Governance through Regulation or Market Forces? Fighting Short-Termism under Moral Hazard and Adverse Selection

Adrian Aycan Corum*

October 25, 2022

Abstract

I study a model of blockholder short-termism, where each blockholder (e.g., activist shareholder) has a stake in a different firm and can sell before the impact of his actions on firm value is realized. I find that the existence of value-destroying blockholders can *increase* average firm value, because it motivates the value-creating blockholders to keep their stake longer due to a lower stock price at exit, and in turn, to exert more effort. Moreover, not only policies that punish short-termism (e.g., raising short-term taxes) but also policies that reward long-termism (e.g., loyalty shares) can *destroy* total firm value, even if the number of value-creating blockholders stays the same. The model has implications for a wide range of blockholders (activists, CEOs, boards, entrepreneurs, VCs).

KEYWORDS: Blockholder, Incentives, Myopia, Shareholder Activism, Short-Termism.
JEL CLASSIFICATION: C70, D82, G23, G24, G32, G34, L26

*Johnson Graduate School of Management, Cornell University, corum@cornell.edu. I am grateful to Warren Bailey, Attila Balogh, Murillo Campello, Vyacheslav Fos, Benjamin Hébert, Naveen Khanna, Doron Levit, Nadya Malenko, Giorgia Piacentino, Mani Sethuraman, Yan Xiong (discussant), and Begum Ipek Yavuz, and participants of the 2021 Northern Finance Association and seminar participants at Bilkent University and Cornell University for helpful comments and suggestions.

1 Introduction

The problem of sacrificing long-term value for short-term gains is a major topic that draws the attention of policymakers, academics, and practitioners all over the world. A common reason why this short-termism problem arises is because the market often cannot immediately assess the accurate NPV of the actions undertaken by firms. Due to this friction, if a blockholder that can affect the firm value also has opportunities to liquidate his stake in the firm before the NPV is realized, the blockholder may profit from deliberately undertaking actions that seem beneficial for the firm but are actually detrimental to the firm value. When this is the case, it might be tempting to argue that such value destruction should be prevented.

Shareholder activism is a primary example for this short-termism debate. While several papers report that the stock price response to activist campaigns is positive on average,[1] others report evidence consistent with activist shareholders destroying long-term value in some of their interventions due to short-termist motives.[2] Laurence Fink, the CEO of the world's largest asset manager BlackRock, has argued that "the proliferation of activist shareholders seeking immediate returns" pressure "companies to meet short-term financial goals at the expense of building longterm value",[3] along with State Street which has expressed similar concerns.[4] In her campaign for the 2016 presidential election, Hillary Clinton called out "hit-and-run activists whose goal is to force an immediate payout" and she proposed to substantially increase the short-term capital gains tax rate and increase the horizon it applies to,[5] changes which were also put forward by Laurence Fink,[6] and endorsed by many other prominent figures such as John Bogle and Warren Buffett.[7] Moreover, similar changes targeted at hedge funds were also suggested by Donald Trump during his campaign, which made headway into both the House and Senate after he was elected.[8]

[1]For extensive surveys, see, e.g., Brav, Jiang, and Kim (2009), Brav, Jiang, and Kim (2015), and Brav, Jiang, and Li (2021).

[2]See, e.g., Cremers, Masconale, and Sepe (2017), deHaan, Larcker, and McClure (2019), Baker (2021).

[3]See Larry Fink's 2015 Letter to CEOs, https://www.blackrock.com/corporate/investor-relations/2015-larry-fink-ceo-letter. For a similar remark made by BlackRock about activists in a separate statement, see HLS Forum on Corporate Governance and Financial Regulation, "Getting Along with BlackRock," 11/06/2017.

[4]See State Street Global Advisors, "Protecting Long-Term Shareholder Interests In Activist Engagements," April 2020.

[5]See NYT DealBook, "Hillary Clinton Aim Is to Thwart Quick Buck on Wall Street," 7/27/2015.

[6]See NYT DealBook, "BlackRock's Chief, Laurence Fink, Urges Other C.E.O.s to Stop Being So Nice to Investors," 4/13/2015.

[7]See Aspen Institute, "Overcoming Short-termism: A Call for a More Responsible Approach to Investment and Business Management," 9/9/2009.

[8]See The Street, "Senate to Debate Tax Reform Plan That Includes Hit for Activist Fund Managers," 11/28/2017.

Increasing short term capital gains tax rates are not the only way proposed to curb activists that destroy value. In 2015, in his speech titled "Activism, Short-Termism, and the SEC," Commissioner Daniel Gallagher conveyed that the "most obvious issue" SEC faced in terms of its role to combat activist short-termism was "Section 13 reporting obligations."[9] Notably, among other things, these obligations dictate the time window that activists have to make their initial 13D filing after crossing the 5% threshold to disclose their position, as well as the time window they have for 13D amendments (e.g., when the activist starts selling his stake). In the year following Gallagher's speech, a number of senators including Bernie Sanders and Elizabeth Warren formally proposed a bipartisan legislation, called Brokaw Act, which would reduce the 13D window to "fight against increasing short-termism in our economy by promoting transparency and strengthening oversight of activist hedge funds."[10] Moreover, this regulatory push has got even stronger over time: In 2022, SEC formally proposed reducing the initial 13D filing window to five business days and the filing window for amendments to one business day, in addition to other restrictions.[11]

While the policies described so far aim curtailing activists' value destruction by punishing them, another set of policies suggested to combat short-termism takes a different route and instead rewards activists for keeping their stake longer. For example, Clinton and Fink have also suggested reducing long-term capital gains taxes as part of their proposals mentioned above. Proxy access, which has been adopted by 76% of S&P 500 firms as of 2019 (compared to 1% in 2014), allows shareholders to nominate directors to the board on the company's proxy ballot if they have held a minimum stake for a certain period of time (typically three years), making such nominations much less costly for the qualifying shareholders.[12] The Florange law in France doubles a shareholder's voting rights after holding the shares for two years. To encourage long-term investing, Toyota issued a special type of loyalty shares in 2015 with an annual dividend yield increasing from 0.5% in the first year to 2.5% in the fifth year.[13]

[9] See sec.gov, "Activism, Short-Termism, and the SEC: Remarks at the 21st Annual Stanford Directors' College," 06/23/2015.

[10] See davispolk.com, "Legislation Introduced to Increase Activist Hedge Fund Disclosure," 3/24/2016, and baldwin.state.gov, "U.S. Senator Tammy Baldwin Introduces Bipartisan Legislation to Strengthen Oversight of Predatory Hedge Funds," 8/31/2017.

[11] See WSJ, "SEC Proposes Giving Activist Investors Less Time to Report Positions," 2/10/2022; and HLS Forum on Corp. Governance and Financial Regulation, "SEC Proposes Updates to Schedule 13D/G Reporting," 2/15/2022. Among other rules, SEC's proposal also includes broadening the definition of who collaborate with activists, which was also part of the Brokaw Act. This would not only make such collaborations more expensive, but also make a 13D disclosure more likely even if a single blockholder does not exceed the 5% threshold.

[12] See HLS Forum on Corp. Governance and Financial Regulation, "Proxy Access: A Five-Year Review," 2/4/2020.

[13] See WSJ, "Q&A: Toyota's New Type of Share, and Why It's Controversial", 6/17/2015.

Moreover, such concerns of short-termism are not limited to activism, and they also apply on other types of blockholders: CEOs and boards of firms are often blamed to suffer from managerial myopia, and venture capitalists and entrepreneurs are criticized for pushing so many "unicorns" to IPOs despite not demonstrating profitability and wasting investors' money on infeasible business plans.

Motivated by these ongoing debates, in this paper I build a theoretical model of blockholder short-termism. The main questions that the paper addresses are as follows: Does the existence of some value-destroying blockholders necessarily hurt firms? If a policy eliminates only the value-destroying blockholders *and* at the same time provides incentives for other blockholders to create more value, does it always improve the value created? More generally, is there any tension between policies that aim to improve governance *forcefully* and market forces that facilitate governance *endogenously*? And if there is such a tension, then what kind of policies are more likely to create value than others?

A critical aspect of the model is that it takes into account the blockholders who destroy value in combination with those who create value (i.e., adverse selection). This is important because from a rational standpoint, the reason why a blockholder can profit from undertaking a value-destroying action in the first place is that he can "pool" with other blockholders who create value. Otherwise, the former blockholder would make a loss upon undertaking his action, because the stock price would go down. Therefore, the flip side of the coin is the incentives of the latter kind of blockholders regarding how much effort to exert and how much value to create as a result (i.e., moral hazard), which I include as part of my model.

I show that a higher number of value-destroying blockholders can result in more effort by the value-creating blockholders, and paradoxically, the overall impact on the average firm value can be positive as a result. I also show that in the case of activism, not only policies that punish short-termism but also policies that reward long-termism can simultaneously weed out value-destroying blockholders and result in lower total firm value, even if the number of value-creating blockholders stays the same. That said, between these two types of policies, rewarding long-termism is less likely to result in such a value destruction. However, the effect of the policy on firm value varies greatly even across the policies that reward long-termism.

The details of the model are as follows. In particular, in Section 2, I start with a baseline version of the model, where there is one firm, and there is a blockholder that has a stake in this firm. Here, the blockholder can represent an activist, as well as a CEO, board director, entrepreneur, or venture capitalist. The blockholder has either a "good" or a "bad" project, which is the private information of the blockholder: In the former case, the blockholder's project has a positive NPV and the blockholder can further increase it by exerting (unobservable) effort when he implements the project. In the latter, the blockholder's project has a negative NPV. The main friction in the model is that, as alluded to above, it takes time for the NPV of the project to be revealed (i.e., become public information), and the blockholder can sell his stake in the company (i.e., "exit") before the NPV is revealed. If the blockholder decides to exit, he has to disclose this information before selling his stake, which is an assumption I relax later. However, with some probability, the blockholder has to sell his stake (e.g., due to a liquidity shock or an attractive outside opportunity), and therefore the market cannot perfectly distinguish whether the blockholder has to sell for this exogenous (e.g., liquidity) reason or because he chooses to sell even if he does not have to.

The exit opportunity of the blockholder creates short-term incentives for him not to exert effort. To see this, consider the case where the blockholder always has a good project. Then, for any cost of effort, the blockholder shirks with some probability. This is because if he exerted effort with certainty, then the stock price would incorporate this expectation, and therefore the blockholder would have incentives to shirk and sell his stake instead. In other words, in equilibrium, the first-best is not achieved due to short-termism.

A key result of the paper is that if the cost of effort is not prohibitively high (that is, the blockholder with a good project does not always shirk), average firm value can *increase* with the probability that the blockholder is implementing a *bad* project. This is because the value-destroying blockholder (i.e., the blockholder that implements a bad project) always sells his stake, and therefore as the probability that the blockholder is destroying value increases, the stock price reacts more negatively upon the blockholder's sale decision. As a result, the incentives of the value-creating blockholder (i.e., the blockholder that implements a good project) to keep his stake until the NPV is revealed increases. In turn, this blockholder internalizes the effect of his actions on the actual firm value more, and therefore his incentives to exert effort to further increase the value of the firm also get stronger.

Importantly, I show that this positive effect described dominates the greater value destruction induced by the higher probability that blockholder is implementing a negative NPV project. The intuition is as follows. As the probability that the blockholder is destroying value increases, the blockholder with a good project increases his effort to a certain point. In particular, his higher effort increases the average stock price upon his exit to the point where he becomes once again indifferent between exerting effort (and keeping his stake unless hit by a liquidity shock) vs. shirking (and selling his stake). The critical observation is that the impact of higher effort of the blockholder has more positive impact on the *unconditional* average value of the firm compared to the stock price *conditional* on the exit of the blockholder. This is because upon the exit of the blockholder, the market assigns a lower probability that the blockholder has exerted effort, since such a blockholder does not exit unless he has to. Therefore, as the blockholder with a good project exerts more effort and the blockholder's exit price reaches its original level, this higher effort results in even a larger increase in the unconditional firm value and pushes it up beyond its original level. This is how the average firm value increases with the likelihood that the blockholder is destroying value. Moreover, this surprising result is not limited to a narrow set of parameters: Indeed, it holds as long as the moral hazard problem is binding, that is, if the blockholder that has a good project shirks with positive probability. Overall, to put it differently, one kind of short-termism (i.e., not exerting sufficient effort while still creating value) stemming from moral hazard can be alleviated with what can be seen as even more severe short-termism (i.e., outright value destruction) stemming from adverse selection.

It is also important to note that the arguments above do not rely on career concerns, but only stem from the changes in stock prices. Note that career concerns will not be relevant if the quality of the blockholders' projects now and in the future are independent from each other. In the case they are positively correlated (that is, the blockholder has a level of "skill"), however, the results would not get weaker and instead would get stronger if career concerns were incorporated in my model as well, as I discuss in Section 2.4. Moreover, if there is such a skill component, then an implication of the model is that a blockholder that has proven his skill over time might start creating less value compared to a blockholder that might be unskilled, even if there are no career concerns involved.

Related to this interpretation, regardless of whether there is any element of skill or career concerns, the model also has interesting implications for the case when there is a principal in charge of choosing the agent as I explain in Section 2.5. First, if the principal is facing two different agents' proposals at the same time (for example, shareholders of a firm voting for the board of directors vs. an activist in a proxy fight), it might be optimal for the principal to follow the proposal of the agent who is more likely to destroy value. Second, whenever there is a principal that selects the agent (e.g., the board choosing a CEO), it might be optimal for the principal to be short-term focused or not too expert in identifying whether the agent has a positive vs. negative NPV project (or alternatively, whether the agent is skilled vs. unskilled, if there is a skill component).

Going back to the original model, next I extend it in Section 3 in order to study policy implications. Motivated by the intense policy discussion surrounding activist short-termism as mentioned earlier, I focus on shareholder activism as the main application in this section. In particular, I extend the baseline model to a multiple firm and multiple blockholder setup, where each blockholder is matched to a different firm and now decides whether to acquire a stake in his matched firm or not, as well as whether to implement his project or not. In addition to showing the robustness of the results described earlier, this extended model allows me to analyze several policies, which can be broadly categorized under four distinct groups: (a) policies that punish short-termism (increasing short-term taxes or tightening disclosure rules for selling), which hurt the blockholder if he exits before the NPV is revealed, (b) policies that reward long-termism (reducing long-term taxes, or giving additional perks for holding the stake long-term, such as a higher dividend rate or more voting power), which benefit the blockholder if he keeps his stake until the NPV is revealed, (c) policies that act as blanket punishments (e.g., tightening the disclosure rules for buying, or raising the firm's defenses against the blockholder), which hurt the blockholder regardless of whether he exits or not, and (d) policies that make it more difficult to implement value-destroying projects (e.g., increasing oversight, transparency, or accountability).

I find that holding the number of blockholders that implement good and bad projects constant, policies that punish short-termism as well as policies that reward long-termism increase firm value, because both of them incentivize the blockholder with a good project to keep his stake, and in turn, to exert effort. Therefore, a question of interest is whether this force continues to dominate under endogenous entry, that is, once each blockholder's decision to acquire a stake and implement his project is taken into account.

Strikingly, under endogenous entry, I find that policies that punish short-termism as well as policies that reward long-termism can *decrease* total firm value (that is, the total value of all firms), even if the number of value-creating blockholders implementing their projects does not decrease. The reason is that fewer value-destroying blockholders implement their projects, resulting in a lower probability that a bad project is implemented. This has a negative impact on the incentives of the value-creating blockholders to exert effort, just like in the baseline model. Importantly, this effect can dominate, despite the *additional* incentive provided by these policies for the value-creating blockholders to exert effort (which was not present in the baseline model). Similarly, I find that blanket punishment policies as well as policies that make it more difficult to implement value-destroying projects can destroy total firm value as well, even if it again only weeds out the blockholders with bad projects. Therefore, regulations that are aimed at mitigating short-termism by discouraging or eliminating value-destroying blockholders might actually result in a reduction in firms' value by doing so, even if these policies also provide direct incentives for value-creating blockholders to exert effort. More generally, this result shows that under short-termism, there is a tension between improving governance *forcefully through regulation* versus *endogenously through market forces.* In many cases, the former can supress the latter too much, making overall governance worse.

Nevertheless, compared to punishing short-termism, I find that policies that reward long-termism is less likely to destroy total firm value. In particular, punishing short-termism results in value destruction whenever there is adverse selection and the moral hazard problem is binding (because it reduces adverse selection but makes the moral hazard problem much worse), while rewarding long-termism may not. That said, the effect on firm value significantly varies even within the policies that reward long-termism: Specifically, I show that compared to rewarding the blockholders with other perks for holding their stakes longer (e.g., a higher dividend rate or more voting power), reducing long term taxes is less likely to destroy total firm value, because the latter is less likely to directly impact the incentives of value-destroying blockholders to implement their projects (moreover, since total firm value increases under lower long-term tax rate, this can even result in a higher amount of total taxes collected). On the other hand, if all blockholders with good projects are exerting effort, then reducing long-term taxes has no effect on firm value at all, while rewarding blockholders with other perks for holding their stake strictly increases total firm value. Therefore, even among the policies that reward long-termism, the choice must be made carefully to avoid harming firm value inadvertently and to ensure increasing it.

Next, in Section 4, I discuss the policy implications of the model for other kinds of blockholders (CEOs, boards, VCs, and entrepreneurs). While there are instances in which many of the policy implications derived for shareholder activism would apply, a policy implication that is more likely to be shared with activism is that regulations or firm policies that make it harder to implement value destroying projects (e.g., due to increased oversight, accountability, or transparency at firms as well as at IPOs) can decrease total firm value.

Finally, to demonstrate the robustness of the results, I discuss several extensions in Section 5, including (*i*) allowing the blockholder with a bad project to improve the quality of his project by exerting effort, (*ii*) micro-founding the blockholder's effort as a search among different projects, (*iii*) relaxing the assumption that the blockholder can implement the project unilaterally, (*iv*) allowing for partial sale as well as dynamic disclosure, and (*v*) modeling further details of proxy access.

Related literature. This paper contributes to multiple strands of the literature. The first strand is the large literature on short-termism that primarily goes back to Narayanan (1985) and Stein (1988, 1989). In this literature, the closest papers to mine are the ones that argue short-termism might have positive effects due to some frictions (e.g., Bolton, Scheinkman, and Xiong (2006), Laux (2012), Hackbarth, Rivera, and Yong (2018), Xiong and Jiang (2021), Donaldson, Malenko, and Piacentino (2020), Thakor (2021)). Marinovic and Varas (2021) study short-termism by combining moral hazard and adverse selection and focusing on IPOs for their implications. However, in contrast to these papers, the focus in my paper is how the presence of value-destroying blockholders can be optimal for firm value, because it strengthens the incentives of other blockholders to exert more effort and create more value as a result. Moreover, due to heated discussion described above, shareholder activism is the focus of the policy implications in this paper.

The second strand my paper is closely related to is the blockholder literature, which is broadly divided into two branches: "voice" and "exit".[14] My paper falls under the voice category, where the blockholder intervenes in a firm to influence the actions or projects undertaken (e.g., Shleifer and Vishny (1986), Admati et al. (1994), Burkart et al. (1997), Cohn and Rajan (2013), Corum and Levit (2019), Corum (2021)). Under the voice category, a further subset of papers study the relation between liquidity and the blockholder's incentives to engage in an intervention (e.g., Kyle and Vila (1991), Bolton and von Thadden (1998), Kahn and Winton (1998), Maug (1998), Noe (2002), Aghion, Bolton, and Tirole (2004), Faure-Grimaud and Gromb (2004), Back et al. (2018)). An important difference with respect to these papers is that I study the impact of incorporating a value-destroying blockholder on the incentives of the blockholder that creates value, and I show that the overall effect on the firm value can be positive.

Note that even though the last set of papers mentioned above involve liquidity, the exit literature generally refers to a different branch of the blockholder literature (and hence also incorporates a more specific concept of "exit" compared to my paper). Broadly speaking, the exit literature studies how a blockholder can influence the decisions of the manager of the firm, not through voice, but because the exit of the blockholder can reveal negative information about the firm and hence punish the manager (e.g., Admati and Pfleiderer (2009), Edmans (2009), Cvijanovic, Dasgupta, and Zachariadis (2022)).[15] In contrast to these papers, in my paper, there is no other player that affects the firm value other than the blockholder I model.

[14] For surveys on voice and exit, see, e.g., Edmans (2014) and Edmans and Holderness (2017).

[15] Some papers combine voice and exit (e.g., Edmans and Manso (2011), Dasgupta and Piacentino (2015), Song (2015), Fos and Kahn (2019), Edmans, Levit, and Reilly (2019), Levit (2019)). For other models where a blockholder's trading impacts the manager's decisions, see, e.g., Khanna and Mathews (2012) and Goldman and Strobl (2013).

2 The Baseline Model

2.1 Setup

In the baseline model, there is one firm and a blockholder. The blockholder can represent an activist shareholder, the CEO, or a board director of the firm, as well as an entrepreneur or a venture capitalist. The only other player in the game is the market maker.

The blockholder's action affects the value of the firm (I use "action" and "project" interchangeably). I denote the value of the firm in status quo (i.e., if the blockholder does not implement any project) by Q_0. The blockholder has α stake in the firm, and he can have either of the two types of projects: good and bad. Whether the project is good or bad is private information of the blockholder. The blockholder with a bad project always destroys firm value, and I denote the impact of the bad project on the firm value by $\Delta_L < 0$. In contrast, the blockholder with a good project always increases the value of the firm. In particular, if he exerts an (unobservable) effort, then the firm value increases by $\Delta_H > 0$ but the blockholder incurs a cost of $c > 0$. If he does not exert effort, then the firm value increases by $\Delta_M > 0$, where $\Delta_M < \Delta_H$. I also refer to the blockholder with a good (bad) project as the value-creating (value-destroying) blockholder. I denote the time at which the blockholder implements the project by $t = 1$ (i.e., the "action" stage). At this stage, the blockholder simultaneously decides whether to implement the project and whether to exert effort (for a discussion of this assumption, see Section 5.1, where I also relax the assumption that the blockholder with a bad project cannot improve the NPV by exerting effort). Note that at $t = 1$, NPV of the project is the private information of the blockholder, as well as whether he has exerted effort. That said, if the blockholder implements the project, then this information immediately becomes public information.

The main friction of the model is that it takes time for the NPV of the blockholder's project to be revealed (i.e., become public information), and the blockholder can sell his stake before then. In particular, the blockholder can sell his stake by $t = 2$ (i.e., the "exit" stage), and the NPV becomes public information at $t = 3$ (i.e, the "realization" stage). At the exit stage, with probability ϕ the blockholder has to sell his stake (e.g., due to a liquidation shock or an attractive outside opportunity), and with probability $1-\phi$ the blockholder has the flexibility to choose whether to sell his stake or not. If the blockholder decides to sell, he has to disclose this information before selling his stake, which is an assumption I relax in the full model (Section 3). The disclosure is observed by the market maker, who determines the stock price based on this information. For simplicity, I assume that the blockholder can sell either all of his stake or none of it. I relax this assumption in Section 5.3.

There is no discounting in the game. I also ignore the the short-term and long-term capital gains taxes in the baseline model. I incorporate taxes as well as many other aspects in the full model later in the paper.

2.2 Analysis under No Voluntary Exit

In this brief section, I analyze a simplified version of the baseline model, which constitutes the first-best benchmark of the model. Specifically, in this benchmark, the only difference with respect to the baseline model is that the blockholder cannot voluntarily exit (i.e., sell his stake) before the NPV is revealed, unless he is hit with a liquidity shock. Therefore, the blockholder has to exit with probability ϕ (which is the probability of a liquidity shock to the blockholder), and has to keep his stake with probability $1-\phi$. While the assumption that the blockholder cannot voluntarily exit is artificial, it will help convey the crucial role that voluntary exit plays in the next section. In particular, under this assumption, the result below follows.

Lemma 1 *Suppose that the blockholder cannot sell his stake before the NPV is revealed unless he is hit with a liquidity shock. Then, when the blockholder implements a good project, he never exerts effort if $c > \bar{c}$ and always exerts effort if*

$$c < \bar{c} \equiv (1-\phi)\,\alpha\,(\Delta_H - \Delta_M)\,. \tag{1}$$

Note that I solve for the Perfect Bayesian Equilibria of the game. The intuition of Lemma 1 is as follows. With probability ϕ, the blockholder has to exit, and at this stage the market cannot distinguish if he has exerted effort or not. Therefore, conditional on implementing the project, the stock price at the exit stage is the same regardless of whether he has exerted effort or not. For this reason, in this case, he receives no benefit for exerting effort. However, with probability $1-\phi$, the blockholder has to keep his stake α until the NPV is revealed, and hence his payoff is $\alpha(\Delta_H - \Delta_M)$ higher if his project is good and he has exerted effort. Therefore, when the blockholder implements a good project, he never exerts effort if $c > \bar{c}$, and he always exerts effort if $c < \bar{c}$, where c is the blockholder's cost of effort. As a result, the first-best achieved when $c < \bar{c}$, and increasing the probability that the project is bad always decreases firm value. However, as I show in the next section, this result changes once the blockholder is allowed to exit voluntarily.

2.3 Analysis under Voluntary Exit

In this section, I solve the baseline model without imposing any additional restriction. Recall that at the exit stage (after the project is implemented but before the NPV of project is revealed), with probability ϕ the blockholder has to sell his stake (e.g., due to a liquidity shock), and with probability $1-\phi$ he chooses whether to sell his stake or keep it until the NPV is revealed.

I again solve for the Perfect Bayesian Equilibria of the game. All proofs are in the appendix. I denote by ρ the probability that the blockholder has exerted effort when implementing a good project, and I denote by q the probability that the implemented project is bad. Also, conditional on the blockholder implementing a project and then exiting (i.e., selling his stake before the NPV is realized), I denote the expected NPV of the project by P. Recall that before the blockholder sells his stake, he has to disclose that he will sell (which is an assumption I relax in the full model in Section 3). Since the value of the firm when no project is implemented is Q_0, once the blockholder discloses that he will exit the stock price becomes $Q_0 + P$, which I refer to as the "exit price". Since Q_0 and α (where the latter is the blockholder's stake) are exogenous constants, Q_0 has no effect on any of the results, and therefore I normalize $Q_0 = 0$ throughout the text in this section to simplify the notation (for a discussion of endogenous α, see Section 5.4). All of the proofs hold for any $Q_0 \geq 0$. I start the analysis with the following lemma.

Lemma 2 *Conditional on implementing the project:*

(*i*) *For any $q \in [0,1)$, the blockholder with a good project never exerts effort (i.e., $\rho^* = 0$) if $c > \bar{c}$ and exerts effort with positive probability (i.e., $\rho^* > 0$) if $c < \bar{c}$, where $\bar{c}$ is given by (1).*

(*ii*) *Suppose that $c < \bar{c}$. If the blockholder's project is good with certainty (i.e., $q = 0$), then he shirks with positive probability (i.e., $\rho^* < 1$).*

Let us first understand the intuition behind part (i) of Lemma 2. Conditional on implementing the project, the payoff of the blockholder with a good project from shirking is given by $\alpha[\phi P + (1-\phi)\max\{P, \Delta_M\}]$, since the payoff of the stock is Δ_M if the blockholder waits until the NPV is revealed, and it is P if he does not wait and chooses to exit instead (note that α is the blockholder's stake in the firm). In contrast, the payoff of the blockholder from exerting effort is given by $\alpha[\phi P + (1-\phi)\Delta_H] - c$, since the exit price P always satisfies P

$\leq \Delta_H$ (in other words, the blockholder weakly prefers to keep his stake if he exerts effort, since the market's expectation is weakly worse at the exit stage). Therefore, the blockholder exerts effort only if

$$\begin{aligned} \alpha[\phi P + (1-\phi)\Delta_H] - c &\geq \alpha[\phi P + (1-\phi)\max\{P, \Delta_M\}] \\ &\Leftrightarrow c \leq (1-\phi)\,\alpha\left(\Delta_H - \max\{P, \Delta_M\}\right). \end{aligned} \tag{2}$$

However, if $c > \bar{c}$, then (2) is never satisfied, and therefore the blockholder never exerts effort. This is because then, even if the exit price P is so low that the blockholder prefers to keep his stake, he still does not exert effort because for him, it is not worth to incur the cost c to increase the stock payoff by $\Delta_H - \Delta_M$. For this reason, throughout the analysis in the baseline model, I will focus on the case where $c < \bar{c}$.

In turn, part (ii) of Lemma 2 introduces the core inefficiency in the paper: It states that even given $c < \bar{c}$, if a blockholder always implements a good project, then he sometimes shirks. Note that this in contrast with Lemma 1 in the previous section, where the channel of voluntary exit was shut down, and it was shown that as a result, the first-best was achieved if $c < \bar{c}$.

To see the reason behind this result, suppose for a moment that if a blockholder implements a project, it is always a good project and he always exerts effort ($q = 0$ and $\rho^* < 1$). Then the exit price is $P^* = \Delta_H$, which is also equal to the eventual payoff of the stock if the blockholder keeps his stake after exerting effort. However, then the blockholder gains nothing by exerting effort and keeping his stake until the NPV is revealed. For this reason, the blockholder would instead strictly prefer to shirk and exit at the price of $P^* = \Delta_H$, and save the cost of effort by doing so. In other words, such an exit price is too high to incentivize the blockholder to exert effort, since it instead motivates the blockholder to shirk and exit.

For this reason, when the implemented project is good with certainty, the blockholder does not always exert effort, even though the first-best would require him to exert effort. As mentioned above, this is the efficiency at the heart of the paper. Interestingly, as we will see further below, increasing the likelihood that the blockholder's project is destroying value actually alleviates this problem. Before showing this result, however, we need to characterize the equilibrium. To that end, I solve the model backwards: In particular, I first derive the blockholder's equilibrium behavior at the exit stage (in the lemma below), and then use it to solve for the effort level.

Lemma 3 *In any equilibrium for any $q \in [0, 1)$, conditional on implementing the project:*

(*i*) *The blockholder with a bad project always exits.*

(ii) If the blockholder with a good project exerts effort, he does not exit unless hit by a liquidity shock.

(iii) If the blockholder with a good project shirks, he always exits.

It is relatively straightforward to understand the exit strategy of the blockholder if he has a good project and has exerted effort, or he has a bad project, given by parts (i) and (ii) of Lemma 3, respectively. Let us start with the former. As long as the implemented project is not always bad (that is, for any $q \in [0, 1)$), the exit price P always satisfies $P^* > \Delta_L$, because there is a positive probability that the blockholder has implemented a good project and is selling his stake involuntarily. However, the blockholder that has implemented a bad project knows that the market value of the firm will be Δ_L if he keeps his stake, and therefore strictly prefers to sell his stake at the exit stage before the NPV is revealed.

On the other end of the spectrum, the blockholder that has implemented a good project never exits if he has exerted effort, because the NPV is not revealed at the exit stage yet. In other words, if he is going to exit before he consequences of his effort is revealed, then he has no reason to exert effort in the first place, yielding part (ii) of Lemma 3.

Finally, part (iii) of Lemma 3 states that the blockholder always exits if he has implemented a good project and shirked. Intuitively, this blockholder keeps his stake only if the exit price is weakly lower than the actual value of the firm (that is, $P \leq \Delta_M$). However, whenever this is the case, the blockholder is strictly better off by exerting effort, and keeping his stake unless hit by a liquidity shock. This is because by doing so, he increases the firm value from Δ_M to Δ_H, and hence his payoff increases by $(1 - \phi)\alpha(\Delta_H - \Delta_M) - c$, which is positive due to $c < \bar{c}$ and (1). Therefore, if the exit price is indeed low such that $P \leq \Delta_M$, the blockholder with a good project will always exert effort. In other words, this blockholder does not exert effort only if the exit price is high ($P > \Delta_M$), and then, it is always profitable for him to exit.

Note that an implication of Lemma 3 is that as a function of ρ and for any given q, the exit price P^* in any equilibrium is given by

$$P^* (\rho; q) = \frac{(1 - q) \rho\phi\Delta_H + (1 - q) (1 - \rho) \Delta_M + q\Delta_L}{1 - (1 - q) \rho (1 - \phi)}, \tag{3}$$

because (3) is the expected NPV of the implemented project conditional on the information that the blockholder is exiting. In turn, the exit price P determines the incentives of the blockholder with a good project to exert effort. In particular, when implementing a good project, Lemma 3 implies that the blockholder chooses between shirking (and exiting) vs. exerting effort (and keeping his stake unless hit by a liquidity shock). The former gives the blockholder a payoff of αP, while the latter gives him a payoff of $\alpha[\phi P + (1-\phi)\Delta_H] - c$. Therefore, the blockholder with a good project is indifferent between these two options if and only if

$$\alpha(1-\phi)P = \alpha(1-\phi)\Delta_H - c, \tag{4}$$

Plugging (3) in (4) yields the solution (6) given in Proposition 1 below. Importantly, if (6) does not exceed 1, then it is the equilibrium level of effort ρ^*. To see why, note that if ρ^* were any larger than (6), then (3) implies that the resulting P^* would be strictly larger.[16] Intuitively, the market incorporates the higher effort of the blockholder in the exit price, since the blockholder that exerts effort still has to exit with probability ϕ. As a result, the blockholder would instead strictly prefer to shirk and exit, since the exit price would be too tempting for the blockholder. In contrast, if ρ^* were any smaller than (6), then P^* would be too low, and hence the blockholder would strictly prefer to keep his stake (unless hit with a liquidity shock). Then, since the blockholder would rationally anticipate that he will keep his stake, he would exert effort (as also implied by part (ii) of Lemma 3).

The situation where the blockholder with a good project does not always exert effort (that is, $\rho^* < 1$) arises if and only if q (i.e., the probability that the implemented project is bad) is not too large, that is $q < \underline{q}$. The formal expression for the threshold $\underline{q}$ is given by (5) in Proposition 1 below. This is because intuitively, as mentioned above, if the blockholder with a good project always exerted effort then the exit price P would become too large to incentivize the blockholder to exert effort.

Importantly, in this region (where $q < \underline{q}$), as q increases ρ^* increases as well. The reason is that for a given ρ, if the likehood that the blockholder is destroying value is higher (i.e., if q is higher), this has a more negative impact on the exit price P. In turn, the resulting lower exit price incentivizes the value-creating blockholder (i.e., the blockholder that implements a good project) to keep his stake until the NPV is revealed. Therefore, the blockholder internalizes the impact of his actions on the firm more, and exerts more effort (i.e., ρ^* increases). In particular, to counteract the negative impact of the value-destroying blockholder (i.e., the blockholder that implements a bad project), the value-creating blockholder exerts more effort until the exit price reaches its original level, that is, until (4) is established once again.

In contrast, if q is larger (i.e., $q \geq \underline{q}$), then for any effort level the resulting P^* is always low (in particular, it is lower than the level implied by (4)), and therefore the value-creating

[16] I show this result formally in the proof of Proposition 1.

blockholder is always incentivized to exert effort (i.e., $\rho^* = 1$). This threshold of q is formally given in Proposition 1 below, which summarizes what is described above and characterizes the equilibrium effort level ρ^* and exit price P^*.

Proposition 1 *Let*

$$\underline{q} \equiv \frac{\frac{\phi}{1-\phi}\frac{c}{\alpha}}{\Delta_H - \Delta_L - \frac{c}{\alpha}}, \tag{5}$$

where $\underline{q} \in (0,1)$. *For any* q*, the equilibrium is unique, and in equilibrium:*

(*i*) *If* $q < \underline{q}$*, then*

$$\begin{aligned} \rho^* &= \frac{1}{1-q}\left(1 + \frac{q\left(\Delta_M - \Delta_L\right) - \frac{\phi}{1-\phi}\frac{c}{\alpha}}{\Delta_H - \frac{c}{\alpha} - \Delta_M}\right) \in (0,1), && (6) \\ P^* &= \Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha}. && (7) \end{aligned}$$

Moreover, ρ^* *is strictly increasing in* q.

(*ii*) *If* $q \geq \underline{q}$*, then* $\rho^* = 1$*, and*

$$P^* = \frac{(1-q)\,\phi\Delta_H + q\Delta_L}{1-(1-q)\,(1-\phi)} \tag{8}$$

As mentioned earlier, if q is not too large, then ρ^* increases as q increases. In other words, as the probability that the implemented project is bad increases, then the blockholder with a good project exerts more effort. However, which of these effects dominate for the value of the firm? Denoting the expected NPV of the project by V, and noting that it is given by

$$V\left(\rho; q\right) = (1-q)\,\rho\Delta_H + (1-q)\,(1-\rho)\,\Delta_M + q\Delta_L \tag{9}$$

and that V also represents the unconditional firm value, the next proposition formalizes that the higher effort dominates the negative impact of value destruction and the firm value is maximized at $q = \underline{q}$.

Proposition 2 V^* *is strictly increasing in* q *if* $q < \underline{q}$*, attains its unique maximum at* $q = \underline{q}$*, and it is strictly decreasing in* q *if* $q > \underline{q}$.

As q increases, why does the positive effect of more effort dominate the negative effect of a higher likelihood of value destruction? As the probability that blockholder is implementing a value-destroying project increases, the blockholder that is implementing a good project increases his effort to a certain point. In particular, as explained previously, his effort increases until the stock price P^* upon his exit reaches the point given by (4), where he becomes once again indifferent between exerting effort (and keeping his stake) vs. not exerting effort (and selling his stake).

The critical observation is that the impact of higher effort has more positive impact on the *unconditional* average value of the firm V compared to the stock price *conditional* on the exit of the blockholder, P. This is because upon the exit of the blockholder, the market correctly assigns a lower probability that the blockholder has exerted effort, since such a blockholder does not exit unless he has to. Therefore, as the value-creating blockholder exerts more effort and the blockholder's exit price P reaches its original level, this higher effort results in even a larger increase in the unconditional firm value V and pushes it up beyond its original level. This is how the average firm value increases with the likelihood that the blockholder is implementing a value-destroying project, and it holds all the way up until this likelihood is sufficiently high (i.e., $q = \underline{q}$) so that the value-creating blockholder always exerts effort.

However, beyond $\underline{q}$, increasing q does not provide any additional benefit but only harm to the firm value. Intuitively, the value-creating blockholder always exerts effort at this point, and therefore it cannot increase any further with the likelihood that the blockholder is implementing a value-destroying project. As a result, the average firm value V^* decreases as q increases further, and hence the maximum firm value is attained at $q = \underline{q}$.

An implication of Propositions 1 and 2 is that the region where $V^*(q)$ increases with q is not a narrow parameter space: Indeed, this result holds as long as the moral hazard problem is binding, that is, $\rho^* < 1$. Moreover, $\underline{q}$ strictly increases in c. In other words, V^* increases in q for a larger range of q if the moral hazard problem is more severe, because then the blockholder with a good project needs more incentives to exert effort. These results are laid out in part (i) of the corollary below.

Corollary 1 *(i) $V^*(q)$ strictly increases with q if the moral hazard problem is binding, that is, if $\rho^* < 1$. Moreover, $\underline{q}$ strictly increases with the cost of exerting effort, c.*

(ii) $\underline{q}$ strictly decreases and $V^*(\underline{q})$ strictly increases as Δ_L decreases.

Another interesting result, which is described by part (ii), is that the maximum firm value that can be achieved across all q (i.e., $V^*(\underline{q})$) actually increases as Δ_L decreases. Therefore, it might be desirable to have the blockholder to destroy a lot of value when he has a bad project, and this might provide an advantage that cannot be achieved by simply increasing the probability that the blockholder is implementing a bad project that destroys less value.

While this result may seem counter-intuitive, the reason is as follows. At $q = \underline{q}$, the value-creating blockholder always exerts effort, and hence exits with only probability ϕ. However, the value-destroying blockholder always exits. Therefore, the unconditional probability that the blockholder exits is given by $\underline{q} + \phi(1 - \underline{q})$, and the average value of the firm conditional on the blockholder's exit is equal to exit price, P^*. On the other hand, the blockholder does not exit with an unconditional probability of $(1 - \underline{q})(1 - \phi)$, which is given by the probability that the blockholder has a good project and is not hit with a liquidity shock. Conditional on this event, the firm value is given by Δ_H. Combining, the unconditional firm value $V^*(\underline{q})$ can be summarized as

$$V^*(\underline{q}) = [\underline{q} + \phi(1 - \underline{q})]P^* + (1 - \underline{q})(1 - \phi)\Delta_H, \tag{10}$$

where P^* is given by (7).[17] Importantly, (7) does not depend on Δ_L or $\underline{q}$, and therefore the expression given by (10) strictly increases as $\underline{q}$ decreases.

In other words, the unconditional firm value $V^*(\underline{q})$ is given by a weighted average of the firm value conditional on the blockholder's exit and conditional on blockholder keeping his stake. Importantly, the value of the firm conditional on either of these events do not change with $\underline{q}$ or Δ_L. This is because if the blockholder is not exiting, then it must be he has implemented a good project and exerted effort, and therefore the firm value must be Δ_H. Similarly, if the blockholder is exiting, then the conditional expected firm value is given by the price P^* that keeps the blockholder with a good project indifferent between exerting effort and not, that is, the price P^* that satisfies (4).[18] In other words, the conditional firm value in either of these two cases does not have anything to do with the likelihood of a bad project per se, or how much value it destroys.

However, the probabilities of these two events (the blockholder exiting vs. not exiting) does depend on $\underline{q}$. Importantly, as $\underline{q}$ decreases, the probability of no exit increases, since the value-destroying blockholder exits more frequently than the value-creating blockholder that has exerted effort. Therefore, as $\underline{q}$ decreases, the unconditional firm value (10) increases.

Going back to the impact of Δ_L, the reason why $V^*(\underline{q})$ increases as Δ_L decreases is that $\underline{q}$ decreases as a result. Intuititively, $\underline{q}$ is the smallest value of q for which the value-creating

[17] Plugging (5) in (8) reveals that (7) applies at $q = \underline{q}$ as well. Note that this is also implied by the continuity of $P^*(q)$ in q.

[18] In particular, $\underline{q}$ is the highest value of q such that this indifference holds.

blockholder always exerts effort. The blockholder is motivated to exert effort only if the exit price is low, and the value-destroying blockholder has a more negative impact on the exit price if he destroys even more value. Therefore, if Δ_L is smaller, full effort is reached at a smaller q, implying that $\underline{q}$ is smaller. To put it differently, if the blockholder with a bad project destroys even more value, a lower likelihood of a bad project is sufficient to motivate the blockholder with a good project to seperate himself and keep his stake, in turn inducing him to exert effort.

2.4 Career concerns and blockholder's "skill"

While the arguments above abstract from career concerns, at this point it is worthwhile to mention that the results would not get weaker and would instead get stronger if career concerns were incorporated in my model as well. First of all, it is important to note the modeling of the blockholder in this paper captures more than the skillfulness of the blockholder. In particular, I do not make any assumption about the time-series correlation of the quality of a blockholder's project. If the quality of the blockholders' projects now and in the future are independent, then incorporating career concerns would have no impact on the blockholders' incentives, since the market wouldn't make any inference from the NPV of the blockholder's current project about the NPV of his future projects (for simplicity, my model consists of a single stage where a blockholder implements a project only once, but it could be easily extended to a repeated game setting where the blockholder can implement different projects over time, and the results would continue to hold). In contrast, if there is positive correlation between the blockholder's projects over time (that is, the blockholder has a level of "skill"), then adding career concerns on top of my model would make the results of the model stronger. This is because as the probability that the blockholder is implementing a bad project increases, the incentives of the "skilled" blockholder to keep his stake would increase so that he can separate from the "unskilled" blockholder, in turn strengthening his incentives to exert effort.

Moreover, if there is such a skill component, then another implication of the model is that a blockholder that has proven his skill over time might start creating less value compared to a blockholder that might be unskilled, even if there are no career concerns involved. This is because as q (i.e., the probability that the blockholder at a firm is value-creating) decreases, the expected value of the firm can decrease, as explained in the previous section.

2.5 When a principal chooses between agents

Regardless of whether there is any element of skill or career concerns, the model also has interesting implications for the case when there is a principal in charge of choosing the agent. First, if the principal is facing two different agents' proposals at the same time (for example, shareholders of a firm voting for the board of directors vs. an activist in a proxy fight), it might be optimal for the principal to follow the proposal by the agent who is more likely to destroy value.

Second, whenever there is a principal that selects the agent (e.g., the board choosing a CEO), it might be optimal for the principal to be short-term focused or not too expert in identifying whether the agent has a positive vs. negative NPV project (or alternatively, whether the agent is skilled vs. unskilled, if there is a skill component). This is because if the principal is maximizing the long-term value of the firm and can perfectly distinguish between these agents, then she always prefers the agent that creates value. However, then the market correctly infers that the probability that the agent is destroying value is zero, and hence such an agent might create less value compared to an agent that destroys value with some probability (where this probability is denoted by q in the model), as again implied by Proposition 2.

In the rest of the analysis, for simplicity I continue abstracting from such a principal who can identify the quality of an agent's project in advance.

3 Extended Model: Shareholder Activism

In this section, I extend the baseline model to study policy implications. Due to the intense policy discussion surrounding activist short-termism as mentioned in the introduction, I focus on shareholder activism as the main application in this section. All proofs are in the online appendix.

3.1 The Setup

While the setup in this section shares many characteristics with the baseline model, there are also many differences. In particular, I extend the baseline model to a multiple firm and multiple blockholder setup, where each blockholder is matched to a different firm and now decides whether to acquire a stake in his matched firm or not, as well as whether to implement his project or not. At the same time, I also incorporate into the model: (i) trading disclosure thresholds for the blockholder when he purchases as well as sells his stake, (ii) short-term vs. long-term capital gains tax rates that apply if the blockholder exits vs. keeps his stake, respectively, (*iii*) additional perks for holding the stake long-term (e.g., receiving a higher dividend rate or more voting power if he holds the shares longer), and (*iv*) the blockholder's cost for implementing the project. The details are as follows.

To begin with, instead of one firm and one blockholder, I now assume that there are measure μ_F of identical firms and a measure $\bar{\mu}_{BL}$ of ex-ante identical blockholders. The only players in the game are these blockholders and a market maker. I add an initial stage (denoted by $t = 0$) to the timeline in the baseline model where each blockholder is matched with a different firm. Upon matching, each blockholder has a good project with probability σ, and a bad project with probability $1 - \sigma$ (an alternative interpretation is that the firm is deciding whether to implement a project, and the blockholder privately observes the value of the project of the firm he is matched with). I denote the measure of blockholders with good (bad) projects by $\bar{\mu}_G$ ($\bar{\mu}_B$). Note that $\bar{\mu}_G = \sigma\bar{\mu}_{BL}$ and $\bar{\mu}_B = (1 - \sigma)\,\bar{\mu}_{BL}$. I assume that the measure of good projects is smaller than the measure of firms, that is, $\bar{\mu}_G < \mu_F$. Note that whether his project is good or bad is the private information of each blockholder. As in the baseline model, I also refer to the blockholder with a good (bad) project as a value-creating (value-destroying) blockholder.

Upon observing the quality of his project, each blockholder decides whether to acquire a stake α in his matched firm or not (the stake size α is exogenous, an assumption which I discuss in Section 5.4). I assume that the market is perfectly liquid and hence the market maker cannot infer any information about the blockholder's stock accumulation if the blockholder does not make any disclosure. If the blockholder decides to buy a stake, he does this purchase continuously, with a disclosure in between: First, he continously buys shares until accumulating a stake of α_0, and once he has accumulated this stake, he has to disclose it. In this disclosure, he also needs to state whether he intends to implement his project.[19] Importantly, following the blockholder's disclosure, the market maker determines the stock price based on this information. After the disclosure, the blockholder accumulates the remaining stake of $\alpha - \alpha_0$. I denote $\eta \equiv \alpha_0/\alpha$, where a lower (higher) η represents a tighter (looser) disclosure threshold that applies when the blockholder buys shares.

Note that in reality, the disclosure threshold might depend on whether the blockholder intends to influence firm value (e.g., due to filing 13G rather than 13D). Therefore, the disclosure threshold might be different if the blockholder does not intend to implement the project upon buying shares. To capture this possibility, I denote the threshold for this case via α_0', where

[19] Indeed, when filing 13D, investors have to also complete state their "purpose of transaction". For further details, e.g., see https://www.investopedia.com/terms/s/schedule13d.asp.

$\alpha_0' > 0$. That said, as I show in the analysis, this particular disclosure threshold does not make any difference for the results.

After the blockholder buys shares, at $t = 1$ he decides whether to implement the project, and if he has a good project, whether to exert effort (these decisions are simultaneous for simplicity; see Section 5.1 for a discussion). As in the baseline model, if the blockholder with a good project exerts an (unobservable) effort, he incurs a cost of $c > 0$, and increases the NPV of the project from Δ_M to Δ_H, where $\Delta_H > \Delta_M > 0$. Also recall that the NPV of the bad project is Δ_L and cannot be improved by exerting effort (for a discussion of this assumption, also see Section 5.1). In addition, I also include a cost for implementing the project: Specifically, the blockholder needs to incur a cost of κ ($\kappa + \Delta\kappa$) to implement a good (bad) project, where $\kappa > 0$ and $\Delta\kappa > 0$. I assume that the blockholder can always implement the project if he would like to do so (in the scenario that the blockholder needs to convince the management of the firm or gather the support of other shareholders to implement the project, κ includes these costs – see Section 5.2 for a discussion). Here, $\Delta\kappa > 0$ represents the additional cost to the blockholder, for example, due to potential legal liability because of the value that the bad project destroys, or due to the extra measures that the blockholder needs to take (such as hiding or falsifying some details of the project) so that the market cannot immediately recognize that this is a bad project. Therefore, a higher $\Delta\kappa$ is a proxy for increased oversight, transparency, accountability, or liability. Note that the cost κ was not relevant in the baseline model, because all the results were conditional on implementation of the project.

As in the baseline model, if the blockholder implements the project, then this information (but not the NPV of the project) immediately becomes public information at the end of $t = 1$. At $t = 2$, the blockholder decides whether to sell his stake (i.e., exit), which is before the NPV is revealed. In contrast to the baseline model, however, I include disclosure thresholds at the exit stage as well. The blockholder's sale of his stake shares the same properties with the previous stage where he bought the shares: The market is again perfectly liquid, so the market maker cannot make any inference about the blockholder's trading other than observing disclosures. The blockholder sells his shares until he sells a stake of α_1 (where $\alpha_1 < \alpha$), then he has to disclose that he has sold this stake, and finally he sells his remaining stake $\alpha - \alpha_1$. To keep the analysis simple, I restrict the blockholder's decision to a binary space: He either keeps all of his stake or sells all of it (in Section 5.3, I relax this assumption and allow partial sales). I denote $\lambda \equiv \alpha_1/\alpha$, where a lower (higher) λ represents a tighter (looser) disclosure threshold that applies when the blockholder sells shares.[20]

[20]Note that this disclosure threshold might be different as well if the blockholder has not implemented the

Again, like in the baseline model, at the exit stage ($t = 2$) the blockholder has to sell his stake with probability ϕ (e.g., due to a liquidity shock or an outside option). However, with probability $1 - \phi$, he has the flexibility to decide whether to exit at $t = 2$ or keep his stake until $t = 3$. While making this decision, there are several factors that he considers. First of all, the NPV is revealed at $t = 3$. Second, I incorporate capital gain taxes. In particular, the blockholder pays a tax rate of τ_s on his short-term gains (that is, if he sells at the exit stage), and a tax rate of τ_l on his long-term gains (that is, if he keeps his stake until the NPV is revealed), where $\tau_s \geq \tau_l$. Third, I also include additional perks for holding the shares longer (e.g., a higher dividend rate or more voting power). In particular, if the blockholder keeps his stake until $t = 3$ rather than selling it at $t = 2$, then he gains an additional $b \geq 0$ per share.

Parameter Specifications

Throughout the analysis, I make the parameter specifications below. Importantly, all of the specifications in this model are generalizations of the parameter specifications made in the baseline model, where it was assumed that $\tau_s = \tau_l = 0$, $\lambda = 0$, $b = 0$, and c satisfies (1).

To begin with, I assume that the cost of effort is not too high, that is, $c < \max\{\bar{c}, \hat{c}\}$, where

$$\bar{c} \equiv \alpha(1 - \tau_l)(1 - \phi)(\Delta_H - \Delta_M), \tag{11}$$

$$\hat{c} \equiv \alpha(1 - \phi)\{(\tau_s - \tau_l)\eta\Delta_H + (1 - \tau_s)(1 - \lambda)(\Delta_H - \Delta_M) + b\}. \tag{12}$$

Here, $c < \max\{\bar{c}, \hat{c}\}$ holds under the assumptions of the baseline model. The reason for these specifications is because if $c > \bar{c}$, then the blockholder with a good project never exerts effort (as I show in Lemma 5 in Online Appendix B) and hence making the moral hazard problem irrelevant, and if $c > \hat{c}$, then multiple equilibria exist that makes the analysis more complicated.[21]

I also assume that the additional benefit b from holding the stake longer is not so high that it completely offsets the cost of implementing the project or the cost of effort, that is,

$$\alpha b < \min\{\kappa, c\}.$$

project (again, for example, due to filing 13G rather than 13D). Therefore, I denote the threshold for this case via α_1', where $\alpha_1' > 0$. However, I also show in the analysis that this particular threshold does not matter for the results.

[21] Nevertheless, I find in an unreported analysis that the main results continue to hold even if the assumption $c > \hat{c}$ is relaxed.

This assumption is automatically satisfied in the baseline model (where $b = 0$). Finally, I also assume that the short-term tax rate is not too high compared to long-term tax rate, that is,

$$\tau_s < \bar{\tau}_s \equiv \tau_l + \frac{c - (1-\phi)\,\alpha b}{\eta\,(1-\phi)\,\alpha\Delta_H}. \tag{13}$$

This is because if this assumption is violated, as I show in Lemma 5 in Online Appendix B, then the blockholder with a good project always exerts effort (because he always keeps his stake unless hit by a liquidity shock), making the moral hazard problem once again irrelevant. Note that under the assumptions of the baseline model ($\tau_s = \tau_l = 0$ and $b = 0$), (13) always holds.

3.2 Robustness of the Results from the Baseline Model

Before moving on to the analysis of the policy implications, I first show that the results derived in the baseline model continue to hold in this model as well. Moreover, the derivations made in this section will also be useful to understand the policy implications better. For the proofs as well as the formalization of the results mentioned but not formalized in this section, see Online Appendix B.

To begin with, in the online appendix I show that Lemmas 2 and 3 from the baseline model continue to hold, with the exception that $\bar{c}$ in (1) in Lemma 2 is replaced with (11). Note that as a result, as in the baseline model, the blockholder keeps his stake if and only if he exerts effort and is not hit with a liquidity shock.

Importantly, as I formalize in the proposition below, I show that all of the other results from the baseline model (Propositions 1 and 2 and Corollary 1) continue to hold as well, with the exception that it no longer specifies the closed form solutions for P^*, and for ρ^* when $q < \underline{q}$.

Proposition 3 *For any $q \in [0, 1)$, an equilibrium ρ^* always exists and it is unique. Moreover, ρ^* is continuous in q, and there exists $\underline{q} \in (0, 1)$ such that in equilibrium:*

(i) $\rho^* \in (0, 1)$ if $q = 0$, ρ^* strictly increases with q if if $q < \underline{q}$, and $\rho^* = 1$ if $q \geq \underline{q}$.

(ii) $V^*(q)$ is strictly increasing in q if $q < \underline{q}$, attains its unique maximum at $q = \underline{q}$, and is strictly decreasing in q if $q > \underline{q}$.

Moreover, $\underline{q}$ strictly increases with c and Δ_L, and $V^*(\underline{q})$ strictly increases as Δ_L decreases.

Notably, among other things, this proposition states that the key result from the baseline model continues to hold: As the probability that the implemented project is bad increases (i.e., q increases), the blockholder that is implementing a good project exerts effort with higher likelihood (i.e., ρ^* increases), and moreover, the average firm value V^* increases since the latter effect dominates. The intuition behind this result is similar to the baseline model, with more subtlety involved. In particular, to understand this result, let us first derive the payoffs of the blockholder from shirking and from exerting effort.

To that end, note that the blockholder pays $\alpha\left[Q_0 + (1-\eta)V^*\right]$ to buy his stake if he intends to implement the project. To see why, note that when accummulating shares, he first buys a stake of α_0 without the need to do any disclosure. Since the market is perfectly liquid, the market maker cannot make any inference about this trade in the absence of disclosure. Therefore, the blockholder pays Q_0 per share, where Q_0 is the value of the firm in status quo (i.e., if no project is implemented).[22] On the other hand, once the blockholder buys a share of α_0, he has to make a disclosure. In particular, he has to disclose this stake and that he intends to implement the project.[23] Therefore, the market maker correctly updates the expected value of the firm to $Q_0 + V^*$, where V^* is the expected NPV conditional on the implementation of the project. For this reason, the blockholder pays $(\alpha - \alpha_0)(Q_0 + V^*)$ to buy the remaning shares. Combining, the blockholder pays $\alpha_0 Q_0 + (\alpha - \alpha_0)(Q_0 + V^*)$ to buy his total stake of α. Since $\eta = \alpha_0/\alpha$ by definition of η, an easier way to express this payment is $\alpha\left[Q_0 + (1-\eta)V^*\right]$. Note that a lower η represents a stricter disclosure threshold when buying the shares (note that a related result that will be useful in the later sections is that using the same arguments, a blockholder that does not intend to implement the project pays αQ_0 to buy his stake, because his disclosure will include his intent and hence prompt the market maker to keep the share price at Q_0).

Next, after implementing the project, if the blockholder exits (i.e., sell his stake before the NPV is revealed), then he sells his stake for $\alpha\left[Q_0 + \lambda V^* + (1-\lambda)P^*\right]$. The reason is that when selling, the blockholder can sell a stake of α_1 without disclosing it. Since the market maker cannot infer this trade, the share price remains at $Q_0 + V^*$ during this time. However, then the blockholder has to disclose that he has sold a stake of α_1, and hence the market maker updates

[22] Note that here, to avoid complicating the analysis further, I ignore the market maker's calculation that a blockholder might be buying a stake in this firm, which will be negligible for example if there are too few blockholders compared to the total number of firms. Nevertheless, I incorporate this aspect to the model in an unreported analysis and show that all results throughout Section 3 (including the policy implications) continue to hold even if the measure of blockholders is large.

[23] As mentioned in Section 3.1, this assumption is in parallel with the 13D filing requirements.

the stock price to Q_0+P^*, where P^* is the expected NPV conditional on the blockholder's exit. Overall, the blockholder collects a total of $\alpha_1(Q_0+V^*)+(\alpha-\alpha_1)(Q_0+P^*)$ for the sale. Since $\lambda=\alpha_1/\alpha$ by definition of λ, these proceeds can also be expressed as $\alpha\left[Q_0+\lambda V^*+(1-\lambda)\,P^*\right]$. Again, note that a lower λ represents a tigher disclosure when selling.

Combining the calculations above, the net profit of the blockholder from buying a stake α, implementing a good project, *shirking*, and then exiting is given by

$$\pi^*_{exit}-\kappa=\alpha(1-\tau_s)\left[\lambda V^*+(1-\lambda)\,P^*-(1-\eta)V^*\right]-\kappa, \tag{14}$$

where κ is the cost of implementing a good project, and π^*_{exit} is the blockholder's profit on his stake when he exits. Therefore, (14) is the net profit of the blockholder with a good project from shirking, since he always exits as noted earlier.

On the other hand, the net profit of the blockholder from buying a stake α, implementing a good project, *exerting effort*, and then keeping his stake until the NPV is revealed (unless hit by a liquidity shock) is given by

$$\phi\pi^*_{exit}+(1-\phi)\alpha\left\{(1-\tau_l)\left[\Delta_H-(1-\eta)V^*\right]+b\right\}-\kappa-c, \tag{15}$$

because with probability ϕ, he gets hit with a liquidity shock and has to exit, and with probability $1-\phi$, he is able to keep his stake (in which case he is subject to the long-term tax rate τ_l). Therefore, the whole expression given by (15) is the net profit of the blockholder with a good project from exerting effort, because also as noted earlier, he keeps his stake unless hit by a liquidity shock.

Note that the value-creating blockholder (i.e., the blockholder that is implementing a good project) exerts with some probability due to the assumption $c<\bar{c}$. Therefore, if he is not always exerting effort (i.e. $\rho^*<1$), he must be indifferent between exerting effort and shirking. In turn, this implies that (14) and (15) must be equal, which implies that

$$(1-\tau_s)\left[\lambda V^*+(1-\lambda)\,P^*-(1-\eta)V^*\right]=(1-\tau_l)\left[\Delta_H-(1-\eta)V^*\right]+b-c/\left[\alpha(1-\phi)\right] \tag{16}$$

or equivalently,

$$(1-\tau_s)\left[\lambda V^*+(1-\lambda)\,P^*\right]+(\tau_s-\tau_l)\,(1-\eta)V^*=(1-\tau_l)\Delta_H+b-c/\left[\alpha(1-\phi)\right]. \tag{17}$$

Importantly, in equilibrium, the LHS in (17) is strictly decreasing in q given ρ, and is strictly increasing in ρ given q.[24] Therefore, this equation yields two critical results, as also formalized in Proposition 3: First, it yields that ρ^* strictly increases in q if $\rho^* < 1$, that is, the value-creating blockholder (i.e., the blockholder that implements a good project) exerts effort with a higher probability as the likelihood of a bad project increases. Intuitively, as in the baseline model, as q increases for a given ρ, exiting becomes less attractive for value-creating blockholder. This induces him to keep his stake, and in turn, to exert effort.

Second, equation (17) also yields the main result, that is, the average firm value $V^*(q)$ strictly increases with q if $\rho^* < 1$ (i.e., whenever the moral hazard problem is binding). Importantly, noting that the LHS of (17) is just a weighted sum of V^* and P^*, this result follows due to the exact same *insight* from the baseline model: The impact of higher effort ρ^* has more positive impact on the *unconditional* average value of the firm V compared to the stock price *conditional* on the exit of the blockholder, P. Therefore, as q increases and ρ^* increases as a result, for the LHS of (17) to stay constant, it must be that $V^*(q)$ is strictly increasing and $P^*(q)$ is strictly decreasing.

A more intuitive way to understand the importance of the insight mentioned above and its connection to the main result is by setting $\tau_s = \tau_l$. Then, as also reflected in (16), as q increases, $\lambda V^* + (1-\lambda) P^*$ has to stay constant for the value-creating blockholder to remain indifferent between exerting effort and shirking. This is because $\lambda V^* + (1-\lambda) P^*$ represents the average price at which the blockholder can sell his stake at (before the NPV is revealed), and if this price is any higher (lower), then it incentivizes the value-creating blockholder to always shirk and exit (exert effort and keep his stake unless hit by a liquidity shock), pushing the price back down (up). In turn, the insight mentioned above again implies that $V^*(q)$ has to strictly increase with q for $\lambda V^*(q) + (1-\lambda) P^*(q)$ to stay constant. Note that an increase in $V^*(q)$ also increases the cost basis of the blockholder, that is, the amount he needs to pay to acquire the stake. Therefore, when $\tau_s > \tau_l$, the increase in $V^*(q)$ w.r.t. q is dampened, since the increase in the blockholder's cost basis decreases his incentives to keep his stake (because it reduces the tax savings he can have from keep his stake and achieving the long-term tax rate τ_l). However, this latter effect cannot completely reverse the increase of $V^*(q)$ w.r.t. q, because the whole reason this effect exits is the increase in $V^*(q)$. As a result, $V^*(q)$ strictly increases with q whenever $\rho^* < 1$.

As also stated in Proposition 3, since ρ^* also increases in q (as established earlier), it follows that there exists a $\underline{q} \in (0,1)$ such that $\rho^* = 1$ if and only if $q \geq \underline{q}$. Since increasing q any further cannot have any benefit on the firm value, V^* attains its maximum at $q = \underline{q}$, just like

[24] I formally show this result in the proof of Proposition 3.

in the baseline model. Moreover, again as in the baseline model, the range of q for which $V^*(q)$ increases in q expands with the severity of the moral hazard problem (that is, the set $[0, \underline{q})$ strictly expands in c).

3.3 Policy Implications

In this section, I study the policy implications of the model. In particular, the model allows me to analyze several policies, which can be broadly categorized under four distinct groups as outlined below. Some of these policies are voluntarily adopted by firms, some of them are determined by regulations, and some overlap. For example, the SEC's formal proposal in 2022 would reduce λ and η and increase κ. For the relevant background information on this proposal as well as many other proposals made, please refer to the introduction. I categorize the policies as follows.

(A) *Policies that punish short-termism*, which hurt the blockholder if he exits before the NPV is revealed: increasing short-term taxes τ_s, or tightening the disclosure rule λ for selling.

(B) *Policies that reward long-termism*, which benefit the blockholder if he keeps his stake until the NPV is revealed: reducing long-term taxes τ_l, or giving additional perks b for holding the stake long-term (such as a higher dividend rate, more voting power, or proxy access).

(C) *Policies that act as blanket punishments*, which hurt the blockholder regardless of whether he exits or not: The policies include tightening the disclosure rule η for buying, or raising the firm's defenses against the blockholder, which would make it more difficult for the blockholder to implement the project and hence increase κ. For the latter, examples that impact κ include staggered boards, super majority voting requirements, restrictions on shareholders' ability to call special meetings, and dual class share structures. Alternatively, κ can also be increased by regulation: For example, SEC's 2022 proposal also includes broadening the definition of who collaborate with activists, which would make such collaborations more difficult (or more expensive) and hence increase κ.

(D) *Policies that make it more difficult to implement value-destroying projects*: increasing $\Delta\kappa$ (for example, by increasing oversight, transparency, liability, or accountability).

3.3.1 Exogenous q

The proposition below formalizes the policy implications, holding q constant (i.e., for a given probability that the project implemented by the blockholder is bad). Note that while the condition $\pi^*_{exit} > 0$ is imposed in this proposition, as I show in the next section, this condition is always satisfied in equilibrium where entry of the blockholders is endogenized (because otherwise some blockholders make a loss in equilibrium).

Proposition 4 *Consider any $q < 1$, and suppose that the equilibrium satisfies $\pi^*_{exit} > 0$, where π^*_{exit} is given by (14). Then, for any given $q < 1$, ρ^* and V^* weakly (strictly) increase in τ_s and b and weakly (strictly) decrease in τ_l and λ (if $q < \underline{q}$).*

The proposition above shows that for a given q, policies that punish short-termism as well as policies that reward long-termism increase firm value, because both of these changes incentivize the blockholder with a good project to exert effort. This result is intuitive, because both of them incentivize the blockholder with a good project to keep his stake, and in turn, to exert effort. However, as we will see in the next section, these policies can have completely opposite implications for the value created in the economy once the entry of blockholders is endogenized, despite the *additional* incentive provided by these policies for the value-creating blockholders to exert effort.

3.3.2 Endogenous q

In this section, to better study policy implications, I endogenize the blockholders' entry, and hence, q. Here, I use the term "entry" to refer to a blockholder's purchase of a stake in a firm and implementation of the project. Endogenizing this aspect is important because as also explained in the introduction, many regulations and policies aimed at mitigating short-termism intend to do so by curtailing activists' value destruction.

Indeed, I show in this section that under endogenous entry, many kinds of policies can destroy total firm value, including policies that punish short-termism as well as policies that reward long-termism, even if the number of blockholders implementing good projects does not change. Nevertheless, I also find that compared to all other policies I study, policies that reward long-termism is the least likely to destroy total firm value. However, the effect on firm value significantly varies even across the policies that reward long-termism.

Recall that there are multiple firms and multiple blockholders, and each blockholder is matched to a different firm at the beginning of the game. After observing the quality of their projects, each blockholder decides whether to acquire a stake α in his matched firm and whether to implement the project (while α is exogenous here, I relax this assumption in Section 5.4). I denote the total measure of blockholders with good (bad) projects by $\bar{\mu}_G$ ($\bar{\mu}_B$), and the measure of blockholders with good (bad) projects that implement their projects by μ_G (μ_B). Note that $q = \frac{\mu_B}{\mu_G+\mu_B}$ by definition of q.

I start the analysis by showing a preliminary result. In particular, as described in the following lemma, there exits a threshold $\bar{\kappa}$ such that if the blockholder's cost κ of implementing a good project is higher than this threshold then no blockholder implements his project, and if $\kappa < \bar{\kappa}$ then all blockholders with good projects implement their projects. This is because the profit of the value-destroying blockholder from entering is lower than that of the value-creating blockholder.[25]

Lemma 4 *There exists a unique threshold $\bar{\kappa}$ such that*

(i) *If $\kappa > \bar{\kappa}$, then no blockholder implements his project (i.e., $\mu_B^* = \mu_G^* = 0$).*

(ii) *If $\kappa < \bar{\kappa}$, then all of the blockholders with good projects implement their projects (i.e., $\mu_G^* = \bar{\mu}_G$).*[26]

Moreover, there exists $\bar{b} > 0$ such that $0 < \bar{\kappa}$ if $b < \bar{b}$ and $\eta > 1 - \max\{\lambda, \Delta_M/\Delta_H\}$.

Due to Lemma 4, I assume $\kappa < \bar{\kappa}$ in the remainder of the analysis.[27] Therefore, all of the value-creating blockholders implement their projects.

In order to find the equilibrium measure of value-destroying blockholders that implement their projects, we need to compare their payoff from doing so to their outside option. If $b = 0$, the blockholder's outside option is zero, since there is no way he can get a positive payoff without implementing his project. However, if $b > 0$, then he gets an expected payoff of $\alpha(1-\phi)b$ by buying a stake in his matched firm, not implementing the project, and then keeping his stake unless hit by a liquidity shock. This is because as explained after Proposition 3 in Section 3.2, if the blockholder does not intend to implement his project, he pays αQ_0 for his stake. Since the market observes that the blockholder does not implement the project, the value of his stake remains at αQ_0. However, if the blockholder keeps his stake (which he can

[25] In turn, this is because the cost $\kappa + \Delta\kappa$ of implementing a bad project is higher than the cost κ of implementing a bad project, as explained in Section 3.1. However, $\Delta\kappa > 0$ is not a necessary condition for the results, but rather a sufficient condition to ensure unique equilibrium. Indeed, if $\Delta\kappa = 0$, then whenever there is an equilibrium where a positive measure of blockholders implement their projects, any $\mu_G^* \in (0, \bar{\mu}_G]$ is an equilibrium, because all of the value-creating blockholders break even by entering.

[26] Note that if $\kappa < \bar{\kappa}$, depending on the off-equilibrium-path beliefs, the equilibrium where no blockholder implements his project may exist as well. However, whenever an equilibrium where a positive measure of blockholders implement their projects, I select that equilibrium.

[27] That said, I do not impose the condition described at the end of Proposition 4, which is a sufficient condition for $\kappa < \bar{\kappa}$ but not necessary.

do with probability $1-\phi$), he gets an additional payoff of b per share, giving him an expected payoff of $\alpha(1-\phi)b$.

Next, note that the payoff of the value-destroying blockholder that buys a stake and implements his project is

$$\pi^*_{exit} - (\kappa + \Delta\kappa) = \alpha(1-\tau_s)\left[\lambda V^* + (1-\lambda)\, P^* - (1-\eta)V^*\right] - (\kappa + \Delta\kappa)\,, \tag{18}$$

because he always exits, where π^*_{exit} is the blockholder's profit on his stake when he exits, and $\kappa + \Delta\kappa$ is the cost of implementing a bad project.[28] Note that a value-destroying blockholder can make profit by implementing the project because he can sell his stake before the NPV is revealed. In particular, he strictly prefers to buy a stake and implement his project if (18) is strictly larger than $\alpha(1-\phi)b$, he is indifferent if they are equal, and he strictly prefers not to implement the project otherwise. However, as more blockholders implement bad projects and q increases as a result, the market incorporates this expectation into the stock price P^* conditional on the blockholder's exit, thereby driving down the profit π^*_{exit} of these blockholders (in other words, $\lambda V^*(q) + (1-\lambda)\, P^*(q) - (1-\eta)V^*(q)$ decreases as q increases). Therefore, the measure μ^*_B of value-destroying blockholders that implement their projects is determined such that the net profit of the blockholder from doing so is $\alpha(1-\phi)b$. The next proposition formalizes this result.

Proposition 5 *$\pi^*_{exit}(q)$ is strictly decreasing with q if $\pi^*_{exit}(q) \geq 0$. Therefore, the equilibrium is unique, and if $\bar{\mu}_B > (\frac{\Delta_H}{-\Delta_L})\bar{\mu}_G$, then $\mu^*_B < \bar{\mu}_B$ and the equilibrium is given by*

$$q^* = \begin{cases} 0, & \textit{if } \kappa + \Delta\kappa \geq \bar{\kappa}, \\ q \in (0,1) \textit{ such that } \pi^*_{exit}(q) - (\kappa + \Delta\kappa) = \alpha(1-\phi)b, & \textit{otherwise.} \end{cases} \tag{19}$$

Note that in equilibrium q^* pins down μ^*_B and vice versa, because $q^* = \frac{\mu^*_B}{\mu^*_G + \mu^*_B}$ and $\mu^*_G = \bar{\mu}_G$. The condition $\bar{\mu}_B > (\frac{\Delta_H}{-\Delta_L})\bar{\mu}_G$ means that the measure of blockholders with bad projects is sufficiently high compared to those with good projects, reflecting the idea that good ideas are scarce and bad ideas are abundant. I will keep this assumption throughout the rest of the section to simplify the analysis.[29]

[28] For the details of the derivation of the payoff (18), see the derivation of (14) in Section 3.2.

[29] If $\bar{\mu}_B \leq (\frac{\Delta_H}{-\Delta_L})\bar{\mu}_G$, then in equilibrium, all of the blockholders with bad projects might implement their projects (i.e., $\mu^*_B = \bar{\mu}_B$). However, this is not an interesting case, because then μ^*_B (and hence q^*) does not respond to policies, and a main goal of this section is to study the effects of policies on endogenous q^*.

Policy implications

Now that the equilibrium q^* is characterized, we can turn our attention to study the policy implications. To that end, the proposition below characterizes the comparative statics of q^* and V^*, and the resulting impact on the total firm value $(\mu_B^* + \mu_G^*)V^*$ (that is, the combined value of all firms, where Q_0 is ignored because it is a constant).[30]

Proposition 6 *There exits $\underline{\kappa}$ such that $\underline{\kappa} < \bar{\kappa}$ and:*

(*i*) *If $\kappa + \Delta\kappa > \bar{\kappa}$, then $q^* = 0$. Moreover, V^* and $(\mu_B^* + \mu_G^*)V^*$ do not change in κ and $\Delta\kappa$, strictly increase in τ_s and b, weakly increase in η, and strictly decrease in τ_l and λ.*

(*ii*) *If $\kappa + \Delta\kappa \in (\underline{\kappa}, \bar{\kappa})$, then $q^* \in (0, \underline{q})$, and:*

- (*a*) *q^* strictly decreases in κ, $\Delta\kappa$, τ_s, and strictly increases in η and λ.*
- (*b*) *V^* strictly decreases in κ, $\Delta\kappa$, and τ_l, strictly increases in η, and does not change in τ_s, λ, and b.*
- (*c*) *$(\mu_B^* + \mu_G^*)V^*$ strictly decreases in κ, $\Delta\kappa$, τ_s, and τ_l, and strictly increases in η and λ.*

(*iii*) *If $\kappa + \Delta\kappa < \underline{\kappa}$, then $q^* > \underline{q}$, and q^* strictly decreases in κ, $\Delta\kappa$, τ_s, and b, strictly increases in λ and η, and does not change in τ_l. Moreover, V^* and $(\mu_B^* + \mu_G^*)V^*$ strictly increase in κ, $\Delta\kappa$, τ_s, and b, strictly decrease in λ and η, and do not change in τ_l.*

The region where $q^* = 0$. This region corresponds to part (i), where $\kappa + \Delta\kappa$ is so high that none of the blockholders that have bad projects implements it (i.e., $\mu_B^* = 0$ and hence $q^* = 0$). Then, policies that punish short-termism (i.e., raise τ_s or decrease λ) as well as policies that reward long-termism (i.e., reduce τ_l or increase b) strictly increase the expected NPV V^* of an implemented project, because it incentivizes the value-creating blockholder to keep his stake, and in turn, internalize his impact on the firm and exert more effort (i.e., increase ρ^*) in the first place. This is not a surprising result, since we have already seen in the previous section that keeping q constant, these policies increase V^*. Since the number of value-creating blockholders

[30] In particular, the full expression for total firm value is $\mu_F Q_0 + (\mu_B^* + \mu_G^*)V^*$, where μ_F is the measure of all firms, Q_0 is the value of a firm if no project is implemented in that firm, and V^* is the expected NPV of the project conditional on implementation of the project.

remain the same ($\mu_G^* = \bar{\mu}_G$), this also implies that the total firm value $(\mu_B^* + \mu_G^*)V^*$ increases as well.

The region where $q^* \in (0, \underline{q})$. The impact of the policies above are very different in the region that corresponds to part (ii), where $\kappa + \Delta\kappa$ is in the intermediate region such that some value-destroying blockholders implement their projects but not too many, so that not all of the value-creating blockholder exert effort (i.e., μ_B^* is such that $q^* \in (0, \underline{q})$ and hence $\rho^* < 1$). To begin with policies that punish short-termism (i.e., raise τ_s or decrease λ), they *always* hurt total firm value $(\mu_B^* + \mu_G^*)V^*$ in this region, even though the measure of value creating blockholders implementing their projects remain at $\mu_G^* = \bar{\mu}_G$. This is because these policies strictly reduce μ_B^* while not increasing V^*. Here, it is straightforward to understand the former effect: μ_B^* strictly decreases because the profit of the value-destroying blockholder from his stake decreases. However, the surprising result is that V^* does not change. To see why, note that combining the value-destroying blockholder's entry indifference equation $\pi_{exit}^* - (\kappa + \Delta\kappa) = \alpha(1 - \phi)b$ from (19) with (18) and the value-creating blockholder's effort indifference equation (16) immediately yields

$$\kappa + \Delta\kappa = \alpha(1 - \tau_l)\left[\Delta_H - (1 - \eta)V^*\right] + \alpha\phi b - c/(1 - \phi), \tag{20}$$

which shows the comparative statics of V^* to any parameter in this region very clearly, including that V^* does not change in τ_s or λ. Specifically, (20) shows that in the determination of V^*, the profit π_{exit}^* that the blockholder makes on his stake by exiting does *not* play a role (due to the combination of the two indifference equations as mentioned above). As a result, neither τ_s nor λ shows up in (20), and hence does not impact V^*.

Intuitively, punishing short-termism discourages value-destroying blockholders from implementing their projects, driving μ_B^* (and hence q^*) down. This has such a negative impact on the incentives of value-creating blockholders to exert effort that it dominates even though (i) now fewer value-destroying blockholders implement their projects (which was also present in the baseline model) and (ii) these policies provide direct incentives to exert effort (which was *not* present in the baseline model). Therefore, the total firm value $(\mu_B^* + \mu_G^*)V^*$ decreases, even though μ_G^* remaining constant (i.e., $\mu_G^* = \bar{\mu}_G$).

Moreover, the reason why more value-creating blockholders choose to shirk is because more of them choose to exit (instead of keeping their stake and internalizing their impact on the firm value). In other words, while trying to mitigate short-termism, these policies might turn so many value-creating blockholders into short-termist blockholders (despite the additional incentive provided by these policies to keep their stake longer) that it can result in value destruction, even though value-destroying short-termist blockholders are driven out.

Due to the same reasons, blanket punishment policies (i.e., raising κ or reducing η) as well as policies that make it more difficult to implement value-destroying projects (i.e., increasing $\Delta\kappa$) also destroy total firm value. Importantly, note that these policies (including punishing short-termism) destroy value in the entire region where $q^* > 0$ and $\rho^* < 1$, that is, whenever there is adverse selection and the moral hazard problem is binding. More generally, these results show that under short-termism, there is a tension between improving governance *forcefully through policies* versus *endogenously through market forces.* As it was just shown, the former can supress the latter too much, making overall governance worse.

Moreover, even policies that reward long-termism can result in value destruction in this region. Specifically, increasing b (i.e., giving the blockholders more perks for holding their stakes longer) can have such an effect. The reason is that even though (20) implies that V^* increases with b, at the same time μ_B^* (and hence q^*) can strictly decrease with b. This is because increasing b makes the outside option more attractive for the value-destroying blockholder, which is not to implement the project and keeping his stake unless hit by a liquidity shock (so that he can enjoy an expected payoff of $\alpha(1-\phi)b$ as explained after Lemma 4 above). The resulting decrease in q^* can disincentivize the value-creating blockholder so much that the total firm value can decrease.[31] Nevertheless, increasing b can also increase total firm value, so its effect can go either way. That said, I show in Section 5.5 that under an alternative modeling of b that is more accurate for proxy access, increasing b destroys total firm value in the entire region of $q^* > 0$ and $\rho^* < 1$, just like the other policies above.

On the other hand, I find that reducing long-term capital gains tax rate τ_l always strictly increases total firm value in this region, in contrast to all of the other policies I study. This is because is that τ_l does not have a direct impact on the value-destroying blockholders' payoff from implementing their projects (because then they always exit before the NPV is revealed), and it also does not impact the blockholder's payoff of $\alpha(1-\phi)b$ from his outside option. In contrast, reducing τ_l directly motivates the value-creating blockholder to keep his stake, and in turn, to exert effort. As a result, total value increases.[32] Moreover, since total firm value

[31] A numerical example that yields this result is $\Delta_H = 100$, $\Delta_M = 1$, $\Delta_L = -1$, $\bar{\mu}_G = 1$, $\phi = 0.01$, $\alpha = 0.1$, $c = 6.5$, $\tau_s = 0.3$, $\tau_l = 0.2$, $\lambda = 0.1$, $\eta = 0.83$, $\kappa = 0.18$, $\Delta\kappa = 0.01$. Indeed, in this numerical example, the total firm value strictly decreases w.r.t. b if $b \leq 0.2$.

[32] If higher b represents a higher dividend rate, then b may increase as τ_l decreases. Then, it may be possible that total firm value decreases as τ_l decreases. However, as already mentioned, increasing b sometimes increases total firm value in this region as well. Therefore, this still would not change the overall result that among all the policies I study, reducing τ_l is the least likely to destroy total firm value.

increases under lower long-term tax rate, this can even result in a higher amount of total taxes collected, so it may not create an issue for keeping a balanced budget. That said, we will see that in the next region below, reducing τ_l does not improve total firm value but increasing b does.

The region where $q^* > \underline{q}$. This region corresponds to part (iii) of Proposition 6. To begin with, in this region total firm value does not change with τ_l, because all of the value-creating blockholders are already exerting effort (i.e., $\rho^* = 1$), and τ_l does not directly impact the incentives of the value-destroying blockholders as explained above. In contrast, increasing b strictly increases total firm value, because it motivates the value-destroying blockholders switch from implementing their projects and exiting to not implementing their projects and keeping their stake to enjoy these perks b. In contrast to the previous region, reducing μ_B^* is beneficial in this region, because it is too high (because the marginal value-destroying blockholder has no impact on ρ^* since $\rho^* = 1$, that is, the moral hazard problem is not binding). Similarly, in this region all other policies increase total firm value as well, because they decrease the profit of the value-creating blockholders from implementing their projects, and hence drive their number down.

Combining all three regions above, the corollary below summarizes some of the important policy implications.

Corollary 2 *(i) Policies that punish short-termism, act as blanket punishments, or make it more difficult to implement a value-destroying project destroy total firm value whenever there is adverse selection (i.e., $\mu_B^* > 0$) and moral hazard is binding (i.e., $\rho^* < 1$), even though they only decrease μ_B^* and not μ_G^*.*

(ii) Compared to any policy in part (i), any policy that rewards long-termism is less likely to destroy total firm value, and moreover, increasing b is a dominating policy (i.e., whenever any policy in part (i) increases total firm value, increasing b increases total firm value as well).

(iii) However, increasing b does not dominate reducing τ_l or vice versa. That said, reducing τ_l is even less likely to destroy total firm value. Specifically:

- *(a) If $\mu_B^* = 0$, then increasing b and reducing τ_l both increase total firm value.*
- *(b) If μ_B^* is positive but not too high (i.e., $\mu_B^*/(\mu_B^* + \bar{\mu}_G) \in (0, \underline{q})$), then reducing τ_l increases total firm value, while the effect of increasing b is ambiguous.*

(c) If μ_B^* is too high (i.e., $\mu_B^*/(\mu_B^* + \bar{\mu}_G) > \underline{q}$), then reducing τ_l has no impact on total firm value, while increasing b strictly increases total firm value.

Therefore, even among the policies that reward long-termism, the choice must be made carefully to avoid harming firm value inadvertently and to ensure increasing it.

4 Policy Implications for Other Types of Blockholders

In this section I discuss the policy implications for blockholders other than activist shareholders (i.e., CEOs, board directors, VCs, and entrepreneurs). Importantly, the short-termism problem studied in this paper applies to these types of blockholders as well. For example, it might take sufficiently long for a project to reveal its NPV (e.g., at pharmaceutical or tech companies) such that (a) the CEO or a board director with a bad project might contemplate whether to implement the project and switch to a different firm (and also sell his stake) before the NPV is revealed, while (b) the CEO or a board director with a good project might decide whether to shirk and switch to a different firm before the NPV is revealed, or to exert effort and keep his stake until the NPV is revealed. An entrepreneur or a VC might also face a similar decision for a project that can be implemented before an IPO, where "exiting" would correspond to selling his stake via the IPO before the NPV of the project is revealed, and "keeping his stake" would correspond to postponing the IPO until the NPV is revealed.[33] Moreover, the interpretation of the "project" can be very broad: Indeed, in the case of an entrepreneur, the project can represent the action of starting the firm itself, and in the case of a VC, the project can represent the action of investing in the firm (in both of these cases, the revelation of the NPV would be the realization of how profitable this firm will be, which would be revealed after the IPO if the firm goes public quickly).

An important aspect that made the extended model introduced in Section 3 more geared towards shareholder activism is the modeling of the stage where the blockholder buys his stake α in the firm. While this stage was constructed to reflect how activists accumulate their shares, the only material impact of the assumptions made about this stage was that the blockholder pays $\alpha[Q_0 + (1-\eta)V^*]$ for his stake (as shown in Section 3.2), where V^* is the expected value added to the firm by the blockholder conditional on implementing his project. Therefore, for blockholders other than activists, if the blockholder's cost basis (i.e., what the blockholders

[33] Even though there might be lock-up periods involved for a VC or entrepreneur to sell his stake after the IPO, again it can take a lot of time for the project's NPV to be revealed, and hence the VC or the entrepreneur might be able to sell his stake before the NPV is revealed if he wishes to do so.

pays for his stake) is positively correlated to V^*, the same policy implications derived for activists under endogenous q may hold for these blockholders as well. For example, a CEO can buy shares in his firm before he formally announces the implementation of his project and hence pay $\alpha[Q_0 + (1-\eta)V^*]$ for his stake α,[34] where $(1-\eta)$ represents the market's prediction for the probability that he will implement the project. Then, the model for this CEO would become similar to the model in Section 3. Whenever this is the case, the policy implications derived for activism would again apply. Amongst these, a relevant implication is that policies punishing short-termism as well as those rewarding long-termism can destroy total firm value. An example for the former policy would be tightening the 10b5-1 disclosure rules on CEOs for selling their shares (i.e., reduce η), which is also recently proposed by the SEC,[35] while an example for the latter policy would be to provide the CEO with long-term bonuses for better retention (i.e., increase b).

However, since there are many kinds of blockholders, modeling each of them separately to endogenize q and to do a comparison of policies is left outside of the scope of this paper due to space constraints. That said, even without further modeling, there is more that can be said about policies that impact $\Delta\kappa$. In particular, recall that $\Delta\kappa$ is the blockholder's additional cost to implement a bad (i.e., value-destroying) project compared to a good (i.e., value-creating) project. For this reason, if $\Delta\kappa$ increases, it directly impacts only the value-destroying blockholders and it discourages them from implementing their projects. In contrast, increasing $\Delta\kappa$ is unlikely to result in a lower number of value-creating blockholders implementing their projects, since it does not have a direct impact on them. As a result, conditional on a project being implemented, the endogenous probability q^* would fall with $\Delta\kappa$. However, as it was already shown in the baseline model (which covered all kinds of blockholders), if q decreases while other parameters are kept constant, then average value V^* of a project drops when $\rho^* < 1$ (that is, when a value-creating blockholder is not always exerting effort). In turn, this would imply that whenever $\rho^* < 1$, the combined value of all firms in this economy would decrease with $\Delta\kappa$, because $(\mu_G^* + \mu_B^*)V^*$ would drop (where μ_G^* and μ_B^* are the measure of blockholders that implement good and bad projects, respectively). An important implication of this result is

[34] Note that to avoid insider trading allegations, the CEO can make these purchases by setting what is called a "preset trading plan," which allows him to trade shares once a certain amount of time (often just 30 days) has passed after the plan is set. WSJ reports that Federal authorities rarely have brought insider-trading cases against executives that allege abuses of preset trading plans. For details, see WSJ, "CEO Stock Sales Raise Questions About Insider Trading," 06/29/2022.

[35] See, e.g., WSJ, "SEC Proposes Tighter Rules on Insider Trading, Stock Buybacks," 12/15/2021; sec.gov, "SEC Proposes Amendments Regarding Rule 10b5-1 Insider Trading Plans and Related Disclosures," 12/15/2021; as well as the WSJ article in the previous footnote.

that policies that increase $\Delta\kappa$ can destroy total firm value, even if they reduce only the number of blockholders that implement value-destroying projects. Examples for such policies include increasing oversight, transparency, liability, or accountability at IPOs (when the blockholder represents entrepreneurs or VCs) or at firms (when the blockholder represents CEOs or board directors).

5 Extensions

In this section, to demonstrate the robustness of the results, I discuss several extensions of the model. In particular, Sections 5.1 through 5.3 below discuss extensions that apply to both the baseline model in Section 2 and the full model in Section 3, and then Sections 5.4 and 5.5 focus more specifically on shareholder activism and hence discuss further extensions of the model in Section 3.

5.1 The Blockholder's Effort

Micro-foundation of effort as learning about projects. I begin this section with offering a micro-foundation for the effort dimension of the model. It was assumed both in the baseline model and in the extended model that the blockholder exerts effort at the same time as he implements the project. Here, a simple interpretation is that effort increases the quality of the blockholder's project (e.g., better implementation). However, an alternative interpretation is that effort represents the blockholder's search and learning among different possible projects before deciding which one to implement. One way to model this micro-foundation is to assume that the blockholder faces several projects, where each project has an NPV of $\Delta_H > 0$ with some probability and $\Delta_{VL} < 0$ otherwise, where each project has an expected NPV of $\Delta_L \in (\Delta_{VL}, 0)$. The firm can implement only one of these projects, or none. With some probability, the blockholder gets a costless signal, which helps him to eliminate some of the projects that has NPV of Δ_{VL} such that the expected NPV of any of the remaining projects is $\Delta_M \in (0, \Delta_H)$. If he exerts effort (e.g., analyzes these remaining projects carefully), then he successfully identifies at least one project that has an NPV of Δ_H.[36] Moreover, if the joint distribution of the NPVs is symmetric, then conditional on project implementation, the market maker cannot infer anything about the NPV from the identity of the project itself, and hence the model would

[36] An easy way to achieve these properties is to assume that the NPV distribution of the projects is such that there is always the same number of projects with NPVs of Δ_H. While this would imply that the distribution of projects is correlated, it does not prevent the joint distribution from being symmetric.

reduce to the original model. Moreover, the blockholder can do this search among the projects after or before he purchases his shares in the firm.

The ability of the blockholder with a bad project to exert effort. In the original model, it was assumed that if the blockholder has a bad project, he cannot improve the value of the project by exerting effort. Let us relax this assumption, and suppose that he can exert effort and increase the value of the project from Δ_L to Δ_H. Then, it is reasonable to assume that then his cost of effort to do so will be larger than the cost of exerting of effort when the project is good (because the latter improves the NPV of the project from Δ_M to Δ_H, where $\Delta_H - \Delta_M > \Delta_H - \Delta_L$). Then, for any $q \leq \underline{q}$, the blockholder with a bad project would never exert effort. That is because in this region, the blockholder with a good project is indifferent between shirking (and exiting) and exerting effort (and keeping his stake unless hit with a liquidity shock), and hence, the blockholder with a bad project strictly prefers to shirk. Therefore, all of the results from the original model would continue to hold in this region, which is the region that yielded the main results in the paper.

5.2 Implementation of the project

The blockholder's ability to implement projects unilaterally. Note that it was assumed in the original model that the blockholder can always implement his project if he desires to. The justification behind this assumption is that the expected value of the project V^* is always positive in equilibrium under endogenous entry, as I show in Lemma 8 in Online Appendix D.1. This is because if $V^* \leq 0$ then the value-destroying blockholder makes a loss from implementing his project, hence contradicting with $V^* \leq 0$. In turn, $V^* > 0$ implies that in equilibrium, even if the blockholder needs to convince the management of the firm or gather the support of the shareholders to implement the project, he can do so if the other parties involved are not informed about the NPV of the project.

The management's information about the project. An aspect that is also related to the previous point is how the results would be impacted if the management of the firm is informed about the value of the blockholder's project (i.e., the management is competent). When this is the case, the likely scenario is that the management already knows about this project and its NPV before the blockholder arrives at the firm. Therefore, if the management is maximizing shareholder value, it would implement the project when it is good even before the blockholder arrives, and therefore the blockholder would never show up (because the market would perfectly infer that the project is bad since the management did not implement it in the first place).

However, it might be that the blockholder *prefers* to keep status quo, for example, due to some private benefits, and hence is opposed to implementing the project even if it is good. Then, the management would try to prevent the implementation of a bad project as well as a good project, and therefore the management's attempts to convince the shareholders that this project should not be implemented would not be heeded by the shareholders.[37] As a result, the blockholder would be able to implement the project with the support of the shareholders, if needed with a proxy fight (in this case, κ would include the blockholder's cost of a proxy fight). Overall, these arguments imply that the results in the original model would continue to hold as long as the management is entrenched or incompetent.

5.3 Allowing for Partial Sale

Note that in the original model, it was assumed that at the exit stage, the blockholder decides between selling all of his stake and selling none of it. However, even if this assumption is relaxed completely and the blockholder is allowed to sell as much of his stake as he would like, the equilibrium described in Section 2 continues to exist, as well as the equilibrium described in Section 3 if the short-term tax rate τ_s is not too high compared to τ_l and the additional perks b for holding the shares is not too high. The reason is that in these equilibria, (a) in the region $q \leq \underline{q}$, the exit price always satisfies $P^* \in (\Delta_M, \Delta_H)$,[38] and hence the blockholder strictly prefers to keep all of his stake if he has has implemented a good project and exerted effort, and he strictly prefers to sell all of his stake otherwise, and (b) in the region $q \in (\underline{q}, 1)$, the exit price satisfies $P^* \in (\Delta_L, \Delta_H)$, and hence the blockholder strictly prefers to keep all of his stake if he has implemented a good project (in which case he always exerts effort because $q > \underline{q}$) and strictly prefers to sell all of his stake if he has implemented a bad project.

5.4 Dynamic Disclosure and the Stake Size

One of the assumptions made in Section 3 was that when the blockholder is buying (or selling) shares, he makes disclosure only once. However, in reality, the blockholder might have to make back to back disclosures. For example, the current SEC rules require blockholders to amend

[37] Note that the management may not be able to produce verifiable evidence that the blockholder's project is bad. Moreover, even if the management can come up with such hard evidence, it may not be able to disclose it to the shareholders because disclosing such information may harm firm value (e.g., by giving an informational advantage to the competitors of the firm) and in turn may result in the breach of fiduciary duty of the management.

[38] This result is formally shown in the proofs of Propositions 1 and 3.

their 13D filing in two business days, which implies that a blockholder might have to make such a dynamic disclosure. Nevertheless, even if the disclosure is modeled in this way, the equilibria described in Sections 2 and 3 would continue to exist. This is because in these equilibria, the additional disclosure would reveal no additional information: Once the blockholder makes his first disclosure when buying (selling) shares, the market fully anticipates that he will continue buying until amassing a stake of α (continue selling until he sells all of stake α).

Another assumption that was made in Section 3 is that if the blockholder decides to buy a stake, the size α of the stake he buys is exogenous and constant. Here, α can represent the size of the stake that the blockholder prefers due to reasons not included in the full model, for example, in order to have sufficient voting power but without making his portfolio too concentrated on this firm (for diversification reasons). Moreover, also note that if α is endogenized, then the blockholder with a bad project always prefers to buy the same number of shares that blockholder with a good project does, because otherwise the market would infer the project quality in equilibrium, making it impossible for the value-destroying blockholder to make a profit on his stake.

To demonstrate the robustness of the results to endogenous α, suppose that the blockholder has alotted a certain capital K to buy shares in this firm. Then, α^* decreases with the expected value V^* that the blockholder creates in the firm, because the blockholder pays more on average to buy a stake if V^* is higher. All else equal, this reduces the incentives of the blockholder with a good project to exert effort, because c/α^* (i.e., his cost of effort per share he owns) increases. Since the main driver of the results in the paper is that $V^*(q)$ increases in q if $q < \underline{q}$ (due to higher effort of the blockholder), a particular concern that might arise is whether this result will not hold anymore under endogenous α. However, the reduction in α^* can never be so much that V^* does not increase with q if $q < \underline{q}$. This is because if V^* did not increase with q at any point $q = q' < \underline{q}$, then it would mean that the shares don't become more expensive as q increases at $q = q'$ and hence α^* would not decrease with q at $q = q'$, in turn yielding a contradiction with the result that V^* does not increase with q at $q = q'$.

5.5 Proxy Access

Even though the model in Section 3 assumes that the blockholder can enjoy the extra benefit b per share whenever he keeps his stake longer, in reality some of the policies of this kind might require in addition that the blockholder does not intend to influence the firm. For example, proxy access has this requirement in some firms. When this is the case, a blockholder that has implemented his project may not be able to utilize proxy access.[39] This has important implications for the effect of increasing b (e.g., introducing proxy access) on total firm value. In particular, if some value-destroying blockholders are implementing their projects (i.e., $q^* > 0$), then as b increases, it has no impact on the value-creating blockholder's incentives to exert effort, because they always strictly prefer to implement their projects and hence are ineligible for these benefits.[40] On the other hand, increasing b strictly reduces the number of value-destroying blockholders that are implementing their projects (i.e., μ_B^*), because it incentivizes them to switch to not implementing their projects and keeping their stake so that they can enjoy these benefits b. This implies that q^* strictly decreases. As a result, in the region where $q^* \in (0, \underline{q})$, increasing b results in a decrease in V^* as well. Therefore, total firm value strictly decreases with b in this region. Moreover, in the region where $q^* = 0$, increasing b can also decrease total firm value, since in that region it can incentivize the value-creating blockholders to switch to not implementing their projects in order to enjoy these benefits.

Overall, these arguments imply that proxy access is more likely to destroy firm value compared to other policies that reward long-termism. More generally, the result of the original model that policies that reward long-termism is less likely to destroy total firm value than all other kinds of policies studied in this paper (including policies that punish short-termism) continues to hold only if the policy that rewards long-termism does not put a direct restraint on the blockholder's incentives to implement his project.

6 Conclusion

Short-termism is a major problem that draws the attention of many policymakers, academics, and practitioners. In this paper, I study a model of blockholder short-termism where a firm's value is affected by the actions of its blockholder. Here, the blockholder can represent not only an activist shareholder, but also a CEO, board director, entrepreneur, or VC. A critical aspect of the model is that it takes into account the blockholders who destroy value in combination

[39] For example, in 2016, the first ever attempt to utilize proxy access was denied on the grounds that the blockholder had filed 13D, which violated the proxy access' requirement that "the nominating shareholder acquired the shares in the ordinary course of business and not with the intent to change or influence control of the Corporation." The blockholder, GAMCO, decided not to pursue proxy access as a result of this denial. For details, see, e.g. HLS Forum on Corporate Governance and Financial Regulation, "The Latest on Proxy Access," 02/01/2019.

[40] Specifically, the value-creating blockholders always strictly prefer to implement their projects in this region ($q^* > 0$) because their payoff from doing so is strictly larger than the value-destroying blockholders' payoff from doing so.

with those who create value (i.e., adverse selection), because the former would not make a profit without the presence of the latter. Therefore, the flip side of the coin is the incentives of the latter kind of blockholder regarding how much value to create (i.e., moral hazard). The other friction in the model is that the blockholder can sell his stake in the firm (i.e., "exit") before the NPV of his actions is realized by the market. This ability to exit creates opportunity for the blockholder to profit from a short-term increase in the stock price even when he is actually destroying value.

I find that, paradoxically, the average firm value increases with the probability that the blockholder is destroying value (up to a certain probability), because it motivates the value-creating blockholder much more to keep his stake longer due to a fall in the exit price, and in turn, incentivizing him to exert effort in the first place. In other words, in the presence of short-termist blockholders that destroy value, the blockholders that create value become more long-termist and create more value, where the latter effect can dominate.

Next, focusing on shareholder activism as the primary application, I extend the model to a multiple firm and multiple blockholder setup to endogenize the blockholders' entry and study policy implications. I find that holding the number of blockholders that implement good and bad projects constant, policies that punish short-termism (e.g., increasing short-term taxes or tightening disclosure rules for selling) as well as policies that reward long-termism (e.g., reducing long-term taxes or increasing the other perks for holding the stake longer) increase firm value. In a stark contrast, under endogenous entry, both of these kinds of policies may decrease total firm value, even if the number of blockholders implementing good projects does not change. This is because fewer value-destroying blockholders implement their projects, and in turn, more blockholders that have good projects choose to shirk and exit as a result. In other words, the value-creating blockholders may become *more* short-termist *despite* the additional incentive provided by these policies to keep their stake longer, and consequently, these policies can result in value destruction. Similarly, policies that act as blanket punishments (e.g., tightening the disclosure rules for buying, or raising the firms defenses against the blockholder) can destroy total firm value as well. More generally, these results show that under short-termism, a tension exists between improving governance *forcefully through regulation* versus *endogenously through market forces.*

Nevertheless, I also find that policies that reward long-termism is the least likely to destroy total firm value, because it distorts the market forces mentioned above to a lesser extent. However, the effect on firm value significantly varies even across the policies that reward long-termism.

The model has implications to blockholders beyond activists, such as CEOs, boards, entrepreneurs, and VCs. For example, an implication that applies to all of these types of blockholders is that regulations or firm policies that make it harder to implement value destroying projects (e.g., due to increased oversight or accountability at firms as well as at IPOs) can decrease total firm value. That said, due to the heated and ongoing policy discussion around shareholder activism, the priority regarding policy implications was given to activists in this paper, and the model was extended to compare the effects of several policies that would apply to them. Therefore, a possible path for future research is to model the other kinds of blockholders in more detail to do such policy comparisons for them as well.

References

[1] Admati, Anat R., and Paul Pfleiderer, 2009, The "Wall Street Walk" and shareholder activism: exit as a form of voice, *The Review of Financial Studies* 22, 2245-2285.

[2] Admati, Anat R., Paul Pfleiderer, and Josef Zechner, 1994, Large shareholder activism and financial market equilibrium, *Journal of Political Economy* 102, 1097-1130.

[3] Aghion, Philippe, Patrick Bolton, and Jean Tirole, 2004, Exit Options in Corporate Finance: Liquidity versus Incentives, *Review of Finance* 8, 327-53.

[4] Back, Kerry, Pierre Collin-Dufresne, Tao Li, and Alexander Ljungqvist, 2018, Activism, strategic trading, and liquidity, *Econometrica* 86, 1431-1463.

[5] Baker, Andrew, 2021, The effects of hedge fund activism, Working paper.

[6] Bolton, Patrick, Jose Scheinkman, and Wei Xiong, 2006, Executive compensation and short-termist behaviour in speculative markets, *The Review of Economic Studies* 73, 577–610.

[7] Bolton, Patrick, and E. Ludwig von Thadden, 1998, Blocks, liquidity, and corporate control, *Journal of Finance* 53, 1-25.

[8] Brav, Alon, Wei Jiang, and Hyunseob Kim, 2009, Hedge Fund Activism: A Review, *Foundations and Trends in Finance* 4, 185-246.

[9] Brav, Alon, Wei Jiang, and Hyunseob Kim, 2015, Recent Advances in Research on Hedge Fund Activism: Value Creation and Identification, *Annual Review of Financial Economics* 7.

[10] Brav, Alon, Wei Jiang, and Rongchen Li, 2021, Governance by Persuasion: Hedge Fund Activism and Market-based Shareholder Influence, Working paper.

[11] Burkart, M., D. Gromb, and F. Panunzi, 1997, Large Shareholders, Monitoring and the Value of the Firm, *Quarterly Journal of Economics* 112, 693-728.

[12] Coffee Jr, John C., and Darius Palia, 2016, The wolf at the door: The impact of hedge fund activism on corporate governance, *Journal of Corporation Law* 41, 545-608.

[13] Cohn, Jonathan B., and Uday Rajan, 2013, Optimal corporate governance in the presence of an activist investor, *Review of Financial Studies* 26, 985-1020.

[14] Corum, Adrian Aycan, Activist Settlements, 2021, Working paper.

[15] Corum, Adrian Aycan, and Doron Levit, 2019, Corporate control activism, *Journal of Financial Economics* 133, 1-17.

[16] Cremers, Martijn, Saura Masconale, and Simone M. Sepe, 2017, Activist Hedge Funds and the Corporation, *Washington University Law Review* 94, 261-339.

[17] Cvijanovic, Dragana, Amil Dasgupta, and Konstantinos E. Zachariadis, 2022, The Wall Street Stampede: Exit As Governance with Interacting Blockholders, *Journal of Financial Economics*, forthcoming.

[18] Dasgupta, Amil and Giorgia Piacentino, 2015, The Wall Street Walk When Blockholders Compete For Flows, *Journal of Finance* 70 (6), 2853-2896.

[19] deHaan, E., Larcker, D., McClure, C., 2019. Long-term economic consequences of hedge fund activist interventions. *Review of Accounting Studies* 24, 536-569.

[20] Donaldson, Jason, Nadya Malenko, and Giorgia Piacentino, 2020, Deadlock on the board, *The Review of Financial Studies* 33, 4445-4488.

[21] Edmans, Alex, 2009, Blockholder trading, market efficiency, and managerial myopia, *Journal of Finance* 64, 2481-513.

[22] Edmans, Alex, 2014, Blockholders and corporate governance, *Annual Review of Financial Economics* 6, 23-50.

[23] Edmans, Alex, Doron Levit, and Devin Reilly, 2019, Governance under common ownership, *Review of Financial Studies* 32, 2673-2719.

[24] Edmans, Alex, and Clifford G. Holderness, 2017, Blockholders: A survey of theory and evidence in *Handbook of corporate governance*, ed. Benjamin Hermalin and Michael Weisbach (New York: Elsevier/North-Holland).

[25] Edmans, Alex, and Gustavo Manso, 2011, Governance Through Trading and Intervention: A Theory of Multiple Blockholders, *Review of Financial Studies* 24, 2395-2428.

[26] Faure-Grimaud, A., and D. Gromb, 2004, Public Trading and Private Incentives, *Review of Financial Studies* 17, 985-1014.

[27] Fos, Vyacheslav, and Charles Kahn, 2019, Governance through threats of intervention and exit, Working Paper.

[28] Goldman Eitan, and Gunther Strobl, 2013, Large shareholder trading and the complexity of corporate investments, *Journal of Financial Intermediation* 22, 106-122.

[29] Hackbarth, Dirk, Alejandro Rivera, and Tak-Yuen Wong, 2018, Optimal short-termism, Working paper.

[30] Kahn, C., and A. Winton, 1998, Ownership Structure, Speculation, and Shareholder Intervention, *Journal of Finance*, 53, 99-129.

[31] Khanna, Naveen, and Richmond D. Mathews, 2012, Doing Battle With Short Sellers: The Conflicted Role of Blockholders in Bear Raids, *Journal of Financial Economics* 106, 229–46.

[32] Kyle, Albert S., and Jean-Luc Vila, 1991, Noise trading and takeovers, *Rand Journal of Economics* 22, 54-71.

[33] Laux, Volker, 2012, Stock option vesting conditions, CEO turnover, and myopic investment, *Journal of Financial Economics* 106, 513-526.

[34] Levit, Doron, 2019, Soft shareholder activism, *Review of Financial Studies* 32, 2775-2808.

[35] Marinovic, Ivan, and Felipe Varas, 2021, Strategic Trading and Blockholder Dynamics, Working paper.

[36] Maug, Ernst, 1998, Large Shareholders as Monitors: Is There a Tradeoff Between Liquidity and Control?, *Journal of Finance* 53, 65-98.

[37] Narayanan, M. P., 1985, Managerial incentives for short-term results, *The Journal of Finance* 40, 1469-1484.

[38] Noe, T., 2002, Investor Activism and Financial Market Structure, *Review of Financial Studies* 15, 289-318.

[39] Shleifer, Andrei, and Robert W. Vishny, 1986, Large shareholders and corporate control, *Journal of Political Economy* 94, 461-488.

[40] Song, Fenghua, 2017, Blockholder short-term incentives, structures, and governance, Working Paper.

[41] Stein, Jeremy C., 1988, Takeover threats and managerial myopia. *Journal of Political Econonomy* 96, 61–80.

[42] Stein, Jeremy C., 1989, Efficient capital markets, inefficient firms: a model of myopic corporate behavior, *Quartely Journal of Economics* 104, 655–669.

[43] Thakor, Richard, 2021, Short-termism, managerial Talent, and firm Value, *The Review of Corporate Finance Studies*, forthcoming.

[44] Xiong, Yan, and Xu Jiang, 2021, Economic Consequences of Managerial Compensation Contract Disclosure, Working paper.

A Proofs of the Baseline Model (Section 2)

Proof of Lemma 1. The proof is this lemma provided right after the lemma in the main text. ■

Proof of Lemma 2. First, I prove part (i). Note that conditional on implementing the project, the payoff of the blockholder with a good project from exerting effort is given by

$$\alpha[\phi P + (1-\phi)\max\{P, \Delta_H\}] - c,$$

while his payoff from not exerting effort is given by

$$\alpha[\phi P + (1-\phi)\max\{P, \Delta_M\}],$$

Therefore, the blockholder exerts effort only if

$$\begin{aligned} \alpha[\phi P + (1-\phi)\max\{P, \Delta_H\}] - c &\geq \alpha[\phi P + (1-\phi)\max\{P, \Delta_M\}] \\ &\Leftrightarrow \frac{1}{1-\phi}\frac{c}{\alpha} \leq \max\{P, \Delta_H\} - \max\{P, \Delta_M\}, \end{aligned} \tag{21}$$

and the blockholder exerts effort if the inequality in (21) holds strictly.

Suppose that $c > \bar{c}$. Since the RHS of (21) is weakly smaller than $\Delta_H - \Delta_M$, then (1) and $c > \bar{c}$ imply that (21) is never satisfied. As a result, the blockholder never exerts effort.

Suppose that $c < \bar{c}$. There are two cases to consider: If $P \leq \Delta_M$, then (21) implies that the blockholder with a good project always exerts effort. In contrast, if $P > \Delta_M$, then it must be that the blockholder with a good project is exerting effort with positive probability (because if he never exerts effort, $P \leq \Delta_M$ would have to be satisfied). This completes the proof of part (ii).

Second, I prove part (ii) by showing that for any $c > 0$, it must be that $\rho^* < 1$ if $q = 0$. Suppose that instead, there exists $c > 0$ such that $\rho^* = 1$ if $q = 0$. However, then it must be that $P^* = \Delta_H$, and hence the blockholder with a good project strictly prefers to deviate to shirking and exiting (since doing so increases his payoff by c), yielding a contradiction with $\rho^* = 1$. ■

Proof of Lemma 3. First, note that the blockholder with a bad project always exits, because $P^* > \Delta_L$ whenever $q < 1$ since $\phi > 0$. Even in the corner case of $q = 1$, he weakly prefers to exit since $P^* = \Delta_L$.

Second, I show that the blockholder with a good project that has exerted effort does not exit unless hit by a liquidity shock. Note that for this result, it is sufficient to show that $P^* < \Delta_H$. Suppose this is not the case. Then, it must be that $P^* = \Delta_H$, and hence, $\rho^* = 1$. However, then the blockholder with a good project strictly prefers to deviate to shirking and exiting, yielding a contradiction with $P^* = \Delta_H$.

Third, I show that the blockholder with a good project always exits if he has shirked. There are two cases to consider. First, suppose that $P^* > \Delta_M$. Then, the blockholder that has shirked strictly prefers exiting over not exiting. Second, suppose that $P^* \leq \Delta_M$. However, then the maximum expected payoff that the blockholder with a good project can achieve is given by $\alpha \left[\phi P^* + (1-\phi)\max\left\{P^*, \Delta_M\right\}\right]$ if he shirks. In contrast, if he exerts effort and does not exit unless hit by a liquidity shock, then he gets an expected payoff of $\alpha \left[\phi P^* + (1-\phi)\Delta_H - c\right]$. Due to (1), $c < \bar{c}$ implies that the latter of these two payoffs is strictly larger, implying that there cannot be any blockholder with a good project that shirks in this equilibrium. ■

Proof of Proposition 1. Note that $\underline{q} \in (0,1)$ because due to (1), $c < \bar{c}$ implies that $0 < \Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha} - \Delta_L$.

Note that by Lemma 3, in any equilibrium if the blockholder with a good project exerts effort, then he never exits (unless he has to, that is, unless he is hit by a liquidity shock) and gets a payoff of $\alpha \left[\phi P^* + (1-\phi)\Delta_H\right] - c$, and in contrast if he does not exert effort, then he gets a payoff of αP^* (because he always exists). Therefore, the best response of the blockholder with a good project (that is, the probability ρ that he exerts effort) as a function of the exit price P is given by

$$\rho(P) = \begin{cases} 0, & \text{if } P > \Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha}, \\ \text{any } \rho \in [0,1], & \text{if } P = \Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha}, \\ 1, & \text{if } P < \Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha}. \end{cases} \tag{22}$$

Suppose that $q < \underline{q}$. Then, $P^* > \Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha}$ if $\rho^* = 1$ (due to (3)), and $P^* \leq \Delta_M < \Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha}$ if $\rho^* = 0$ (where the latter inequality follows from $c < \bar{c}$). Therefore, it must be that $\rho^* \in (0,1)$, and hence $P^* = \Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha}$. In turn, this yields (6), since plugging (3) in P^* yields

$$\begin{aligned} \Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha} \quad &= \quad P^* = \frac{(1-q)\,\rho\left[\phi\Delta_H - \Delta_M\right] + (1-q)\,\Delta_M + q\Delta_L}{1-(1-q)\,\rho\,(1-\phi)} \\ &\Leftrightarrow \quad \rho^* = \frac{1}{1-q}\left(1 + \frac{q\left(\Delta_M - \Delta_L\right) - \frac{\phi}{1-\phi}\frac{c}{\alpha}}{\Delta_H - \frac{c}{\alpha} - \Delta_M}\right) \end{aligned}$$

Note that $\rho^* > 0$ since

$$0 < 1 + \frac{q\left(\Delta_M - \Delta_L\right) - \frac{\phi}{1-\phi}\frac{c}{\alpha}}{\Delta_H - \frac{c}{\alpha} - \Delta_M} \Leftrightarrow 0 < \frac{\Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha} - \Delta_M + q\left(\Delta_M - \Delta_L\right)}{\Delta_H - \frac{c}{\alpha} - \Delta_M},$$

which holds since $\Delta_M > \Delta_L$ and $\Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha} > \Delta_M$ (where the latter follows from $c < \bar{c}$ due to (1)). Moreover, also note that $\rho^* < 1$ if $q < \underline{q}$, because

$$\rho^* < 1 \Leftrightarrow \frac{1}{1-q}\left(1 + \frac{q\left(\Delta_M - \Delta_L\right) - \frac{\phi}{1-\phi}\frac{c}{\alpha}}{\Delta_H - \frac{c}{\alpha} - \Delta_M}\right) < 1 \Leftrightarrow q < \frac{\frac{\phi}{1-\phi}\frac{c}{\alpha}}{\Delta_H - \frac{c}{\alpha} - \Delta_L} = \underline{q}$$

Moreover, also note that: (a) ρ^* is strictly increasing in q (because $\Delta_H - \frac{c}{\alpha} - \Delta_M > 0$ and $\rho^* > 0$), (b) $\rho^* \to 1$ as $q \to \underline{q}$, and (c) $\underline{q} \in (0,1)$ as shown at the beginning of the proof.

Suppose that $q \geq \underline{q}$. Then, to show that in equilibrium it must be $\rho^* = 1$, (22) implies that it is sufficient to show that $P^* < \Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha}$ if $\rho^* < 1$, and $P^* \leq \Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha}$ if $\rho^* = 1$. In turn, since $\Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha} > \Delta_M$ (due to $c < \bar{c}$), it is sufficient to show that $P^* \leq \Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha}$ if $\rho^* = 1$, and P^* (which is given by (3)) is strictly increasing in ρ if $P^* \geq \Delta_M$. To see that $P^* \leq \Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha}$ if $\rho^* = 1$, note that

$$\begin{aligned}
P^* &= \frac{(1-q)\,\phi\Delta_H + q\Delta_L}{1-(1-q)(1-\phi)} \leq \Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha} \\
&\Leftrightarrow (1-q)(1-\phi)\left(\Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha}\right) + (1-q)\,\phi\Delta_H + q\Delta_L \leq \left(\Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha}\right) \\
&\Leftrightarrow q \geq \underline{q}.
\end{aligned}$$

And finally, to see that P^* is strictly increasing in ρ if $P^* \geq \Delta_M$, note that

$$\begin{aligned}
0 &< \frac{\partial P}{\partial \rho} \Leftrightarrow 0 < \frac{\partial}{\partial \rho}\frac{(1-q)\,\rho\phi\Delta_H + (1-q)(1-\rho)\,\Delta_M + q\Delta_L}{1-(1-q)\,\rho\,(1-\phi)} \\
&\Leftrightarrow \frac{(1-q)\,\rho\phi\Delta_H + (1-q)(1-\rho)\,\Delta_M + q\Delta_L}{1-(1-q)\,\rho\,(1-\phi)} + \frac{(1-q)\,\rho\phi\Delta_H + (1-q)(1-\rho)\,\Delta_M + q\Delta_L}{\left[1-(1-q)\,\rho\,(1-\phi)\right]^2}(1-q)(1- \\
&\Leftrightarrow 0 < \frac{(1-q)\,\phi\Delta_H - (1-q)\,\Delta_M}{1-(1-q)\,\rho\,(1-\phi)} + \frac{P^*}{1-(1-q)\,\rho\,(1-\phi)}(1-q)(1-\phi) \\
&\Leftrightarrow \Delta_M < \phi\Delta_H + (1-\phi)\,P^*,
\end{aligned}$$

which always holds if $P^* \geq \Delta_M$. ■

Proof of Proposition 2. First, I show that $(1-q)\rho^*$ is strictly increasing in q if $q < \underline{q}$. Note that since P^* is given by (3) and P^* does not change with q if $q < \bar{q}$ by Proposition 1(i), applying Implicit Function Theorem (IFT) on (3) w.r.t. q yields

$$\begin{aligned}
0 &= \frac{d}{dq}\frac{(1-q)\,\rho^*\,[\phi\Delta_H - \Delta_M] + (1-q)\,\Delta_M + q\Delta_L}{1-(1-q)\,\rho^*\,(1-\phi)} \\
0 &= [(1-q)\,\rho^*\,[\phi\Delta_H - \Delta_M] + (1-q)\,\Delta_M + q\Delta_L]\,(1-\phi)\,\frac{d\,(1-q)\,\rho^*}{dq} \\
&\quad + \left\{\frac{d\,(1-q)\,\rho^*}{dq}\,[\phi\Delta_H - \Delta_M] - \Delta_M + \Delta_L\right\}[1-(1-q)\,\rho^*\,(1-\phi)] \\
\frac{d\,(1-q)\,\rho^*}{dq} &= \frac{(\Delta_M - \Delta_L)\,[1-(1-q)\,\rho^*\,(1-\phi)]}{\phi\Delta_H + q\,(1-\phi)\,\Delta_L - [1-(1-q)\,(1-\phi)]\,\Delta_M}. \qquad (23)
\end{aligned}$$

Note that $\Delta_L < \Delta_M$ implies that the numerator of the RHS is positive, therefore it remains to show that the denominator is positive as well. To see this, note that for any $q < \underline{q}$, Proposition 1 implies that $\rho^* < 1$ and hence that $P^* > \Delta_M$, because if $P^* \leq \Delta_M$ then $c < \bar{c}$ (due to (1)) would imply that the blockholder with a good project would strictly prefer to exert effort and receive a payoff of $\alpha\,[\phi P^* + (1-\phi)\Delta_H] - c$ rather than to shirk and receive a payoff of $\alpha\,[\phi P^* + (1-\phi)\max\{P^*, \Delta_M\}]$. Moreover, since Proposition 1 implies that P^* is continuous w.r.t. q (note that plugging (5) in (8) yields that $P^*(\underline{q})$ is equal to (7)), this also implies that $P^* \geq \Delta_M$ when $q = \underline{q}$. Since the denominator of the RHS in (23) is strictly decreasing in q (because $\Delta_L < \Delta_M$), it is sufficient to show that it is positive for $q = \underline{q}$. Plugging P^* for $q = \underline{q}$ from Proposition 1 yields

$$\Delta_M \leq P^* \Leftrightarrow \Delta_M \leq \frac{(1-\underline{q})\phi\Delta_H + \underline{q}\Delta_L}{1-(1-\underline{q})\,(1-\phi)} \Leftrightarrow 0 \leq (1-\underline{q})\phi\Delta_H + \underline{q}\Delta_L - \Delta_M\left[1-(1-\underline{q})\,(1-\phi)\right].$$

Since $\underline{q} \in (0,1)$ by Proposition 1, this implies that the denominator of the RHS in (23) is positive, concluding that $(1-q)\rho^*$ is strictly increasing in q if $q < \underline{q}$. Moreover, note that by Proposition 1, ρ^* and P^* are continuous w.r.t. q at $q = \underline{q}$, and hence going through the same steps above yields that $(1-q)\rho^*$ is also strictly increasing in q from below at $q = \underline{q}$.

Second, I show that V^* is strictly increasing in q if $q < \underline{q}$. Note that (9) and (3) imply that for all $q \in [0,1]$,

$$V^* = \Delta_H - (\Delta_H - P^*)\,[1-(1-q)\rho^*(1-\phi)]\,. \qquad (24)$$

Note that P^* is constant and $P^* < \Delta_H$ for all $q \leq \underline{q}$ by Proposition 1. Therefore, since $(1-q)\rho^*$ is strictly increasing in q if $q < \underline{q}$ (and also strictly increasing in q from below at $q = \underline{q}$), so is

V^*.

Third, if $q \geq \underline{q}$, then $\rho^* = 1$ by Proposition 1, and hence (9) and $\Delta_L < \Delta_H$ imply that V^* strictly decreases as q increases. Due to the previous step, this implies that V^* attains its unique maximum at $q = \underline{q}$. ■

Proof of Corollary 1. Note that both of results that (a) $\underline{q}$ strictly decreases as Δ_L decreases and (b) $\underline{q}$ strictly increases with c directly follow from the the definition of $\underline{q}$ in (5).

Therefore, it remains to show that $V^*(\underline{q})$ strictly increases as Δ_L decreases. To see this result, note that plugging (5) in (8) yields that $P^*(\underline{q})$ is given by (7) and does not change w.r.t. Δ_L. Proposition 1 also implies that $\rho^* = 1$ if $q = \underline{q}$, and hence (24) and $P^* < \Delta_H$ imply that $V^*(\underline{q})$ is strictly larger if $\underline{q}$ is smaller. Since $\underline{q}$ strictly decreases as Δ_L decreases, this implies that $V^*(\underline{q})$ strictly increases as Δ_L decreases, concluding the proof. ■

INTERNET APPENDIX

B Online Appendix: Mapping and Proofs for Section 3.2

This section shows that all the results from the baseline model (i.e., Section 2.3) continue to hold under the model extended by Section 3.1. The proofs are provided in Section B.1. The mapping of the results in this section to their counterparts in the baseline are as follows (the formal results are provided below as well, right after the mapping):

(I) In Lemmas 5 and 6 below, I show that Lemmas 2 and 3 from the baseline model continue to hold, with the following exceptions:

- (a) First, (1) in Lemma 2 is replaced with (11). This is because if the blockholder with a good project keeps his stake with probability $1-\phi$ (that is, whenever he is not hit with a liquidity shock), the benefit he realizes from exerting effort is now $\alpha(1-\tau_l)(1-\phi)(\Delta_H-\Delta_M)$ rather than $\alpha(1-\phi)(\Delta_H-\Delta_M)$ due to the existence of taxes. Note that $\tau_s<\bar{\tau}_s$ is assumed (where τ_s is given by (26)) due to parameter restriction made in Section 3.1, where restriction is made due to part (ii) of Lemma 5, as it was explained in that section.
- (b) Second, Lemma 3 continue to hold as well, with the exception that part (i) (i.e., the result that the blockholder that has implemented a bad project always exits) is proven by a different lemma later on (by Lemma 8 in the Online Appendix D.1), since this particular result now utilizes endogenous entry.

(II) Proposition 3 in Section 3.2 shows that all of the other results from the baseline model (Propositions 1 and 2 and Corollary 1) continue to hold as well, with the exception that it no longer specifies the closed form solutions for P^*, and for ρ^* when $q<\underline{q}$.

Lemma 5 *In any equilibrium for any $q\in[0,1)$, conditional on implementing the project:*

(i) *The agent with a good project never exerts effort if $c>\bar{c}$ and exerts effort with positive probability if*

$$c<\bar{c}\equiv\alpha(1-\tau_l)(1-\phi)(\Delta_H-\Delta_M)\,. \tag{25}$$

(ii) *If $c<\bar{c}$, then the agent with a good project always exerts effort if $\tau_s\geq\bar{\tau}_s$, where*

$$\bar{\tau}_s\equiv\tau_l+\frac{c-(1-\phi)\,\alpha b}{\eta\,(1-\phi)\,\alpha\Delta_H} \tag{26}$$

Lemma 6 *In any equilibrium for any $q\in[0,1)$, conditional on implementing the project:*

(i) If the blockholder with a good project exerts effort, then he does not exit unless hit by a liquidity shock.

(ii) If the blockholder with a good project shirks, he always exits.

(iii) The blockholder with good project shirks with positive probability (i.e., $\rho^* < 1$) if no bad project is implemented (i.e., $q = 0$).

B.1 Proofs

This section provides the proofs of all the results listed in Sections 3.2 and B. An auxiliary result (i.e., Lemma 7) has been relegated to the end of this section, to Section B.1.1 ("Supplemental results for Section B.1"). I refer to these results in some of the proofs below.

Proof of Lemma 5.

I start by proving part (i). Note that the payoff of the blockholder with a good project from exerting effort is given by

$$\begin{aligned}&\phi\alpha(1-\tau_s)\left[\lambda V+(1-\lambda)P-(1-\eta)V\right]\\&+(1-\phi)\alpha\max\left\{(1-\tau_s)\left[\lambda V+(1-\lambda)P-(1-\eta)V\right],(1-\tau_l)\left[\Delta_H-(1-\eta)V\right]+b\right\}-\kappa_G-c,\end{aligned}$$

while his payoff from shirking is given by

$$\begin{aligned}&\phi\alpha(1-\tau_s)\left[\lambda V+(1-\lambda)P-(1-\eta)V\right]\\&+(1-\phi)\alpha\max\left\{(1-\tau_s)\left[\lambda V+(1-\lambda)P-(1-\eta)V\right],(1-\tau_l)\left[\Delta_M-(1-\eta)V\right]+b\right\}-\kappa_G,\end{aligned}$$

where κ_G is the blockholder's cost of implementing the project. Therefore, the blockholder exerts effort only if

$$\begin{aligned}&(1-\phi)\alpha\max\left\{(1-\tau_s)\left[\lambda V+(1-\lambda)P-(1-\eta)V\right],(1-\tau_l)\left[\Delta_H-(1-\eta)V\right]+b\right\}-c\\\geq\;&(1-\phi)\alpha\max\left\{(1-\tau_s)\left[\lambda V+(1-\lambda)P-(1-\eta)V\right],(1-\tau_l)\left[\Delta_M-(1-\eta)V\right]+b\right\},\end{aligned}$$

or, equivalently,

$$\begin{aligned}\frac{1}{1-\phi}\frac{c}{\alpha}\;\leq\;&\max\left\{(1-\tau_s)\left[\lambda V+(1-\lambda)P-(1-\eta)V\right],(1-\tau_l)\left[\Delta_H-(1-\eta)V\right]+b\right\}\\&-\max\left\{(1-\tau_s)\left[\lambda V+(1-\lambda)P-(1-\eta)V\right],(1-\tau_l)\left[\Delta_M-(1-\eta)V\right]+b\right\}\end{aligned}\qquad(27)$$

and the blockholder exerts effort if the inequality in (27) holds strictly.

Suppose that $c > \bar{c}$. Since the RHS of the inequality in (27) is weakly smaller than $(1-\tau_l)(\Delta_H - \Delta_M)$, (25) implies that (27) is never satisfied. As a result, the blockholder never exerts effort.

Suppose that $c < \bar{c}$. It is sufficient to prove the blockholder does not always shirk in equilibrium. Suppose he does. Then, $V^* \leq \Delta_M$ and $P^* \leq \Delta_M$. Therefore, $\lambda V^* + (1 -$

$\lambda)P^* \leq \Delta_M$ and $\Delta_M - (1-\eta)V^* \geq 0$. Hence, combining with $\tau_s \geq \tau_l$, (27) reduces to $\frac{1}{1-\phi}\frac{c}{\alpha} \leq (1-\tau_l)(\Delta_H - \Delta_M)$. However, this inequality holds strictly (because $c < \bar{c}$), yielding a contradiction with the blockholder always shirking in equilibrium.

Next, I prove part (ii). There are two steps: If $c < \bar{c}$ and $\tau_s \geq \bar{\tau}_s$, then (a) $\rho^* < 1$ cannot be an equilibrium, and (b) $\rho^* = 1$ is always an equilibrium (recall that ρ is the likelihood that the blockholder with a good project exerts effort). I start with (a). Suppose that $\rho^* < 1$ is an equilibrium. We already know from part (i) that $\rho^* > 0$. Hence, it must be that $\rho^* \in (0,1)$, that is, the blockholder is indifferent between exerting effort and not. This implies that in equilibrium, (27) must be holding with equality:

$$\begin{aligned} \frac{1}{1-\phi}\frac{c}{\alpha} &= \max\left\{(1-\tau_s)\left[\lambda V^* + (1-\lambda)P^* - (1-\eta)V^*\right], (1-\tau_l)\left[\Delta_H - (1-\eta)V^*\right] + b\right\} \\ &\quad - \max\left\{(1-\tau_s)\left[\lambda V^* + (1-\lambda)P^* - (1-\eta)V^*\right], (1-\tau_l)\left[\Delta_M - (1-\eta)V^*\right] + b\right\} \end{aligned} \tag{28}$$

Then, it must be that

$$(1-\tau_l)\left[\Delta_H - (1-\eta)V^*\right] + b > (1-\tau_s)\left[\lambda V^* + (1-\lambda)P^* - (1-\eta)V^*\right],$$

because otherwise the RHS of (28) equals 0, violating the equality (28) itself. Moreover, it also must be that

$$(1-\tau_s)\left[\lambda V^* + (1-\lambda)P^* - (1-\eta)V^*\right] > (1-\tau_l)\left[\Delta_M - (1-\eta)V^*\right] + b,$$

because otherwise (28) cannot be satisfied due to $c < \bar{c}$. Therefore, (28) reduces to

$$\frac{1}{1-\phi}\frac{c}{\alpha} = (1-\tau_l)\left[\Delta_H - (1-\eta)V^*\right] + b - (1-\tau_s)\left[\lambda V^* + (1-\lambda)P^* - (1-\eta)V^*\right], \tag{29}$$

or, equivalently,

$$\frac{1}{1-\phi}\frac{c}{\alpha} - b = (1-\tau_l)\Delta_H - (\tau_s - \tau_l)\left[(1-\eta)V^*\right] - (1-\tau_s)\left[\lambda V^* + (1-\lambda)P^*\right] \tag{30}$$

Note that the RHS in (30) is decreasing in P and V since $\tau_s \in [\tau_l, 1)$. Moreover, since $P^* < \Delta_H$ and $V^* < \Delta_H$ (because $\rho^* < 1$), (29) implies that

$$\frac{1}{1-\phi}\frac{c}{\alpha} - b > (1-\tau_l)\left[\Delta_H - (1-\eta)\Delta_H\right] - (1-\tau_s)\left[\lambda\Delta_H + (1-\lambda)\Delta_H - (1-\eta)\Delta_H\right],$$

or equivalently $\tau_s < \bar{\tau}_s$, yielding a contradiction.

Finally, I prove (b), that is, $\rho^* = 1$ is an equilibrium if $c < \bar{c}$ and $\tau_s \geq \bar{\tau}_s$. For this, it is sufficient to show that the blockholder weakly prefers exerting effort over shirking in this equilibrium. In turn, it is sufficient to show that (27) holds in this equilibrium. For this to hold, it must be

$$(1-\tau_l)\left[\Delta_H-(1-\eta)V^*\right]+b>(1-\tau_s)\left[\lambda V^*+(1-\lambda)P^*-(1-\eta)V^*\right],$$

because otherwise the RHS of the inequality in (27) equals 0, violating the equality (27) itself. Therefore, (27) reduces to

$$\begin{aligned}\frac{1}{1-\phi}\frac{c}{\alpha} \leq\ & (1-\tau_l)\left[\Delta_H-(1-\eta)V^*\right]+b \\ & -\max\left\{(1-\tau_s)\left[\lambda V^*+(1-\lambda)P^*-(1-\eta)V^*\right],(1-\tau_l)\left[\Delta_M-(1-\eta)V^*\right]+b\right\}\end{aligned} \tag{31}$$

There are two cases to consider. First, suppose that

$$(1-\tau_l)\left[\Delta_M-(1-\eta)V^*\right]+b\geq(1-\tau_s)\left[\lambda V^*+(1-\lambda)P^*-(1-\eta)V^*\right]. \tag{32}$$

Then, (31) reduces to $\frac{1}{1-\phi}\frac{c}{\alpha}\leq(1-\tau_l)(\Delta_H-\Delta_M)$, which holds due to $c<\bar{c}$. Second, suppose that (32) does not hold. Then, (31) reduces to

$$\frac{1}{1-\phi}\frac{c}{\alpha}-b\leq(1-\tau_l)\left[\Delta_H-(1-\eta)V^*\right]-(1-\tau_s)\left[\lambda V^*+(1-\lambda)P^*-(1-\eta)V^*\right]. \tag{33}$$

Note that the RHS in (33) is decreasing in P and V, since $\tau_s\in[\tau_l,1)$. Moreover, $P^*\leq\Delta_H$ and $V^*\leq\Delta_H$. Therefore, it is sufficient to show that (33) holds for $P^*=\Delta_H$ and $V^*=\Delta_H$, that is,

$$\frac{1}{1-\phi}\frac{c}{\alpha}-b\leq(1-\tau_l)\left[\Delta_H-(1-\eta)\Delta_H\right]-(1-\tau_s)\left[\lambda\Delta_H+(1-\lambda)\Delta_H-(1-\eta)\Delta_H\right],$$

which is equivalent to $\tau_s\geq\bar{\tau}_s$ and therefore holds by assumption. ■

Proof of Lemma 6. First, I prove part (i). To that end, note that for any V^* and P^*, if the blockholder with a good project exerts effort, then it must be that he weakly prefers exerting effort, that is (27) holds as explained in the proof of Lemma 5. Then, it must be that

$$(1-\tau_l)\left[\Delta_H-(1-\eta)V^*\right]+b>(1-\tau_s)\left[\lambda V^*+(1-\lambda)P^*-(1-\eta)V^*\right], \tag{34}$$

because otherwise the RHS of (27) is not positive, violating the equality (27) itself. In turn, (34) implies that for the blockholder that has implemented the project and exerted effort, his payoff from keeping his stake is strictly larger than his payoff from exiting.

Second, I prove part (ii). To prove by contradiction, suppose that with positive probability, the blockholder with a good project implements the project, shirks, and keeps his stake. Then, his payoff from keeping his stake must be weakly larger than exiting, that is:

$$(1-\tau_l)\left[\Delta_M-(1-\eta)V^*\right]+b\geq(1-\tau_s)\left[\lambda V^*+(1-\lambda)P^*-(1-\eta)V^*\right]. \tag{35}$$

However, $c < \bar{c}$ implies that

$$(1-\phi)\,\alpha\left\{(1-\tau_l)\left[\Delta_H-(1-\eta)V^*\right]+b\right\}-c>(1-\phi)\,\alpha\left\{(1-\tau_l)\left[\Delta_M-(1-\eta)V^*\right]+b\right\},$$

and combining this with (35) yields

$$\begin{aligned} & \phi\alpha(1-\tau_s)\left[\lambda V^*+(1-\lambda)P^*-(1-\eta)V^*\right] \\ & +(1-\phi)\,\alpha\left\{(1-\tau_l)\left[\Delta_H-(1-\eta)V^*\right]+b\right\}-c \\ > \; & \phi\alpha(1-\tau_s)\left[\lambda V^*+(1-\lambda)P^*-(1-\eta)V^*\right] \\ & +(1-\phi)\,\alpha\left\{(1-\tau_l)\left[\Delta_M-(1-\eta)V^*\right]+b\right\}, \end{aligned} \tag{36}$$

Note that due to (35), the whole expression after the inequality sign in (36) represents the maximum payoff of the blockholder if he shirks. Therefore, conditional on implementing the project, the blockholder's payoff from exerting effort and keeping his stake (unless hit by a liquidity shock) is strictly larger than his payoff from shirking (regardless of whether he keeps his stake or not after shirking). This yields a contradiction with the starting assumption that the blockholder with a good project implements the project and shirks with positive probability.

Finally, I prove part (iii). To see this part, suppose that $q = 0$ and $\rho^* = 1$. Then, $V^* = P^* = \Delta_H$. Therefore, conditional on implementing the project, the blockholder's profit from shirking and exiting is

$$\alpha(1-\tau_s)\left[\lambda V^*+(1-\lambda)P^*-(1-\eta)V^*\right]=\alpha(1-\tau_s)\eta\Delta_H, \tag{37}$$

while his profit from exerting effort is given by (recall that due to part (ii), he must be keeping his stake unless hit by a liquidity shock)

$$\begin{aligned} & \phi\alpha(1-\tau_s)\left[\lambda V^*+(1-\lambda)P^*-(1-\eta)V^*\right] \\ & +(1-\phi)\alpha\left\{(1-\tau_l)\left[\Delta_H-(1-\eta)V^*\right]+b\right\}-c \\ = \; & \alpha\left[\phi(1-\tau_s)+(1-\phi)(1-\tau_l)\right]\eta\Delta_H-c+(1-\phi)\alpha b \end{aligned} \tag{38}$$

Between these two payoffs (37) and (38), $\tau_s < \bar{\tau}_s$ implies that the former is strictly larger. Therefore, the blockholder with a good project strictly prefers shirking over exerting effort, yielding a contradiction with $\rho^* = 1$. This concludes the proof. ■

Proof of Proposition 3. Note that a blockholder implements his project only if he has acquired a stake in the target, because otherwise his payoff is weakly smaller than $-\kappa_i$, where κ_i is the blockholder's cost of implementing the project for project $i \in \{G, B\}$ (that is, $\kappa_G = \kappa$ and $\kappa_B = \kappa + \Delta\kappa$). Throughout the proof, I assume that all of the blockholders who purchase a stake and make a disclosure always implement their project, which is a result that I confirm in Lemma 8 in Online Appendix D.1. Therefore, a blockholder implements his project if and only if he buys a stake in the target and makes a disclosure. I also assume that if a blockholder with a bad project purchases a stake in a target and implements his project, then he always exits, which is also a result that I confirm in Lemma 8 in Online Appendix D.1. Therefore, combining with Lemma 6, the average firm value conditional on the exit by the blockholder following project implementation is given by $Q_0 + P^*$, where $P^*(\rho; q)$ is given by (3), and the average firm value conditional on stake disclosure by the blockholder is given by $Q_0 + V^*$, where $V^*(\rho; q)$ is given by (9). Note that whenever the notation $V^*(q)$ ($P^*(q)$) is used, it represents $V^*(\rho^*; q)$ ($P^*(\rho^*; q)$).

Mapping of the proof. The proof consists of several steps. Among these, steps 6, 8, and 10 prove that for any $q \in [0,1)$, an equilibrium ρ^* always exists and it is unique, steps 8 and 10 prove that ρ^* is continuous in q for all $q \in [0,1)$, step 5 proves that $\underline{q} \in (0,1)$, steps 8 and 10 prove part (i), steps 12 and 13 prove part (ii), step 11 proves that $\underline{q}$ strictly increases with c, step 14 proves that $\underline{q}$ strictly increases with Δ_L, and step 15 proves that $V^*(\underline{q})$ strictly increases as Δ_L decreases. The rest of the steps are intermediary steps. The steps are as follows.

Step 1: Note that any equilibrium with $\rho^* \in (0,1)$ has to satisfy

$$(1-\tau_s)\left[\lambda V^* + (1-\lambda)P^* - (1-\eta)V^*\right] = (1-\tau_l)\left[\Delta_H - (1-\eta)V^*\right] - \frac{1}{1-\phi}\frac{c}{\alpha} + b, \tag{39}$$

which is equivalent to

$$(1-\tau_s)\lambda V^* + (\tau_s - \tau_l)(1-\eta)V^* + (1-\tau_s)(1-\lambda)P^* = (1-\tau_l)\Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha} + b. \tag{40}$$

Note that this directly follows from Lemma 6, as this lemma implies that for a blockholder with a good project, in any equilibrium his payoff from shirking is given by

$$\alpha(1-\tau_s)\left[\lambda V^* + (1-\lambda)P^* - (1-\eta)V^*\right] - \kappa_G, \tag{41}$$

because he always exits, while his payoff from exerting effort is given by

$$\begin{aligned}&\phi\alpha(1-\tau_s)\left[\lambda V^* + (1-\lambda)P^* - (1-\eta)V^*\right] \\ &+(1-\phi)\alpha\left\{(1-\tau_l)\left[\Delta_H - (1-\eta)V^*\right] + b\right\} - \kappa_G - c,\end{aligned} \tag{42}$$

because he does not exit unless hit by a liquidity shock. Since $\rho^* \in (0,1)$ implies that (41) is equal to (42), this yields (39).

Step 2: I show that for any given $q \in [0,1)$, if there exists any $\rho' \in [0,1]$ that satisfies (39), then $\rho^* = \rho'$ is the unique equilibrium for q, and it must be that $P^*(\rho'; q) > \Delta_M$ (recall that both $V^*(\rho; q)$ and $P^*(\rho; q)$ are functions of ρ). To see this, note that (39) is equivalent to (40) by step 1. Then, it must be that $P^*(\rho'; q) > \Delta_M$, because if $P^*(\rho'; q) \leq \Delta_M$ then $c < \hat{c}$ implies that (40) is violated, because then $V^* \leq \Delta_H$ and hence

$$\begin{aligned} & (1-\tau_s)\,\lambda V^* + (\tau_s - \tau_l)(1-\eta)V^* + (1-\tau_s)\,(1-\lambda)P^* \\ \leq\; & (1-\tau_s)\,\lambda \Delta_H + (\tau_s - \tau_l)(1-\eta)\Delta_H + (1-\tau_s)\,(1-\lambda)\Delta_M \\ <\; & (1-\tau_l)\Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha} + b, \end{aligned}$$

where the last inequality follows from $c < \hat{c}$, where $\hat{c}$ is given in (12). This establishes that $P^*(\rho'; q) > \Delta_M$. In turn, since $P^*(\rho; q)$ is strictly increasing in ρ if $P^*(\rho; q) > \Delta_M$ (by the proof of Proposition 1), it must be that $P^*(\rho; q) > P^*(\rho'; q)$ for any $\rho > \rho'$ and $P^*(\rho; q) < P^*(\rho'; q)$ for any $\rho < \rho'$. Moreover, $V^*(\rho; q)$ is strictly increasing in ρ. Therefore, it follows that for any $\rho > \rho'$, the LHS of (39) is strictly larger than the RHS (as can be seen more clearly from (40)), and hence (41) and (42) imply that a blockholder with a good project strictly prefers to shirk, yielding a contradiction with $\rho > \rho' \geq 0$. Similarly, for any $\rho < \rho'$, the LHS of (39) is strictly smaller than the RHS, and hence (41) and (42) imply that a blockholder with a good project strictly prefers to exert effort, yielding a contradiction with $\rho < \rho' \leq 1$. In contrast, $\rho = \rho'$ is indeed an equilibrium because (39) is satisfied for $\rho = \rho'$, and (39) implies that a blockholder with a good project is indifferent between shirking and exerting effort.

Step 3: I show that if $q = 0$, then it must be that $\rho^* \in (0, 1)$. To see this, suppose $\rho^* = 1$. Then, $V^* = P^* = \Delta_H$ and hence

$$\begin{aligned} & (1-\tau_s)\,\lambda V^* + (\tau_s - \tau_l)(1-\eta)V^* + (1-\tau_s)\,(1-\lambda)P^* \\ =\; & (1-\tau_s)\,\lambda \Delta_H + (\tau_s - \tau_l)(1-\eta)\Delta_H + (1-\tau_s)\,(1-\lambda)\Delta_H \\ >\; & (1-\tau_l)\Delta_H - \frac{1}{1-\phi}\frac{c}{\alpha} + b, \end{aligned} \tag{43}$$

where the last inequality follows from $\tau_s < \bar{\tau}_s$ (where $\bar{\tau}_s$ is given by (26)). Therefore, (41) and (42) imply that a blockholder with a good project strictly prefers to shirk, yielding a contradiction with $\rho^* = 1$. Next, supppose that $\rho^* = 0$. Then, $V^* = P^* = \Delta_M$. However, then (41) and (42) imply that the blockholder with a good project strictly prefers to exert effort (yielding a contradiction with $\rho^* = 0$), because

$$(1-\tau_s)\left[\lambda V^* + (1-\lambda)\,P^* - (1-\eta)V^*\right] < (1-\tau_l)\left[\Delta_H - (1-\eta)V^*\right] - \frac{1}{1-\phi}\frac{c}{\alpha} + b,$$

which is satisfied because

$$\begin{aligned} \frac{1}{1-\phi}\frac{c}{\alpha} - b \;<\; & (1-\tau_l)\Delta_H - (1-\tau_s)\,\lambda\Delta_M - (\tau_s-\tau_l)(1-\eta)\Delta_M - (1-\tau_s)\,(1-\lambda)\Delta_M \quad (44) \\ \Leftrightarrow\; & \frac{1}{1-\phi}\frac{c}{\alpha} - b < (\tau_s - \tau_l)\eta\Delta_M + (1-\tau_l)\,(\Delta_H - \Delta_M) \end{aligned}$$

which holds due to $c < \bar{c}$ (where $\bar{c}$ is given by (25)).

Step 4: I show that if $V^*(\rho;q) \leq 0$ then the LHS of (40) is strictly smaller than the RHS. This is because the RHS is positive due to $c < \bar{c}$ (where $\bar{c}$ is given by (25)), and the LHS is not positive because $V^*(\rho;q) \leq 0$ implies that $P^*(\rho;q) \leq 0$, which in turn satisfied because (3) and (9) imply that

$$P^*(\rho;q) = \Delta_H - \frac{\Delta_H - V^*(\rho;q)}{1-(1-q)\rho(1-\phi)} \tag{45}$$

for any ρ and q.

Step 5: Letting $\underline{q}$ be the value of q such that (40) holds for $\rho = 1$, I show that $\underline{q}$ is unique and $\underline{q} \in (0,1)$. Note that $\underline{q}$ is unique because (a) $P^*(1;q)$ is strictly decreasing in q (as shown in the proof of Lemma 7), and (b) $V^*(1;q)$ is strictly decreasing in q due to (9). Moreover, $\underline{q} \in (0,1)$ because (a) $P^*(1;q)$ and $V^*(1;q)$ are continuous in q, (b) if $q = 0$ and $\rho = 1$, then (43) implies that the LHS of (40) is strictly larger than the RHS, and (c) if $\rho = 1$ and $q \uparrow 1$, then $P^*(1;q)$ and $V^*(1;q)$ become negative, implying that the LHS of (40) becomes strictly smaller than the RHS, because the LHS becomes negative and the RHS is positive due to $c < \bar{c}$ (where $\bar{c}$ is given by (25)).

Step 6: Note that due to step 2 above, step 5 implies that for $q = \underline{q}$, $\rho^* = 1$ is the unique equilibrium and satisfies (40), and $P^*(1;\underline{q}) > \Delta_M$.

Step 7: I show that for any $q < \underline{q}$, there exists $\rho' \in (0,1)$ such that (40) holds for $\rho = \rho'$. To see this, note that for any $q < \underline{q}$, if $\rho = 1$ then the LHS in (40) is strictly larger than the RHS, because as implied by step 5, (a) (40) holds with equality if $q = \underline{q}$ and $\rho = 1$, and (b) holding $\rho = 1$ constant, $P^*(1;q)$ and $V^*(1;q)$ strictly decrease in q for all $q \leq \underline{q}$. On the other hand, for any $q < \underline{q}$, if $\rho = 0$ then $V \leq \Delta_M$ and $P^* \leq \Delta_M$, which in turn imply that the LHS in (40) is strictly smaller than the RHS due to (44). Therefore, due to continuity of the LHS (40) w.r.t. ρ, there has to be some $\rho' \in (0,1)$ such that this equation holds.

Step 8: Due to step 2, step 7 implies that for any $q < \underline{q}$, the equilibrium is unique, it satisfies $\rho^* \in (0,1)$ and (40), and it must be $P^* > \Delta_M$ in this equilibrium. Moreover, ρ^* is strictly increasing and continuous for all $q < \underline{q}$ (including when q is approaching $\underline{q}$ from below). To see this latter argument, note that as q decreases and ρ is fixed, (a) $V^*(\rho;q)$ strictly increases (as implied by (9)), (b) $P^*(\rho;q)$ strictly increases (as shown in the proof of Lemma 7), and (c) $V^*(\rho;q)$ and $P^*(\rho;q)$ are continuous. Similarly, as ρ increases and q is fixed, (a) $V^*(\rho;q)$ strictly increases (as again implied by (9)), (b) $P^*(\rho;q)$ strictly increases (as shown in the proof of Proposition 1, because $P^* > \Delta_M$), and (c) $V^*(\rho;q)$ and $P^*(\rho;q)$ are continuous. Since (40) must be satisfied in equilibrium for all $q \leq \underline{q}$ (note that this is implied for $q = \underline{q}$ due to step 6), it indeed follows that ρ^* is strictly increasing and continuous for all $q < \underline{q}$ (including when q is approaching $\underline{q}$ from below).

Step 9: Note that $P^*(q)$ and $V^*(q)$ are continuous in q for all $q \in [0,1)$ (because, by definition, $P^*(q) = P^*(\rho^*(q);q)$ and $V^*(q) = V^*(\rho^*(q);q)$). In particular, for $q \leq \underline{q}$, the continuity is implied by step 8, and for $q > \underline{q}$, it follows trivially since $\rho^* = 1$, which is shown in the next step below.

Step 10: I show that for all $q \geq \underline{q}$, the equilibrium is unique and given by $\rho^* = 1$. For $q = \underline{q}$, this result follows directly from step 6 above. Therefore, it remains to show this result for any $q > \underline{q}$. To that end, note that for any $q > \underline{q}$ and $\rho \in [0,1]$, the LHS in (40) is strictly smaller than the RHS, because (a) (40) holds for $q = \underline{q}$ and $\rho = 1$ by step 5, (b) $P^*(1; \underline{q}) > \Delta_M$ by step 6, (c) $P^*(\rho; q)$ strictly increases in ρ if $P^*(\rho; q) > \Delta_M$ (as shown in the proof of Proposition 1), and it also strictly decreases in q (as shown in the proof of Lemma 7), and (d) $V^*(\rho; q)$ strictly decreases in q and strictly increases in ρ. In turn, since the LHS in (40) is strictly smaller than the RHS, (41) and (42) imply that a blockholder with a good project strictly prefers to exert effort, establishing the unique equilibrium as $\rho^* = 1$.

Step 11: I show that $\underline{q}$ strictly increases with c. To see this, compare any two possible values of c, denoted by c_1 and c_2, where $c_2 > c_1$. Recall that if $q = \underline{q}$, then (40) holds for $\rho = 1$ by step 5, and in equilibrium $\rho^* = 1$ by step 6. However, holding $\rho = 1$ and $q = \underline{q}(c_1)$ constant, if c increases from c_1 to c_2, the LHS of (40) becomes strictly larger than the RHS. Moreover, given $c = c_2$ and $\rho = 1$, the LHS of (40) is strictly larger than the RHS for any $q < \underline{q}(c_1)$ as well. This is because $P^*(1; q)$ and $V^*(1; q)$ strictly decrease w.r.t. q for all $q < \underline{q}(c_1)$. Since (40) has to be satisfied for $q = \underline{q}$, this implies that $\underline{q}(c_2) > \underline{q}(c_1)$.

Step 12: I show that $V^*(q)$ is strictly increasing in q if $q < \underline{q}$. To see this, consider any q_1 and q_2 such that $0 \leq q_1 < q_2 < \underline{q}$. Suppose that $V^*(q_2) \leq V^*(q_1)$. However, then $P^*(q_2) < P^*(q_1)$, which follows from combining Lemma 7 with $P^*(q_1) > \Delta_M$ and $P^*(q_2) > \Delta_M$, where the latter inequalities are in turn implied by step 8. Therefore, at the equilibrium $\rho^*(q)$, the LHS of (40) evaluated at $q = q_2$ is strictly smaller than the LHS of (40) evaluated at $q = q_1$, yielding a contradiction with the fact that at the equilibrium $\rho^*(q)$, (40) is satisfied for both $q = q_1$ and $q = q_2$ (by step 8).

Step 13: I show that $V^*(q)$ attains its unique maximum at $q = \underline{q}$, and it is strictly decreasing in q if $q \geq \underline{q}$. Because of step 12, as well as because $V^*(q)$ is continuous for all q (by step 9), it is sufficient to show that if $q \geq \underline{q}$, then $V^*(q)$ is strictly decreasing in q. In turn, this holds because $\rho^* = 1$ for all $q \geq \underline{q}$ (by step 10) and $V^*(\rho; q)$ is given by (9).

Step 14: I show that $\underline{q}$ strictly increases with Δ_L. To prove by contradiction, consider any two values Δ_L' and Δ_L'' that Δ_L can take, and suppose that $\Delta_L'' < \Delta_L'$ and $\underline{q}(\Delta_L'') \geq \underline{q}(\Delta_L')$. Note that step 6 implies that for $q = \underline{q}$, $\rho^* = 1$ is the unique equilibrium and satisfies (40). However, the LHS of (40) evaluated at equilibrium (i.e., at $\rho^* = 1$) for $\Delta_L = \Delta_L''$ and $q = \underline{q}(\Delta_L'')$ is strictly smaller than the LHS of (40) evaluated at equilibrium (i.e., at $\rho^* = 1$) for $\Delta_L = \Delta_L'$ and $q = \underline{q}(\Delta_L')$ (because $V^*(\rho; q)$ and $P^*(\rho; q)$ strictly decrease in q and strictly increase in Δ_L), which yields a contradiction with the fact that (40) is satisfied in equilibrium for both $(q, \Delta_L) = (\underline{q}(\Delta_L'), \Delta_L')$ and $(q, \Delta_L) = (\underline{q}(\Delta_L''), \Delta_L'')$ (again, by step 6).

Step 15: I show that $V^*(\underline{q})$ strictly increases as Δ_L decreases. To see this, again consider any two values Δ_L' and Δ_L'' that Δ_L can take such that $\Delta_L'' < \Delta_L'$. To prove by contradiction, suppose that $V^*(\underline{q}(\Delta_L')|\Delta_L = \Delta_L') \geq V^*(\underline{q}(\Delta_L'')|\Delta_L = \Delta_L'')$. Then, since (40) is satisfied at equilibrium (i.e., for $\rho^* = 1$) for both $(q, \Delta_L) = (\underline{q}(\Delta_L'), \Delta_L')$ and $(q, \Delta_L) = (\underline{q}(\Delta_L''), \Delta_L'')$, it follows that $P^*(q(\Delta_L')|\Delta_L = \Delta_L') \leq P^*(\underline{q}(\Delta_L'')|\Delta_L = \Delta_L'') < \Delta_H$ (where the last inequality follows from $\underline{q} > 0$, which was shown in step 5). However, then it must be that $V^*(q(\Delta_L')|\Delta_L =$

$\Delta'_L) < V^*(\underline{q}(\Delta''_L)|\Delta_L = \Delta''_L)$, because: (a) (9) and (3) imply that for all $q \in [0,1]$,

$$V^*(\rho; q) = \Delta_H - (\Delta_H - P^*(\rho; q))\left[1 - (1-q)\rho(1-\phi)\right],$$

(b) $\underline{q}(\Delta''_L) < \underline{q}(\Delta'_L)$ by step 14, and (c) $\rho^*(\underline{q}(\Delta_L)|\Delta_L) = 1$ for any Δ_L due to step 6. ■

B.1.1 Supplemental results for Section B.1

This section provides the supplemental results that are utilized by some of the proofs in Section B.1.

Lemma 7 *Let $q_1, q_2 \in [0,1)$ such that $q_2 > q_1$. Suppose that if a blockholder with a bad project implements his project, then he always exits. Also suppose that for both $q = q_1$ and $q = q_2$, $P^*(q) \geq \Delta_M$ in equilibrium. Then, $P^*(q_2) \geq P^*(q_1)$ implies that $V^*(q_2) > V^*(q_1)$.*

Proof of Lemma 7. Recall that $V^*(\rho; q)$ is given by (9). Moreover, Lemma 6 and the assumption that if a blockholder with a bad project always exits after implementing his project imply that in any equilibrium, $P^*(\rho; q)$ is given by (3). Throughout the proof, I denote the equilibrium variables by (ρ_1, V_1, P_1) and (ρ_2, V_2, P_2) for $q = q_1$ and $q = q_2$ respectively.

First, I show that for a given ρ, $P^*(\rho; q)$ is strictly decreasing in q for any $q \in [0,1)$. Indeed, plugging in (3) for P^* yields

$$\begin{aligned} 0 \;&>\; \frac{\partial P^*}{\partial q} \Leftrightarrow 0 > \frac{-\rho\phi\Delta_H - (1-\rho)\,\Delta_M + \Delta_L}{1 - (1-q)\,\rho\,(1-\phi)} - \frac{(1-q)\,\rho\phi\Delta_H + (1-q)\,(1-\rho)\,\Delta_M + q\Delta_L}{\left[1-(1-q)\,\rho\,(1-\phi)\right]^2}\rho\,(1-\phi) \\ &\Leftrightarrow\; \rho\phi(\Delta_H - \Delta_L) + (1-\rho)\,(\Delta_M - \Delta_L) > 0, \end{aligned}$$

which always holds.

Second, note that $P_2 \geq P_1 \geq \Delta_M$ implies that $\rho_2 > \rho_1$. This is because as shown in the proof of Proposition 1, if $P(\rho; q) \geq \Delta_M$ for any given q, then $P(\rho; q)$ is strictly increasing in ρ. Combining this with the first step above yields the desired result.

Third, I show that $P_2 \geq P_1 \geq \Delta_M$ implies that $V_2 > V_1$. The proof consists of two substeps. First, I show that for $P_2 \geq P_1 \geq \Delta_M$ to hold, it must be that $(1-q_2)\rho_2 > (1-q_1)\rho_1$. Suppose that $(1-q_2)\rho_2 \leq (1-q_1)\rho_1$. However, then

$$(1-q_2)\rho_2\phi\Delta_H \leq (1-q_1)\rho_1\phi\Delta_H. \tag{46}$$

Moreover, $\rho_2 > \rho_1$ and $q_2 > q_1$ also imply that

$$(1-q_2)(1-\rho_2)\Delta_M \;\leq\; (1-q_1)(1-\rho_1)\Delta_M, \tag{47}$$

$$q_2\Delta_L \;<\; q_1\Delta_L \tag{48}$$

However, since P^* is given by (3), combining $(1-q_2)\rho_2 \leq (1-q_1)\rho_1$ and (46)-(48) with $P_2 \geq \Delta_M \geq 0$ and $P_1 \geq \Delta_M \geq 0$ yields $P_2 < P_1$, yielding a contradiction.

Second, I complete the proof by showing that it must be $V_2 > V_1$. Indeed, note that (3) and (9) imply that in equilibrium, P^* can also be expressed as

$$P^* = \Delta_H - \frac{\Delta_H - V^*}{1-(1-q)\rho^*(1-\phi)} \tag{49}$$

Also note that $V_1 < \Delta_H$ and $V_2 < \Delta_H$ since $\rho_1 < 1$ (because $\rho_1 < \rho_2 \leq 1$) and $q_2 > 0$. Combining this with $(1-q_2)\rho_2 > (1-q_1)\rho_1$, $P_2 \geq P_1$, and (49) implies that $V_2 > V_1$, concluding the proof. ■

C Online Appendix: Proofs for Policy Implications Under Exogenous q (Section 3.3.1)

Proof of Proposition 4. Note that it is sufficient to show the comparative statics stated for ρ^*, since those stated for V^* follow immediately due to (9).

First, I prove the proposition for $q < \underline{q}$. Note that by part (i) of Proposition 3, $\rho^* \in (0,1)$. In turn, step 1 in the proof of Proposition 3 implies that (39), which is equivalent to (40), must be both satisfied in equilibrium. Note that holding ρ^* and q constant, the LHS in (39) becomes strictly smaller than the RHS as τ_s and b increases or as τ_l and λ decreases (because $\lambda V^* + (1-\lambda) P^* - (1-\eta)V^* > 0$, $V^* < \Delta_H$ (due to $\rho^* < 1$), and also $P^* < V^*$ because

$$P^*(\rho^*;q) = \Delta_H - \frac{\Delta_H - V^*(\rho^*;q)}{1-(1-q)\rho^*(1-\phi)} \tag{50}$$

due to (3) and (9)). In turn, this implies that holding ρ^* and q constant, the LHS in (40) becomes strictly smaller than the RHS as τ_s and b increases, or as τ_l and λ decreases. As a result, ρ^* has to strictly increase so that (40) is established again, because (a) $V^*(\rho;q)$ strictly increases in ρ, and moreover, (b) $P^*(\rho^*;q) > \Delta_M$ due to step 8 in the proof of Proposition 3 and $P^*(\rho;q)$ is strictly increasing in ρ if $P^*(\rho;q) > \Delta_M$ (by the proof of Proposition 1).

Second, I prove the proposition for $q > \underline{q}$. Note that by part (i) of Proposition 3, $\rho^* = 1$. Moreover, note that by step 10 in the proof of Proposition 3, for any $q > \underline{q}$ and $\rho \in [0,1]$, the LHS in (40) is strictly smaller than the RHS. Therefore, in turn (41) and (42) imply that a blockholder with a good project strictly prefers to exert effort, implying that the equilibrium remains to be unique and satisfy $\rho^* = 1$.

Finally, I prove the proposition for $q = \underline{q}$. Note that again by part (i) of Proposition 3, $\rho^* = 1$. Moreover, step 6 in the proof of Proposition 3 implies that (40), which is equivalent to (39), are both satisfied in equilibrium. Note that holding $\rho^* = 1$ and q constant, the LHS in (39) becomes strictly smaller than the RHS as τ_s and b increases or as τ_l and λ decreases (because again, $\lambda V^* + (1-\lambda) P^* - (1-\eta)V^* > 0$, $V^* < \Delta_H$ (because $q = \underline{q}$, where $\underline{q} > 0$ due to Proposition 3), and $P^* < V^*$ due to (50)). There are two cases to consider:

(I) Suppose that τ_s and b increases or τ_l and λ decreases. Then, the LHS in (39) becomes strictly smaller than the RHS for all $\rho \in [0,1]$ (again, holding q constant), because (39) is equivalent to (40), and (a) $V^*(\rho; q)$ strictly increases in ρ, and moreover, (b) $P^*(1; \underline{q}) > \Delta_M$ due to step 6 in the proof of Proposition 3 and $P^*(\rho; q)$ is strictly increasing in ρ if $P^*(\rho; q) > \Delta_M$. Since the LHS in (40) becomes strictly smaller than the RHS for all $\rho \in [0,1]$, in turn (41) and (42) imply that a blockholder with a good project strictly prefers to exert effort, implying that the equilibrium remains to be unique and satisfy $\rho^* = 1$.

(II) Suppose that τ_s and b decreases or τ_l and λ increases. Then, holding $\rho^* = 1$ and q constant, the LHS in (40) becomes strictly larger than the RHS. However, since the LHS in (40) is never larger than the RHS in equilibrium (as implied by steps 6, 8, and 10 in the proof of Proposition 3), this implies that ρ^* must change in response. In particular, since $\rho^* = 1$, the only direction it can change is to decrease. ■

D Online Appendix: Proofs for Policy Implications Under Endogenous q (Section 3.3.2)

Proof of Lemma 4. Note that whenever there exists an equilibrium where a positive measure of blockholders implement their project, I select that equilibrium. Moreover, in any such equilibrium, (a) a blockholder never implements his project if he hasn't acquired a stake (because otherwise he incurs the cost of implementing the project but gets nothing), (b) if a blockholder has acquired a stake and made a disclosure, then he always implements his project (by part (vi) of Lemma 8), and (c) the average firm value conditional on stake disclosure by the blockholder is given by $Q_0 + V^*$, where $V^*(\rho; q)$ is given by (9), and the average firm value conditional on the exit by the blockholder following project implementation is given by $Q_0 + P^*$, where $P^*(\rho; q)$ is given by (3). The latter is due to combining Lemma 6 with part (ii) of Lemma 8.

Also note that if any blockholder with a bad project enters in equilibrium, then the blockholders with good projects strictly prefer to enter. This is because the entry cost of is $\kappa + \Delta\kappa$ for the blockholders with bad projects, while it is κ for the blockholders with good projects. On the other hand, after entering, the payoff of a blockholder with a good project is weakly larger than that of a blockholder with a bad project.

Therefore, to prove parts (i) and (ii), it is sufficient to show that if no blockholder with bad project enters, then no blockholder with good projects enters if $\kappa > \bar{\kappa}$, and all of them enter if $\kappa < \bar{\kappa}$, where

$$\bar{\kappa} \equiv -\alpha(1-\phi)b + \alpha(1-\tau_s)[\lambda V^*(0) + (1-\lambda) P^*(0) - (1-\eta)V^*(0)], \quad (51)$$

where $V^*(0)$ and $P^*(0)$ are $V^*(q)$ and $P^*(q)$ evaluated at $q = 0$, respectively. To that end, note that Proposition 3 implies that $\rho^* \in (0, 1)$, because $q = 0$. This implies that the blockholder with a good project is indifferent between exerting effort and shirking if he enters. Since Lemma 6 implies that a blockholder with a good project always exits if he shirks, it follows that this blockholder's payoff in equilibrium is given by

$$\alpha(1 - \tau_s)[\lambda V^*(0) + (1 - \lambda) P^*(0) - (1 - \eta)V^*(0)] - \kappa. \tag{52}$$

when $q = 0$. On the other hand, if the blockholder buys a stake and does not implement his project, then his payoff is $\alpha(1 - \phi)b$. This is because part (vi) of Lemma 8 implies that he does not disclose his stake, hence he pays αQ_0 for his stake. Since he does not implement the project, he keeps his stake (unless hit by a liquidity shock) and gets a value of $\alpha (Q_0 + b)$ out of his stake (note that if he exits, he gets a value of αQ_0 instead, so he strictly prefer to keep his stake). Comparing the payoff of $\alpha(1 - \phi)b$ with the payoff of (52), no blockholder with good project enters if $\kappa > \bar{\kappa}$, and all of them enter if $\kappa < \bar{\kappa}$.
Finally, as the last step, I show that there exists $\bar{b} > 0$ such that $0 < \bar{\kappa}$ if $b < \bar{b}$ and $\eta > 1 - \max\{\lambda, \Delta_M/\Delta_H\}$. Since $\bar{\kappa}$ is linear in b, it is sufficient to show this result for $b = 0$: First, I show that if $\lambda > 1 - \eta$, then $\bar{\kappa} > 0$. Note that this follows directly from (51), because $\rho^*(0) > 0$ (due to Proposition 3), which also implies $V^*(0) > \Delta_M \geq 0$ and $P^*(0) > \Delta_M \geq 0$. Second, I show that if $\eta > 1 - \frac{\Delta_M}{\Delta_H}$, then $\bar{\kappa} > 0$. Indeed, this holds because $\eta > 1 - \frac{\Delta_M}{\Delta_H}$ implies that $\Delta_M - (1 - \eta)\Delta_H > 0$, which in turn implies that (51) is positive, because $P^*(0) \geq \Delta_M \geq 0$ and $V^*(0) \in [\Delta_M, \Delta_H]$, concluding the proof. ■

Proof of Proposition 5. Note that $\kappa < \bar{\kappa}$ by assumption, and therefore all of the $\bar{\mu}_G$ blockholders with good projects enter due to Lemma 4. Also note that $\Delta_L < 0$, and $\pi^*_{exit}(q)$ is continuous in q for all q, because ρ^* is continuous w.r.t. q by Proposition 3. Here, $\pi^*_{exit}(q)$ denotes the gross profit (that is, the payoff excluding the project implementation cost κ) of the blockholder with a bad project from entering, because by Lemma 8, he always exits after implementing the project.

First, I prove that $\pi^*_{exit}(q)$ is strictly decreasing with q if $\pi^*_{exit}(q) \geq 0$. In fact, I show a stronger result: I show that $\pi^*_{exit}(q)$ is strictly decreasing with q if $\pi^*_{exit}(q) > -\varepsilon_\pi$, where

$$\varepsilon_\pi \equiv \alpha(1 - \tau_s)\eta\,(-\Delta_L) > 0.$$

I show this result in three substeps: (a) First, I show that $\pi^*_{exit}(q)$ is strictly decreasing with q if $q < \underline{q}$. Note that by steps 6 and 8 in the proof of Proposition 3, (40) is always satisfied in equilibrium. Since (40) is equivalent to (39) as explained in step 1 of the same proof, it is sufficient to show that $V^*(q)$ strictly increases in q. To prove by contradiction, suppose that there exist q' and q'' such that $0 \leq q' < q'' \leq \underline{q}$ and $V^*(q'') \leq V^*(q')$. Since $P^*(q') > \Delta_M$ and $P^*(q'') > \Delta_M$ (due to steps 6 and 8 of Proposition 3), Lemma 7 implies that $P^*(q'') < P^*(q')$. However, then the LHS of (40) evaluated at $q = q''$ is strictly smaller than the LHS of (40) evaluated at $q = q'$, yielding a contradiction with the fact that at the equilibrium $\rho^*(q)$, (40) is satisfied for both $q = q'$ and $q = q''$.

(b) Second, note that due to the same arguments made in substep (a) above, $\pi^*_{exit}(q)$ is strictly decreasing in q as q converges $\underline{q}$ from below.

(c) Third, I show that $\pi^*_{exit}(q)$ is strictly decreasing in q if $q \geq \underline{q}$ and $\pi^*_{exit}(q) > -\varepsilon_\pi$. Note that $\rho^* = 1$ by Proposition 3. Therefore, both V^* and P^* strictly decrease with q (note that the latter was shown in the proof of Lemma 7). Also note that letting $\tilde{\eta} \equiv 1 - \frac{\eta}{1-\lambda}$,

$$\begin{aligned} \pi^*_{exit}(q) &= \alpha(1-\tau_s)\left[\lambda V^* + (1-\lambda)P^* - (1-\eta)V^*\right] \\ &= \alpha(1-\tau_s)(1-\lambda)\left[P^* - \tilde{\eta}V^*\right] \end{aligned} \tag{53}$$

There are two cases to consider: (I) Suppose $\tilde{\eta} \leq 0$. Note that as q increases, P^* and V^* strictly decrease. Therefore, (53) strictly decreases in q.

(II) Suppose $\tilde{\eta} > 0$. Note that $\tilde{\eta} < 1$ as well by the definition of $\tilde{\eta}$. Hence, $\tilde{\eta} \in (0,1)$. By the proof of Lemma 9, $P^* - \tilde{\eta}V^*$ is strictly decreasing in q if $P^* - \tilde{\eta}V^* \geq (1-\tilde{\eta})\Delta_L$. Therefore, due to (53), $\pi^*_{exit}(q)$ is strictly decreasing in q if $\pi^*_{exit}(q) \geq \alpha(1-\tau_s)(1-\lambda)(1-\tilde{\eta})\Delta_L$, or equivalently, $\pi^*_{exit}(q) \geq -\varepsilon_\pi$. This concludes the proof of the first result (that is, $\pi^*_{exit}(q)$ is strictly decreasing with q if $\pi^*_{exit}(q) > -\varepsilon_\pi$).

Second, I show that the equilibrium is unique and is given by

$$q^* = \begin{cases} 0, & \text{if } \kappa + \Delta\kappa \geq \bar{\kappa} = \pi^*_{exit}(0) - \alpha(1-\phi)b, \\ \frac{\bar{\mu}_B}{\bar{\mu}_B + \bar{\mu}_G}, & \text{if } \kappa + \Delta\kappa \leq \tilde{\kappa} \equiv \pi^*_{exit}\left(\frac{\bar{\mu}_B}{\bar{\mu}_B + \bar{\mu}_G}\right) - \alpha(1-\phi)b \\ q \in (0,1) \text{ such that } \pi^*_{exit}(q) = \kappa + \Delta\kappa + \alpha(1-\phi)b, & \text{otherwise,} \end{cases} \tag{54}$$

This directly follows from the results that (a) $\pi^*_{exit}(q)$ is strictly decreasing with q if $\pi^*_{exit}(q) > -\varepsilon_\pi$, (b) $\pi^*_{exit}(q)$ is continuous in q (as noted at the beginning of the proof), (c) all of the $\bar{\mu}_G$ blockholders with good projects enter (as mentioned at the beginning of the proof), (d) for a given q, the payoff of a blockholder with a bad project from buying a stake and not implementing the project is $\alpha(1-\phi)b$ (as explained in the proof of Lemma 4), while his payoff from buying a stake and implementing a project is $\pi^*_{exit}(q) - (\kappa + \Delta\kappa)$ (by definition of $\pi^*_{exit}(q)$).

Fourth, note that $0 < \bar{\kappa}$ if and only if $b < \frac{1}{\alpha(1-\phi)}\pi^*_{exit}(0)$, where $0 < \pi^*_{exit}(0)$. Here, $0 < \pi^*_{exit}(0)$ holds because $0 < \kappa < \bar{\kappa}$ by assumption. By the definition (51) of $\bar{\kappa}$, this implies that $\bar{\kappa} + \alpha(1-\phi)b = \pi^*_{exit}(0) > 0$.

Fifth, I show that if $\bar{\mu}_B > (\frac{\Delta_H}{-\Delta_L})\bar{\mu}_G$, then $q^* < \frac{\bar{\mu}_B}{\bar{\mu}_B + \bar{\mu}_G}$ in equilibrium (which is equivalent to $\mu^*_B < \bar{\mu}_B$, because $\mu^*_G = \bar{\mu}_G$ by Lemma 4). Note that $\bar{\mu}_B > \left(\frac{\Delta_H}{-\Delta_L}\right)\bar{\mu}_G$ implies that $0 > \frac{1}{\mu_F}(\bar{\mu}_B\Delta_L + \bar{\mu}_G\Delta_H)$, which in turn implies that $V^*(q) < 0$ if $q \geq \frac{\bar{\mu}_B}{\bar{\mu}_B + \bar{\mu}_G}$. However, since $V^*(q^*) > 0$ in equilibrium by Lemma 8, it follows that $q^* < \frac{\bar{\mu}_B}{\bar{\mu}_B + \bar{\mu}_G}$.

Sixth, note that the second and fifth steps together imply that if $\bar{\mu}_B > (\frac{\Delta_H}{-\Delta_L})\bar{\mu}_G$, then the equilibrium is unique and given by (19). ■

Proof of Proposition 6. Note that unless noted otherwise, in almost all of the results below, the comparative statics of $(\mu_B^* + \mu_G^*)V^*$ immediately follow from the comparative statics of q^* and V^*, because $\mu_G^* = \bar{\mu}_G$ by Lemma 4. In the cases where the comparative statics of $(\mu_B^* + \mu_G^*)V^*$ does not immediately follow, it is proven explicitly.

First, note that $q^* < \frac{\bar{\mu}_B}{\bar{\mu}_B + \bar{\mu}_G}$ in equilibrium (which is equivalent to $\mu_B^* < \bar{\mu}_B$, because $\mu_G^* = \bar{\mu}_G$ by Lemma 4) by the fifth step in the proof of Proposition 5, because $\bar{\mu}_B > (\frac{\Delta_H}{-\Delta_L})\bar{\mu}_G$ by assumption.

Second, I prove part (i). To that end, suppose that $\kappa + \Delta\kappa > \bar{\kappa}$. Then, $q^* = 0$ by Proposition 5. Moreover, by steps 1 and 8 in the proof of Proposition 3, in equilibrium (39) (which is equivalent to (40)) is satisfied, and also $P^* > \Delta_M$. Note that for a given q, the LHS in (40) (and hence the LHS in (39) compared to its RHS) is strictly increasing in ρ around $\rho = \rho^*$, because $V^*(\rho; q)$ is strictly increasing in ρ, and $P^*(\rho; q)$ is also strictly increasing in ρ when $P^* > \Delta_M$ (as shown in the proof of Proposition 1). Therefore, the following arguments complete the proof for this step: (a) As $\kappa + \Delta\kappa$ increases, (39) continues to hold for the same level of ρ. Therefore, ρ^* does not change (recall by step 2 in the proof of Proposition 3, for any given q, if there exists any $\rho' \in [0, 1]$ that satisfies (39), then $\rho^* = \rho'$ is the unique equilibrium for q). (b) As τ_s increases, holding $\rho = \rho^*$ constant, the LHS in (39) becomes strictly smaller than the RHS, because the LHS in (39) is positive (this is because $\pi_{exit}^*(0) > 0$ by the fourth step in the proof of Proposition 5). As a result, ρ^* strictly increases. (c) If $\tau_s = \tau_l$, then as η increases, (40) continues to hold for the same level of ρ. Therefore, ρ^* does not change. (d) If $\tau_s > \tau_l$, then as η increases, the LHS in (40) becomes strictly smaller than the RHS, because $V^* > 0$ by Lemma 8. As a result, ρ^* strictly increases. (e) As τ_l increases, the RHS in (39) becomes strictly smaller than the LHS, because $\eta > 0$. As a result, ρ^* strictly decreases. (f) As λ increases, the LHS in (39) becomes strictly larger than the RHS. This is because $P^* < V^*$, which in turn holds because $\rho^* > 0$ (due to Proposition 3) and

$$P^*(\rho^*; q) = \Delta_H - \frac{\Delta_H - V^*(\rho^*; q)}{1 - (1 - q)\rho^*(1 - \phi)} \tag{55}$$

due to (3) and (9)). As a result, ρ^* strictly decreases. (h) As b increases, the RHS in (39) becomes strictly larger than than the LHS. As a result, ρ^* strictly increases.

Third, letting $\underline{\kappa} \equiv \pi_{exit}^*(\underline{q}) - \alpha(1 - \phi)b$, I prove that $\underline{\kappa} < \bar{\kappa}$. Note that $\pi_{exit}^*(q)$ is strictly decreasing in q if $\pi_{exit}^*(q) \geq 0$ (by Proposition 5), and $\pi_{exit}^*(0) > 0$ (by the fourth step in the proof of Proposition 5). Since $\bar{\kappa} = \pi_{exit}^*(0) - \alpha(1 - \phi)b$, this implies that $\pi_{exit}^*(\underline{q}) < \pi_{exit}^*(0)$, and hence $\underline{\kappa} < \bar{\kappa}$.

Fourth, I prove part (iii). To that end, suppose that $\kappa + \Delta\kappa < \underline{\kappa}$, where $\underline{\kappa} = \pi_{exit}^*(\underline{q}) - \alpha(1 - \phi)b$. Note that Proposition 5 implies that $\kappa + \Delta\kappa + \alpha(1 - \phi)b = \pi_{exit}^*(q^*)$ (because $\kappa + \Delta\kappa < \underline{\kappa} < \bar{\kappa}$) and $q^* > \underline{q}$ (because $\pi_{exit}^*(q)$ is strictly decreasing in q if $\pi_{exit}^*(q) \geq 0$). In turn, $q^* > \underline{q}$ implies that $\rho^* = 1$ due to Proposition 3. Recall that $\pi_{exit}^*(q)$ is given by (18). Also given that $\rho^* = 1$, $\pi_{exit}^*(q)$ is strictly decreasing in q if $\pi_{exit}^*(q) \geq 0$ (by substep (c) of the first step in the proof of Proposition 5), and $V^*(\rho^*; q) = \frac{1}{\mu_F}(\mu_B^*\Delta_L + \bar{\mu}_G\Delta_H) = \frac{1}{\mu_F}(\frac{q}{1-q}\bar{\mu}_G\Delta_L + \bar{\mu}_G\Delta_H)$

is strictly decreasing in q. Therefore, the following arguments complete the proof for this step: (a) As $\kappa + \Delta\kappa$ increases, q^* strictly decreases such that $\kappa + \Delta\kappa + \alpha(1-\phi)b = \pi^*_{exit}(q^*)$ is established again. (b) As τ_s increases, holding q constant at $q = q^*$, $\pi^*_{exit}(q)$ strictly decreases (because $\pi^*_{exit}(q^*) > 0$). Therefore, q^* strictly decreases. (c) As λ increases, holding q constant at $q = q^*$, $\pi^*_{exit}(q)$ strictly increases, because $P^* < V^*$ (for the same reasons explained in substep (f) of the proof of part (i) above). As a result, q^* strictly increases. (d) As η increases, holding q constant at $q = q^*$, $\pi^*_{exit}(q)$ strictly increases, because $V^* > 0$ by Lemma 8. Therefore, q^* strictly increases. (e) As τ_l increases, holding q constant at $q = q^*$, $\pi^*_{exit}(q)$ does not change. As a result, q^* does not change either. (f) As b increases, holding q constant at $q = q^*$, $\pi^*_{exit}(q)$ does not change while $\alpha(1-\phi)b$ increases. Therefore, q^* strictly decreases such that $\kappa + \Delta\kappa + \alpha(1-\phi)b = \pi^*_{exit}(q^*)$ is established again.

Fifth, I prove part (ii). To that end, suppose that $\kappa + \Delta\kappa \in (\underline{\kappa}, \bar{\kappa})$, that is, $\kappa + \Delta\kappa \in (\pi^*_{exit}(\underline{q}) - \alpha(1-\phi)b, \pi^*_{exit}(0) - \alpha(1-\phi)b)$. Note that Proposition 5 implies that $\kappa + \Delta\kappa + \alpha(1-\phi)b = \pi^*_{exit}(q^*)$ and $q^* \in (0, \underline{q})$ (where the latter follows because $\pi^*_{exit}(q)$ is strictly decreasing in q if $\pi^*_{exit}(q) \geq 0$). In turn, $\rho^* \in (0,1)$ due to Proposition 3, and moreover, due to steps 1 and 8 in the proof of Proposition 3, in equilibrium (39) (which is equivalent to (40)) is satisfied, and also $P^* > \Delta_M$. Note that for a given q, the LHS in (40) (and hence the LHS in (39) compared to its RHS) is strictly increasing in ρ around $\rho = \rho^*$ due to the same arguments made in the proof of part (i) above. Moreover, (39) and $\kappa + \Delta\kappa + \alpha(1-\phi)b = \pi^*_{exit}(q^*)$ together imply that

$$\frac{\kappa + \Delta\kappa}{\alpha(1-\phi)} = (1-\tau_l)\left[\Delta_H - (1-\eta)V^*\right] - \frac{1}{1-\phi}\frac{c}{\alpha} \tag{56}$$

has to be satisfied in equilibrium as well. Therefore, the following arguments complete the proof for this step:

(a) As τ_s increases, holding $q = q^*$ and $\rho = \rho^*$ constant, the LHS in (39) strictly decreases while the RHS remains constant (because the LHS is positive due to $\pi^*_{exit}(q) = \kappa + \Delta\kappa + \alpha(1-\phi)b > 0$). Therefore, holding q constant: (I) ρ^* strictly increases until (39) is established again, (II) hence V^* strictly increases, (III) in turn, the RHS in (39) strictly decreases (and hence, so does the LHS in (39)), and (IV) hence, $\pi^*_{exit}(q)$ strictly decreases. Since $\pi^*_{exit}(q)$ strictly decreases, it follows that q^* (and hence μ^*_B) strictly decreases. Moreover, $V^*(q^*)$ does not change, because (56) continues to hold.

(b) As $\kappa + \Delta\kappa$ increases, holding $q = q^*$ constant, ρ^* does not change, because (39) continues to hold (recall from step 2 in the proof of Proposition 3 that for any given q, if there exists any $\rho' \in [0,1]$ that satisfies (39), then $\rho^* = \rho'$ is the unique equilibrium for q). In turn, this implies that holding $q = q^*$ constant, $\pi^*_{exit}(q)$ does not change and hence becomes strictly smaller than $\kappa + \Delta\kappa + \alpha(1-\phi)b$. Therefore, q^* strictly decreases such that $\kappa + \Delta\kappa + \alpha(1-\phi)b = \pi^*_{exit}(q^*)$ is established again. Moreover, $V^*(q^*)$ strictly decreases due to (56).

(c) As λ increases, holding $q = q^*$ and $\rho = \rho^*$ constant, the LHS in (40) strictly increases while the RHS remains constant, because $P^* < V^*$ (for the same reasons explained in substep (f) of the proof of part (i) above). Therefore, holding q constant: (I) ρ^* strictly decreases until

(40) is established again, (II) hence V^* strictly decreases, (III) in turn, the RHS in (39) strictly increases (and hence, so does the LHS in (39)), and (IV) hence, $\pi^*_{exit}(q)$ strictly increases. Since $\pi^*_{exit}(q)$ strictly increases, it follows that q^* (and hence μ^*_B) strictly increases. Moreover, $V^*(q^*)$ does not change, because (56) continues to hold.

(d) As τ_l increases, holding $q = q^*$ and $\rho = \rho^*$ constant, the RHS in (39) strictly decreases while the LHS remains constant, because $\eta > 0$. Therefore, holding q constant, ρ^* strictly decreases until (39) is established again. Note that while q^* responds as well, this response cannot reverse the decrease in ρ^*, since the sole reason of the change in q^* is the change in ρ^* (because τ_l does not appear in $\pi^*_{exit}(q^*)$). Moreover, $V^*(q^*)$ decreases due to (56). In addition, I also show that $(\mu^*_G(q^*) + \mu^*_B(q^*))V^*(q^*)$ strictly decreases. To see this, there are two cases to consider: (I) First, suppose that q^* (and hence μ^*_B) weakly increases. Then, $(\mu^*_G(q^*) + \mu^*_B(q^*))V^*(q^*) = [\bar{\mu}_G(\rho^*\Delta_H + (1-\rho^*)\Delta_M) + \frac{q^*}{1-q^*}\bar{\mu}_G\Delta_L]$ strictly decreases (because recall that ρ^* strictly decreases as well). (II) Second, suppose that q^* (and hence μ^*_B) strictly decreases. Then, $(\mu^*_G(q^*) + \mu^*_B(q^*))V^*(q^*)$ strictly decreases because both $V^*(q^*)$ and $\mu^*_B(q^*)$ strictly decrease, while $\mu^*_G(q^*)$ remains constant at $\mu^*_G(q^*) = \bar{\mu}_G$.

(e) Suppose $\tau_s = \tau_l$. As η increases, holding $q = q^*$ constant, ρ^* does not change, because (39) continues to hold. However, holding $q = q^*$ constant, even though ρ^* does not change, $\pi^*_{exit}(q)$ strictly increases, because $V^* > 0$ by Lemma 8. Therefore, q^* strictly increases such that $\kappa + \Delta\kappa + \alpha(1-\phi)b = \pi^*_{exit}(q^*)$ is established again. Moreover, (56) implies that $V^*(q^*)$ strictly increases.

(f) Suppose $\tau_s > \tau_l$. As η increases, holding $q = q^*$ and $\rho = \rho^*$ constant, the LHS in (40) strictly decreases while the RHS remains constant, because $V^* > 0$. Therefore, holding q constant at $q = q^*$: (I) ρ^* strictly increases until (40) is established again, (II) hence V^* and P^* strictly increase (P^* strictly increases as shown in the proof of Proposition 1, because $P^* > \Delta_M$ as mentioned previously), and (III) $(1-\eta)V^*$ strictly decreases. To see why $(1-\eta)V^*$ strictly decreases, suppose that it weakly increases at η for some $\eta = \eta'$ (again, holding q constant). However, then, this implies that holding q constant, the LHS in (40) gets strictly larger (because V^* and P^* gets strictly larger), while the RHS remains constant, yielding a contradiction with (40). This establishes that holding q constant, $(1-\eta)V^*$ strictly decreases, and therefore the RHS in (39) and in turn the LHS in (39) strictly increases (because they have to be equal). Therefore, holding q constant at $q = q^*$, $\pi^*_{exit}(q)$ strictly increases. Hence, q^* strictly increases such that $\kappa + \Delta\kappa + \alpha(1-\phi)b = \pi^*_{exit}(q^*)$ is established again. Moreover, (56) implies that $V^*(q^*)$ has to strictly increase as well.

(g) As b increases, (56) implies that $V^*(q^*)$ does not change.

Even though the proof of the proposition is complete, in addition I also prove that V^* attains its global maximum w.r.t. $\kappa + \Delta\kappa \in [0, \infty)$ at $\kappa + \Delta\kappa = \max\{0, \underline{\kappa}\}$. To that end, note that $\pi^*_{exit}(q)$ is continuous w.r.t. q, because ρ^* is continuous w.r.t. q by Proposition 3. Since $\pi^*_{exit}(q)$ is also strictly decreasing in q if $\pi^*_{exit}(q) > -\varepsilon_\pi$ for some $\varepsilon_\pi > 0$ (as shown in the first step of Proposition 5), this implies that q^* is continuous and strictly decreasing w.r.t. $\kappa + \Delta\kappa$ for all $\kappa + \Delta\kappa \geq 0$ as well. Therefore, V^* is continuous w.r.t. κ as well, and combining with the results in parts (i)-(iii) about κ and $\Delta\kappa$ implies that V^* attains its global maximum w.r.t.

$\kappa + \Delta\kappa \in [0, \infty)$ at $\kappa + \Delta\kappa = \max\{0, \underline{\kappa}\}$. ■

D.1 Supplemental results for Section D

Lemma 8 *Suppose that $\alpha b < \kappa + \Delta\kappa$. Under endogenous entry, in any equilibrium, if there is a positive measure of blockholders implementing their project, then:*

(i) If a blockholder has not acquired a stake, then he never implements his project.

(ii) If a blockholder with a bad project acquires a stake in a target and implements his project, then he always exits.

(iii) $q^* < 1$, that is, if a project is implemented, it cannot be a bad project with probability 1.

(iv) $\rho^* > 0$, that is, if a blockholder with a good project implements a project, he exerts effort with positive probability.

(v) $V^* > 0$ and $\lambda V^* + (1 - \lambda) P^* > 0$, where P^* and V^* are given by (3) and (9), respectively.

(vi) If a blockholder has acquired a stake and made a disclosure, then he always implements his project.

Proof of Lemma 8. Throughout the proof, denote by $\gamma \in [0, 1]$ the fraction of blockholders who implement their project after acquiring and disclosing their stake.

To see part (i), note that a blockholder never implements his project if he hasn't acquired a stake, because his payoff from doing so is negative due to the cost of implementing the project. Note that an implication of this result is that $\gamma^* > 0$. This is because: (a) a positive measure of blockholders implement their project in equilibrium, (b) they implement only if they acquire a stake, and (c) when acquiring a stake, then they have to disclose it if they will implement their project.

To prove part (ii), suppose that with positive probability, a blockholder with a bad project acquires a stake, implements his project, and keeps his stake. Note that his payoff from keeping his stake after acquiring a stake and implementing his project is given by

$$\alpha \left\{ (1 - \tau_l) \left[\Delta_L - (1 - \eta) \gamma^* V^* \right] + b \right\} - (\kappa + \Delta\kappa), \tag{57}$$

where V^* is given by (9). Note that (57) follows because once the blockholder discloses his stake, the market assigns probability γ that he will implement the project, and if the project is not implemented, the market sees this (before the blockholder can sell his stake) and as a result the share price becomes Q_0. However, (57) is negative since $V^* \geq \Delta_L$ and $\alpha b < \kappa + \Delta\kappa$. In turn, it must be that this blockholder's payoff in equilibrium is negative, because when he exits after implementing his project, his payoff from doing so must be weakly smaller than

(57), because he keeps his stake with positive probability. However, this yields a contradiction, because this blockholder strictly prefers not to buy any stake in the target and not to implement the project, as this would give the blockholder a payoff of zero (which is strictly larger than (57)).

Before proceeding to the proof of remaining parts, note that in any equilibrium where project implementation is on-the-equilibrium-path, due to parts (i), (ii), and Lemma 6, the average firm value conditional on the exit by the blockholder following project implementation is given by $Q_0 + P^*$, where P^* is given by (3). We also already know that the average firm value conditional on project implementation is given by $Q_0 + V^*$, where V^* is given by (9).

Next, I prove (iii), that is, $q^* < 1$. Recall that q denotes the probability that conditional on a project being implemented, it is a bad project. Suppose that $q^* = 1$. However, then $V^* = P^* = \Delta_L$, and hence the blockholder with a bad project always makes a loss by acquiring a stake and implementing his project. This is because if he exits, then his payoff is $\alpha(1-\tau_s)[\lambda V^* + (1-\lambda)P^* - (1-\eta)\gamma^* V^*] - (\kappa + \Delta\kappa)$, which is negative, and if he keeps his stake then his payoff is given by (57), which is negative as well. However, then any blockholder with a bad project strictly prefers to not buy any stake and not to implement his project, because this gives him a payoff of zero. However, this yields a contradiction with $q^* = 1$.

Next, I prove part (iv), that is, $\rho^* > 0$. Recall that ρ denotes the probability of blockholder exerting effort conditional on project being implemented by a blockholder with a good project. Also recall from part (i) that a blockholder never implements his project if he hasn't acquired a stake, and note that by Lemma 6, if a blockholder with a good project shirks (exerts effort), then he always exits (keeps his stake unless hit by a liquidity shock). Then, for a blockholder with a good project, his expected payoff from acquiring a stake, exerting effort, and implementing a project is (because he keeps his stake unless hit by a liquidity shock)

$$\begin{aligned}&\phi\alpha(1-\tau_s)[\lambda V^* + (1-\lambda)P^* - (1-\eta)\gamma^* V^*] \\ &+(1-\phi)\alpha\{(1-\tau_l)[\Delta_H - (1-\eta)\gamma^* V^*] + b\} - \kappa - c,\end{aligned} \tag{58}$$

Similarly, his expected payoff from acquiring a stake, shirking, and implementing a project is (because then he always exits)

$$\alpha(1-\tau_s)[\lambda V^* + (1-\lambda)P^* - (1-\eta)\gamma^* V^*] - \kappa. \tag{59}$$

To see $\rho^* > 0$, suppose that $\rho^* = 0$. However, then $P^* \leq \Delta_M$ and $V^* \leq \Delta_M$. Therefore, (58) is strictly larger than (59), because

$$(1-\tau_s)[\lambda V^* + (1-\lambda)P^* - (1-\eta)\gamma^* V^*] < (1-\tau_l)[\Delta_H - (1-\eta)\gamma^* V^*] + b - \frac{c}{(1-\phi)\alpha},$$

which is satisfied because

$$\begin{aligned}\frac{c}{(1-\phi)\,\alpha}-b &< (1-\tau_l)\Delta_H-(1-\tau_s)\,\lambda\Delta_M-(\tau_s-\tau_l)(1-\eta)\Delta_M-(1-\tau_s)\,(1-\lambda)\Delta_M\\ &\Leftrightarrow\ \frac{c-(1-\phi)\alpha b}{(1-\phi)\,\alpha}<(\tau_s-\tau_l)\eta\Delta_M+(1-\tau_l)\,(\Delta_H-\Delta_M)\end{aligned}$$

which holds due to $c<\bar{c}$ (where $\bar{c}$ is given by (25)). However, since (58) is strictly larger than (59), any blockholder with a good project strictly prefers to exert effort when implementing the project, yielding a contradiction with $\rho^*=0$.

Next, I prove that $V^*>0$. Recall from part (i) that a blockholder never implements his project if he hasn't acquired a stake. Also note that any blockholder's payoff from acquiring a stake, implementing his project, and then exiting is

$$\alpha\,(1-\tau_s)\,[\lambda V^*+(1-\lambda)P^*-(1-\eta)\gamma^*V^*]-\kappa_i, \tag{60}$$

(where κ_i denotes the blockholder's cost of implementing project $i\in\{G,B\}$, that is, $\kappa_G=\kappa$ and $\kappa_B=\kappa+\Delta\kappa$), or equivalently,

$$\alpha\,(1-\tau_s)\,[(1-(1-\eta)\,\gamma^*)\,V^*+(1-\lambda)\,(P^*-V^*)]-\kappa_i. \tag{61}$$

However, if $V^*\leq 0$, then (61) is negative because $\lambda<1$, $\rho^*>0$, $q^*<1$, and $P^*<V^*$ (where the last inequality follows from

$$P^*=\Delta_H-\frac{\Delta_H-V^*}{1-(1-q^*)\rho^*(1-\phi)},$$

which in turn follows from (3) and (9)). In turn, since a blockholder with a bad project always exits if he implements the project (due to part (ii)), (61) being negative implies that a blockholder with a bad project would strictly prefer not acquiring any stake and not implementing the project over acquiring a stake and implementing the project. Because a blockholder never implements his project if he hasn't acquired a stake (by part (i)), this implies that all blockholders with a bad project strictly prefers not to implement their project, implying that $q^*=0$. However, combining this with $\rho^*>0$, then it cannot be $V^*\leq 0$, yielding a contradiction.

Next, I prove part (vi), that is, $\gamma^*=1$. For any blockholder that does not implement his project, his payoff from acquiring his stake and disclosing is $(1-\tau_s)\alpha\,(-(1-\eta)\gamma^*V^*)$ if the blockholder exits and $(1-\tau_l)\alpha\,(-(1-\eta)\gamma^*V^*+b)$ if he keeps his stake, and his payoff from acquiring his stake and not disclosing it is zero if the blockholder exits and αb if he keeps his stake (note that as also explained above, once the blockholder discloses his stake, the market assigns probability γ that he will implement the project, and once the project is not implemented, the market sees this before the blockholder can sell his stake and as a result, the share price becomes Q_0). Since $V^*>0$ and $\gamma^*>0$ (where the latter was explained at the end of the proof of part (i) above), it follows that $(1-\tau_s)\alpha\,(-(1-\eta)\gamma^*V^*)<0$ and

$(1-\tau_l)\alpha\left(-(1-\eta)\gamma^* V^* + b\right) < \alpha b$. Therefore, the blockholder strictly prefers not to disclose his stake if he will not implement the project. As a result, $\gamma^* = 1$.

Finally, I prove that $\lambda V^* + (1-\lambda)P^* > 0$. Suppose that $\lambda V^* + (1-\lambda)P^* \leq 0$. Recall from the proof of $V^* > 0$ above that any blockholder's payoff from acquiring a stake, implementing his project, and then exiting is given by (60), which is negative because $\lambda V^* + (1-\lambda)P^* \leq 0$, $V^* > 0$, and $\gamma^* > 0$. In turn, since a blockholder with a bad project always exits if he implements the project (due to part (ii)), this again implies that all blockholders with a bad project strictly prefers not to implement their project, implying that $q^* = 0$. However, combining this with $\rho^* > 0$, then it cannot be $P^* \leq 0$, yielding a contradiction with $V^* > 0$ and $\lambda V^* + (1-\lambda)P^* \leq 0$. ■

Lemma 9 *For any $\tilde{\eta} \in (0,1]$, if $q \geq \underline{q}$ and $P^*(q) - \tilde{\eta}V^*(q) > (1-\tilde{\eta})\Delta_L$, then $P^*(q) - \tilde{\eta}V^*(q)$ strictly decreases w.r.t. q.*

Proof of Lemma 9. Note that due to Proposition 3, $q^* \geq \underline{q}$ implies that $\rho^* = 1$. Hence,

$$P - \tilde{\eta}V = \frac{\phi\Delta_H + q\left[\Delta_L - \phi\Delta_H\right]}{1-(1-q)(1-\phi)} - \tilde{\eta}\left\{\Delta_H + q\left[\Delta_L - \Delta_H\right]\right\}$$

Therefore,

$$\begin{aligned}
0 &> \frac{d\left(P-\tilde{\eta}V\right)}{dq} \Leftrightarrow 0 > \frac{\left[\Delta_L - \phi\Delta_H\right]}{1-(1-q)(1-\phi)} - \frac{\phi\Delta_H + q\left[\Delta_L - \phi\Delta_H\right]}{\left[1-(1-q)(1-\phi)\right]^2}(1-\phi) - \tilde{\eta}\left\{\left[\Delta_L - \Delta_H\right]\right\} \\
&\Leftrightarrow \frac{\phi\Delta_H + q\left[\Delta_L - \phi\Delta_H\right]}{\left[1-(1-q)(1-\phi)\right]^2}(1-\phi) + \tilde{\eta}\left\{\left[\Delta_L - \Delta_H\right]\right\} > \frac{\left[\Delta_L - \phi\Delta_H\right]}{1-(1-q)(1-\phi)} \\
&\Leftrightarrow \left[\phi\Delta_H + q\left[\Delta_L - \phi\Delta_H\right]\right](1-\phi) + \tilde{\eta}\left\{\left[\Delta_L - \Delta_H\right]\right\}\left[1-(1-q)(1-\phi)\right]^2 \\
&> \left[\Delta_L - \phi\Delta_H\right]\left(1-(1-q)(1-\phi)\right) \\
&\Leftrightarrow \tilde{\eta}\left\{\left[\Delta_L - \Delta_H\right]\right\}\left[1-(1-q)(1-\phi)\right]^2 > \phi\left[\Delta_L - \Delta_H\right] \Leftrightarrow \tilde{\eta}\left[1-(1-q)(1-\phi)\right]^2 < \phi \\
&\Leftrightarrow q < q' \equiv 1 - \frac{1-\sqrt{\phi/\tilde{\eta}}}{1-\phi},
\end{aligned}$$

where the RHS is strictly larger than 0. Moreover, since $P^*(q) = V^*(q) = \Delta_L$ and hence $P^*(q) - \tilde{\eta}V^*(q) = (1-\tilde{\eta})\Delta_L$ if $q = 1$, this implies that $P^*(q) - \tilde{\eta}V^*(q)$ strictly decreases w.r.t q if $P^*(q) - \tilde{\eta}V^*(q) > (1-\tilde{\eta})\Delta_L$ and $q \geq \underline{q}$, concluding the proof. ■