DIVIDENDS AND ALTERNATIVE MARKET SIGNALS: INSIDER TRADING

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ABSTRACT: One function of dividend payouts is their role as informative signals. However, the recent lack of substantive information in dividend announcements makes it necessary to analyse the effect of dividend announcements jointly with alternative signals that may be contravening their role. Considering directors' holdings as an additional signal, this paper concludes that investors react positively to increases in dividends when they are accompanied by insiders' purchases (and negatively when accompanied by sales). This is the first time this has been shown for a European market. When correlating both signals with a firm's level of investment opportunities, evidence is found contradicting the single-signal cash flow signalling theory of dividends.

Keywords: dividend increases, insider trading, cash flow signalling, information-based signalling theory of dividends.

JEL Classification: G14; G35

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INTRODUCTION

According to signalling theory, dividends are traditionally viewed as an efficient mechanism to reduce information asymmetries in stock markets. By paying dividends, managers are sending signals about the expected earnings of the firm and about the firm's investment opportunities, thus stimulating a revision of market expectations. From this point of view, an increase in dividends signals good news about the firm and thus leads to an increase in stock prices, whilst a decrease in dividends signals bad news about the firm and thus leads to a decrease in stock prices. The *positive* reaction, also called the *investor's preference for dividends,* has been explained from different perspectives, including the tax-based signalling theory and the free cash flow theory, each producing different results.

By contrast, more recent papers on dividends highlight the recent declining information content of dividend announcements and, consequently, their inefficiency as market signals. Among the plausible explanations for this decline is the need to control for other factors, such as institutional holdings (Amihud and Li, 2004) and multiple market signals (John and Lang, 1991). In regard to the latter, John and Lang point out that dividends can only be useful signals when combined with other market signals, such as the level of insider trading. Insiders exploit multiple signals; thus, why should the study of efficient signalling be restricted to dividends by themselves? Under the assumptions of the information-based signalling theory, dividend initiations do not

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always signal good news, since alternative signals may modify the information content of the dividend announcement. In this sense, John and Lang (1991) detected that announcements of dividend initiations preceded by intensive insider sales caused a downward market reaction; thus, the market reaction to a dividend announcement was adjusted according to the sign of the insiders' transaction (sale or purchase). John and Lang focused on the impact of dividend initiations; we extend the model to the case of any kind of dividend announcements, for two main reasons. First, usually the role of dividend initiations as a market signal is only circumstantial, and their study reveals economic consequences beyond the analysis of the signalling theory of dividends. Second, dividend initiations are not a common event in the Spanish stock market (where the current study is focused), since firms have traditionally paid large dividends and although the payout may decrease, there are few cases where firms temporarily gave up paying out dividends**.**

The list of potential alternative signals to be analysed jointly with dividend announcements is quite large. Among those mentioned by Lintner (1956), we highlight directors' holdings, share repurchases, debt, institutional holdings, and investment. Among them, we analyse the combined effect of dividend announcements and directors' holdings, starting from the premise that insider purchases of their own firm shares signal managers' forecasts of good future earnings and firm growth, and, conversely, that insider sales of their own firm shares signal their lack of confidence in the future evolution of the firm. We gauge the combined effect of these two signals when they are sent to the market simultaneously. Accordingly, we analyse how the Spanish stock market reacts to eight distinct situations: increases or decreases in dividends combined with insider purchases or sales, and increases or decreases in dividends combined with insider sales or purchases.

To this end, we look more closely at the information-based signalling theory to identify those situations where the signalling theory of dividends would have predicted an increase (or decrease) in stock prices after the announcement of increases (or reductions) in dividend payouts, but where an alternative signal has altered its interpretation, moving prices in a different direction. Clearly, the realization of a single insider transaction does not necessarily represent a meaningful signal to the market; therefore, we have followed Lorie and Niederhoffer (1968) and used the so-called *intensive criterion*. We constructed two proxy variables for intensive insider trading: intensive insider net sales and intensive insider net purchases.

Foremost, since both insider trading and dividends may be intended to convey information, we also needed to determine which of these two signals is better understood by the market. To do so, we analysed the interaction of both dividends and insider trading with the quality of the investment opportunities of the firm, as measured by Tobin's q, thus testing which hypothesis is more appropriate to depict the information content of dividend announcements: the cash flow signalling theory (which predicts a positive relationship between the change in dividends and stock market movements) or the information-based signalling theory (which holds that multiple signalling policies may distort the interpretation of dividend announcements).

Our results suggest that an increase in dividend payouts represents good news only when it is preceded by intensive insider net purchases, while an increase in dividends represent bad news when there are intensive insider net sales in the previous months. In conclusion, the joint analysis of both signals modifies the expected reaction to dividend announcements. Moreover, in some cases the signal provided by insider trading seems to be more informative about the market than that of dividends. This may help us to understand some relevant features pointed out by different dividend theories,

such as the negative wealth effects surrounding dividend change announcements, or their declining information content.

The current study obtained results different from those traditionally obtained for the US markets under the assumptions of either the information-based signalling theory or the cash flow signalling theory, and closer to those obtained recently by Khang and King (2003). Finally, we also provide evidence on the signalling role of dividend decreases.

This paper is organised as follows: Section 2 reviews the signalling theory of dividends and its advances in the last decades, focusing especially on previous studies of the combined effect of multiple signals. Section 3 describes the sample and the methodology employed. Sections 4 and 5 contain the results and the main conclusions.

2. REVIEW OF LITERATURE

Lintner (1956) was one of the first authors to analyse how corporate managers use dividend policy as a mechanism to convey private information on the future of the firm to the market. In this sense, dividend payouts were not only a way of remunerating shareholders, but also a financial decision that managers could manipulate according to the effect they wished to produce in the market. However, Lintner held that it was the change in dividends, rather than the dividend itself, which works as a market signal. Miller and Modigliani (1961) provided new insights in what they call the dividend-puzzle, and Fama and Babiak (1968) corroborated previous results, stating that at the outset, an increase (or decrease) in dividends signals good (or bad) expectations about a firm's earnings and thus stimulates an increase (or decrease) in stock prices. Pettit (1972) showed that unexpected changes in dividends lead to price movements in the same direction as a consequence of the revision of market expectations. Aharony and Swary (1980) and Ofer and Siegel (1987) demonstrated that the market revises its

expectations in proportion to the change in the announced dividend payout, in line with studies on the information content of dividends such as that of Watts (1973). However, Leland and Pyle (1977) and Ross (1977) went a step further by analysing the moral hazard problem that arises when managers of bad-quality firms send ambiguous signals to the market in order to imitate good-quality firms. Thus, market signals should be costly; otherwise, any firm may easily send misleading signals. Dividends suitably fit the concept of a costly signal, since paying them out reduces the free cash flow of the firm and reduces problems of over-investment (or increases those of under-investment).

During the eighties, the role of dividends was still being re-examined. Asquith and Mullins (1983), Dyl and Weigand (1998), and Lipson, Maquieira, and Megginson (1998) analysed the signalling role of dividend initiation announcements, as distinct from announcements of changes in the size of the dividend. Healey and Palepu (1988), Michaely, Thaler, and Womack (1995) and Bajaj (1999) focused on dividend omissions, while Jayaraman and Shastri (1988), Brickley (1990), Gombola and Liu (1999), and Chhachhi and Davidson (1997) analysed announcements of specially designated dividends. Kalay and Loewenstein (1986) held that the appropriate signal was the schedule of dividend announcements, since early announcements usually contain good news while late announcements convey bad news. Marsh and Merton (1987) went further by positing a model of dividends in which managers design their dividend policy by taking into consideration not only the economic circumstances of the firm but also those of other firms in the same industry. Finally, authors such as Benartzi, Michaely, and Thaler (1997) find little evidence of dividends' signalling a firm's future earnings, concluding that they are only able to signal the past. Chen and Wu (1999), however, state that dividend changes frequently provide information about unexpected changes in future earnings for a little more than a year.

Apart from the refinements in the understanding of dividends as market signals, the financial literature has also re-examined the uses of such signalling. We highlight three major contingencies in the study of the signalling theory of dividends: taxes (distinct tax treatment for capital gains versus dividends), firms' investment policies (measured by the quality of investment opportunities or the level of free cash flow), and asymmetric distribution of information among investors (based on the presence of insider trading). Accordingly, we distinguish three approaches to the signalling theory of dividends: the tax-based signalling theory, the cash flow signalling theory (which Kaestner and Liu, 1998, also call the single-signal cash flow theory), and the information-based signalling theory (which they call the multiple-signal cash flow signalling theory).

(i) Tax-based signalling models

One of the factors that throws into question the signalling theory of dividends is the fact that managers expect a positive market reaction to an increase in dividends even though capital gains and other forms of remuneration for shareholders receive better tax treatment (Miller and Scholes, 1978). One explanation for this was provided by John and Williams (1985), who proposed a model in which the firms whose managers have better information on the firm's prospects may pay out larger dividends, since the increase in stock prices is large enough to compensate for the shortfall derived from the tax burden. In contrast, firms whose private information is unfavourable cannot afford to pay such a large dividend, since the tax burden will not be compensated for in any case, and investors will be worse off. Therefore, the signalling effect works adequately and the market is able to discriminate "bad" from "good" firms. The theory of the efficient signalling effect is also supported by Bernheim and Wantz (1995), who determined that high-quality firms do not need to pay very large dividends to prevent other firms from

mimicking them, since it is possible to convey the same information by paying out smaller dividends—the rationale being that for high tax rates, a smaller dividend may provoke a tax burden equally unaffordable for the investor. Similar results have been obtained by Fonseca (1997) for the Spanish market.

In a different context, Bajaj and Vith (1990) support a highly significant positive relationship between increments in dividends and stock prices, since firms may receive profits from the *clienteles effect*, previously defined by Kim, Lewellen, and McConnell (1979). According to them, stockholders may be categorised by distinct segments or clienteles according to their personal tax rates and different demands for liquidity. Thus, firms may encourage investors to buy the kind of shares that best fit their tax preferences, so the tax effect will not weaken the signalling effect of dividends. Hence, the tax-based signalling theory still supports the positive effects of dividend increases despite the tax effect as a consequence of either the high quality of the firm or the clienteles effect. Amihud and Murgia (1997) analyse dividend signalling in a context where dividends are not tax-disadvantaged and conclude that there should be another reason beyond taxation that makes dividends informative, leaving a door open for further analysis beyond the tax-based signalling theory. Evidence against this theory is also presented by Kalay and Michaely (2000).

(ii) The cash flow signalling hypothesis was first applied to dividends by Bhattacharya (1979), John and Williams (1985), and Miller and Rock (1985). More recently, Khang and King (2003) support it in the context of insider trading. Since managers normally have more information than outsiders, they have incentives to signal information to investors unambiguously when it contains good news. For instance, when a firm has high-quality investment opportunities, investors will react positively to an increase in dividend payouts even though it implies raising capital. The explanation is

that the combined effect of debt and dividends as control mechanisms may be positive for the firm. Further, a firm with valuable investment opportunities may have enough liquidity to finance its investments and also distribute a dividend, in which case the combined signal sent to the market is especially positive. In the same line of research we find Bhattacharya (1979), who states that when the returns obtained from its investment projects are not high enough to cover the dividend payout, the firm will increase its debt to compensate for the poor investment return. Therefore, the transaction costs will be lower for firms with high-quality investment projects than for the rest, and sometimes the reduction in transaction costs is high enough to prevent other firms from signalling misleading information, so that the firm can always efficiently signal its better quality compared with the other firms.

The cash flow signalling hypothesis also helps us analyse the problems of over- or under-investment. Miller and Rock (1985) observed that because the private corporate information held by insiders cannot be directly observed by outsiders, the largest firms tend to over-invest and pay out large dividends in order to ensure a level of equilibrium high enough to guarantee that other firms cannot afford to pay such a high dividend and thus will not send a similar signal.

Lang and Litzenberger (1989) hold that the impact on stock prices from a dividend increase will be more positive for firms without valuable investment projects than for those with valuable projects. The explanation is that a firm with no valuable projects that does not pay a dividend will be over-investing, and thus increasing risk and reducing the wealth of the firm. In this sense, an increase in dividends will be understood by the market as good news since the reduction in free cash flow causes a reduction in managers' discretion. Ambarish, John, and Williams (1987) also observe changes in a firm's dividend policy according to its level of investment opportunities.

From their point of view, mature firms usually signal their quality by paying out large dividends, while growth firms base their signalling policy on investments rather than on dividends. Therefore, they hold that dividend signalling should be interpreted according to the level of maturity of the firm, which may help, for instance, to explain increases in stock prices after the announcement of dividend omissions.

(iii) The information based signalling theory addresses the effects of dividend signalling on the distribution of information in the stock market. As expounded in papers such as those of Bhattacharya (1979), Miller and Rock (1985), and John and Williams (1985), this approach seeks to uncover the processes which make dividend announcements more informative, thus reducing information asymmetries in stock markets. Actually, when a firm seems undervalued in the light of the private information held by corporate insiders, they may use market signals to bring stock prices in line with the firm's intrinsic value. However, dividend signals alone may not be sufficient for managers to align stock prices with intrinsic values. Managers may use many other mechanisms to convey their private information to the market, including investment (Williams, 1988), share repurchases (Haush and Seward, 1993; Chhachhi and Davidson, 1997; Grullon and Michaely, 2002), and insiders' holdings (John and Mishra, 1990; John and Lang, 1991; Kaestner and Liu, 1998). The SEC requirement for corporate insiders to publicly report any transaction made with their own firm's shares makes insider trading a suitable signal of the managers' forecasts about their firm's future. John and Lang, however, do not consider the signalling effect of insider trading sufficient by itself. They analyse how the signalling effects of dividends may be nuanced by insider trading prior to the dividend announcement. Since John and Lang consider insider trading a signal of the quality of the firm's growth opportunities, their results are very close to those of the cash flow signalling theory. However, they provide the basis

for a new approach to the signalling theory of dividends, the multiple-signal theory of dividends, which concludes that dividend signalling is efficient only when combined with other signals, such as the level of insider trading.

Using a sample of dividend initiations, John and Lang conclude that these may not always be considered good news; instead, they should be interpreted in the light of any sales and purchases of a firm's shares realised by corporate insiders on the dates surrounding the dividend announcement. In fact, their results show that an increase in dividends can convey either good or bad news according to the direction of the insider transactions (i.e., sales or purchases). Thus, an unexpected re-initiation of dividends concurrent with insiders' purchases stimulates an increase in stock prices, while re-initiation of dividends concurrent with insiders' sales stimulates a decrease in stock prices. However, it is also true that no market reaction is detected for re-initiation of dividends announced by firms whose insiders choose not to trade. John and Lang (1991) furthermore complement their study by analysing how the signalling efficiency improves when taking into consideration the quality of a firm's investment opportunities (measured by Tobin's q). They conclude that dividend initiations preceded by insiders' purchases are positively received by the market, especially for mature firms; however, for firms having good growth expectations, the market reacts positively to insiders' net selling.

By contrast, Kaestner and Liu (1998), and Khang and King (2003) have obtained results opposite to those of John and Lang just cited. Kaestner and Liu analyse the use of multiple signals, but conclude that managers use dividends as the most efficient signal to convey information on a firm's future growth. Khang and King (2003) look more closely at the effect of dividend announcements on information asymmetries, as proxied by insider holdings, and find little evidence that changes in dividend policy affect such

asymmetries. The current study revisits this relationship between insider holdings and dividend changes in a stock market outside the US.

3. SAMPLE AND METHODOLOGY

Our sample was composed of announcements of dividend changes made by non-financial Spanish firms quoted on the Spanish Continuous Market (SIBE) for the period 1992-1996, where evidence was previously given on the profits obtained by insiders in their market transactions (Del Brio, Miguel and Perote, 2002). Overall, we recorded 624 dividend payments announced by 88 firms, 319 of which represent increases and 219 decreases. In the remaining 82 cases the dividend size remains the same. The dividend announcements used in the study were taken from a database containing historical records of dividend payments by firms quoted on the Spanish market published in the Daily Bulletin of the Madrid Stock Exchange. Other databases used were the records of daily stock prices for the SIBE, also published in the Daily Bulletin of the Madrid Stock Exchange, and the Interim Financial Reports obtained from the CNMV (Spanish National Securities Exchange Commission). Finally, insider trading data were collected from the Historical Records of Insider Trading Transactions compiled by the Department of Studies of the CNMV. Like the SEC in the US, the CNMV requires officers, directors, and large shareholders of all publicly held firms to report all their trading in their firms' stocks. Spanish insiders are required to report their trading within fifteen days following the trade. These daily records were used to construct a proxy of intensive insider trading according to the model started by Lorie and Niederhoffer (1968), who define a month of intensive net purchases as one in which there are at least three insider purchases and no sales, and a month of intensive net sales as one when there are at least three insider sales and no purchases. Months with neither case are

excluded from the analysis.

Next, we constructed a dummy variable that takes the value of 1 when there is intensive purchasing by insiders during the period (-60,-15) and takes the value of 0 when there are intensive sales by insiders in the same period. The underlying argument for this intensive criterion is that the intensiveness of the insider trading reflects the holding of private information more clearly than do individual trades. Furthermore, the sign of the intensive month (sales or purchases) allows us to gauge whether the private information held by the insiders contains bad or good news, respectively. In a month of intensive net purchases (or sales) the number of purchasers (or sellers) will have been bigger than the number of sellers (or purchasers), which implies that the insider has positive (or negative) insights regarding the firm's future evolution. However, as noted, the CNMV allows insiders fifteen days following the transaction date to report their trading, and in practice the insider signal usually does not reach the market before this time is up. For this reason, we measured the intensive insider trading that took place from 2 months to 15 days prior to the date of the dividend announcement [period (-60,-15)], so as to guarantee that the insider signal had reached the market.

There is an additional consideration: Presumably not all insider transactions take place as a consequence of the holding of private information. For this reason, we dropped from the sample any transaction made for non-informational reasons, i.e., those made as a consequence of inheritances, gifts, bonuses, acquisition disposals by conversion or exchange, and exercise of options and futures. Information on the motivation of insider trading was also extracted from the insiders' files remitted to the CNMV, where the insiders themselves report the reasons for their trading.

Furthermore, to isolate dividend announcements and insider transactions from other confounding events, we dropped from the sample all those announcements that

were concurrent with a relevant firm-related event, such as a merger, takeover, outstanding investment or divestment announcement, exclusion from negotiation, equity issues, bankruptcy, or firm dissolution.

The signalling theory focuses on the market reaction after the announcement of changes in dividend payments. Thus, we first analyse the signalling effect of dividends by themselves, and we then analyse the market reaction to changes in dividends surrounded by insider transactions, considering four distinct situations: increases (or decreases) in dividends combined with insider purchases, and increases (or decreases) in dividends combined with insider sales. The comparison of the market reaction to both signals allows us to analyse their role as transmitters of private information.

We applied the methodology of event studies, which means testing whether the abnormal returns on the day of the dividend announcement (day 0) are significantly different from zero. For the prediction period we took the period (-10, +10). The post-event period selected is not very long (+1, +10), following common practice in the study of dividend announcements. The pre-event period is (-10, -1), which is aimed at detecting any market reaction occurring prior to the announcement. For the estimation period, we selected the eighty days prior to day -10, that is (-90, -11).

To measure current returns, we used the difference of logarithms of closing prices for two consecutive days adjusted to dividends and subscription rights (equation 1)

$$R_{it} = \log\left[\frac{(P_{it} + d_{it} + sr_{it})}{P_{i,t-1}}\right] \qquad (1)$$

where R_{it} stands for firm *i*'s return in period *t*; P_{it} stands for the closing price of firm *i* in period *t*; d_{it} stands for dividend payments by firm *i* in period *t*; and sr_{it} stands for the subscription rights of firm *i* in period *t*.

To measure abnormal returns, we calculated the difference between current returns and expected returns, which were measured using a modified version of the market model, as shown in equations 2 and 3. We thus define expected returns as those that would have been obtained if no dividend had been paid.

The market model for each asset *i* may be written as in equation 2.

$$R_{it} = \alpha_i + \beta_i R_{mt} + u_{it}, \qquad (2)$$

where R_{it} and R_{mt} stand for asset and market return, respectively; u_{it} represents a random variable distributed as independent N$(0, \sigma_i^2)$, and α_i and β_i are the parameters of the model.

Conditional heteroskedasticity has been widely found when working with high-frequency financial data and has given rise to criticism of the effectiveness of the pure market model as a return-generating model (Sunder, 1980; Hsu, 1982; Bey, 1983; Hays and Upton, 1986). Therefore, efficient estimation methods must take such a phenomenon into consideration and thus some structure for conditional volatility must be assumed, the GARCH (1,1) model being the most widely used to capture conditional heteroskedasticity. For this purpose, we modify the market model by incorporating an accurate measure of volatility through a GARCH model, which also accounts for some specific characteristics of our study, such as multi-event studies, use of closing prices, and so on (for a previous analysis, see Del Brio, Miguel, and Perote, 2002).

The incorporation of conditional heteroskedasticity implies a transformation of the market model by allowing the variance to vary over time. We thus assumed that the innovation u_{it} in equation 2 is conditionally distributed as N$(0, \sigma_{it}^2)$, where σ_{it}^2 follows a GARCH process, as stated in equation 3.

$$\sigma_{it}^2 = \alpha_{0i} + \alpha_{1i}\sigma_{t-1}^2 + \alpha_{2i}u_{it-1}^2;\ \alpha_{ji} \geq 0, \forall j = 0,1,2 \text{ and } \alpha_{1i} + \alpha_{2i} < 1. \qquad \textbf{(3)}$$

For testing purposes, the portfolio test was also modified accordingly to this GARCH structure by incorporating the estimated conditional variances for each period. Abnormal returns were also calculated using the Scholes and Williams (1977) estimator to account for thin trading, a phenomenon clearly patent in our sample but whose influence does not seem to be significant, since the results obtained do not change our conclusions.

4. EMPIRICAL RESULTS

As stated above, the first step was to measure the market reaction to increases and decreases in dividends, considered as individual signals, as shown in Section 4.1. Next, we measured the market reaction to dividend announcements (Section 4.2) and finally we analysed the interaction of both signals with the level of valuable investment opportunities within the firm (Section 4.3).

4.1. Dividend signals

Previous evidence already exists on how investors react to dividend announcements in the Spanish markets (González, 1995; Pastor Llorca, 2000). However, we still chose to first replicate this analysis—not only to check whether the same reaction persists for the sample and period considered in this study, but also because it will allow us later to compare the market reaction before and after controlling for insider dealings. Thus, we first analyse the impact of dividend announcements for the overall sample, that is, without distinguishing among unchanged dividends or increases and decreases of dividends. As shown in Table 1, no significant reaction was detected for any date in the period (-10, +10), with the highest value of the t-statistic equal to 1.36. Second, we analysed the reaction to a sub-sample composed only of announcements of increases in dividends (hereafter, DI). Results are shown in Table 2. This provided new results since, when disaggregating the sample, we observed a positive market reaction to DI announcements on day 0, at the 5% significance level. Finally, as shown in Table 3,

when analysing the announcements of decreases in dividends (hereafter DD), we detected that the market reacts downwards, with values of the t-statistic significant at the 1% level for days 0 and 1, which reflects the value reduction motivated by the DD. Therefore, for the overall sample, positive and negative abnormal returns seem to cancel each other out, while significant abnormal returns are obtained when disaggregating into two sub-samples. We may thus conclude that, in principle, investors react more positively to unexpected DI announcements than to DD announcements. This evidence contradicts previous results obtained by Pastor Llorca (2000), who concluded that only DI announcements convey private information to the Spanish market.

4.2. Blending the signalling effects of dividend announcements and insider trading

Following the information-based signalling theory of dividends, we focus on the market reaction to dividend announcements when they are preceded by intensive insider trading. First, we consider any dividend change–without distinguishing between DI and DD—preceded by any kind of insider dealing (sales or purchases); second, we take the sub-sample of DI and disaggregate it according to whether DI are preceded by insiders' purchases or by insiders' sales.

By interacting dividend announcements and insider transactions, we obtain the following sample: In 63% of the 319 DI announcements, insiders traded intensively in their own firms within period (-60,-15), which represents 201 cases, versus 118 announcements not preceded by insider transactions. In view of these results, insider trading seems to be quite a common event in Spanish firms. Regarding the distribution between sales and purchases by insiders, the number of purchases is bigger than the number of sales, a fact that is correlated with both the bonanza years of the Spanish market and the higher number of DI announcements during the period under analysis.

Results for the market reaction to the blended signal are shown in Figure 1,

where we plotted the values of the modified t-statistic for the reaction of Spanish markets to DI and insider purchases and sales. As can be seen, when DI announcements are preceded by insider purchases, the market takes them as good news, since positive abnormal returns were detected on day 0 at the 1% significance level. However, we also detected a larger reaction on date -3, when the market seems to react to the insider trading signal. On the other hand, when DI are preceded by insider sales, the reduction in insider holdings is taken negatively by the market, which reacts downwards in the period (-5, -3), with significant t-statistics at the 1% level. The market reacts positively on date 0, although the t-statistic is significant only at the 10% level. Thus, our results provide corroboration that the change in the interpretation of the signal is conditional on the direction of the insider transaction, in line with the results previously obtained by John and Lang (1991) for the US market.

We then replicate the study for the sample of DD. Out of 219 DD announcements, insider transactions in the selected surrounding period took place in 67% of the cases (147, versus 72 announcements without insider transactions). Results are shown in Figure 2, where we plotted the t-statistics for DD announcements concurrent with insider purchases and sales. When DD announcements are preceded by insider purchases, the insiders' signal is taken as positive by the market, which reacts upwards in the period (-5, -3) at the 1% level, although no significant reaction is detected on day 0 when the DD is announced (the t-statistic still takes negative non-significant values). However, for insider sales, we detect a clear downward reaction from day -7 onwards—which also includes the day of the DD announcement. The accumulation of both signals on day 0 gives us a t-statistic of -2.35. However, on days -10 and -9 a significant positive return is detected in the market, which may imply that insiders are collecting their sales profits about ten days prior to the dividend

announcement.

Unlike Ambarish, John, and Williams (1987), we observe that the effects of alternative signals do alter the impact of dividend announcements. Furthermore, if we take into account the fact that insiders usually time their sales prior to bad news announcements and their purchases prior to good news announcements, we may conclude that in both cases, insiders' best returns are obtained when they time their transactions with when the company pays out dividends.

4.3. Market signals and the level of valuable investment opportunities within the firm

The cash flow signalling theory of dividends states that dividends are efficient signals of a firm's prospects, which could be proxied by the quality of its investment opportunities as measured by Tobin's q. The relationship between dividends and investment opportunities was clearly described by Miller and Rock (1985), who state that corporate directors have private information about the firm's future, on which both the dividend payout and the investment financing depend. However, that private information cannot be directly known by uninformed investors, which is why the best firms have to signal their good prospects by paying out dividends larger than the equilibrium level, thus fostering under-investment problems within the firm. In fact, what they are intending is to prevent lesser-quality firms from mimicking their dividend policy and thus getting noticed by the market.

Broadly speaking, the cash flow dividend signalling theory predicts that any DI announced by a firm having high-quality investment opportunities will be taken as good news by the market. The signal will be interpreted as when future growth expectations are good, firms tend to signal their good health by paying out higher dividends rather than saving them for self-financing. Circumstantially, this may generate under-

investment problems within the firm, as depicted by Yoon and Starks (1995), when valuable projects cannot be financed due to a shortfall in funds. When the firm has low-quality investment opportunities, however, the market reaction to DI announcements may vary. In this case, the market may take any DI as bad news, since payouts may reflect the firm's lack of valuable investment opportunities.

However, as seen before, in the context of the information-based signalling theory of dividends and specifically in the consideration of multiple signals, DI do not always convey good news. Moreover, DI by mature firms are not always taken as good news (as predicted by the free cash flow theory). In an attempt to determine which theory is more appropriate for explaining signalling mechanisms within Spanish markets, we took a further step and jointly analysed the signalling effects of both dividends and insider trading in conjunction with those investment opportunities.

To measure a firm's investment opportunities, we used Tobin q with the interpretation currently used in the literature: For values of Tobin's q greater than or equal to 1, a firm's investment opportunity set is classified as high-quality (hereafter, HQ firm), as stated before, and for Tobin's q values under 1, a firm's investment opportunity set is classified as low-quality (hereafter, LQ firm). Among the different proxies used in the literature to measure Tobin's q, we selected the one employed by Miguel and Pindado (2001), which combines the quality of the investment opportunities and the firm's capacity for self-financing rather than raising new capital.

For this purpose, two models were tested. Comparing the results for both models, we were able to determine whether the cash flow theory or the information-based signalling theory applies to the Spanish markets. Model (1) analyses how market reaction to dividend announcements varies according to whether the firm is classified as an HQ firm or an LQ firm. Therefore, it attempts to determine whether the dividend

signal allows the market to distinguish accurately the level of investment opportunities of the firm. Model (2) analyses the interaction of dividend announcements with the level of investment opportunities and insider trading, distinguishing between concurrent net insider seller and net insider buyer activity.

To estimate Model (1), we regressed abnormal returns on two binary variables which represent dividend announcements (DI versus DD) and investment opportunities (HQ versus LQ). (Note that due to the heterogeneity of the databases employed, sample size was reduced to 214 transactions.)

$$AR_i = \beta_1 + \beta_2 D_{1i} + \beta_3 Q_{1i} + \beta_4 D_{1i} Q_{1i} + u_i \qquad (1)$$

where ARi stands for the accumulative abnormal returns obtained by firm *i* on days (-10, 0), D_{1i} is a binary variable constructed to measure the sign of the change in the dividend payout announced by firm *i*, taking the value of 1 for DI, and the value of 0 for DD; Q_{1i} stands for a binary variable that takes the value of 1 for HQ firms (Tobin's q≥ 1), and takes the value of 0 for LQ firms (Tobin's q<1). Finally, u_i stands for the error term.

Model (2) incorporates the effects of insider trading into the analysis in order to check how the three variables interact.

$$AR_i = \beta_1 + \beta_2 D_{1i} + \beta_3 Q_{1i} + \beta_4 I_{1i} + \beta_5 D_{1i} Q_{1i} + \beta_6 D_{1i} I_{1i} + \beta_7 Q_{1i} I_{1i} + \beta_8 D_{1i} Q_{1i} I_{1i} + u_i \quad (2)$$

where I_{1i} represents the sign of the intensiveness of insiders' transactions, and therefore takes the value of 1 when days (-60,-15) have been net purchases months and 0 when they have been net sales months. The remaining variables are defined as in Model (1).

Results for Model (1) are shown in Table 4. Using the four possible

combinations of dividend sign and level of Q, four sub-equations were obtained:

DI, and HQ firms: $AR_i = \beta_1 + \beta_2 D_{1i} + \beta_3 Q_{1i} + \beta_4 D_{1i} Q_{1i} + u_i$

DI, and LQ firms: $AR_i = \beta_1 + \beta_2 D_{1i} + u_i$

DD, and HQ firms: $AR_i = \beta_1 + \beta_3 Q_{1i} + u_i$

DD, and LQ firms: $AR_i = \beta_1 + u_i$

Coefficients and t-statistics for the four sub-equations are shown in the first column of Table 6. Our results corroborate that the consideration of a firm's investment opportunities modifies the market interpretation of DI, but that actually not all DI are interpreted as good signals by the market. In fact, although DI announced by HQ firms (t = 6.61) are considered good news by the market, DI announced by LQ firms (t = -7.0) are taken negatively by the market, thus penalising dividend outflows in bad times and in mature firms, and therefore contradicting the position of the cash-flow signalling theory, which supports a positive reaction to DI in both cases. We may conclude that Spanish investors fear an erosion of the firm's future value if it pays outs dividends when growth opportunities are low. Moreover, investors appreciate neither the reduction of free cash flow nor the reduction in manager's discretion. Therefore, it seems that Spanish insiders are able to disregard misleading dividend signals sent by LQ firms, as shown by the fact that they do not positively react to DI when a firm's prospects are not good. Finally, we note that the Spanish market reacts positively to DD when the firm's income is devoted to financing valuable investment projects rather than being distributed.

To test the information-based signalling theory of dividends, Model (2) incorporates the effects of insider trading into Model (1). Results are shown in Table 5. Here there are eight possible sub-equations, depending on the value taken by each of the

three dummy variables under analysis. Coefficients and t-statistics are shown in the second column of Table 6. (Note that all the coefficients in the model are significant.) Insiders' purchases accompanied by DI announced by HQ firms are received positively by the market, as well as DI by LQ when insiders are also buying their own firm' shares (although at a less significant level). The market also reacts positively when HQ firms decrease their dividends in order to finance valuable projects, following the signal sent by insiders' acquiring company shares. For the rest of the cases, the market reaction is significant but negative.

Spanish investors show their preference for increased dividends as a signal by reacting negatively to DD in most cases. Stock prices react upwards after DD announcements only for HQ firms whose insiders are buying new shares; otherwise, DD are not welcome. It is also worth noting that Spanish markets react negatively to DI announced by HQ firms whose directors are net sellers (which again supports the hypothesis that dividend signals are modulated by insider trading signalling), and also to DI announced by LQ firms when insiders reduce their holdings.

Therefore, our main conclusion is that the best-quality firms signal their good health by increasing both dividend payouts and insider holdings. By contrast, it is difficult for mature but LQ firms to send positive signals: Although they can increase their expected dividends over their efficient level, investors perceive that the prospects of the firm are not good enough when insiders are not willing to invest in their own firms (contrary to the results of John and Lang, 1991 for the US market). All in all, Spanish directors should take into account the market reaction to dividends and insider dealings before designing their signalling policy. Therefore, our results support neither the cash flow signalling of dividends nor John and Lang's (1991) model. Instead, our main conclusion is that for the Spanish market, the insider trading signal seems to

overcome the dividend signal.

5. CONCLUSIONS

In view of the joint effects of insider trading and dividend announcements as market signals, we may conclude for the Spanish market that it is too simplistic to assume that the announcement of a DI will always be considered good news by the market. Accordingly, it is important to identify the situations where dividend theories would have predicted a direct relationship between market reaction and DI, but where the market reaction has been the opposite. In this sense, insider trading seems to be an efficient signal to combine with dividends when the firm is willing to provide investors with new relevant corporate information.

Summarising our results, three main conclusions can be drawn. First, the combined study of dividend announcements and insider trading may help us to better understand the behaviour of managers when disclosing firms' public information, and also to understand how investors interpret market signals. In this sense, the cash flow signalling theory alone seems insufficient to explain the information effects of dividend announcements. Second, quite often insiders seem to signal firms' future prospects by altering their holdings of the firms' capital rather than by disclosing changes in dividend payouts. Third, Spanish investors seem to prefer dividend payments to capital gains, since they react positively to DI, which contradicts observed trends in US markets and those in other countries where the utility of dividends and their information content has been questioned.

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Table 1: Market reaction to dividend announcements

For the overall sample of dividend announcements (dividend increases, dividend decreases, and unchanged dividends), abnormal returns (ARs) drawn by the GARCH_MM and $t_{\_GARCH}$ statistics are provided, together with the number of observations for each day in the event period.

ARS	$t_{\_GARCH}$	N_OBSERVATION	DAYS
0.04%	0.38	412	-10
0.02%	0.08	296	-9
0.13%	0.32	369	-8
0.20%	1.15	595	-7
0.02%	1.32	482	-6
0.13%	0.58	367	-5
0.10%	0.85	373	-4
0.08%	0.81	417	-3
-0.06%	-0.22	313	-2
0.10%	0.26	372	-1
-0.98%	1.24	624	0
-0.05%	-0.18	491	1
-0.10%	-0.24	352	2
-0.13%	-1.08	376	3
-0.04%	-0.43	420	4
0.04%	0.16	320	5
-0.14%	-0.37	394	6
0.00%	-0.01	585	7
0.12%	1.05	481	8
0.03%	0.08	361	9
-0.13%	-0.40	387	10

Table 2: Market reaction to increases in dividend payouts

For the sub-sample of announcements of dividend increases, abnormal returns (ARs) drawn by the GARCH_MM and $t_{\_GARCH}$ statistics for each day in the event period are provided. The number of observations is also shown.

ARS	$t_{\_GARCH}$	N_OBSERVATION	DAYS
0.11%	0.86	210	-10
-0.04%	-0.09	167	-9
0.12%	0.19	213	-8
0.13%	1.43	305	-7
0.07%	1.30	235	-6
0.25%	0.54	165	-5
0.02%	0.45	176	-4
0.10%	0.56	211	-3
-0.02%	1.08	176	-2
0.13%	0.35	208	-1
-0.94%	1.98	319	0
-0.01%	0.90	239	1
-0.07%	0.66	158	2
-0.09%	0.28	189	3
0.07%	0.54	216	4
-0.09%	0.52	178	5
-0.04%	-0.06	219	6
-0.01%	-0.02	290	7
0.06%	0.43	231	8
0.10%	0.14	164	9
-0.12%	-0.20	197	10

Table 3: Market reaction to decreases in dividend payouts

For the sub-sample of announcements of dividend increases, abnormal returns (ARs) drawn by the GARCH_MM and $t_{\_GARCH}$ statistics for each day in the event period are provided. The number of observations is also shown.

ARS	$t_{\_GARCH}$	N_OBSERVATION	DAYS
-0.04%	-0.22	151	-10
0.13%	0.29	86	-9
0.04%	0.11	101	-8
0.27%	1.03	206	-7
-0.13%	1.06	180	-6
0.31%	1.24	150	-5
0.12%	0.70	149	-4
0.23%	1.38	148	-3
-0.10%	-0.39	90	-2
0.12%	-0.18	109	-1
-1.14%	-2.45	219	0
-0.13%	-2.20	183	1
-0.20%	-0.47	144	2
-0.12%	-0.49	140	3
-0.13%	-0.55	146	4
-0.01%	-0.02	95	5
-0.37%	-0.94	121	6
0.07%	0.36	213	7
0.01%	0.04	180	8
0.03%	0.12	147	9
-0.18%	-0.73	141	10

Table 4: Results for Model (1). Interaction between dividend announcements and Tobin's q

Coefficients, t-statistics, and p-value are shown for Model (1), which regresses accumulative abnormal returns obtained by firm *i* on days (-10, 0) on two binary variables which represent dividend announcements and investment opportunities. $AR_i = \beta_1 + \beta_2 D_{1i} + \beta_3 Q_{1i} + \beta_4 D_{1i} Q_{1i} + u_i$. D_{1i} is a binary variable constructed to measure the sign of the change in the dividend payout announced by firm *i*, taking the value of 1 for a dividend increase, and the value of 0 for a dividend decrease. Q_{1i} stands for a firm's investment opportunity set; a firm is classified as high-quality or HQ for Tobin's q$\geq$ 1, and the firm is classified LQ for Tobin's q<1. Finally, u_i stands for the error term.

	COEFFICIENT	T-STATISTIC	P-VALUE
C	-2.061	-3.6	[.000]
dD1	2.371	0.603	[.548]
dQ1	0.871	1.48	[.140]
D1*Q1	0.647	0.69	[.357]
R^2: 0.080590; Adjusted-R^2: 0.067456			
F: 6.13578 [.001]			
Number of observations: 214			

Table 5: Results for Model (2). Interaction among dividend announcements, insider holdings, and Tobin's q

Coefficients, t-statistics and p-value are shown for Model (2), which regresses accumulative abnormal returns obtained by firm *i* on days (-10,0) on three binary variables which represent dividend announcements, investment opportunities, and directors dealings:

$AR_i = \beta_1 + \beta_2 D_{1i} + \beta_3 Q_{1i} + \beta_4 I_{1i} + \beta_5 D_{1i} Q_{1i} + \beta_6 D_{1i} I_{1i} + \beta_7 Q_{1i} I_{1i} + \beta_8 D_{1i} Q_{1i} I_{1i} + u_i$. The variable I_{1i} represents the sign of the intensiveness of insiders' transactions, and therefore takes the value of 1 when the two months prior to the announcements have been net purchases months and 0 when they have been net sales months. The remaining variables are defined as in Model (1).

	COEFFICIENT	T-STATISTIC	P-VALUE
C	-2.5300	-2.38	[.018]
dD1	-0.1262	0.11	[.915]
dI1	0.6560	0.52	[.602]
dQ1	1.4000	1.28	[.202]
D1*Q1	0.4300	0.35	[.728]
D1*I1	1.2960	0.21	[.833]
Q1*I1	1.7620	0.59	[.559]
D1*Q1*I1	0.2220	0.15	[.884]
F: 2.73852 [0.010]			
R^2: 0.085134; Adjusted-R^2: 0.054046.			
Number of observations: 214			

Table 6: Coefficients of the sub-equations of Model (1) and Model (2)

Coefficients and t-statistics (in parentheses) for the four sub-equations of model (1) are shown in the first column. The four sub-equations are as follows: Dividend increases, and HQ firms: $AR_i = \beta_1 + \beta_2 D_{1i} + \beta_3 Q_{1i} + \beta_4 D_{1i} Q_{1i} + u_i$. Dividend increases, and LQ firms: $AR_i = \beta_1 + \beta_2 D_{1i} + u_i$. Dividend decreases, and HQ firms: $AR_i = \beta_1 + \beta_3 Q_{1i} + u_i$. Dividend decreases, and LQ firms: $AR_i = \beta_1 + u_i$.

Coefficients and t-statistics (in parentheses) for the eighth sub-equations of model (2) are also displayed in the second column. The eight sub-equations are as follows: Dividend increases, HQ firms and insiders purchases: $AR_i = \beta_1 + \beta_2 D_{1i} + \beta_3 Q_{1i} + \beta_4 I_{1i} + \beta_5 D_{1i} Q_{1i} + \beta_6 D_{1i} I_{1i} + \beta_7 Q_{1i} I_{1i} + \beta_8 D_{1i} Q_{1i} I_{1i} + u_i$. Dividend increases, HQ firms and insiders sales: $AR_i = \beta_1 + \beta_2 D_{1i} + \beta_3 Q_{1i} + \beta_5 D_{1i} Q_{1i} + u_i$. Dividend increases, LQ firms and insiders purchases: $AR_i = \beta_1 + \beta_2 D_{1i} + \beta_4 I_{1i} + \beta_6 D_{1i} I_{1i} + u_i$. Dividend increases, LQ firms and insiders sales: $AR_i = \beta_1 + \beta_2 D_{1i} + u_i$. Dividend decreases, HQ firms and insider purchases: $AR_i = \beta_1 + \beta_3 Q_{1i} + \beta_4 I_{1i} + \beta_7 Q_{1i} I_{1i} + u_i$. Dividend decreases, HQ firms and insider sales: $AR_i = \beta_1 + \beta_3 Q_{1i} + u_i$. Dividend decreases, LQ firms and insider purchases: $AR_i = \beta_1 + \beta_4 I_{1i} + u_i$ Dividend decreases, LQ firms and insider sales: $AR_i = \beta_1 + u_i$.

MODEL (1)		**MODEL (2)**	
DIVIDEND INCREASE + HQ FIRM	0.555	DIVIDEND INCREASE + HQ FIRM +INSIDER PURCHASES	3.110
	(6.61)		(5.58)
DIVIDEND INCREASE + LQ FIRM	-2.462	DIVIDEND INCREASE + HQ FIRM + INSIDER SALES	-1.570
	(-7.00)		(-2.07)
DIVIDEND DECREASE + HQ FIRM	0.3091	DIVIDEND INCREASE + LQ FIRM +INSIDER PURCHASES	0.040
	(7.14)		(1.81)
DIVIDEND DECREASE + LQ FIRM	-2.06	DIVIDEND INCREASE + LQ FIRM +INSIDER SALES	-2.656
	(-3.66)		(-5.00)
		DIVIDEND DECREASE + HQ FIRM +INSIDER PURCHASES	1.288
			(5.58)
		DIVIDEND DECREASE + HQ FIRM + INSIDER SALES	-1.874
			(-2.79)
		DIVIDEND DECREASE + LQ FIRM +INSIDER PURCHASES	-0.130
			(-4.38)
		DIVIDEND DECREASE + LQ FIRM +INSIDER SALES	-2.530
			(-2.38)

Figure 1: T-statistic for dividend increases preceded by either sales or purchases by insiders

t_{GARCH} statistics are plotted for the event period (days -10, +10) for two sub-samples, dividend increases and insider sales (dotted line) and dividend increases and insider purchases (continuous line).

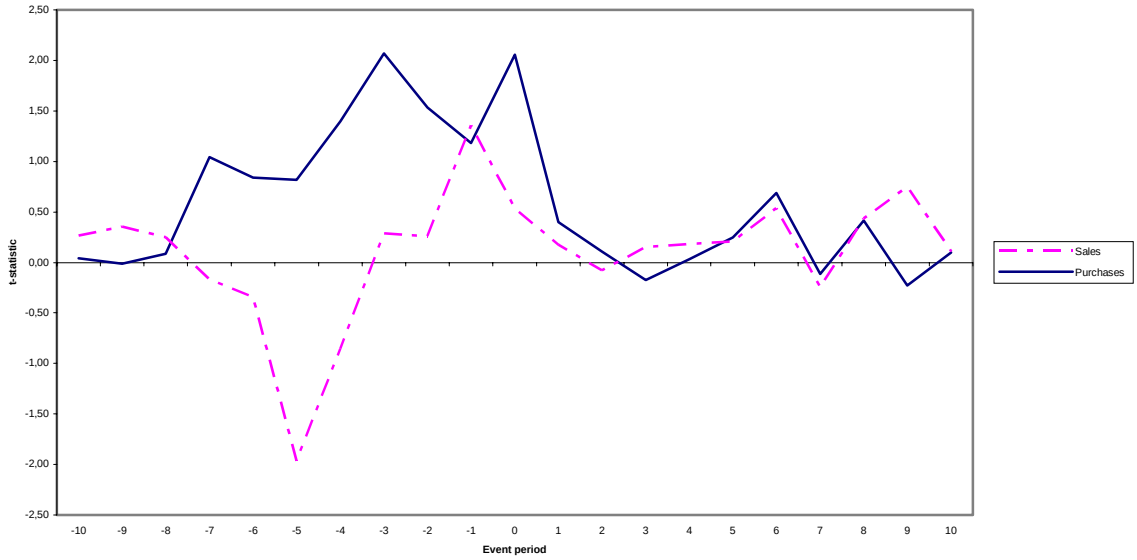

Figure 2: T-statistic for dividend decreases preceded by either sales or purchases by insiders

t_{GARCH} statistics are plotted for the event period (days -10, +10) for two sub-samples, dividend decreases and insider sales (dotted line) and dividend decreases and insider purchases (continuous line).