



Do firms use dividend changes to signal future profitability? A simultaneous equation analysis



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ABSTRACT

This paper retests the signaling hypothesis of dividends by examining whether managers change dividends to signal their expectation of earnings prospects using a simultaneous-equation approach. This approach allows us to more clearly test the earnings prospects signaling hypothesis and facilitates the control of several alternative motives that managers may have for changing dividends. We also examine the information content of dividend changes with respect to future earnings changes in the same model system. Our results show that managers change dividends to signal equity-scaled rather than asset-scaled earnings prospects. In addition, we find evidence that managers also change dividends for signaling previous earnings changes and for catering to dividend clienteles. As for the information content of dividend changes, we find that dividend changes have significant and negative impact on ROA changes. The findings suggest that if investors consistently cannot recognize the signaling purpose and find that dividend increases (decreases) are not useful in predicting favorable (unfavorable) future earnings, managers may someday give up using dividend changes to signal the earnings prospects of their firms because they cannot obtain the expected market benefits anymore.

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1. Introduction

The signaling theory of dividends argues that dividends serve as a prospects signaling device because managers own asymmetric information about firms' future profitability. Therefore, the relationship between dividend changes and future profitability becomes an important empirical issue in corporate finance. In the literature, two methods are usually used to test the hypothesis. The first method examines whether dividend changes can predict subsequent stock price changes. The other examines whether dividend changes can predict subsequent accounting earnings changes. Under both methods, signaling hypothesis is tested by looking at the predictive ability of dividend changes. Specifically, under these methodologies, if predictive ability of dividend changes is statistically confirmed, it is inferred that the signaling hypothesis is valid, meaning firms use dividend changes to signal their future profitability. One of the objectives of the paper is to provide a workable test for the dividend signaling hypothesis with a more accurate model by examining the mutually endogenous problem between dividend changes and future earnings changes. Furthermore, because managers' expectation of future profitability can influence dividends, dividend changes thereby can influence future profitability by affecting

the capital structure of the firms. This means, a stronger econometric methodology that accounts for this endogenous relationship between dividend changes and future profitability, and controls for other motives is needed to more accurately test the dividend signaling theory. This paper attempts to address this by examining the relationship between dividend changes and future earnings changes using a simultaneous equation method.

In reviewing the literature, even with the evidence that stock returns positively follow dividend change announcements (e.g., Aharony & Swary, 1980; Asquith & Mullins, 1983; Bajaj & Vijh, 1990; Kalay & Loewenstein, 1985; Petit, 1972), whether managers indeed change the dividends to signal the earnings prospects of their firms cannot be completely discerned by the existing test methodology. The possibility exists that investors may rationally or irrationally conclude that dividend changes are always used by managers as a signaling device. This causes them to positively (negatively) react to the dividend increases (decreases) but without contemplating that in addition to signaling, managers may change dividends for other reasons. Moreover, Watts (1973), Gonedes (1978), Penman (1983), DeAngelo et al. (1996), Benartzi et al. (1997), Nissim and Ziv (2001), Grullon, Michaely, and Swaminathan (2002), Brav et al. (2005), Grullon et al. (2005), Denis and Osobov (2008), Braggion and Moore (2011), etc., directly examine whether dividend changes can predict subsequent accounting earnings changes instead of future stock returns. However, their results still cannot completely discern whether the relationship between dividend changes and subsequent earnings changes is due to signaling because

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managers may change dividends, for example, to retain more capital for future investments or disburse excess cash for which they have no better alternative use. In short, no matter what the motives are, the distribution of dividends itself may have an impact on future earnings. According to Myers and Majluf (1984), internal finance for projects is preferable to external finance because of its lower costs and less resistance. With regard to dividend changes, because dividend increases reduce the funds available for investment, firms may either lose potential positive net present value (NPV) projects or have to finance the projects with higher costs. Either may result in a decline in future earnings. Alternatively, the well-known constant dividend growth model (Gordon, 1962) shows that with constant expected return of portfolios, high dividend payouts should be offset by low expected earnings growth. On the contrary, the agency theory (Jensen, 1986, 1988; Jensen & Meckling, 1976) yields different predictions. Since managers could allocate resources to activities that benefit themselves or invest in negative NPV projects, the increased payouts can reduce potential agency costs. Meanwhile, dividend payouts also bring firms under greater monitoring of capital markets as the firms will visit the capital markets more frequently for financing needs. Both situations will be beneficial to firm future earnings. Therefore, there is no unique impact of dividend changes on future earnings.

Testing the signaling hypothesis by examining if dividend changes can predict subsequent stock price changes or accounting earnings changes is the appropriate methodology if signaling is the unique motive for dividend changes; otherwise, other motives for dividend changes should also be controlled for in the test. Specifically, in addition to signaling, other motives for changing dividends are possible. Examples include distributing free cash flow to reduce the agency costs arising due to the conflict between insiders and outsiders (e.g., DeAngelo, DeAngelo, & Stulz, 2006; Easterbrook, 1984; Grullon & Michaely, 2004; Lang & Litzenger, 1989; Michaely & Roberts, 2012; Rozeff, 1982), catering to the preference for dividends from heterogeneous clientele (e.g., Baker & Wurgler, 2004a, 2004b; Desai & Jin, 2011; Ferris, Jayaraman, & Sabherwal, 2009; Li & Lie, 2006), and confirming the persistence of previous earnings changes (e.g., Koch & Sun, 2004). In this paper, we perform a more direct and intuitive test of the dividend signaling hypothesis by examining how current dividend changes are influenced by future earnings changes rather than by examining how future earnings changes can be predicted by current dividend changes as in previous studies. To do so, we employ a simultaneous-equation model system incorporating an equation that allows us to regress current dividend changes on future earnings changes and at the same time controls for other motives of dividend changes, as well. Our methodology more accurately tests the signaling hypothesis because if the signaling hypothesis is true, meaning that managers possess insider information about firm earnings prospects and use dividends as a signaling tool, then the implication is, it should be the forecasted future earnings changes that determine current dividend changes but not the reverse. More precisely, it is not that managers change dividends and future earnings change, but that managers know with a high degree of certainty that future earnings will change, and they change their dividends now. Although the data on forecasted future earnings changes are not available, actual future earnings changes should be close and positively related to them as managers are insiders. Thus we use the actual future earnings changes as the proxy for the forecasted future earnings changes in our analysis.

This paper contributes to the literature in several ways. First, we provide a workable test for the dividend signaling hypothesis with a more accurate model by examining whether dividends are changed on the basis of managers' expectation of earnings prospects. The simultaneous-equation model incorporates a "dividend change equation" and a "future earning change equation," where the future earning change equation is the regression of future earnings changes on dividend changes. The incorporation of the future earning change equation together with the dividend change equation addresses the mutually

endogenous problem between dividend changes and future earnings changes not fully controlled for in previous studies. Specifically, if prospects signaling is the purpose of dividend changes, dividend changes should depend on future earnings changes. However, dividend changes may in turn affect future earnings due to the changed capital structure as discussed above. This means that if a univariate equation is estimated using the ordinary least squares (OLS) method, the results can be biased and inconsistent and then lead to a wrong inference. In this study, we combine the future earning change equation (both the linear and nonlinear forms in Nissim and Ziv (2001) and Grullon, Michaely, Benartzi, and Thaler (2005), respectively) with the dividend change equation in a simultaneous equation framework. As a result, the estimated model system can simultaneously test whether managers change dividends to signal earnings prospects and whether dividend changes can be used to predict future earnings changes. We estimate the model system by applying the method of two-stage least squares (2SLS).

Second, this paper also contributes to the debate on the predictive ability of dividend changes on future earnings changes using a more recent data set of dividend announcements than available studies. The predictive ability of dividend changes has been analyzed using different methodologies, both linearly and nonlinearly, by a number of researchers with conflicting results. Nissim and Ziv (2001), for example, base their analysis on using "linear" equation specification to model the mean reversion of earnings. Specifically, Nissim and Ziv assume that the relationship between ROE and dividend changes can be modeled linearly in a regression framework. They find that dividend changes are positively related to future earnings changes, future earnings, and future abnormal earnings. Grullon et al. (2005) criticize Nissim and Ziv for controlling for a wrong linear form of the mean reversion in earnings, which can lead to a spurious positive correlation between dividend changes and future earnings changes. Their criticism is based on Brooks and Buckmaster (1976), Elgers and Lo (1994), and Fama and French (2000) who find that the mean reversion process of earnings are highly nonlinear. Grullon et al., therefore, modify Nissim and Ziv's regression model to incorporate a nonlinear earnings process. Using this methodology, the significance of the coefficient of dividend changes disappears, showing no support for the information content of dividends about earnings prospects. On the other hand, more recently, applying both Nissim and Ziv's linear and Grullon et al.'s nonlinear models to the dividend events of British firms between 1895 and 1905, Braggion and Moore (2011) find strong support for the information content of dividends under both models.

Third, this paper contributes to the issue concerning why firms pay dividends. We control for various other factors which may influence firms' dividend decisions in the dividend change equation. The factors include controls to account for the free cash flow hypothesis, the previous earnings hypothesis, and the catering hypothesis. According to Jensen (1988), managers may pay out cash that is surplus after they finish investing in all available positive NPV projects to reduce agency costs. Firms with more free cash flow have more ability and incentives to divert their cash flow from investing in traditional/safer projects to more risky projects (Banko & Zhou, 2010). DeAngelo and DeAngelo's (2006) lifecycle theory argues that firms may alter dividends through time in response to the evolution of their investment opportunity set. If firms have fewer investment opportunities, they are expected to pay more dividends to mitigate the possibility that the free cash flow would be wasted. Lang, Stulz, and Walkling (1991) show that firms with high cash flow and low investment opportunity experience the greatest agency costs. Thus, we include the interaction of the changes in free cash flow and the changes in investment opportunity set in our model equations to test the free cash flow hypothesis. Moreover, Benartzi, Michaely, and Thaler (1997) find that firms that increase (decrease) dividends in year 0 have experienced significant earnings increases (decreases) in year -1 and 0, but find no subsequent unexpected earnings growth (decline). Koch and Sun (2004) also show that dividend changes are used as a signal about the persistence of past earnings changes because

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