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THE ANNOUNCEMENT EFFECTS OF STOCK SPLITS ON STOCK PRICES

ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΕΙΡΑΙΩΣ	
ΑΡ. ΕΠ.	36743
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ΒΙΒΛΙΟΘΗΚΗ	

DESPINA KTISTAKI
 SUPERVISOR: N. TSAGARAKIS

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1. INTRODUCTION

Listed firms often decide to split their stock, in which case they increase the number of shares outstanding by distributing more shares as dividends and adjusting respectively the nominal price of the stock, leaving however the total capital unaffected. In theory a stock split is merely an accounting change, which leaves investors no better or worse off than they were before the split.

Yet stock splits are a relatively common corporate event. This implies that there must be some benefit either real or perceived, that results from firms splitting their stock. Survey evidence indicates that managers split their stock to get the stock's price into some optimal trading range (Baker and Gallagher (1980)). Managers believe this will attract small investors, which implies managers believe that splitting their firm's stock has implications for the firm's ownership structure.

As we will see in the literature review that will follow, evidence exists that stock splits by U.S. firms are associated with positive abnormal returns around the announcement date and the day the stock split is realized. Also, there is an increase in variance following the ex-day.

Several hypotheses have been put forward to explain the market reaction around the announcement day and can be summarized as follows:

- the Signaling Hypothesis (Asquith, Healy and Palepu (1989), Rankine and Stice (1997)), which states that firms signal information about their future earnings through their split announcement decision,

- the Liquidity Hypothesis (Baker and Powell (1993), which takes the form of an Optimal Trading Range Hypothesis (Lakonishok & Lev (1987)), (Ikenberry, Rankine & Stice (1996)) and states that companies tend to move their share price back towards an as optimal perceived trading range after the share price has risen substantially,
- The Neglected Firm Hypothesis (Muscarella and Vetsuypens (1996)), which proposes that firms use the stock split to draw attention to ensure that information about the company is wider recognized than before.
- The Optimal Tick Size Hypothesis (Angel (1997)), which defines, that firms split their stock to increase the size of the tick relative to the share price.
- The Self-Selection Hypothesis (Ikenberry, Rankine & Stice (1996)), which is a synthesis of the Signaling and Trading Range Hypotheses. It suggests that managers use stock splits to move share prices into a trading range, but condition their decision to split on expectations about the future performance of the firm.

The purpose of this paper is not to explain why managers decide to split their firm's stock, but rather to examine the market reaction to stock splits using a set of Greek firms, and especially to give further insight on the announcement effect. This paper contributes to the literature in the sense that it extends the international empirical evidence on stock splits to the Greek capital market and also provides additional insight into the relative explanation power of the existing theories.

It is also worth mentioning that this corporate event (stock split), while very popular in other countries and especially in the U.S., it was not preferred in Greece until the last few years. In specific, from the total amount of 110 stock splits that took place in the Athens Stock Exchange during the period of 1990-2000, sixty six percent (66%) appeared in the last two years of 1999 and 2000. This was due to the rapid evolution of Athens Stock Exchange during this period. The listed firms followed the trend of splitting their stock due to the increase of trade and demand for their shares.

The outline of the thesis is as follows. In section 2 a general literature review is presented. In Section 3 the institutional scope is described. In Section 4 the types of stock split are presented. In Section 5 we present the hypotheses which will be tested. Section 6 describes the data and methodology. In Section 7 a cross sectional analysis is made. In Section 8 the empirical results are discussed and in Section 9 conclusions are presented.

2. LITERATURE REVIEW

A Stock Split is a relatively common corporate event that has been investigated by many researchers. They have examined not only the reasons of its occurrence, but also its effects on the market price and the liquidity of the shares.¹ Those that examine the effect of stock splits on share prices are presented here:

Grinblatt, Masulis and Titman (1984), following the Signaling Hypothesis, examined the valuation effects of stock split and stock dividend announcements. The data exhibited significantly positive announcement returns for the entire sample, for a sample of "PURE" events, which had no other announcements in the three-day period around the announcement day, and for a sample where no cash dividends were declared in the previous three years. The use of "PURE" sample gave the results a great significance, since they were uncontaminated by other contemporaneous firm-specific announcements.

The sample contained the initial announcements of proposed splits and stock dividends for the years 1967-1976, and day 0 was presumed to be the date on which the market becomes aware of the firm's intention to expand the number of shares. The authors used the mean-adjusted return methodology in their research. The returns on various days around the announcement were compared with the average daily return for a subsequent benchmark period of forty trading days (days 4-43). To test the significance of the announcement return, they examined both day 0 and day 1 because the announcement often became public after the close of trading on day 0.

¹ Other researchers have examined other aspects related to stock splits: Copeland (1979), McNichols, Dravid (1990), Conroy, Harris (1999).

Lakonishok and Lev (1987), accepting the signaling and optimal price hypotheses, developed a model using a test and a control sample, in order to show the positive effect of stock split and stock dividend announcement date to abnormal return. In particular, they used a test sample of 1,015 stock split events covering the twenty-year period 1963-1982 and a control sample, which was constructed by matching every company that had a stock split with a company from the same four-digit Standard Industrial Classification industry code with an asset size as close as possible to the test company. Throughout their analysis, "month zero" was defined as the month in which the stock split was announced.

The researchers came to the conclusion that stock splits are mainly aimed at restoring stock prices, which increased considerably during an unusual growth period, to a normal range, defined in terms of market and industry-wide price averages and firm-specific prices. As to marketability, splits did not appear to affect permanently the volume of trade. Yet it might be that other aspects of marketability, such as the composition of stockholders, were influenced by splits.

They also found that stock dividends were altogether different from stock splits, and they appeared to be a decreasing phenomenon. The clue to stock dividend distributions might lie in their perceived substitution for relatively low cash dividends.

Lamoureux and Poon (1987), created a model of market reaction to stock splits. They argued that the announcement of a split sets off the following chain of events. The market recognizes that, subsequent to the (reverse) split ex-day, the daily number of transactions along with the raw volume of shares traded will increase (decrease). This increase in volume results in an increase in the noisiness of the security's return process. The increase in noise raises the tax-option value of the stock, and it is this value that generates the announcement effect of stock splits.

They used a splitting sample of 217 stocks during the period of July 1962 through December 1985. To reduce the problem of contamination of the split by other factors and to provide a sample, of which reverse splits comprise a meaningful part, only splits of at least five for two are included. To ascertain the impact of the announcement of a split, along with ex-day behavior, the standard event-time methodology was employed. The market model was assumed to be a means of approximating security price movement. In this study, daily returns were used. In addition a period of 130 days, beginning 250 days prior to the split announcement, was used for each announcement.

The results showed that the announcement of a large split (reverse split) caused a positive (negative) abnormal return. The split resulted in an increase in the number of transactions along with the number of shares traded, which increased the volatility of the price series. That portion of the increase in volatility that was diversifiable was desirable, particularly to investors in high tax brackets, as it expanded the tax opportunities of owning the stock. Liquidity was generally reduced by a split and increased by a reverse split, but there was no indication that the market attached any value to that change in liquidity.

Brennan and Hughes (1991), developed a model in which the dependence of the brokerage commission rate on share price provided an incentive for brokers to produce research reports on firms with low share prices. Stock splits therefore affected the attention paid to a firm by investment analysts. The prediction of the model was tested and confirmed on a sample of firms listed on the I/B/E/S database during 1976-1987. The number of analysts making forecasts was negatively related to share price, and the change in analyst following was positively related to the magnitude of stock splits.

The researchers assumed that investors traded only in stocks that they "knew about", and traded through brokers who analyzed those firms which would

generate the greatest trading volume and brokerage fees. A manager with private "good news" had an incentive to attract the attention of security analysts so that they would discover the good news and inform their clients through earnings forecasts. In their model the manager did this by announcing a stock split, thereby reducing the share price and increasing the trading commission revenue, which would result from research activity by brokerage houses. Investors accordingly interpreted a stock split as a signal that the manager had favorable information, which explained the positive abnormal returns observed around split announcements.

The model also predicted that there would be an increase in the amount of information generated by analysts after the ex-date. This might account for the increase in price volatility observed after the ex-date, the wider bid-ask spread, and the increase in the number of shareholders.

Ikenberry, Rankine and Stice (1996), following the Signaling and Self-selection Hypotheses, suggested that splits realigned prices to a lower trading range, but managers self-selected by conditioning the decision to split on expected future performance. They used a sample of 1,275 two for one stock splits from 1975 to 1990 and followed the Market Adjusted Return Method.

In the short-run performance, the market reaction to split announcements was examined by computing five-day market adjusted returns from two days before to two days after the announcement. Splits announcement returns were larger for smaller firms, because less information about small firms generally was available to market participants. In the long-run performance, they examined the stock price performance of split firms in the three years after the split, and they found that excess returns were positive for all size groups.

In particular they came to the conclusion that splits were often observed when prices had increased substantially in the recent past or when shares traded at

relatively high levels. Splits undertaken by firms with low share prices or with negative pre-split returns were associated with positive announcement returns but negative returns in the year following the split. This suggested that investors initially interpreted these announcements as positive news, but were disappointed as post-split events unfold.

Post-split prices showed substantial dispersion, and this result was consistent with the view that splits were typically used to realign share prices to a normal trading range. The market initially under-reacted to the information in a split announcement. This was due to the failure of the market to fully respond to information within a short announcement period and it was characteristic of all corporate events.

Dennis and Strickland (May 1998), following the signaling and liquidity hypotheses, showed that the abnormal return at the announcement of a split was positive and negatively related to the proportion of institutional ownership prior to the split. This indicated that firms with low institutional ownership prior to the split achieved the largest liquidity benefit following the split. They also showed that the largest post-split increase in institutional ownership occurred for firms that had low institutional ownership prior to the split. This indicated that the large increases in trading volume for firms with low institutional ownership prior to the split was the result of increased institutional ownership following a split. Finally they came to the conclusion that the abnormal return following a split is negatively related to the level of institutional ownership prior to the split. This was consistent with the notion that the market rewarded those firms that had the largest increase in liquidity following a split.

In specific they collected a sample of all splits that occurred for firms that trade on the NYSE, AMEX or NASDAQ from January 1, 1990 to December 31, 1993. They used the mean and median change in turnover for splitting firms conditioned on the level of institutional ownership in the quarter prior to the split

announcement. Turnover change is defined as the difference in average monthly turnovers from the post to pre-announcement period divided by the average monthly pre-announcement period turnover.

Christian Wulff (May 1999), using the liquidity and neglected firm hypothesis, he applied the standard event study methodology of Brown and Warner (1985) in order to show whether stock splits are associated with positive abnormal returns around the announcement and the execution day and in addition with an increase in variance following the ex day.

He used a sample of 72 stock splits of Frankfurt Stock Exchange during the period of 1994 to 1996. Denoting the event date as day 0, regression coefficients are estimated over a period of 200 days, from day -230 to day -31. At the announcement date itself the abnormal return is very low and insignificant, but the following day exhibits a significant return. Abnormal returns remain positive and partly significant up to four days after the announcement.

Table 1 presents a summary of the literature review, containing the Author, the method used to analyze the data, the effect of the stock split announcement had on the stock price and other related results.

3. INSTITUTIONAL SETTINGS

Firms listed on the Athens Stock Exchange are required to follow certain procedures in order to perform stock splits or stock dividends.

A. PROCEDURES FOR STOCKS SPLITS AND STOCK DIVIDENDS

(Law 18/15.1.99 (ΦΕΚ 40Β' 27.1.99) which includes the decision of the Board of Directors of Athens Stock Exchange and Law 2190/1920, Article 13)

1. New Shares due to an Increase of Capital Equity With a "Free" Stock Dividend Distribution From Reserves Capitalization

The procedure of new shares offering due to the Increase of Equity Capital with "free" stock dividend distribution from reserve capitalization is divided in two stages:

Stage 1: ex-right date - price adjustment - approval of the new share's distribution

- i. The company determines the date that the new shares are distributed. Before that, the following actions are obligatory:
 - ◆ The company should submit relative documents to the Athens Stock Exchange, where the respective department will confirm the fulfillment of the firm's obligations
 - ◆ The company must inform the investors.

- ii. The stock price adjustment due to the new share distribution is made the first day trade without the coupon.
- iii. The new shares are approved by the Board of Directors of Athens Stock Exchange.

Stage 2: New Shares offering

- The company is responsible for the Issuance of new shares that the stockholders are entitled to.
- The company should announce through the press information concerning the exact date that the new shares are distributed and listed on the Athens Stock Exchange.
- The company should send a confirmation letter to the Athens Stock Exchange with the exact date that the new shares are distributed and available to the investors.
- Shares are distributed to investors.
- Time Limit: The issuing firm must distribute the new shares within a month from the date that the General Shareholder's Meeting made the decision.

2. New Shares due to Stock Split

In order for a company to perform a stock split, it should take into consideration the nominal value of the shares outstanding. This nominal price should not be less than 100 drachmas; it is the lower limit and it applies in all cases of stock split.

The procedure of a stock split can be divided in two stages:

Stage 1: ex-right date - price adjustment - approval of the new share distribution

- i. The date, which the outstanding shares with their new nominal value are listed, is determined by the company. Before that date, the following actions are obligatory:
 - ◆ The company should submit relative documents to the Athens Stock Exchange, where the respective department will confirm the fulfillment of the firm's obligations.
 - ◆ The company must inform the investors.
- ii. The price adjustment of the shares, due to the change of its nominal value, is made on the first day, that the outstanding shares are listed with their new nominal value.
- iii. The new shares are approved by the Board of Directors of Athens Stock Exchange Market.

Stage 2: New Shares offering

The steps that the firm must follow are:

- The company is responsible for the Issuance of new shares that the stockholders are entitled to.
- The company should announce through the press information concerning the exact date that the new shares are distributed and listed on the Athens Stock Exchange.
- The company should send a confirmation letter to the Athens Stock Exchange with the exact date that the new shares are distributed and available to the investors.
- Shares are distributed to investors.
- Time limit: The issuing firm must distribute the new shares within a month from the date that the General Shareholder's Meeting made the decision.

B. DOCUMENTATION FOR STOCK SPLITS AND STOCK DIVIDENDS

The documents that the company should submit to the Athens Stock Exchange due to a capital increase via stock dividend distribution are the following:

1. Proceeding of Company's Board of Directors with subject 'Certification of Capital Equity Payment'.
2. Abstract of the decision of company's General Shareholder's Meeting, during which the decision of the above increase of Capital Equity has been made.

3. Approval of Ministry of Development and Entry in the 'MAE' of the relevant change of company's decision.
4. Evidence of reserve submission in favor of board of Capital Market, to the Bank of Greece.
5. Announcement of the names of two widely circulated newspapers to the Athens Stock Exchange. The publication of the announcement should be made no longer than the previous day from the stock price adjustment.

The documents that the company should submit to the Athens Stock Exchange due to stock split are the following:

1. Abstract of the decision of company's General Shareholder's Meeting, during which the decision of the above increase of Capital Equity has been made.
2. Approval of Ministry of Development and Entry in the 'MAE' of the relevant change of company's decision.

4. TYPES OF STOCK SPLITS

In this paper we will examine two types of the same corporate event: a) A "PURE" Stock Split, where there is no other corporate event involved and b) A "COMBINED" Stock Split, which is a concurrent event of stock split and Increase of Capital Equity with stock dividend distribution, which are both very common in the Greek Capital Market.

A. "PURE" STOCK SPLIT (no other corporate event involved)

In this case the company decreases the nominal value of stock by printing new shares for each original share and distributing the new shares to its stockholders as a "free gift", but leaves the total capital unchanged.

B. "COMBINED" STOCK SPLIT (Stock Split and Increase of Capital with stock dividend distribution)

Here, the decrease of nominal value of shares is accompanied by simultaneous Increase of Capital Equity with stock dividend distribution. The afore mentioned Increase can have the form of "capitalization of profits", "capitalization of reserves" and "capitalization of reserves from revaluation of assets", which have nothing to do with the cash inflow in the company. The stock dividend distribution is made according to Law 2190/1920, which states that only the old stock holders are entitled to the stock dividend distribution and is proportional to the number of shares they already own.

The increase of equity with stock dividend distribution is decided by the Board of Directors and confirmed by the General Shareholder's Meeting. Also, the General Shareholder's Meeting determines the terms of the capital increase, the proportional number of new shares to old shares and the related dates. The three forms of Equity Increases with Stock Dividend Distributions are:

i. Capitalization of profits

Greek firms can use their current profits to distribute stock dividends. In this case, the profits so used are transferred to the stock capital account. According to Greek tax code, until 1992, firms paid corporate taxes only on the undistributed profits, after deducting the amount allocated to tax-free reserves, if any. On any distributed cash or stock dividends, exchange-listed firms withheld personal taxes at rates of 42 or 45%, depending on whether the shares were registered or issued to the bearer, respectively. After receiving the cash or stock dividend, shareholders were liable to pay additional taxes or they were entitled to a refund, depending on whether their effective marginal personal tax rate exceeded or fell short of the withholding tax rate. After 1992, the earnings before taxes are reduced by allocations to tax-free reserves, if any, and the remainder is taxed as corporate income. Any distribution of cash or stock dividends out of these net earnings is tax-free to the shareholders. Therefore, cash as well as stock dividends are not subjected to double taxation under the Greek tax system. It should be noted that the distribution of stock dividends out of current earnings is an extremely uncommon corporate event in Greece. As a result, the sample of the present study does not contain stock dividends paid out of current profits.

ii. Capitalization of Reserves

In this case, the amount affected is transferred from the reserves to the stock capital account. If the reserves represent accumulation of already taxed profits, the stock dividends are treated as a tax-free distribution. If, instead, the reserves were formed from non-taxed profits, the stock dividends are taxable as regular income. In practice, it is also uncommon for Greek firms to distribute stock dividends out of Tax-free reserves (that is, reserves formed from non-taxed profits). Consistent with this corporate behavior, our sample does not include stock dividends distributed out of tax-free reserves.

iii. Capitalization of Reserves from Revaluation of Assets

Due to high levels of inflation in Greece since the early 1970s, a series of laws were enacted that require firms to revalue their assets, so that their book values would better reflect their current market values. The difference between the new and the old book value of assets was recorded as special reserve. In the period 1981-94 there were four legislative decrees (Laws 1249/1982, 1731/1987, 2665/1988 and 2065/1992) that mandated firms to form reserves from the revaluation of their assets. These decrees specified such terms as the amount of revaluation, the computational method, and the tax consequences. They also determined whether the capitalization of such reserves would be effected through a stock dividend distribution or an increase of the par value of the shares. Stock dividends distributed out of this type of reserves are tax-free.

The reasons that a company decides an increase of capital equity with stock dividend distribution is according to international literature the following: a) the need of credit capacity increase b) liquidity maintenance c) re-adjustment of stock price to an optimal trading range d) the psychological effect to shareholders.

The *advantages* of company's financing by issuing new common stocks are the following:

1. Common stocks do not create additional expenses. That means that there is no legal obligation of cash dividend distribution, in contrast with the interests of bonds. The company will distribute cash dividends to shareholders only in case of profit during its accounting period. In the opposite case, the company has no other obligation to its common shareholders.
2. Common stocks do not have a fixed expiration date.
3. Common capital equity is a guarantee for company's borrowers, since borrowers precede common shareholders in case of capital reward payment. Consequently, the issue of common capital equity improves the credit estimation of company's bonds to securities of small risk, and as a result the decrease of loan's cost for the company.
4. In many cases, common capital equity can be sold easier than that of a loan liability since: a) in theory it has higher estimated return than preferred stocks or loans, b) in the grade that it represents the company's ownership, it gives better security to investors from inflation than that of the preferred stocks or loans, c) the capital gains from common stocks are not taxable in some countries until they are realized and in other countries are not taxable at all.

The *disadvantages* of company's financing by issuing new common stocks are the following:

1. The sell of common stocks gives the right of vote and control to new shareholders, who in that way enter in to the company. For that reason, the issue of new stocks is avoided in small companies.

2. When the company expects high profits, loans are preferable due to their stable cost in contrast to the issue of new common stocks, where more stockholders will share the company profits in the future.
3. The cost of underwriting and issuing common stocks is higher than that of preferred stocks and bonds.
4. Due to the advantage, that in case of profits the company has no obligation to the common shareholders, the issue of new common stocks can be considered as a company weakness and therefore to provoke decrease of stock price.

DIFFERENCE BETWEEN A STOCK SPLIT AND A STOCK DIVIDEND

Both corporate events are mostly similar.

A *stock split* increases the number of shares, reduces the nominal value per share, leaves the total equity unaffected, and adjusts the market value of the shares accordingly.

A *stock dividend*, also, increases the number of shares, reduces the nominal value per share, adjusts the market value of the shares accordingly but increases the total equity of the firm. A stock dividend is shown as a transfer from one or more accounts to equity.

So the difference between the two corporate events is the fact that the latter increases the total equity, while a stock split is shown as a reduction in the par value of each share.

5. HYPOTHESES

The hypotheses most favored by researchers to explain the announcement effects around stock splits are the signaling, the liquidity and the neglected firm hypothesis. They are not mutually exclusive, but often combined.

A. Signaling Hypothesis

Grinblatt, Masulis and Titman (1984), Asquith, Healy and Palepu (1989), and Rankine and Stice (1997) believe that firms signal information about their future earnings through their stock split announcement decision. If a manager believes that the future share price will decrease, they may not be willing to split the stock due to the increased cost of trading a lower priced stock, or due to their reluctance to split the stock and then have the share price fall below the manager's perceived "optimal trading range". While managers may not explicitly intend for the split to be a positive signal about the future prospects of the firm, the split still conveys information to the market. Institutional owners may be better able to take advantage of this signal, compared to individual owners, either because they trade much more than individuals and are not as wealth constrained, or because they are more efficient at interpreting and processing the signal.

B. Liquidity Hypothesis

The liquidity hypothesis, Baker & Powell (1993), often takes the form of an optimal trading range hypothesis which states that companies tend to move their share price back towards an as optimal perceived trading range after the share

price has risen substantially. Although Lakonishok and Lev (1987) and Han (1995) provide some empirical evidence on the existence of an optimal trading range in the U.S., this hypothesis is in contrast to the decrease in trading activity after a stock split observed by Copeland (1979) and Conroy, Harris and Benet (1990). Focussing on an arguably signal-free sample of ADR splits, Muscarella and Vetsuypens (1996) show that liquidity after the stock split improves which is accompanied by wealth gains to investors. Their findings support the model of Amihud and Mendelson (1986), that predicts a positive relation between equity value and liquidity. According to this model rational investors discount illiquid securities heavier than liquid ones due to the higher transaction costs and greater trading frictions they face. This hypothesis could provide explanation power to Greek stock split announcement effects as well.

C. Neglected firm Hypothesis

Arbel and Swanson (1993) in the context of stock splits predominantly propose the neglected firm hypothesis. It states that if there is little known about a firm its share trades at a discount. Thus, firms use the split to draw attention to ensure that information about the company is wider recognized than before.

Less used to explain the power of stock splits are two other hypotheses: the optimal tick size hypothesis and the self-selection hypothesis.

D. Optimal Tick Size Hypothesis

Angel (1997) holds that firms split their stock to increase the size of the tick relative to the share price. A larger relative tick size means greater protection for limit orders, fewer trading errors and lower costs of negotiation between traders. These advantages are traded off against the cost to investors inherent in a wider

percentage spread that comes with a wider tick. As a result of this trade off and institutional practices that dictate a constant absolute tick size, a firm splits its stock in an attempt to maintain the optimal relative tick size.

E. Self Selection Hypothesis

Ikenberry, Rankine & Stice (1996) used the self-selection hypothesis as a synthesis of signaling and trading range hypothesis. In particular it states that managers use splits to move share prices into a trading range, but condition their decision to split on expectations about the future performance of the firm.

6. DATA AND METHODOLOGY

A. DATA

The initial sample in this study consists of all stock splits by firms listed on the Athens Stock Exchange between 1990 and 2000. The sample was identified through a search of ASE publications, the daily press (all major newspapers were considered), and the Database of "FINANCE". The announcement day investigated is the day of the first public announcement in the press. To ensure that this was the first day that the information became public, the announcement was confirmed or corrected by reviewing each firm's official records.

The announcement is a press release by the board of directors calling a general meeting of shareholders to approve the stock split proposal. All proposals included in the sample were subsequently approved by the shareholders.

During the period under investigation 110 splits were made by the firms, from which 40 cases are excluded because the split execution date coincided with the increase of equity by cash payment, and 7 other cases are excluded due to unavailability of data, leaving a final sample of 63 stock splits. We divided the final sample of 63 cases in the two following sub-samples. A sample of "PURE" Stock Splits and a sample of "COMBINED" Stock Splits.

- "PURE" is the stock split, where no other corporate event is involved
- "COMBINED" is the stock split and Increase of Capital with stock dividend distribution.

The final sample is presented in detail in Table 2.

I. "PURE" STOCK SPLITS

This sample consists of 36 cases of "PURE" stock splits during the period of 1990 - 2000. As can be seen in Table 2, during the years 1990, 1993, 1995 and 1996 there was a total of only one event of the above mentioned split, while in 1994 and 1998 there were only two such cases. In 1997 the Athens Stock Exchange realised four "PURE" stock splits. It is worth mentioned that in 1999 there was a significant increase of stock splits due to the bullish market that had developed in the Athens Stock Exchange. In specific, during that year companies executed seventeen (17) "PURE" stock splits. During the year 2000 there were only seven (7) such cases.

II. "COMBINED" STOCK SPLITS (Stock Split & Increase of Capital Equity with stock dividend distribution)

This sample includes 27 cases of "COMBINED" Stock Splits (Stock Split and Increase of capital equity with stock dividend distribution). From Table 2 we see that during 1990, 1991, 1992, 1993 and 1996 there were no such events, while in 1997 there was only one. In 1995 and 1998 two (2) and three (3) cases of "COMBINED" stock splits (stock split and increase of capital equity with stock dividend distribution) occurred respectively. Following the same trend with that of "PURE" Stock Splits, "COMBINED" Stock Splits also showed a significant increase in 1999 (specifically 12). Finally in year 2000 there was a total of nine (9) stock splits.

B. METHODOLOGY

In our research, before we proceed with the elaboration of our data and the use of our methodology, we will try to examine statistically the following hypotheses:

$$H_0: AR_t = 0$$

$$H_1: AR_t \neq 0$$

Where:

AR_t is the abnormal return of the sample during the announcement of the stock split

H_0 is the zero hypothesis

H_1 is the alternative hypothesis

The methodology that we will follow is an "Event Study Methodology" by Brown & Warner (1985). This method is focusing in the effect of various corporate events on the price of the company's stock. The first step in measuring the effect on stock value of an 'event' is to define an event period. Usually this is centered on the announcement date, which is designated day 0 in event time. The purpose of the event period is to capture all the effects on stock price of the event. Longer periods will make sure all the effects are captured, but the estimate is subject to more noise in the data. Many studies choose a period like day's -40 to +40 that is from 40 days before the announcement to 40 days after the announcement. Note that day 0 is the date the announcement is made for a particular firm and will be different calendar dates for different firms. In our paper we are denoting the announcement date of the stock split as day 0 and in a period of 210 days, we denote the estimation period from -200 to -50 and the event period from -49 to +10.

The next step is to calculate a predicted return R_{at} , for each day in the event period for each firm. The predicted return represents the return that would be expected if no event took place. There are basically three methods of calculating this predicted return. These are the mean adjusted return method, the market model method, and the market adjusted return method. For most cases the three methods yield similar results. In our case we are using the market adjusted return method, in order to calculate the abnormal return of every stock, which is the actual return for that day for the firm minus the predicted return:

$$AR_t = R_{it} - R_{at}$$

Where:

R_{it} is the actual return of stock i in day t .

R_{at} is the actual return of stock market portfolio at day t and is considered to be the expected return of the stock. The index that is being used for the stock market portfolio return is the Athens Stock Exchange Index.

Next we estimate the average of the abnormal return of every stock (AAR_t) during the period of -49 to +10 as follows:

$$AAR_t = \frac{\sum_{i=1}^N AR_t}{N}$$

Where:

$t = -49, -48, \dots, 0, \dots, +10$

N = the number of stock splits in the sample the specific day

In this way we cancel out the possible effect of other firm facts that were irrelevant with the announcement of stock split at the same time period and for the N stock splits of our sample.

Finally we estimate the Cumulative Abnormal Returns for the period of two days: CAR (-1,0) and six days: CAR (-5,0) for the N stock splits of our sample as follows:

$$CAR = \sum_{t=-1}^0 AAR_t$$

$$CAR = \sum_{t=-5}^0 AAR_t$$

In order to find out whether the Average Abnormal Return and the Cumulative Abnormal Return are equal to zero, we make statistical control with the help of 't-statistics':

$$t(AAR_t) = \frac{AAR_t}{\sigma(AAR_t)}$$

$$t(CAR) = \frac{CAR}{\sqrt{T} * \sigma(AAR_t)}$$

Where:

$\sigma(AAR_t)$ is the standard deviation of average abnormal return portfolio during the estimation period. The defining period contains 150 days from period $t = -200$ to $t = -50$ in relation with the announcement day $t = 0$.

$$T = t_2 - t_1 + 1 \text{ days}$$

t_1 is the first day of the period that the cumulative abnormal return is calculated and
 t_2 is the last day.

7. EMPIRICAL RESULTS

Using the 'Event Study Methodology' we tried to examine the market reaction to stock splits and specifically the effect of stock split announcement on share prices. The results are presented in three groups relevant to the type of Stock Split. The first sample contains 36 cases of "PURE" stock splits, where no other corporate event is involved, during the period of 1990-2000 and the second contains 27 events of "COMBINED" Stock Splits (Stock Split and increase of capital equity with stock dividend distributions) during the same period. The third includes the sum of the two above-mentioned group samples.

The results are shown in Tables 3, 4 and 5 and present the period of forty-nine days before and ten days after the announcement date of the stock split. Column 1 lists the event time relative to the announcement day in terms of trading days. Column 2 presents the number (N) of stock splits. Column 3 lists the number of positive abnormal returns, whereas column 4 the negative ones. Column 5 shows the daily average abnormal returns for each event day. Column 6 presents the standard deviation of daily average abnormal returns during the estimation period (from day -200 to day -50), that we are using later for the t-statistic of daily average abnormal returns during the event period (from day -49 to day +10). The above-mentioned t-statistic is shown in column 7. In the last two rows of the table we can see the cumulative average abnormal returns for two days CAR (-1, 0) and six days CAR (-5, 0) as well as the t-statistics for these two CARs.

A. RESULTS FROM "PURE" STOCK SPLITS

Table 3 presents daily average abnormal returns of "PURE" Stock Splits and cumulative average abnormal returns for two and six days. The effect on the stock price from the announcement of "PURE" Stock Splits (N = 36) revealed an average abnormal return for day 0 of 0,79%, which is not statistically significant ($t = 0,72$) at the 0,01 level of significance. Also we found a positive average abnormal return of 0,12% on day -1 which was also not statistically significant ($t = 0,10$).

The cumulative average abnormal return was not statistically significant for both two and six days. Specifically $CAR(-1, 0) = 0,92\%$ and $CAR(-5, 0) = 4,4\%$ with t-statistics 0,58 and 1,62 respectively at the 0,01 level of significance.

B. RESULTS FROM "COMBINED" STOCK SPLITS (Stock Splits and Increase of Capital Equity with stock dividend distribution)

Table 4 shows presents daily average abnormal returns of "COMBINED" Stock Splits (stock splits and increase of capital equity with stock dividend distribution) and cumulative average abnormal returns for two and six days. The effect on stock price by the "COMBINED" Stock Splits (N = 27) revealed an average abnormal return for -1 of -0,64% and 0 of 0,81%, which are not statistically significant ($t = -1,07$ and $t = 1,35$ respectively at 0,01 level). On the contrary, days +1 and +2 show positive abnormal returns (1,61% and 1,55%), which are statistically significant ($t = 2,69$ and $t = 2,58$ respectively at 0,01 level).

Concerning the cumulative abnormal return, $CAR(-1, 0) = 0,16\%$ with t-statistics 0,19, which is not significant and $CAR(-5, 0) = 4,6\%$ with t-statistics 3,123 that is significant at the 0,01 level.

C. RESULTS FROM OVERALL SAMPLE OF STOCK SPLITS

Table 5 presents the daily average abnormal returns for the total sample of "PURE" and "COMBINED" Stock Splits as well as the cumulative average abnormal returns for two and six days. The effect on stock price by the overall sample of stock splits ($N = 63$) revealed an average abnormal return for day 0 is 0,80%, which is not statistically significant ($t = 0,76$) at the 0,01 level. It is also shown a negative average abnormal return -0,20% on day -1 which is not statistically significant too ($t = -0,19$).

As far as the cumulative average abnormal return is concerned, there is no statistically significant results for both two and six days. Specifically $CAR(-1, 0) = 0,59\%$ and $CAR(-5, 0) = 4,4\%$ with t-statistics 0,39 and 1,74 respectively at the 0,01 level.

8. CROSS SECTIONAL ANALYSIS

A. METHODOLOGY

In order to thoroughly analyze the abnormal returns associated with stock split announcements, we perform a cross-sectional analysis of the abnormal returns for the twenty-six firms that made "PURE" Stock Splits during the period of 1990-1999. The stock splits of the year 2000 were excluded due to unavailability of data from the Athens Stock Exchange Publications. This analysis helps identify factors that explain the abnormal stock returns.² The cross-sectional analysis is performed by estimating the regression:

$$CAR(-1,0) = a_0 + a_1NSH + a_2DUM + a_3SHA + a_4MKT + a_5VOL + e$$

Where:

CAR(-1,0) is the two days cumulative abnormal stock return for sample firms

NSH is the ratio of the number of new to old shares that firms distributed to the investors when splitting their shares

DUM is a dummy variable distinguishing the regular from the irregular General Shareholder's Meeting of the firms (regular = 0 and irregular = 1)

SHA is the cumulative percentage change of the share's price during the estimation period of -49 to -1 days for the sample firms

² N. Tsagarakis (1996).

MKT is the cumulative percentage change of market index during the estimation period of -49 to -1 days

VOL is the volume of trade of the sample firms during the estimation period of -49 to -1 days

e is an error term with the usual OLS properties

B. TEST RESULTS

Coefficient estimates for the regression, where the dependent variable is the two-day cumulative average abnormal stock return $CAR(-1, 0)$, are shown in Table 6, where all the results of the regression are presented:

$$CAR(-1,0) = 0,03 + 0,002NSH + 0,009DUM - 0,005SHA - 0,048MKT - 3,8 \cdot 10^{-9}VOL - 3,799e$$

The regression explains 21,18% of the variation in the dependent variable. The coefficient estimate of constant, NSH and DUM are positive, whereas those of SHA, MKT and VOL are negative. None of these six coefficients are statistically significant, as we can see from our results in table 6.

Since the results from the regression were statistically insignificant, we subtracted coefficient estimates, in order to see if this alter our results.

In particular, Table 7 presents the results of a regression, that did not include the dummy variable of regular/irregular General Shareholder's Meeting of the 26 firms that made "PURE" Stock Splits during the period of 1990-1999, in contrast with the original regression. This regression explains 20,6% of the variation in the dependent variable, a percentage nearly the same with that of the original one.

The coefficient estimate of constant and NSH are positive, whereas those of SHA, MKT and VOL are negative. None of these five coefficients are statistically significant, as it was in the original regression too.

Table 8 shows the results of a regression, that did not include the coefficient estimate of new to old shares ratio for the 26 firms that made "PURE" Stock Split during the period of 1990-1999. The results are the same with the ones that the "No Dummy Variable Regression" had. That means that neither the Dummy Variable nor the variable of new to old shares ratio plays a significant role.

A regression, that did not include the trade volume of the 26 firms that made "PURE" Stock Splits during the period of 1990-1999, is presented in Table 9. This regression explains 11,75% of the variation in the dependent variable, a percentage much smaller than that of the original one. The coefficient estimate of constant, NSH and DUM are positive, whereas those of SHA and MKT are negative. None of these five coefficients are statistically significant, as it was in the original regression.

Finally the regression, whose results are shown in Table 10, where we have subtracted both the dummy variable and the variable of new to old shares ratio explained 20,18% of the variation in the dependent variable, a percentage nearly the same with that of the original one. It is important to notice that the constant coefficient is positive and statistically significant since t-statistic is 2,054.

9. CONCLUSIONS

This thesis investigates the response of stock prices to the announcement of Stock Splits in Greece during the period 1990-2000. We explore both "PURE" and "COMBINED" stock splits as well as the total sample. "PURE" is the stock split, where no other corporate event is involved, and "COMBINED" is the stock split and Increase of Capital with stock dividend distribution.

In particular, following the Signaling and the Optimal Trading Range Hypothesis, our research examined a total sample of sixty-three (63) Stock Splits during the period of 1990-2000, where the thirty seven (37) were "PURE" Stock Splits and twenty seven (27) were "COMBINED" Stock Splits. We used the "Event Study Methodology" and in specific the Market Adjusted Return Method, in order to calculate the daily average abnormal return of every stock around the announcement day of the Stock Split. In addition, a cross-sectional analysis for the twenty-six (26) "PURE" Stock Splits during the period of 1990-1999 was performed, in order to investigate whether coefficient estimates, such as volume of trade, the percentage of new to old shares, the percentage change of share's price etc., affect the dependent variable of the two-day cumulative abnormal return.

For all sub-samples of "PURE" Stock Splits, "COMBINED" Stock Splits and Total sample of Stock Splits, the abnormal returns around the announcement date were statistically insignificant, meaning that the market did not react to the announcement of the stock split, providing no support to the signaling hypothesis.

Our results support the assumption that firms act according to the Optimal Trade Range Hypothesis, Baker & Powell (1993). That is, companies tend to move their share price back towards an as optimal perceived trading range after the share price has risen substantially. The Neglected Firm Hypothesis, Arbel and Swanson (1993) can also explain them, which states that if there is little known about a firm its share trades at a discount. Thus, firms use the stock split to draw attention to ensure that information about the company is wider recognized than before.

In the cross sectional analysis we used a regression, where the dependent variable was the two-day cumulative abnormal return $(-1, 0)$ and the coefficients were the ratio of new to old shares, the regular/irregular dummy variable, the percentage change of share's price, the percentage change of market index and the volume of trade. Our test showed statistically insignificant results, meaning that the above mentioned coefficients were not able to explain the abnormal returns of the listed firms around the announcement date of stock split.

We conclude that managers decide to split their firm's stock mainly to move their share price back to an optimal trading price and to draw attention to their firm.

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ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΕΙΡΑΙΩΣ

APPENDIX

Πανεπιστήμιο Πειραιώς

TABLE 1
LITERATURE REVIEW

This table presents a summary of the literature review containing the Author, the method used to analyze the data, the effect of the stock split announcement had on the stock price and other related results.

AUTHORS	YEAR	METHOD	RESULTS RELATIVE TO STOCK PRICE	OTHER RESULTS
Grinblatt, Masulis, Titman	1984	Mean-adjusted return methodology	Positive abnormal returns	
Lakonishok, Lev	1987		Positive abnormal returns	Splits don't affect the volume of trade
Lamoureux, Poon	1987	Standard event time methodology	Positive abnormal returns	Splits increase the number of transactions Splits reduces liquidity
Brennan, Huges	1991		Positive abnormal returns	Increase in amount of information after the ex-date Increase in price volatility after the ex-date
Ikenberry, Rankine, Stice	1996	Market adjusted return method	Positive abnormal returns	
Dennis, Strickland	1998		Positive abnormal returns	Institutional ownership increases in firms with low inst. ownership Abnormal return: negatively related to the level of inst. ownership
Wulff	1999	Standard event study methodology	Positive abnormal returns	

TABLE 2

This table shows yearly all the splits, that companies made during the period of 1990-2000. Specifically, it shows the exact number of "PURE" Stock Splits and "COMBINED" Stock Splits (stock split & Increase of Capital Equity with stock dividend distribution - stock split and increase of Capital Equity with cash payment)

YEAR	COMPANIES THAT MADE "PURE" STOCK SPLIT	COMPANIES THAT MADE SPLIT & INCREASE OF CAPITAL EQUITY WITH STOCK DIVIDEND DISTRIBUTION	COMPANIES THAT MADE SPLIT & INCREASE OF CAPITAL EQUITY		TOTAL
			WITH STOCK DIVIDEND DISTRIBUTION	WITH CASH PAYMENT	
1990	1	0		4	5
1991	0	0		3	3
1992	0	0		0	0
1993	1	0		2	3
1994	2	0		3	5
1995	1	2		0	3
1996	1	0		1	2
1997	4	1		1	6
1998	2	3		3	8
1999	17	12		12	41
2000	7	9		11	27
GRAND	36	27		40	103

TABLE 3
ABNORMAL STOCK RETURNS FROM "PURE" STOCK SPLITS OF FIRMS LISTED ON
ATHENS STOCK EXCHANGE DURING THE PERIOD OF 1990-2000

This Table shows the number of negative and positive observations, daily average abnormal returns and t-statistics for each day in the period from 49 days before through 10 days after the announcement date of stock split, as well as the cumulative average abnormal returns for two and five days.

PERIOD	N	POSITIVE	NEGATIVE	AAR	$\sigma(\text{AAR})$	$t(\text{AAR})$
					0,011119	
-49	36	15	21	-0,005927		-0,593082
-48	36	16	20	-0,002116		-0,190280
-47	36	23	13	0,000432		0,038820
-46	36	19	17	0,001802		0,162044
-45	36	20	16	0,009480		0,852635
-44	36	23	13	-0,001752		-0,157567
-43	36	15	21	-0,008987		-0,626416
-42	36	17	19	0,002954		0,265642
-41	36	18	18	0,005647		0,507836
-40	36	18	18	0,004807		0,432284
-39	36	16	20	-0,001231		-0,110748
-38	36	19	17	0,004742		0,426462
-37	36	14	22	0,006074		0,546265
-36	36	15	21	0,000190		0,017053
-35	36	15	21	0,002226		0,200216
-34	36	15	21	-0,000110		-0,009866
-33	36	19	17	0,000695		0,062537
-32	36	16	20	-0,000585		-0,052572
-31	36	16	20	0,001367		0,122936
-30	36	18	18	0,008301		0,746551
-29	36	14	22	0,004537		0,408075
-28	36	20	16	0,009886		0,889105
-27	36	22	14	0,007519		0,676234
-26	36	18	18	-0,002191		-0,197080
-25	36	18	18	0,004772		0,429163
-24	36	19	17	0,013669		1,229305
-23	36	24	12	0,011401		1,025315
-22	36	18	18	0,012383		1,113707
-21	36	16	20	0,000360		0,032339
-20	36	17	19	0,006906		0,621123
-19	36	23	13	0,013839		1,244631
-18	36	22	14	0,011290		1,015411
-17	36	21	15	0,005650		0,508176
-16	36	18	18	0,003512		0,315823
-15	36	14	22	0,000458		0,041220
-14	36	17	19	0,008618		0,775105
-13	36	18	18	0,005989		0,538588
-12	36	19	17	0,003310		0,297669
-11	36	22	14	0,007792		0,700734
-10	36	15	21	0,000027		0,002412
-9	36	25	11	0,014971		1,346471

PERIOD	N	POSITIVE	NEGATIVE	AAR	$\sigma(\text{AAR})$	$t(\text{AAR})$
					0,011119	
-8	36	22	14	0,009768		0,878487
-7	36	18	18	0,007209		0,648352
-6	36	18	18	0,008524		0,766625
-5	36	19	17	0,011401		1,025324
-4	36	19	17	0,004935		0,443794
-3	36	20	16	0,009857		0,886471
-2	36	24	12	0,008706		0,782954
-1	36	23	13	0,001197		0,107634
0	36	25	11	0,007989		0,718499
1	36	21	15	0,005604		0,503963
2	36	21	15	0,010859		0,976605
3	36	18	18	0,002091		0,188037
4	36	24	12	0,009809		0,882186
5	36	20	16	0,002964		0,266595
6	36	18	18	0,001421		0,127788
7	36	20	16	0,008972		0,806872
8	36	19	17	0,003058		0,275036
9	36	18	18	0,005466		0,491603
10	36	18	18	0,007081		0,636798

	$t(\text{CAR})$	
$\text{CAR}(-1,0)$	0,00918583	0,581783967
$\text{CAR}(-5,0)$	0,044083499	1,618235355

TABLE 4

ABNORMAL STOCK RETURNS FROM "COMBINED" STOCK SPLITS
(STOCK SPLIT AND INCREASE OF CAPITAL EQUITY WITH STOCK DIVIDEND DISTRIBUTION
OF FIRMS LISTED ON ATHENS STOCK EXCHANGE DURING THE PERIOD OF 1990-2000

This Table shows the number of negative and positive observations, daily average abnormal returns and t-statistics for each day in the period from 49 days before through 10 days after the announcement date of stock split, as well as the cumulative average abnormal returns for two and five days.

PERIOD	N	POSITIVE	NEGATIVE	AAR	$\sigma(\text{AAR})$ 0,00602	t(AAR)
-49	27	14	13	0,002907		0,482926
-48	27	11	16	0,000934		0,155175
-47	27	14	13	0,000404		0,067195
-46	27	14	13	0,001345		0,223502
-45	27	10	17	-0,007761		-1,289215
-44	27	13	14	0,002932		0,487135
-43	27	11	16	0,005097		0,846766
-42	27	12	15	0,005765		0,957658
-41	27	15	12	0,005057		0,840122
-40	27	13	14	-0,002245		-0,373026
-39	27	13	14	0,000523		0,086806
-38	27	13	14	-0,009257		-1,537719
-37	27	11	16	0,004395		0,730955
-36	27	9	18	-0,006592		-1,095155
-35	27	12	15	0,000934		-0,005655
-34	27	15	12	-0,005966		-0,991050
-33	27	10	17	-0,007764		-1,289753
-32	27	14	13	0,004760		0,790714
-31	27	17	10	0,008624		1,432667
-30	27	10	17	-0,000516		-0,085692
-29	27	14	13	0,002248		0,373461
-28	27	19	8	0,007753		1,287995
-27	27	16	11	0,007971		1,324185
-26	27	21	6	0,016174		2,686801
-25	27	14	13	0,024234		4,025741
-24	27	20	7	0,021898		3,637671
-23	27	14	13	0,009410		1,563138
-22	27	11	16	-0,000896		-0,148915
-21	27	14	13	0,011292		1,875840
-20	27	14	13	0,014559		2,418516
-19	27	17	10	0,010238		1,700815
-18	27	18	9	0,014872		2,470590
-17	27	16	11	0,012841		2,133165
-16	27	13	14	0,007587		1,260430
-15	27	16	11	0,003554		0,590420
-14	27	12	15	0,004673		0,776251
-13	27	18	9	0,011454		1,902697
-12	27	13	14	-0,001058		-0,175694
-11	27	14	13	0,000607		0,100757
-10	27	11	16	-0,008449		-1,403586
-9	27	11	16	0,035952		5,972488

PERIOD	N	POSITIVE	NEGATIVE	AAR	$\sigma(\text{AAR})$ 0,00602	t(AAR)
-8	27	12	15	0,024724		4,107246
-7	27	12	15	0,000567		0,094126
-6	27	12	15	0,003089		0,513157
-5	27	18	9	0,010425		1,731746
-4	27	19	8	0,020150		3,347338
-3	27	18	9	0,009882		1,641566
-2	27	15	12	0,003911		0,649714
-1	27	9	18	-0,006458		-1,072816
0	27	19	8	0,008150		1,353816
1	27	21	6	0,016194		2,690241
2	27	16	11	0,015539		2,581383
3	27	15	12	-0,000632		-0,105026
4	27	11	16	-0,004303		-0,714788
5	27	14	13	-0,001319		-0,219058
6	27	20	7	0,013753		2,284666
7	27	14	13	0,013509		2,244204
8	27	16	11	0,010750		1,785865
9	27	13	14	0,006164		1,024003
10	27	12	15	0,001965		0,326436

		t(CAR)
CAR(-1,0)	0,00169153	0,197887775
CAR(-5,0)	0,046058671	3,123006011

TABLE 5
ABNORMAL STOCK RETURNS FROM PURE STOCK SPLITS AND COMBINED STOCK SPLITS
(STOCK SPLIT AND INCREASE OF CAPITAL EQUITY WITH STOCK DIVIDEND DISTRIBUTION)
OF FIRMS LISTED ON
ATHENS STOCK EXCHANGE DURING THE PERIOD OF 1990-2000

This Table shows the number of negative and positive observations, daily average abnormal returns and t-statistics for each day in the period from 49 days before through 10 days after the announcement date of stock split, as well as the cumulative average abnormal returns for two and five days.

PERIOD	N	POSITIVE	NEGATIVE	AAR	$\sigma(\text{AAR})$ 0,010519	t(AAR)
-49	63	29	34	-0,002141		-0,203553
-48	63	27	36	-0,000809		0,075876
-47	63	37	26	0,000420		0,039929
-46	63	33	30	0,001606		0,152694
-45	63	30	33	0,002091		0,198824
-44	63	36	27	0,000256		0,024298
-43	63	26	37	-0,001808		-0,171903
-42	63	29	34	0,004158		0,395325
-41	63	33	30	0,005394		0,512789
-40	63	31	32	0,001784		0,169623
-39	63	29	34	-0,000480		-0,045605
-38	63	32	31	-0,001257		-0,118541
-37	63	25	38	0,001587		0,150906
-36	63	24	39	-0,002717		-0,258293
-35	63	27	36	0,001258		0,119548
-34	63	30	33	0,002619		0,249020
-33	63	29	34	-0,002930		-0,278545
-32	63	30	33	0,001706		0,162172
-31	63	33	30	0,004477		0,425626
-30	63	28	35	0,004522		0,429918
-29	63	28	35	0,003556		0,338080
-28	63	39	24	0,008972		0,852928
-27	63	38	25	0,007713		0,733224
-26	63	39	24	0,005679		0,539912
-25	63	32	31	0,013113		1,246559
-24	63	39	24	0,017195		1,634687
-23	63	38	25	0,010547		1,002682
-22	63	29	34	0,006692		0,636182
-21	63	30	33	0,005045		0,479594
-20	63	31	32	0,010186		0,968327
-19	63	40	23	0,012296		1,168920
-18	63	40	23	0,012825		1,219258
-17	63	37	26	0,008732		0,830120
-16	63	31	32	0,005258		0,499892
-15	63	30	33	0,001785		0,169702
-14	63	29	34	0,006927		0,658561
-13	63	36	27	0,008331		0,791966
-12	63	32	31	0,001438		0,136709
-11	63	36	27	0,004712		0,447970
-10	63	26	37	-0,003606		-0,342780

PERIOD	N	POSITIVE	NEGATIVE	AAR	$\sigma(\text{AAR})$	$t(\text{AAR})$
					0,010519	
-9	63	36	27	0,023963		2,278085
-8	63	34	29	0,016178		1,537951
-7	63	30	33	0,004362		0,414704
-6	63	30	33	0,006195		0,588913
-5	63	37	26	0,010982		1,044040
-4	63	38	25	0,011455		1,089015
-3	63	38	25	0,009867		0,938052
-2	63	39	24	0,006651		0,632268
-1	63	32	31	-0,002084		-0,198100
0	63	44	19	0,008058		0,766021
1	63	42	21	0,010142		0,964202
2	63	37	26	0,012865		1,222990
3	63	33	30	0,000924		0,087820
4	63	35	28	0,003761		0,357554
5	63	34	29	0,001129		0,107304
6	63	38	25	0,006706		0,637514
7	63	34	29	0,010916		1,037773
8	63	35	28	0,006355		0,604121
9	63	31	32	0,005765		0,548082
10	63	30	33	0,004888		0,464701

		$t(\text{CAR})$
$\text{CAR}(-1,0)$	0,005973987	0,399943888
$\text{CAR}(-5,0)$	0,044930001	1,743385689

TABLE 6
REGRESSION

This table shows a regression model concerning abnormal returns for twenty six firms that made "PURE" stock splits during the period of 1990-1999

$$\text{CAR}(-1,0) = a_0 + a_1\text{NSH} + a_2\text{DUM} + a_3\text{SHA} + a_4\text{MKT} + a_5\text{VOL} + e$$

$$\text{CAR}(-1,0) = 0,03 + 0,002\text{NSH} + 0,009\text{DUM} - 0,005\text{SHA} - 0,048\text{MKT} - 3,8*10^{-9}\text{VOL} - 3,799e$$

Dependent Variable: CAR(-1,0)					
Method: Least Squares					
Sample: 1 26					
Included observations: 26					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
C	0.030067	0.023494	1.279.758	0.2153	
NSH	0.002332	0.005387	0.432945	0.6697	
DUM	0.009294	0.026071	0.356473	0.7252	
SHA	-0.005246	0.032667	-0.160600	0.8740	
MKT	-0.048024	0.081041	-0.592596	0.5601	
VOL	-3.80E-09	2.46E-09	-1.546.560	0.1376	
R-squared	0.211853	Mean dependent var		0.011875	
Adjusted R-squared	0.014816	S.D. dependent var		0.050691	
S.E. of regression	0.050314	Akaike info criterion		-2.941.896	
Sum squared resid	0.050630	Schwarz criterion		-2.651.566	
Log likelihood	4.424.465	F-statistic		1.075.195	
Durbin-Watson stat	2.154.595	Prob(F-statistic)		0.403590	

TABLE 7
NO DUMMY REGRESSION

This table shows a regression concerning abnormal returns for twenty six firms that made "PURE" stock splits during the period of 1990-1999, which does not include the dummy variance that the original regression includes.

Dependent Variable: CAR(-1, 0)					
Method: Least Squares					
Sample: 1 26					
Included observations: 26					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
C	0.032884	0.021661	1.518.133	0.1439	
NSH	0.001849	0.005104	0.362239	0.7208	
SHA	-0.005944	0.031923	-0.186189	0.8541	
MKT	-0.045148	0.078944	-0.571898	0.5735	
VOL	-3.90E-09	2.39E-09	-1.630.888	0.1178	
R-squared	0.206845	Mean dependent var		0.011875	
Adjusted R-squared	0.055768	S.D. dependent var		0.050691	
S.E. of regression	0.049257	Akaike info criterion		-3.012.486	
Sum squared resid	0.050951	Schwarz criterion		-2.770.544	
Log likelihood	4.416.231	F-statistic		1.369.137	
Durbin-Watson stat	2.212.625	Prob(F-statistic)		0.278339	

TABLE 8
NO NEW TO OLD SHARES RATIO REGRESSION

This table shows a regression concerning abnormal returns for twenty six firms that made "PURE" stock splits during the period of 1990-1999, which does not include the new to old shares ratio, that the original regression includes.

Dependent Variable: CAR(-1, 0)					
Method: Least Squares					
Sample: 1 26					
Included observations: 26					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
C	0.035824	0.018990	1.886.413	0.0731	
DUM	0.006452	0.024738	0.260820	0.7968	
SHA	-0.006366	0.031928	-0.199379	0.8439	
MKT	-0.046624	0.079394	-0.587254	0.5633	
VOL	-3.87E-09	2.40E-09	-1.608.462	0.1227	
R-squared	0.204466	Mean dependent var		0.011875	
Adjusted R-squared	0.052936	S.D. dependent var		0.050691	
S.E. of regression	0.049331	Akaike info criterion		-3.009.491	
Sum squared resid	0.051104	Schwarz criterion		-2.767.549	
Log likelihood	4.412.338	F-statistic		1.349.344	
Durbin-Watson stat	2.126.725	Prob(F-statistic)		0.284969	

TABLE 9
NO TRADE VOLUME REGRESSION

This table shows a regression concerning abnormal returns for twenty six firms that made "PURE" stock splits during the period of 1990-1999, which does not include the trade volume variance, that the original regression includes.

Dependent Variable: CAR(-1,0)					
Method: Least Squares					
Sample: 1 26					
Included observations: 26					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
C	0.028085	0.024224	1.159.396	0.2593	
NSH	0.002858	0.005551	0.514849	0.6120	
DUM	0.013817	0.026751	0.516503	0.6109	
SHA	-0.014380	0.033176	-0.433431	0.6691	
MKT	-0.092423	0.078257	-1.181.030	0.2508	
R-squared	0.117596	Mean dependent var		0.011875	
Adjusted R-squared	-0.050480	S.D. dependent var		0.050691	
S.E. of regression	0.051955	Akaike info criterion		-2.905.854	
Sum squared resid	0.056685	Schwarz criterion		-2.663.913	
Log likelihood	4.277.611	F-statistic		0.699659	
Durbin-Watson stat	2.001.778	Prob(F-statistic)		0.600810	

TABLE 10
NO DUMMY & NO NUMBER OF SHARES REGRESSION

This table shows a regression concerning abnormal returns for twenty six firms that made "PURE" stock splits during the period of 1990-1999, which does not include the dummy variable and the new to old shares ratio, that the original regression includes.

Dependent Variable: CAR(-1, 0)					
Method: Least Squares					
Sample: 1 26					
Included observations: 26					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
C	0.037027	0.018027	2.054.006	0.0520	
SHA	-0.006711	0.031218	-0.214967	0.8318	
MKT	-0.044707	0.077360	-0.577911	0.5692	
VOL	-3.93E-09	2.34E-09	-1.678.590	0.1074	
R-squared	0.201889	Mean dependent var		0.011875	
Adjusted R-squared	0.093056	S.D. dependent var		0.050691	
S.E. of regression	0.048275	Akaike info criterion		-3.083.180	
Sum squared resid	0.051270	Schwarz criterion		-2.889.626	
Log likelihood	4.408.134	F-statistic		1.855.033	
Durbin-Watson stat	2.174.145	Prob(F-statistic)		0.166762	