-0.0021	-0.0021		-0.0591	-0.0330
	0.0000	*0.8177*	*0.5765*	*0.9528*	*0.9528*	*0.9528*		*0.0985*	*0.3565*
B_EoM	0.3282	0.0010	0.0496	-0.0004	-0.0004	-0.0004	-0.0591		-0.0054
	0.0000	*0.9773*	*0.1658*	*0.9917*	*0.9917*	*0.9917*	*0.0989*		*0.8806*
HS_Ext	-0.2151	-0.0532	-0.0584	0.0563	0.0563	0.0563	-0.0330	-0.0054	
	0.0000	*0.1368*	*0.1028*	*0.1157*	*0.1157*	*0.1157*	*0.3564*	*0.8805*	

Upper-right cells and lower-left cells diagonal represent Pearson and Spearman correlation coefficients, respectively.
P-Values in italic.
Weekdays dummy variables not shown.
782 daily observations.

Table 4 Regression models outputs and tests results

$$MA_t = \alpha + \sum_{j=1}^{3} \beta_j Per_t^j + \sum_{i=1}^{11} \delta_i Month_{i,t} + \sum_{l=1}^{2} \lambda_l SP500_{l,t} + \sum_{m=1}^{2} \zeta_m Fed_{m,t} + \omega\, IP_t + \\ + \phi\, MKTC_t + \gamma\, GDP_t + \varphi\, TD_t + \theta\, Event_t + \xi\, MA_{t-1} + \varepsilon_t \quad (2)$$

Backward elimination regression, with all variables left in the model significant at the 0.05 level:

Panel A: Estimation and tests results for model using M&A monthly data

Parameter	*Estimate*	*P-Value*	*T Statistic*	*Standard Error*
Intercept	-245.992	*0.1057*	-1.67637	146.741
Per	-38.3226	*0.0001*	-4.68077	8.18724
Per_2	2.05267	*0.0047*	3.08964	0.664373
Per_3	-0.02809	*0.0242*	-2.3933	0.011735
Aug	-58.0454	*0.0039*	-3.16688	18.3289
Nov	-52.9105	*0.0060*	-2.99344	17.6755
SP500	0.35015	*0.0003*	4.23733	0.082635
Fed	32.7201	*0.0297*	2.30109	14.2194
TD	18.6442	*0.0000*	5.36609	3.47444
ANOVA *F* value	68.49	*0.0000*		
R-squared	95.4696%			
R^2 Adjusted for d. f.	94.0756%			
N used (*read*)	35 (*36*)			
Durbin-Watson D	2.07124	*0.2912*		
Chi-Squared (13 d. f.)	4.77137	*0.979887*		
Shapiro-Wilk W	0.955366	*0.212621*		
Skewness Z-score	1.37276	*0.169827*		
Kurtosis Z-score	1.10334	*0.269877*		
Kolmogorov-Smirnov	0.0816716	*0.973699*		
Modified K-S D	0.494093	*≥ 0.10**		
Cramer-Von Mises W^2	0.048242	*0.525551**		
Watson U^2	0.0384931	*0.645844**		
Anderson-Darling A^2	0.386077	*0.372269**		
Kuiper V	0.152129	*≥ 0.10**		
Box-Pierce Test	8.90604	*0.630565*		

* P-Value has been compared to tables of critical values specially constructed for fitting the selected distribution. Except for the Chi-Squared Test, other P-values are based on general tables.

Table 4 Regression models outputs and tests results (continued)

$$WITH_t = \alpha + \sum_{j=1}^{3} \beta_j Per_t^j + \sum_{i=1}^{11} \delta_i Month_{i,t} + \sum_{l=1}^{2} \lambda_l SP500_{l,t} + \sum_{m=1}^{2} \zeta_m Fed_{m,t} +$$
$$+\phi\, MKTC_t + \gamma\, GDP_t + \omega\, IP_t + \varphi\, Trad_t + \rho\, MA_t + \phi\, Event_t + \quad (5)$$
$$+\xi\, WITH_{t-1} + \varepsilon_t$$

Backward elimination regression, with all variables left in the model significant at the 0.05 level:

Panel B: Estimation and tests results for model utilised to test hypothesis two

Parameter	*Estimate*	*P-Value*	*T Statistic*	*Standard Error*
Intercept	-46.4071	*0.0285*	-2.32547	19.956
Per	-9.00213	*0.0000*	-6.27822	1.43387
Per_2	0.57598	*0.0000*	5.68897	0.101245
Per_3	-0.00916	*0.0000*	-5.39809	0.001697
Aug	-9.58472	*0.0025*	-3.36588	2.84761
Oct	-6.79894	*0.0133*	-2.66549	2.55073
Fed	9.80755	*0.0001*	4.60347	2.13047
MKTC	0.004098	*0.0012*	3.66945	0.001117
MA	-0.07593	*0.0034*	-3.23117	0.023499
TD	1.85311	*0.0117*	2.71929	0.681467
ANOVA *F* value	20.80	*0.0000*		
R-squared	88.2183%			
R^2 Adjusted for d. f.	83.9769%			
N used (*read*)	35 (*36*)			
Durbin-Watson D	2.28273	*0.5118*		
Chi-Squared (13 d. f.)	16.6575	*0.21544*		
Shapiro-Wilk W	0.945907	*0.109975*		
Skewness Z-score	0.969005	*0.332541*		
Kurtosis Z-score	-0.619124	*0.535832*		
Kolmogorov-Smirnov	0.151482	*0.402887*		
Modified K-S D	0.916429	*<0.05**	*(≥0.10)*	
Cramer-Von Mises W^2	0.114195	*0.06836**		
Watson U^2	0.105329	*0.07100**		
Anderson-Darling A^2	0.637081	*0.08891**		
Kuiper V	0.220846	*≥0.10**		
Box-Pierce Test	6.46306	*0.840753*		

* P-Value has been compared to tables of critical values specially constructed for fitting the selected distribution. Except for the Chi-Squared Test, other P-values are based on general tables.

Table 4 Regression models outputs and tests results (continued)

$$MA_t = \alpha + \sum_{j=1}^{3} \beta_j Per_t^j + \sum_{i=1}^{4} \delta_i Week_{i,t} + \sum_{l=1}^{2} \lambda_l SP500_{l,t} + \sum_{m=1}^{2} \zeta_m Fed_{m,t} + \\ + \phi\, E\_BoM_t + \varphi\, TD_t + \theta\, Event_t + \psi\, Event\_ED_t + \xi\, MA_{t-1} + \varepsilon_t \quad (3)$$

Backward elimination regression, with all variables left in the model significant at the 0.05 level:

Panel C: Estimation and tests results for model using weekly M&A data

Parameter	*Estimate*	*P-Value*	*T Statistic*	*Standard Error*
Intercept	-28.3688	*0.4957*	-0.683	41.5356
Per	-2.64935	*0.0000*	-4.93264	0.537105
Per_2	0.0344024	*0.0013*	3.2878	0.0104637
Per_3	-0.0001183	*0.0070*	-2.73458	0.0000432
Week1	13.6826	*0.0033*	2.98494	4.58386
Week3	7.85482	*0.0259*	2.25012	3.49085
E_BoM	22.113	*0.0000*	4.60669	4.80019
SP500	0.0614736	*0.0069*	2.74118	0.0224259
Fed	9.30303	*0.0264*	2.24266	4.14821
TD	15.7606	*0.0000*	5.9524	2.64778
ANOVA *F* value	49.60	*0.0000*		
R-squared	75.4806%			
R^2 Adjusted for d. f.	73.9587%			
N used (*read*)	155 (*156*)			
Durbin-Watson D	1.80846	*0.1172*		
Chi-Squared (26 d. f.)	33.0323	*0.161153*		
Shapiro-Wilk W	0.969081	*0.0375546*		
Skewness Z-score	1.8038	*0.0712629*		
Kurtosis Z-score	1.0161	*0.309581*		
Kolmogorov-Smirnov	0.059553	*0.64161*		
Modified K-S D	0.744899	*≥ 0.10**		
Cramer-Von Mises W^2	0.0788054	*0.213151**		
Watson U^2	0.0591803	*0.345972**		
Anderson-Darling A^2	0.641829	*0.092473**		
Kuiper V	0.0961851	*≥ 0.10**		
Box-Pierce Test	23.7014	*0.478771*		

* P-Value has been compared to tables of critical values specially constructed for fitting the selected distribution. Except for the Chi-Squared Test, other P-values are based on general tables.

Table 4 Regression models outputs and tests results (continued)

$$MA_t = \alpha + \sum_{j=1}^{3} \beta_j Per_t^j + \sum_{i=1}^{4} \delta_i Weekday_{i,t} + \lambda\ SP500_t + \zeta\ Fed_t + \varphi\ Hol_t + \\ + \varpi\ HS\_Ext_t + \phi\ E\_BoM_t + \theta\ Event_t + \psi\ Event\_ED_t + \xi\ MA_{t-1} + \varepsilon_t \quad (4)$$

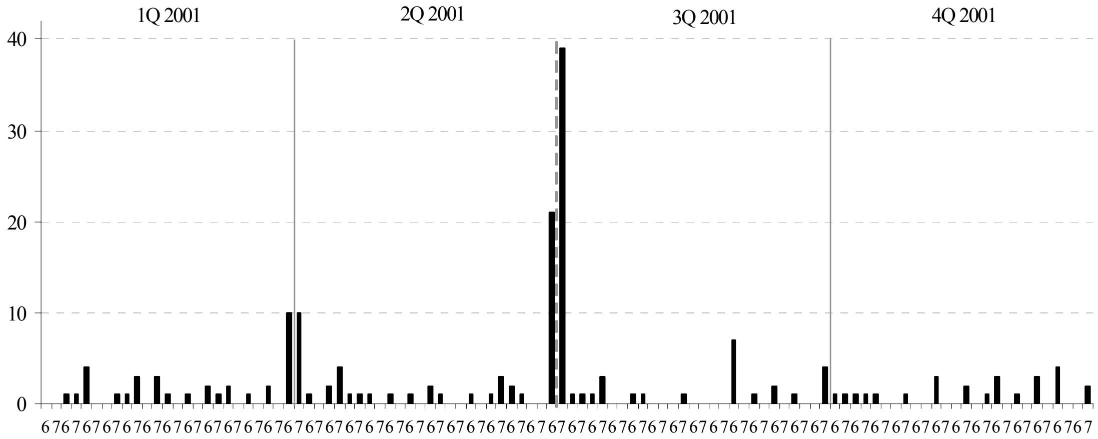
Backward elimination regression, with all variables left in the model significant at the 0.05 level:

Panel D: Estimation and tests results for model using daily M&A data

Parameter	*Estimate*	*P-Value*	*T Statistic*	*Standard Error*
Intercept	13.1969	*0.0221*	2.288	5.76786
Per	-0.0428325	*0.0000*	-8.81313	0.00486008
Per_2	0.0000432	*0.0000*	7.65654	0.00000564
Mon	8.74325	*0.0000*	11.3343	0.771398
Tue	6.03012	*0.0000*	7.8878	0.764487
Wed	4.21136	*0.0000*	5.5252	0.762209
Thu	3.79882	*0.0000*	5.00339	0.759248
Hol	-17.5629	*0.0000*	-12.8825	1.36332
HS_Ext	-11.9676	*0.0000*	-6.72071	1.7807
E_BoM	12.6377	*0.0000*	15.1327	0.835129
SP500	0.0100865	*0.0086*	2.62597	0.00384108
MA_lag	0.0951784	*0.0009*	3.33449	0.0285436
ANOVA *F* value	95.34	*0.0000*		
R-squared	57.6940%			
R^2 Adjusted for d. f.	57.0889%			
N used (*read*)	781 (*782*)			
Durbin-Watson D	2.00652	*0.4637*		
Chi-Squared (52 d. f.)	41.3188	*0.855999*		
Shapiro-Wilk W	0.982401	*0.0777322*		
Skewness Z-score	3.37554	*0.0007368*		
Kurtosis Z-score	4.67686	*0.0000029*		
Kolmogorov-Smirnov	0.0270437	*0.617458*		
Modified K-S D	0.759124	*≥ 0.10*		
Cramer-Von Mises W^2	0.169881	*≥ 0.10*		
Watson U^2	0.132836	*≥ 0.10*		
Anderson-Darling A^2	1.2108	*≥ 0.10*		
Kuiper V	0.047927	*≥ 0.10*		
Box-Pierce Test	36.9366	*0.0444019*		

* P-Value has been compared to tables of critical values specially constructed for fitting the selected distribution. Except for the Chi-Squared Test, other P-values are based on general tables.

Figure 1 M&A announcements during weekends, 2001



Number of M&A announcements during weekends in 2001
Number six for Saturdays and number seven for Sundays.

Source: SDC Platinum (Thomson Financial, 2006).