Dividend announcements signaling role in financial reporting certification*

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Abstract
This paper demonstrates a crucial signaling role for dividend announcements in the certification of corporate financial reporting. In light of the great financial reporting scandals of the 2000s, we adjust a price-diffusion model to asymmetric information friction, such that first-stage unexpected earnings announcements are conditionally absorbed by the market, depending on the corporate governance–level of the firm's transparency. In the second stage, the firm undertakes a complement dividend announcement-signaling act, certifying the first-stage earnings surprise announcement, in light of the firm's transparency. We conjecture theoretically and confirm empirically that the dividend announcement's cumulative abnormal return (CAR) is negatively and statistically significant, depending on the interaction between the unexpected earnings announcement's magnitude and the corporate transparency level. Hence, the study demonstrates a key role of dividend announcement, signaling the market about the initial financial reporting credibility. Specifically, low transparency level firms are incentivized to certify their preliminary financial reporting by dividend announcements, to alleviate the market hesitant absorption of their positive earnings surprise.

Keywords: Dividend announcements; earning announcements; signaling; firm transparency; corporate value

JEL classification: G32, G34, G35

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Introduction

One of the greatest puzzles in corporate finance is the role and value implications of dividend policy in the conduct of a publically traded company (Black, 1976). It is already common empirical knowledge that dividend announcements induce abnormal stock returns (Aharony and Swary, 1980; Healy and Palepu, 1988; Asquite and Mullins 1983; Brickley, 1983; Beer, 1993; Michaeli *et* al., 1995). Nevertheless, the exact reason for this excess return remains obscure.

Modigliani-Miller (1961) argue that, given perfect markets with full and symmetric information, dividend policy is irrelevant, as it simply represents a change in the location of funds from the company to its owners' pockets, without any real impact on overall shareholders' wealth. Hence, the vast majority of theories regarding the confounding value impact of dividends rely heavily on two real-world frictions: agency problem and asymmetric information.

The *agency problem* in dividend theory, also known as *the free cash flow hypothesis,* argues that insiders might wastefully use the corporation's free cash flow - either as perks or sub-optimal megalomaniac 'Empire State buildings' bearing negative NPV projects (Easterbrook, 1984; Jensen, 1986). The proponents of this approach postulate that dividend announcements or a positive change in the amount of distributed dividends reduces the management's spending capacity and also forces a greater reliance on external capital–perceived as having better monitoring abilities. Indeed, Lang and Litzenberger (1989) show that the market reaction to dividend increase in less profitable companies and firms with fewer business opportunities (Tobin's Q<1) is *ceteris paribus* significantly higher than in the case of firms with higher performance (Tobin's Q>1). However, Denis *et* al. (1994) demonstrate how

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this result might be a byproduct of a negative correlation between Tobin's Q and dividend yield, rather than a confirmation of the *free cash flow hypothesis*.

The second approach in explaining the purpose of dividends is based on the realistic assumption of asymmetric information. It is rather clear that a firm's management possesses the most extensive and highest quality of information regarding the company's real conduct, as well as the prospect of its future earnings. Therefore, management may use current dividend payouts as a signaling device to convey their expectations regarding the firm's future profitability (Modigliani-Miller, 1961; Ross, 1977; Bhattacharya, 1979, Tao *et* al., 2016). The dividend signaling theory regarding a company's future income implies that unanticipated dividend changes should be followed by a corresponding significant change in share value. Aharony and Swari (1980) found a significant upward (downward) shift in stock price around the announcement of a dividend increase (decrease). Moreover, the results are not sensitive to the chronological order of the dividend change or earning announcement, implying that dividends contain some unique information, beyond that of current earnings announcements. Supportive evidence of this notion can be found in Ogden (1994), Stevens and Jose (1992), Kato and Loewenstein 1995, and Lee (1995), all showing positive relations among dividend initiations, stock returns and the firm's future cash flows.

Michaely *et* al. (1995) provide a multidimensional inspection of the signaling approach by examining both the immediate and long-term impact of dividend changes. They find that dividend cut announcements have a greater negative magnitude – as large as double the positive effect of a dividend announcement. Furthermore, a similar pattern appears in regard to future long-run price returns, three years after the dividend omission or initiation announcement. Nevertheless, a different

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view is shown in Stern (1979), who points out that due to the loss of growth opportunities resulting from dividend initiations, dividends are not necessarily a positive signal of the company's future success.

In this study, we propose and test the validity of a novel explanation for the role of dividends via extensive approach, combining the above two main theories used so far, namely, agency problem and asymmetric information. The research is highly associated with the notion of Lev (2018), who postulates about the deteriorating usefulness of financial report information as well as Zhou, Simneti, and Green (2017) which demonstrate market enthusiasm for perusing additional information by showing how the adoption of discretionary high standard (*Integrated Report*) financial reporting reduces the cost of equity capital. At the beginning of the current millennium, several great accounting scandals occurred, i.e., the October 2001 Enron scandal, demonstrating classical examples of extensive unreliable reporting and inflated phony proclaimed profits. We hypothesize that since then, dividend announcements are also observed by the market, as an indicator of accuracy and reliability of corporate seasonal financial reports–specifically, income statements and unexpected earnings announcements. To test this approach, we propose a two-stage information-signaling model, in which the second-stage dividend announcement may reflect the credibility of the first-stage positive unexpected earnings announcements.

The theoretical model conjectures that if dividends serve as a signaling device certifying earning surprise, then a dividend announcement's cumulative abnormal return (CAR) should depend on the interaction between the unexpected earnings announcement's magnitude and the corporate transparency level. Hence, this study uniquely integrates dividends' signaling role with corporate transparency. The empirical analysis, conducted using a logistic transformation of the GIM index (where

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GIM indicates the governance measure of Gompers, Ishii, and Metrick, 2003) – a proxy for firms' transparency – demonstrates a key role of dividend announcement, signaling the market about the firm's initial financial reporting credibility. Corresponding to the model's predictions, we find a negative and highly statistically significant dividend signaling value effect, depending on the interaction between the unexpected earnings surprises and the level of corporate transparency. Moreover, the magnitude of this effect, its level of significance, and the regression's explanatory power dramatically increase for the least transparent companies announcing the highest earnings surprises. Thereby, firms with low transparency levels are incentivized to certify their initial financial reporting through the use of dividend announcements, to diminish negative value market reactions. We conduct a robustness check in the period prior to the accounting scandals' period. Aligned with our conjectures, we do not find any role for dividends announcements in the certification of financial reporting before the 2000's accounting scandals period.

The model and hypothesis

We consider a standard asset-pricing model, based on Merton's (1976) Jump-Diffusion model. Define S_t as the stock price at time t, such that the natural log of the stock return is $Ln\left(\dfrac{S_{t+1}}{S_t}\right) \sim N\left[\mu, \sigma^2\right]$. Denote the common knowledge parameter, $\psi \in [0,1]$, as the firm's transparency level and the reliability of its financial reports; where $\Psi = 1$ indicates the firm's full transparency, e.g., the firm credibly discloses corporate value impact events, and vice versa, for $\Psi = 0$. Define N_t as the number of jumps (shocks) at time t, governed by a Poisson process with a mean and variance of λ, such that $N_t \sim \text{Poisson}[\lambda]$. The model is based on a two-stage information shock

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process. In the first stage, certain informative events take place, i.e., the firm announces a positive unexpected earning, and the price reacts within the limits of the information's clarity and authenticity. Shortly after, in the second stage, the market receives a supportive signal allowing it to update the price accordingly. The model's time-line is depicted schematically as in Figure 1.
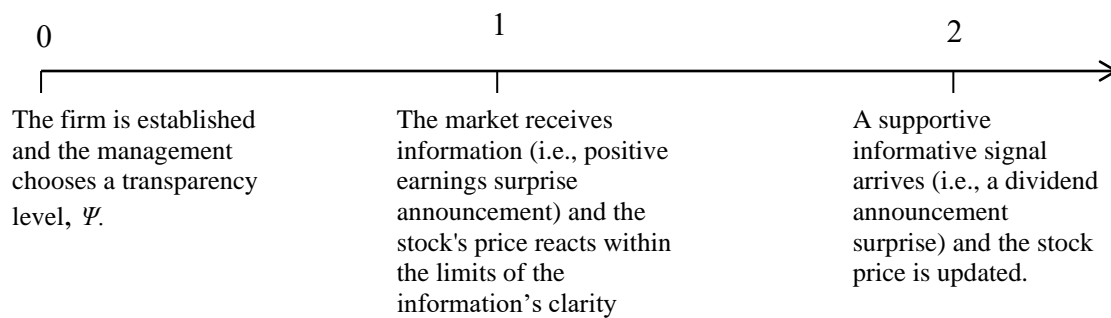
Figure 1. The model's timeline

We assume a two-stage information absorption relevant to positive unexpected announcements; hence, we define Y_{jt} as the magnitude of a new unexpected positive information item j at time t. For simplicity and *without the loss of generality,* we assume that for $Y_{jt} = \Delta > 0$. In addition, we conjecture that the final magnitude of the stock price shock also interacts with the firm's transparency level and the reliability of its announcements, i.e., those related to financial reporting information. The model hence considers the following stock-price adjustment mechanism to positive unexpected information events.

The dynamics of the first-stage positive information shock process (henceforth *FSPISP*) is presented as follows:

$$FSPISP = \int_{j=0}^{N_t} \psi \cdot \left(Y_{jt} \,\middle|\, Y_{jt} > 0 \right) dY_t \quad ; \tag{1}$$

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where N_t represents the number of positive events generated by a Poisson process –
Nt ~ Poisson[λ]; $\psi \in [0,1]$ is the level of firm transparency and the credibility of its
announcement; and Y_{jt} is the positive realization of the event, i.e., $\Delta > 0$. According
to *FSPISP*, any positive information will be absorbed by the market proportionally to
the transparency and credibility level (ψ) of its announcements, with complete and
immediate adaptation in the case of companies considered to have maximum
transparency ($\psi = 1$).

The economics of uncertainty, however, demonstrates that dividends may
serve as a signal for supplemental economic information; hence, we consider a
second-order adjustment effect. In the second stage, the corporation's management
provides a supportive signal for the first event–the dividend announcement. For
simplicity, we assume that the size of the dividend announcement equals the
unexpected positive earnings surprise. Observing the signal, the market updates its
stock-price expectation according to the second stage's positive information shock
process (*SSPISP*), represented by the following equation:

$$SSPISP = \int_{j=0}^{N_t} \left((1-\psi) \cdot \left(Y_{jt} \big| Y_{jt} > 0 \right) + \delta \left(Y_{jt} \right) \right) dY_t \; ; \qquad (2)$$

where the term $\delta \left(Y_{jt} \right)$ in the equation represents an *attribute function* of the given
supportive signal, which projects its value implications beyond the informative role
(of the first stage), and where all the other factors are defined as above.

The attribute function, $\delta \left(Y_{jt} \right)$, projects the corporate value effect of the signal in the
second stage beyond its signaling role *per se*. The attribute function is regarded as a
cost incurred by the signaling act, and hence is associated with crucial parameters of
the event type. For instance, in the case of a dividend announcement, the cost of
signaling is influenced by the company's ability to forgo cash, without undermining

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the firm's stability and ongoing business opportunities. Thus, the cost of signaling depends on the ratio of the total cash dividend to the available free cash, leverage, and firm market value. The attribute function expresses this dividend as a corporate credibility signal, which can exist, as long as there is a non-negative profit tradeoff between the dividend's signaling beneficial effect and its cost.

Using the two scenarios developed above, we are now able to introduce positive information events in the two-stage model as follows:

$$\frac{dS_t}{S_t} = \underbrace{\mu dt + \sigma dB}_{I} + \underbrace{\int_{j=0}^{N_t} \psi \cdot \left(Y_{jt} \middle| Y_{jt} > 0\right) dY_t}_{II, \, first \, stage, \, positive} + \underbrace{\int_{j=0}^{N_t} \left((1-\psi) \cdot \left(Y_{jt} \middle| Y_{jt} > 0\right) + \delta\left(Y_{jt}\right)\right) dY_t}_{III \, second \, stage, \, positive} . \quad (3)$$

The model, presented in Equation (3), uses a modified version of Merton's (1976) Jump-Diffusion model in order to incorporate the return drift and the Brownian motion of the Weiner process (denoted as term I) with the information effects of the firm's announcements (e.g., unexpected earnings surprise). This is then followed by some supportive informative events (e.g., an unexpected dividend announcement), both modeled as jump diffusions. The effect of the positive information two-stage signaling scenario is illustrated in terms II and III. The above model demonstrates the dividend's role as a signaling tool for the authenticity of financial reporting and firm stability. As such, we conjecture that dividend announcement should be especially considerable for companies with low transparency, presenting large earnings surprise, than for high transparency level firms.

Next, we depict the nature of the relationships among the dividend price reaction - appearing in the second phase – the firm's transparency level, and the magnitude of earnings surprise – appearing in the first stage.

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Corollary 1. The price impact of an unexpected dividend announcement signal in the second stage is negatively correlated with the firm's transparency level, ψ.

Proof:

In the case of a positive dividend signal in the second stage, substitute $Y_{jt} = \Delta > 0$, in the second stage of the positive shocks scenario (term III) and get:

$$\frac{dS_t}{S_t} = \mu dt + \sigma dB + \underbrace{\int_{j=0}^{N_t} \left((1-\psi) \cdot \left(Y_{jt} | Y_{jt} > 0 \right) + \delta \left(Y_{jt} \right) \right) dY_t}_{AR \text{ to positive dividend event}} =$$
$$= \mu dt + \sigma dB + \underbrace{(1-\psi) \cdot \Delta + \delta \left(Y_{jt} \right)}_{AR \text{ to dividend event}} = \mu dt + \sigma dB + \underbrace{\Delta - \psi\Delta + \delta \left(Y_{jt} \right)}_{AR \text{ to dividend event}} \quad . \quad (4)$$

Therefore, the price impact of the positive unexpected dividend, as reflected in the Abnormal Return (*AR*) shock term in Equation (4), is negatively correlated with the transparency level, ψ. In addition to the *AR's* negative correlation with transparency, it is also influenced by the cost of signaling, represented by the attribute function, $\delta \left(Y_{jt} \right)$.

Hence, we conclude that considering a positive unexpected earnings announcement and its derived dividend announcement as a signal for financial reporting authenticity, the dividend announcement's abnormal return *AR* (representing price shock reaction) is negatively correlated with the multiplication (joint effect) of firm transparency with earnings surprise magnitude $(\psi \cdot Y_{jt} = \psi \cdot \Delta)$ ■.

The above theoretical insights generate our main hypotheses:

Hypothesis 1. *If dividend announcements have a signaling role, indicating the reliability of a firm's positive unexpected earnings announcements, then its abnormal*

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return, AR, is negatively correlated with the interaction between the firm's transparency level and the magnitude of its earnings surprise.

Hypothesis 2. *The signaling effect of a dividend as reflected in the interaction between earnings surprise magnitude and the firm's transparency level is particularly considerable in cases of low transparency and large earnings surprises.*

Next, we empirically test the signaling role of dividend in light of firm transparency.

Methodology

The theoretical model provides a non-intuitive prediction regarding the relations among earnings surprise, firm transparency and the corporate value impact of dividend announcements. The value impact of the dividend signal in terms of abnormal returns is testable and can be operationalized using a standard event study. Hence, we use the stock's Cumulative Abnormal Returns over the customary Fama-French (1993) and Carhart four-factor model (Carhart, 1997) in a three-day time window, starting one day prior to the dividend announcement and ending one day following the announcement.[1] The earnings surprise magnitude can be measured using the Standardized Unexpected Earnings (henceforth SUE) provided by I/B/E/S. The SUE is the normalized deviation of reported earnings from the expected forecast as reflected in the analysts' consensus.

Somewhat less trivial to measure, however, is the firm's transparency level. Since, to the best of our knowledge, no direct transparency parameter exists it is essential to proxy the firm's transparency using another highly correlated variable. Therefore, we assume that a company's transparency is highly and positively

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[1] The model consists of Fama and French's (1993) four-factor model with benchmarks for size, market and book-to-market ratio, along with the Carhart's (1997) momentum factor.

correlated with the quality of its *Corporate Governance* (CG henceforth). Thus, we proxy for transparency level using the well-known *CG* quality index described in Gompers *et* al. (2003), also known as the GIM index.[2] Since the GIM index was last updated for the years 2004 and 2006,[3] we focus our analysis on the three-year time window starting in the beginning of 2004 and ending at the end of 2006. This time window is an adequate candidate for testing the informative role of dividend announcements in the context of financial reporting reliability because of its relative proximity to the major accounting scandals of the early 2000s. Yet, to test our model using the GIM index as a proxy for firm transparency, we first have to resolve the following technical matter: the GIM index support ranges from zero (representing the highest managerial accountability) to 24 (representing the lowest managerial accountability), whereas our model uses a transparency support ranging from zero (indicating non-transparent) to 1 (indicating full transparency). Therefore, in order to adjust the GIM index to our model's setting measure of transparency, ψ, we apply the following *Logistic function* transformation:

$$\psi_i = 2 \cdot \frac{1}{1 + e^{GIM}} \quad ; \tag{8}$$

where the multiplication of the logistic term by 2 satisfies that the ψ_i support ranges from zero to 1. Note that the logistic transformation postulates non-linearity of the perceived corporate transparency with respect to its CG quality, resulting from multiple facets relevant to firm transparency.

Another important methodological condition in the testing of the dividend signal's value effect regards its disentangling from the first-stage impact of an earnings announcement. To achieve this, we filter our sample to include only a

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[2] GIM, indicating initials: Gompers , Ishii, and Metrick.
[3] The GIM index was updated every two years until 2006.

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dividend announcement that occurred at least five days after the earnings announcement. Under efficient market conditions, a five-day period from the unexpected earnings announcement allows for complete price shock absorption, such that the subsequent second-stage dividend announcement reaction is not affected by the first-stage information.

Empirical analysis results and discussion

Data and sample description

Stock prices, firm characteristics data and quarterly dividends data for 2004 through 2006 are extracted from the CRSP (Center for Research in Securities Prices) and CRSP-Compustat-Merged (CCM). To refine the market reaction from the impact of the earnings announcement, the sample includes only dividend announcements occurring at least five days post the first-stage positive earnings announcements (e.g., similar to the methodology of Aharony and Swary, 1980). We also exclude the missing observation cases, either dividends and/or the company's financial information. The final sample consists of the 1,096 dividend announcements of 372 firms during the three-year time window of 2004-2006.

[Insert Table 1 about here]

Table 1 presents the descriptive statistics for the variables used in the analysis. CAR1P is the Cumulative Abnormal Return (*CAR*) percentage in a [-1,+1] day time window around the dividend announcement day, adjusted to Fama and French (1993) and Carhart's (1997) four-factor model, estimated one year prior to the dividend announcement day. Table 1 shows that sample's average reaction to the dividend announcement, beyond the effect of the earnings announcement, is only about six

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basis points, and actually not significantly different from zero. The median is even smaller (less than 3 bps) while the standard deviation equals 2.07 percent, which is about 79 times the median. This relatively high standard deviation also explains the significant difference between the lowest (-20.81) and highest (14.69) CARs, demonstrating the fact that the market's response to the announcement is positive in some cases, while in other cases it reflects market dissatisfaction with regard to the dividend announcement. This rather extensive market reaction span to dividend announcements reflects their informative diversity and value effect complexity.

The SUE variable denotes standardized unexpected earnings–measuring the gap between positive earnings surprise and the expected forecast (namely, the analysts' consensus), adjusted for the standard deviation of EPS forecasting surprise, all extracted from I/B/E/S. [4] The mean (average) standardized EPS forecasting positive surprise is 2.60, while the median equals 1.57, indicating positive skewness of EPS forecasting, resulting from analysts' conservative future earnings appraisal. The wide SUE span (0.02 to 53.50) generates the relatively high SUE standard deviation of 3.59.

Considerable diversity is also detected with regard to firm size, SIZE, represented by total assets (in millions of US dollars), as well as the LEV, denoting corporate financial leverage and measured as debt-to-equity ratio (all refer to the end of the considered years, 2004, 2005, 2006). The companies tend to be profitable, as is reflected in the mean quarterly income, INCOME, of $305 million USD, with a median of $86 million USD. Furthermore, the sample firms exhibit notable levels of free cash, CASH – a quarterly average of $3 billion USD. While the much smaller-in-

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[4] The SUE is computed as: $\mathrm{SUE}_t = \dfrac{\mathrm{EPS}_t\text{-}\mathrm{EPS}_t\left(\mathrm{forecast}\right)_t}{\sigma\left(\mathrm{EPS}_t\text{-}\mathrm{EPS}_t\left(\mathrm{forecast}\right)\right)}$; where EPS is the earnings per share measure, and $\sigma\left(\mathrm{EPS}_t\text{-}\mathrm{EPS}_t\left(\mathrm{forecast}\right)\right)$ is the standard deviation of the EPS forecasting surprise.

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scale free cash median equals $340 million USD, it is still high enough to adequately support the average level of total dividends, denoted as TD, which equals $113.9 million USD, with a median of only $23.42 million USD. The sufficient profitability of the sample's companies is aligned with an average Tobin's Q of 1.888 with a median of 1.541, indicating a satisfactory market performance for the vast majority of companies. The above sample's variability assures that, despite our dividend-announcement five days post earning-announcement filter, the sample reflects a wide dispersion of companies with various financial features.

Table 2 presents a comparative analysis of the above study's variables, assigned to polar transparency groups–namely, the most distant quality quintile groups of the proposed corporate governance measure.

[Insert Table 2 about here]

Specifically, the table shows an inferential analysis for the study variables' means difference, i.e., the mean differences of the CG quality's (GIM index) lowest and highest range quintiles representing the most and the least transparent firms, respectively. Most transparent companies seem to have considerably higher total assets ($19.39 billion USD) compared with the least transparent firms ($10.50 billion USD). They are also more profitable, hold higher cash balances and tend to distribute much higher cash dividends ($82.84 Vs $27.86 million USD). Higher efficiency of the most transparent firms is also demonstrated by their higher Q (denoting Tobin's Q). These findings, binding corporate transparency with higher efficiency, are not surprising in light of the documented evidence of such a relationship between companies' CG quality and profitability (see Gompers *et* al. 2003; Cremers and Nair, 2005).

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In light of the above, one should expect that the signaling role of dividend is less acute for more transparent companies, which tend to exhibit better financial display. Intriguingly, the market reaction to the dividend announcements of these transparent firms is on average negative (-0.0849%), while for the least transparent companies, such announcements yield a positive average CAR (0.0693%). Although this mean difference is statistically insignificant, it may imply that dividend initiation as a signaling device is less vital to highly transparent companies, whose financial reporting is perceived by the market as credible.

A final inspection of Table 2 reveals that the least transparent firms present only a slightly higher average (3.41) of EPS forecasting surprises (SUE) compared with the corresponding value of the transparent companies (3.08). The proximity of the corresponding earnings surprises is conceivable, given that SUE is a standardized value and therefore does not necessarily imply that the absolute magnitude of earnings surprises is similar in these very different transparency groups.

The above mean difference analysis results of all positive SUE sharpens when we repeat the polar analysis for highest earnings surprise, as described in Table 3, which focuses on the highest SUE quintile.

[Insert Table 3 about here]

The most transparent companies, besides being larger, still present higher quality financial indicators such as income, free cash flow, higher dividends and better Tobin's Q. Market reaction is still on average positive for the least transparent group (0.072%), and negative with regard to the most transparent one (-0.14%). This larger (compared to Table 2), yet insignificant, gap may be interpreted as higher market valuation for dividends paid by non-transparent companies when earning

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surprise is relatively high. Nonetheless, the reaction to dividend announcements seems to be influenced by various and complex factors.

An additional interesting facet is revealed when comparing the above attributes of the highest versus lowest transparency group with regard to cases of low earnings surprises. Table 4 presents the results of such a comparison, which focuses on the lowest SUE quintile.

[Insert Table 4 about here]

It appears that companies characterized by substantially different levels of transparency tend to be less different in their financial features in cases of small earnings surprise. Specifically, they are quite similar in size and their relatively similar higher leverage may induce better monitoring as well as more extensive media coverage. Yet, the most transparent firms continue to present higher dividends and better financial performance, as reflected in the significantly higher Tobin's Q. In contrast to the highest SUE mean difference analysis, the market reaction to the dividend announcement (CAR), when earnings surprises are in the lowest SUE, turn out to be negative for the least transparent firms (-0.3913%) and positive (0.0305%) for the most transparent ones.

The negative market reaction when the signaling aspect of the dividend is of lesser necessity seems to mainly incur signaling cost incorporating the financial risk of higher leverage (almost 80% above the average of the lowest transparent firms) and the dismissal of a higher portion of cash (more than 40% above the corresponding average). Nevertheless, the statistically insignificant polar transparency mean difference, i.e., between market reactions to dividend announcements, demonstrates

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once again the multifaceted nature of dividends' value effect as well as the need for more multi-dimensional analysis as shown in the next section.

Regression analysis

Panel regression analysis allows us to *ceteris paribus* detect the co-integrated impact of firm transparency and earnings surprise on the market's reaction to dividend announcements. Moreover, regression analysis's control variables incorporate the value effect of the variables, estimating the potential cost of the dividend announcement signal beyond its corporate benefit-signaling role *per se*.

Table 5 presents the OLS estimates of four regressions in which CAR1 (i.e., the four-factor model adjusted market reaction to the dividend announcement as defined above) appears as the dependent variable. All regressions use the same explanatory variables as listed in Table 5, all of which are adjusted to Industry and Quarter Fixed-Effects[5]. They differ, however, in the size and composition of sampling.

[Insert Table 5 about here]

Regression I presents the results for the full sample, Regression II refers to the highest quartile of earnings surprise (SUE), while regressions III and IV highlight the cases of the least and most transparent firms within the highest SUE quartile, respectively. We define the least (most) transparent companies to be those whose GIM score is greater (less) than 12 (roughly the midrange value of the GIM index)[6].

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[5] Industry fixed effects were obtained using Fama and French's (1997) industry classification.
[6] Recall that the GIM is inversely correlated with transparency.

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The prominent result appearing in these four models is the highly statistically significant negative impact of the interaction between the firm's transparency level and earnings surprise magnitude (see -51,620, P-value < 0.05, in Model III; -1.9491, P-value < 0.01, in Model IV), as predicted by the theoretical model. Apparently, the market participants process the information embedded in the dividend announcement in light of the firm's transparency, projecting the reliability of earnings surprise reporting. This finding, demonstrating dividends' signaling role, strongly supports our theoretical model's main conjecture, formulated in Hypothesis 1. This result is further reinforcement of the claim that under imperfect market conditions, such as asymmetric information, dividend signaling provides significant corporate value. While previous studies confirm dividends' signaling role, to the best of our knowledge, this is the first study illustrating dividend announcements as a signaling tool certifying financial reporting reliability of earnings surprise.[7]

The study results imply that in light of the great accounting scandals, i.e., Enron (2001), Worldcom (2002), Tyco (2002), HealthSouth (2003) Freddie Mac (2003) etc., starting in the early 2000s, the market's perception of the agency problem has expanded to include the possibility of unreliable earnings announcements reporting. The financial literature (e.g., Garen 1994, Bebchuk *et* al., 2002) warns against the negative consequences of non-diversified senior management, whose compensation scheme has been highly performance-dependent since the 90s. In this sense, our main finding may imply that the market tries to cope with this financial reporting unreliability problem by applying the 'show me the money' approach–observing dividends as necessary complementary items following financial reporting,

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[7] Aharony and Swari (1980), Michaely, Thaler and Womack (1995).

whose role is to signal the accuracy and reliability of first-stage earnings announcements.

The identified dividend's signaling role depends on both the size of SUE and the firm's transparency level. On the one hand, the negative sensitivity of the interaction term is fundamentally higher for the least transparent firms. However, given the non-linear nature of the GIM logistic transformation, it is important to examine the average CAR effect for high transparency firms versus low transparency firms. This essential inspection evolves from the simultaneous dependence of dividend announcements, as a certification mechanism of financial reporting, in both the magnitude of positive SUE and/or the level of firm transparency.

To examine this, we calculate for each model the average dividend announcement signaling effect, i.e., the magnitude of positive surprise (SUE) interacting with firm transparency (Logistic(CGI))[8]. As shown in the last row of Table 5, the average (negative) impact of this joint effect, $\hat{\beta}_5 * \overline{SUE} * \overline{Logistic(CGI)}$, is significantly higher in scale for the highest quartile SUE and the least (below median) transparent firms (e.g., see the average effect in Model III , is -0.952 compared to -0.007, -0.027 and -0.056 of Models I, II and IV, respectively). Moreover, regressions' explanatory power also follows this pattern of increasing with the magnitude of surprise and decreasing with the level of transparency (see R^2 in Model III , is 0.392 compared to 0.014, 0.050 and 0.114 of Models I, II and IV, respectively).

To complete the analysis and examine dividends' certification role of earning announcements, we conduct a similar overall analysis as in Table 5 for the lowest

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[8] For each estimated model, we calculate $\beta_5 * \overline{SUE} * \overline{Logistic(CGI)}$ (the bar indicates the average figure within the group) according to each model's estimated coefficient and corresponding sample.

SUE quartile. In accordance with the suggested theory, the signaling role of dividends is negligible in the case of the lowest earning announcements. The results of this type of estimation are shown in Table 6. Note that, in contrast to the findings of Table 5, if the SUE is the lowest, none of the interaction term coefficients are statistically significant (Models II, III, and IV), and furthermore the models' explanatory power deteriorates (see the lower levels of R^2 in Table 6 than those of Table 5).

[Insert Table 6 about here]

The above findings support our second hypothesis (Hypothesis 2), which claims that dividends' signaling effect are particularly considerable within low transparency companies announcing large earnings surprises, and of lesser importance in the case of highly transparent companies declaring low earnings surprises.

The overall results support the claim that dividends are used and perceived as a financial reporting credibility signaling device. This creates an interest to explore the cost of this signaling tool as well. Dividends might bear costs resulting from the waiver of free cash intended to utilize business opportunities, thereby harming potential growth, and exposing the firm to the cost of raising additional capital. Moreover, dividend announcements is an indication of approaching cash diminish which effects leverage, and might destabilize the firm's corporate going concern status.

Recall that the model's two-stage information analysis includes the function $\delta\left(Y_{jt}\right)$ in the second stage, in order to incorporate dividends' signaling potential cost considered by firm size (SIZE), leverage (LEV), the ratio of the total dividend to available free cash (DIVpCASH), and firm market-to-book value (Q), all appearing in our regression model as control variables. Interestingly, the vast majority of the

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respective coefficients of these signaling cost variables turn out to be insignificant in almost all cases. The only significant cost-oriented variable, which is the ratio of the total dividend to free cash (DIVpCASH), receives the expected negative sign solely in the case of low (below median) transparency firms declaring high earnings surprises (see Model III in Table 5). The negative and significant contribution of the DIVpCASH component in this segment is comprehensible, given that less transparent companies tend to have considerably less free cash in their balance sheets (see Tables 2 and 3). Apparently, the market expresses concern regarding the consequences of waiving cash under relatively low cash conditions.

Intriguingly, when it comes to highly transparent companies the effect of DIVpCASH to overall market response is reversed, and turns out to be positive. The same above logic can also be used here. Recall that highly transparent companies tend to have significantly higher cash balances (compared to less transparent companies); given that under high transparency conditions signaling through dividends is much less valued, we can perceive this byproduct result as additional support for *the free cash flow hypothesis*. Thus, when earnings are above what is expected and cash balances are high enough, shareholders prefer to get a higher portion of free cash flows rather than bear a risk resulting from wasteful and non-economic use of this cash.

Nevertheless, the reverse effect of the very same argument with regard to the different transparency groups once again illustrates the multifaceted attitude of the market towards dividend announcements. Furthermore, we should not disregard the relatively low explanatory power of the more general I and II regressions, i.e., rather low R-squared levels. Presumably, the value effect of the dividend announcement is

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influenced by additional, diverse (e.g., psychological and unobservable) factors and forces. Thus, the dividend puzzle, although gradually being resolved, still remains.

Robustness check: does the phenomenon exist before the 2000's?

Our main premise was that the major accounting scandals, which occurred at the beginning of the millennium (i.e., 2001-2003), have changed investor's perceptions towards corporate financial reporting, depending on the corporate's transparency. Hence, we conjecture that this shift in market alertness has triggered a signaling process in which dividends became a means of certification of financial statements credibility. Accordingly, we expect the identified relation between (post-unexpected earning surprise) dividends' announcement and firm transparency on market reaction to be much weaker or even non-existing in the years prior to 2000s.

In order to examine this hypothesis, we repeat the very same analysis conducted in the post-accounting scandals period, in the three years window period of 1997-1999 – prior the accounting scandals. The empirical analysis of this subsample is shown in Table 7.

[Insert Table 7 about here]

Table 7 exhibits the results of OLS regressions explaining the market reaction to the announcement (CAR) with the same explanatory variables used before. Model I refers to the estimation based on the full 1997-1999 sample. As expected, the coefficient of the interaction between the magnitude of earning surprise (*SUE*) and the proxy for the level of corporate transparency (*Logistic CGI*) is insignificant (see Model I: -0.0273, P-value > 0.10). We further search for the phenomenon in the

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results of Model II which focuses on the highest SUE quartile and should reflect higher incentive to signal the reliability of earnings announcement. Likewise, the coefficient of the interaction variable is insignificant (see Model II: -3.900, P-value > 0.10). Finally, a similar conclusion emerges from the inspection of Model III, which concentrates on the highest earnings surprises quartile (SUE) and the lowest transparency companies (see Model III: 1736.531, P-value > 0.10). Model III segment is supposed to represent firms with the highest motivation for signaling – e.g., the segment that yielded the most prominent transparency-value effect in the years subsequent to the great financial scandals. However, the results clearly demonstrate that in the prior-accounting scandals time window there is no statistically significant effect of dividend announcement in the certification of financial reporting. Aligned with our conjectures, the phenomenon of dividend announcement signaling the credibility of financial statement throughout dividend announcement does not exist in the period prior to the 2000's.

Summary and Conclusions

The debate regarding dividends' irrelevancy may hold in a financial setting absent from financial and economic frictions. However, market frictions, such as information asymmetry, may generate an important signaling role for dividend announcements. The major financial reporting scandals of the 2000s are considered an information asymmetry friction milestone of non-reliable financial reporting. In this paper, we shed important light on the role of dividend announcements as a signaling device, confirming financial reporting credibility. To this end, we uniquely link corporate transparency, measured by corporate governance quality (Logistic GIM index), together with dividend announcements' analysis.

We incorporate the corporate level of firm transparency into a price diffusion model, using logistic transformation on the well-known corporate governance quality level, namely the GIM index. We disentangle the value effects of a first-stage unexpected earnings announcement, followed by a second-stage dividend announcement. The value effect of the dividend announcement is translated into a (cumulative) abnormal return, reflecting, on the one hand, the corporate value benefit of the dividend signal and, on the other hand, the potential cost of the signaling. The theoretical model predicts that if corporations use dividends as a signaling device indicating financial reporting credibility, the cumulative abnormal return (CAR) around the dividend event should negatively depend on the interaction between the unexpected earnings surprise magnitude and the level of corporate transparency. Additionally, we propose that the effect of such a signaling mechanism is particularly considerable in cases of low transparency and large earnings surprises where the benefits outweigh its potential financial cost.

The empirical analysis supports the likelihood that the major fraudulent accounting events, occurred in the early years of the 2000's, have changed the market perceptions towards corporate financial reporting. Accordingly, the analysis confirms that dividends have a crucial second-stage signaling role in the certification of the first-stage financial reporting, i.e., unexpected earnings surprises. Aligned with the model's predictions, we find a negative and highly statistically significant dividend signaling value effect, depending on the interaction between the unexpected earnings surprise and the level of corporate transparency. The coefficient magnitude of the effect and level of significance, along with the regressions' explanatory power, increase in the cases of less transparent companies announcing relatively large earnings surprises. Moreover, the average negative magnitude effect of market

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reaction to the dividend announcement is substantially higher for the less transparent group of firms.

We conclude that the motivation for using dividends as a signal for certifying positive earnings announcements is higher for the least transparent firms. This motivation is reflected from (*1*) the considerably higher and negative sensitivity of the least transparent firms for a given incremental rise in the transparency level; (*2*) the fact that, following positive earnings announcements, on average, the market reaction to the least transparent firms' dividend announcements is lower by about 0.9% compared with the most transparent firms. It seems that the market reaction to positive earnings surprise is rather hesitant and non-exhaustive, due to perceived insufficient firm's transparency. Thus, to alleviate the slow market absorption of the positive earnings surprise, the least transparent firms use dividend announcements as a signaling device to certify the credibility of their first-stage financial reporting, thereby indicating cash flow credibility in spite of their low transparency identity.

In this sense, it seems that the corporate value benefits of dividend announcements as a signaling device exceed the costs, especially in light of high earnings surprises and for firms with low transparency levels. Yet, the analysis limitation shows that further financial relations could be incorporated to improve the explanatory power of dividends' corporate value effects.

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Table 1. Descriptive statistics of the full sample

Firm and Dividend Characteristics. The table presents descriptive statistics of the sample's 1,096 dividend announcements of 372 firms, following positive unexpected earning announcements during 2004, 2005 and 2006. CAR1P is the percentage of the Cumulative Abnormal Return from one day before a dividend announcement to one day after, relative to the four-factor model of Fama and French (1993) and Carhart (1997), estimated one year prior to the dividend announcement event; SUE is the Standardized Unexpected Earnings [in terms of number of standard deviations of surprise] taken from I/B/E/S; SIZE is a firm's total assets in accordance with the corresponding quarterly report; LEV is a firm's debt-to-equity ratio in accordance with the corresponding quarterly report; INCOME is the quarterly income; CASH is the amount of cash on the quarterly balance sheet ; TD is the total quarterly dividend; Q is the firm's Tobin's Q according to the corresponding quarterly report. All absolute measures are in millions of US dollars.

Variable	Mean	Median	Standard deviation	Minimum	Maximum
CAR1P	0.0606	0.0263	2.07	-20.81	14.69
SUE	2.60	1.57	3.59	0.0023	53.50
SIZE	36,087	6,837	136,105	38	1,459,737
LEV	3	1.70	5.95	0.07	41.13
INCOME	305	86	708	-1253	5945
CASH	3000	340	16,276	0.66	210,265
TD	113.90	23.42	314.62	0.18	2,806
DIVpCASH	0.3150	0.0701	1.866	0.00066	36.6838
Q	1.888	1.541	1.234	0.9206	16.802

Table 2. Mean difference tests for the most versus the least transparent firms for all positive SUE

Mean difference in major variables between firms in the lowest quintile range of the GIM corporate governance index (the most transparent) and firms that belong to the highest quartile range (the least transparent). DIVpCASH is the dividend total amount divided by the firm's cash; all other variables are as defined in Table 1. *, ** and *** indicate that the coefficient's mean difference is significantly different from zero at a 10%, 5% and 1% significance level, respectively.

| Variable | *Full Sample: Positive SUE* | | | |
	Highest GIM quartile: the least transparent	*Lowest GIM quartile: the most transparent*	*p-value of t test for mean difference*	*p-value of Wilcoxon test for mean difference*
CAR1P	0.0693	-0.0849	0.6583	0.8024
SUE	3.41	3.08	0.6941	0.1671
SIZE	10,509	19,399	0.0165***	0.5857
LEV	2.49	3.31	0.1396	0.6698
INCOME	118	387	0.0015***	0.0828*
CASH	389	1,919	<.0001***	0.1371
TD	27.86	82.84	0.0011***	0.0777*
DIVpCASH	0.1441	0.1738	0.5375	0.0048***
Q	1.683	2.096	0.0045***	0.1418
Obs.	68	87		

Table 3. Mean difference tests for the most versus the least transparent firms in the highest SUE quartile

Mean difference in major variables between firms in the lowest quartile of the GIM corporate governance index (the most transparent) and firms that belong to the highest quartile (the least transparent). DIVpCASH is the dividend total amount divided by the firm's cash; all other variables are as defined in Table 1. *,** and *** indicate that the coefficient's mean difference is significantly different from zero at a 10%, 5% and 1% significance level, respectively.

	Full Sample: Positive SUE/ Highest SUE Quintile			
Variable	*Highest GIM quartile: the least transparent*	*Lowest GIM quartile: the most transparent*	*p-value of t test for mean difference*	*p-value of Wilcoxon test for mean difference*
CAR1P	0.0724	-0.1438	0.6770	0.9662
SUE	4.98	5.92	0.5271	0.0802*
SIZE	8,730	24,446	0.0100**	0.3038
LEV	2.08	2.85	0.3518	0.2581
INCOME	110	503	0.0076***	0.8248
CASH	376	2,476	0.0013***	0.0160**
TD	24.80	110.88	0.0029***	0.6411
DIVpCASH	0.1430	0.1649	0.7634	0.0282**
Q	1.810	2.320	0.0304**	0.2504
Obs.	42	39		

Table 4. Mean difference tests for the most versus the least transparent firms in the lowest SUE quartile

Mean difference in major variables between firms in the lowest quartile of the GIM corporate governance index (the most transparent) and firms that belong to the highest quartile (the least transparent). DIVpCASH is the dividend total amount divided by the firm's cash; all other variables are as defined in Table 1. *,** and *** indicate that the coefficient's mean difference is significantly different from zero at a 10%, 5% and 1% significance level, respectively.

| Variable | *Full Sample: Positive SUE/ Lowest SUE Quintile* | | | |
	Highest GIM quartile: the least transparent	*Lowest GIM quartile: the most transparent*	*p-value of t test for mean difference*	*p-value of Wilcoxon test for mean difference*
CAR1P	-0.3913	0.0305	0.5717	0.9691
SUE	0.42	0.36	0.3941	0.3458
SIZE	13,521	10,934	0.6399	0.0883*
LEV	4.43	3.90	0.7539	0.4182
INCOME	83	187	0.2954	0.3362
CASH	374	890	0.2604	0.4182
TD	31.01	48.74	0.4783	0.0212**
DIVpCASH	0.2039	0.2477	0.7634	0.4635
Q	1.266	1.714	0.0125**	0.0303**
Obs.	9	25		

Table 5. The value effect (CAR) of the dividend announcement and its relation to the firm's transparency and highest earnings surprises

The table presents the OLS regression results of the following model:

$$CAR1P_i = \beta_0 + \beta_1 \cdot \ln SIZE_i + \beta_2 \cdot LEV + \beta_3 \cdot Q + \beta_4 \cdot DIVpCASH +$$
$$\beta_5 \cdot SUE * Logistic(CGI) + \delta_{IND} \cdot DumIndustry + \tau_{QRT} \cdot DumQuarter + e_i$$

CAR1P is the Cumulative Abnormal Return in percentages in a [-1,+1] day time window around the dividend announcement day, relative to the four-factor model of Fama and French (1993) and Carhart (1997), estimated one year prior to the dividend announcement day; SIZE is the natural logarithm (Ln) of the total assets; LEV is a firm's debt-to-equity ratio; the Q ratio is the firm's Tobin's Q; DIVpCASH is the ratio of the total quarterly dividends to the firm's available cash in the current quarter; SUE is the Standardized Unexpected Earnings taken from I/B/E/S; Logistic (CGI) is the adjusted *Logistic* function of the GIM index, representing the transparency level, ψ, in the range of 0 (non-transparent) to 1 (fully transparent); the SUE*Logistic (CGI) is SUE multiplied by the Logistic (CGI). $\hat{\beta}_s * \overline{SUE} * \overline{Logistic(CGI)}$ is the product of the estimated coefficient, β_5, and averages of SUE and Logistic (CGI) in the reference sample. Regression I refers to the full sample, Regression II to the highest quartile of earning surprises (SUE), Regression III refers only to cases which satisfy low transparency (GIM above 12) and high surprise (highest SUE quartile), while Regression IV is restricted to high transparency (GIM below 12) and high surprise (highest SUE quartile) . All regressions include Industry and quarterly fixed effects. Industry fixed effects were obtained using Fama and French's (1997) industry classification. T-statistics, corrected for heteroscedasticity using the White method, are presented in parentheses. ** and *** indicate that the coefficient is significantly different from zero at a 5% and 1% significance levels, respectively.

	Model I Full Sample	**Model II** Highest SUE	**Model III** H.SUE: Lowest ψ	**Model IV** H.SUE: Highest ψ
**Variable**				
Ln(Size)	0.01733	0.0271	0.1162	0.0308
	(0.42)	(0.34)	(0.25)	(0.34)
LEV	-0.0093	-0.0068	0.0590	-0.0138
	(-1.11)	(-0.35)	(0.45)	(-0.71)
_Q_	-0.1443	-0.0561	0.5312	-0.1306
	(-1.38)	(-0.70)	(0.61)	(-1.46)
DIVpCASH	0.0261	0.4422***	-3.0716***	0.6149***
	(1.11)	(2.41)	(-2.43)	(2.85)
SUE*Logistic(CGI)	-0.9222**	-1.5263***	-51,620**	-1.9491***
	(-2.12)	(-2.95)	(-2.12)	(-3.51)
Quarterly fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Obs.	1,096	275	41	202
R^2	0.0142	0.050	0.392	0.1143
$\hat{\beta}_s * \overline{SUE} * \overline{Logistic(CGI)}$	-0.007	-0.027	-0.952	-0.056

Table 6. The value effect (CAR) of the dividend announcement and its relation to the firm's transparency and lowest earnings surprise

The table presents the OLS regression results of the following model:

$$CAR1P_i = \beta_0 + \beta_1 \cdot \ln SIZE_i + \beta_2 \cdot LEV + \beta_3 \cdot Q + \beta_4 \cdot DIVpCASH +$$
$$\beta_5 \cdot SUE * Logistic(CGI) + \delta_{IND} \cdot DumIndustry + \tau_{QRT} \cdot DumQuarter + e_i$$

CAR1P is the Cumulative Abnormal Return in percentages in a [-1,+1] day time window around the dividend announcement day, relative to the four-factor model of Fama and French (1993) and Carhart (1997), estimated one year prior to the dividend announcement day; SIZE is the natural logarithm (Ln) of the total assets; LEV is a firm's debt-to-equity ratio; the Q ratio is the firm's Tobin's Q; DIVpCASH is the ratio of the total quarterly dividends to the firm's available cash in the current quarter; SUE is the Standardized Unexpected Earnings taken from I/B/E/S; Logistic (CGI) is the adjusted *Logistic* function of the GIM index, representing the transparency level, ψ, in the range of 0 (non-transparent) to 1 (fully transparent); the SUE*Logistic (CGI) is SUE multiplied by the Logistic (CGI). Regression I refers to the full sample, Regression II to the lowest quartile of earning surprises (SUE) , Regression III refers only to cases which satisfy low transparency (GIM above 12) and low surprise (lowest SUE quartile), while Regression IV is restricted to high transparency (GIM below 7) and low surprise (lowest SUE quartile) . All regressions include Industry and quarterly fixed effects. Industry fixed effects were obtained using Fama and French's (1997) industry classification. T-statistics, corrected for heteroscedasticity using the White method, are presented in parentheses. ** and *** indicate that the coefficient is significantly different from zero at a 5% and 1% significance levels, respectively.

	Model I Full Sample	Model II Lowest SUE	Model III L.SUE: Lowest ψ	Model IV L.SUE: Highest ψ
Variable				
Ln(Size)	0.01733	0.10241	-0.41387	0.11591
	(0.42)	(1.18)	(-0.71)	(1.21)
LEV	-0.0093	0.00838	-0.31938	0.01983
	(-1.11)	(0.22)	(-1.04)	(0.47)
Q	-0.1443	-0.01223	-2.46355	0.13058
	(-1.38)	(-0.07)	(-1.21)	(0.65)
DIVpCASH	0.0261	0.0847***	1.63714	0.0843***
	(1.11)	(2.95)	1.46	(3.22)
*SUE*Logistic(CGI)*	-0.9222**	0.71633	1,088,989	-9.80607
	(-2.12)	(0.06)	(1.01)	(-0.8)
Quarterly fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Obs.	1096	272	40	188
R^2	0.0142	0.0455	0.1559	0.0881

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Table 7. The value effect (CAR) of the dividend announcement and its relation to the firm's transparency and earnings surprises, in the period 1997-1999

The table presents the OLS regression results of the following model:

$$CAR1P_i = \beta_0 + \beta_1 \cdot \ln SIZE_i + \beta_2 \cdot LEV + \beta_3 \cdot Q + \beta_4 \cdot DIVpCASH +$$
$$\beta_5 \cdot SUE * Logistic(CGI) + \delta_{IND} \cdot DumIndustry + \tau_{QRT} \cdot DumQuarter + e_i$$

CAR1P is the Cumulative Abnormal Return in percentages in a [-1,+1] day time window around the dividend announcement day, relative to the four-factor model of Fama and French (1993) and Carhart (1997), estimated one year prior to the dividend announcement day; SIZE is the natural logarithm (Ln) of the total assets; LEV is a firm's debt-to-equity ratio; the Q ratio is the firm's Tobin's Q; DIVpCASH is the ratio of the total quarterly dividends to the firm's available cash in the current quarter; SUE is the Standardized Unexpected Earnings taken from I/B/E/S; Logistic (CGI) is the adjusted *Logistic* function of the GIM index, representing the transparency level, ψ, in the range of 0 (non-transparent) to 1 (fully transparent); the SUE*Logistic (CGI) is SUE multiplied by the Logistic (CGI). Regression I refers to the full sample, Regression II to the highest SUE quartile of earning surprises (SUE), Regression III refers to Quartile of the lowest transparency and highest SUE. All regressions include Industry and quarterly fixed effects. Industry fixed effects were obtained using Fama and French's (1997) industry classification. T-statistics, corrected for heteroscedasticity using the White method, are presented in parentheses. ** and *** indicate that the coefficient is significantly different from zero at a 5% and 1% significance levels, respectively.

	Model I Full Sample	Model II Highest SUE	Model III H.SUE: Lowest ψ
Variable			
Ln(Size)	0.0239	0.1489	-0.0247
	(0.20)	(0.85)	(-0.07)
LEV	0.0818	0.1015	0.3035
	(1.45)	(1.89)	(1.90)
Q	-0.0628	0.0664	-0.1048
	(-0.48)	(0.32)	(-0.33)
DIVpCASH	0.0080	0.0064	0.0229
	(0.78)	(0.67)	(1.19)
*SUE*Logistic(CGI)*	-0.0273	-3.9000	1736.531
	(-0.01)	(-1.26)	(0.44)
Quarterly fixed effect	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes
Obs.	520	130	130
R^2	0.0241	0.0856	0.0602