STOCK SPLIT SIZE, SIGNALING AND EARNINGS MANAGEMENT: EVIDENCE FROM THE SPANISH MARKET

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Stock split size, signaling and earnings management: Evidence from the Spanish market

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Abstract

This study uses a sample of Spanish companies to examine the use of stock split announcements as signals of a firm's earnings performance. Our results confirm that, as in other stock markets, investors in the Spanish market upwardly revise share prices and financial analysts improve their earnings forecasts after stock split announcements. We also find that firms that announce a stock split show significantly better operating profitability in the years prior to the split than matching companies of the same size and industry; and that these relatively better profits are not the result of earnings management practices. Finally, our results suggest that only when the split factor is greater than expected will investors interpret splits as a signal of the permanent character of past earnings.

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Keywords: stock splits, announcement effect, earning forecasting, earning management.

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1. Introduction

A stock split is a corporate decision which increase the number of equity shares outstanding of a firm. Existing shareholders exchange their old shares for stocks with a lower par value without additional cash outlays. As stock splits do not affect the real activities or the financial structure of the firm, under certain assumptions, they are considered theoretically as irrelevant decisions.

Despite their apparent innocuousness, it is well documented that split announcements provoke a positive reaction in share prices. One of the most plausible explanations for this reaction is the signaling hypothesis, which postulates that managers use stock split announcements to convey private information to the market. The finance literature considers them to be positive signals, although there are certain discrepancies over whether stock splits signal future earnings increases or whether the good pre-split earnings performance is permanent.

Studies on the relationship between stock splits and earnings quality all find the presence of pre-split earnings management, although they differ in their findings around the motivation for this. Guo *et al.* (2005) suggest that it is a case of opportunistic behavior by managers. Louis and Robinson (2005) consider that earnings management is an additional mechanism used to signal information to the market. In this way, earnings management and stock splits work together to mutually enhance their credibility.

The basic aim of this paper is to study whether stock split announcements incorporate information content about firm earnings performance. First, we take three perspectives to examine whether managers use splits to convey favorable private information: share price reaction, earnings forecast revisions by financial analysts, and the trend of the firm's

operating profitability in the pre and post split years. Second, we analyze the possible existence of pre-split discretional earnings management. Third, we study the use of split factor size as a signal and the nature of the earnings information conveyed by it.

This study extends the previous empirical literature in various directions: First, it adds evidence on the existing controversial link between positive market reaction and the operating earnings of splitting firms, giving support to the argument that as well as announcing larger future profits, split announcements signal the permanent character of previous earnings. Second, and in a market with accounting standards that differ to those of the US market, it provides new evidence on the possible existence of earnings management before the split announcement. Third, it extends previous findings on signal intensity, measured by the unexpected component of the split factor (Conroy and Harris, 1999). Finally, with regard to the study of Menéndez and Gómez (2003) in the Spanish market, we analyze a different sample over a longer period, covering various stages of the economic cycle and we incorporate the revision of analysts' earnings forecasts and the analysis of operating returns.

Our findings do not support the earnings management hypothesis, but they do support the hypothesis that the information content of stock splits is a function of the split factor. First we find the existence of significant positive abnormal returns around the announcement day, which are related to certain characteristics of the stock split and the splitting firm. Second, we observe that, in the announcement month, financial analysts abnormally upwardly revise their earnings forecasts. This is consistent with the argument that stock splits are undertaken by undervalued firms in order to induce a revaluation of their fundamentals. Third, we find that splitting firms present consistently better operating profitability than non-splitting firms of similar size and industry. Additionally, unlike in the USA, our results show that high pre-split earnings are not a product of the use of discretionary accruals to distort pre-split financial statements. Finally, in a cross sectional analysis, we find that the price effect is highly

dependent on the intensity of the signal, as measured by the unexpected component of the split factor. However, we find that abnormal returns around split announcements are significantly related to pre-split earnings but not to post-split earnings; and that this relationship is confined to firms that announce an unexpectedly large split. Conversely, stock splits do not contain information when the announced split factor is unusually low.

The rest of the paper is organized as follows. Section 2 presents a brief review of the empirical literature on stock splits. Section 3 describes the sample and data. In Section 4 we analyze the price reaction to stock split announcements. In Section 5, we examine the characteristics of analysts' earnings forecasts around the split announcement. Sections 6 and 7 analyze operating earnings and the use of discretionary accruals in the years around the split, respectively. In Section 8, we conduct a cross sectional analysis to determine whether the observed price effect can be explained by information reasons. Finally, we present our main conclusions in Section 9.

2. Previous literature

In a perfect market, stock splits should neither create nor destroy value. However, and contrary to the efficiency hypothesis, these decisions have real impacts, as their announcements are usually accompanied by significantly positive abnormal returns, both in the US market (Grinblatt *et al.*, 1984, Lamoureux and Poon, 1987, Ikenberry *et al.* 1996, and Byun and Rozeff, 2003) and in other countries: Canada (Kryzanowski and Zhang, 1991); Hong Kong (Wu and Chan, 1997), Germany (Wulff, 2002), Spain (Menéndez and Gómez, 2003), etc.

The literature basically proposes two types of explanations for this paradoxical positive market reaction: the information content or signaling hypothesis and the trading range-liquidity hypothesis. According to the first hypothesis, split announcements can convey

information in two different ways: First, because managers use them to disclose private information on firm future prospects (signaling hypothesis); and second because they can help to attract the interest of analysts and investors (attention hypothesis).

The signaling hypothesis proposes that firms with favorable future prospects use stock splits to convey information to market investors (Brennan and Copeland, 1988). The cost of the signal is the increase in the costs associated with the split, which include: the increased fees paid to the exchange for trading a greater number of shares and the higher transaction costs due to the lower post-split share price (higher bid-ask spreads, higher brokerage commissions, etc.). The empirical evidence for the signaling hypothesis is mixed. In its favor stock splits are associated with information about future earnings (Pilotte, 1997), with increased earnings forecasts (Conroy and Harris, 1999) and with reduced asymmetric information (Doran, 1994). Conversely, other studies conclude that split announcements do not convey information on future firm earnings (Asquith *et al.,* 1989, Huang *et al.*, 2006).

Another possibility is that the intention of managers is not to signal but to attract market attention, thus provoking a share revaluation (Grinblatt *et al*., 1984; and Brennan and Hughes, 1991). This argument is based on the observation that incomes of brokerage firms grow as share prices fall. Therefore, managers with favorable information split their stocks to reduce the price to a level that makes trading more profitable, thus attracting the attention of analysts, brokers and market-makers.

The liquidity hypothesis holds that stock splits improve the marketability of the shares. This happens because either the lower post-split price satisfies the specific preferences of certain investors (trading range hypothesis), or because they increase incentives for certain market participants, such as market makers, to promote the split stocks (optimal relative tick size hypothesis).

The trading range hypothesis proposes that the aim of splits is to increase the shareholder base. This is achieved by reducing the price to a level that balances: on the one hand, the reduced transaction costs for small investors through trading in round lots, and on the other, the increased transaction costs given by lower prices, in terms of brokerage commissions and relative bid-ask spreads (Copeland, 1979). This hypothesis is empirically supported by a series of studies which find: an increase in the number of shareholders (Lamoureux and Poon, 1987), more trading by small uninformed investors (Kadapakkam *et al.*, 2005), and an increase in the relative bid-ask spread (Conroy *et al.*, 1990). In opposition is the fall in trading volume detected by Copeland (1979) and Lamoureux and Poon (1987), among others.

The optimal relative tick size hypothesis gives us an alternative version of the liquidity hypothesis (Angel, 1997). It basically proposes that the aim of a split is to maintain the optimal relative tick size and encourage market makers to promote the stock. In this way the split provokes an increased percentage bid-ask spread, which leads to encourage the submission of limit orders. The evidence confirms that after a stock split there is an increase in the number of limit orders and their frequency with respect to market orders (Schultz, 2000).

Given that both the signaling and liquidity hypotheses are empirically supported, some authors bring the two explanations together with the self-selection hypothesis (McNichols and Dravid, 1990; and Ikenberry *et al*., 1996). According to this hypothesis, managers decide to split stocks in order to move the share price to a preferred price range, but the decision is conditional on an optimistic evaluation of future prospects. In this study we examine the self-selection hypothesis. That is, we analyze whether splits constitute a favorable signal, conditional on certain information known to the market which increases the likelihood of a split announcement.

3. Sample and Data

The sample period is from 1997 to 2005; it begins in 1997 because the first stock split after the introduction of the electronic continuous trading system in the Spanish exchange was made in that year. The end of the sample period is the year 2005, due to the need for post split announcement accounting data. In the nine years of the sample period, which covers economic cycles of opposing signs, there were a total of 99 announced and executed splits. We eliminate stock splits undertaken by foreign and financial companies, splits with incomplete market data and stocks with any kind of significant contemporary event in the ten days around the announcement (equity and debt issues, mergers, earnings announcements, etc.). The final sample comprises 45 splits made by non-financial companies.

To examine the announcement effect of splits we use the daily closing price of stocks, monthly analysts' earnings forecasts and accounting data (earnings, assets, equity, etc.). The daily stock prices are obtained from the Stock Market Interconnection System (SIBE) and are used to calculate daily stock returns as the natural logarithm of the quotient between the closing prices of two consecutive days, adjusted for dividends, equity right issues and splits. The daily returns series of the Ibex35 index is used as a proxy for market return. Monthly one-year-ahead and two-year-ahead earnings forecasts are taken from the data base of the Institutional Brokers Estimate System (I/B/E/S). The firms' accounting data is obtained from the *Comisión Nacional del Mercado de Valores* (CNMV), the Spanish version of the American Securities and Exchange Commission (SEC).

Table 1 describes some characteristics of the sample stock splits and splitting firms. Panel A shows the annual distribution of split announcements and mean market return. The data reveals a direct link between the annual number of splits and the general stock price trend similar to that observed by Ikenberry *et al.* (1996) and Hallock and Mashayekhi (2003).

Panel B presents the monthly distribution of split announcements and shows that stock splits tend to be announced between March and June. These four months account for 86% of announcements, with March alone accounting for 35.5%. Panel C shows that, as with Pirim *et al.* (2007), announcements are mainly made in the middle of the week, between Tuesday and Thursday (80%). Panel D shows that splits are undertaken by companies from eight different industries, although four of them account for 80% of the announcements: Other industries and services (11), Metal (9), Construction (9) and Food (7). Panel E shows that the most common split factors are 3 (40%) and 2 (22%). The minimum split factor is 2 and the average is 4.8. This size distribution is very different to that of the US market, where half of all split factors are below 2 (Ikenberry and Ramnath, 2002).

Panel F presents a descriptive statistic of some characteristics of the sample stocks and firms. The mean pre-split share price of 60.35€ is relatively high and can be partly justified by companies splitting to move the price to a normal trading range.[1] The mean and median firm size, measured by the market capitalization at the beginning of the year of the split, is €1,655 and €548 million, respectively. The mean and median book-to-market (BTM) ratio is 0.50 and 0.39. The mean and median return in the previous year is 129% and 127%. Therefore, as in other markets, firms that announce splits in the Spanish market are large, profitable, have growth opportunities (with a low BTM ratio) and their share prices have raised strongly in the months prior to the split announcement (Grinblatt *et al.*, 1984, Lakonishok and Lev, 1987, and Ikenberry *et al.*, 1996).

[1] In the Spanish market, in terms of tick (minimum price variation), stocks over 50€ are considered to be high priced.

4. Price reaction to split announcement

First we analyze price reaction around the split announcement using the event-study methodology. The estimation of the valuation effect is made by calculating abnormal returns as prediction errors with the following expression:

$$AR_{i\tau} = R_{i\tau} - (\hat{\alpha}_i + \hat{\beta}_{i-1} R_{m\tau-1} + \hat{\beta}_i R_{m\tau} + \hat{\beta}_{i+1} R_{m\tau+1}) \quad [1]$$

where $AR_{i\tau}$ and $R_{i\tau}$ are the abnormal and observed returns on stock i for each day τ, respectively; $R_{m\tau}$ is the return on portfolio market on day τ, and $\hat{\alpha}_i$, $\hat{\beta}_{i-1}$, $\hat{\beta}_i$ and $\hat{\beta}_{i+1}$ are the estimates of the parameters of the following returns generation model,

$$R_{i\tau} = \alpha_i + \beta_{i-1} R_{m\tau-1} + \beta_i R_{m\tau} + \beta_{i+1} R_{m\tau+1} + h_{i\tau}^{1/2} \eta_{i\tau}$$

$$h_{it} = \alpha_0 + \alpha_1 \varepsilon_{i\tau-1}^2 + \alpha_2 h_{\tau-1} \quad [2]$$

where $R_{i\tau}$ and $R_{m\tau}$ are defined in [1], $\varepsilon_{i\tau} = h_{i\tau}^{1/2} \eta_{i\tau}$ as the random disturbance term of the model, $h_{i\tau}$ is the conditional variance, $h_{i\tau} = E_{\tau-1}[\varepsilon_\tau^2]$ with $\varepsilon_{i\tau} | \varepsilon_{i\tau-1}, \varepsilon_{i\tau-2}, \ldots \sim \mathrm{N}(0, h_{i\tau})$, and $\eta_{i\tau}$ is a Gaussian white noise process *i.i.d.* with $E[\eta_{it}] = 0$ and $E[\eta^2_{it}] = 1$. Model [2] includes as explanatory variables lead and lagged market returns in order to avoid problems due to non-synchronous trading. The market model is generalized to allow the variance of the residuals to follow a GARCH(1,1) process.

Model [2] is estimated for the post-event period (day +5 to +145) since firms tend to split their stocks after periods of substantial price increases. The price effect of splits is analyzed in a period of 11 days around the announcement (t=0), from day –5 to day +5. The announcement date is the day on which the first news of the split is published in the economic press or in the official register of the CNMV, with specification of the split factor. To determine the statistical significance of the abnormal returns we use the parametric test of Boehmer, Musumeci and Poulsen (1991) and the non-parametric test of Corrado (1989).

The columns of Table 2 show the average abnormal returns on the announcement date and the average cumulative abnormal returns over various time intervals around it, for the full sample and various sub-samples partitioned by characteristics of stock splits and firms. Overall, the results show that splits have a positive and significant impact on share prices on the day of the announcement, and that this effect lasts for various days. There is no evidence that share prices react significantly during the five days before the announcement date. These results are consistent with the idea that the market interprets split announcements as a favorable signal and that the split creates value for shareholders.

The average abnormal return on the announcement day is 0.94%, statistically significant at 1% with the parametric test and at 5% with the non-parametric test. The average cumulative abnormal returns in the post-split intervals considered are all positive and significant, at least until five days after the announcement.

Panel A reports the average abnormal returns of sub-samples partitioned by split characteristics. First, according to whether they are made in the sub-periods of before or after 1998, we observe that abnormal returns are positive in both cases and significant until five days after the announcement in the pre 1988 sub-sample and only until three days after in the second sub-period. Additionally, the post announcement abnormal returns are always greater in the first sub-period. This suggests that, over time, the positive effect of splits has weakened but not disappeared. The temporal permanence of the announcement effect and the decline in its intensity are consistent with the results of Ikenberry *et al.* (1996).

Examining the stock splits in terms of split factor, we observe that abnormal returns are a direct function of its size. This finding suggests, in line with McNichols and Dravid (1990), that the larger the split the more information is conveyed to the market about the firm's future prospects and the higher the positive abnormal return on the announcement day.

When the split sample is partitioned by the number of times a firm splits, we observe that the market reaction is stronger with the first split than with the second and subsequent splits. The negative relationship between split frequency and market reaction is consistent with the results of Pilotte and Manuel (1996) and Elfakhani and Lung (2003), and suggests that the firm's first split could contain more information than later splits.

In Panel B we examine abnormal returns by momentum, firm size and BTM. In the previous literature there is no consensus around the relationship between the pre split price rise and abnormal returns generated by split announcements. Chern *et al.* (2006) hold that a higher run-up leads to lower abnormal returns, whereas Leledakis *et al.* (2005), in an explanation compatible with the momentum effect, argue the opposite as the run-up would reflect expectations of higher future profits. In our sample, the market reacts positively to splits with both high and low run-ups, and although abnormal returns on the announcement day are higher in the first group, there is no clear pattern in the cumulative abnormal returns on the following days.

In general, there is more information in the market on large companies, so specific information provided by split announcements should not be an important incremental contribution in these companies. Our results are contrary to this belief, given that the price reaction is always stronger in large firms, except in the pre-announcement period (-5,-1). We also find that, as in Ikenberry *et al.* (1996), post-split abnormal returns are negatively related to the BTM ratio so the larger the growth opportunities of the company, the more intense the price reaction to the split announcement.

Therefore, although stock splits do not affect cash flows or the operating structure of companies, in the Spanish market they have a significant positive impact on their share prices. The positive announcement effect observed is similar to the effect detected previously in the literature and initially it could be consistent with the signaling hypothesis.

5. Revision of analysts' earnings forecasts

In the previous section it was shown that investors react positively to split announcements. In this section we examine whether financial analysts, as informed agents, also consider stock splits as favorable signals of the firm's future prospects. These professionals frequently update their earnings forecasts to reflect any new information on a company. In fact, previous research sufficiently shows that analysts revise their forecasts when firms announce decisions containing information such as: equity offerings (Brous, 1992), takeovers (Brous and Kini, 1993), etc. Hence, they should upwardly revise their annual earnings per share forecasts if they believe that split announcements are a positive signal.

Analysts' earnings forecasts have the advantage that, unlike stock returns, they directly reflect information and not liquidity or transaction costs. The revision of earnings forecasts is calculated as the monthly change in the mean annual earnings per share forecasts, divided by the share price: $FR_{i,t,} = (F_{i,t} - F_{i,t-1})/p_{i0}$, where $F_{i,t}$ is the mean of analysts' annual earnings per share forecasts at month t and p_{i0} is the share price at the beginning of the announcement month. The subscript t represents the month relative to the split announcement month (month 0). We use annual earnings forecasts made for the announcement year (one-ahead-forecast) and for the following year (two-ahead-forecasts).

However, the above simple revision of earnings forecasts could be a biased estimation of the true impact of splits, given that a monthly series of forecasts has problems of optimism and serial correlation bias (Brous, 1992; and Ederington and Goh, 1998). Accordingly, and bearing in mind these empirical characteristics in the non adjusted revisions of earnings forecasts, we calculate the abnormal or unexpected forecast revision as the difference between the actual forecast revision and the expected revision,

$$AFR_{i,t} = FR_{i,t} - E\left(FR_{i,t}\right) \qquad [3]$$

where $AFR_{i,t}$ is the abnormal earnings forecast revision for share i published in month t, $FR_{i,t}$ is the actual (realized) forecast revision for share i in month t, and $E(FR_{i,t})$ is the expected forecast revision for firm i in month t, calculated with the expectations model proposed by Brous (1992) as,

$$E(FR_{i,t}) = k_i + n^{-1}\sum_{s=1}^{n-1}\varepsilon_{i,t-s} \quad [4]$$

where the expected revision for firm i in month t consists of a forecastable component (k_i) plus the equally weighted average of the unexpected component in the n previous months. The forecastable component, k_i, is the average forecast revision during an estimation period which consists of all the months of the sample period excluding the five months before and after the announcement, and $\varepsilon_{i,t-s}$ is the unexpected component of the forecast revision for firm i in month t-s, which is calculated as the difference between k_i and the revision made in month t-s. The value of n is five, meaning that we assume that analysts' forecast revisions follow a fourth-order moving average process, which is consistent with the fact that around 20% of analysts update their forecasts every month.[2]

The earnings forecast error for firm i in month t, $FE_{i,t}$, is computed as the difference between the actual earnings per share $EPS_{i,t}$ and the mean earnings per share forecast $F_{i,t}$. normalized by the absolute value of the forecast:

$$FE_{i,t} = (EPS_{i,t} - F_{i,t})/F_{i,t} \quad [5]$$

A positive value indicates that analysts are pessimistic in their earnings forecasts. The change in earnings forecast error $\Delta FE_{i,t}$ is the difference between the prediction errors of two consecutive months.

Panels A and B of Table 3 shows information on the above characteristics for one-year and two-years ahead earnings per share forecasts, respectively, in a period of six months

around the split announcement. Specifically, we report cross-sectional mean and median of the monthly earnings forecast revisions, of the abnormal revisions, of the forecast errors and of the variations in the earnings forecast errors.

We observe that earnings forecast revision is positive and significant in the announcement month, both with the one-year-ahead earnings forecasts with a revision of 0.068 (t =3.39 and p<0.01), and the two-year-ahead earnings forecasts at 0.075. Before the split the revision is also positive in both cases, although it is only statistically significant in the third and second months before the split announcement in the one-year earnings forecasts and from month -2 in the two-year forecasts. After the split announcement only the two-year earnings forecasts show a significant increase from the month after the announcement.

In terms of abnormal one-year earnings forecast revisions, only in the announcement month is it significantly different from zero at a level of 1%. In this month the mean abnormal revision is of 0.069 with a t statistic value of 2.99. In the three months before and after the split there are no significant abnormal revisions. With the two-year earnings forecasts there are significant positive abnormal revisions in the announcement month and in the following month.

The mean one-year forecast error is positive before the announcement month and negative after, although in neither case is it significantly different from zero. The two-year forecast error is positive, both the mean and the median, in all the months around the announcement, but it is never statistically significant. This data indicates that analysts' forecasts are not pessimistic after the split announcement, as in the US market (Ikenberry and Ramnath, 2002). Alternatively, the lack of error indicates that splitting firms' actual earnings coincide with the analysts' forecasts.

[2] This frequency is similar to that obtained in the US (Brous and Kini, 1993), and in Spain by López-Espinosa and Gómez-Sala (2006).

Finally, in the last columns we present the change in forecast error. If the split announcement contains information about the future prospects of the company, we should also find a reduction in forecast errors. Supporting this information content argument we observe that, in the case of one-year earnings forecasts, there is a reduction in the mean analysts' forecast errors from the month before until the month after the announcement. In the case of two-year forecasts there are no significant improvements in forecast precision in the three months around announcement.

Therefore, analysts improve their earnings forecasts around splits and there are indications that their forecasts are more reliable. These results suggest that these professionals also interpret splits as signals to the market of specific favorable information, which is consistent with evidence previously obtained by Klein and Peterson (1989), Doran (1994) and Conroy and Harris (1999).

6. Operating profitability

In this section we analyze the behavior of annual earnings in a five-year period around the split announcement. As Kadiyala and Vetsuypens (2002), instead of earnings, we use return on assets, ROA, defined as earnings before interest, taxes and extraordinary items, divided by the mean total assets. We also compute the abnormal return on assets of each firm using two different matching procedures. First we measure the excess return over the mean of the industry and year considered, excluding splitting firms, in order to control possible industry and time effects. Second we calculate the abnormal return on assets using the control firm method of Barber and Lyon (1997). The control firm for each split is selected from all Spanish stock market listed firms that do not split their stocks in the five-year period around the announcement. From this set of firms, we match each splitting company with the firm in the same industry that has the closest market capitalization.

Table 4 presents the mean and median ROA for a five-year period, from -2 to +2, where year zero is the split announcement year. Panel A shows the ROA, Panel B the excess ROA over the industry mean and Panel C the excess ROA over the mean ROA of the control firms selected according to industry and size.

Panel A reveals that ROA increases until year -1, and falls over the next two years. This pattern is observed in both the mean and the median, with an economic return in year -1 of 9.31% and 9.24%, respectively. Both values are significantly different from zero with practically null *p*-values, for the parametric tests based on a *t*-Student for the mean, and the non parametric tests such as the Wilcoxon test for the median. This post-split decreasing returns tendency is consistent with the decline in earnings growth rates after the split announcement detected by Lakonishok and Lev (1987) and Asquith *et al.* (1989). This finding is an initial indication that splits contain little information on future operating earnings improvements.

The difference in economic returns between splitting firms and the industry median is shown in Panel B. We can see that the economic returns of splitting firms are always higher than the returns of non-splitting firms in the same industry. Additionally, the difference in operating profitability between the two sets of firms seems to be somewhat more pronounced before than after the split, which means that this measurement also suggests that splits are not a signal of improved future returns on assets. The economic returns of splitting firms surpass their industry median by around 3.73 in mean, or 3.87 in median, in the year prior to the event-year. Both values are the maximum registered in the analysis window and are significantly different from zero with practically null *p*-values in both cases.

Finally, Panel C presents the excess operating returns over the same size and industry control firms. We find that splitting companies usually have higher ROA than same industry and size firms. This excess is at its maximum in the pre-event year, when ROA are at a mean

of 3.62 points above the control firms and significant at 1%. The same applies to the median values, with a maximum excess of 4.35% in year -1, backed up by a *p*-value of around 0.5%.

Therefore, firms that announce a stock split present significantly higher operating returns than same industry firms. This excess reaches its maximum in the year before the split announcement and then gradually reduces. Our finding that the returns of splitting firms and the returns adjusted for industry and size are higher before the split than after could indicate that managers tend to be overly optimistic about future prospects and base the split decision more on past and present earnings than on future returns. These results suggest that split announcements should be interpreted not so much as optimistic future signals but as signals that the splitting firms obtain consistently better earnings than firms that do not split their stocks.

7. Earnings quality

The previous literature analyses extensively whether stock splits are associated with higher past, present and/or future earnings. However, there is little evidence on the quality of earnings figures around splits.

Numerous studies demonstrate that managers behave opportunistically to intentionally alter financial statements around certain corporate events. For example, it has been shown that they manipulate earnings to temporally inflate share prices when the firm releases shares; as with IPOs (Teoh *et al.*, 1998a) and SEOs (Teoh *et al.*, 1998b), or when they give shares in exchange for other shares as in stock mergers with full or partial payment in shares (Erickson and Wang, 1999). Similarly, there is evidence of downward earnings management prior to stock repurchases (Gong *et al.*, 2006).

Unlike the above events, with stock splits and reverse splits the firm exchanges its own shares for others of the same firm but with lower or higher par values respectively and

without cash outlays. In a similar way to the findings around other corporate event announcements interpreted as negative signals, the empirical evidence finds opportunistic behavior designed to increase earnings around reverse splits (Ho *et al.*, 2005). However, contrary to the expected in announcements of events interpreted as positive signals by the market, all the scarce previous literature finds upward management of earnings prior to stock split announcements in US firms. Guo *et al.* (2005), suggest that opportunistic upward earnings management combined with splits is used to increase the share price of the acquiring firm before a takeover. Louis and Robinson (2005) consider that managers do not manage earnings upward to mislead investors but to convey favorable private information to the market, given that abnormal positive returns around split announcements are significantly related to a proxy for earnings quality.

We will now test the possible existence of earnings management in our sample by computing an earnings quality measure based on discretionary current accruals. To estimate this measure we use the modified version of the cross-sectional model of Jones (1991), proposed by Dechow *et al.* (1995). In this model, discretionary accruals (abnormal) are obtained as the difference between total current accruals, $ACC_{i,t}$, and non-discretionary accruals (normal), $NACC_{i,t}$, explained by the operating activities of the firm and its industry,

$$AACC_{i,t} = \frac{ACC_{i,t}}{MTA_{i,t}} - NACC_{i,t} = \left(\frac{ACC_{i,t}}{MTA_{i,t}}\right) - \left[\hat{\alpha}_{s,t}\left(\frac{1}{MTA_{i,t}}\right) + \hat{\beta}_{s,t}\left(\frac{\Delta NSALES_{i,t} - \overbrace{\Delta TR_{i,t}}^{adjustment}}{MTA_{i,t}}\right)\right] \qquad [6]$$

where, on the left, $AACC_{i,t}$ is the abnormal component of current accruals for splitting firm *i* in year *t*. It represents the part of accruals potentially subjected to management. All the variables on the right side are normalized by $MTA_{i,t}$, the mean total assets from year *t*-1 to year *t* for firm *i*, to reduce the problem of heteroscedasticity. In the second term of the right

side, $NACC_{i,t}$ is the estimate of non-discretionary accruals for firm *i* in year t, $\Delta NSALES_{i,t}$ is the change in the net sales; $\Delta TR_{i,t}$ is the change in trade receivables in year *t*. $\hat{\alpha}_{st}$ and $\hat{\beta}_{st}$ are the cross-sectional estimations obtained in each year *t* with firms of each industry *s*, excluding splitting firms, using the following model,

$$ACC_{j,t}/MTA_{j,t} = \alpha_{s,t}\left(1/MTA_{j,t}\right) + \beta_{s,t}\left(\Delta NSALES_{j,t}/MTA_{j,t}\right) + u_{j,t} \quad [7]$$

where the variables are defined as in the above equation, but the subscript *j* refers to non-splitting firms belonging to the same industry (*s*) as the splitting company *i*.

Kothari *et al.* (2005) reveal the importance of problems of specification and power of accrual models when they are estimated with non-random samples; especially when accruals are correlated with the firm's operating performance. In these cases, the above authors demonstrate that in all samples stratified by various firm characteristics such as BTM ratio, earnings-price ratio, size, cash flow or growth rates, the best performance is obtained by employing abnormal accruals adjusted by control firms matched by ROA and industry. For this reason, abnormal accruals estimated as explained above are adjusted by abnormal accruals of the non-splitting firm of the same industry with the closest ROA. Following the same procedure, we replicate the tests adjusting by the median of all non-splitting firms' abnormal accruals in the same year; and by subtracting the abnormal accruals of a firm matched on the basis of size, industry and year. All the results are presented in Table 5.

Table 5 shows that the mean abnormal accruals is slightly positive (Panel A) or slightly superior to that of their control samples (rest of the panels). However, the maximum value does not show a clear pattern in the event year or in the previous year. Additionally, the parametric tests for the mean do not find, in any of the specifications employed, that the abnormal accruals are significantly different from zero or different from control sample abnormal accruals. In terms of medians, in all cases the maximum value is centered on the event year. The non-parametric Wilcoxon test shows that abnormal accrual of splitting firms

are positive and marginally significant at 10%. Also, in Panel C we observe that the median splitting firms' abnormal accruals is higher than the median abnormal accruals for non-splitting firms of the same industry, with a significance level of 5%. However, matching based on ROA or on size, the *p*-values rise noticeably, thus reducing the conclusiveness of the differences observed in Panels A and C.

Accordingly, we cannot affirm that managers use discretionary current accruals around split announcements. The quality of pre-split firm earnings is high, which means that managers do not need to manipulate them to generate a positive price reaction.

8. The relationship between abnormal returns and operating earnings

So far we have found evidence consistent with the signaling hypothesis and contrary to opportunistic use of accounting rules to manipulate earnings before split announcements. In this section we extend the analysis of the signaling argument. First examining split factor size as the signal used by managers and second, studying the type of information conveyed by the split announcement.

8.1 The information signal of the split

Brennan and Copeland (1988) and Brennan and Hughes (1991) develop theoretical models in which the information signal is not the split but its size, measured by the split factor. Following McNichols and Dravid (1990) there are two components to the split factor: an expected component which, according to the trading range argument, is positively related to the pre-split share price (Lakonishok and Lev, 1987) and negatively associated with firm size (Defeo and Jain, 1991), and an unexpected component, a proxy for the management's private information. The fact that the selected split factor is higher than would be expected to place the price in a conventional trading range would suggest that the managers have

especially positive information and expect a subsequent recuperation which will return the price to its optimal range. Accordingly, and following McNichols and Dravid (1990), we use the following tobit model to isolate the unexpected component of the split factor:

$$SPFAC = \begin{cases} \alpha_1 + \alpha_2 PRICE + \alpha_3 SIZE + spfac, & if\ SPFAC^* > 0 \\ 0, & otherwise \end{cases} \quad [8]$$

where $SPFAC^* = \alpha_1 + \alpha_2\ PRICE + \alpha_3\ SIZE + spfac$, and *SPFAC,* is the natural logarithm of the announced split factor; *PRICE* is the share price on day -6 (expressed as a logarithm), and *SIZE* is the firm's size, measured as the logarithm of total asset value at the beginning of the split announcement year. The residual term *spfac,* is a proxy for the private information not known by the market when the split factor is chosen and is, therefore, considered as the signal used by managers. The variable *PRICE* is included because firms with high share prices are more likely to split their stock. The variable *SIZE* is included because larger firms prefer to keep higher share prices. Therefore, in accordance with the trading range hypothesis, we expect the coefficient on *PRICE* to be positive and the coefficient on *SIZE* to be negative.

With the available data, the estimated value of the coefficient on pre-split price, α_2 = 0.290, is positive and significant (t = 2.72 and p = 0.00), indicating that the higher the share price, the higher the split factor chosen by managers. The coefficient on the variable SIZE, α_3 = - 0.107, is negative and significantly different from zero (t = -1.94 and p =0.05), which supports the idea that larger companies prefer to have higher share prices. These results are similar to those of McNichols and Dravid (1990), Nayak and Prabhala (2001) and Huang *et al.* (2006), and are consistent with the trading range hypothesis. We will now examine whether, apart from placing the price at a certain level, the announced split factor, and specifically its unexpected component, has information content.

8.2 Cross-sectional analysis of abnormal returns.

According to the signaling hypothesis, the private information in the unexpected component of the split factor should explain the abnormal market reaction around the announcement day. To test this hypothesis, we run a cross-sectional regression of the cumulative abnormal returns in the period (0,+3) on the residual split factor estimated with Model [8].

Consistent with the proposed hypothesis and the previous evidence (McNichols and Dravid, 1990; Conroy and Harris, 1999), the results presented in Table 6 show that cumulative abnormal returns around the announcement are positive and significantly associated with the non-expected component of the split factor. Therefore, the surprise in the announced split factor is the signal used by managers to convey the firm's private information to the market (Conroy and Harris, 1999).

To analyze the market reaction in function of the intensity of the signal, we partition the split sample into two sub-samples: splits with positive *spfac* and splits with negative *spfac*. A positive value for the unexpected component of the split factor (*spfac*) indicates that the announced factor is larger than expected, and that the split will provide favorable private information. A negative value would suggest a lack of information content. As seen in Table 6, abnormal returns around the announcement are significantly related to the variable *spfac* in the unexpectedly high split factor sub-sample. However, this relationship is not significant in the unexpectedly low split factor sub-sample. These results support the argument that only stock splits that place the price below the preferred trading range have information content.

The evidence provided suggests that managers use split size to convey favorable private information on the situation of the firm. However, there is no consensus on whether split announcements convey information on earnings previous, contemporaneous or subsequent to the split. Pilotte (1997) affirms that split announcements signal future earnings

improvements with the finding of a positive and significant relationship between abnormal returns and post-split earnings increases. Conversely, Asquith *et al.* (1989) and Kadiyala and Vetsuypens (2002) conclude that split announcements are used by managers not so much to signal improved subsequent earnings performance but to indicate that pre-split earnings increases are permanent and not transitory.

If splits convey information on the evolution of firm earnings, the market reaction should be positively related to operating earnings performance. Therefore, we estimate the following regression model of abnormal returns on operating returns (previous, contemporaneous and post split) and the control variable *RUNUP*[3],

$$CAR_i(0,+3) = \beta_0 + \beta_1 ROA_{t,i} + \beta_2 RUNUP_i + u_i \qquad [9]$$

where *CAR*(0,+*3*) are cumulative abnormal returns from the announcement day until three days after; ROA_t with t = -2,-1,0,+1 or +2, are excess returns on assets on the control firm sample of same industry and size for year *t*, with 0 being the announcement year. The variable *RUNUP* calculated as the quotient of the share price on the sixth day before the announcement and the share price a year before this date, measures the revaluation experienced by the shares before the split. *RUNUP* is included because it has been shown that the market reaction depends on expectations around the probability of a split (Lakonishok and Lev, 1987). These regressions are estimated separately for the positive unexpected split factor sub-sample and for the negative unexpected split factor sub-sample.

In Panel A of Table 7, which shows the results for the positive *spfac* split sub-sample, it can be seen that abnormal returns around the announcement day are positively and

[3] An alternative method could be to estimate a multivariante regression of abnormal returns on all the operating returns of the years around the split simultaneously. However, high correlation levels have been found between annual operating returns, which could cause multicollinearity problems. For reasons of space, the correlation matrix is not shown although it is available on request.

significantly correlated with the abnormal economic returns of years -2 and -1. Conversely, the coefficients on ROA for the announcement year and the two years after do not present significant values. These results are very different to those observed in Panel B of Table 7, which shows the estimations of model [9] for the negative *spfac* splits. In this case, there are no statistically significant coefficients.

Therefore, our findings suggest that the positive market reaction depends on the intensity of the signal. The announcement effect in splits where the unexpected split factor is positive, can be explained by the information conveyed by the split, which is mainly relative to the good earnings performance of the pre-split year, in line with Asquith *et al.* (1989) and Kadiyala and Vetsuypens (2002). However, in splits where the unexpected component of the split factor is negative, the positive market reaction does not seem to be justified by the evolution of the firm's earnings.

9. Conclusions

This study examines whether Spanish firms use splits as signals to convey information to the market on the evolution of their earnings. First, we test whether, as in most countries, the Spanish market reacts positively on the announcement day, generating significantly positive abnormal returns around this day. This reaction is stronger in splits announced before 1999, in those with higher split factors, in a firm's first split and in splits undertaken by firms with good growth opportunities. Second, we also find that in the announcement month, analysts significantly revise upward their one-year and two-year-ahead earnings forecasts. The revision to their one-year-ahead earnings forecasts reduces their prediction error, which suggests a decrease in asymmetric information.

The response of investors and financial analysts is consistent with the explanation that managers use splits to send favorable earnings signals to the market. In support of this

argument, we find that splitting firms present significantly higher operating returns than control firms of the same industry and size. Specifically, this higher profitability is centered on the pre-split announcement years. Moreover, we find that splitting firms do not use practices of earnings management, as we do not find significant abnormal discretionary accruals in the years around the split.

Finally, our results suggest that the signal considered by the market is the unexpected component of the split factor. Consistent with the self-selection hypothesis, we find a statistically significant relationship between abnormal returns around the split announcement and the surprise component of the split factor, especially in splits in which the factor is higher than expected given the pre-split share price level and the size of the firm. After examining the relationship between abnormal returns and the evolution of annual earnings, in line with Asquith *et al.* (1989) and Kadiyala and Vetsuypens (2002), we conclude that managers use unexpectedly high split factors to convey to the market that good pre-split earnings performance is permanent and not transitory. Conversely, in stock splits where the split factor is lower than expected, the market reaction is not explained by the evolution of the firm's earnings.

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Table 1
Non-financial characteristics of the split sample

Panel A, Annual Distribution

	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
# Sample	7	15	14	2	1	0	0	3	3	45
% Sample	15.56	33.33	31.11	4.44	2.22	0.00	0.00	6.67	6.67	100.00
Rm (%)	32.22	27.77	10.82	-24.25	-7.82	-32.76	20.80	14.19	16.25	

Panel B, Monthly Distribution

	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
# Sample	0	1	16	7	11	5	3	0	1	1	0	0	45
% Sample	0.00	2.22	35.56	15.56	24.44	11.11	6.67	0.00	2.22	2.22	0.00	0.00	100.00

Panel C, Daily Distribution

	Monday	Tuesday	Wednesday	Thursday	Friday	Total
# Sample	5	11	14	11	4	45
% Sample	11.11	24.44	31.11	24.44	8.89	100.00

Panel D, Industry Distribution

	Food	Banking	Com.	Constr.	Electr.	Invest.	Metal	N. Tec.	Others	Oil	Total
# Sample	7	0	0	9	5	1	9	1	11	2	45
% Sample	15.56	0.00	0.00	20.00	11.11	2.22	20.00	2.22	24.44	4.44	100.00

Panel E, Split factor distribution

	2 x 1	3 x 1	4 x 1	5 x 1	6 x 1	10 x 1	20x1	50 x 1	Total
# Sample	10	18	6	6	3	0	1	1	45
% Sample	22.22	40.00	13.33	13.33	6.67	0.00	2.22	2.22	100.00

Panel F, Splitting firms characteristics

	Mean	Min.	q1	Median	q3	Max.	Dev.
Pre-split price (€)	60.35	4.39	32.00	51.00	76.75	192.32	43.53
Size (mill. €)	1,655.72	18.14	202.57	548.18	1,782.45	14,439.03	3,046.54
BTM	0.50	0.04	0.29	0.39	0.65	1.44	0.32
Run-up	1.29	0.05	0.94	1.27	1.52	3.68	0.69

The final sample comprises 45 stock splits announced by non-financial companies listed on the Spanish continuous market in the period 1997-2005. Panels A, B and C show the annual, monthly and daily distributions of announcement date, respectively. Panel D shows the industry distribution of splitting firms. Panel E shows the split factor distribution. Panel F shows certain characteristics of the sample firms: Pre-split price is the share price 6 days prior to the announcement (in euros). Size is the market capitalization at the end of the year before the announcement year (in millions of euros). BTM is the book-to-market ratio at the end of the year before the announcement year. Run-up is the revaluation experienced by share prices before the split, calculated as the quotient of the share price on the sixth day before the announcement and the price one year before this date.

Table 2
Abnormal returns on the split announcement day

	N	AR(0)			CAR(0,+1)			CAR(0,2)			CAR(0,+3)			CAR(-5,-1)			CAR(+1,+5)		
		$\overline{RA}$ (%)	t- BMP	t-Corr.	$\overline{RA}$ (%)	t- BMP	t-Corr.	$\overline{RA}$ (%)	t- BMP	t-Corr.	$\overline{RA}$ (%)	t- BMP	t-Corr.	$\overline{RA}$ (%)	t- BMP	t-Corr.	$\overline{RA}$ (%)	t- BMP	t-Corr.
Panel A, Split Characteristics																			
Complete	45	0.94	2.80***	2.15**	1.76	3.48***	2.81***	2.82	3.72***	3.19***	3.44	4.19***	3.44***	0.50	-0.56	-0.64	2.07	2.56**	1.10
Before 1998	22	1.65	2.51**	2.31**	1.98	2.71**	2.26**	4.06	3.43***	3.20***	4.73	3.73***	3.46***	-1.17	-1.64	-1.19	2.57	2.48**	1.63
After 1998	23	0.26	1.37	0.78	1.55	2.19**	1.79*	1.64	1.88*	1.41	2.20	2.56**	1.50	2.10	0.32	0.28	1.58	0.95	-0.04
Factor ≤3x1	28	0.37	1.81*	1.19	1.24	2.45**	1.92*	2.21	2.50**	2.48**	2.72	2.86***	2.54**	1.79	0.95	0.71	1.91	2.20**	1.07
Factor > 3x1	17	1.88	2.14**	2.11**	2.63	2.51**	2.31**	3.84	2.80**	2.25**	4.62	3.13***	2.59***	-1.62	-3.83***	-1.95**	2.33	1.36	0.51
First split	29	0.90	1.77*	1.11	2.11	3.01***	2.41**	3.28	3.53***	2.94***	3.87	3.61***	3.03***	1.24	-0.18	-0.03	2.18	2.20**	0.75
Second and sub.	16	1.01	2.50**	2.34**	1.13	1.71	1.70*	2.00	1.43	1.64	2.64	2.10*	1.96**	-0.85	-0.84	-1.12	1.86	1.28	0.94
Panel B, Firm Characteristics																			
Low run-up	22	0.58	1.94*	1.26	2.29	2.96***	2.73***	2.70	2.89***	2.57***	3.49	3.05***	2.69***	2.17	0.37	-0.18	2.36	2.10**	0.71
High run-up	23	1.32	2.02*	1.77*	1.41	1.92*	1.38	3.21	2.53**	2.09**	3.76	2.98***	2.46**	-1.13	-2.01*	-1.04	2.16	1.75*	1.21
Small	22	0.14	0.70	-0.25	1.31	1.30	0.68	2.25	1.98*	1.17	3.34	2.66**	1.95*	1.27	0.62	-0.12	2.05	1.74*	0.70
Large	23	1.74	3.26***	3.31***	2.34	4.34***	3.43***	3.64	3.24***	3.46***	3.91	3.29***	3.12***	-0.27	-2.08**	-1.09	2.46	2.01**	1.18
Low BTM	22	1.72	2.68**	2.29**	2.48	2.94***	2.44**	3.78	2.94***	2.70***	4.44	3.31***	2.84***	-0.13	-1.21	-1.15	2.89	2.03*	1.03
High BTM	23	0.23	1.16	0.64	1.22	1.93*	1.60	2.18	2.31**	1.88*	2.86	2.65**	2.22**	1.07	0.08	-0.01	1.65	1.69	0.85

This table shows the average abnormal returns on the announcement day -AR(0)- and average cumulative abnormal returns in various intervals ($\overline{CAR}$). The abnormal returns are estimated as prediction errors. Expected returns are estimated by the market model that includes lead and lagged market returns in order to consider the effects of non-synchronous trading, and following the GARCH (1,1) modelization to adjust for kurtosis and persistent heterocedasticity. The estimation period is (+6,+150), with day 0 being the announcement day. The statistics used to test the significance of the abnormal returns are those of Boehmer *et al.* (1991) [t-BMP] and of Corrado (1989) [t-Corr]. (***) significant at 1%, (**) significant at 5% and (*) significant at 10%.

Table 3
Earnings forecasts of financial analysts

Month relative to announcement	$RF_{i,t}$ (x100)		$ARF_{i,t}$ (x100)		$FE_{i,t}$		$\Delta FE_{i,t}$ (x1000)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Panel A. One-year earnings per share forecasts								
Month -3	0.029	0.000	0.001	-0.008	0.057	0.013	-0.025	0.000
-2	0.090**	0.010***	0.066	0.000	0.025	0.016	-0.480	0.0235
-1	0.036	0.000	0.029	-0.009	0.048	0.021	1.014	0.000**
0	0.068***	0.022***	0.069***	0.031***	-0.033	0.019	-2.378	-0.106**
+1	0.028	0.000	0.039	-0.002	-0.075	0.000	-2.988	0.000**
+2	-0.013	0.000	-0.002	-0.006	-0.071	0.012	0.214	0.000
Month +3	-0.01	0.000	-0.021	-0.007	-0.073	0.000	0.186	0.000
Panel B. Two-year earnings per share forecasts								
Month -3	0.023	0.003*	-0.004	-0.011	-0.006	0.029	-0.005	0.000
-2	0.062*	0.008**	0.039	0.003	-0.005	0.065	-0.909	0.000
-1	0.051*	0.000	0.039	-0.009	-0.015	0.025	-0.611	0.000
0	0.075**	0.006***	0.073**	0.017**	0.046	0.048	0.781	0.000
+1	0.076**	0.000	0.083**	0.006*	0.025	0.034	-0.666	0.000
+2	-0.026	0.000	-0.008	-0.008	0.040	0.024	0.721	0.000
Month +3	0.005	0.000	0.005	-0.005	0.032	0.021	-0.122	0.000

This table shows $RF_{i,t}$ the monthly revision of analysts' earnings forecasts for firm i in month t and $ARF_{i,t}$ the abnormal revision of earnings forecasts. The abnormal revisions are estimated using a fourth-order moving average process. It uses the mean monthly earnings per share forecast. It also shows the forecast error in the months around the announcement $FE_{i,t}$ and its changes $\Delta FE_{i,t}$. The table shows the mean and median of the observations that comprise the sample. The null hypothesis for each month is that the mean (median) of the corresponding variable is equal to zero. As a test statistic, we use the t test for the mean and the Wilcoxon test for the median. (***) significant at 1%, (**) significant at 5% and (*) significant at 10%.

Table 4
Operating profitability around the split announcement (ROA)

Year t	Mean	p(mean)	Median	p(median)
		Panel A, ROA		
-2	0.0866	0.00	0.0742	0.00
-1	0.0931	0.00	0.0924	0.00
0	0.0885	0.00	0.0904	0.00
1	0.0755	0.00	0.0769	0.00
2	0.0767	0.00	0.0740	0.00
		Panel B, excess ROA over industry control group		
-2	0.0372	0.00	0.0297	0.00
-1	0.0374	0.00	0.0387	0.00
0	0.0296	0.00	0.0353	0.00
1	0.0214	0.00	0.0233	0.00
2	0.0269	0.01	0.0275	0.00
		Panel C, excess ROA over control firm		
-2	0.0345	0.01	0.0280	0.14
-1	0.0363	0.00	0.0436	0.01
0	0.0161	0.20	0.0410	0.26
1	0.0088	0.42	0.0258	0.14
2	0.0267	0.05	0.0223	0.07

This table shows the mean and median operating returns in a period of five years around the announcement (year 0). ROA is the earnings from ordinary activities deflated by total assets value; *t*, year with respect to split announcement year 0. Panel A shows the operating returns values for splitting firms. Panel B shows the difference in ROA between splitting firms and all firms from the same industry and year means (excluding the splitting firms). Panel C shows abnormal operating returns with respect to a control firm of the same industry, size and year; p(mean) is the p-value of the bilateral test of means based on a Student t distribution; p(median) is the p value of the bilateral median test based on the Wilcoxon test.

Table 5
Abnormal accruals around the split announcement

t	Mean	p(mean)	Median	p(median)
		Panel A, Modified Jones		
-2	0.0021	0.88	0.0122	0.41
-1	0.0138	0.36	0.0159	0.51
0	0.0142	0.51	**0.0282**	**0.10**
1	0.0055	0.82	0.0151	0.19
2	0.0147	0.53	-0.0010	1.00
		Panel B, Modified Jones with KLW adjustment		
-2	0.0249	0.24	0.0242	1.00
-1	0.0375	0.17	0.0263	0.51
0	0.0245	0.36	0.0355	0.19
1	-0.0032	0.91	0.0187	0.32
2	0.0174	0.54	-0.0147	0.74
		Panel C, Modified Jones with SEC adjustment		
-2	0.0006	0.97	0.0139	0.86
-1	0.0141	0.38	0.0162	0.87
0	0.0210	0.34	**0.0353**	**0.05**
1	0.0104	0.67	0.0216	0.10
2	0.0176	0.45	0.0046	1.00
		Panel D, Modified Jones with SIZE adjustment		
-2	-0.0086	0.74	0.0212	0.62
-1	-0.0060	0.81	0.0021	1.00
0	0.0048	0.87	0.0247	0.51
1	0.0299	0.30	0.0302	0.51
2	0.0209	0.51	0.0117	0.74

The table reports the mean and the median of abnormal accruals estimated with the model specified in each panel. *t,* year with respect to the split announcement year 0; p(mean) is the p-value of the bilateral test of means based on a Student *t* distribution; p(median) is the p value of the bilateral median test based on the Wilcoxon test; Panel A, abnormal accruals estimated by modified Jones model. Panel B, KLW adjustment, splitting firms abnormal accruals adjusted by subtracting abnormal accruals for a non-splitting firm of the same industry and year matched based on ROA and industry. Panel C, SEC adjustment, sample firms abnormal accruals adjusted by the median abnormal accruals for all non-splitting firms;Panel, D, SIZE adjustment, abnormal accruals adjusted by subtracting abnormal accruals for a non-splitting firm of the same industry and year matched by firm SIZE (measured by total assets).

Table 6
Abnormal returns and the split factor

$$CAR_i(0,+3) = \alpha_0 + \alpha_1 fac_i + \varepsilon_i$$

	α_0	$t(\alpha_0)$	α_1	$t(\alpha_1)$	R^2 *ajust*
All splits	0.032	5.11***	0.033	2.19**	0.09
Splits with positive *fac*	0.020	1.94*	0.064	2.84**	0.32
Splits with negative *fac*	0.043	2.07*	0.017	0.34	-0.05

This table shows the results of the regression of abnormal returns on the unexpected component of the split factor (*spfac*), for both the full sample and the sub-samples formed by *spfac*, announcements with positive *spf*ac and with negative *spfac*. The dependent variable is the average cumulative abnormal return in the period (0,+3), obtained using as standard the return on the market model that includes lead and lagged market returns and estimated by GARCH (1,1); *spfac* is the unexpected component of the announced split factor, estimated as the residual term of model [8]. Each regression collects the estimated value of each coefficient and the t-statistic. Where necessary, the values of the statistics are estimated by the White correction to adjust for heterocedasticity. (***) significant at 1%, (**) significant at 5% and (*) significant at 10%.

Table 7
Abnormal returns around the announcement and operating returns

$CAR_j(0,+3) = \beta_0 + \beta_1 ROA_{t,i} + \beta_2 RUNUP_i + u_i$

Panel A, Splits with positive *fac*

Year	β_0	t(β_0)	β_1	t(β_1)	β_2	t(β_2)	R^2 *adjus.*
-2	0.066	2.86**	0.512	3.36***	-0.028	-1.69	0.33
-1	0.027	1.11	0.383	2.33**	-0.006	-0.40	0.16
0	0.038	1.38	0.095	0.62	0.001	0.03	-0.09
1	0.035	1.40	0.093	0.31	0.003	0.17	-0.11
2	0.019	0.69	0.206	1.51	0.009	0.51	0.02

Panel B, Splits with negative *fac*

Year	β_0	t(β_0)	β_1	t(β_1)	β_2	t(β_2)	R^2 *adjus.*
-2	0.055	1.92*	-0.124	-0.80	-0.009	-0.55	-0.07
-1	0.051	2.59**	-0.176	-0.86	-0.007	-0.89	-0.06
0	0.041	1.61	0.225	1.21	-0.004	-0.24	-0.02
1	0.046	1.74	0.053	0.32	-0.006	-0.38	-0.11
2	0.045	1.65	0.004	0.02	-0.006	-0.35	-0.12

This table shows the results of the bivariate regression model of abnormal returns on the operating returns and the variable run-up. The dependent variable is the average cumulative abnormal returns in the period (0,+3), obtained using as standard the return on the market model that includes lead and lagged market returns and estimated by GARCH (1,1). The independent variables are, ROA_t the return on assets excess over the control firm from the same industry and size (abnormal operating returns) for year *t*, with year 0 being the announcement year; *RUNUP* measures the revaluation experienced by the share price before the split, calculated as the quotient of the share price on the sixth day before the announcement and the price one year before that date. Panel A shows the results for stock splits with a positive unexpected split factor and Panel B for splits with a negative *spfac*. Each regression collects the estimated value of each coefficient and the *t* statistic. Where necessary, the values of the statistics are estimated by the White correction to adjust for heterocedasticity. (***) significant at 1%, (**) significant at 5% and (*) significant at 10%.

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