Applied Financial Economics, 2006, **16,** 535–549

Corporate scandals and the market response of dividend payout changes

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This paper examines whether the dividend valuation changed after corporate accounting scandals such as that of Enron in October 2001 broke out. We find that dividend increasing firms experienced positive abnormal returns in the industry affected by corporate scandals up to four months after the first scandal in the industry became public. We interpret this finding in the context of the agency theory of Jensen (1986). To provide a perspective, we examine the dividend valuation from early 1980s to early 2000s, and find that the dividend valuation increased consistently for this time period. We also find that the dividend valuation was highest in the information technology industry after the year 2000. These findings fit well with the agency theory as well.

I. Introduction

A well-established fact on corporate dividends is that the change in dividend payout rates affects a firm's value despite the irrelevance theory of Modigliani and Miller (1961). While numerous theories have been developed to explain this phenomenon, two theories stand out prominently: the signalling theory of Miller and Rock (1985) and the agency theory of Jensen (1986). The signalling theory of Miller and Rock suggests that dividend payout rates reveal inside information about future earnings prospects that should be reflected in a company's stock price. Jensen's agency theory suggests that the dividend payout rate affects the agency costs of free cash flow, which would in turn affect the stock price.

Various empirical evidences have been presented supporting the signalling theory or the agency theory interpretation of the dividend valuation. However, the question of which theory is more relevant has not been settled yet. In this paper, we take up this question again empirically in an interesting new setting, i.e. in the context of the corporate accounting scandals of years 2001 and 2002.

We hope to contribute to the literature in two ways. First, we want to add one more set of empirical evidence, in our opinion, supporting the agency theory of the dividend valuation. Second, perhaps more importantly, we present an analysis of how stock markets reacted to the series of corporate accounting scandals that broke out in years 2001 and 2002.

As an evidence for the agency theory, our finding may not be the strongest evidence ever reported in the literature. Nonetheless, we believe our findings to be worth reporting as it is one of the first attempts to apply the theories of dividend valuation to the

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Applied Financial Economics ISSN 0960–3107 print/ISSN 1466–4305 online © 2006 Taylor & Francis
http://www.tandf.co.uk/journals
DOI: 10.1080/09603100500426390

aftermath of the corporate accounting scandal. After the series of corporate accounting scandals shocked the investment community in 2001 and 2002, their consequence became one of the most widely discussed topics in the investment community. Some claimed that investors got out of the stock market because they were disappointed with the corporate scandals. Others claimed that stock prices decreased significantly due to the high premium that was being demanded by investors. However, careful research has not been conducted that is able to support or repudiate these claims. We hope to present such research. We examine whether investors changed their behaviour in any significant way after the corporate scandals, as suggested by many professionals. We found that investors did change their behaviour after the scandals took place, at least regarding the way in which they evaluate a firm's dividend policy. This finding is worth reporting, independent of whether the driving force behind this change is the signalling content of future earnings prospects or the agency cost. Although the idea that the dividends are priced in the market is not new, how the dividend valuation changes over time and how they differ across industries have not received much attention in the previous literature, especially in the cross-sectional context.

Examining the relationship between the change of dividend payout rates and the returns of profitable, dividend-paying US common stocks from the early 1980s to the early 2000s, our analysis finds three patterns:

1. The effect of dividend payout changes on stock returns became stronger after the year 2000 than before.
2. After the year 2000, the effect of payout changes on stock returns was strongest in the information technology industry.
3. The effect of payout changes on stock returns was greater in the industry and at the time when corporate accounting scandals took place.

We believe that these patterns, with varying degrees, support the agency theory. The significance of corporate over-investment (and the free cash flow problem in the sense of Jensen (1986)) came to the attention of investors when the unprecedented stock market expansion of the 1990s finally ended. Thus, investors placed higher valuations on dividend payout growth firms believing that higher dividends would limit the agency cost, which may have produced the first pattern.

The second pattern is also consistent with the agency explanation. Investors may have been most concerned about the agency cost in the information technology industry. This is so because the information technology industry was at the forefront of the 'Internet Revolution', which made the free cash flow problem quite serious. Corporate managers' enthusiasm about the Internet Revolution contributed to over-investment problems in this industry, and when the Internet bubble exploded, investors became concerned.

The third pattern supports the agency theory as well. Corporate scandals exposed the importance of the agency problem to investors, and it is natural to see the strong link between dividend payout changes and stock returns at the time of corporate scandals. We discuss the reasoning further later.

We adopt two empirical methodologies in this paper. In the first part, we run the cross-sectional regression of returns on a number of pricing factors including dividend payout rate changes. This is a common approach in the equilibrium asset pricing literature.

In the second part of the paper, we perform an event study, treating the first corporate scandal in each industry as an event. The event study approach is often adopted in the literature to study the valuation effect of dividend policy (e.g. Aharony and Swary, 1980; Divecha and Morse, 1983). As is well known, the main challenge in applying the event study approach is to identify the event date exactly. Given the lack of better alternative, many event studies use the *Wall Street Journal* coverage to identify the event date. With a similar excuse, we use the list of corporate scandals made by *Forbes* magazine to identify the event date. *Forbes* magazine is one of the most influential and widely circulated business magazines worldwide. Using a daily newspaper would have involved a more subjective and arbitrary assignment of the event date. We discuss this issue further in the later part of the paper.

The market response to the dividend payout changes can be linked to the market response to stock repurchases. Grullon and Michaely (2004) suggest that the market reaction to share repurchase announcements can be consistent with the free cash flow problem in the sense that the market reaction is more positive among those firms that are likely to over-invest. At the initial stage of our investigation, we followed this suggestion and examined share repurchases as well as dividend payouts. However, we found that share repurchases had a weaker effect on stock price than that of dividend payouts in the empirical patterns we examined.

We see two potential explanations for this discrepancy between the effect of dividends and the effect of share repurchases. First, as Grullon and

Michaely (2002) carefully mentioned, share repurchase has been increasing gradually over time, becoming more significant in dollar amount than dividends only in the late 1990s. As our sample covers a relatively longer period, it is natural to see a weaker effect of share repurchase. Second, dividends may indicate stronger commitment of corporations to reduce the free cash flow given the fact that corporations are reluctant to change the dividend policy. Investors' reaction to share repurchase can be smaller than their reaction to dividends for that reason. While we make comments regarding share repurchases when necessary in the remainder of the paper, for brevity and clarity of exposition, we focus on dividend payouts for the majority of this paper.

The rest of the paper is organized as follows. In Section II, we review literature on the relationship between dividend policy changes and stock price, focusing our discussion on the signalling theory and the agency theory. The next three sections present empirical findings and their interpretation in a logical order, rather than in the order of significance, to make the paper more readable. Our main finding is discussed in Section V, where we look at the effect of dividend payout changes on stock returns around the time of the corporate accounting scandals. The findings of Sections III and IV are less original, but these two sections serve as useful background for Section V. Section III examines the cross-sectional relationship between dividend payout changes and stock returns from the early 1980s to early 2000s. Section IV looks at the effect of dividend payout changes on stock returns across industries. Section VI is the conclusion.

II. Dividend Payout Policy and Valuation

There are a number of competing theories regarding why dividend payout policies of a firm affect its stock price. In this section, we review two of the most prominent theories that attracted attention in the literature and also are highly relevant to our empirical findings. The first is the signalling theory, which suggests that dividends are used as a signalling mechanism between insiders and outsiders with asymmetric information. The second is the agency theory, which states that dividends are used to limit agency costs.

The signalling theory describes dividend policy as a method by which managers of firms with insider information can credibly signal information to outsiders. Miller and Rock (1985) develop a model in which dividends are used as a signal to convey information about the firm. They state that dividends are a signal of positive information, but it cannot be used as a source for negative information. John and Williams (1985) and Ambarish *et al.* (1987) develop models implying the signalling nature of dividends. In their model, firms with higher favourable inside information will optimally pay higher dividends and receive higher prices for their stock.

Empirical evidence regarding the signalling theory is mixed. Using analyst earnings forecast data, Ofer and Siegel (1987) find that dividend changes are positively related to earnings, which is consistent with the signalling theory. Similarly, Healy and Palepu (1988) report that dividend initiation and omissions signal for future earnings. Examining the relationship between the stock price and dividends, Hand and Landsman (1999) find that dividends are priced more for 'loss' incurring firms, which is also consistent with the signalling theory. On the other hand, contrary to the prediction of the signalling theory, Ikenberry *et al.* (1995) find that markets did not react to new information conveyed by dividend changes at least in the short term, and DeAngelo *et al.* (1996) did not find any support for the signalling role of dividends either. The position of Benartzi *et al.* (1997) is somewhere in the middle, as their finding indicates that the increase in dividends is not a significant predictor of future earnings growth but that dividend increasing firms are less likely than non-changing firms to experience a drop in future earnings.

Evidence from non-US data is also mixed. Allen and Rachim (1996) find that the dividend payout rates are negatively correlated with stock price volatility in the Australian stock markets. They interpret this finding as supporting the signalling theory. A negative correlation between payout rates and stock price volatility means a positive correlation between payout rates and stock price, as implied by the signalling theory. On the other hand, Aydogan and Muradoglu (1998) claim that the signalling effect of stock dividends and rights offering disappeared in the Turkish stock markets as the markets became more mature.

As an alternative to the signalling theory, the agency theory describes dividends as a mechanism to resolve potential conflicts between principals (shareholders) and agents (managers). Easterbrook (1984) interprets continuing dividends as a force that compels management to use capital markets to raise new money for investment projects. This would enable capital markets to enhance the monitoring of managers through the need to float new securities. Jensen (1986) proposed a related free cash flow hypothesis. Managers and shareholders face conflicting incentives regarding the size of a firm and payments of cash to shareholders. A company's management with particularly large cash flows may be tempted to invest in negative net-present-value projects (too much cash chasing too few projects). The payment of dividends may be one way that shareholders can reduce this agency conflict with management.

Empirical evidence supporting the agency theory is also mixed. Rozeff (1982) finds that the dividend payout rate of a firm is negatively related to high insider ownership. This result suggests that the greater the percentage of a firm's outstanding shares owned by insiders, the less severe is the agency problem. Using Tobin's q to identify firms with serious agency problems, Lang and Litzenberger (1989) find that investors have a greater reaction to dividend payout changes for firms with serious agency problems. However, Starks and Yoon (1995) dispute the finding of Lang and Litzenberger.

The difficulty in determining the relative merits of the agency theory and the signalling theory arises from the fact that both make similar predictions, especially regarding the relationship between dividends and stock price. For example, Elfakhani (1998) reports price impact of dividend signal but this finding can be similarly interpreted in the agency context as well. Balachandran *et al.* (1999) report a strong price reaction of interim dividend reduction from the UK markets, but fail to identify which of the alternative theories is more relevant. While the issue has been investigated for almost 20 years, it remains difficult to proclaim a clear winner.

III. Dividend Payout Changes and Returns: Did the Relationship Change Over Time?

In this section, we look at the relationship between dividend payout changes and stock returns over time. The main finding of this section is that the effect of dividend payout changes on stock returns was significantly greater after the year 2000 than in the 1980s and 1990s.

Previous studies have reported the positive relationship between dividend changes and stock returns. Our primary interest here is whether the magnitude of this relationship has changed over time. Also, the analysis here will serve as a basis for the discussion of the following sections.

While there are numerous studies documenting the relationship between dividends and stock returns, their approaches and emphasis are usually different from the one adopted here. Market response studies analyse the portfolio returns after dividend payout changes. (Aharony and Swary (1980) and Divecha and Morse (1983), to name a few.) Other studies adopt the time series regression approach to show the predictive power of dividend for future stock returns. (See, for example, Fama and French (1988) for the US; Raj and Thurston (1995) for New Zealand; and McManus *et al.* (2004) for the UK.) Rees (1997) and Akbar and Stark (2003) use cross-sectional regression to document the effect of dividends, but they use stock prices rather than stock returns as the dependent variable. Boudoukh *et al.* (2004), however, do examine the cross-sectional regression of stock returns on dividend payout changes, as we do here.

Our sample includes firms whose shares are traded in the major US stock markets, as compiled by Standard and Poor's Compustat. We use only dividend-paying, profitable firm-years. Dividend-paying firm-years are defined as the year of a firm that paid any dividends, regular or special, during the period between July of the previous year to the June of the current year. Including non-dividend-paying, non-profitable firm-years would be incompatible with our empirical strategy. Firms with inadequate data are also excluded from our analysis. For example, firms for which we cannot estimate the three-factor model of Fama and French are dropped.[1,2]

Our sample covers the period from 1980 to 2003. The data for the first four years (1980–1983) are used only in constructing variables. Thus, our analysis covers the period from 1984 to 2003. We suspect that the relationship between dividends and stock returns may have changed since the US stock

[1] The exclusion of young firms (due to the estimation of three-factor betas) does not necessarily imply that the relationship we report in this section is restricted to old firms. In fact, the opposite is quite likely. The agency problem is likely to be more serious for young firms because they have not yet accumulated sufficient reputation for good corporate governance. Thus, dividends can be more effective for young firms in limiting agency cost. On the other hand, it is possible that dividend-paying young firms experience negative valuation as it may signal the lack of profitable opportunities.

[2] One may be concerned about the survivorship bias. However, the fact that the relationship among the variables is different for survivors and non-survivors does not automatically cause a problem. A problem arises only when the different relationships influence who survives and who does not. In our case, a problem arises if the firms that cannot increase their stock valuation with higher dividend payouts are less likely to survive than other firms. However, the possibility of this happening does not seem to be very high.

Table 1. Descriptive statistics for regression variables

Period	Obs	$\log R(t)$	$\log E(t)$	$\log E(t-1)$	$M(t-1)$	$S(t-1)$	$B(t-1)$	$\log D(t)$	$\log D(t-1)$
1984–2003	30 349	0.0980	0.0267	−0.0206	0.8464	0.4333	0.2563	−0.9359	−1.0172
		(0.2950)	(0.9776)	(0.9696)	(0.5669)	(0.8329)	(0.8041)	(1.1600)	(1.1980)
1984–1990	10 007	0.0948	−0.1405	−0.1899	0.9230	0.5184	0.1165	−1.0837	−1.1872
		(0.2928)	(1.0772)	(1.0740)	(0.5065)	(0.9350)	(0.8629)	(1.2650)	(1.2961)
1991–2000	15 751	0.0980	0.0308	−0.0198	0.8625	0.4530	0.3057	−0.9290	−1.0032
		(0.2937)	(0.8904)	(0.8879)	(0.5853)	(0.8052)	(0.8374)	(1.1002)	(1.1433)
2001–2003	4591	0.1050	0.3771	0.3456	0.6240	0.1800	0.3917	−0.6371	−0.6945
		(0.3039)	(0.9405)	(0.8940)	(0.5719)	(0.6124)	(0.4199)	(1.0571)	(1.0835)

Notes: The numbers are the average of each variable for the period. The numbers inside parentheses represent the standard deviation.
'Obs' indicates the number of observations.
Log $R(t)$, $M(t-1)$, $S(t-1)$, $B(t-1)$ are in percentages.

markets experienced unprecedented bull markets in the 1990s. This is also a period in which there is no significant change in the number of firms in the Compustat dataset.

The following annual variables are constructed for the analysis of this section:

1. Return $R(t)$: the annual return from the beginning of July of year $t-1$ to the end of June of year t.
2. Dividends per share $D(t)$: per share dividend paid from July of year $t-1$ to June of year t.
3. Earnings per share $E(t)$: per share earnings from the beginning of year $t-1$ to the end of year $t-1$.
4. Payout rates $D(t)/E(t)$: per share dividend paid from July of year $t-1$ to June of year t divided by per-share earnings from the beginning of year $t-1$ to the end of year $t-1$. Following the standard practice, we allow a six-month gap between the last day of the earnings period and the last day of the dividend period since earnings figures are not available immediately to investors, while dividend figures are available immediately.
5. Market beta $M(t)$, size beta $S(t)$, and BM beta $B(t)$: We estimated the three-factor model of Fama and French (1992) for individual stocks using monthly returns from July of year $t-3$ to June of year t.[3] If the return numbers are not available for all 36 months, we used only the data for available months. However, if the number of returns available was less than 24, we did not estimate the model. Market beta, size beta, and BM beta are coefficients for market factor, size factor ('small minus big'), and book-to-market factor ('high minus low'), respectively.

Table 1 reports the summary statistics of the variables. The relatively small sample size reflects the fact that only profitable and dividend-paying firm-years with at least a three-year data history are included.

We estimate a cross-sectional equation where explanatory variables include current and past earnings, the three-factor betas, and year-dummy variables as well as current and past dividends. The equation can be written as follows:

$$\begin{aligned}\log(R_{i,t}) = {} & \beta_1 \log(E_{i,t}) + \beta_2 \log(E_{i,t-1}) + \beta_3 M_{i,t-1} \\ & + \beta_4 S_{i,t-1} + \beta_5 B_{i,t-1} + \beta_6 \log(D_{i,t}) \\ & + \beta_7 \log(D_{i,t-1}) + \text{Year Dummies} + \varepsilon_{i,t} \quad (1)\end{aligned}$$

The above equations are in the spirit of the three-factor model of Fama and French (1992).[4] We added the earnings and dividend variables because our primary interest is the effect of dividend payout rates. By adding earnings and dividend variables, the equations reflect the idea of Boudoukh *et al.* (2004), who state that the dividend payout rate can be a pricing factor in addition to the three factors of Fama and French.

Note that including the present and past level variables is identical to including the present (or past) level and the change in level. Thus, the above specification allows for the examination of the effect of dividend payout changes as well as the effect of dividend payout levels.While current earnings and dividends are contemporaneous with the dependent variable, all three-factor beta variables lag one period in order to avoid the simultaneity problem.

The coefficients of dividend variables measure the effect of dividends on returns over and above

[3] Fama–French three factors were obtained from K. French's data library.
[4] We do not follow the approach of Fama and MacBeth (1973) mainly because our sample is rather short in the time series dimension to perform a final-stage statistical test of the Fama–MacBeth regression.

Table 2. Cross-sectional regression – single-stage regression

Period	Obs	$\log E(t)$	$\log E(t-1)$	$M(t-1)$	$S(t-1)$	$B(t-1)$	$\log D(t)$	$\log D(t-1)$	$\log D(t) - \log D(t-1)$	R-squared
1984–2003	30 349	0.0480	−0.0665	−0.0298	−0.0200	0.0212	0.0990	−0.1034		19.00%
		(0.0025)	(0.0026)	(0.0030)	(0.0021)	(0.0022)	(0.0050)	(0.0047)		
		0.0466	−0.0687	−0.0279	−0.0188	0.0200			0.1027	18.99%
		(0.0024)	(0.0024)	(0.0029)	(0.0020)	(0.0021)			(0.0047)	
1984–1990	10 007	0.0591	−0.0794	−0.0523	−0.0275	0.0240	0.0961	−0.0978		25.22%
		(0.0042)	(0.0046)	(0.0054)	(0.0030)	(0.0034)	(0.0081)	(0.0077)		
		0.0585	−0.0803	−0.0517	−0.0271	0.0235			0.0973	25.22%
		(0.0041)	(0.0041)	(0.0053)	(0.0029)	(0.0033)			(0.0076)	
1991–2000	15 751	0.0530	−0.0755	−0.0080	−0.0147	0.0126	0.0972	−0.1043		19.04%
		(0.0035)	(0.0036)	(0.0040)	(0.0029)	(0.0029)	(0.0073)	(0.0069)		
		0.0507	−0.0789	−0.0051	−0.0126	0.0109			0.1040	19.04%
		(0.0034)	(0.0034)	(0.0038)	(0.0028)	(0.0028)			(0.0069)	
2001–2003	4591	0.0078	−0.0138	−0.0948	−0.0343	0.1248	0.1125	−0.1113		10.94%
		(0.0064)	(0.0068)	(0.0091)	(0.0083)	(0.0128)	(0.0122)	(0.0117)		
		0.0081	−0.0133	−0.0954	−0.0346	0.1251			0.1116	10.94%
		(0.0063)	(0.0066)	(0.0087)	(0.0082)	(0.0127)			(0.0116)	

Notes: The dependent variable is $\log R(t)$. The numbers inside parentheses represent the standard error. 'Obs' indicates the number of observations.

the effect of earnings and other standard return forecasting variables. Also, these coefficients can be considered to measure the effect of payout rates on returns. Payout rates are the difference between (the logarithm of) dividends and (the logarithm of) earnings, only two out of three interesting quantities – the earnings effect, the dividend effect, and the payout effect – can be independently identified. Therefore, in this section, we do not attempt to distinguish the effect of dividend payout rates from the effect of dividends.

We estimate the equation for our entire sample period (1984–2003), and for three periods (1984–1990, 1991–2000, 2001–2003). We believe that this method of breaking down the sample period is reasonable since the US stock market had a historic bull market from 1991 to 2000. For example, the Dow Jones Industrial Average experienced positive growth for every year in this time period. The bull market was clearly finished by June of 2000, when the market entered into a 'correction period'. We presumed that the payout effect may be different before, during and after the bull market, which turned out to be the case in our sample.[5]

Table 2 shows the estimation results. The current dividend variable is significantly positive and the past dividend variable is significantly negative. In a distributed lags model such as Equation 1, the sum of the coefficients measures the effect of the level, and either the coefficient of the current variable or the negative of the coefficient of the past variable measures the effect of growth. That is, two dividend terms in Equation 1 can be rewritten as:

$$\begin{aligned}\beta_6 \log D_{i,t} + \beta_7 \log D_{i,t-1} &= \beta_6(\log D_{i,t} - \log D_{i,t-1}) + (\beta_6 + \beta_7)\log D_{i,t-1} \\ &= (\beta_6 + \beta_7)\log D_{i,t} - \beta_7(\log D_{i,t} - \log D_{i,t-1}) \qquad (2)\end{aligned}$$

Thus, while the sum of two coefficients $(\beta_6 + \beta_7)$ measures the effect of the current and past level, either β_6 or the negative of β_7 measures the effect of changes. Applying this logic, we can interpret the estimation results as saying that dividend growth has a positive effect on returns.

Note also that the absolute values of the two coefficients are very close to each other. That is, the sum of the two coefficients is close to zero, which suggests that the dividend levels, current or past, do not have much of an effect on returns. At any conventional significance level, we cannot reject the null hypothesis that the sum of the coefficients of current dividends and past dividends is zero. (For H_0: $\beta_6 - \beta_7 = 0$, the p-value is 25%.) This allows us to impose the restriction that the sum of the coefficients is zero and to replace two level variables with one difference variable.

The results of the estimation with this restriction are also reported in Table 2. As one may expect,

[5] We include year-dummy variables to control for year-specific effects in the estimations. We consider that the sample size is not large enough to estimate the equation year-by-year, especially given the number of parameters estimated. The observations are distributed as follows: 1108 observations (year 1984), 1433 (1985), 1453 (1986), 1422 (1987), 1453 (1988), 1543 (1989), 1595 (1990), 1543 (1991), 1516 (1992), 1519 (1993), 1439 (1994), 1537 (1995), 1725 (1996), 1782 (1997), 1671 (1998), 1545 (1999), 1474 (2000), 1370 (2001), 1199 (2002), 2022 (2003).

Table 3. Cross-sectional regression – two-stage regression

Period	Stage	$\log E(t)$	$\log E(t-1)$	$M(t-1)$	$S(t-1)$	$B(t-1)$	$\log D(t)$	$\log D(t-1)$	$\log D(t) - \log D(t-1)$	R-squared
1984–2003	1	0.0535	−0.0744	−0.0235	−0.0164	0.0176				17.71%
		(0.0024)	(0.0024)	(0.0029)	(0.0020)	(0.0022)				
	2						0.0981	−0.0996		
							(0.0048)	(0.0046)		
									0.0994	
									(0.0046)	
1984–1990	1	0.0668	−0.0882	−0.0465	−0.0248	0.0202				24.01%
		(0.0040)	(0.0040)	(0.0053)	(0.0029)	(0.0033)				
	2						0.0936	−0.0932		
							(0.0077)	(0.0075)		
									0.0932	
									(0.0075)	
1991–2000	1	0.0568	−0.0835	−0.0015	−0.0103	0.0097				17.81%
		(0.0034)	(0.0034)	(0.0038)	(0.0028)	(0.0029)				
	2						0.0979	−0.1013		
							(0.0070)	(0.0068)		
									0.1013	
									(0.0068)	
2001–2003	1	0.0154	−0.0172	−0.0896	−0.0296	0.1179				9.15%
		(0.0063)	(0.0066)	(0.0088)	(0.0083)	(0.0128)				
	2						0.1086	−0.1082		
							(0.0118)	(0.0115)		
									0.1083	
									(0.0114)	

Notes: The dependent variable of the first stage regressions is $\log R(t)$. The dependent variable of the second stage regressions is the residual from the first regressions. The numbers inside parentheses represent the standard error.

the new coefficient estimates are the average of the coefficient of the current level and the negative of the coefficient of the past level.

The coefficient on dividend growth is somewhat above 10% for the entire sample period. That is, if the dividends growth rate (or payout growth rate) increases by 10%, the return increases by an average of 1%. The effect during the 1990s bull market is higher than in the 1980s, and it is even higher after the bubble burst. For the sub-periods of 2001–2003, the coefficient estimate is higher than the overall level by as much as 1.4%. In fact, if we take only years 2001 and 2002, the coefficient is significantly different from other sub-periods. (For H_a: $\beta_{01-02} \leq \beta_{91-00}$, the p-value is 8%.)

To check for the robustness, we estimate the same equation in two stages. In the first stage, we include all the explanatory variables except the dividend variables. In the second stage, we regress the residual from the first stage on the current and the past dividend variables. The system of equations estimated can be written as follows:

$$\log(R_{i,t}) = \beta_1 \log(E_{i,t}) + \beta_2 \log(E_{i,t-1}) + \beta_3 M_{i,t-1} + \beta_4 S_{i,t-1} + \beta_5 B_{i,t-1} + \text{Year Dummies} + \varepsilon_{i,t} \tag{3}$$

$$\varepsilon_{i,t} = \beta_6 \log(D_{i,t}) + \beta_7 \log(D_{i,t-1}) + \upsilon_{i,t} \tag{4}$$

There are two reasons we perform the two-stage regression. First, we want our analysis to be comparable to preceding research, which has cross-sectional regression of returns on three factor betas and some form of earnings variables. Secondly, we want to isolate the effect of dividends from the effect of earnings. If dividend variables are included in the first stage, some of what other researchers consider to be earnings effects may appear in the coefficient of dividend variables since earnings and dividends are correlated. However, by using dividend variables only in the second stage we avoid the question of how much of the effects is truly dividend effects rather than earnings effects.

Nonetheless, there is a downside to this approach as well. In terms of specification, the first stage regression may be considered mis-specified because the dividend is a component of the error variable.

We report the two-stage estimation results in Table 3. We basically obtain the same results, showing that the effect of the dividends increased over time and is highest after the year 2000.

What led to the increase in the effect of dividend payout changes? We find the agency theory to be useful in interpreting these results. US stock markets went through an unprecedented bull market in the 1990s that was accompanied by huge capital expenditures by corporations. As capital expenditures increased, investors became more worried about the over-investment/agency problem. When the boom finally ended, it became clear that much of the capital expenditures were unjustifiable (i.e. investment in negative NPV projects) and investors realized the severity of the agency problem more seriously. Thus, the role of dividends as a safeguard against the agency problem has become more effective. The next two sections provide more analysis of the driving forces behind the effect of dividend payout changes.

While not reported here, we estimated the equations using stock repurchases as well as dividends. This makes sense since many studies (e.g. Dann, 1981; Vermaelen, 1981) report a positive market response towards stock repurchases. However, we found that while the effects of repurchases have the same sign as that of dividends, the magnitude and significance of the effects of repurchases were much smaller in comparison. We have not included the detailed results since repurchases do not change our main findings and do not add any insights to the main issue.

IV. Dividend Payout Changes and Returns: Is the Relationship Different Across Industries?

To better understand why dividend payout changes have a strong correlation with stock returns after the year 2000, we examine the relationship between payout changes and returns by industry. We found the effect of payout change on returns to be substantially larger in the information technology industry than in all other industries.

To look at the relationship between change in payout rates and stock returns across industries, we could continue to adopt the regression analysis by simply adding industry dummy variables. However, we would then be concerned about the degree-of-freedom problem because the dataset is not large enough for a cross-industry analysis. Therefore, we instead adopt a portfolio analysis. For each industry, we group firms based on payout rate changes. Then we form a portfolio of high payout growth firms and a portfolio of low payout growth firms for each industry, comparing the returns of each pair of portfolios. The difference between the two portfolio returns shows the magnitude of the effect of payout changes on returns.

We define the industry by the 2-digit Global Industrial Classification System provided by Compustat. The following 10 industries are defined: (1) Energy; (2) Material; (3) Industrial; (4) Consumer discretionary; (5) Consumer staples; (6) Healthcare; (7) Finance; (8) Information technology; (9) Telecommunication; and (10) Utilities.

For each of the 10 industries, we create three portfolios based on the ranking of the payout growth rates. At the end of June 2000, we ranked the firms in each industry by the payout growth rate. Firms in the top 33% are included in the high payout growth portfolio, while those firms belonging to the bottom 33% are included in the low payout growth portfolio. The remaining firms are then placed in the medium payout growth portfolio. Three portfolios were created for each of the 10 industries, resulting in 30 portfolios in total. The portfolios were rebalanced monthly in case a firms drops out of the sample. The portfolios were completely recreated at the end of June 2001 and June 2002 with the same methodology.

Once the portfolios were formed, we calculated monthly equal-weighted portfolio returns from July 2000 to June 2003. We calculated both gross returns and risk-adjusted returns. Risk-adjusted returns are calculated using the three-factor model of Fama and French (1992). First, the three-factor model is estimated for individual stocks using up to five-year monthly returns.[6] If a stock does not have five-year monthly returns, we use only available monthly returns as long as the stock has more than two years of monthly returns. The residuals from these regressions are the risk-adjusted returns of individual stocks. From the risk-adjusted returns of individual stocks, we obtain equal-weighted risk-adjusted portfolio returns.[7]

We are interested in the difference between the high payout growth portfolio return and the low payout growth portfolio return. This difference shows the effect of payout changes of stock returns at an industry level. This difference can be called the return of the zero-investment portfolio as it is the return of a long position in the high payout growth portfolio

[6] The three-factor model was estimated twice for each stock to guard against parameter change. First, the model was estimated using the data from July 1999 to June 2002, and the resulting risk-adjusted returns were used for the analysis of July 2000 to June 2002. Second, the model was estimated using data from July 2000 to June 2003, and the resulting risk-adjusted returns were used for the analysis of July 2002 to June 2003.

[7] As a robustness check, we also calculated risk-adjusted returns of portfolios directly by regressing portfolio returns on three factors. The results reported in this section do not depend on how risk-adjusted returns of portfolios are computed.

Table 4. Average monthly returns by industry

	Returns of:			Risk-adjusted returns of:		
Sectors	High payout growth portfolios (1)	Low payout growth portfolios (2)	Zero-investment portfolios (1)–(2)	High payout growth portfolios (3)	Low payout growth portfolios (4)	Zero-investment portfolios (3)–(4)
Energy	1.0230	1.8594	−0.8364	−0.1272	0.6373	−0.7645
Material	0.5961	1.3125	−0.7163	−0.1692	0.2926	−0.4617
Industrial	1.0528	1.0099	0.0429	0.0881	−0.2026	0.2907
Consumer discretion	0.9817	1.2637	−0.2820	0.0298	−0.1973	0.2271
Consumer staples	1.3717	1.3455	0.0263	0.2201	0.1750	0.0451
Healthcare	1.2769	1.2939	−0.0170	0.4259	0.1928	0.2331
Finance	1.9348	2.0588	−0.1240	0.7214	0.8066	−0.0852
Info-tech	−0.0012	−1.0120	1.0108	−0.6349	−1.6437	1.0088
Telecom	0.0169	0.2334	−0.2165	0.0332	−0.5583	0.5914
Utilities	0.5451	1.1036	−0.5585	−0.3703	−0.0610	−0.3094

Notes: The reported numbers are the average of monthly equal-weighted portfolio returns from July 2000 to June 2003. All numbers are in percentages.

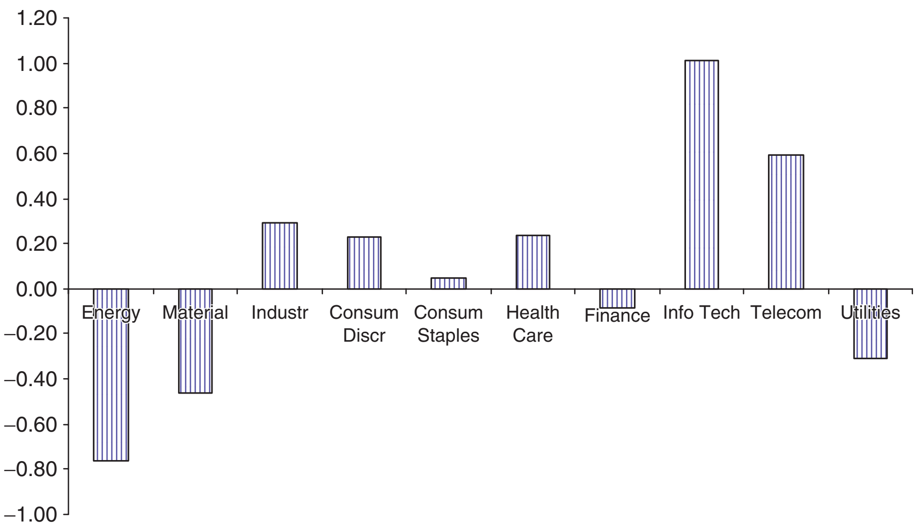

Fig. 1. Risk-adjusted returns of zero-investment portfolio by industry
Notes: Average risk-adjusted monthly returns from July 2000 to June 2003 of the zero-investment portfolio created for each industry.

combined with a short position in the low payout growth portfolio.

Table 4 reports the industry average monthly returns of (1) high payout growth portfolios; (2) low payout growth portfolios; and (3) zero-investment portfolios. In terms of non risk-adjusted returns, the zero-investment portfolio in the information technology industry has the highest average monthly return, which is about 1.01%. The negative returns of the high and low payout portfolios reflect the tremendous loss of market value in the information technology industry during this time period. The pattern is very similar to the risk-adjusted returns. One noticeable difference is that the zero-investment portfolio return changed sign from minus to plus. This is understandable as the risk-adjustment tends to take out the trend of the market which was negative for this time period. Figure 1 plots the returns of the zero-investment portfolios by industry.

We find the agency theory very helpful in interpreting these results. If investors reward firms with payout growth because of a reduced concern for the agency problem, it is natural to see that the strongest link between payout changes and returns exists in the industry where investors have greatest concern for the agency problem. After the Internet bubble exploded in the year 2000, it is quite probable that investors were concerned about the agency problem, especially in the information technology industry since it was at the forefront of the

Internet-related expansion. Many technology companies in the late 1990s made huge capital investment expenditures, many of which turned out be not very profitable. Eventually, investors got concerned at the 'burning-rate' of cash reserves in these companies and paid more attention to where cash reserves are spent. Investors realized that the free cash flow was a serious problem in the technology companies as the Internet bubble exploded. Two authors of this paper observed this phenomenon at first hand as they worked in an Internet start-up company around the year 2000. Before the Internet bubble exploded, investors (including venture capitalists) had a rather relaxed attitude about the high 'burning-rates' of companies and, as a result, control of capital expenditures was not very tight. However, as the general mood in the capital markets changed after the year 2000, the attitude of investors towards capital expenditures also changed.

V. Dividend Payout Change, Stock Return and Corporate Scandal

In this section, we examine the possible role of corporate scandals such as the Enron scandal of October 2001 in altering the relationship between dividend payout changes and stock returns. We hypothesize that, if corporate scandals changed the perception of investors regarding the stock market as commentators claimed, then the valuation of dividend payout policies should have been affected as well. Furthermore, we hypothesize that a corporate scandal, say, that of Enron, would make investors worry more about firms in the utility industry than firms in other industries. The analysis in this section supports our hypothesis and also helps to explain why dividend payout changes have a stronger correlation with stock returns after the year 2000 as reported in Section III.

We consider corporate scandals as repeated events, and adopt an event study approach. We treat the first scandal in an industry as an 'event', and pool these events across the industry. We then look at the portfolio returns around the time of the event, where portfolios are constructed by the ranking of the payout growth rate.

As far as the event study methodology is concerned, two issues may be worth mentioning at this point. The first is how to exactly identify the event date, i.e. the date when corporate scandals became public. Deciding the exact day (rather than the week or the month) of scandals is rather impractical as it takes time for the nature and the magnitude of scandals to be known to public. Instead, we tried to identify the month of scandals. For this purpose, we used *Forbes Corporate Scandal Sheet*, which assigns 22 major corporate scandals to certain months between June 2000 and July 2002. *Forbes* is one of the most respectable business journals, so using the list by *Forbes* seems to be a reasonable strategy. Also, the list identifies a small number of significant scandals, which is very suitable for our study. At the minimum, our assignment of the event date is less arbitrary and less subject to error than other alternatives.

The second issue in the event study approach is how to interpret the pattern emerging from the analysis, i.e. whether we can attribute the pattern to the event. In a sense, the event study can be compared to a regression with a single explanatory variable. The conclusion we draw from the event study will be valid if the 'excluded' factors (factors that we do not consider) are independent from the 'included' factors. Thus, our conclusion from the event study will be valid if dividend payout changes and the occurrence of corporate scandals are independent from other pricing factors. We believe that it is a reasonable assumption to maintain.

The exact procedure of analysis is as follows. We distribute the 22 scandals identified by *Forbes* into the 10 industries defined in the previous section. In this scheme, three out of the 10 industries did not experience any scandals. Table 5 lists the first scandal in each industry and the calendar month is matched to the event month. In the analysis that follows, we focus on the seven industries that experienced corporate scandals.

To identify the effect of dividend payout changes, we create three portfolios for each industry based on the ranking of the payout growth rate, as explained in the previous section. That is, for each industry, we create (1) the high payout growth portfolio; (2) the medium payout growth portfolio; and (3) the low payout growth portfolio. For the seven industries with three portfolios each, there are now a total of 21 portfolios. We arrange the portfolios according to the event date as shown in Table 5. Finally, we created two 'pooled' portfolios out of the 21 industry-level portfolios. The pooled high payout growth portfolio is made out of the seven highest payout growth industry level portfolios, and the pooled low payout growth portfolio is made from the seven lowest payout growth industry level portfolios. The medium payout portfolios were dropped from the analysis.

We calculate the equal-weighted monthly portfolio returns and the risk-adjusted portfolio returns, as explained in the previous section. That is, we first run the regression for monthly returns on three factors

Table 5. Event calendar

	Sectors									
	Energy	Material	Industrial	Consumer discretion	Consumer staples	Healthcare	Finance	Info-tech	Telecom	Utilities
	First corporate scandal:									
	Halliburton (May 02)	None	Arthur Anderson (Nov 01)	Adelphia (Apr 02)	None	Merck (Jul 02)	None	Xerox (Jun 00)	Quest Comm (Feb 02)	Enron (Oct 01)
Dec 99								$t-6$		
Jan 00								$t-5$		
Feb 00								$t-4$		
Mar 00								$t-3$		
Apr 00								$t-2$		
May 00								$t-1$		
Jun 00								t		
Jul 00								$t+1$		
Aug 00								$t+2$		
Sep 00								$t+3$		
Oct 00								$t+4$		
Nov 00								$t+5$		
Dec 00								$t+6$		
~										
Apr 01										$t-6$
May 01			$t-6$							$t-5$
Jun 01			$t-5$							$t-4$
Jul 01			$t-4$							$t-3$
Aug 01			$t-3$						$t-6$	$t-2$
Sep 01			$t-2$						$t-5$	$t-1$
Oct 01			$t-1$	$t-6$					$t-4$	t
Nov 01	$t-6$		t	$t-5$					$t-3$	$t+1$
Dec 01	$t-5$		$t+1$	$t-4$					$t-2$	$t+2$
Jan 02	$t-4$		$t+2$	$t-3$		$t-6$			$t-1$	$t+3$
Feb 02	$t-3$		$t+3$	$t-2$		$t-5$			t	$t+4$
Mar 02	$t-2$		$t+4$	$t-1$		$t-4$			$t+1$	$t+5$
Apr 02	$t-1$		$t+5$	t		$t-3$			$t+2$	$t+6$
May 02	t		$t+6$	$t+1$		$t-2$			$t+3$	
Jun 02	$t+1$			$t+2$		$t-1$			$t+4$	
Jul 02	$t+2$			$t+3$		t			$t+5$	
Aug 02	$t+3$			$t+4$		$t+1$			$t+6$	
Sep 02	$t+4$			$t+5$		$t+2$				
Oct 02	$t+5$			$t+6$		$t+3$				
Nov 02	$t+6$					$t+4$				
Dec 02						$t+5$				
Jan 03						$t+6$				

for individual stocks and treat the residuals from this regression as the risk-adjusted returns of individual stocks. Then the risk-adjusted portfolio returns were the equal-weighted portfolio returns of these residuals.[8]

Table 6 reports the equal-weighted returns of the pooled high payout growth portfolio and the pooled low payout growth portfolio for each event time. The difference between the returns of the two portfolios shows the effect of corporate scandals on stock returns. We call this difference the return on the zero-investment portfolio, as it can be interpreted as the return of a long position in the pooled high payout growth portfolio combined with a short position in the pooled low payout growth portfolio.

The return on the zero-investment portfolio varies from about negative 1% to about positive 2.6%

[8] We use monthly returns instead of daily or weekly returns because the nature of the event in our study does not allow us to examine a shorter-term response. Also, the *Forbes* list does not identify the exact date when a corporate scandal became public. In addition, it is unclear how one might determine the exact date that a scandal 'shocked' the markets.

Table 6. Monthly returns around the event month

Period	Returns of: High payout growth portfolio (1)	Returns of: Low payout growth portfolio (2)	Returns of: Zero-investment portfolio (1)–(2)	Risk-adjusted returns of: High payout growth portfolio (3)	Risk-adjusted returns of: Low payout growth portfolio (4)	Risk-adjusted returns of: Zero-investment portfolio (3)–(4)
$t-6$	2.9934	4.0507	−1.0573	−1.8457	−0.8797	−0.9660
$t-5$	4.1970	3.8369	0.3601	0.6305	0.5240	0.1065
$t-4$	5.9665	3.3197	2.6469	3.2666	0.9439	2.3228
$t-3$	0.6274	1.4391	−0.8116	2.0529	1.6566	0.3963
$t-2$	−2.5071	−2.3206	−0.1865	0.9427	0.6850	0.2578
$t-1$	−0.1027	0.9934	−1.0961	−2.4558	−1.1730	−1.2828
t	3.1601	3.0440	0.1160	0.2013	0.1469	0.0544
$t+1$	0.9728	0.1970	0.7759	−0.1356	−0.8296	0.6941
$t+2$	−0.7022	−0.9063	0.2040	1.2443	1.0342	0.2100
$t+3$	−1.6766	−2.9878	1.3112	0.7951	−0.6884	1.4836
$t+4$	2.2323	0.1765	2.0558	0.8353	−0.9238	1.7591
$t+5$	−3.0899	−0.9762	−2.1136	−0.6143	1.5503	−2.1647
$t+6$	0.5847	1.5847	−1.0000	−1.4151	−1.3440	−0.0711

Notes: The reported numbers are equal-weighted portfolio returns for respective months. All numbers are in percentages.

before the event without a distinctive pattern.[9] However, after the event, the return is clearly positive up to month 4, gradually increasing from about 0% to 2%. It is clear that the distribution of returns after the event is different from the distribution before the event and that the effect of the payout growth is significant up to month 4. If we test the null hypothesis that the returns of the zero-investment portfolio after the event up to month 4 are drawn from the same distribution as the returns before the event, we can reject the null hypothesis at a significance level of 10%. Formally speaking, for H_0: $r_{t+s,s\geq 0} \sim \Phi(r_{t+s',s'<0})$, $s = 0, \ldots, 4$ and $s' = -1, \ldots, -4$, where Φ is the return generating process, we get a p-value of 6%.[10] Therefore, we may conclude that the returns of the zero-investment portfolio increased after the event.

The fact that no pattern exists before the event date makes our argument stronger. It indicates that the post-event pattern is a response to the event rather than to something else. If there was some pre-event pattern, it could have indicated that the post-event pattern might reflect some time series properties, e.g. autocorrelation.

Table 7 presents the cumulative abnormal returns (CAR), i.e., the cumulative return on the zero-investment portfolio after the event. The CAR increases consistently up to month 4 after the event. In month 4, the CAR is above 4%. Figure 2 plots the risk-adjusted CAR. It provides visual evidence that the effect of the corporate scandal is significant.

Table 7. Cumulative abnormal returns around the event month

Period	CAR	Risk-adjusted CAR
$t-6$	0.1946	−0.7970
$t-5$	−0.8719	−1.7802
$t-4$	−0.5100	−1.6719
$t-3$	2.0817	0.6361
$t-2$	1.2805	1.0284
$t-1$	1.0961	1.2828
	0	0
t	0.1160	0.0544
$t+1$	0.8928	0.7488
$t+2$	1.0986	0.9604
$t+3$	2.4242	2.4582
$t+4$	4.5299	4.2606
$t+5$	2.3205	2.0037
$t+6$	1.2973	1.9311

Notes: For period t and after, the risk-adjusted zero-investment portfolio returns were accumulated forward. For period $t-1$ and before, the risk-adjusted zero-investment portfolio returns were accumulated backward and minus one was multiplied.

The evidence presented above suggests that when corporate scandals occur, investors will reward high

[9] Given that the utility industry and the finance industry have rather different regulation, one may exclude them from the analysis. The finance industry is automatically excluded from the analysis as there was no event in this industry. Overall pattern is not affected if we exclude the utility industry, either.

[10] To simplify the calculation, we assumed that the portfolio returns have a normal distribution and that there is no serial correlation. Under this assumption, the test statistic has a chi-squared distribution. The degree of freedom in this case is 5.

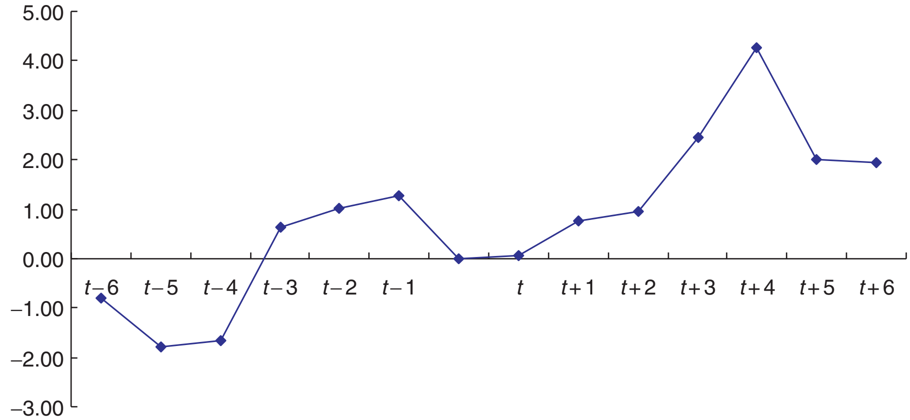

Fig. 2. Cumulative abnormal returns of zero-investment portfolio around the event month
Notes: Risk-adjusted cumulative abnormal returns of zero-investment portfolios created over the event calendar.

payout growth firms within the same industry. There are two possible explanations for these actions.

An agency theory based explanation would state the following. A corporate scandal is a showcase of an extreme agency problem that reveals improperly monitored corporate managers and the inadequate protection of the investors' interest. Therefore, when a corporate scandal occurs, investors become more concerned about the agency problem. First, investors punish the scandal-plagued firm by lowering its market valuation. And in order to not repeat the same mistake of overlooking the agency cost, investors guard themselves by lowering the valuation of firms that are most likely to also have a serious agency problem. One strategy of identifying these firms is to look at payout growth rates with the belief that firms paying out high dividends are less likely to have agency problems.

In contrast, an alternative explanation for these results can be made based on the signalling theory. This interpretation states that when a corporate scandal occurs, investors are reluctant to take reported earnings as true statements. Instead they may have more faith in the signalling content of dividends for future earnings. Thus, investors are more inclined to reward dividends, under the belief that firms paying out high dividends truly have better earnings prospects.

While these two explanations are not completely exclusive of one another, we believe that the agency theory best explains the overall patterns of dividend valuation. As a result of corporate scandals, investors have lost faith not only in corporate financial statements, but also in corporate managers. In the wake of the corporate scandals, numerous media accounts have focused on 'executive enrichment', which has justifiably upset investors. The public was more upset at managers who enriched themselves at the expense of shareholders than at managers who falsified statements to enhance a firm's outlook. When investors lost trust in managers, it is unclear whether managers' signalling by whatever means about future earnings prospects can be more effective to investors. In this situation, called 'crisis of trust' in the stock markets, what matters to investors is that they cannot trust corporate managers and believe that firms who pay out high dividends will have less free cash flows.

Additionally, as we reported in Section III, the valuation of dividend payout change by investors has increased during the past 20 years. In the agency story framework, this pattern can also be understood easily. As the US economy expanded in the 1990s, corporations substantially increased capital expenditures and investors became more concerned about the over-investment and free cash flow problems. As investors became more worried about the agency problem, they increased the valuation of dividend payout change. On the other hand, it is difficult to understand why signalling for future earnings through dividend payout is more effective during the 1990s than it is for the 1980s.

In addition, the agency theory best explains why the valuation of dividend payout changes was the strongest in the information technology industry after the year 2000. As we discussed in Section IV, the Internet bubble in the 1990s may have made investors more worried about the agency problem. After many 'free-spending' information technology companies failed, it is probable that investors increased the valuation of dividend payout changes to guard against further agency problems. The signalling theory, however, does not have a compelling explanation for why the information industry showed the highest valuation of dividend payout changes. Hence, the overall evidence supports the agency theory rather than the signalling theory.

VI. Conclusion

In the last decade, investor confidence in corporations was shaken by two historic events: the burst of the Internet bubble and the outbreak of corporate scandals. Throughout the 1990s, many corporate managers overstated their company's ability to take advantage of the 'Internet Revolution', creating an over-investment problem at the expense of the interest of investors. As corporate scandals such as Enron became public, investors found that managers manipulated financial statements in order to cheat investors while enriching themselves through various avenues.

How did investors react to these two events? This paper presents three patterns. First, investors increased the valuation of high payout growth firms after the year 2000 more than ever before. Second, investors most highly rewarded the high payout growth firms in the sector where the Internet bubble had the biggest effect, the information technology industry. Third, investors further rewarded the high payout growth firms at the time when, and the industry in which, the corporate scandal took place.

We interpret our findings in the following way. Investors believe that there is less of an agency problem in firms with high dividend payouts since there is less free cash remaining after paying high dividends to investors. Therefore, investors reward an increase in payouts with higher valuations. The magnitude of such rewards depends on the circumstances. Investors place more value on payout growth when they are more concerned about the agency problem. In recent years, two events have made investors extremely concerned about corporate governance: the Internet bubble and corporate scandals. Thus, investors place more value in payout growth in sectors where the Internet bubble was most serious. Similarly, investors value payout growth more highly in the industry and at the time of the corporate scandals.

This analysis suggests that when investors are concerned about a company's management's dedication to maximize shareholder value, a proper dividend payout policy may help to alleviate the concern. However, changing the dividend payout policy is not a zero-cost strategy, so this statement is valid only when firms have the ability to change the dividend payout policy without incurring too much cost.

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