“Preparing” the Equity Market for Adverse Corporate Events: A Theoretical Analysis of Firms Cutting Dividends

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Abstract

This paper presents the first theoretical analysis of the choice of firms between “preparing” and not preparing the equity market in advance of a possible dividend cut. In our model, insiders have private information about their firm’s intermediate cash flow as well as about the net present value of its growth opportunity. We show that, in equilibrium, firms in temporary financial difficulties but with good long-term growth prospects are more likely to prepare the market in advance of dividend cuts, while those with permanently declining earnings are less likely to prepare the market. Our model generates several new testable predictions.

I. Introduction

Should firms “prepare” the equity market for adverse corporate events? Does such market preparation indeed matter for a firm’s future operating and stock return performance? Further, if firm insiders receive some private information that their firm may perform poorly in the future, should they inform investors about this adverse information as soon as possible, or should they wait to release this information? In other words, does the nature of the private information received by firm insiders affect the manner in which they release this information to the equity market?

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Consider the case of a firm contemplating a dividend cut in the future. Firm insiders may have received some private information about a potential decline in future earnings, or that the current level of dividends is unsustainable for some other reason (e.g., a change in the competitive environment requiring it to retain more cash within the firm). Under these circumstances, should insiders release a statement to the market that they are reviewing the dividend, and indicating that there is a possibility of a dividend cut (i.e., “prepare” the market for a dividend cut)? Or should they wait until they in fact decide to cut their firm’s dividends before making any announcement? The former strategy seems to have been adopted by Gould when it cut its quarterly dividend from $0.43 to $0.17 per share on Dec. 6, 1983. Several months prior to the dividend cut, management released a statement announcing that it was reviewing the company’s dividend policy to determine its consistency with the firm’s new business strategy. On the other hand, when ITT cut its dividend from $0.69 to $0.25 per share on July 10, 1984, it seems to have adopted the latter strategy (i.e., not providing any information in advance of the actual dividend cut announcement).

The above raises several interesting questions. First, is preparing the market or not preparing the market for a potential dividend cut a dominant strategy, in the sense that all firms would be strictly better off following one or the other strategy? Alternatively, are some firms better off preparing the market, while others are better off not doing so? If the latter case is true, what are the characteristics of firms that are better off preparing the market compared to those that are worse off doing so? In particular, what is the relationship between the “transparency” of a firm (i.e., the ease with which outsiders can detect a firm’s true cash flows) and its propensity to prepare the market for a potential dividend cut? Finally, what are the implications of a firm preparing or not preparing the market for the announcement effect upon a dividend cut, its future operating and dividend payment performance, and its future stock return performance? There has been no literature so far that allows us to answer the above questions. The objective of this paper is to fill this gap in the literature. We develop a theoretical analysis of the equilibrium choice of a firm between preparing and not preparing the market for a potential dividend cut. Our model generates several testable predictions for empirical research.

We consider a setting in which a firm has assets in place that will generate a high or low intermediate cash flow and a new positive net present value (NPV) project, which needs to be funded from the firm’s internal cash flow. The firm currently pays a certain dividend, and we assume that, while a high intermediate

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1A large theoretical literature analyzes the signaling effect of dividend changes (see, e.g., Allen, Bernardo, and Welch (2000), Bhattacharya (1979), John and Williams (1985), and Miller and Rock (1985)). There is a theoretical literature analyzing a firm’s choice between alternative cash disbursement methods and the market’s response to them (see, e.g., Brennan and Thakor (1990), Chowdhry and Nanda (1994), Oded (2005), or Ofer and Thakor (1987)). See also the broader corporate finance theoretical literature on the role played by various corporate decisions in conveying information to the equity market (see, e.g., Allen and Faulhaber (1989) or Welch (1989)), and on the interaction between outside investors and firm insiders in a setting characterized by moral hazard (see, e.g., Ravid and Spiegel (1997)).

2The anecdotes of Gould and ITT are provided by Woolridge and Ghosh (1985). They, however, do not focus on firms preparing versus not preparing the market in their empirical analysis.
cash flow generated by the firm’s assets in place would be adequate to not only fund the investment opportunity, but also to maintain the current dividend level, a low intermediate cash flow realization would require the firm to either cut its dividend from its current level or to pass up its growth opportunity. The equity market is characterized by asymmetric information: The manager (insider) has private information about the probability of the firm realizing a high intermediate cash flow and also the intrinsic value of its growth opportunity. We capture this private information by assuming that there are three types of firms with only the manager observing firm types to begin with. High intrinsic value (type $G$) firms have a high likelihood of realizing a high intermediate cash flow, and have a high NPV growth opportunity; medium intrinsic value (type $M$) firms have a lower probability of realizing a high intermediate cash flow, but like high-type firms, they have a high NPV growth opportunity; and finally, low intrinsic value (type $B$) firms not only have the lowest chance of realizing a high intermediate cash flow, but also have the lowest NPV growth opportunity. Low intrinsic value (type $B$) firms are also assumed to have a positive probability of deteriorating further (prior to a possible dividend cut), in which case their true type becomes observable to outsiders as well.3

In the above setting, we analyze the equilibrium choice of a firm about whether or not to prepare the equity market in advance of a possible dividend cut, as well as its decision to cut or not to cut its dividend (after its intermediate cash flow is realized). First, consider the high intrinsic value firm. It clearly will not choose to prepare the market in equilibrium, since there is little chance that it will realize a low intermediate cash flow and therefore little chance of its having to cut its dividend in the first place. Now consider the medium intrinsic value firm. It does have an incentive to prepare the market for a possible dividend cut, depending on the following trade-off: On the one hand, preparing the market by preannouncing that there is a possibility of a dividend cut conveys negative information to the equity market, thereby depressing the current stock price. However, in the event that the firm has to cut its dividend subsequently, preannouncing the dividend cut indicates to the market that the firm is likely a medium intrinsic value firm rather than a low intrinsic value firm (i.e., it indicates that, while the firm is in temporary financial difficulties, its long-term growth prospects are good); this, in turn, ensures that in the event of a dividend cut, its stock price does not fall to the true level of the stock price of a low intrinsic value firm (which is a firm that not only has short-run financial difficulties, but also poor long-term growth prospects). Balancing the benefits and costs of preparing the market prior to dividend cuts, the medium intrinsic value firm chooses to prepare the market with some probability and not to prepare the market with the complementary probability (i.e., it plays a mixed strategy between preparing and not preparing the market).

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3This assumption is meant to capture, in the simplest possible way, the idea that there may be some additional (partial) revelation of information about firm types prior to a possible dividend cut. Our results go through even if we make the more general assumption that all three types of firms have some probability of deterioration (see footnote 10 for details).
Finally, consider the low intrinsic value firm. It faces a trade-off similar to the medium intrinsic value firm: Preparing the market is costly to it, since it has the effect of depressing the current stock price (the market realizes that it cannot be a high intrinsic value firm) but also has benefits, since it allows the low intrinsic value firm to mimic the medium intrinsic value firm in the event of a dividend cut (thus preventing its stock price from falling to the level it would fall to if outsiders inferred it to be of low intrinsic value with probability 1). However, given that the low intrinsic value firm also faces a positive probability of future deterioration that would reveal its true type to the equity market regardless of whether it prepared the market for a dividend cut or not, the low intrinsic value firm chooses to prepare the market with some probability and not to prepare the market with the complementary probability (i.e., it mixes between preparing and not preparing the market). Although both the medium and low intrinsic value firms play a mixed strategy between preparing and not preparing the market, the medium intrinsic value firm prepares the market with a higher probability than the low intrinsic value firm in equilibrium.

The dividend-cut decision, made by firm insiders after they observe the realization of the firm’s intermediate cash flow, is straightforward in the above setting. All three types of firms will maintain the current level of dividends and invest in the firm’s growth opportunity if they realize a high intermediate cash flow. They will cut their dividend and implement the firm’s positive NPV growth opportunity if they realize a low intermediate cash flow. As long as the NPV of the firm’s new project is significant, no type of firm has an incentive to maintain the current dividend level in the event of realizing a low intermediate cash flow by passing up the firm’s positive NPV project, since the loss in long-term value arising from passing up the new project will be greater than any temporary stock valuation benefits from maintaining the current dividend level.4

Given the above equilibrium behavior by the three types of firms, the combination of a firm’s decision to prepare (or not prepare) the equity market for a dividend cut and the subsequent decision to cut the dividend or not conveys information to the equity market. First, the decision to prepare the market for a dividend cut conveys negative information to the market, since the decision indicates to outsiders that the firm is likely to be a medium or low intrinsic value (rather than a high intrinsic value) firm, and they therefore use this information to assign a lower price to its equity (i.e., there is a negative stock price reaction on the market-preparation day). Second, a firm that does not prepare the market but subsequently cuts its dividend conveys to outsiders that it is more likely to be a low intrinsic value firm, prompting a severe negative stock price

4Note, however, that while we formally assume, for simplicity, that the firm needs to implement the new project from internal financing, all our results will go through qualitatively unchanged even if we allow the firm to raise external financing for the firm’s project as long as the amount of external financing is observable by the financial market. This is because outside investors can net out the amount of external financing raised and make inferences about firm type (as in our existing model), so that the broad intuition behind our results will continue to hold. Furthermore, one way to incorporate new equity issues into our setting would be to replace dividends in our analysis by “net dividends”: that is, total cash dividends paid by the firm to all shareholders net of any new equity issue proceeds (see Miller and Rock (1985) for a similar assumption).
reaction on the day of the dividend-cut announcement: In this case, the information conveyed to the market is that the firm has not only realized a low intermediate cash flow but also has poor long-term growth opportunities. Finally, a firm that prepares the market and subsequently cuts its dividend conveys to outsiders that it is more likely to be a medium intrinsic value firm. In this case, a dividend cut conveys negative information to the equity market, but the stock price reaction to the dividend cut will be less negative than in the previous scenario (where the firm cuts its dividend without market preparation). This is because the market realizes that the firm has realized a low assets-in-place (intermediate) cash flow and does not indicate anything negative about its future growth opportunity.

Our model generates several testable predictions. First, our model predicts that more transparent firms are less likely to prepare the market prior to dividend cuts. Second, firms in industries with high perceived industry risk are more likely to prepare the market than firms in industries with low perceived industry risk. Third, firms with lower current profitability but higher long-term growth opportunities are more likely to prepare the market prior to dividend cuts. Fourth, the announcement effect on the market-preparation day will itself be negative. Fifth, firms cutting dividends subsequent to preparing the market will have a more favorable (less negative) announcement effect compared to the announcement effect of those cutting dividends without such market preparation. Sixth, even if we combine the market reactions of prepared dividend cutters on both the market-preparation day and on the dividend-cut announcement day and compare that to the announcement effect of nonprepared dividend cutters, prepared dividend cutters will still have a less negative market reaction. Seventh, the announcement effect will be less negative both on the market-preparation day and the dividend-cut announcement day for firms in industries with low perceived industry risk. Finally, the long-term operating, dividend payment, and stock return performance subsequent to dividend cuts will be more favorable for prepared dividend cutters compared to nonprepared dividend cutters. In a recent empirical study, Chemmanur and Tian (2012) use a hand-collected sample of dividend-cutting firms to test five of the above predictions of our model (the third to the sixth and the eighth). Their empirical findings strongly support these model predictions. We discuss their findings and how they relate to our model predictions at some length in Section IV.

In addition to its implications for the decision to prepare or not prepare the market in advance of dividend cuts, our analysis also has implications for firms’ choice regarding whether or not to prepare the market in advance of other adverse corporate events, and for the optimal timing of the release of bad news in general. There are three categories of firms in our setting. The first category of firms has good financial health and is unlikely to incur adverse corporate events. They, therefore, do not need to prepare the market in the first place. The second category of firms is expecting permanently declining operating efficiency (e.g., reduced earnings or poor long-term growth opportunities). These firms never prepare the market because they would prefer to delay revealing their true value to the equity market for as long as possible, thus enjoying a higher stock price for a longer period. The third category of firms is in between the other two. Firms in
this category may face temporary financial difficulties but have good long-term
growth prospects. They are more likely to prepare the market in advance of ad-
verse corporate events, since the strategy of revealing bad news earlier allows
them to credibly separate themselves (to a greater degree) from the second cate-
gory of firms in case the adverse corporate event actually happens to them. The
most immediate application of our theory outside market preparation around div-
idend cuts seems to be for the analysis of the optimality of firms issuing earnings
warnings in the face of negative earnings surprises. While some have argued that
firms are better off disclosing bad news early to lower litigation risk (e.g., Skinner
(1994)), the optimality or otherwise of firms issuing earnings warnings is con-
troversial in the accounting literature. For example, while the empirical study
of Kasznik and Lev (1995) documents that warning firms experience lower stock
returns than nonwarning firms, the empirical study of Shu (2005) shows that,
after controlling for self-selection bias, both warning and nonwarning firms seem
to have made the right choice of disclosure strategy (i.e., both kinds of firms would
have experienced worse stock returns had they adopted the alternative strategy).
While the objective of the current paper is not to address this issue, our model
provides some guidance that helps to resolve the above controversy.

This is the first paper in the literature to develop a theoretical analysis of the
choice of a firm regarding whether or not to prepare the equity market for a divi-
dend cut (or for any other corporate event). Thus, the theoretical literature closest
to this paper is the literature on signaling through dividends or announcing share
repurchases (see, e.g., Allen, Bernardo, and Welch (2000), Bhattacharya (1979),
John and Williams (1985), and Miller and Rock (1985)). In contrast to the above
literature, where the decision to change dividends alone conveys information to
outsiders, in our setting it is the combination of the decision whether to prepare
the market and the dividend-cut decision that conveys information to the market
about the firm’s future prospects.

The small empirical literature on the timing of dividend announcements is
indirectly related to our paper: see, for example, Kalay and Loewenstein (1986),
who show that late announcement of dividends is disproportionately associated
with bad news (dividend reductions).\(^5\) Our paper is also broadly related to the
large literature analyzing the relationship between dividend changes and omis-
sions to prior and subsequent operating performance, as well as the literature on
the information content of dividend changes (see, e.g., Watts (1973), Aharony
and Swary (1980), Asquith and Mullins (1983), Healy and Palepu (1988), and
DeAngelo, DeAngelo, and Skinner (1992)). Our theoretical analysis can explain
a puzzling empirical finding of this literature, namely, that while dividend reduc-
tions are strongly related to poor earnings performance concurrently and in the
immediate past, they are not a strong predictor of poor future earnings. In contrast
to dividend signaling models in the existing theoretical literature, our analysis
predicts that dividend cuts do not, by themselves, predict poor future operating
performance: In our setting, whether dividend cuts predict poor future operating
performance or not depends on the nature of the private information held by firm

\(^5\)See also Kothari, Shu, and Wysocki (2009), who show management on average delays the release
of bad news.
The rest of the paper is organized as follows: In Section II, we describe the essential features of our model, and we characterize its equilibrium in Section III. In Section IV, we describe the testable predictions of our model. We conclude in Section V. The proofs of all propositions and detailed parameter restrictions in various propositions are confined to the Appendix.

II. Model

The model has three dates: time 0, time 1, and time 2. There are two types of agents in the model: the firm manager (insider) and outside investors. The firm has assets in place and a new NPV project (growth opportunity) that it is going to implement. The firm’s assets in place will generate an intermediate cash flow at time 1 with two possible outcomes: high \( h \) or low \( l \). The new project needs an investment \( I \) at time 1, and it generates a payoff with a high \( H \) or low \( L \) realization at time 2. For simplicity, we normalize the low cash flow realization of the new project to be zero \( (L = 0) \).

The investment requirement is fulfilled by internal financing (i.e., the realization of the intermediate cash flow generated from assets in place). Note, however, that while we formally assume, for simplicity, that the firm needs to implement the new project from internal financing, all our results will go through qualitatively unchanged even if we allow the firm to raise external financing for the firm’s project, as long as the amount of external financing is observable by the financial market. This is because outside investors can net out the amount of external financing raised and make inferences about firm type (as in our existing model), so that the intuition behind our results will continue to hold. Furthermore, one way to incorporate new equity issues into our setting would be to replace dividends in our analysis by “net dividends”: that is, total cash dividends paid by the firm to all shareholders net of any new equity issue proceeds (see Miller and Rock (1985) for a similar assumption).\(^7\)

At time 1, the firm pays out a dividend \( D \), which is its intermediate cash flow generated from assets in place net of its investment \( I \) in its new project (if it chooses to implement it). In the interest of analytical tractability, we assume that the firm’s current dividend level \( D \) is equal to \( h - I \), and \( l = I = D \), that is, if the firm has a high realization of the intermediate cash flow at time 1, after investing \( I \) in the new project, the firm can maintain its current dividend level; if the firm has a low realization of its intermediate cash flow at time 1, the firm

\( ^6 \)There have been some practitioner-oriented papers providing anecdotes indicating that at least some firm managers are concerned about preparing the market in advance of dividend cuts (see, e.g., Woolridge and Ghosh (1985)) and also that managers are concerned about the proper manner in which to release negative information about dividends to the equity market (see, e.g., Soter, Brigham, and Evanson (1996)). See also the HBS case “Florida Power and Light (FPL)” (HBS# 9-689-041), which highlights the importance in practice of appropriately communicating the possibility of a future dividend cut to the equity market.

\( ^7 \)Even when the amount of external financing is not directly observable at the time of the firm’s dividend decision, all our results will go through qualitatively unchanged, provided the conditions we specify in Section III.B are satisfied.
can either cut the dividend to 0 if it chooses to implement the new project or pay out its current dividend level $D$ by passing up the new project. We assume that all agents are risk neutral, the risk-free rate of return is 0, and the firm manager holds all of the firm’s equity. The sequence of events is depicted in Figure 1.

### FIGURE 1

**Sequence of Events**

- Firm insiders receive their private information; they choose to prepare the market for a dividend cut or not.
- Cash flow from assets in place is realized; firm insiders announce a dividend cut if needed. Firm insiders choose whether or not to implement the new project.
- Cash flow from the new project is realized.

If firm is of type $B$, it deteriorates with probability $\lambda$, fully revealing its true type.

### A. Information Structure

The equity market is characterized by asymmetric information. In particular, we assume that there are three types of firms: $G$ (good), $M$ (median), or $B$ (bad), with the intrinsic value of the type $G$ firm being higher than that of the type $M$ firm, which in turn is higher than that of the type $B$ firm, $V_G > V_M > V_B$.

We denote firm type by $k$, $k \in \{G, M, B\}$, and the type $k$ firm’s probability of getting a high realization of the intermediate cash flow at time 1 by $\beta_k \equiv \text{prob}(h|k)$. We assume that a type $G$ firm always has a high realization of the intermediate cash flow at time 1, denoted for $\beta_G \equiv \text{prob}(h|k=G) = 1$. The type $B$ firm always has a low realization of the intermediate cash flow at time 1, denoted for $\beta_B \equiv \text{prob}(h|k=B) = 0$. The type $M$ firm has a medium probability of getting high realization of the intermediate cash flow, denoted for $\beta_M \equiv \text{prob}(h|k=M)$. The probabilities of a high realization of the intermediate cash flow of the different types of firms satisfy $0 = \beta_B < \beta_M < \beta_G = 1$.

We further denote a firm’s probability of getting a high cash flow from its new project at time 2 by $\theta_k \equiv \text{prob}(H|k)$. A type $G$ firm is good at implementing the new project and has a probability $\theta_G$ of getting cash flow $H$ (i.e., $\theta_G \equiv \text{prob}(H|k=G)$). The type $M$ firm has a probability $\theta_M$ of getting the high cash flow $H$. The type $B$ firm has probability $\theta_B$ of getting high cash flow. The probabilities of a firm’s getting a high cash flow from the new project satisfy $\theta_B < \theta_M = \theta_G$.

Since even the type $B$ firm has a positive NPV project, $H\theta_B - I > 0$.

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8For simplicity, we assume $\theta_G = \theta_M$, but relaxing this assumption does not affect our model’s results.
While firm insiders observe the type of their own firm, outsiders observe only the prior probability distribution across firm type at time 0: Outsiders believe that the firm is of type $G$ with probability $\gamma_G$; of type $M$ with $\gamma_M$; and of type $B$ with probability $\gamma_B$: $\gamma_G + \gamma_M + \gamma_B = 1$. For expositional simplicity, we drop the subscript $M$ and refer to $\gamma_M$ as $\gamma$, and assume, for analytical tractability, that $\gamma_G = \gamma_B = (1 - \gamma)/2$. Between time 0 and time 1, a type $B$ firm may deteriorate visibly with a probability $\lambda$ such that outsiders are able to distinguish its true type from that of type $G$ and type $M$ firms; the type $B$ firm will not deteriorate with the complementary probability $(1 - \lambda)$. The higher-type firms, type $G$ and type $M$, do not suffer from any probability of deterioration. All parameters of the model are common knowledge, and outside investors can observe whether the firm implements the new project at time 1 or not. At time 2, the new project’s cash flow is realized so that the asymmetric information between firm insiders and outsiders is resolved completely.

B. The Manager’s Objective and Dividend Decisions

The manager needs to make two different decisions regarding the dividend at different points in time. At time 0, the manager observes his true type $k$ and decides whether or not to prepare the market by preannouncing a dividend cut. We denote by $a \in \Theta \equiv \{NP, P\}$, the manager’s action set at time 0, where $NP$ stands for not preparing the market and $P$ stands for preparing the market. At time 1, the manager decides whether to cut the dividend or not (and if he decides to cut, by how much) after he observes the firm’s intermediate cash flow. If the high intermediate cash flow is realized, the firm has enough cash to both fulfill the investment requirement and maintain the current dividend level $D$; if, however, the low intermediate cash flow is realized, insiders need to determine whether to cut the dividend to 0 or pass up the new project. We denote by $b \in \Omega \equiv \{NC, C\}$, the manager’s action set at time 1, where $NC$ stands for not cutting the dividend and $C$ stands for cutting the dividend.

At time 0, the manager chooses his action $a$ to maximize his objective (1), which is the weighted average of the firm’s current, intermediate-term, and long-term stock price. He chooses his action $b$ at time 1 after observing the realization of the firm’s cash flow from its assets in place to maximize the value of his

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9The assumption that $\gamma_G = \gamma_B = (1 - \gamma)/2$ is not crucial to our model, and the relaxation of this assumption does not affect our results qualitatively.

10Our results go through qualitatively unchanged even if we make a more general version of this assumption, which involves all three types of firms having a positive probability of deterioration, with the higher types of firm having a lower probability of deterioration compared to lower types: that is, $\lambda_G < \lambda_M < \lambda_B$, although various expressions become more complicated in that case. This assumption is meant to capture the idea that, as the intrinsic quality of a firm is worse, its true quality has a greater chance of being revealed exogenously. See Allen and Faulhaber (1989) or Stein (1992) for analogous assumptions, in the context of theoretical models of initial public offering underpricing and convertible debt, respectively.

11Since the new project has a positive NPV, it can be shown that insiders will never raise the dividend by passing up the project when they get a high realization of the intermediate cash flow.
objective for the remainder of the game, given by expression (2). Then, at time 0 the manager chooses his market-preparation policy $a$ to maximize

$$\max_{a \in \Theta} \alpha_0 V_0(a) + \alpha_1 E_0[V_1(a,b)] + \alpha_2 E_0[V_2(b)],$$

subject to

$$b \in \arg \max \alpha_1 V_1(a,b) + \alpha_2 E_1[V_2(b)],$$

where $V_0$, $V_1$, and $V_2$ denote the value of the firm equity at times 0, 1, and 2, respectively, and $\alpha_0$, $\alpha_1$, and $\alpha_2$ are the weights placed by the manager on the firm’s time 0, time 1, and time 2 stock prices, respectively.\(^{12}\)

In expression (1), the firm’s expected stock price at time 1 conditional on the information available to the manager at time 0 is given by $E_0[V_1(a,b)] = \beta J V_{NC|a} + (1 - \beta) V_{C|a}$, where the superscript “$NC|a$” stands for the strategy path that the firm does not cut the dividend conditional on the manager’s action $a$ at time 0, and the superscript “$C|a$” stands for the strategy path that the firm cuts the dividend conditional on the manager’s action $a$ at time 0. At time 2, the firm’s expected stock price $V_2$ is $\Theta \theta_2$ if the firm chooses to implement its new project and is 0 if the firm does not implement its new project. In other words, the firm’s stock price at time 2 is a function of its dividend decision $b$ made at time 1 (i.e., $V_2 = V_2(b)$).

### III. Equilibrium

We will now characterize the equilibrium of the model. Equilibrium strategies and beliefs in our model are defined as those constituting a Pareto dominant or efficient Perfect Bayesian Equilibrium (PBE) satisfying the Cho-Kreps intuitive criterion, where the higher type (type $G$) firms engage only in pure strategies (i.e., only the type $M$ and type $B$ firms engage in mixed strategies). Before going on to characterize the equilibrium of our model, we analyze the problem faced by each type of firm.\(^{13}\)

#### A. Analysis of the Firm’s Problem

We now analyze the trade-offs faced by the three types of firms in arriving at their equilibrium strategies. In particular, we analyze how each type of firm arrives at its equilibrium choice of market preparation and dividend cuts. In our

\(^{12}\)Note that this simplified objective function is adopted only to minimize mathematical complexity. This objective function can be thought of as capturing the notion that the CEO of a firm is concerned about both the short-term as well as the long-term stock price of the firm (see, e.g., Ross (1977) or Miller and Rock (1985) for similar objective functions). Alternatively, we can think of such an objective function as arriving from the manager’s desire to maximize the long-term value of current shareholders’ wealth in a setting where the firm funds part of its investment requirement by issuing new equity at time 0 and at time 1. In the latter setting, the manager cares about the firm’s stock price at time 0 and at time 1 (as well as at time 2), since selling equity at an undervalued price at these two dates will dilute the equity holdings of current shareholders, thus reducing their long-term wealth.

\(^{13}\)Thus, we look for PBE, which minimizes the aggregate dissipative costs incurred by the higher-type firms. See Fundenberg and Tirole (1991) for a formal definition of a PBE, and Milgrom and Roberts (1986) for an application of Pareto dominant or efficient PBE to signaling games. The Cho-Kreps intuitive criterion is formally defined in Cho and Kreps (1987).
discussion below, we will focus primarily on the type $M$ and type $B$ firms, since, given the equilibrium choices made by the type $M$ and type $B$ firms, the type $G$ firm is always clearly worse off from mimicking the above two types of firms compared to its payoff if it follows its full information equilibrium strategy.

1. The Type G Firm’s Problem

The type $G$ firm has a probability 1 of realizing a high intermediate cash flow at time 1, and also has favorable private information about its new project. The type $G$ firm knows that it will have enough cash at time 1 to maintain its current dividend level $D$, and therefore it does not have any incentive to prepare the equity market for a dividend cut at time 1, since it does not need to cut its dividend in the first place. The type $G$ firm therefore does not prepare the market at time 0, and maintains its current dividend level $D$ by distributing a cash dividend of $D = h - I$ at time 1, maximizing its objective.

2. The Type M Firm’s Problem

The type $M$ firm has a moderate probability, $\beta_M$, of realizing a high intermediate cash flow. At time 0, the type $M$ firm chooses between preparing the market or not. Similarly, at time 1, it will choose one of two strategies if it realizes a low intermediate cash flow: It can cut its dividend and use the cash flow it conserves to implement the new project; alternatively, it can maintain the current level dividend $D$ while passing up its new positive NPV project. However, if the type $M$ firm realizes a high cash flow at time 1, it does not need to make any such choice, since, in this case, it will have enough cash both to maintain its current dividend and to implement its new project. Thus, combining the two choices that the type $M$ firm has at time 0 (preparing vs. not preparing the market) with the two choices it has at time 1 (cutting its dividend vs. not cutting it), the type $M$ has four pure strategies. Below, we present the expected payoff of the type $M$ firm if it plays each of these pure strategies.\(^{14}\)

If it prepares the market and chooses to cut the dividend if the low intermediate cash flow is realized at time 1, the type $M$ firm’s payoff at time 0 is given by $J_M = \alpha_0 V_P^0 + \alpha_1 [\beta_M V_C^{NC|P} + (1 - \beta_M) V_C^{P}] + \alpha_2 H_0 G$, where $V_C^{NC|P}$ stands for the firm’s stock price at time 1 conditional on the strategy path by which it prepares the market at time 0 and does not cut the dividend at time 1, and $V_C^{P}$ stands for the firm’s stock price at time 1 conditional on the strategy path by which it prepares the market at time 0 and cuts its dividend at time 1. With probability $\beta_M$, the type $M$ firm gets a high intermediate cash flow and maintains the current dividend level and gets the stock price of $V_C^{NC|P}$. With the complementary probability $1 - \beta_M$, it gets a low intermediate cash flow and cuts its dividend, thereby getting the stock price of $V_C^{P}$. The type $M$ firm’s stock price at time 2 is its expected cash flow.

\(^{14}\)We allow the type $M$ firm to mix between preparing and not preparing the market at time 0 (indeed, we will show that this is what happens in equilibrium). However, for ease of exposition, we will discuss in detail the type $M$ firm’s time 0 expected payoff corresponding only to its four pure strategies. Note, however, that the type $M$ firm’s payoff from a mixed strategy at time 0 is simply a weighted average of its payoff from the corresponding pure strategies with the mixing probabilities of preparing and not preparing the market serving as the weights.
from the new project (i.e., \(H\theta_0\)). On the other hand, if a type \(M\) firm prepares the market at time 0 but chooses to maintain its current dividend level by paying out \(D = l\) and passing up the new project even when the low intermediate cash flow is realized at time 1, its expected payoff is given by \(J'_{M} = \alpha_0 V'_0 + \alpha_1 V'_{NC|P}\).

If, however, the type \(M\) firm chooses not to prepare the market and cuts its dividend when the low intermediate cash flow is realized at time 1, its expected payoff is \(J_{NP}^{M} = \alpha_0 V_{NP}^{0} + \alpha_1 [\beta M V_{NP}^{NC|NP} + (1 - \beta M) V_{NP}^{C|NP}] + \alpha_2 H\theta_G\). On the other hand, if the type \(M\) firm chooses to pay out its current dividend by passing up the new project even when the low intermediate cash flow is realized at time 1, its expected payoff at time 0 is given by \(J_{NP}^{M} = \alpha_0 V_{NP}^{0} + \alpha_1 V_{NP}^{NC|NP}\).

The type \(M\) firm chooses from the above four strategies in order to maximize its expected payoff. While the type \(M\) firm can maintain its current dividend and implement its new project if it realizes a high intermediate cash flow, it will have to cut its dividend if it realizes a low intermediate cash flow and wishes to implement its new project. Given that it may have to cut its dividend with a significant probability at time 1, the type \(M\) firm has an incentive to distinguish itself from the type \(B\) firm by preparing the market by preannouncing the possibility of a dividend cut at time 1. By doing so, it partially reveals its private information about its intermediate cash flow. The type \(M\) firm can credibly convey information by preparing the market, since, by doing so, the type \(M\) firm permanently distinguishes itself from the type \(G\) firm, and therefore suffers an immediate stock-price drop at time 0. Thus, while the cost to the type \(M\) firm of preparing the market at time 0 is this immediate stock-price drop upon market preparation, its benefit of preparing the market is that it allows the firm to distinguish itself from the type \(B\) firm in case it needs to cut its dividend at time 1, thus ensuring that its stock price does not fall to the true intrinsic value of a type \(B\) firm at that time. We will discuss the type \(M\) firm’s equilibrium choice among the above four strategies in Section III.B.

3. The Type B Firm’s Problem

Unlike the type \(M\) firm, the type \(B\) firm will get a low intermediate cash flow at time 1 with probability 1. Further, there exists a probability \(\lambda\) that the type \(B\) firm will deteriorate between time 0 and time 1, revealing its true type. Similar to the case of a type \(M\) firm, the type \(B\) firm can choose between preparing or not preparing the market at time 0, and subsequently cutting its dividend or not cutting its dividend. This yields the type \(B\) firm four pure strategies, and we present below the expected payoff to the type \(B\) firm if it plays each of these pure strategies.\(^{15}\)

The expressions for the type \(B\) firm’s expected payoff are very similar to the type \(M\) firm’s, with the difference that the type \(B\) firm is subject to an additional probability of deterioration \(\lambda\) that fully reveals its true type between time 0 and time 1. If the type \(B\) firm prepares the market at time 0 and chooses to cut its

\(^{15}\)We allow the type \(B\) firm to mix between preparing and not preparing the market at time 0 (indeed, we will show that this is what happens in equilibrium). However, for ease of exposition, we will discuss in detail the type \(B\) firm’s time 0 expected payoff corresponding only to its four pure strategies.
dividend at time 1, its expected payoff is given by 
\[ J_B^p = \alpha_0 V_0^p + \alpha_1 [\lambda V_1^{C|\text{TRUE}} + (1 - \lambda) V_1^{C|\text{TRUE}}] + \alpha_2 H\theta_B, \]
where \( V_1^{C|\text{TRUE}} \) is the firm’s valuation (stock price) at time 1 conditional on the arrival of the deterioration that fully reveals the type B firm’s true type. So, \( V_1^{C|\text{TRUE}} = H\theta_B \). On the other hand, if the type B firm chooses to prepare the market at time 0 and pays out the current dividend by passing up its new project if it does not deteriorate between time 0 and time 1, its expected payoff will be given by 
\[ J_B^n = \alpha_0 V_0^n + \alpha_1 [\lambda V_1^{C|\text{TRUE}} + (1 - \lambda) V_1^{N|\text{TRUE}}] + \alpha_2 H\theta_B. \]

If, however, the type B firm chooses not to prepare the market at time 0 and cuts its dividend at time 1, its expected payoff is given by 
\[ J_B^c = \alpha_0 V_0^c + \alpha_1 [\lambda V_1^{C|\text{TRUE}} + (1 - \lambda) V_1^{C|\text{TRUE}}] + \alpha_2 H\theta_B. \]
Finally, if the type B firm chooses not to prepare the market at time 0 and passes up its new project at time 1 to maintain its current dividend level, its expected payoff is 
\[ J_B^{NP} = \alpha_0 V_0^{NP} + \alpha_1 [\lambda V_1^{C|\text{TRUE}} + (1 - \lambda) V_1^{N|\text{NP}}] + \alpha_2 H\theta_B. \]

The type B firm will choose between preparing and not preparing the market at time 0, and between maintaining its current dividend level and cutting it at time 1 in order to maximize its expected payoff. The benefit to the type B firm of not preparing the market at time 0 is that it can mimic the type G firm at this time. However, the cost of not preparing the market is that, since (unlike the type G firm) the type B firm will realize a low intermediate cash flow with probability 1, its true type will be revealed with a high probability if it chooses to cut its dividend at time 1. The benefit to the type B firm of preparing the market is that this allows it to mimic the type M firm (we will see in the next section that the type M firm plays a mixed strategy between preparing and not preparing the market in equilibrium). However, the cost incurred by the type B firm if it prepares the market at time 0 is that its stock price will drop at this time, since preparing the market reveals that it is not a type G firm (recall that the type G firm never prepares the market at time 0 in equilibrium). Further, while preparing the market allows the type B firm to pool with the type M firm at time 0, it may not be able to continue pooling with the type M firm at time 1 with probability \( \lambda \) (since it will deteriorate between time 0 and time 1 with such a probability, causing its true type to be revealed). In other words, while preparing the market allows the type B firm to pool with the type M firm at time 0, it is able to maintain this pooling with the type M firm at time 1 only with a probability \( (1 - \lambda) \). Overall, the type B firm chooses to prepare or not prepare the market by trading off the above costs and benefits.

**B. Equilibria with Market Preparation**

We now characterize the equilibria of the model involving market preparation by at least one type of firm.

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\[ ^{16} \text{We can see that if the deterioration that reveals the type B firm’s true type arrives, the firm will always cut its dividend and implement the new project at time 1, since it is always a dominated strategy for the type B firm to pay out the current dividend and pass up the positive NPV project, } H\theta_B - I > 0 \text{ (given that, once its type is revealed, there is no longer any benefit from maintaining its current dividend, since there is no further possibility of pooling with higher-type firms).} \]
Proposition 1. (Equilibria with Market Preparation). Let $\alpha H \theta_B > \alpha_1 [(h - I) + H(\theta_G - \theta_B)]$. Then there exist equilibria that involve the following:

(i) If $\beta_M < \beta_M < \beta_M$ and $\lambda < \lambda < \lambda$, at time 0, the type $G$ firm does not prepare the market with probability 1. The type $M$ firm prepares the market with probability $\delta_M$ and does not prepare the market with the complementary probability $(1 - \delta_M)$. The type $B$ firm prepares the market with probability $\delta_B$ and does not prepare the market with the complementary probability $(1 - \delta_B)$. Furthermore, $0 < \delta_B < \delta_M < 1$.

(ii) If we replace the condition on $\beta_M$ in (i) with $\beta_M > \beta_M$ while keeping all other conditions the same, at time 0, the equilibrium involves the type $G$ firm not preparing the market with probability 1, the type $M$ firm preparing the market with probability 1, and the type $B$ firm preparing the market with probability $\delta_B$ and not preparing the market with the complementary probability $(1 - \delta_B)$. Furthermore, $0 < \delta_B < 1$.

(iii) At time 1, the type $G$ firm never cuts its dividend. The type $M$ firm maintains its current dividend level if a high intermediate cash flow is realized and cuts its dividend if a low intermediate cash flow is realized. The type $B$ firm always cuts its dividend from the current level. All three types of firms implement their positive NPV project regardless of the realization of the firm’s time 1 intermediate cash flow. The equilibrium behavior of the three types of firms at time 1 does not change regardless of whether the firm’s equilibrium behavior at time 0 is as specified in part (i) or in part (ii). \[17\]

In the equilibrium specified in part (i), the type $G$ firm never prepares the market at time 0, since firm insiders anticipate that it will realize the high intermediate cash flow at time 1 with probability 1, so that it will always have enough cash flow to maintain the current dividend level and also to implement its new project at time 1. In equilibrium, the type $M$ firm plays a mixed strategy between preparing and not preparing the market and prepares the market with probability $\delta_M$ as long as $\beta_M < \beta_M < \beta_M$. This is because, on the one hand, since $\beta_M < \beta_M$, the type $M$ firm faces a large probability of cutting its dividend at time 1, and it wants to distinguish itself from the type $B$ firm in case it has to cut the dividend. By doing so, it partially reveals its private information about its intermediate cash flow. The type $M$ firm can credibly convey information by preparing

\[17\] Consistent with the above equilibrium, outsiders believe a firm that does not prepare the market at time 0 and does not cut its dividend at time 1 to be of the type $G$ with probability $(1 - \gamma)((1 - \gamma) + 2\gamma(1 - \delta_M)/\beta_M)$ and of the type $M$ with probability $(2\gamma(1 - \delta_M)\beta_M)/((1 - \gamma) + 2\gamma(1 - \delta_M)/\beta_M)$; on the other hand, they believe a firm that does not prepare the market at time 0 but cuts its dividend at time 1 to be of the type $M$ with probability $(2\gamma(1 - \delta_M)(1 - \beta_M))/((1 - \gamma)(1 - \delta_M)/(1 - \delta_M)/(1 - \gamma)(1 - \delta_M))$ and of the type $B$ with probability $(1 - \gamma)(1 - \delta_M)/(1 - \delta_M)/(1 - \gamma)(1 - \delta_M))$. If a firm prepares the market at time 0, and does not cut its dividend at time 1, outsiders believe the firm to be the type $M$ with probability 1. Finally, if a firm prepares the market at time 0 and cuts its dividend at time 1, outsiders believe the firm to be of the type $M$ with probability $(2\gamma(1 - \delta_M)/\beta_M)/(2\gamma(1 - \delta_M)/\beta_M) + (1 - \gamma)\delta_B)$. They believe such a firm to be the type $B$ with probability $((1 - \gamma)\delta_B)/(2\gamma(1 - \delta_M)/\beta_M) + (1 - \gamma)\delta_B)$. Since all possible moves available to each type of firm are along the equilibrium path, Bayes’ rule alone pins down equilibrium beliefs (as specified above), and we do not need to specify any off-equilibrium-path beliefs here. Finally, since there are no out-of-equilibrium moves observable by outsiders, the equilibria characterized in Proposition 1 satisfy the Cho-Kreps (1987) intuitive criterion.
the market, since, by doing so, it permanently distinguishes itself from the type $G$ firm, and therefore suffers an immediate stock-price drop at time 0. On the other hand, since $\beta_M > \beta_M$, the type $M$ firm has a nontrivial probability of realizing a high intermediate cash flow and maintaining its current dividend level at time 1, and it wants to enjoy the current high level of stock price by not preparing the market and pooling with the type $G$ firm. Overall, while the cost to the type $M$ firm of preparing the market at time 0 is this immediate stock-price drop upon market preparation, the benefit of preparing the market is that it can potentially distinguish itself from the type $B$ firm in the scenario where it needs to cut its dividend at time 1 (which, in turn, allows it to maintain a higher stock price at time 1).

In equilibrium, the type $M$ firm balances the above costs and benefits of preparing versus not preparing the market, choosing the probability of preparing the market, $\delta^*_M$, to maximize its objective function at time 0.

The type $B$ firm mixes between preparing and not preparing the market in equilibrium as long as $\lambda < \lambda < \overline{\lambda}$. The benefit to the type $B$ firm of not preparing the market at time 0 is that it can mimic the type $G$ firm at this date. However, the cost of not preparing the market is that, since (unlike the type $G$ firm) the type $B$ firm will realize a low intermediate cash flow at time 1 with probability 1, its true type will be revealed with a significant probability if it chooses to cut its dividend at time 1 without preparing the market. The benefit to the type $B$ firm of preparing the market is that this allows it to mimic the type $M$ firm at time 1, thus allowing it to maintain a higher stock price. However, there are two costs incurred by the type $B$ firm if it prepares the market at time 0. First, it bears a stock-price drop at time 0 by revealing that it is not a type $G$ firm, since the type $G$ firm never prepares the market at time 0 in equilibrium. Second, while preparing the market allows the type $B$ firm to pool with the type $M$ firm at time 0, it may not be able to continue pooling with the type $M$ firm at time 1 with probability $\lambda$. In equilibrium, the type $B$ firm balances the above costs and benefits of preparing versus not preparing the market, choosing the probability of preparing the market $\delta^*_B$ that maximizes its objective function at time 0.

In equilibrium, no type of firm will choose to maintain its current dividend level at time 1 by passing up its positive NPV project. The type $G$ firm never faces such a choice between maintaining its current dividend level and passing up its positive NPV project because it always realizes a high intermediate cash flow at time 1. The type $M$ firm, however, will face a choice between implementing its positive NPV project and maintaining its current dividend level if it realizes a low intermediate cash flow at time 1. However, as long as the NPV of its new project is large enough and firm insiders place enough weight on the firm’s long-term (time 2) cash flow, the type $M$ firm will prefer to cut its dividend and implement its new project if it realizes a low intermediate cash flow at time 1. This is because the long-term value benefit to current shareholders achieved from implementing the firm’s positive NPV project at time 1 dominates the short-term benefit arising from attaining a temporarily high stock price by maintaining its current dividend level (arising from distinguishing itself from the type $B$ firm with a higher probability).

The type $B$ firm will also face a choice between implementing its positive NPV project and maintaining its current dividend level. Similar to the type $M$
firm, if it obtains a low intermediate cash flow, the type B firm will also choose to cut its dividend and implement its positive NPV project as long as the NPV of its new project is large enough and firm insiders place enough weight on the firm’s long-term (time 2) cash flow. The type B firm has a short-term (time 1) benefit from maintaining its current dividend level by passing up its positive NPV project, since (in the scenario where it does not deteriorate) this allows it to mimic higher-type firms (either type G or type M, depending on whether or not it prepared the market at time 0) attaining a higher time 1 stock price. However, as long as the NPV of the firm’s project is large enough and firm insiders put sufficient weight on its long-term (time 2) stock value, the long-term benefit arising from implementing the firm’s positive NPV project dominates any such short-term benefits.

We now discuss in detail the beliefs of outsiders in response to the equilibrium strategies adopted by each type. At time 0, upon observing a firm preparing the market for a possible dividend cut at time 1, outsiders infer, consistent with the equilibrium strategies of firms discussed earlier, that the firm is either a type M or a type B firm and update their beliefs about the type of the firm using Bayes’ rule as

\[
\begin{align*}
\gamma_G^P &= 0, \\
\gamma_M^P &= \frac{2\gamma\delta_M}{2\gamma\delta_M + (1 - \gamma)\delta_B}, \\
\gamma_B^P &= \frac{(1 - \gamma)\delta_B}{2\gamma\delta_M + (1 - \gamma)\delta_B}.
\end{align*}
\]

Note that, conditional on market preparation, outsiders revise their probability assessment of the firm being of the type G downward to 0. On the other hand, upon observing a firm not preparing the market at time 0, outsiders continue to believe that the firm may be of type G, type M, or type B, with the probabilities of each type updated using Bayes’ rule as follows:

\[
\begin{align*}
\gamma_G^{NP} &= \frac{1 - \gamma}{(1 - \gamma) + 2\gamma(1 - \delta_M) + (1 - \gamma)(1 - \delta_B)}, \\
\gamma_M^{NP} &= \frac{2\gamma(1 - \delta_M)}{(1 - \gamma) + 2\gamma(1 - \delta_M) + (1 - \gamma)(1 - \delta_B)}, \\
\gamma_B^{NP} &= \frac{(1 - \gamma)(1 - \delta_B)}{(1 - \gamma) + 2\gamma(1 - \delta_M) + (1 - \gamma)(1 - \delta_B)}.
\end{align*}
\]

At time 1, in equilibrium, the type G firm maintains its current dividend level with probability 1, and the type B firm cuts its dividend with probability 1. The type M firm maintains its dividend at the current level if a high intermediate cash flow is realized at time 1 and cuts its dividend if a low intermediate cash flow is realized.\(^{18}\) Upon observing a firm’s dividend-cut decision at time 1, outsiders will look back at whether or not the firm prepared the market at time 0, updating their beliefs about firm type based on the path followed by the firm. Overall, there are four dynamic paths a firm can follow, and we will discuss outside investors’ updated beliefs along each path. The four possible equilibrium paths and outside investors’ beliefs about the firm’s true type along these paths are given in Figure 2.

\(^{18}\)We prove in the Appendix that no firm has an incentive to deviate from the equilibrium strategy path at time 1 by maintaining the current dividend level by passing up its new project if a low intermediate cash flow is realized.
If outsiders observe that a firm that prepared the market at time 0 does not cut its dividend at time 1 (i.e., it is on Path 1), they will infer that the firm is of type \( M \) with probability 1, because a type \( G \) firm never prepares the market at time 0, and a type \( B \) firm always cuts its dividend at time 1. If outsiders observe that a firm that prepared the market at time 0 cut its dividend at time 1 (i.e., Path 2), they infer that it is a type \( M \) firm with a certain probability

\[
\frac{2\gamma \delta_M (1 - \beta_M)}{2\gamma \delta_M (1 - \beta_M) + (1 - \gamma) \delta_B}
\]

or a type \( B \) firm with the complementary probability

\[
\frac{(1 - \gamma) \delta_B}{2\gamma \delta_M (1 - \beta_M) + (1 - \gamma) \delta_B}.
\]

This is because a type \( G \) firm never prepares the market, and both a type \( M \) and a type \( B \) firm may potentially prepare the market and cut its dividend in equilibrium.

If outsiders observe that a firm that did not prepare the market at time 0 does not cut its dividend at time 1 (i.e., Path 3), they infer that the firm is of type \( G \) with a certain probability

\[
\frac{1 - \gamma}{(1 - \gamma) + 2\gamma (1 - \delta_M) \beta_B}
\]

or a type \( M \) firm with the complementary probability

\[
\frac{2\gamma (1 - \delta_M) \beta_B}{(1 - \gamma) + 2\gamma (1 - \delta_M) \beta_B}.
\]

This is because all three types of firms may not prepare the market with a certain probability (i.e., 1 for the type \( G \) firm, \( (1 - \delta_M) \) for the type \( M \) firm, and \( (1 - \delta_B) \) for the type \( B \) firm) at time 0, and a type \( B \) firm always cuts its dividend at time 1.

Finally, if outsiders observe that a firm that did not prepare the market at time 0...
cuts its dividend at time 1 (i.e., Path 4), they infer that the firm is of type $M$ with a certain probability

\[
\frac{2\gamma(1 - \delta_M)(1 - \beta_B)}{2\gamma(1 - \delta_M)(1 - \beta_B) + (1 - \gamma)(1 - \delta_B)}
\]

or a type $B$ firm with the complementary probability

\[
\frac{(1 - \gamma)(1 - \delta_B)}{2\gamma(1 - \delta_M)(1 - \beta_B) + (1 - \gamma)(1 - \delta_B)}
\]

because all three types of firms do not prepare the market with a certain probability at time 0 and a type $G$ firm never cuts its dividend at time 1. The probabilities specified above are computed by insiders using Bayes’ rule.

The equilibrium we characterize in part (i) of Proposition 1 is unique under the specified parameter conditions. We discuss four possible alternative candidate equilibria, showing that, under the specified parameter restrictions specified, none of these equilibria will exist. Consider the first candidate (partially pooling) equilibrium where the type $B$ firm mimics the type $G$ firm by not preparing the market with probability 1 at time 0, and the type $M$ firm plays a mixed strategy between preparing and not preparing the market. The restriction $\lambda < \lambda$ rules out this candidate equilibrium. This is because given $\lambda < \lambda$, there is a significant probability that deterioration (revealing the true value of the type $B$ firm) will not happen and the type $B$ firm’s benefit from mimicking the type $M$ firm by preparing the market will be larger. Therefore, under the parameter restrictions specified, it can be shown that the type $B$ firm will not mimic the type $G$ firm with probability 1 at time 0, ruling out this candidate equilibrium.

Consider the second candidate (partially pooling) equilibrium, where the type $B$ firm prepares the market with probability 1 and the type $M$ firm prepares the market with probability 1 as well (and the type $G$ firm does not prepare the market with probability 1). The restriction $\lambda > \lambda$ rules out this candidate equilibrium. This is because given $\lambda > \lambda$, there is a significant probability that deterioration, which reveals the true value of the type $B$ firm, will happen and the type $B$ firm’s cost of preparing the market is larger. Therefore, under the parameter restrictions specified, it can be shown that the type $B$ firm will not prepare the market with probability 1, ruling out this candidate equilibrium.

Consider the third candidate (fully pooling) equilibrium, where the type $M$ firm mimics the type $G$ by not preparing the market with probability 1 and the type $B$ firm does not prepare the market with probability 1 as well. The restriction $\beta_M < \beta_M$ rules out this fully pooling equilibrium. This is because given $\beta_M < \beta_M$, there is a significant chance that the type $M$ firm will realize a low intermediate cash flow and will therefore have to cut its dividend, so that the type $M$ firm’s benefit of preparing the market is larger. Therefore, under the parameter restrictions specified, it can be shown that the type $M$ firm will not mimic the type $G$ firm by not preparing the market with probability 1, ruling out this candidate equilibrium.

Finally, consider the fourth candidate (partially pooling) equilibrium, where the type $M$ firm always prepares the market and the type $B$ firm plays the mixed strategy between preparing and not preparing the market at time 0 (this is the
The equilibrium we characterize in part (ii) of Proposition 1). The restriction $\beta_M > \beta_M$ rules out this partially pooling equilibrium. This is because given $\beta_M > \beta_M$, there is a significant probability that the type $M$ firm will realize a high intermediate cash flow and will be able to keep its current dividend levels, so that the type $M$ firm’s benefit of preparing the market is smaller. Therefore, under the parameter restrictions specified, it can be shown that the type $M$ firm will not prepare the market at time 0 with probability 1, ruling out this candidate equilibrium. In summary, given the restrictions specified in part (i) of Proposition 1, the equilibrium we characterize in part (i) of Proposition 1 is unique.

The equilibrium we characterize in part (ii) of Proposition 1 is also unique under the parameter restrictions specified there. This equilibrium involves the type $G$ firm never preparing the market, the type $M$ firm preparing the market with probability 1, and the type $B$ firm playing a mixed strategy between preparing and not preparing the market. The first two candidate alternative equilibria discussed earlier are also ruled out here, given that $\lambda < \lambda < \lambda$. Since $\beta_M \leq \beta_M$, which automatically implies that $\beta_M < \beta_M$, the third candidate alternative equilibrium discussed above is also ruled out, as we pointed out earlier. The fourth potential alternative equilibrium here is the one specified in part (i) of Proposition 1. However, given $\beta_M \leq \beta_M$, the probability of a type $M$ firm realizing a high cash flow at time 1 is low enough, so that it is optimal for the type $M$ firm to prepare the market with probability 1 under the parameter restrictions specified in part (ii) of Proposition 1. Thus, this fourth alternative candidate equilibrium (characterized in part (i) of Proposition 1) is ruled out as well. In summary, given the restrictions specified in part (ii) of Proposition 1, the equilibrium we characterize in part (ii) of Proposition 1 is also unique.

Regardless of whether the equilibrium behavior of the firm at time 0 is as characterized in part (i) or in the part (ii) of Proposition 1, the equilibrium behavior of the firm at time 1 is as characterized in part (iii) of Proposition 1, and it is unique under the parameter restrictions specified. The only alternative candidate equilibrium at time 1 is that the type $M$ and type $B$ firms maintain their current dividend level by passing up their positive NPV project when the low intermediate cash flow is realized. The parameter condition, $\alpha_2 H_{th_B} > \alpha_1 [(h - I) + H(\theta_G - \theta_B)]$, rules out this candidate equilibrium. This is because given $\alpha_2 H_{th_B} > \alpha_1 [(h - I) + H(\theta_G - \theta_B)]$, the type $M$ and type $B$ firms are always better off by implementing their positive NPV project by cutting the dividend if a low intermediate cash flow is realized. In summary, the equilibrium behavior characterized in part (iii) of Proposition 1 is unique given the parameter restrictions specified there.

In the above equilibrium, market preparation conveys credible information from firm insiders to outsiders. However, unlike most signaling models where the signal involves some financing decision (e.g., paying dividends, issuing debt) or investment decision (e.g., undertaking a project), here the information is conveyed by a simple announcement. In this sense, readers may at first view market preparation as similar to “cheap talk,” as in the model of Crawford and Sobel (1982).19

19Other models of cheap talk are Farrell and Gibbons (1989), who apply the “cheap talk” mechanism to the context of bargaining games, and Stein (1989), who studies how the Federal Reserve can manipulate expectations and pursue a time-inconsistent policy through “cheap talk.”
However, this is not really the case: In the context of a firm interacting with outside investors in the equity market, information cannot, in general, be credibly conveyed between these two parties through the cheap-talk mechanism. This is because, in the equity market, the interests of a firm and outside investors are diametrically opposed to each other when it comes to equity valuation: If an investor values a firm’s equity higher than warranted by intrinsic value, outside investors lose, while firm insiders benefit. In such a situation, credible information transmission is achievable only through a costly signal. Note here that, in our model setting, market preparation, while implemented through a simple announcement, is nevertheless a costly signal, where the signaling cost arises from the fall in stock price of a type $M$ or type $B$ firm upon market preparation. Furthermore, market preparation satisfies the requirements of a credible signal, since the net benefit of market preparation for a type $M$ firm is greater than that for a type $B$ firm.

**Proposition 2.** *(Announcement Effect and Long-term Operating Performance).*

In the equilibrium characterized in Proposition 1:

(i) The stock price of any firm drops upon market preparation (at time 0) for a dividend cut.

(ii) The stock price drops upon the announcement of a dividend cut (at time 1), whether or not the firm previously prepared the market.

(iii) The negative stock price reaction upon a dividend-cut announcement (at time 1) will be more severe for firms that did not prepare the market compared to those that prepared the market.

(iv) The combined negative stock price reaction upon market preparation (at time 0) and upon a dividend-cut announcement (at time 1) for firms that prepared the market will be less severe than the negative stock price reaction upon a dividend cut announcement (at time 1) for firms that did not prepare the market.

(v) There is a $\theta^*_G \in (0, 1)$ such that, if $\theta_G > \theta^*_G$, the long-term post-dividend-cut operating performance of a dividend-cutting firm will be higher on average for prepared dividend cutters relative to that of nonprepared dividend cutters.

The intuition behind part (i) of Proposition 2 is as follows: As can be seen from Figure 2 and as previously discussed, when outsiders observe a firm preparing the market at time 0, outsiders infer that the firm is a pool of type $M$ with a certain probability and of type $B$ with the complementary probability. On the other hand, if a firm does not prepare the market at time 0, outsiders infer that the firm is of type $G$ with a certain probability, of type $M$ with a certainty probability, and of type $B$ with the complementary probability. So, given the equilibrium conditions at time 0, i.e., $\beta_M < \beta_M < \beta_M$ and $\lambda < \lambda < \lambda$, the stock price of a firm

---

20The precise equilibrium, on the basis of which we derive this proposition for the announcement effect and long-term operating performance of firms, is that characterized in part (i) of Proposition 1. However, it can be shown that the predictions based on the equilibrium in part (ii) of Proposition 1 are also very similar (recall that this equilibrium is a limiting case of the equilibrium in part (i), arising when the market-preparation probability of the type $M$ firm goes to 1).
drops upon the market preparation for a dividend cut, because outsiders believe that the firm that prepares the market is more likely to be a worse type of firm on average relative to a firm that does not.

The intuition behind part (ii) of Proposition 2 also can be seen in Figure 2. If the firm prepared the market at time 0, cutting dividends at time 1 makes outsiders believe that the firm belongs to a pool consisting of type \( M \) and type \( B \) firms (Path 2), while not cutting dividends fully reveals the firm to be of type \( M \) (Path 1). Therefore, conditional on market preparation, cutting its dividend reveals a firm’s true type to be type \( M \) with some probability and to be type \( B \) with the complementary probability. On the other hand, if the firm did not prepare the market at time 0, cutting its dividend reveals the firm’s true type to be type \( M \) with some probability and type \( B \) with the complementary probability (Path 4), while not cutting its dividend reveals the firm to be of type \( G \) with some probability and of type \( M \) with the complementary probability (Path 3). Given the above beliefs, again, the stock price will drop upon the dividend-cut announcement, since outsiders infer that the pool of dividend-cutting firms is a worse type of firms on average relative to firms not cutting dividends. Overall, the announcement effect of a dividend cut will be negative regardless of whether or not the firm prepared the market at time 0.

The intuition behind part (iii) of Proposition 2 is as follows: The difference in a firm’s true value between cutting and not cutting its dividend conditional on not preparing the market is larger than that conditional on its preparing the market at time 0; that is, the difference between time 1 firm values along Path 3 and along Path 4 is larger than the difference between the time 1 firm values along Path 1 and Path 2. Correspondingly, the negative stock price reaction upon a dividend-cut announcement (at time 1) will be more severe for firms that did not prepare the market compared to those that prepared the market.

A similar intuition applies to part (iv) of Proposition 2 as well. Conditional on dividend cutting, outsiders infer that the pool of firms that did not prepare the market is of worse type on average than firms that prepared the market. Therefore, the negative stock price reaction on the dividend-cut announcement day of firms that did not prepare the market will be more negative than the combined stock price reaction on both the market-preparation day and the dividend-cut announcement day for firms that prepared the market.

The intuition behind part (v) of Proposition 2 can be seen from Figure 2 as well. In equilibrium, prepared dividend cutters belong to a pool of type \( M \) and type \( B \) firms (Path 2), while nonprepared dividend cutters belong to a pool of type \( M \) and type \( B \) firms as well (Path 4). Since the type \( M \) firm is more likely to prepare the market than the type \( B \) firm in equilibrium (i.e., \( 0 < \delta_M^* < \delta_B^* < 1 \), as we show in Proposition 1), the pool of prepared dividend cutters will have a larger probability of type \( M \) firms than type \( B \) firms; the opposite will be the case for the pool of nonprepared dividend cutters. Hence, on average, prepared dividend cutters will have higher intrinsic values relative to nonprepared dividend cutters. Correspondingly, as this higher intrinsic value is realized through superior operating performance, our model predicts that the long-run post-dividend-cut operating performance will be better for prepared dividend cutters relative to nonprepared dividend cutters.
C. Perceived Industry Risk and Market Preparation

In this section, we analyze the relationship between perceived industry risk and the announcement effect of market preparation and of a dividend cut as well as the firm’s propensity to prepare the market.\textsuperscript{21} We define “perceived industry risk” as the outsiders’ probability assessment of any given firm being of type $M$. Thus, industries with a higher value of $\gamma_M$ will have lower perceived industry risk, since they consist of a larger proportion of safe firms (recall that the type $M$ firm has median growth prospects); on the other hand, industries with a lower value of $\gamma_M$ have higher perceived industry risk because these industries will have a larger proportion of either the type $G$ firm (that has very high growth prospects) or the type $B$ firm (that has poor growth prospects and may exit the market). Thus, in this section, we will study the relationship between perceived industry risk (denoted for expositional simplicity, as before, by $\gamma$, suppressing the subscript $M$) and the propensity to prepare the market by a type $M$ as well as by a type $B$ firm. We will also study the relationship between $\gamma$ and the announcement effect on the firm’s equity upon preparing the market for a dividend cut, as well as the relationship between $\gamma$ and the announcement effect upon an actual dividend cut.

Proposition 3. (Perceived Industry Risk and the Announcement Effect). In the equilibrium characterized above:

(i) The stock-price drop upon market preparation (at time 0) for a dividend cut will be smaller (i.e., less negative) for a higher value of $\gamma$.

(ii) The stock-price drop upon the announcement of a dividend cut (at time 1) will be smaller (i.e., less negative) for a higher value of $\gamma$.

The intuition behind part (i) of Proposition 3 is as follows: The stock-price drop upon market preparation for a dividend cut comes from the fact that the firm preparing the market distinguishes itself from the type $G$ firm by doing so (since the type $G$ firm never prepares the market). When $\gamma$ is higher (i.e., a firm’s perceived industry risk is lower), outside investors already assign the firm a lower probability of being a type $G$ firm to begin with. Therefore, market preparation for a dividend cut is less informative about firm type for a higher value of $\gamma$, which implies that the stock-price drop upon market preparation at time 0 is correspondingly smaller for a higher value of $\gamma$.

The intuition behind part (ii) of Proposition 3 is as follows: The difference between the type $M$ and the type $B$ firm is that the type $M$ firm cuts its dividends (with some probability) only when it realizes a lower intermediate cash flow at time 1, while the type $B$ firm cuts its dividend with probability 1 because it always realizes a low intermediate cash flow at time 1. Therefore, upon the announcement of a dividend cut, outside investors update their prior beliefs about firm type and assign a higher probability of a dividend-cutting firm to be of type $B$. However, a higher value of $\gamma$ implies that outside investors already assign a higher weight that a given firm is of type $M$, thereby assigning a lower weight to their Bayesian

\textsuperscript{21}We thank the referee for suggesting the interpretation of $\gamma$ as perceived industry risk and $\lambda$ as firm transparency, as well as for suggesting that we study the relationship between perceived industry risk and the propensity to prepare the market in this section and the relationship between firm transparency and the propensity to prepare the market presented in Section III.D.
belief update upon dividend cutting. This, in turn, implies that the Bayesian revision of beliefs by investors toward a firm being of type \( B \) upon a dividend cut will be smaller for a higher level of \( \gamma \), resulting in a smaller stock-price drop upon a dividend cut.

We now examine the relationship between \( \gamma \) and the type \( M \) and type \( B \) firm’s propensity to prepare the market at time 0. Since the functional form of the relationship between the propensity to prepare the market by a type \( M \) as well as a type \( B \) firm and perceived industry risk is extremely complex, we examine this relationship using numerical simulations. We assume the exogenous model parameter values to be as follows: \( h = 100, I = 20, H = 1,000, \theta_G = 0.6, \theta_H = 0.4, \lambda = 0.3, \beta_M = 0.4, \alpha_0 = 1, \alpha_1 = 1, \) and \( \alpha_2 = 1 \). We make sure that the above parameter values satisfy our model assumptions and equilibrium parameter conditions. We vary the perceived industry risk parameter, \( \gamma \), from 0.1 to 0.9.

Table 1 reports the corresponding equilibrium values of \( \delta_M^* \), the type \( M \) firm’s probability of preparing the market at time 0, and \( \delta_B^* \), the type \( B \) firm’s probability of preparing the market at time 0, for different values of \( \gamma \).

<table>
<thead>
<tr>
<th>( \gamma )</th>
<th>( \delta_M^* )</th>
<th>( \delta_B^* )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>0.961</td>
<td>0.136</td>
</tr>
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<td>0.2</td>
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<tr>
<td>0.5</td>
<td>0.327</td>
<td>0.143</td>
</tr>
<tr>
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<tr>
<td>0.7</td>
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</tr>
<tr>
<td>0.8</td>
<td>0.267</td>
<td>0.150</td>
</tr>
<tr>
<td>0.9</td>
<td>0.256</td>
<td>0.152</td>
</tr>
</tbody>
</table>

Three interesting patterns arise from Table 1. First, the type \( M \) firm’s probability of preparing the market at time 0 (i.e., \( \delta_M^* \)) goes down as the value of \( \gamma \) goes up. The intuition is as follows: As the value of \( \gamma \) goes up, the probability of the type \( M \) firm’s true valuation being correctly assigned by outside investors is higher, and therefore its benefit of distinguishing itself from a type \( B \) firm (when it has to cut its dividend) goes down. Therefore, \( \delta_M^* \) decreases as \( \gamma \) increases. Second, the type \( B \) firm’s probability of preparing the market at time 0 (i.e., \( \delta_B^* \)) goes up as the value of \( \gamma \) goes up. The intuition here is that, when the \( \gamma \) assigned by outsiders to a type \( B \) firm is higher, outsiders’ prior valuation of the firm (i.e., valuation at time 0) is greater. This means that, if a type \( B \) firm does not prepare the market at time 0 but cuts its dividend at time 1, its fall in valuation will be greater. In other words, a type \( B \) firm’s benefit of mimicking the type \( M \) firm by preparing the market at time 0 is greater for a greater value of \( \gamma \). Therefore, \( \delta_B^* \) increases as \( \gamma \) increases. Third, note that the value of \( \delta_M^* \) is always higher than the value of \( \delta_B^* \), which is consistent with part (i) of Proposition 1.

From Table 1, it also can be seen that the type \( M \) firm’s probability of preparing the market \( \delta_M^* \) drops significantly as the perceived industry risk parameter \( \gamma \) moves from 0.1 to 0.9, while the type \( B \) firm’s probability of preparing the market \( \delta_B^* \) is relatively flat in \( \gamma \). That is, it increases only a little as \( \gamma \) moves from 0.1 to 0.9. Since the type \( G \) firm never prepares the market, this implies that the average propensity to prepare the market (across various firm types) decreases as the
perceived industry risk decreases (i.e., $\gamma$ increases). This has testable implications, as we discuss in Section IV.

D. Firm Transparency and Market Preparation

In this section, we analyze the relationship between firm transparency and the firm’s propensity to prepare the market. We define “transparency” as the exogenous probability that the true type of any given firm will be revealed to outsiders even in the absence of any signaling action taken by the firm. As we discussed in footnote 10, while we assume in our formal model that this probability is positive for the type $B$ firm (and is equal to $\lambda$) and 0 for both type $G$ and type $M$ firms, in practice, all types of firms may have some positive probability of their true type being revealed exogenously. Our results go through even if we make this more realistic assumption (though at the expense of making our analysis more complex), as long as this probability is smaller for higher intrinsic value firms (as discussed in footnote 10). Since transparency is likely to be correlated across firms in a given industry (it is likely to be determined by the nature of the projects in that industry), we can use $\lambda$ as a measure of the transparency of the firms in an industry. The higher the value of $\lambda$, the greater the likelihood that the true type (intrinsic value) of the firm is exogenously revealed. We can think of transparency as being related to the extent of information asymmetry facing a firm: the greater the information asymmetry, the lower the transparency. Transparency may vary across industries (firms in industries using more complex and pioneering technologies may be more opaque and therefore less transparent) and across countries (firms based in countries with stricter disclosure requirements, like the United States, will have higher levels of transparency, and firms based in countries with poor legal protection to minority shareholders will have lower levels of transparency). Thus, in this section, we will study the relationship between firm transparency, $\lambda$, and the propensity to prepare the market by a type $M$ as well as by a type $B$ firm.

Since the functional form of the relationship between the propensity to prepare the market by a type $M$ as well as by a type $B$ firm and firm transparency is extremely complex, we examine this relationship using numerical simulations. We assume the exogenous model parameter values to be as follows: $h = 100$, $I = 20$, $H = 1,000$, $\theta_G = 0.6$, $\theta_B = 0.4$, $\gamma = 0.5$, $\beta_M = 0.4$, $\alpha_0 = 1$, $\alpha_1 = 1$, and $\alpha_2 = 1$. We make sure that the above parameter values satisfy our model assumptions and equilibrium parameter conditions specified in part (i) of Proposition 1. We then vary the firm transparency parameter, $\lambda$, from 0.15 to 0.55. Table 2 reports the corresponding equilibrium values of $\delta^*_M$, the type $M$ firm’s probability of preparing the market at time 0, and $\delta^*_B$, the type $B$ firm’s probability of preparing the market at time 0, for different values of $\lambda$.

One can observe three interesting patterns from Table 2. First, the type $M$ firm’s probability of preparing the market at time 0, that is, $\delta^*_M$, goes down as $\lambda$ goes up. The intuition here is that as $\lambda$ goes up, the type $M$ firm’s benefit of distinguishing itself from a type $B$ firm when it has to cut its dividend goes down. This is because for a higher value of $\lambda$, the probability that the type $B$ firm’s true type is revealed exogenously between time 0 and time 1 is higher, so that the benefit
TABLE 2
Firm Transparency and Propensity to Prepare the Market

Table 2 reports the equilibrium market-preparation probabilities of the type M and type B firms given different values of firm transparency, $\lambda$, assuming $h = 100$, $I = 20$, $H = 1,000$, $\theta_G = 0.6$, $\theta_B = 0.4$, $\gamma = 0.5$, $\beta_B = 0.4$, $\alpha_0 = 1$, $\alpha_1 = 1$, and $\alpha_2 = 1$.

<table>
<thead>
<tr>
<th>$\lambda$</th>
<th>$\delta^*_{M}$</th>
<th>$\delta^*_{B}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.15</td>
<td>0.385</td>
<td>0.285</td>
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<tr>
<td>0.2</td>
<td>0.357</td>
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<tr>
<td>0.55</td>
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</tbody>
</table>

of preparing the market for the type M firm is lower. Therefore, $\delta^*_M$ decreases as $\lambda$ increases. Second, the type B firm’s probability of preparing the market at time 0, that is, $\delta^*_B$, also goes down as $\lambda$ goes up. The intuition is as follows: As $\lambda$ goes up, the probability of the type B firm’s true type being revealed between time 0 and time 1 (regardless of whether or not it has prepared the market) is greater. Since the type B firm cannot pool with the type M firm once its true type is revealed, the above implies that the benefit to the type B firm from preparing the market becomes smaller as $\lambda$ goes up. Therefore, $\delta^*_B$ decreases as $\lambda$ increases. Third, note that the value of $\delta^*_M$ is always higher than the value of $\delta^*_B$, which is consistent with part (i) of Proposition 1. In summary, since $\lambda$ proxies for firm transparency, a firm’s probability of preparing the market decreases as its transparency $\lambda$ increases.22

E. Current Profitability, Growth Opportunities, and the Propensity to Prepare the Market

In this section, we discuss the type B firm’s propensity to prepare the market in response to its current profitability and growth opportunities. In the interest of analytical tractability, we consider the special (corner) equilibrium specified in part (ii) of Proposition 1, where the type G firm never prepares the market, the type M firm prepares the market with probability 1, and the type B firm plays a mixed strategy between preparing (with probability $\delta^*_B$) and not preparing the market (with probability $1 - \delta^*_B$) at time 0.

**Proposition 4. (Current Profitability, Growth Opportunities, and the Propensity to Prepare the Market).** Let $\alpha_0 = \alpha_1 = 1$ and $\gamma > \gamma^*$. Then:

(i) The type B firm’s equilibrium probability of preparing the market, $\delta^*_B$, is increasing in the NPV of its growth opportunity.

(ii) The type B firm’s equilibrium probability of preparing the market, $\delta^*_B$, is decreasing in the firm’s current profitability.

Proposition 4 studies how the intermediate cash flows generated from the firm’s assets in place (current profitability) and its new project (future growth opportunity) affect the type B firm’s propensity to prepare the market. Part (i) says that, holding other parameters constant, the higher the firm’s cash flow generated

22While, due to space constraints, we present only a small number of simulations in Tables 1 and 2, we find that the patterns presented hold for a wide range of exogenous parameters; these additional simulations are available from the authors.
from its growth opportunity, the more likely the firm is to prepare the market. This is because the type B firm’s propensity to prepare the market depends on the cost versus benefit of doing so. The firm’s benefit of preparing the market arises from its ability to pool with the type M firm in the event it has to cut its dividend. The type B firm’s cost of preparing the market comes from its having to reveal that it is not a type G firm, and the resulting fall in stock price on the day of market preparation. The type G firm’s advantage in intrinsic value over the type M firm arises from the fact that its cash flows from assets in place are larger than those of a type M firm. Therefore, an increase in the NPV of growth opportunities keeping cash flows from assets in place constant increases the type B firm’s propensity to prepare the market, since it makes the benefit-to-cost trade-off of preparing the market more favorable by making it somewhat more attractive for the type B firm to mimic the type M firm rather than the type G firm. By the same token, an increase in the value of the firm’s cash flows from assets in place (i.e., current profitability), while keeping the NPV of growth opportunities constant, decreases the type B firm’s propensity to prepare the market, since it makes the benefit-to-cost trade-off of preparing the market less favorable for the type B firm by making it less attractive for the type B firm to mimic the type M firm rather than the type G firm.

F. Equilibria without Market Preparation

We now characterize the equilibria of the model that does not involve market preparation by any type of firm.

Proposition 5. (Equilibria for Extreme Values of \( \lambda \)). Let \( \alpha_2 H \theta_B > \alpha_1 [(h - I) + H(\theta_G - \theta_B)] \). Then there exist equilibria that involve the following:

(i) If \( \lambda \) is very large such that \( \lambda \geq \lambda \), no type of firms prepares the market (with probability 1) at time 0.

(ii) If \( \lambda \) is very small such that \( \lambda \leq \lambda \), no type of firms prepares the market (with probability 1) at time 0.

(iii) At time 1, the type G firm never cuts its dividend. The type M firm maintains its current dividend level if a high intermediate cash flow is realized and cuts its dividend if a low intermediate cash flow is realized. The type B firm always cuts its dividend from the current level. All three types of firms implement their positive NPV project regardless of the realization of the firm’s time 1 intermediate cash flow.

The intuition behind part (i) of Proposition 5 is as follows: If transparency \( \lambda \) is very large such that \( \lambda \geq \lambda \), the probability of the type B firm’s deterioration occurring is very high, so that the need for the type M firm to signal is lower. This means that, when \( \lambda \geq \lambda \), the type M firm’s benefit of preparing the market to distinguish itself from the type B firm (if it cuts its dividend) is dominated by the cost of revealing that it is not the type G firm when it prepares the market. Therefore, the type M firm does not prepare the market in this situation. Now consider the type B firm. Since its probability of deterioration is very high when \( \lambda \geq \lambda \), its benefit of pooling with the type M firm by preparing the market is
dominated by its benefit of pooling with the type $G$ firm by not preparing the market. Recall that if the type $B$ firm’s true type is revealed between time 0 and time 1, it will be unable to mimic the type $M$ firm. Therefore, the type $B$ firm also does not prepare the market when $\lambda \geq \bar{\lambda}$. Finally, as we discussed under Proposition 1, the type $G$ firm never prepares the market, since it always realizes a high intermediate cash flow and therefore does not need to cut its dividend in the first place.

The intuition behind part (ii) of Proposition 5 is as follows: If transparency $\lambda$ is very small such that $\lambda \leq \bar{\lambda}$, the probability of the type $B$ firm’s deterioration occurring is very low. For the type $M$ firm to be able to signal its true type by preparing the market, there has to be a significant difference (“wedge”) between the benefit of preparing the market to a type $M$ firm versus this benefit to a type $B$ firm. When $\lambda \leq \bar{\lambda}$, the probability of the type $B$ firm being revealed is so low that the ability of the type $M$ firm to signal is low, correspondingly reducing the benefit of a type $M$ firm’s market preparation. In this case, the type $M$ firm’s benefit from preparing the market (if it cuts its dividend) is dominated by the cost of revealing that it is not the type $G$ firm when it prepares the market, so that the type $M$ firm does not prepare the market. Now consider the type $B$ firm. The type $B$ firm’s only benefit from preparing the market comes from being able to mimic the type $M$ firm (and thus obtain a higher stock price) at time 1 when it cuts its dividend. Given that, in this equilibrium, the type $M$ firm does not prepare the market, the type $B$ firm does not have any benefit from preparing the market. This means that the type $B$ firm’s choice between preparing and not preparing the market at time 0 is driven solely by its decision to mimic the type $G$ firm. Therefore, the type $B$ firm also never prepares the market.

The intuition behind part (iii) of Proposition 5 is the same as that in part (iii) of Proposition 1; that is, as long as the NPV of the firm’s new project is large enough and firm insiders place enough weight on the firm’s long-term (time 2) cash flow, the type $M$ and type $B$ firms will prefer to cut dividends and implement their new projects if a low intermediate cash flow is realized at time 1 (recall that the type $G$ firm always realizes a high intermediate cash flow at time 1 and does not need to cut the dividend to begin with).

### IV. Testable Implications

Our model generates several testable predictions, which we describe below. Since the two equilibria we characterized in parts (i) and (ii) of Proposition 1 generate very similar predictions, we will not distinguish between these two equilibria when describing the testable implications of our model below.

1. **The relation between firm transparency and the propensity to prepare the market:** Our analysis in Section III.D implies that more transparent firms are less likely to prepare the market. Furthermore, our analysis in Section III.F implies that firms that are extremely transparent or extremely opaque are unlikely to prepare the market at all. This implication can be tested by future empirical researchers using appropriate proxies for firm transparency. The existing literature has already developed proxies for the extent of information asymmetry facing a firm in the equity market: the number of analysts following the firm, the error in
analysts’ earnings forecasts, and the standard deviation of analyst earnings forecasts. These proxies can also be used to proxy for firm transparency. More recently developed proxies from market microstructure models of information asymmetry that assume that better-informed agents use their informational advantage to profit from trading in an asymmetric information setting can also be used to proxy for firm transparency. These microstructure models suggest three proxies for information asymmetry (firm transparency). The first two proxies are bid-ask spread and stock illiquidity (see Clarke and Shastri (2001), Amihud (2002), and Bharat, Pasquariello, and Wu (2009)). Firms with higher levels of bid-ask spread and stock illiquidity are expected to have a greater extent of information asymmetry. The third microstructure-based information asymmetry proxy is the probability of informed trading (PIN). Easley, Kiefer, O’Hara, and Paperman (1996) argue that the extent of information asymmetry can be inferred from the trading process. A higher level of PIN indicates a greater extent of information asymmetry. The accounting literature has also suggested the annual Association for Investment Management and Research (AIMR) corporate disclosure rankings as another proxy for firm transparency (see Healy, Hutton, and Palepu (1999)). Finally, firms undergoing restructuring can be viewed as being more opaque (i.e., less transparent), since these firms’ future cash flows may not look like their past, making the extent of their cash flows harder to predict by outsiders.

2. The relation between perceived industry risk and the propensity to prepare the market: Our model implies that firms in industries with high perceived industry risk are more likely to prepare the market than firms in industries with low perceived industry risk. This implication can be tested by future empirical researchers using appropriate proxies for industry risk. The existing empirical literature has developed proxies for industry risk: for example, the standard deviation of the cash flows of firms in a given industry (see, e.g., Chemmanur, He, and Nandy (2010)).

3. The relation between current profitability, long-run growth opportunities, and the propensity to prepare the market: Our model predicts that firms with poorer current profitability but greater future growth opportunities are more likely to prepare the market. In a recent empirical study, Chemmanur and Tian (2012) use a hand-collected sample of dividend-cutting firms that allows them to distinguish between prepared and nonprepared dividend cutters. Consistent with this implication, they show that firms with lower current profitability but higher long-term growth opportunities are more likely to prepare the market prior to dividend cuts.

4. Announcement effect on the market-preparation day: Our model implies that some information will be conveyed to the market on the market-preparation day, that is, on the day when a firm releases a statement indicating that it is reviewing its dividend policy, and may (or may not) have to cut its dividend. In particular, our model predicts that the announcement effect on a firm’s equity on the market-preparation day will be negative. The empirical analysis of Chemmanur and Tian (2012) finds a significantly negative abnormal stock return upon a firm’s market preparation for a potential dividend cut. A firm preparing the market, on average, experiences a $-3.2\%$ abnormal return during the $-1$ to $+1$ event window around the market-preparation day.
5. Announcement effect of prepared versus nonprepared dividend cutters in response to dividend-cut announcements: Our model predicts that the announcement effect on the equity of firms cutting dividends subsequent to preparing the market will be less negative compared to that of firms cutting dividends without sufficiently preparing the market, although our model predicts that the announcement effect will be negative for both kinds of firms. Consistent with this prediction, Chemmanur and Tian (2012) find that the announcement effect on the equity of firms cutting dividends subsequent to market preparation is substantially less negative (about 5.1% less negative during the −1 to +1 event window around the dividend-cut announcement day) than that of firms cutting dividends without such market preparation.

6. The “combined” announcement effect of prepared versus nonprepared dividend cutters: Our model predicts that the combined market reactions of prepared dividend cutters on both the market-preparation day and on the dividend-cut announcement day will be less negative than the market reaction of nonprepared dividend cutters on the dividend-cut announcement day. This prediction allows us to distinguish the predictions of our model from that of an alternative model where, by preparing the market, firms are not signaling their superior long-run growth opportunities but merely “splitting up” the information release arising from their dividend cuts over two separate days, namely, the market-preparation day and the dividend-cutting day. If the latter situation were the one that obtains in practice, one should find that the combined announcement effect (over the market-preparation and dividend-cutting days) of prepared dividend cutters is not different than the announcement effect (on the dividend-cut day) of nonprepared dividend cutters. Consistent with the above prediction of our model (and inconsistent with those of alternative models), the empirical analysis of Chemmanur and Tian (2012) shows that the combination of the abnormal stock return on the market-preparation day and the dividend-cut announcement day is 3.4% lower for prepared dividend cutters compared to the abnormal stock return on the announcement day of nonprepared dividend cutters. This finding indicates that prepared dividend cutters are not simply splitting up the negative news of a dividend cut over two separate days.

7. The relation between perceived industry risk and the announcement effects on the market-preparation and dividend-cut days: Our model predicts that the announcement effect will be less negative both on the market-preparation day and the dividend-cut announcement day for firms in industries with low perceived industry risk. This implication can be tested by future empirical researchers using the proxies we discussed in implication 2.

8. Long-run operating performance of prepared versus nonprepared dividend cutters: Given that, in our setting, it is the firms with more unfavorable private information that are more likely to cut dividends without preparing the market (i.e., type B firms), our model predicts that the operating performance of firms subsequent to dividend cuts will be better for those cutting dividends after preparing the market compared to those cutting dividends without preparing the market. Consistent with this, the empirical study of Chemmanur and Tian (2012) shows that the long-term operating performance of prepared dividend cutters is better than that of nonprepared dividend cutters.
9. **Dividend payment performance subsequent to dividend cuts:** Our model predicts that the dividend payment performance subsequent to dividend cuts will be better for prepared dividend cutters compared to nonprepared dividend cutters. This prediction derives from the fact that, in the longer term, dividend payment performance cannot deviate significantly from operating performance: In other words, firms with better operating performance are likely to increase dividends more often (and by larger amounts) than those with poorer operating performance. Consistent with this implication, the empirical study of Chemmanur and Tian (2012) shows significant differences between prepared and nonprepared dividend cutters in their pattern of dividend payments in the years subsequent to a dividend cut. While prepared dividend cutters increase their dividends on average in the years following a dividend cut, nonprepared dividend cutters either decrease dividends or leave them unchanged.

10. **Long-term stock returns of prepared versus nonprepared dividend cutters:** Our model predicts that it is the firms with more unfavorable private information that are more likely to cut dividends without preparing the market (i.e., type B firms). This, in turn, implies that the long-term stock return performance of prepared dividend cutters will be better than that of nonprepared dividend cutters. Consistent with this prediction, the empirical analysis of Chemmanur and Tian (2012) shows that the long-term stock return performance of prepared dividend cutters is better than that of nonprepared dividend cutters.

V. Conclusion

This paper has presented the first theoretical analysis of the choice of firms between preparing and not preparing the equity market in advance of a possible dividend cut. In our model, a firm has assets in place and a growth opportunity. Firm insiders have private information not only about the probability of their firm realizing a high intermediate cash flow, but also about the NPV of its growth opportunity. In the above setting, we characterized the firm insiders’ equilibrium choice between preparing and not preparing the market, as well as their decision regarding whether or not to cut the firm’s dividend (subsequent to the realization of the firm’s intermediate cash flow). We showed that, in equilibrium, firms in temporary financial difficulties but with good long-term growth prospects are more likely to prepare the market in advance of dividend cuts, while those with permanently declining earnings are less likely to prepare the market. Our analysis generates several testable predictions, not only for the propensity of firms to prepare the market prior to dividend cuts, but also for the announcement effect.

23The usual caveats common to predictions about long-term stock returns apply here. If we assume that all investors are fully rational, and instantly infer firm insiders’ private information from their choice to prepare the market for a dividend cut or not, then all effects on the stock returns of the two groups of firms will be captured by the announcement effect rather than by the long-run stock return. If, however, firm insiders’ private information is not fully reflected in the stock price on the day of the announcement of dividend cuts, but is incorporated only over a longer period, then our model predicts superior long-term stock return performance for prepared dividend cutters relative to nonprepared dividend cutters as the superior operating performance of prepared dividend cutters gets reflected in stock prices over time.
(on the market-preparation day, the dividend-cut day, and the combined announcement effect over both days) of prepared versus nonprepared dividend-cutting firms, as well as for the long-run operating, dividend payment, and stock return performance of prepared versus nonprepared dividend cutters.

5 Appendix. Proofs of Propositions

Proof of Proposition 1. (i) At time 0, each type of firm has two possible choices: preparing or not preparing the market for a possible dividend cut at time 1. We will show the payoffs to each type of firms following each choice and then derive the conditions under which the choice made by each type of firms maximizes its expected payoff at time 0, given its equilibrium action at time 1 and outsiders’ equilibrium beliefs about its true type.

For the type \( G \) firm, if it chooses to prepare the market, its expected payoff at time 0 is \( J_G^P = \alpha_0 V_0^P + \alpha_1 V_1^M + \beta G H \theta G \). On the other hand, if it chooses not to prepare the market, its expected payoff at time 0 is \( J_G^N = \alpha_0 V_0^N + \alpha_1 V_1^M + \alpha_2 H \theta G \). Given model assumptions and equilibrium restrictions, we can show that

\[
J_G^P - J_G^N = \left[ \alpha_0 \left\{ \gamma \delta (h - I) (1 - \beta a) \right\} \frac{1}{2} \right] - \left[ \frac{1}{2} \delta (2 - \delta a) + \gamma (1 - \beta a) \right] \frac{1}{2} \delta a + \gamma \delta a > 0.
\]

Therefore, the type \( G \) firm always chooses not to prepare the market at time 0, given the equilibrium strategies of the other two types of firms.

For the type \( M \) firm, if it chooses to prepare the market, its expected payoff at time 0 is \( J_M^P = \alpha_0 V_0^P + \alpha_1 V_1^M + (1 - \beta m) V_1^C + \beta G H \theta G \). On the other hand, if it chooses not to prepare the market, its expected payoff at time 0 is \( J_M^N = \alpha_0 V_0^N + \alpha_1 V_1^M + (1 - \beta m) V_1^C + \alpha_2 H \theta G \). The type \( M \) firm plays a mixed strategy by choosing \( \delta m \), the probability of preparing the market, such that it equalizes its expected payoff of preparing and not preparing the market. Therefore, the equilibrium value of \( \delta m \) makes \( J_M^P = J_M^N \), given the equilibrium strategies of the other two types of firms. The type \( M \) firm will not prepare the market with probability 1 if \( J_M^P < J_M^N \) and \( \delta m = 1 \), which implies that \( \beta m < \beta G \).

where

\[
\bar{\beta} = \frac{\beta_G + \sqrt{B^2 - 4\alpha}}{2\alpha}
\]

and

\[
\bar{A} = \left\{ \frac{1}{2} - \gamma \right\} (2 - \delta a) \left\{ \alpha_0 \gamma (h - I) - \alpha_1 H \left[ \gamma + \left( \frac{1 - \gamma}{2} \right) \delta a \right] (\theta G - \theta a) \right\};
\]

\[
\bar{B} = \left\{ \alpha_0 \left\{ (h - I) \left( \frac{1 - \gamma}{2} \right) \right\} + \frac{1}{2} \right\} \left\{ \gamma (1 - \delta a) (h - I - H (\theta G - \theta a)) + \gamma 2 (h - I) + H (\theta G - \theta a) \right\} - 2 \alpha a H \left( \frac{1 - \gamma}{2} \right) (2 - \delta a) \left\{ \gamma + \left( \frac{1 - \gamma}{2} \right) \delta a \right\} (\theta G - \theta a) \right\};
\]

\[
\bar{C} = \left\{ \gamma + \delta a \left( \frac{1 - \gamma}{2} \right) \right\} \left\{ \alpha_0 \left( \frac{1 - \gamma}{2} \right) \left\{ \gamma (h - I) + \delta a \left( \frac{1 - \gamma}{2} \right) (h - I + H (\theta G - \theta a)) \right\} - H (1 - \delta a) (\theta G - \theta a) \right\} - \alpha_1 H \gamma \left( \frac{1 - \gamma}{2} \right) (2 - \delta a) (\theta G - \theta a) \right\}.
\]
Similarly, the type $M$ firm will not prepare the market with probability 0 if $J_M^p > J_M^0$ and $\delta_M = 0$, which implies that $\beta_M > \beta_M^*$.

\[
\beta_M^* = \frac{-B + \sqrt{B^2 - 4AC}}{2A}
\]

where

\[
A \equiv \gamma \left\{ \alpha \gamma (h - I) - \alpha \gamma (1 - \gamma) \delta \right\} \left( \theta_G - \theta_B \right)
\]

\[
B \equiv \gamma \left\{ \alpha \gamma \left(1 - I\right) \left(1 - \frac{1 - \gamma}{2}\right) (1 - \delta_B) - h - I + H(\theta_G - \theta_B) \right\} \left(1 + \gamma \right)
\]

\[
B + 2\alpha H \left[ 1 - \left( \frac{1 - \gamma}{2}\right) \delta \right] \left( \theta_G - \theta_B \right)
\]

\[
C \equiv \alpha \left( \gamma + (1 - \frac{1 - \gamma}{2}) \left( 1 - \delta_B \right) \right) \left[ H(\theta_G - \theta_B) - h - I + H(\theta_G - \theta_B) \right] \left(1 - \frac{1 - \gamma}{2}\right)
\]

\[
- \alpha H \gamma \left[ \left(1 - \frac{1 - \gamma}{2}\right) (1 - \delta_B) + \frac{1 - \gamma}{2}\right] (\theta_G - \theta_B).
\]

For the type $B$ firm, if it chooses to prepare the market, its expected payoff at time 0 is $J_B^p = \alpha_0 V_B^0 + \alpha_1 \left[ \lambda V_1^{\text{true}} + (1 - \lambda) V_1^{\text{false}} \right] + \alpha_2 H \theta_B$. On the other hand, if it chooses not to prepare the market, its expected payoff at time 0 is $J_B^0 = \alpha_0 V_B^0 + \alpha_1 \left[ \lambda V_1^{\text{true}} + (1 - \lambda) V_1^{\text{false}} \right] + \alpha_2 H \theta_B$. The type $B$ firm plays a mixed strategy by choosing $\delta_B$, the probability of preparing the market, such that it maximizes its expected payoff. Therefore, the equilibrium value of $\delta_B$ makes $J_B^p = J_B^0$, given the equilibrium strategies of the other two types of firms. The type $B$ firm will not prepare the market with probability 1 if $J_B^p < J_B^0$ and $\delta_B = 1$, which implies that $\lambda < \bar{\lambda}$, where

\[
\bar{\lambda} = 1 - \frac{\alpha_0 \left( \frac{1 - \gamma}{2} \right) \gamma (1 - \beta_M \delta_M) \left[ \beta_M (h - I) \left( \frac{1 - \gamma}{2} \right) + H (\theta_G - \theta_B) \right]}{\alpha_1 H \left( \frac{1 - \gamma}{2} \right) (1 - \gamma \delta_M) (\theta_G - \theta_B)}.
\]

Similarly, the type $B$ firm will not prepare the market with probability 0 if $J_B^p > J_B^0$ and $\delta_B = 0$, which implies that $\lambda > \bar{\lambda}$, where

\[
\bar{\lambda} = 1 - \frac{\alpha_0 \left( \frac{1 - \gamma}{2} \right) \gamma (1 - \beta_M \delta_M) \left[ \beta_M (h - I) \left( \frac{1 - \gamma}{2} \right) + H (\theta_G - \theta_B) \right]}{\alpha_1 H \left( \frac{1 - \gamma}{2} \right) (1 - \gamma \delta_M) (\theta_G - \theta_B)}.
\]

Solving $J_M^p = J_M^0$ and $J_B^p = J_B^0$ simultaneously, the equilibrium market-preparation probabilities are $\delta_M = \{\alpha_0, \alpha_1, \alpha_2, \lambda, H, \theta_G, \theta_B, \gamma, \beta_M, \lambda\}$ and $\delta_B = g(\alpha_0, \alpha_1, \alpha_2, h, I, H, \theta_B, \gamma, \beta_M, \lambda)$. The type $M$ and the type $B$ firms' equilibrium probabilities of preparing the market, $\delta_M$ and $\delta_B$, maximize their respective expected objective functions. The general expression of the type $M$ firm's objective function is $\max_{\delta_M} \lambda \beta_M \left[ \alpha_0 V_M^0 + \alpha_1 \left( 1 - \lambda \beta_M \right) \beta_M V_M^{\text{true}} + \left( 1 - \beta_M \right) V_M^{\text{false}} + \alpha_1 \left( 1 - \lambda \beta_B \right) \beta_B V_B^{\text{true}} + \left( 1 - \beta_B \right) V_B^{\text{false}} \right] + \alpha_2 H \theta_B$. The general expression of the type $B$ firm's objective function is $\max_{\delta_B} \lambda \beta_B \left[ \alpha_0 V_B^0 + \alpha_1 \left( 1 - \lambda \beta_B \right) \beta_B V_B^{\text{true}} + \left( 1 - \beta_B \right) V_B^{\text{false}} \right] + \alpha_2 H \theta_B$. Comparing the objective functions of the two types of firms, it can be shown that the benefit of preparing the market for the type $B$ firm is lower than that of the type $M$ firm, since $\lambda_M = 0$ and $0 < \lambda_B < 1$. In other words, the type $B$ firm is subject to a positive probability of deterioration such that its true type is revealed and it cannot continue to enjoy the benefit of pooling with the type $M$ firm by preparing the market at time 0. At the same
time, for any given prior probability distribution, the cost of preparing the market at time 0 is the same for a type $M$ firm and a type $B$ firm (since, in the absence of market preparation, either type will pool with each other and the type $G$ firm, getting a value of $V_0^G$.

If they prepare the market, they separate from the type $G$ firm and pool with each other, getting a value $V_0^G$). Finally, the cost of preparing the market arising from firm valuation at time 1 is higher for the type $M$ firm than for the type $B$ firm (since the type $B$ firm always realizes a low intermediate cash flow and cuts its dividend, while the type $M$ firm will cut its dividends only with a probability less than 1, yielding the latter a greater loss in value in the scenario where it does not need to cut its dividend). However, for $\lambda < \lambda < \lambda$, the incremental cost of market preparation incurred by the type $M$ firm over that of the type $B$ firm is smaller than its incremental benefit from market preparation over the type $B$ firm, yielding $0 < \delta^*_B < \delta^*_M < 1$.

(ii) From (i), it can be shown that if $\beta_M < \beta_M$, then $J_M^B - J_M^B > 0$, which implies that the type $M$ firm prepares the market with probability 1. Given the type $G$ and the type $M$ firms’ equilibrium strategies, the type $B$ firm chooses $\delta_B$ that maximizes its objective function at time 0: $\delta_B J_M^B + (1 - \delta_B) J_M^B$. Solving its 1st-order condition, we obtain the type $B$ firm’s equilibrium market-preparation probability $\delta_B^*$.

where

$\delta_B^* = \frac{-B^* + \sqrt{(B^*)^2 - 4AC^*}}{2A^*}$ and

$A^* \equiv \left\{ \frac{1 - \gamma}{2} \right\}^2 \{ \alpha_0 \left( \frac{1 - \gamma}{2} \right)^2 \left[ (h - I) + H(\theta_G - \theta_B) \right] + \alpha_1 H(1 - \lambda)(1 - \beta_M) (\theta_G - \theta_B) \}$

$B^* \equiv -2 \left\{ \frac{1 - \gamma}{2} \right\} \left\{ \alpha_0 \frac{1 + \gamma}{2} \left( \frac{1 + \gamma}{2} - \gamma \beta_M \right) \right[ \left[ \frac{1 - \gamma}{2} \right] \left[ (h - I) + H(\theta_G - \theta_B) \right] + \gamma \left[ (h - I) \beta_M + H(\theta_G - \theta_B) \right] \right] + \alpha_1 H(1 - \lambda)(1 - \beta_M) (\theta_G - \theta_B) \}$

$C^* \equiv \left\{ \frac{1 + \gamma}{2} \right\} \left\{ \frac{1 - \gamma}{2} \right\} \left[ (h - I) + H(\theta_G - \theta_B) \right] + \gamma \left[ (h - I) \beta_M + H(\theta_G - \theta_B) \right] \}$.

(iii) At time 1, since the type $G$ firm always has a high realization of the intermediate cash flow and can both maintain its current dividend level and implement the new project, it will always keep its current dividend level and implement the new project in equilibrium regardless of the strategies played by the other two types of firms.

For the type $M$ and type $B$ firms, we first consider the equilibrium strategies as specified in part (i), where both the type $M$ and the type $B$ firms play mixed strategies between preparing and not preparing the market at time 0.

For the type $M$ firm, if it chooses to cut its dividend when the low intermediate cash flow is realized, its expected payoff at time 0 conditional on preparing the market is $J_M^M = \alpha_0 V_0^M + \alpha_1 [\beta_M V_1^M] + (1 - \beta_M) V_1^{CP} + \alpha_2 H(\theta_M)$. On the other hand, if the type $M$ firm chooses to pass up the new project by maintaining its current dividend level, its expected payoff at time 0 conditional on preparing the market is $J_M^M = \alpha_0 V_0^M + \alpha_1 V_1^{CP}$. Then the difference in expected payoffs between these two actions would be
\[ J_B' - J_B'' = \alpha_1 \left[ H(1 - \beta_M) \left( \frac{\frac{1}{\Delta_M} \delta_M \theta_M + \delta_M \theta_G(1 - \beta_M)}{1 + \frac{1}{\Delta_M} \delta_M} \right) - (1 - \beta_M)(h - I + H\theta_G) \right] + \alpha_2 H\theta_G, \]

1 and the type M firm will choose to implement the new project when the low intermediate
cash flow is realized if and only if

\[
(A-1) \quad \alpha_2 H\theta_G > \alpha_1 \left[ (1 - \beta_M)(h - I + H\theta_G) - \frac{H(1 - \beta_M) \left( \frac{\frac{1}{\Delta_M} \delta_M \theta_M + \delta_M \theta_G(1 - \beta_M)}{1 + \frac{1}{\Delta_M} \delta_M} \right)}{(1 - \beta_M)(h - I + H\theta_G)} \right].
\]

By the same token, the difference in expected payoffs between these two actions
would be

\[ J_M^N - J_M^{N'} = \alpha_1 \left[ H(1 - \beta_M) \left( \frac{\frac{1}{\Delta_M} \delta_M \theta_M + \delta_M \theta_G(1 - \beta_M)}{1 + \frac{1}{\Delta_M} \delta_M} \right) - (1 - \beta_M)(h - I + H\theta_G) \right] + \alpha_2 H\theta_G, \]

and the type M firm will choose to implement the new project when the low intermediate
cash flow is realized if and only if

\[
(A-2) \quad \alpha_2 H\theta_G > \alpha_1 \left[ (1 - \beta_M)(h - I + H\theta_G) - \frac{H(1 - \beta_M) \left( \frac{\frac{1}{\Delta_M} \delta_M \theta_M + \delta_M \theta_G(1 - \beta_M)}{1 + \frac{1}{\Delta_M} \delta_M} \right)}{(1 - \beta_M)(h - I + H\theta_G)} \right].
\]

Similarly, for the type B firm, if it chooses to cut its dividend and implement its new
project if it does not deteriorate, its expected payoff at time 0 conditional on preparing the
market is \( J_B^p = \alpha_2 V^p_B + \alpha_1 [V^C_{\text{true}}(1 - \lambda) V^I_{\text{true}}] + \alpha_2 H\theta_B \). On the other hand, if the
type B firm chooses to maintain its current dividend level by passing up its new project if
it does not deteriorate, its expected payoff at time 0 conditional on preparing the market is

\[ J_B^{p'} = \alpha_2 V^p_B + \alpha_1 [V^C_{\text{true}}(1 - \lambda) V^I_{\text{true}}] + \alpha_2 H\theta_B. \]

The difference in expected payoffs
between these two actions would be

\[ J_B^p - J_B^{p'} = \alpha_1 \left[ H \left( \frac{\frac{1}{\Delta_M} \delta_M \theta_M + \delta_M \theta_G(1 - \beta_M)}{1 + \frac{1}{\Delta_M} \delta_M} \right) - H\lambda \theta_B - (1 - \lambda)(h - I + H\theta_G) \right] + \alpha_2 H\theta_B, \]

and the type B firm will choose to implement the new project when the deterioration does
not occur if and only if

\[
(A-3) \quad \alpha_2 H\theta_B > \alpha_1 \left[ H\lambda \theta_B + (1 - \lambda)(h - I + H\theta_G) - \frac{H \left( \frac{\frac{1}{\Delta_M} \delta_M \theta_M + \delta_M \theta_G(1 - \beta_M)}{1 + \frac{1}{\Delta_M} \delta_M} \right)}{(1 - \beta_M)(h - I + H\theta_G)} \right].
\]
By the same token, the difference in expected payoffs between these two actions would be

\[ J_{B}^{np} - J_{B}^{o} = \alpha_1 \left[ \frac{H}{1+\delta_M} \theta_M (1 - \delta_B) \gamma (\gamma (1 - \beta_M) (1 - \delta_M) (\theta_M + (1 - \lambda) \theta_G))}{1+\delta_B} + \gamma (1 - \beta_M) (1 - \delta_M) \right] \]

\[ - H \lambda \theta_B - (1 - \lambda) (h - I + H \theta_G) + \alpha_2 H \theta_B, \]

and the type B firm will choose to implement the new project when the deterioration does not occur if and only if

\[ \alpha_2 H \theta_B > \alpha_1 \left[ H \lambda \theta_B + (1 - \lambda) (h - I + H \theta_G) \right] \]

\[ - H \left[ \frac{1}{1+\delta_M} \theta_M (1 - \delta_B) \gamma (\gamma (1 - \beta_M) (1 - \delta_M) (\theta_M + (1 - \lambda) \theta_G))}{1+\delta_B} + \gamma (1 - \beta_M) (1 - \delta_M) \right] \].

If the type B firm deteriorates, it has no benefit from maintaining its current dividend, since it has already been revealed as a type B firm. Given that its project has a positive NPV, the type B firm will always choose to cut its dividend and implement the new project if it deteriorates. Combining equations (A-1) through (A-4), we can show that the necessary and sufficient condition for the type M firm to choose to implement the new project when a low intermediate cash flow is realized and for the type B firm to choose to implement the new project when the deterioration does not occur is condition (A-4).

Next, we consider the equilibrium strategies as specified in part (ii), where the type M firm always prepares the market at time 0 and the type B firm plays a mixed strategy between preparing and not preparing the market at time 0.

For the type M firm, conditional on preparing the market at time 0,

\[ J_{M}^{p} - J_{M}^{o} = \alpha_1 (1 - \beta_M) \left[ \frac{\delta_B H (\theta_G - \theta_B)}{1 - \beta_M + \delta_B} - (h - I) \right] + \alpha_2 H \theta_G, \]

and the type M firm will choose to implement the new project when the low intermediate cash flow is realized if and only if

\[ \alpha_2 H \theta_G > \alpha_1 (1 - \beta_M) \left[ (h - I) - \frac{\delta_B H (\theta_G - \theta_B)}{1 - \beta_M + \delta_B} \right]. \]

By the same token, conditional on not preparing the market at time 0, \( J_{M}^{np} - J_{M}^{o} = \alpha_1 (1 - \beta_M) \left[ (h - I) + H (\theta_G - \theta_B) \right] + \alpha_2 H \theta_G, \) and the type M firm will choose to implement the new project when the low intermediate cash flow is realized if and only if

\[ \alpha_2 H \theta_G > \alpha_1 (1 - \beta_M) \left[ (h - I) + H (\theta_G - \theta_B) \right]. \]

For the type B firm, conditional on preparing the market at time 0,

\[ J_{B}^{p} - J_{B}^{o} = \alpha_1 \left[ \frac{\delta_B H (\theta_G - \theta_B)}{1 - \beta_M + \delta_B} - (h - I) \right] + \alpha_2 H \theta_B, \]

and the type B firm will choose to implement the new project when the deterioration does not occur if and only if

\[ \alpha_2 H \theta_B > \alpha_1 \left[ (h - I) - \frac{\delta_B H (\theta_G - \theta_B)}{1 - \beta_M + \delta_B} \right]. \]
By the same token, conditional on not preparing the market at time 0, $J_{NP}^B - J_{NP}^B = \alpha_1 [H(\theta_B - \theta_C) - (h - I)] + \alpha_2 H\theta_B$, and the type B firm will choose to implement the new project when the deterioration does not occur if and only if

\[(A-8) \quad \alpha_2 H\theta_B > \alpha_1 ([h - I] + H(\theta_C - \theta_B)).\]

If the type B firm deteriorates, it has no benefit from maintaining its current dividend, since it has already been revealed as a type B firm. Given that its project has a positive NPV, the type B firm will always choose to cut its dividend and implement the new project if it deteriorates. Combining equations (A-5) through (A-8), we obtain the necessary and sufficient condition for both type M and type B firms to choose to implement the new project when a low intermediate cash flow is realized and for the type B firm to choose to implement the new project when the deterioration does not occur.

Combining expressions (A-4) and (A-8), we can show that the necessary and sufficient condition for both type M and type B firms to follow the equilibrium strategies specified in part (iii) at time 1 is $\alpha_2 H\theta_B > \alpha_1 ([h - I] + H(\theta_C - \theta_B))$, which is the global condition of Proposition 1.

**Proof of Proposition 2.** (i) It can be shown that

$V_0^{NP} - V_0^p = \left[\beta_0 \gamma \frac{1 + \gamma}{2} (h - I)(1 - \beta_M) + \frac{1 + \gamma}{2} \delta_B [h - I + H(\theta_C - \theta_B)] + \gamma (\delta_M - \delta_B) [(h - I)\beta_M + H(\theta_C - \theta_B)] \right] / \left[\frac{1 + \gamma}{2} (2 - \delta_B) + \gamma (1 - \delta_M) \left(\frac{1 + \gamma}{2} \delta_B + \gamma \delta_M\right)\right] > 0,$

so that the stock price of any firm drops upon market preparation for a dividend cut.

(ii): Substituting the definitions of $V_1^{NC|NP}$, $V_1^{NP|NP}$, $V_1^{NC|p}$, and $V_1^{NP|p}$ from the main text, we can prove the following relations:

$V_1^{NC|NP} - V_1^{NP|NP} = h - I + H(\theta_C - \theta_B) \frac{(1 - \gamma) \delta_B}{2\gamma \delta_M (1 - \beta_M) + (1 - \gamma) \delta_B} > 0$

and

$V_1^{NC|p} - V_1^{NP|p} = h - I + H(\theta_C - \theta_B) \frac{(1 - \gamma) (1 - \delta_B)}{2\gamma (1 - \beta_M) (1 - \delta_M) + (1 - \gamma) \delta_B} > 0.$

Therefore, the stock price drops upon the announcement of a dividend cut, whether or not the firm previously prepared the market.

(iii): Making use of part (i) in Proposition 1 and part (i) in Proposition 2, we can show that

$\left(V_1^{NC|NP} - V_1^{NP|NP}\right) - \left(V_1^{NC|p} - V_1^{NP|p}\right) = H(\theta_C - \theta_B) \times \frac{2\gamma (1 - \gamma) (1 - \delta_B) (\delta_M - \delta_B)}{2\gamma (1 - \beta_M) (1 - \delta_M) + (1 - \gamma) \delta_B} [2\gamma \delta_M (1 - \beta_M) + (1 - \gamma) \delta_B] > 0.$

Therefore, the negative stock price reaction upon a dividend-cut announcement will be more severe for firms that did not prepare the market compared to those that prepared the market.
Therefore, the combined stock price reaction upon market preparation, $V_{NP}^N - V_{NP}$, and that upon a dividend-cut announcement, $V_{CNP}^N - V_{CNP}$, for firms that prepared the market is less negative than the stock price reaction upon a dividend-cut announcement, $V_{NP}^N - V_{NP}$, for firms that did not prepare the market.

(v): In equilibrium, prepared dividend cutters are a pool of the type $M$ and the type $B$ firms, and nonprepared dividend cutters are also a pool of the type $M$ and the type $B$ firms. Prepared dividend cutters’ cash flow at time 2 will be $H(\delta_M \theta_G + \delta_B \theta_B)$, while nonprepared cutters’ cash flow at time 2 will be $H\theta_G (1 - \delta_M) + H\theta_B (1 - \delta_B)$. If $\theta_G > \theta_B^*$, where $\theta_B^* = \theta_B (1 - 2\delta_B)/(2\delta_B - 1)$, then the difference between prepared and nonprepared dividend cutters’ cash flow is given by $H\theta_G (2\delta_M - 1) + H\theta_B (2\delta_B - 1) > 0$, so that the long-term post-dividend-cut-operating performance of a dividend-cutting firm will be higher on average for prepared dividend cutters relative to that of nonprepared dividend cutters.

**Proof of Proposition 3.** (i) We can show that the marginal effect of a stock-price drop upon market preparation for a dividend cut with respect to $\gamma$ at time 0 is given by

$$\frac{\partial (V_{NP}^N - V_{NP})}{\partial \gamma} = \frac{\partial V_{NP}^N}{\partial \gamma} - \frac{\partial V_{NP}}{\partial \gamma} = \frac{2\delta^2 \gamma (1 - \delta_M) \partial M + \gamma (1 - \delta_M) \partial h}{(1 - \gamma \delta \delta M)^2} < 0,$$

where

$$A^\delta = (h - I) (2\delta M + 1) + H \theta_G > 0;$$

$$B^\delta = \delta_M (h - I) + H (\theta_G - \theta_B) > 0;$$

$$C^\delta = \theta_G (1 - \gamma)^2 + \gamma (1 - I)^2 (1 + \delta_M) + \gamma \delta_M \delta M$$

$$D^\delta = (h - I) [\delta_M (1 + \delta_M) + 1] + H (\theta_G - \theta_B) + \delta_M (h - I) + 3H (\theta_G - \theta_B) > 0.$$

Therefore, the stock-price drop upon market preparation for a dividend cut is smaller (less negative) for a higher value of $\gamma$.

(ii) We can show that the marginal effect of a stock-price drop upon the announcement of a dividend cut with respect to $\gamma$ at time 1 if the firm does not prepare the market at time 0 is given by

$$\frac{\partial (V_{CN}^N - V_{CN})}{\partial \gamma} = \frac{2H (1 - \delta_B) (1 - \delta_M) \theta_G \theta_B (1 - \delta_M)}{[2\gamma (1 - \delta_M) (1 + \gamma) (1 - \delta_M)]^2} \frac{H (\theta_G - \theta_B) (1 - \delta_M)}{2\gamma (1 - \delta_M) (1 + \gamma) (1 - \delta_M)} < 0.$$

Therefore, the stock-price drop upon the announcement of a dividend cut for firms that did not prepare the market will be smaller (less negative) for a higher value of $\gamma$. 

The marginal effect of a stock-price drop upon the announcement of a dividend cut with respect to $\gamma$ at time 1 if the firm prepares the market at time 0 is given by

$$\frac{\partial}{\partial \gamma} \left( V_{1}^{NCP} - V_{1}^{CP} \right) = \frac{2H \delta_b \delta_M (\theta_G - \theta_B) (1 - \beta_M)}{[2\gamma \delta_M(1 - \beta_M) + (1 - \gamma) \delta_B]^{\frac{3}{2}}} - \frac{H (\theta_G - \theta_B) \delta_B}{2\gamma \delta_M(1 - \beta_M) + (1 - \gamma) \delta_B} < 0.$$  

Therefore, the stock-price drop upon the announcement of a dividend cut for firms that prepared the market will be smaller (less negative) for a higher value of $\gamma$. □

Proof of Proposition 4. (i) Making use of the parameter restrictions that $\gamma > \gamma^* = \beta_M/(2 - \beta_M)$, we can show that

$$\frac{\partial \delta^*_b}{\partial H} = \frac{AB - E}{C \sqrt{D^2 - 4BC}} + \frac{AD (\sqrt{D^2 - 4BC} + D)}{2C \sqrt{D^2 - 4BC}} > 0,$$

where

$$A = (\theta_G - \theta_B) \left[ \lambda^2 (1 - \beta_M) + (2 - \beta_M - \lambda) \right] > 0;$$
$$B = (h - I) (1 - \beta_M) [2\gamma - \beta_M (1 + \gamma)] + H (\theta_G - \theta_B) (1 - \beta_M) [2 - \gamma (1 + \lambda)] > 0;$$
$$C = (h - I) [2\gamma + \beta_M (1 - \gamma)] + H (\theta_G - \theta_B) \left[ \lambda^2 (1 - \beta_M) + (2 - \beta_M - \lambda) \right] > 0;$$
$$D = (h - I) \gamma (1 - \gamma) [\gamma (1 - \gamma) + \gamma \lambda^2 (2 - \gamma)] > 0;$$
$$E = (\theta_G - \theta_B) (1 - \beta_M) (\gamma \lambda + \lambda - 2) < 0.$$

The signs of the expressions $A$, $B$, $C$, and $E$ are obvious since $\gamma > \gamma^* = \beta_M/(2 - \beta_M)$. The expression $D$ is positive given the model’s assumptions. Therefore, the type $B$ firm’s equilibrium probability of preparing the market is increasing in the firm’s growth opportunity.

(ii) Once again, using the parameter restrictions on $\gamma$, we can show that

$$\frac{\partial \delta^*_b}{\partial b} = \frac{E' \left( \sqrt{B^2 - 4A'C'} - B' \right) (C' + 2D') - 2A'C'D' - 2F'' + 4 \sqrt{B^2 - 4A'C'}^2}{2C' \sqrt{B^2 - 4A'C'}} < 0,$$

where

$$A' = H (\theta_G - \theta_B) (1 - \beta_M) [2 - \gamma (1 + \lambda)] + (h - I) [2\gamma + \beta_M (1 - \gamma)] > 0;$$
$$B' = (h - I) [4\gamma (1 - \beta_M) + \beta_M (1 - \gamma)] > 0;$$
$$C' = H (\theta_G - \theta_B) (1 - \beta_M) \left[ \lambda^2 (1 - \beta_M) + 2 - \gamma (1 + \lambda) \right] + (h - I) [2\gamma + \beta_M (1 - \gamma)] > 0;$$
$$D' = 2\gamma + \beta_M (1 - \gamma) > 0;$$
$$E' = 4\gamma (1 - \beta_M) + \beta_M (1 - \gamma) > 0;$$
$$F' = (1 - \beta_M) [2\gamma - \beta_M (1 + \gamma)] > 0.$$

Using the same logic as we used in part (i) of this proposition, $2\gamma - \beta_M (1 + \gamma) > 0$, and so $F' > 0$. In addition, since $A' > 0$ and $C' > 0$, $\sqrt{B^2 - 4A'C'} < B'$. Hence, the type
firm’s equilibrium probability of preparing the market is decreasing in the firm’s current profitability.

Proof of Proposition 5. (i). From the proof of part (i) in Proposition 1, it can be shown that if \( \lambda \geq \lambda^* \), then \( J_{PB} - J_{NPB} \leq 0 \) and \( J_{MB} - J_{NPB} \leq 0 \), which implies that the type \( M \) and the type \( B \) firms do not prepare the market with probability 1.

(ii). From the proof of part (i) in Proposition 1, it can be shown that if \( \lambda \leq \lambda^* \), then \( J_{PB} - J_{NPB} \leq 0 \) and \( J_{MB} - J_{NPB} \leq 0 \), which implies that the type \( M \) and the type \( B \) firms do not prepare the market with probability 1.

(iii). The proof is the same as that in part (iii) of Proposition 1.

References


