Sustainable Organizations

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Stakeholder preferences over sustainability are becoming more polarized. While some investors, managers, and employees push for stronger environmental and social commitments from firms and other organizations, others actively oppose them, and the gap between them appears to be widening. For example, Republican-led pension funds have withdrawn mandates from ESG-focused asset managers, reallocating control over portfolio companies, while other institutional investors simultaneously demanded stronger commitments.[1] Danone removed its CEO following shareholder resistance to his sustainability agenda, and Amazon has restricted worker influence following climate activism.[2] Colak et al. (2024) document that CEOs facing sustainability-related conflicts are significantly more likely to be replaced. These governance conflicts share a common feature: disagreements over sustainability are resolved through reallocations of control rights. Crucially, the intensity of such conflicts is driven not by the average level of green preferences, but by the degree of polarization across stakeholders. This paper studies how heterogeneity—specifically, polarization—in stakeholders' green preferences shapes organizational governance and, in turn, organizations' sustainability outcomes.

We develop a theory of stakeholder governance and analyze how polarization—diverging green preferences of stakeholders—affects organizations. In our model, the owner (principal) and the manager (agent) collaborate on implementing a project. The owner, who is the controlling stakeholder, can opt for either a green or brown project but incurs an implementation cost. To circumvent this cost, the owner can delegate control rights and allow the manager to select and implement the project. Control rights enable the manager to pursue their preferred project, even if it conflicts with the owner's preferences. To mitigate this potential conflict of interest with the manager, the owner can offer an equity stake to the manager, which comes at a cost as it dilutes their own ownership.

Our analysis yields two central insights about how the owner's and manager's green preferences affect the organization's sustainability efforts. First, we demonstrate an asymmetry between top-down and bottom-up approaches to shaping an organization's sustainability.

[1] See "Texas accuses BlackRock of energy company boycott in ESG clampdown," *Financial Times*, 24 August 2022; "Why Texas is banning banks over their ESG policies," *Bloomberg*, 20 March 2024; "New York pension funds put asset managers on notice over climate plans," *Financial Times*, 22 April 2025; and "BlackRock loses $5.9 billion mandate from Dutch pension fund over ESG stance," *ESG Today*, 16 December 2025.

[2] See "A top CEO was ousted after making his company more environmentally conscious. Now he's speaking out," *Time Magazine*, 21 November 2021; and "Amazon Illegally Fired Activist Workers, Labor Board Finds," *The New York Times*, 5 April 2021.

Specifically, changes in the owner's green preferences have the intended effect: stronger green preferences increase sustainability, while weaker ones reduce it. In contrast, changes in the manager's green preferences can have unintended effects, as they may prompt the owner to reallocate control rights: a greener manager may reduce sustainability, and a browner one can enhance it. Because these effects operate through the reallocation of control rights, even small shifts in stakeholders' green preferences can generate large changes in the organization's sustainability. This is precisely what unfolded at Danone, where a "green" CEO's removal by "browner" shareholders triggered a discontinuous reversal of the firm's sustainability agenda. Second, we highlight a difference in how green and brown owners approach delegation and compensation decisions. Green owners who prefer the green project can ensure its implementation by delegating control rights while aligning incentives with the manager by offering no equity compensation. In contrast, brown owners who favor the brown project may need to provide equity compensation to align incentives if they choose to delegate control rights and may withdraw control rights if the conflict of interest with the manager becomes too severe.

In our model, the asymmetry in contracts offered by green and brown owners stems from the public good nature of social payoffs. Green owners can exploit this feature to achieve perfect alignment of incentives. By offering no equity stake, they ensure that a manager always weakly prefers to implement the green project. In contrast, brown owners face a fundamental limitation—since their preferred project primarily generates monetary payoffs, a private and rival good, they cannot achieve alignment without sharing equity. To shift the manager's preferences toward the brown project, they must share these monetary payoffs through equity compensation, creating a trade-off between the benefits of delegation and the costs of incentive alignment. Thus, our analysis reveals an asymmetry: while brown owners face the classic trade-off between delegation benefits and incentive costs, green owners can achieve their objectives by simply delegating control rights and leveraging the public good nature of social payoffs. This distinction between green and brown owners contrasts with standard principal-agent models, in which resolving conflicts of interest typically requires providing financial incentives such as equity compensation for managers (e.g., Shleifer and Vishny, 1997).

Our framework challenges the conventional wisdom that ESG-linked compensation is required to effectively incentivize improvements in an organization's sustainability. We demonstrate that such compensation—based on the organization's social outcome—is never optimal in our framework. Green owners can align incentives without sharing ownership by leveraging the public good nature of social payoffs, while brown owners have no reason to encourage green projects through social compensation. These findings call into question common recommendations that ESG-linked compensation may be necessary to promote sustainability (e.g., Hong et al., 2016; Flammer et al., 2019), suggesting instead that such compensation may increase managerial rents without achieving owners' objectives (e.g., Bebchuk and Tallarita, 2022). Additionally, our analysis reveals that greener managers may extract larger rents through higher equity compensation even without higher ability. This happens because brown owners must offer stronger monetary incentives to offset managers' stronger green preferences. Our findings also challenge recent proposals advocating expanded shareholder voting rights on environmental and social issues (e.g., Hart and Zingales, 2017), as our model demonstrates that green owners may be able to achieve their desired outcomes more efficiently through delegation than through direct control.

Our framework also challenges traditional perspectives on corporate sustainability and governance. Contrary to the view that managerial engagement in sustainability comes at shareholders' expense (e.g., Friedman, 1970), our model shows that owners may rationally delegate control rights to managers, even when this leads to greater sustainability than owners prefer. This delegation occurs because it spares the owner from bearing the implementation cost, potentially making it the most efficient choice from their perspective, even though the resulting outcome is more sustainable than what the owner would have chosen directly.

A natural question is whether changes in green preferences that increase sustainability also enhance welfare. We show that they need not: sustainability and welfare are distinct objectives that can move in opposite directions. We define welfare as the sum of utilities of the owner, the manager, and an outside stakeholder who captures externalities not accounted for by the organization's decision-makers. To see why sustainability and welfare can diverge, consider a green manager who gains control rights and thereby increases the organization's sustainability. This shift in control rights reduces welfare when society places relatively little weight on social relative to monetary payoffs. Our analysis characterizes the economic forces driving this divergence, including how shifts in control rights can simultaneously reduce sustainability and increase welfare and vice versa.

Our analysis generates several additional results. First, we show that delegation and equity compensation are complements for brown owners but not for green owners. We then extend the baseline model by introducing a manager's limited span of influence and show that this weakens a brown owner's use of equity incentives and can increase sustainability, while leaving green owners unaffected.

While we focus on owner-manager relationships, our findings apply broadly to manager-employee interactions, investor-entrepreneur relationships, board-CEO dynamics, and organizations such as NGOs and universities. Our framework rationalizes several documented empirical patterns that existing theory struggles to explain. First, Francoeur et al. (2017) find that environmentally focused firms pay *lower* equity-based CEO compensation, which our model explains directly: green owners reduce equity stakes to exploit the public good nature of social payoffs. Second, empirical studies find conflicting evidence on whether green investors increase sustainability (e.g., Dimson et al., 2015; Chen et al., 2020), decrease it (e.g., Kim et al., 2025), or have no effect (e.g., Heath et al., 2023). Our framework overturns the standard prediction of a monotonically positive relationship: the relationship is non-monotonic. Third, many organizations that embraced sustainability subsequently scaled back even as average public concern for the environment appears to remain high (e.g., EPIC and AP-NORC, 2025). Our framework explains these reversals as a consequence of polarization: what matters is not the average level of green preferences but the gap between stakeholders, and as this gap widens, governance conflicts intensify, and organizations may retreat from sustainability commitments. Beyond rationalizing existing patterns, we generate novel testable predictions linking stakeholders' green preferences to control-rights allocations, equity compensation, managerial effort, and organizational sustainability.

A Related Literature

Our paper presents a novel theory of stakeholder society (e.g., Tirole, 2001; Allen et al., 2015; Magill et al., 2015; Chang and Hong, 2024) based on the allocation of control rights and contributes to several strands of the literature.

First, we contribute to the literature on green stakeholders and corporate governance (e.g., Matsusaka and Shu, 2021; Gollier and Pouget, 2022; Jin and Noe, 2023; Malenko and

Malenko, 2023; Döttling et al., 2024; Bond and Levit, 2024; Levit et al., 2024).[3] While corporate governance and financial contracting research has extensively studied control rights (e.g., Aghion and Bolton, 1992; Burkart et al., 1997), their role in the presence of green stakeholders remains largely unexplored. By examining control rights, we demonstrate their fundamental role in shaping how green stakeholders influence corporate sustainability. Our analysis reveals two central insights. First, we identify asymmetries between green and brown owners in their ability to align stakeholder incentives through delegation and compensation. Second, we distinguish between top-down and bottom-up approaches to sustainability, showing how they differ in their effects on governance structures and sustainability outcomes. Our findings yield novel insights into shareholder-manager conflicts, investor-entrepreneur relationships, and board-CEO interactions, generating several novel testable empirical predictions.

Second, we contribute to the emerging literature on corporate polarization (e.g., Colonnelli et al., 2023; Fos et al., 2023; Kempf and Tsoutsoura, 2024; Ferreira and Nikolowa, 2025; Gormley et al., 2026) by examining how diverging stakeholder preferences affect corporate governance. Specifically, we show that greater polarization can increase or decrease an organization's sustainability.

Third, we add to the theoretical literature on managerial compensation and corporate public good provision (e.g., Bucourt and Inostroza, 2024; Chaigneau and Sahuguet, 2024). Our finding that green owners align incentives by reducing managers' equity stakes relates to Glaeser and Shleifer (2001) and Chowdhry et al. (2019), both of which show that reducing profit motives shifts attention toward social payoffs. We share this economic force and extend it by formally incorporating the allocation of control rights. This generates an asymmetry between green and brown owners in their ability to align incentives through delegation and compensation. It also makes the relationship between green preferences, equity compensation, and the organization's sustainability non-monotonic under brown ownership—equity stakes and sustainability initially rise with managerial green preferences, but are lower once control rights are withdrawn. Our findings also reveal that ESG-linked compensation is never optimal in our framework; instead, even green principals rely exclusively on delegation and standard financial incentives.

Fourth, we contribute to the literature on the delegation of authority (e.g., Aghion and

[3] See Malenko (2024) for a survey on corporate governance. A related literature focuses on green investors (e.g., Heinkel et al., 2001; Chowdhry et al., 2019; Hart and Zingales, 2022; Oehmke and Opp, 2024; Green and Roth, 2025; Landier and Lovo, 2025; Gupta et al., 2026).

Tirole, 1997; Dessein, 2002).[4] Specifically, we introduce green preferences, public good provision, and optimal compensation.[5] This combination is essential because standard control rights theories focus on conflicts over rival goods, while public goods theories (e.g., Olson, 1965; Bergstrom et al., 1986) study non-rival goods but assume exogenous institutional arrangements and do not model delegation or compensation. Neither strand alone can explain how conflicts over externalities are resolved through allocations of control rights and compensation. Our framework fills this gap and yields novel insights into the differences between green and brown owners' delegation and compensation decisions. Moreover, we highlight a key distinction between bottom-up and top-down approaches to organizational sustainability.

I Model

We consider an organization consisting of two risk-neutral stakeholders: an owner ($j = O$) and a manager ($j = M$).[6] The organization implements one of two projects, which differ in their social and monetary payoffs. The timeline consists of three periods, with no time discounting. At time zero, the owner decides whether to delegate control rights to the manager and whether to offer the manager equity-based compensation. At time one, the manager exerts effort, which affects the probability of identifying viable projects. At time two, one of the stakeholders chooses and implements a project.

The organization's output is a pair (π, s), where π and s represent the monetary and the social payoff, respectively. There are two viable projects: green ($k = G$) and brown ($k = B$). The green project generates a higher social payoff s_k but a lower monetary payoff π_k than the brown project, such that $\pi_B > \pi_G > 0$ and $s_G > s_B$. We denote the differences between the projects' payoffs as $\Delta\pi = \pi_G - \pi_B < 0$ and $\Delta s = s_G - s_B > 0$. In addition to these viable projects, there exists a third project that generates a large negative monetary and social payoff such that no stakeholder would implement this project. At this stage, we remain agnostic about whether the green or brown project maximizes social welfare. This allows our framework to accommodate both scenarios: where a more sustainable organization enhances

[4] See Bolton and Dewatripont (2013) for a survey.

[5] While some studies examine both delegation and compensation (e.g., Athey and Roberts, 2001; Prendergast, 2002; Bester and Krähmer, 2008; Dessein et al., 2010; Rantakari, 2013; Chen, 2024), they focus on traditional agency problems.

[6] As we discuss in Section VII, our framework also applies to other principal-agent relationships, such as boards and CEOs, investors and entrepreneurs, or managers and employees.

social welfare and where it may reduce it. In Section V, we discuss the welfare implications of our model.

Stakeholder j's utility when project (π, s) is implemented is given by

$$u_j(\pi, s) = \beta_j \pi + \gamma_j s,$$

where $\gamma_j \geq 0$ captures the stakeholder's green preferences and $\beta_j \geq 0$ represents the stakeholder's equity stake.[7] When indifferent between the two projects, a stakeholder chooses the project preferred by the other stakeholder.[8] This preference formulation is consistent with the extensive empirical evidence documenting that some stakeholders exhibit green preferences and that these preferences can vary across individuals (e.g., List, 2009; Riedl and Smeets, 2017; Bauer et al., 2021; Humphrey et al., 2021; Baker et al., 2022; Heeb et al., 2023; Guenzel et al., 2023; Bonnefon et al., 2025; Giglio et al., 2025).

The manager faces an informational friction in identifying viable projects, as in Aghion and Tirole (1997). If uninformed, the manager cannot distinguish between the green, brown, and loss-making projects. Because the manager would incur a large disutility when implementing the loss-making project, the manager would never implement a project without first acquiring information. In contrast, the owner faces no such friction and can always identify and implement their preferred project. As a result, an uninformed manager must rely on the owner's superior information and will implement the owner's preferred project. At time one, the manager chooses an effort level $q_M \in [0, 1]$, determining the probability of becoming informed about the projects' payoffs. However, effort is costly, imposing a quadratic disutility of $\frac{\phi_M}{2} q_M^2$ on the manager, where $\phi_M > 0$.

The manager's incentives to generate information depend on their green preferences γ_M and the contract offered by the owner at time zero, denoted by (d, β_M). This contract consists

[7] Since we allow for a negative social payoff ($s_k < 0$) and include an implementation cost c (see below), the manager's utility could be negative. In such cases, we implicitly assume that the manager's outside option is sufficiently low to ensure participation. In Internet Appendix E, we formally extend the model to incorporate a participation constraint for the manager and show that all of our main results remain qualitatively unchanged when the manager must receive a minimum level of compensation. The owner can then also offer a fixed wage: a green owner meets the constraint with a fixed wage and still offers no equity, whereas a brown owner may combine the fixed wage with equity. A more stringent constraint leaves a green owner's contract qualitatively unchanged but makes a brown owner more likely to delegate control rights and to offer a positive equity stake, since equity then both ensures participation and tilts the manager toward the brown project.

[8] If both stakeholders are indifferent, we assume that the organization implements the green project.

of a delegation decision, $d \in \{O, M\}$, determining whether control rights remain with the owner ($d = O$) or are delegated to the manager ($d = M$), and the manager's equity stake in the organization, $\beta_M \in [0, 1]$.[9] Consistent with our framework, Nagar (2002) documents that real-world employment contracts include both delegation of control rights and equity-based compensation.

The manager receives a fraction β_M of the organization's monetary payoff π. The equity stake can be implemented, for example, through non-voting shares, allowing cash flow and control rights to be separated. The remaining share, $\beta_O = 1 - \beta_M$, is retained by the owner. Increasing the manager's equity stake strengthens their incentives to choose the brown project over the green project by making their utility more sensitive to monetary performance. However, this comes at the cost of reducing the owner's equity stake. Following the incomplete contracting literature (e.g., Grossman and Hart, 1986), we assume that project choice is non-contractible. We focus on equity-based compensation as it is widely used in practice (e.g., Frydman and Jenter, 2010). However, allowing for contracts that compensate the manager directly based on project choice while ensuring limited liability would lead to similar economic trade-offs and results.[10] When indifferent between offering a positive equity stake and offering none, we assume the owner offers no equity stake.

The owner can either retain control rights ($d = O$) or delegate them to the manager ($d = M$), determining which stakeholder has formal authority to choose the project at time two.[11] However, formal control rights do not always translate into effective control. In particular, when the manager holds control rights but is uninformed, they must rely on the owner's superior information, giving the owner effective control over project choice. We assume the owner retains control rights when indifferent between delegation and retention.

The stakeholder with control rights not only chooses but also implements the project, incurring an implementation cost $c > 0$ that captures, for instance, the cost of time and

[9] Our model assumes a fixed owner-manager match and does not consider personnel turnover. Hiring and firing managers entails costs, including the loss of firm-specific expertise (e.g., Taylor, 2010).

[10] Under such contracts, the owner would optimally offer no compensation to incentivize the manager to implement the green project, similar to the zero equity compensation in our framework (Proposition 1). To incentivize the brown project, the owner would offer higher compensation for the brown project than for the green project, replicating the effect of an equity stake in our framework (Proposition 2).

[11] We assume that the owner cannot renege on the delegation decision at time two. This assumption clearly holds if control rights are contractually agreed on. If not, the assumption can be justified if reneging imposes a reputational cost greater than $u_O(\pi_O, s_O) - c - u_O(\pi_M, s_M)$. Baker et al. (1999) micro-found such a reputational cost in a repeated delegation of authority model.

effort spent on implementation. By delegating control rights, the owner shifts this cost to the manager.[12]

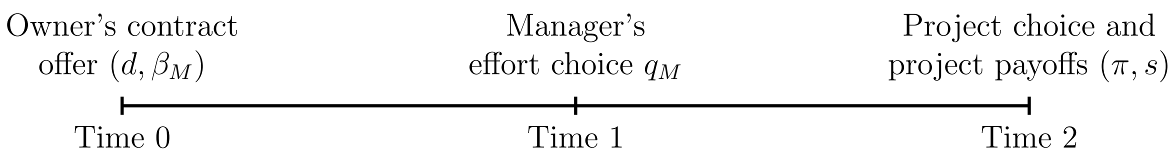

Figure 1: **Model timeline.**

Figure 1 summarizes the timeline of the model: at time 0, the owner offers a contract (d, β_M) to the manager, specifying both the delegation decision and the manager's equity stake; at time 1, the manager chooses their effort level q_M; at time 2, a project is chosen and implemented, and all payoffs are realized.

II Owner's Contracting Problem

In this section, we characterize the owner's contracting problem. We first determine each stakeholder's project choice at time two. We then determine the manager's effort choice at time one. Finally, we characterize the owner's contracting problem at time zero.

A Project Choice

At date two, an informed stakeholder $j \in \{O, M\}$ with control rights chooses the green project rather than the brown project if and only if

$$\underbrace{\beta_j \pi_G + \gamma_j s_G - c}_{\textit{Utility from green project}} \quad > \quad \underbrace{\beta_j \pi_B + \gamma_j s_B - c}_{\textit{Utility from brown project}} \quad \Leftrightarrow \quad \gamma_j > -\beta_j \frac{\Delta \pi}{\Delta s} \geq 0.$$

This inequality shows that a stakeholder will implement the green project if and only if their green preferences γ_j exceed $-\beta_j \frac{\Delta \pi}{\Delta s}$. Stakeholders with stronger green preferences are more willing to trade off lower monetary payoffs in favor of higher social payoffs, making them more likely to choose the green project. For example, a manager with stronger green preferences may be more willing to accept a lower wage or bonus if the organization generates

[12] We assume that the implementation cost is the same for the owner and the manager. Our results remain robust when this assumption is relaxed, as long as the manager's participation constraint is satisfied.

a higher social payoff, in line with the findings of Krueger et al. (2022). Similarly, an owner with stronger green preferences is willing to accept a lower financial return in exchange for a higher social return, consistent with empirical evidence (e.g., Riedl and Smeets, 2017).

Project choice also depends on the stakeholder's endogenous equity stake β_j. Specifically, a higher equity stake β_j strengthens the stakeholder's incentives to choose the brown project. Since the monetary payoffs are divided between the owner and manager, such that $\beta_O + \beta_M = 1$, increasing one stakeholder's equity stake necessarily reduces the other's, leading to opposing effects on their incentives.

Our framework distinguishes between monetary payoffs, which are a rival good that must be divided between stakeholders through equity stakes, and social payoffs, which have a public good nature—both stakeholders fully benefit from the organization's social impact regardless of ownership. This distinction between rival and non-rival payoffs proves central to our analysis.

Let (π_j, s_j) represent stakeholder j's preferred project. When neither the owner nor the manager has green preferences, $\gamma_O = \gamma_M = 0$, their preferred projects coincide, and no conflict of interest arises, regardless of their equity stakes.[13] Therefore, a necessary condition for their preferred projects to differ and for a conflict of interest to arise, $(\pi_O, s_O) \neq (\pi_M, s_M)$, is the presence of green preferences, $\gamma_O > 0$ or $\gamma_M > 0$.

B Managerial Effort

Given the owner's and manager's preferred projects, we can determine the manager's expected utility at time one, which determines their effort to become informed. Figure 2 illustrates how project choice at time two depends on the allocation of control rights and the manager's information acquisition. When the manager holds control rights ($d = M$) and is informed, they implement their preferred project (π_M, s_M). However, if the manager is uninformed, they follow the owner's recommendation and implement the owner's preferred project (π_O, s_O), giving the owner effective control. When the owner holds control rights ($d = O$), the owner implements their preferred project (π_O, s_O), regardless of whether the manager is informed.

[13] If $\beta_M = 0$, the manager is indifferent between the green and brown project and will choose the owner's preferred project. As we demonstrate below, in equilibrium, the owner would never give up all equity, such that $\beta_O > 0$.

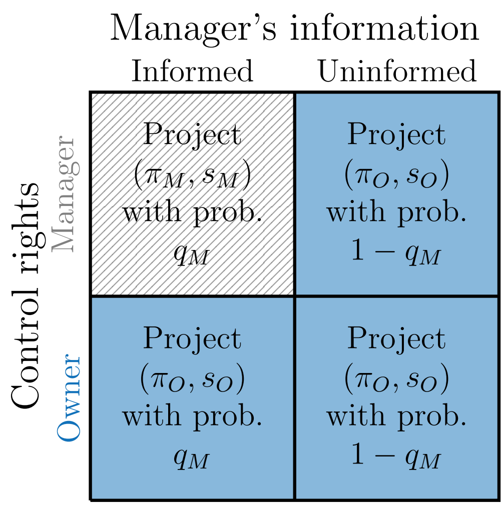

Figure 2: **Control rights and effective control.** This figure summarizes which project is implemented at time two and the probability of the different cases as a function of the allocation of control rights and the manager's information. The background color indicates who holds effective control, where blue-filled (gray-shaded) indicates that the owner (manager) has effective control.

The manager's expected utility at time one is given by

$$U_M(q_M, d, \beta_M) = \begin{cases} u_M(\pi_O, s_O) - \frac{\phi_M}{2} q_M^2, & \text{if } d = O, \\ q_M u_M(\pi_M, s_M) + (1 - q_M) u_M(\pi_O, s_O) - \frac{\phi_M}{2} q_M^2 - c, & \text{if } d = M. \end{cases} \tag{1}$$

This expression captures how the manager's utility depends on delegation d and effort q_M. When the owner holds control rights ($d = O$), the manager's effort does not affect project choice. In contrast, when the manager holds control rights ($d = M$), the probability of the owner having effective control decreases to $1 - q_M$, while the probability of the manager having effective control increases to q_M. Additionally, in this case, the manager incurs the implementation cost c. Regardless of the delegation decision, exerting effort imposes a cost on the manager.

The manager's equilibrium effort $q_M(d, \beta_M)$ maximizes their utility $U_M(q_M, d, \beta_M)$ and therefore depends on the contract (d, β_M). Equation (1) implies that the manager exerts no effort when the owner retains control rights, $q_M(O, \beta_M) = 0$, since effort cannot influence project choice. However, when the owner delegates control rights, the manager's optimal effort is:

$$q_M(M, \beta_M) = \min\left\{\frac{u_M(\pi_M, s_M) - u_M(\pi_O, s_O)}{\phi_M}, 1\right\}. \tag{2}$$

The manager exerts effort, $q_M(M, \beta_M) > 0$, if and only if there is a conflict of interest: $(\pi_O, s_O) \neq (\pi_M, s_M)$.

The manager's equity stake β_M affects their incentives to exert effort in two ways. First, when there is a conflict of interest, $(\pi_O, s_O) \neq (\pi_M, s_M)$, varying the manager's equity stake β_M influences their utility difference between the stakeholders' preferred projects, $u_M(\pi_M, s_M) - u_M(\pi_O, s_O) = \beta_M(\pi_M - \pi_O) + \gamma_M(s_M - s_O)$. In addition, varying β_M may alter the manager's and owner's preferred projects, potentially resolving the conflict of interest.

C Contracting Problem

At time zero, the owner offers a contract (d, β_M) to the manager. The owner's expected utility under this contract is:

$$U_O(d, \beta_M) = \begin{cases} u_O(\pi_O, s_O) - c, & \text{if } d = O, \\ q_M(M, \beta_M)u_O(\pi_M, s_M) + (1 - q_M(M, \beta_M))u_O(\pi_O, s_O), & \text{if } d = M. \end{cases}$$

When the owner does not delegate control rights ($d = O$), they retain effective control but must bear the implementation cost c. In contrast, under delegation ($d = M$), the owner risks losing effective control with probability $q_M(M, \beta_M)$ but avoids the implementation cost. This creates the fundamental trade-off in our model: the owner avoids incurring the implementation cost by delegating control rights but risks losing control over project choice. However, the owner can mitigate this loss of control by adjusting the manager's equity stake β_M. The owner thus selects the optimal contract (d^*, β_M^*) to maximize their utility: $\max_{(d,\beta_M)\in\{O,M\}\times[0,1]} U_O(d, \beta_M)$.

III Optimal Contracting

In this section, we study how the two stakeholders' green preferences shape the optimal contract (d^*, β_M^*). We first examine how the manager's green preferences γ_M influence the owner's contract offer, followed by the owner's green preferences γ_O. This analysis provides the foundation for examining the implications of stakeholders' green preferences for the organization's sustainability in Section IV and welfare in Section V.

A Manager's Preferences

To understand how the manager's green preferences γ_M affect contracting, we distinguish between two types of owners based on their green preferences. A green owner with strong green preferences ($\gamma_O \geq -\frac{\Delta\pi}{\Delta s}$) chooses the green project even when retaining full ownership ($\beta_O = 1$), while a brown owner with weak green preferences ($\gamma_O < -\frac{\Delta\pi}{\Delta s}$) selects the brown project under the same ownership conditions.

We first study the contract offered by a green owner ($\gamma_O \geq -\frac{\Delta\pi}{\Delta s}$).

Proposition 1 (Optimal Contract with Green Owner)**.** *A green owner delegates control rights to the manager, $d^* = M$, and offers no equity stake, $\beta_M^* = 0$.*

In our model, a green owner achieves their highest possible utility when the organization implements the green project, and they do not incur the implementation cost. The owner can achieve this outcome by delegating control rights while retaining full equity ownership. Specifically, the green owner leverages the public good nature of social payoffs to achieve alignment of incentives. This contract induces the manager to implement the green project, as without an equity stake, the manager weakly prefers the green project. As a result, the green owner optimally delegates control rights.

This mechanism highlights how the interaction between stakeholders' green preferences and the trade-off between monetary and social payoffs generates new insights for the governance of organizations. Our result that green owners can achieve their objectives through delegation while retaining full equity ownership contrasts with classic principal-agent models, where resolving conflicts of interest typically requires providing financial incentives such as equity compensation for managers (e.g., Shleifer and Vishny, 1997). The distinction arises because green owners can leverage the public good nature of social payoffs to align incentives without sacrificing ownership—a feature unique to our setting, where organizations may pursue both monetary and social objectives.

Unlike a green owner, a brown owner ($\gamma_O < -\frac{\Delta\pi}{\Delta s}$) faces a trade-off when delegating control rights and using equity to align incentives. When delegating control rights without offering the manager an equity stake ($\beta_M = 0$), the manager weakly prefers the green project, while the owner prefers the brown project. To reduce this conflict of interest, the owner can increase the manager's equity stake. However, this alignment of incentives comes at a cost: the owner's own equity stake decreases as the manager's equity stake increases. Proposition 2 characterizes how a brown owner optimally balances these competing forces.

Proposition 2 (Optimal Contract with Brown Owner). *There exist three thresholds $\underline{\gamma}_M$, $\bar{\gamma}_M$, and $\hat{\gamma}_M$, where $0 \leq \underline{\gamma}_M \leq \bar{\gamma}_M \leq \hat{\gamma}_M$,*[14] *such that a brown owner:*

(*i*) *Delegates control rights to the manager, $d^* = M$, if and only if the manager is not too green, that is, $\gamma_M < \hat{\gamma}_M$.*

(*ii*) *Offers a positive equity stake to the manager, $\beta_M^* > 0$, if and only if delegating control rights and the manager is green but not too green, that is, $\gamma_M \in (\underline{\gamma}_M, \bar{\gamma}_M)$.*

Proposition 2 implies that, in contrast to green owners, brown owners cannot, in general, achieve their highest possible utility. While delegating control rights saves them from bearing the implementation cost, it also leads to a loss of control over project choice, which may require sharing costly equity ownership to reduce the conflict of interest with the manager regarding project choice. Thus, our analysis uncovers an asymmetry in how green and brown owners approach delegation and compensation. While brown owners must balance the competing pressures of monetary incentives and green preferences, green owners can achieve their highest possible utility simply by delegating control rights. This asymmetry stems from the monetary-social payoff tension central to our model: green owners align incentives through a zero equity stake because they can leverage the public good nature of social payoffs, while brown owners must use costly equity compensation to do so.

Part (*ii*) of Proposition 2 reveals a non-monotonic relationship between managerial green preferences and equity compensation. When the manager has weak green preferences ($\gamma_M < \underline{\gamma}_M$), they exert minimal effort even without equity incentives, so offering compensation is not optimal under delegation. When the manager has intermediate green preferences ($\gamma_M \in (\underline{\gamma}_M, \bar{\gamma}_M)$), a brown owner who delegates control rights offers a positive equity stake to partially align incentives. When the manager has strong green preferences ($\gamma_M \geq \bar{\gamma}_M$), the owner offers no equity stake either because the cost of providing sufficient equity compensa-

[14]Note that we can have $\hat{\gamma}_M = \infty$ when the implementation cost c is sufficiently high, in which case the owner always delegates control rights.

tion to influence the manager's effort and project choice becomes prohibitively high under delegation or because the owner chooses not to delegate control rights in the first place.

Our results can also be interpreted in light of the recent increase in polarization. With a brown owner, the stronger the manager's green preferences γ_M, the more polarized the two stakeholders become. From Proposition 2 it then follows that the owner stops delegating control rights when the stakeholders become too polarized. Regarding compensation, the owner offers the manager an equity stake only at intermediate levels of polarization.

When a brown owner offers a positive equity stake, that stake rises with the manager's green preferences (Proposition 7 in the Appendix), and equilibrium effort rises as well, since the larger stake does not fully offset the manager's stronger green preferences (Proposition 8 in the Appendix). Figure 3 shows this increase in compensation together with the discontinuous drop to zero once the owner withdraws control rights at $\gamma_M = \hat{\gamma}_M$. Both relationships are therefore non-monotonic: a greener manager receives a larger stake and exerts more effort when control is delegated, but the stake and effort are zero when the owner retains control.

These dynamics imply that green preferences can generate managerial rent extraction (e.g., Bebchuk and Tallarita, 2022): a greener manager may receive a larger equity package without higher ability, because the brown owner must offer stronger monetary incentives to offset the manager's green preferences.

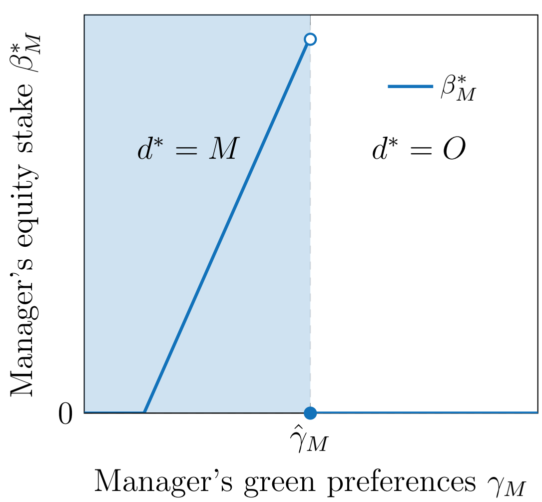

Figure 3: **Manager's green preferences and optimal contract.** The figure plots the equity stake β_M^* and delegation decision d^* from Proposition 2, as a function of the manager's green preferences γ_M in the case where $0 < \underline{\gamma}_M < \bar{\gamma}_M = \hat{\gamma}_M$.

B Owner's Preferences

In this section, we examine how the owner's green preferences γ_O shape the optimal contract (d^*, β_M^*). In Proposition 3, we describe the optimal contract, which we then illustrate in Figure 4.

Proposition 3 (Optimal Contract and Owner's Green Preferences)**.** *There exist two thresholds $\hat{\gamma}_O$ and $\bar{\gamma}_O$, where $\hat{\gamma}_O \leq \bar{\gamma}_O \leq -\frac{\Delta\pi}{\Delta s}$, such that the owner:*

(*i*) *Delegates control rights to the manager, $d^* = M$, if and only if the owner is sufficiently green, that is, $\gamma_O > \hat{\gamma}_O$.*

(*ii*) *Offers a positive equity stake to the manager, $\beta_M^* > 0$, if and only if delegating control rights and the owner is brown but not too brown, that is, $\gamma_O \in (\hat{\gamma}_O, \bar{\gamma}_O)$.*

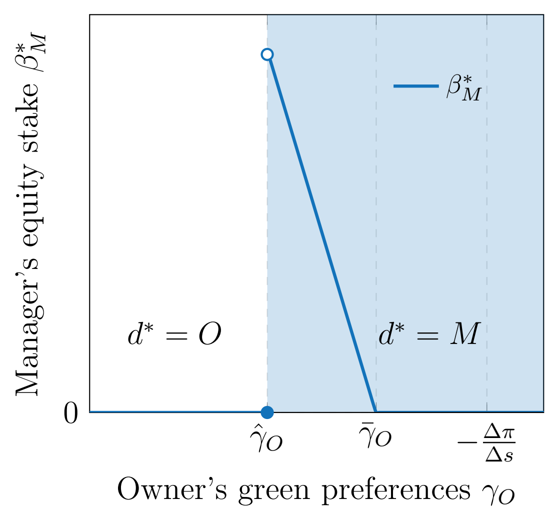

Figure 4: **Owner's green preferences and optimal contract.** The figure plots the equity stake β_M^* and delegation decision d^* from Proposition 3, as a function of the owner's green preferences γ_O in the case where $\hat{\gamma}_O < \bar{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$.

Proposition 3 mirrors our earlier analysis of the role of managerial green preferences. As discussed in Section III.A, a green owner always delegates control rights because they can perfectly align incentives at no cost by offering no equity stake and retaining full ownership. In contrast, while a brown owner may still find it optimal to delegate control rights when conflicts of interest are moderate, they may need to share ownership to better align incentives. Proposition 3 formalizes this reasoning: when the owner is sufficiently green ($\gamma_O \geq \bar{\gamma}_O$), the owner delegates control rights and offers no equity stake. If the owner is brown but not too brown ($\gamma_O \in (\hat{\gamma}_O, \bar{\gamma}_O)$), they opt for delegation while offering an equity stake to mitigate conflicts of interest. However, when the brown owner's green preferences are sufficiently weak ($\gamma_O \leq \hat{\gamma}_O$), aligning incentives would require such a large equity stake that the owner prefers to retain control rights despite bearing the implementation cost. In line with our interpretation of Proposition 2, these results can also be interpreted in light of the recent increases in polarization.

While our previous analysis demonstrates that a brown owner increases the equity stake to offset stronger managerial green preferences, the relationship between the owner's green preferences and the manager's equity stake works in the opposite direction. We show that an owner with stronger green preferences offers a lower equity stake when compensation is positive (Proposition 9 in the Appendix), eventually reaching zero equity compensation as their green preferences become sufficiently strong (Proposition 3). This shift toward zero equity compensation reflects the same mechanism observed with green owners: as the owner places greater value on the organization's social payoff, the conflict of interest with the manager narrows, reducing the need to offer equity compensation to align incentives.

IV Organization's Sustainability

We next study how the owner's and manager's green preferences affect the organization's expected social payoff—a measure of the greenness of the organization's outcomes—which we refer to as the organization's sustainability:

$$\mathbb{E}[\tilde{s}] = q_M s_M + (1 - q_M) s_O.$$

Here, both the manager's effort, q_M, and the social payoffs associated with the owner's and manager's preferred projects, s_O and s_M, are determined by the optimal contract (d^*, β_M^*). Higher expected social payoffs indicate a more sustainable organization, which could be measured through standard ESG metrics or the level of carbon emissions. However, as we formally study in Section V, more sustainable organizations may not necessarily be optimal from a welfare perspective.

A Manager's Preferences

In this section, we explore how the manager's green preferences affect the organization's sustainability, distinguishing between green and brown owners, in line with our earlier analysis of optimal contracts.

As shown previously, a green owner ($\gamma_O \geq -\frac{\Delta\pi}{\Delta s}$) always delegates control rights and offers no equity stake (Proposition 1). This contract ensures perfect alignment: without equity compensation, the manager weakly prefers the green project regardless of γ_M, so the green project is always implemented, and the organization's sustainability is constant at $\mathbb{E}[\tilde{s}] = s_G$, independent of the manager's green preferences.

Proposition 4 (Organization's Sustainability with Green Owner)**.** *With a green owner, the organization's sustainability is independent of the manager's green preferences γ_M and given by $\mathbb{E}[\tilde{s}] = s_G$.*

Our finding that green owners reach high sustainability through delegation speaks to proposals to expand shareholder voting rights on environmental and social issues (e.g., Hart and Zingales, 2017). In our framework, when owners have strong green preferences, they achieve their desired level of sustainability more efficiently by delegating to the manager than by exercising direct control, which forces them to bear the implementation cost. Expanding shareholder control over sustainability may therefore impose costs on green owners without improving outcomes.

Under a brown owner ($\gamma_O < -\frac{\Delta\pi}{\Delta s}$), the relationship between managerial green preferences and the organization's sustainability becomes more nuanced. Brown owners face a trade-off when considering delegation: they can save on their implementation cost by delegating control rights to the manager, but this loss of control may necessitate sharing equity ownership to better align the manager's incentives with the owner's preferences. This trade-off influences both the design of the optimal contract and the organization's sustainability.

Proposition 5 (Organization's Sustainability with Brown Owner)**.** *For a brown owner, for all $\gamma_M \neq \hat{\gamma}_M$, the organization's sustainability is weakly increasing in the manager's green preferences γ_M and strictly increasing in some cases. The organization's sustainability is weakly decreasing at $\hat{\gamma}_M$, and is strictly decreasing in some cases.*

As shown in Figure 5, the organization's sustainability generally improves with stronger managerial green preferences γ_M, but with a discontinuous drop when the owner withdraws control rights at $\gamma_M = \hat{\gamma}_M$. This pattern arises from the interaction of several channels identified in our contracting analysis.

First, as the manager's green preferences strengthen, the manager exerts more effort to gain greater effective control over project choice. In response, the owner increases the manager's equity stake (Proposition 7 in the Appendix), which partially reduces the manager's incentives to exert effort. However, this increase in the equity stake does not fully offset the manager's stronger green preferences (Proposition 8 in the Appendix). This results in an overall increase in the organization's sustainability through stronger managerial effort and effective control.

The positive relationship between the manager's green preferences and the organization's sustainability breaks down at $\gamma_M = \hat{\gamma}_M$, where the brown owner withdraws control rights. This shift leads to a discontinuous drop in sustainability, as control passes to the brown owner, who always implements the brown project. Figure 5 illustrates this decline, showing how changes in control rights can dominate the direct effects of stakeholder preferences on sustainability. Danone's removal of CEO Emmanuel Faber illustrates exactly this mechanism: control rights were withdrawn from a "green" CEO by "browner" shareholders, resulting in a discontinuous drop in the firm's sustainability. The other governance conflicts discussed in the introduction reflect the same reallocation of control rights at the investor and employee levels.

This result also implies that a decrease in the manager's green preferences at $\gamma_M = \hat{\gamma}_M$ can lead to an increase in the organization's sustainability. This happens because the change in preferences causes control rights to shift from the brown owner to the manager. Thus, a "backlash" against sustainability, captured in our model by a reduction in the manager's green preferences, could actually make the organization more sustainable. Overall, our results suggest that changes in the manager's green preferences can have the opposite effect on the organization's sustainability: a greener manager may reduce sustainability, and a browner one can enhance it.

Our analysis emphasizes the role of control rights in determining how green preferences impact an organization's sustainability. While a growing body of literature examines sustainable investing and green stakeholders, the governance dimension of control rights has been largely overlooked in this context. This stands in contrast to the central role of control rights in corporate governance and financial contracting (e.g., Aghion and Bolton, 1992;

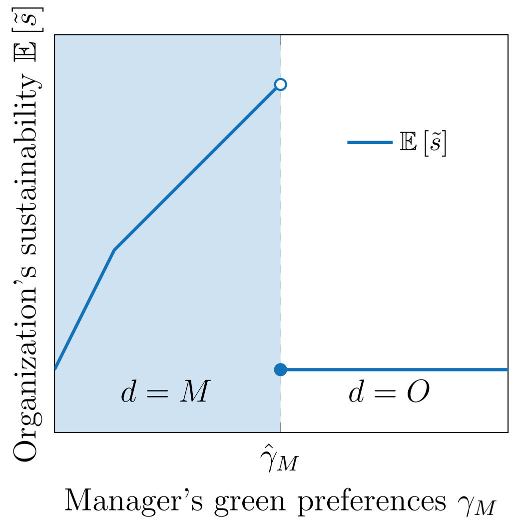

Figure 5: **Manager's green preferences and organization's sustainability with brown owner.** The figure plots the organization's sustainability, $\mathbb{E}[\tilde{s}]$ under a brown owner, as a function of the manager's green preferences γ_M.

Burkart et al., 1997). As some stakeholders increasingly demand that organizations address sustainability concerns, it becomes relevant to understand how control rights translate these demands into organizational outcomes.

These insights challenge traditional perspectives on corporate sustainability and governance. Contrary to the view that managerial engagement in sustainability generates private benefits at the expense of shareholders (e.g., Friedman, 1970), our model shows that owners may rationally delegate control rights to managers, even when this leads to greater sustainability than owners prefer. Our analysis of diverging stakeholder preferences also adds a novel governance perspective to the emerging literature on corporate polarization (e.g., Colonnelli et al., 2023; Fos et al., 2023; Kempf and Tsoutsoura, 2024; Ferreira and Nikolowa, 2025). In particular, our results show that what drives governance conflicts and sustainability outcomes is the *divergence* between stakeholders' green preferences, not their average level. This is precisely the force at work in the current environment: the recent ESG backlash does not represent a uniform retreat from sustainability but a widening of the preference gap between stakeholders, intensifying the very conflicts our model analyzes. Greater polarization can increase or decrease an organization's sustainability, which helps explain why some organizations retreat from ESG commitments even as average public concern for environmental issues appears to remain high (e.g., EPIC and AP-NORC, 2025).

B Owner's Preferences

We next analyze how changes in the owner's green preferences influence the organization's sustainability. Our earlier analysis shows that as owners become greener, they are more likely to delegate control rights and, when doing so, may offer an equity stake that they progressively reduce as they become greener. These changes in optimal contracts have implications for sustainability outcomes.

Proposition 6 (Organization's Sustainability and Owner's Green Preferences)**.** *The organization's sustainability weakly increases in the owner's green preferences γ_O and is strictly increasing in some cases.*

The relationship between the owner's green preferences and the organization's sustainability, as shown in Figure 6, differs from that of managerial preferences. Specifically, at the threshold $\hat{\gamma}_O$, the owner begins delegating control rights, resulting in an upward jump in sustainability as control shifts from the brown owner to the manager. At $\gamma_O = -\frac{\Delta\pi}{\Delta s}$, the owner becomes green, further increasing sustainability as the owner's preferences align with the green project. Notably, the results indicate that a greener owner always enhances the organization's sustainability, while a browner owner leads to a decrease in sustainability.

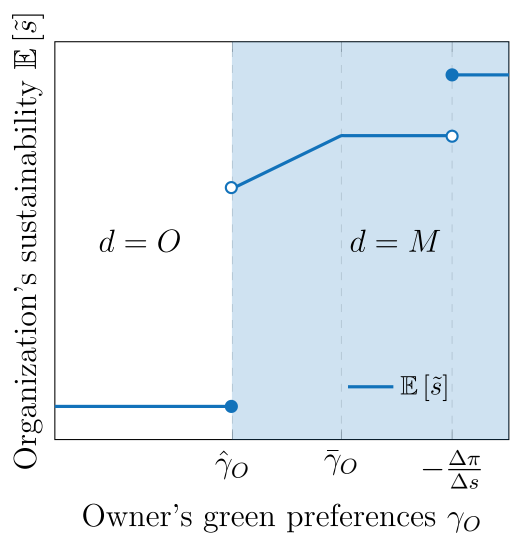

Figure 6: **Owner's green preferences and organization's sustainability.** The figure plots the organization's sustainability $\mathbb{E}[\tilde{s}]$ as a function of the owner's green preferences γ_O.

Our results on the impact of stakeholders' green preferences on an organization's sustainability can also be interpreted through the lens of polarization. When more polarization is driven by the manager becoming greener (Proposition 5), its effect on sustainability is ambiguous: stronger managerial green preferences raise sustainability except when they trigger the owner to withdraw control rights, causing a discontinuous decline. In contrast, when more polarization is driven by the owner becoming less green (Proposition 6), the effect is unambiguous: sustainability always declines.

These results highlight an asymmetry between *top-down* and *bottom-up* approaches to influencing an organization's sustainability. A bottom-up approach, driven by changes in the manager's green preferences, can lead to changes in control rights that have unintended effects on the organization's sustainability. Specifically, a greener manager may inadvertently reduce the organization's sustainability, while a browner manager might increase it. In contrast, a top-down approach has the intended effect on sustainability: a greener owner always enhances sustainability, while a browner owner inevitably reduces it. This asymmetry suggests that an organization's sustainability may be more effectively shaped by initiatives targeting the ownership structure rather than focusing on managerial behavior. Our analysis also underscores that even small changes in stakeholder preferences can lead to significant shifts in sustainability outcomes through changes in control rights.

V Welfare

A natural question is whether changes in green preferences that increase sustainability also enhance welfare. As we show in this section, organizational sustainability and welfare are distinct objectives: changes in green preferences that make an organization more sustainable need not enhance welfare and may even reduce it. To identify the economic forces behind this divergence, we decompose the welfare impact of a change in green preferences. Internet Appendix A contains the formal results and proofs.

We define welfare as the sum of the utilities of the owner, the manager, and an outside stakeholder who assigns weight $\gamma_R \geq 0$ to the social payoff and captures externalities the organization's decision-makers ignore, such as toxic emissions that affect local communities or environmental damage that affects broader society. The green project then maximizes welfare if and only if $\Delta\pi + (\gamma_O + \gamma_M + \gamma_R)\Delta s \geq 0$, and equilibrium welfare equals

$$W = U_O(d^*, \beta_M^*) + U_M(d^*, \beta_M^*) + \gamma_R \mathbb{E}[\tilde{s}] = \mathbb{E}\left[\pi + (\gamma_O + \gamma_M + \gamma_R)\tilde{s}\right] - \frac{\phi_M}{2}\left(q_M\right)^2 - c,$$

where (d^*, β_M^*) is the equilibrium contract and q_M the equilibrium effort.

When the delegation decision is unchanged, a change in green preferences $\gamma \in \{\gamma_O, \gamma_M, \gamma_R\}$ affects welfare through two channels (Proposition 10 in the Internet Appendix):[15]

$$\frac{\partial W}{\partial \gamma} = \underbrace{\mathbb{E}[\tilde{s}]}_{\textit{Level effect}} + \underbrace{\frac{\partial q_M}{\partial \gamma}\left((1-\beta_M^*)\Delta\pi + (\gamma_O + \gamma_R)\Delta s\right)}_{\textit{Effort effect}}.$$

The *level effect* captures how a higher weight on social payoffs directly alters welfare: it is positive if and only if the organization's expected social payoff is positive. For instance, when the organization is expected to generate negative externalities, placing more weight on them mechanically reduces welfare.

The *effort effect* captures how the preference change alters contracting and managerial effort. It equals the change in effort times the owner's and outside stakeholder's combined utility gain from the green rather than the brown project. The manager's own utility does not appear, as any benefit from higher effort is exactly offset by its marginal cost—an application of the envelope theorem. The effort effect can raise or lower welfare. Under a brown owner, stronger managerial green preferences raise effort and tilt the organization toward the green project the owner dislikes. As a result, the impact on welfare is negative when the outside stakeholder's green preferences are weak and positive when they are sufficiently strong.

When a change in green preferences instead shifts control rights, welfare changes by (Proposition 11 in the Internet Appendix):

$$\begin{aligned}\Delta W &= W(d=M) - W(d=O)\\ &= \underbrace{\beta_M^*\left(\pi_B + q_M\Delta\pi\right) + q_M\gamma_M\Delta s - \frac{\phi_M}{2}\left(q_M\right)^2}_{\textit{Control effect}\geq 0} \quad \underbrace{-c}_{\substack{\textit{Implementation}\\ \textit{cost effect}<0}} \quad + \underbrace{\gamma_R q_M \Delta s}_{\substack{\textit{Externality}\\ \textit{effect}\geq 0}},\end{aligned}$$

where a shift toward the manager changes welfare by ΔW and a shift toward the owner by $-\Delta W$. The owner's utility does not appear, because the owner is indifferent between delegating and retaining control at the delegation threshold. The manager, however, faces a tradeoff: gaining control raises utility through project choice—the *control effect*—but im-

[15] If welfare is only left- and right-differentiable, then the formula applies to the left or right derivative. The formula fails to hold when welfare is not continuous, which may be the case when changing the manager's preferences γ_M at $\gamma_M = \bar{\gamma}_M$ (see Proposition 2) or changing the owner's preferences γ_O at $\gamma_O \in \{\bar{\gamma}_O, -\frac{\Delta\pi}{\Delta s}\}$ (see Proposition 3) since the manager's effort may not be continuous.

poses the implementation cost—the *implementation cost effect*. The outside stakeholder is better off, since managerial control makes the green project weakly more likely—the *externality effect*.

The control and externality effects move with the organization's sustainability, which weakly rises as control shifts to the manager, whereas the implementation cost effect moves against it. As a result, a preference change that shifts control to the manager—and thereby weakly increases sustainability—can either raise or lower welfare; conversely, a shift toward the owner weakly lowers sustainability but can move welfare in either direction.

VI Additional Results

This section presents several additional results. The Internet Appendix contains the formal analyses and proofs.

A Social Compensation

A natural conjecture is that an owner who wants to promote sustainability should tie the manager's pay to the organization's social payoff. We show that such ESG-linked compensation is never optimal in our framework. Proposition 12 in Internet Appendix B establishes that, even when the owner can reward the manager directly for the social payoff s, the owner optimally sets this social compensation to zero.

The reason is that, absent any compensation, the manager already weakly prefers the green project, so the only purpose of compensation is to tilt the manager toward the brown project or to dampen effort. Social compensation does precisely the opposite. A green owner therefore has no need for it, aligning incentives through the public good nature of social payoffs while retaining full ownership, and a brown owner has no reason to reward the green project they dislike. This result challenges the idea that ESG-linked compensation may be necessary to promote sustainability (e.g., Hong et al., 2016; Flammer et al., 2019), suggesting instead that it raises managerial pay without advancing owners' objectives (e.g., Bebchuk and Tallarita, 2022). It is consistent with Efing et al. (2025), who find that the amount of ESG compensation in CEO contracts is immaterial.

B Complementarity of Delegation and Compensation

The owner chooses both whether to delegate control rights and how much equity compensation to grant. We show that these two instruments are complements: access to one makes the owner more willing to use the other. Proposition 13 in Internet Appendix C establishes that the availability of equity compensation makes the owner more willing to delegate, while the option to delegate makes a positive equity stake worthwhile.

On the one hand, the availability of equity compensation makes a brown owner more willing to delegate. Without it, the conflict with a green manager may be too large to delegate control rights, as the manager would exert substantial effort to implement the green project. Equity allows the owner to shift the manager's incentives toward the brown project, thereby rendering delegation viable where it otherwise would not be. On the other hand, the option to delegate makes a positive equity stake worthwhile. When the owner retains control, the manager's preferences do not affect project choice, so equity serves no purpose; only under delegation does aligning incentives through compensation create value.

Importantly, this complementarity is asymmetric across owner types. Green owners do not rely on it, since they align incentives through the public good nature of social payoffs and delegate regardless of whether equity is available, whereas brown owners depend on it. An implication is that restrictions on equity compensation, such as say-on-pay provisions, reduce delegation more in organizations with brown owners than in those with green owners.

C Manager's Span of Influence

Many principal-agent relationships feature free-rider problems that arise when outcomes depend on the collective efforts of many parties, such as other members of the management team or other workers involved in production. To capture this, we allow the manager to control only a fraction of the organization's outcomes—the span of influence—with the remainder determined by other agents. We develop this extension formally in Internet Appendix D.

For a given span of influence, the qualitative structure of the optimal contract is unchanged, but the manager's span of influence shapes a brown owner's contract offer and, in turn, the organization's sustainability. As the manager's influence falls, the conflict of interest between the owner and manager shrinks, so the benefit of equity compensation declines while its cost does not. As a result, a brown owner reduces and eventually eliminates the manager's equity stake once the manager's influence is sufficiently small (Proposition 14 in Internet Appendix D). Conversely, as the manager's influence rises, the conflict intensifies, and a brown owner may withdraw control rights, lowering sustainability (Proposition 15 in Internet Appendix D). Green owners are unaffected, as they continue to align incentives through the public good nature of social payoffs. An implication is that mergers or growth initiatives that expand managerial influence reduce delegation more in brown-owner organizations than in green-owner ones, and can thereby reduce sustainability more under brown ownership.

VII Empirical Implications and Testable Predictions

In this section, we discuss the empirical implications of our model and relate them to existing evidence. While we adopt the terms owners and managers for the principal and agent in our framework, our results have broader applicability and can be extended to various principal-agent relationships, such as managers and employees, and boards and CEOs.

As discussed in the introduction, stakeholder conflicts over externalities are routinely resolved through reallocations of control rights, the central mechanism of our model, and arise at every level of the organization.[16] Systematic evidence confirms these dynamics operate at scale: Colak et al. (2024) document that, across 18 countries, CEOs facing sustainability-related conflicts are approximately nine percentage points more likely to be replaced. What drives these conflicts is not a uniform shift in average preferences but the widening gap between stakeholders.

Understanding these patterns requires a framework that combines conflicts of interest over public goods with the endogenous allocation of control rights. Neither standard agency theories nor public goods theories alone can capture how preference conflicts over externalities are resolved through reallocations of control rights. Our framework combines both and generates testable predictions in three areas: control rights, compensation, and organizational sustainability.

[16] Beyond outright mandate withdrawals, voting choice has emerged as another mechanism through which principals restrict agents' authority over sustainability decisions; see Malenko and Malenko (2023).

A Control Rights

Our model generates predictions regarding stakeholders' green preferences and control rights (Propositions 1 and 2).

Prediction 1 (Control Rights)**.** *Principals who focus on financial returns are more inclined to restrict agents' control rights when faced with conflicts over sustainability policies, compared to principals who prioritize social outcomes.*

Control rights can be measured through CEO turnover, which represents the most extreme form of the withdrawal of control rights. While Huang et al. (2020) show that disagreement between investors and management over traditional financial objectives drives CEO turnover, our model extends this insight to conflicts over sustainability policies. Our model predicts a novel asymmetry: changes in control rights are more likely when owners prioritize financial returns but less likely when owners have green preferences. While existing literature measures shareholders' and other investors' non-financial preferences through surveys (e.g., Bauer et al., 2021), experiments (e.g., Bonnefon et al., 2025), and public commitments (e.g., Kacperczyk and Peydró, 2022; Bolton and Kacperczyk, 2026), it has not directly explored their relationship with stakeholder disagreement or turnover patterns.

Board composition changes provide another empirically observable manifestation of control rights reallocation. Activist investors frequently seek board seats through proxy contests or settlement agreements, effectively strengthening their control over corporate decisions rather than delegating them to potentially misaligned agents (e.g., Brav et al., 2008; Bebchuk et al., 2020). While previous studies have examined how green shareholders engage in corporate governance (e.g., Di Giuli and Kostovetsky, 2014; Dimson et al., 2015; McCahery et al., 2016; Dyck et al., 2019; Dasgupta et al., 2021), the link between stakeholders' green preferences and board-level control rights reallocations remains largely unexplored and offers a promising avenue for testing our predictions about the asymmetric responses of green and brown owners to preference conflicts.

B Compensation

Our model generates novel predictions regarding stakeholders' green preferences and equity-based compensation (see Propositions 7 and 9 in the Appendix).

Prediction 2 (Compensation). *Organizations with greener principals tend to offer less equity-based compensation to agents, given control rights. On the other hand, equity-based compensation rises with agents' green preferences when they are moderate but may decline when these preferences become strong.*

The first part of the prediction aligns with evidence suggesting that environmentally friendly firms tend to pay lower equity-based compensation to CEOs (Francoeur et al., 2017). Our framework provides a theoretical foundation for this finding: green owners optimally reduce equity stakes to exploit the public good nature of social payoffs, achieving alignment without costly ownership transfers (Proposition 1). The second part introduces a novel prediction linking managers' green preferences to their compensation levels. While recent research has attempted to measure managerial social preferences (e.g., Guenzel et al., 2023; Feng et al., 2024), it has not yet explored how these preferences relate to compensation practices. Our prediction emphasizes that agents' equity stake initially increases in their green preferences but may decrease once those preferences become stronger.

C Organizational Sustainability

Our model generates predictions about stakeholders' green preferences and organizational sustainability (Propositions 4, 5, and 6).

Prediction 3 (Organizational Sustainability). *A top-down approach through changes in principals' green preferences always produces the intended effect on an organization's sustainability, strengthening as the principal's green preferences increase and weakening as they decrease. In contrast, a bottom-up approach through changes in agents' green preferences can have the opposite effect on sustainability.*

This prediction helps reconcile mixed empirical evidence on the impact of green investors on firms' social and environmental performance. While some studies find positive effects (e.g., Di Giuli and Kostovetsky, 2014; Chen et al., 2020), others document negative effects (e.g., Kim et al., 2025) or no effects (e.g., Heath et al., 2023). Existing theories of sustainable investing typically predict a monotonically positive relationship between stakeholders' green preferences and organizational sustainability. Our framework overturns this prediction: the relationship is non-monotonic (Proposition 5). The mixed evidence is therefore an expected feature of the data, not a puzzle.

Our framework also suggests that conflicting results may stem from differences in how green preferences affect control rights across various contexts. Investors may act as principals, such as banks investing directly in companies, or as agents, like asset managers investing on behalf of clients. For instance, BlackRock's increasingly green stance as an agent—asset manager—initially enhanced its influence on the sustainability of portfolio companies, but the subsequent withdrawal of funds or voting rights by its principals reduced this impact. These mandate withdrawals are precisely the control-rights reallocations our model predicts: principals restricting agents' influence when preference conflicts become too severe. Our model suggests that asset managers' recent moderation of ESG commitments may benefit sustainability by helping them retain control over portfolio companies through larger asset holdings or retention of voting rights.

Moreover, our framework explains why many organizations that embraced sustainability have subsequently scaled back their commitments even as average public concern for environmental issues appears to remain high (e.g., EPIC and AP-NORC, 2025). The key insight is that what matters is not the average level of green preferences but the *gap* between stakeholders. As preference polarization widens—with some stakeholders becoming greener and others becoming browner—control rights conflicts intensify, and organizations may retreat from sustainability commitments, even without any change in average preferences. Consistent with this mechanism, Gormley et al. (2026) document that institutional investors are less likely to support environmental and social shareholder proposals in states with Republican leadership, providing direct evidence that political polarization shapes how investors exercise their governance rights on sustainability issues. The recent ESG backlash, therefore, illustrates our mechanism: it is not a uniform retreat from sustainability but a widening of the preference gap between stakeholders, intensifying the very conflicts our model analyzes.

A complementary prediction concerns the channel through which agents shape sustainability, namely effort (Proposition 8 in the Appendix). Our model also predicts that greener agents enhance sustainability by exerting more effort and gaining effective control, conditional on control rights. This prediction aligns with evidence of higher effort levels among green employees (e.g., Hedblom et al., 2019; Krueger et al., 2022) and CEOs' influence through personal values (e.g., Guenzel et al., 2023; Feng et al., 2024). Our model shows this relationship emerges endogenously even under optimal contracting: although a brown owner raises the agent's equity stake to counteract stronger green preferences (Proposition 7), this increase in monetary incentives does not fully offset the agent's stronger motivation, so equilibrium effort still rises (Proposition 8). Importantly, this positive relationship holds only conditional on control rights being delegated. Once the agent's green preferences exceed the delegation threshold, the principal withdraws control rights, and effort drops to zero—a discontinuity that distinguishes our prediction from a simple monotonic relationship between green preferences and effort.

VIII Conclusion

This paper develops a theory of stakeholder governance that examines how green preferences influence an organization's sustainability through control rights. Our analysis reveals that while stronger green preferences enhance sustainability when implemented top-down through ownership, they may lead to unintended negative consequences when operating bottom-up through managerial preferences, as they can trigger reallocations of control rights that dominate the direct effect.

The framework is built to study conflicts arising from heterogeneous green preferences. In an environment of rising stakeholder polarization—where some demand sustainability action while others oppose it—these conflicts intensify as the preference gap between stakeholders widens. Our model shows that it is this divergence, not the average level of green preferences, that drives governance conflicts and sustainability outcomes. The recent ESG backlash further illustrates this mechanism: organizations retreat from sustainability commitments not because average preferences have shifted but because polarization has widened the gap between stakeholders, intensifying control rights conflicts.

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Appendix

A Optimal Contract

Proof of Proposition 1. The green owner's utility is bounded from above

$$U_O(d, \beta_M) \leq \pi_G + \gamma_O s_G,$$

since the owner's utility is less than the maximum utility they get from the green project, $\pi_G + \gamma_O s_G$.

Observe that for $(d, \beta_M) = (M, 0)$ we have that

$$U_O(M, 0) = \pi_G + \gamma_O s_G.$$

Therefore, when delegating control rights, the optimal contract with the smallest β_M is $(d, \beta_M) = (M, 0)$.[17]

Furthermore, retaining control rights yields

$$\begin{aligned} U_O(O, \beta_M) &= \max\{(1 - \beta_M)\pi_G + \gamma_O s_G, (1 - \beta_M)\pi_B + \gamma_O s_B\} - c \\ &\leq \pi_G + \gamma_O s_G - c \\ &< \pi_G + \gamma_O s_G \\ &= U_O(M, 0), \end{aligned}$$

and therefore, a contract in which the owner retains control rights cannot be optimal. Therefore, the optimal contract with the smallest β_M is $(d^*, \beta_M^*) = (M, 0)$. □

Proof of Proposition 2. Before proceeding with the proof, we define $\bar{\beta}_M^M := -\gamma_M \frac{\Delta s}{\Delta \pi}$ and $\bar{\beta}_M^O := 1 + \gamma_O \frac{\Delta s}{\Delta \pi}$, which are the values of β_M for which the manager and the owner are indifferent between the green and the brown project, respectively. Further, define $\underline{\beta}_M := \min\{\bar{\beta}_M^M, \bar{\beta}_M^O\}$ and $\bar{\beta}_M := \max\{\bar{\beta}_M^M, \bar{\beta}_M^O\}$. Note that since we consider a brown owner, $\gamma_O < -\frac{\Delta \pi}{\Delta s}$, we have $\bar{\beta}_M^O \in (0, 1]$.

[17] Recall that we assume the owner chooses the smallest equity stake if indifferent.

The owner's utility when the manager holds control rights, $U_O(M, \beta_M)$, is given by

$$\begin{cases} (1-\beta_M)\pi_B + \gamma_O s_B + q_M(M,\beta_M)((1-\beta_M)\Delta\pi + \gamma_O \Delta s), & \text{if } \beta_M \leq \underline{\beta}_M, \\ \max\{(1-\beta_M)\pi_G + \gamma_O s_G, (1-\beta_M)\pi_B + \gamma_O s_B\}, & \text{if } \underline{\beta}_M < \beta_M < \bar{\beta}_M, \\ (1-\beta_M)\pi_G + \gamma_O s_G - q_M(M,\beta_M)((1-\beta_M)\Delta\pi + \gamma_O \Delta s), & \text{if } \beta_M \geq \bar{\beta}_M, \end{cases} \tag{A.1}$$

where

$$q_M(M,\beta_M) = \begin{cases} \min\left\{\frac{\beta_M \Delta\pi + \gamma_M \Delta s}{\phi_M}, 1\right\}, & \text{if } \beta_M < \underline{\beta}_M, \\ 0, & \text{if } \underline{\beta}_M \leq \beta_M \leq \bar{\beta}_M, \\ \min\left\{\frac{\beta_M(-\Delta\pi) + \gamma_M(-\Delta s)}{\phi_M}, 1\right\}, & \text{if } \beta_M > \bar{\beta}_M. \end{cases}$$

We want to show that $U_O(M, \beta_M)$ is continuous in β_M. For $\beta_M \notin \{\underline{\beta}_M, \bar{\beta}_M\}$, this follows directly from the functions. At $\underline{\beta}_M$, there are two cases. First, $\underline{\beta}_M = \bar{\beta}^M_M$ and then $q_M(M, \underline{\beta}_M) = 0$ and $\max\{(1-\underline{\beta}_M)\pi_G + \gamma_O s_G, (1-\underline{\beta}_M)\pi_B + \gamma_O s_B\} = (1-\underline{\beta}_M)\pi_B + \gamma_O s_B$, which ensures continuity at $\underline{\beta}_M$. Second, $\underline{\beta}_M = \bar{\beta}^O_M$ and then $(1-\underline{\beta}_M)\Delta\pi + \gamma_O \Delta s = 0$, which ensures continuity. Similar arguments imply continuity at $\bar{\beta}_M$.

The proof proceeds in several steps. We first establish optimal compensation conditional on control rights (Steps 1-4), and then optimal delegation of control rights (Step 5).

Step 1. We first establish that an optimal equity stake given the delegation of control rights $\beta^*_M(M)$ satisfies $\beta^*_M(M) \leq \bar{\beta}^M_M$ and $\beta^*_M(M) \leq \bar{\beta}^O_M$. It is straightforward to show that $U_O(M, \beta_M) < U_O(M, \underline{\beta}_M)$ for all $\beta_M > \underline{\beta}_M$.[18] In particular, this result implies that $\beta^*_M(M) \leq \underline{\beta}_M$ such that we can restrict attention to the first case of the owner's utility function in equation (A.1) when determining the optimal equity stake.

The result also implies that when $\gamma_M = 0$, we have $\beta^*_M(M) = 0$ since $\bar{\beta}^M_M = 0$ in this case. For the remainder of the proof, we therefore consider the case $\gamma_M > 0$.

Step 2. In this second step, we establish several properties of the owner's utility function

[18] For $\beta_M \in (\underline{\beta}_M, \bar{\beta}_M)$ (the second case in equation (A.1)), it follows that for the derivative of $U_O(M, \beta_M)$ with respect to β_M is either $-\pi_G$ or $-\pi_B$, which means that the owner's utility is strictly decreasing in β_M for $\beta_M \in (\underline{\beta}_M, \bar{\beta}_M)$. For $\beta_M \geq \bar{\beta}_M$ (the third case in equation (A.1)), the derivative of $U_O(M, \beta_M)$ with respect to β_M is $-\pi_G - \frac{\partial q_M(M,\beta_M)}{\partial \beta_M}((1-\beta_M)\Delta\pi + \gamma_O \Delta s) + q_M(M,\beta_M)\Delta\pi < 0$ since $\frac{\partial q_M(M,\beta_M)}{\partial \beta_M} \geq 0$ and $(1-\beta_M)\Delta\pi + \gamma_O \Delta s \geq 0$ in this case. Therefore, $U_O(M, \beta_M)$ is strictly decreasing for $\beta_M \geq \underline{\beta}_M$.

$U_O(M, \beta_M)$. To do so, it is helpful to define the following auxiliary function for $\beta_M \in [0, \underline{\beta}_M]$:

$$F(\beta_M) := (1-\beta_M)\pi_G + \gamma_O s_G - (1 - \tilde{q}_M(M, \beta_M)) \underbrace{((1-\beta_M)\Delta\pi + \gamma_O \Delta s)}_{\leq 0}, \tag{A.2}$$

where

$$\tilde{q}_M(M, \beta_M) = \frac{\beta_M \Delta\pi + \gamma_M \Delta s}{\phi_M}.$$

That is, F is the owner's utility adjusted by not imposing the maximum effort of 1.

We have $U_O(M, \beta_M) = F(\beta_M)$ when $q_M(M, \beta_M) < 1$. Note that $\tilde{q}_M(M, \beta_M) \geq 0$ for $\beta_M \leq \underline{\beta}_M$ as $\tilde{q}_M(M, \beta_M) \geq \tilde{q}_M(M, \underline{\beta}_M) \geq \tilde{q}_M(M, \bar{\beta}_M^M) = 0$. When $q_M(M, \beta_M) = 1$, then $U_O(M, \beta_M) = (1-\beta_M)\pi_G + \gamma_O s_G$. From equation (A.2) it follows that for $\beta_M \leq \underline{\beta}_M$ and $\beta_M < \bar{\beta}_M^O$, we have

$$(1-\beta_M)\pi_G + \gamma_O s_G \geq F(\beta_M) \quad \Leftrightarrow \quad \tilde{q}_M(M, \beta_M) \geq 1 \quad \Leftrightarrow \quad q_M(M, \beta_M) = 1.$$

For $\beta_M = \bar{\beta}_M^O$, we have $F(\beta_M) = (1-\beta_M)\pi_G + \gamma_O s_G$. In particular, we have

$$U_O(M, \beta_M) = \max\left\{F(\beta_M), (1-\beta_M)\pi_G + \gamma_O s_G\right\}.$$

Note further that the function F has the form

$$F(\beta_M) = A\beta_M^2 + B\beta_M + C,$$

where $A < 0$. Thus, $F(\beta_M)$ is strictly concave.

In addition, $\tilde{q}_M(M, \beta_M)$ is strictly decreasing in β_M. As a result, there are three cases:

1. If $\tilde{q}_M(M, 0) < 1$, then $q_M(M, \beta_M) < 1$ for all $\beta_M \in [0, \underline{\beta}_M]$.

2. If $\tilde{q}_M(M, 0) = 1$, then $q_M(M, 0) = 1$ and $q_M(M, \beta_M) < 1$ for all $\beta_M \in (0, \underline{\beta}_M]$.

3. If $\tilde{q}_M(M, 0) > 1$, then there exists an interval $[0, \eta] \subseteq [0, \underline{\beta}_M]$ such that $q_M(M, \beta_M) = 1$ for all $\beta_M \in [0, \eta]$ and $q_M(M, \beta_M) < 1$ for all $\beta_M \in (\eta, \underline{\beta}_M]$.

Note that we have $\tilde{q}_M(M, 0) > 1 \Leftrightarrow \gamma_M > \frac{\phi_M}{\Delta s}$. In particular, if $\gamma_M \leq \frac{\phi_M}{\Delta s}$, then

$$U_O(M, \beta_M) = F(\beta_M). \tag{A.3}$$

If $\gamma_M > \frac{\phi_M}{\Delta s}$, then

$$U_O(M, \beta_M) = \begin{cases} (1-\beta_M)\pi_G + \gamma_O s_G, & \text{if } \beta_M \leq \eta, \\ F(\beta_M), & \text{if } \eta < \beta_M \leq \underline{\beta}_M. \end{cases} \tag{A.4}$$

Note that the interval $(\eta, \underline{\beta}_M]$ may be empty.

Step 3. A necessary condition for $\beta_M > 0$ to be optimal is that

$$F'(0) = \frac{\Delta\pi(\Delta\pi + \Delta s(\gamma_O - \gamma_M))}{\phi_M} - \pi_B > 0. \tag{A.5}$$

The reason is that, since $F(\beta_M)$ is strictly concave, if $F'(0) \leq 0$, then $F(\beta_M)$ is strictly decreasing for $\beta_M \in (0, \underline{\beta}_M]$ and $U_O(M, \beta_M) = \max\{F(\beta_M), (1-\beta_M)\pi_G + \gamma_O s_G\}$ is strictly decreasing for $\beta_M \in (0, \underline{\beta}_M]$. The condition $F'(0) > 0$ can be rewritten as

$$\gamma_M > \underline{\gamma}_M = \frac{\Delta\pi\,(\Delta\pi + \Delta s \gamma_O) - \pi_B \phi_M}{\Delta\pi\Delta s}.$$

Note that the derivative $F'(0)$ is strictly increasing in γ_M.

There are several cases:

1. Consider the case $\underline{\gamma}_M \leq 0$. When $\gamma_M \in (0, \frac{\phi_M}{\Delta s}]$, then $U_O(M, \beta_M)$ has the form in equation (A.3) and therefore $\beta^*_M(M) > 0$ since $F'(0) > 0$. When $\gamma_M > \frac{\phi_M}{\Delta s}$, then $U_O(M, \beta_M)$ has the form in equation (A.4). Since the function is strictly decreasing for $\beta_M \leq \eta$ ($\frac{\partial U_M(M,\beta_M)}{\partial \beta_M} = -\pi_G < 0$), the optimum of $U_O(M, \beta_M)$ is either $\beta^*_M(M) = 0$ or $\beta^*_M(M) \in (\eta, \underline{\beta}_M]$.

   As a next step, we show that $\max_{\beta_M \in [0, \underline{\beta}_M]} U_O(M, \beta_M)$ is continuous and weakly decreasing in γ_M when $\gamma_M > \frac{\phi_M}{\Delta s}$. Note that while the optimal equity stake will be in the interval $[0, \underline{\beta}_M]$, it is convenient to consider $U_O(M, \beta_M)$ up to $\bar{\beta}^O_M$, which is extending the interval of consideration if $\bar{\beta}^M_M < \bar{\beta}^O_M$. Specifically, note that

$$\max_{\beta_M \in [0, \underline{\beta}_M]} U_O(M, \beta_M) = \max_{\beta_M \in [0, \bar{\beta}^O_M]} U_O(M, \beta_M),$$

   since $U_O(M, \beta_M)$ is strictly deceasing in β_M for $\beta_M \in [\bar{\beta}^M_M, \bar{\beta}^O_M]$ so that we can consider the latter maximum.

   For every $\eta < \beta_M < \underline{\beta}_M$, $\tilde{q}_M(M, \beta_M)$ is strictly increasing in γ_M. As a result, $F(\beta_M)$

is strictly decreasing in γ_M. Further, note that for $\beta_M < \eta$ and, for $\beta_M \in (\bar{\beta}_M^M, \bar{\beta}_M^O]$, $U_O(M, \beta_M)$ is independent of γ_M. At $\beta_M = \eta$, we have $\tilde{q}_M(M, \beta_M) = 1$. If γ_M increases marginally, then $U_O(M, \beta_M)$ is constant, and $U_O(M, \beta_M)$ strictly increases when γ_M decreases marginally since $\tilde{q}_M(M, \beta_M)$ is strictly increasing in γ_M. If $\bar{\beta}_M^M < \bar{\beta}_M^O$, then at $\beta_M = \bar{\beta}_M^M$, we have $\tilde{q}_M(M, \beta_M) = 0$. If γ_M increases marginally, then $U_O(M, \beta_M)$ is strictly decreasing since $\tilde{q}_M(M, \beta_M)$ is strictly increasing in γ_M. It is constant when γ_M decreases marginally. If $\bar{\beta}_M^M \geq \bar{\beta}_M^O$, then at $\beta_M = \bar{\beta}_M^O$, $U_O(M, \beta_M)$ is independent of γ_M. In all cases, $U_O(M, \beta_M)$ is continuous in γ_M. Thus, applying Berge's Maximum Theorem, the maximum value of $U_O(M, \beta_M)$ is continuous and weakly decreasing in γ_M on $[0, \bar{\beta}_M^O]$ (and therefore on $[0, \underline{\beta}_M]$).

The results above combined with the fact that $U_O(M, 0)$ is independent of γ_M when $\gamma_M > \frac{\phi_M}{\Delta s}$ and the fact that $\beta_M^*(M) > 0$ when $\gamma_M = \frac{\phi_M}{\Delta s}$ implies that there exists a threshold $\bar{\gamma}_M > \frac{\phi_M}{\Delta s}$ such that $\beta_M^*(M) > 0$ for all $\gamma_M \in (\frac{\phi_M}{\Delta s}, \bar{\gamma}_M)$ and $\beta_M^*(M) = 0$ for all $\gamma_M \geq \bar{\gamma}_M$. Note that when indifferent between $\beta_M = 0$ and some $\beta_M > 0$, the owner picks $\beta_M = 0$.

Taken together, the results imply that when $\underline{\gamma}_M \leq 0$, then $\beta_M^*(M) > 0$ for $(0, \bar{\gamma}_M)$. To ensure the formulation in the proposition is correct, we redefine $\underline{\gamma}_M$ in the case $\underline{\gamma}_M \leq 0$ as $\underline{\gamma}_M = 0$.

2. Consider the case $0 < \underline{\gamma}_M < \frac{\phi_M}{\Delta s}$. Then we have $\beta_M^*(M) = 0$ for all $\gamma_M \in [0, \underline{\gamma}_M]$, and $\beta_M^*(M) > 0$ for all $\gamma_M \in (\underline{\gamma}_M, \frac{\phi_M}{\Delta s}]$. For $\gamma_M > \frac{\phi_M}{\Delta s}$, the same arguments as in Case 1 apply. In particular, there exists a $\bar{\gamma}_M > \frac{\phi_M}{\Delta s}$ such that $\beta_M^*(M) > 0$ for all $\gamma_M \in (\frac{\phi_M}{\Delta s}, \bar{\gamma}_M)$ and $\beta_M^*(M) = 0$ for all $\gamma_M \geq \bar{\gamma}_M$.

   Taken together, this implies that when $\gamma_M \in (\underline{\gamma}_M, \bar{\gamma}_M)$, then $\beta_M^*(M) > 0$, and $\beta_M^*(M) = 0$ otherwise.

3. Consider the case $\underline{\gamma}_M \geq \frac{\phi_M}{\Delta s}$. Then we have $\beta_M^*(M) = 0$ for all $\gamma_M \in [0, \underline{\gamma}_M]$. Observe that at $\gamma_M = \underline{\gamma}_M$, the owner cannot be indifferent between a zero and a positive equity stake as $F'(0) = 0$. Therefore, at $\underline{\gamma}_M$, the owner must strictly prefer a zero equity stake such that $\beta_M^*(M) = 0$. When $\gamma_M > \underline{\gamma}_M \geq \frac{\phi_M}{\Delta s}$, then $U_O(M, \beta_M)$ has the form in equation (A.4). We further know from Case 1 that the maximum value of $U_O(M, \beta_M)$ on $[0, \underline{\beta}_M]$ is continuous and weakly decreasing in γ_M and that $U_O(M, 0)$ is independent of γ_M. Thus, it must be

that $\beta_M^*(M) = 0$ for $\gamma_M > \underline{\gamma}_M$. Therefore, if $\underline{\gamma}_M \geq \frac{\phi_M}{\Delta s}$, then we have $\beta_M^*(M) = 0$ for all $\gamma_M \geq 0$.

Step 4. When retaining control rights, the owner offers no equity compensation, $\beta_M^*(O) = 0$ as their utility is strictly decreasing in β_M:

$$U_O(O, \beta_M) = \max\{(1-\beta_M)\pi_B + \gamma_O s_B, (1-\beta_M)\pi_G + \gamma_O s_G\} - c. \tag{A.6}$$

Step 5. Finally, we determine the owner's delegation decision. The owner's utility when retaining control rights is $U_O(O, 0) = \pi_B + \gamma_O s_B - c$, since the owner does not offer any equity compensation when retaining control rights. In particular, the owner's utility is independent of γ_M in this case.

From the arguments in Step 3, we know that $\max_{\beta_M \in [0, \underline{\beta}_M]} U_O(M, \beta_M)$ is weakly decreasing in γ_M. Furthermore, for $\gamma_M = 0$, the owner delegates control rights. Therefore, there exists a $\hat{\gamma}_M > 0$ such that the owner delegates control rights if and only if $\gamma < \hat{\gamma}_M$.[19] Note that we can have $\hat{\gamma}_M = \infty$ if c is sufficiently high.

We redefine $\bar{\gamma}_M$ as $\min\{\bar{\gamma}_M, \hat{\gamma}_M\}$ and after that $\underline{\gamma}_M = \min\{\underline{\gamma}_M, \bar{\gamma}_M\}$ to control for the fact that, without delegation, there is no compensation. This completes the proof. □

Proposition 7 (Manager's Equity Stake with Brown Owner under Delegation)**.** *The manager's equity stake is continuous and strictly increasing in the manager's green preferences γ_M whenever it is positive, $\beta_M^* > 0$.*

Proof of Proposition 7. From Proposition 2 it follows that $\beta_M^* > 0$ is offered only on the open interval $\gamma_M \in (\underline{\gamma}_M, \bar{\gamma}_M)$. This result implies that when $\beta_M^* > 0$, there always exists an interval around γ_M such that the equity stake remains positive $\beta_M^* > 0$.

Observe that if $\beta_M^* > 0$, then β_M^* solves

$$\max_{\beta_M \in [\max\{\eta, 0\}, \underline{\beta}_M]} F(\beta_M) \tag{A.7}$$

since $U_O(M, \beta_M)$ is strictly decreasing in β_M on $[0, \max\{\eta, 0\})$.[20] In the proof of Proposition 2, we already established that $F(\beta_M)$ is strictly concave, continuous in γ_M, and differen-

[19] Recall that we assume that if the owner is indifferent, they retain control rights.

[20] Here, η solves $\tilde{q}_M(M, \eta) = 1$, and we have $\eta > 0 \iff \gamma_M > \frac{\phi_M}{\Delta_s}$ (see Step 2 in the proof of Proposition 2).

tiable in β_M. Applying Berge's Maximum Theorem, the continuity of the function in γ_M in combination with the concavity in β_M as well as the compactness and continuity of the constraint set $[\max\{\eta, 0\}, \underline{\beta}_M]$ in γ_M implies that $\beta_M^* > 0$ is continuous in γ_M.[21]

We know that $\beta_M^* = \eta > 0$ is not possible, since in that case the owner would choose $\beta_M^* = 0$, which yields higher utility. Therefore, the optimizer $\beta_M^* > 0$ solves one of the following two equations: (i) $F'(\beta_M) = 0$ or (ii) $\beta_M = \underline{\beta}_M$ as the optimum either solves the first-order condition (cases (i)) or is given by the boundary of the interval (case (ii)). In case (i),

$$\beta_M^* = \frac{\Delta\pi(\Delta\pi - \Delta s(\gamma_M - \gamma_O)) - \pi_B\phi_M}{2(\Delta\pi)^2}, \tag{A.8}$$

which is strictly increasing in γ_M since $-\Delta\pi\Delta s > 0$. In case (ii),

$$\beta_M^* = \underline{\beta}_M = \min\left\{\bar{\beta}_M^M, \bar{\beta}_M^O\right\} = \min\left\{-\gamma_M\frac{\Delta s}{\Delta\pi}, 1 + \gamma_O\frac{\Delta s}{\Delta\pi}\right\}.$$

We want to show that when $\beta_M^* > 0$ then $\beta_M^* < \bar{\beta}_M^O$. If $\underline{\beta}_M < \bar{\beta}_M^O$ then it follows from $\beta_M^* \leq \underline{\beta}_M < \bar{\beta}_M^O$. If $\underline{\beta}_M = \bar{\beta}_M^O$ then

$$U_O(M, \bar{\beta}_M^O) = (1 - \bar{\beta}_M^O)\pi_G + \gamma_O s_G \leq \pi_G + \gamma_O s_G \leq U_O(M, 0) < U_O(M, \beta_M^*)$$

where the last inequality follows from the fact that the owner must strictly prefer $\beta_M^* > 0$ over offering no equity stake. As a result, $\beta_M^* < \bar{\beta}_M^O$ when $\beta_M^* > 0$ and in case (ii)

$$\beta_M^* = -\gamma_M\frac{\Delta s}{\Delta\pi},$$

which is strictly increasing in γ_M since $\frac{\Delta s}{\Delta\pi} < 0$. Therefore, $\beta_M^* > 0$ is strictly increasing in γ_M.

If positive, the equity stake β_M^* is strictly increasing in some cases, as demonstrated by the following numerical example. Solving the model for $(\pi_G, s_G, \pi_B, s_B, \phi_M, c, \gamma_O) = (0.1, 3, 0.8, 1, 0.6, 0.3, 0.05)$ shows that moving γ_M from 0.05 to 0.1 strictly increases β_M^* from 0.0102041 to 0.0816327. $\square$

Proposition 8 (Equilibrium Effort Level under Brown Owner)**.** *When a brown owner offers*

[21] Intuitively, if $\beta_M^* > 0$ were not continuous, then this would imply that there exists a γ_M such that there are two $\beta_M > 0$ which solve equation (A.7), which contradicts the strict concavity of this function and therefore the uniqueness of the optimizer.

a positive equity stake, $\beta_M^* > 0$, the manager's equilibrium effort level $q_M(M, \beta_M^*)$ is weakly increasing in the manager's green preferences γ_M, and is strictly increasing in some cases.

Proof of Proposition 8. From Proposition 2 it follows that $\beta_M^* > 0$ is offered only on the open interval $\gamma_M \in (\underline{\gamma}_M, \bar{\gamma}_M)$. This result implies that when $\beta_M^* > 0$, there always exists an interval around γ_M such that the equity stake remains positive $\beta_M^* > 0$.

From the proof of Proposition 7 it follows that $\beta_M^* > 0$ is continuous in γ_M when positive. As a result, $q_M(M, \beta_M^*)$ is continuous in γ_M when $\beta_M^* > 0$. Furthermore, it solves one of the two following equations: (i) $F'(\beta_M) = 0$, or (ii) $\beta_M = \underline{\beta}_M$. Note further that when $\beta_M^* > 0$, we have $q_M(M, \beta_M^*) < 1$. If $\beta_M^* > \eta$ then $q_M(M, \beta_M^*) < 1$ by construction. Observe that $0 < \beta_M^* \leq \eta$ is not possible since the owner's utility is strictly decreasing on the interval $[0, \eta]$ (Step 2 of the proof of Proposition 2) and therefore the optimal equity share cannot be strictly positive. We now show that for each of these cases $q_M(M, \beta_M^*)$ is weakly increasing in γ_M. In case (i),

$$q_M(M, \beta_M^*) = \frac{1}{2}\left(\frac{\Delta\pi + \Delta s(\gamma_M + \gamma_O)}{\phi_M} - \frac{\pi_B}{\Delta\pi}\right).$$

In case (ii),

$$q_M(M, \beta_M^*) = \frac{\underline{\beta}_M \Delta\pi + \gamma_M \Delta s}{\phi_M}.$$

For the first case, a direct calculation shows it is strictly increasing in γ_M. For the second case, notice that when $\underline{\beta}_M = \bar{\beta}_M^M$, then $q_M(M, \bar{\beta}_M^M) = 0$, which is independent of γ_M, and when $\underline{\beta}_M = \bar{\beta}_M^O$, then $q_M(M, \bar{\beta}_M^O)$ is weakly increasing in γ_M. Therefore, the manager's equilibrium effort is weakly increasing in γ_M when $\beta_M^* > 0$.

If the manager's equity stake is positive, then the manager's equilibrium effort is strictly increasing in some cases, as demonstrated by the following numerical example. Solving the model for $(\pi_G, s_G, \pi_B, s_B, \phi_M, c, \gamma_O) = (0.1, 3, 0.8, 1, 0.6, 0.3, 0.05)$ shows that moving γ_M from 0.05 to 0.1 strictly increases $q_M(d^*, \beta_M^*) = q_M(M, \beta_M^*)$ from 0.154762 to 0.238095. $\square$

Proof of Proposition 3. A green owner ($\gamma_O \geq -\frac{\Delta\pi}{\Delta s}$) always delegates control rights to the manager and offers no equity compensation (Proposition 1).

For a brown owner ($\gamma_O < -\frac{\Delta\pi}{\Delta s}$), we first show that, conditional on delegation, the owner only offers equity compensation when $\gamma_O < \bar{\gamma}_O$. When the brown owner retains control rights, the owner does not offer any equity compensation (see Step 4 in the proof of Proposition 2).

We then show that the owner only delegates control rights when $\gamma_O > \hat{\gamma}_O$.

Compensation: From the proof of Proposition 2 it follows that $\beta_M^* \leq \underline{\beta}_M$. There are two cases:

1. Consider the case $\gamma_M \leq \frac{\phi_M}{\Delta s}$, which does not depend on γ_O. In this case, $U_O(M, \beta_M)$ has the form in equation (A.3). Following the arguments in the proof Proposition 2, $\beta_M^* > 0$ if and only if $F'(0) > 0$ (see equation (A.5)), which can be rewritten as

$$\gamma_O < \frac{\Delta\pi(\gamma_M \Delta s - \Delta\pi) + \pi_B \phi_M}{\Delta\pi\Delta s} = \bar{\gamma}_O.$$

2. Consider the case $\gamma_M > \frac{\phi_M}{\Delta s}$. In this case, $U_O(M, \beta_M)$ has the form in equation (A.4), where $\eta > 0$ is independent of γ_O as it solves $\tilde{q}_M(M, \eta) = 1$. Observe that for $\beta_M \in [\eta, \underline{\beta}_M]$,

$$\begin{aligned}
&U_O(M, \beta_M) - U_O(M, 0) \\
&= U_O(M, \beta_M) - U_O(M, \eta) + U_O(M, \eta) - U_O(M, 0) \\
&= F(\beta_M) - F(\eta) - \eta\pi_G \\
&= \int_\eta^{\beta_M} F'(\beta) d\beta - \eta\pi_G.
\end{aligned}$$

Note that

$$\frac{\partial F'(\beta_M)}{\partial \gamma_O} = \frac{\Delta\pi\Delta s}{\phi_M} < 0,$$

since $\Delta\pi < 0$ and $\Delta s > 0$. Therefore, for $\beta_M > \eta$, we have that $U_O(M, \beta_M) - U_O(M, 0)$ is strictly decreasing in γ_O. Furthermore, $\underline{\beta}_M$ is weakly decreasing in γ_O and $\max_{\beta_M \in [\eta, \underline{\beta}_M]} U_O(M, \beta_M) - U_O(M, 0)$ is continuous in γ_O because of Berge's Maximum Theorem. Assume that for some γ_O, we have $\max_{\beta_M \in [\eta, \underline{\beta}_M]} U_O(M, \beta_M) - U_O(M, 0) > 0$, then the optimizer must be strictly larger than $\eta > 0$ since $U_O(M, \beta_M)$ is strictly decreasing for $\beta_M \in [0, \eta]$. This implies that $\max_{\beta_M \in [\eta, \underline{\beta}_M]} U_O(M, \beta_M) - U_O(M, 0) > 0$ is strictly decreasing in γ_O. Therefore, $\max_{\beta_M \in [\eta, \underline{\beta}_M]} U_O(M, \beta_M) - U_O(M, 0)$ reaches zero from above at most once. We then have that $\beta_M^* > 0 \Leftrightarrow \gamma_O < \bar{\gamma}_O$. Note that at $\gamma_O = \bar{\gamma}_O$, the owner is indifferent between $\beta_M = 0$ and some $\beta_M > 0$ that is the unique maximum of F on $[\eta, \underline{\beta}_M]$ and in this case the owner selects $\beta_M^* = 0$.

Delegation: Assume that $\bar{\beta}_M^O \leq \bar{\beta}_M^M$. In this case, the brown owner's utility from delegating and offering $\beta_M = \bar{\beta}_M^O = 1 + \gamma_O \frac{\Delta s}{\Delta \pi} > 0$ is

$$U_O(M, \bar{\beta}_M^O) = (1 - \bar{\beta}_M^O)\pi_G + \gamma_O s_G \leq \pi_G + \gamma_O s_G = U_O(M, 0).$$

Therefore, when $\underline{\beta}_M = \bar{\beta}_M^O$, we can let the owner select $\beta_M \in [0, \underline{\beta}_M)$ instead of $\beta_M \in [0, \underline{\beta}_M]$ without loss of generality.

From the proof of Proposition 2, it follows that for $\beta_M \in [0, \underline{\beta}_M]$, we have[22]

$$\frac{\partial U_O(M, \beta_M)}{\partial \gamma_O} = s_B + q_M(M, \beta_M)\Delta s \geq s_B,$$

When the owner retains control rights, the owner optimally does not offer any equity compensation (see Step 4 in the proof of Proposition 2) and $\frac{\partial U_O(O,0)}{\partial \gamma_O} = s_B$. From the envelope theorem, it then follows that

$$\frac{\partial \max_{\beta_M \in [0, \underline{\beta}_M]} U_O(M, \beta_M)}{\partial \gamma_O} = \frac{\partial U_O(M, \beta_M^*)}{\partial \gamma_O} \geq \frac{\partial U_O(O, 0)}{\partial \gamma_O}.$$

Note that we can ignore changes in $\underline{\beta}_M$ because it either does not bind when $\bar{\beta}_M^O \leq \bar{\beta}_M^M$ or it is independent of γ_O when $\bar{\beta}_M^O > \bar{\beta}_M^M$.

As a consequence there exists a threshold $\hat{\gamma}_O < -\frac{\Delta \pi}{\Delta s}$ such that

$$d^* = O \quad \Leftrightarrow \quad U_O(O, 0) \geq \max_{\beta_M \in [0, \underline{\beta}_M]} U_O(M, \beta_M) \quad \Leftrightarrow \quad \gamma_O \leq \hat{\gamma}_O.$$

Remark: Observe that there could be a region for γ_O where

$$\max_{\beta_M \in [0, \underline{\beta}_M]} U_O(M, \beta_M) = U_O(O, 0).$$

Recall that we assume that the owner does not delegate control rights in this case.

We redefine $\bar{\gamma}_O$ as $\max\{\bar{\gamma}_O, \hat{\gamma}_O\}$ to account for the fact that without delegation, there is no equity compensation. From these results, it follows that for $\gamma_O > \hat{\gamma}_O$, the owner delegates control rights, and for $\gamma_O \in (\hat{\gamma}_O, \bar{\gamma}_O)$ they offer a positive equity stake. □

Proposition 9 (Manager's Equity Stake and Owner's Green Preferences)**.** *The manager's*

[22] Note that when $\underline{\beta}_M = \bar{\beta}_M^O$, then the intervals considered in the proof become open to the right since $\beta_M^* < \bar{\beta}_M^O$ in this case.

equity stake is continuous and weakly decreasing in the owner's green preferences γ_O *whenever it is positive,* $\beta_M^* > 0$*, and is strictly decreasing in some cases.*

Proof of Proposition 9. From Proposition 3 it follows that $\beta_M^* > 0$ is offered only on the open interval $\gamma_O \in (\hat{\gamma}_O, \bar{\gamma}_O)$. This result implies that when $\beta_M^* > 0$, there always exists an interval around γ_O such that the equity stake remains positive $\beta_M^* > 0$.

From the proof of Proposition 7, it follows that if $\beta_M^* > 0$, then it is given by one of two cases (i) $F'(\beta_M) = 0$, or (ii) $\beta_M = \underline{\beta}_M$. Applying Berge's Maximum Theorem, the continuity of $F(\beta_M)$ in γ_O in combination with the concavity of this function in β_M as well as the compactness and continuity of the constraint set $[\max\{\eta, 0\}, \underline{\beta}_M]$ in γ_O implies that $\beta_M^* > 0$ is continuous in γ_O.

In case (i), from equation (A.8) and the fact that $\Delta\pi\Delta s < 0$ it follows that $\beta_M^* > 0$ is strictly decreasing in γ_O. We know from the proof of Proposition 3 that $\bar{\beta}_M^O$ is never chosen, as in this case, the owner would weakly prefer $\beta_M = 0$. Therefore, if case (ii) applies it must be that $\underline{\beta}_M = \bar{\beta}_M^M < \bar{\beta}_M^O$ and $\beta_M^* > 0$ is independent of γ_O. Therefore, $\beta_M^* > 0$ is weakly decreasing in γ_O.

If positive, the equity stake β_M^* is strictly decreasing in some cases, as demonstrated by the following numerical example. Solving the model for $(\pi_G, s_G, \pi_B, s_B, \phi_M, c, \gamma_M) = (0.1, 3, 0.8, 1, 0.6, 0.3, 0.05)$ shows that moving γ_O from 0.025 to 0.05 strictly decreases β_M^* from 0.0459184 to 0.0102041. □

B Organization's Sustainability

Proof of Proposition 4. As shown in Proposition 1, a green owner ($\gamma_O \geq -\frac{\Delta\pi}{\Delta s}$) always delegates control rights, $d^* = M$, and sets $\beta_M^* = 0$. Since there is no conflict of interest, the manager exerts no effort ($q_M = 0$), and the green project is always implemented. Thus, the organization's sustainability is constant and given by $\mathbb{E}[\tilde{s}] = s_G$. □

Proof of Proposition 5. Figure B.1 summarizes the optimal contract from Proposition 2.

A preliminary result is that when a brown owner delegates control rights, the organization's sustainability can be written as

$$\mathbb{E}[\tilde{s}] = s_B + q_M(M, \beta_M^*)\Delta s = s_B + \min\left\{\frac{\beta_M^*\Delta\pi + \gamma_M\Delta s}{\phi_M}, 1\right\}\Delta s$$

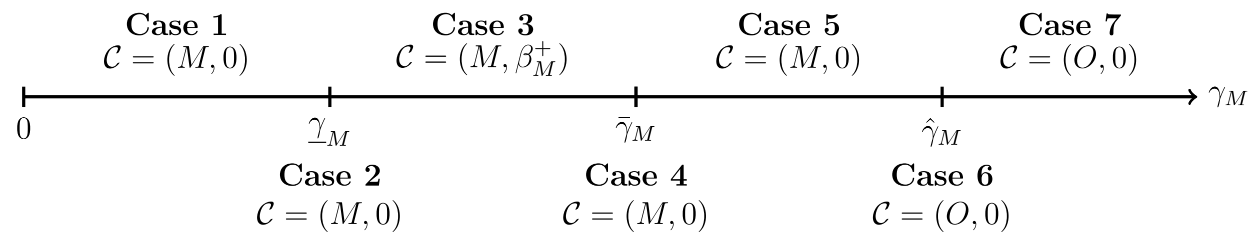

Figure B.1: **Optimal contract as a function of γ_M.** In this figure, $\mathcal{C} = (d^*, \beta_M^*)$ is the optimal contract offered to the manager, where β_M^+ denotes a strictly positive equity stake.

since the owner always chooses the brown project (as $\beta_M^* < \bar{\beta}_M^O$; see the proof of Proposition 3) and the manager chooses the green project when exerting effort and becoming informed ($\beta_M^* < \bar{\beta}_M^M$) or exerts no effort ($\beta_M^* = \bar{\beta}_M^M$).

Three parameter constellations can arise: (1) $\underline{\gamma}_M = \bar{\gamma}_M = \hat{\gamma}_M$ such that $\beta_M^* = 0$ for all γ_M, (2) $\underline{\gamma}_M < \bar{\gamma}_M = \hat{\gamma}_M$, and (3) $\underline{\gamma}_M < \bar{\gamma}_M < \hat{\gamma}_M$, which we discuss separately below.

Parameter Values 1 ($\underline{\gamma}_M = \bar{\gamma}_M = \hat{\gamma}_M$): In this situation, Cases 2-6 collapse.

Case 1. In this case, $\beta_M^* = 0$ and the organization's sustainability is

$$\mathbb{E}\left[\tilde{s}\right] = s_B + q_M(M, 0)\Delta s = s_B + \min\left\{\frac{\gamma_M \Delta s}{\phi_M}, 1\right\}\Delta s,$$

which is weakly increasing in γ_M.

Cases 2-6. Observe that $\hat{\gamma}_M > 0$ since at $\gamma_M = 0$, the owner strictly prefers to delegate control rights as $c > 0$. At $\gamma_M = \hat{\gamma}_M$, we have

$$\lim_{\gamma_M \uparrow \hat{\gamma}_M} \mathbb{E}\left[\tilde{s}\right] = s_B + q_M(M, 0|\hat{\gamma}_M)\Delta s > s_B = \lim_{\gamma_M \downarrow \hat{\gamma}_M} \mathbb{E}\left[\tilde{s}\right],$$

since $\lim_{\gamma_M \uparrow \hat{\gamma}_M} q_M(M, 0) = \min\left\{\frac{\hat{\gamma}_M \Delta s}{\phi_M}, 1\right\} > 0$. The last equality follows from Case 7, in which the owner retains control rights and always chooses the brown project.

Case 7. In this case, the owner does not delegate control rights and always chooses the brown project, such that the organization's sustainability is $\mathbb{E}\left[\tilde{s}\right] = s_B$.

Parameter Values 2 ($\underline{\gamma}_M < \bar{\gamma}_M = \hat{\gamma}_M$): In this situation, Cases 4-6 collapse.

Case 1. Follows from Case 1 in Parameter Values 1.

Case 2. We show that the organization's sustainability is continuous in γ_M at $\underline{\gamma}_M$. We first show that $\lim_{\gamma_M \downarrow \underline{\gamma}_M} \beta_M^* = 0$. For $\underline{\gamma}_M = 0$, this is true since $\beta_M^* \leq \underline{\beta}_M \leq -\gamma_M \frac{\Delta s}{\Delta \pi}$ and $-\gamma_M \frac{\Delta s}{\Delta \pi} \to 0$ as $\gamma_M \to 0$. To show this for $\underline{\gamma}_M > 0$, note that from the proof of Proposition

2, we need to have $\underline{\gamma}_M < \frac{\phi_M}{\Delta s}$ as otherwise $\beta_M^* = 0$ for all γ_M. This implies that in an interval around $\underline{\gamma}_M$, $\beta_M^* \in [0, \underline{\beta}_M]$ maximizes $F(\beta_M)$. The fact that $\underline{\beta}_M$ and $F(\beta_M)$ are continuous in γ_M, and that $F(\beta_M)$ is strictly concave in β_M in combination with Berge's Maximum Theorem ensures that β_M^* is continuous in γ_M in this region. Since the equity stake is continuous in γ_M at $\underline{\gamma}_M$ and $\beta_M^* \leq \underline{\beta}_M$, so is the manager's effort, and therefore, the organization's sustainability is as well.

Case 3. From Proposition 8 it follows that $q_M(M, \beta_M^*)$ is weakly increasing in γ_M. As a consequence, the organization's sustainability weakly increases in γ_M.

Cases 4-6. At $\gamma_M = \hat{\gamma}_M$,

$$\lim_{\gamma_M \uparrow \hat{\gamma}_M} \mathbb{E}[\tilde{s}] = \lim_{\gamma_M \uparrow \hat{\gamma}_M} s_B + q_M(M, \beta_M^*)\Delta s \geq s_B = \lim_{\gamma_M \downarrow \hat{\gamma}_M} \mathbb{E}[\tilde{s}].$$

Case 7. Follows from Case 7 in Parameter Values 1.

Parameter Values 3 ($\underline{\gamma}_M < \bar{\gamma}_M < \hat{\gamma}_M$):

Case 1. Follows from Case 1 in Parameter Values 1.

Case 2. Follows from Case 2 in Parameter Values 2.

Case 3. Follows from Case 3 in Parameter Values 2.

Case 4. Observe that the manager's compensation weakly decreases at $\gamma_M = \bar{\gamma}_M$ and therefore

$$\lim_{\gamma_M \uparrow \bar{\gamma}_M} q_M(M, \beta_M^*) \leq \lim_{\gamma_M \downarrow \bar{\gamma}_M} q_M(M, 0),$$

and as a consequence

$$\lim_{\gamma_M \uparrow \bar{\gamma}_M} \mathbb{E}[\tilde{s}] = \lim_{\gamma_M \uparrow \bar{\gamma}_M} s_B + q_M(M, \beta_M^*)\Delta s \leq \lim_{\gamma_M \downarrow \bar{\gamma}_M} s_B + q_M(M, 0)\Delta s = \lim_{\gamma_M \downarrow \bar{\gamma}_M} \mathbb{E}[\tilde{s}].$$

Case 5. Follows from Case 1 in Parameter Values 1.

Case 6. Observe that

$$\lim_{\gamma_M \uparrow \hat{\gamma}_M} \mathbb{E}[\tilde{s}] = \lim_{\gamma_M \uparrow \hat{\gamma}_M} s_B + q_M(M, 0)\Delta s > s_B = \lim_{\gamma_M \downarrow \hat{\gamma}_M} \mathbb{E}[\tilde{s}].$$

Case 7. Follows from Case 7 in Parameter Values 1.

As a result, the organization's sustainability weakly increases in the manager's green preferences, except in cases where the owner withdraws control rights at $\hat{\gamma}_M$.

The organization's sustainability is strictly increasing in the manager's green preferences in some cases, as demonstrated by the following numerical example. Solving the model for $(\pi_G, s_G, \pi_B, s_B, \phi_M, c, \gamma_O) = (0.1, 3, 0.8, 1, 0.6, 0.3, 0.05)$ and varying γ_M from 0.05 to 0.1 causes the organization's sustainability to strictly increase from 1.30952 to 1.47619. Furthermore, increasing γ_M to 0.17 causes the organization's sustainability to drop to 1 (since $\hat{\gamma}_M \approx 0.161786$). □

Proof of Proposition 6. Figure B.2 summarizes the optimal contract from Proposition 3.

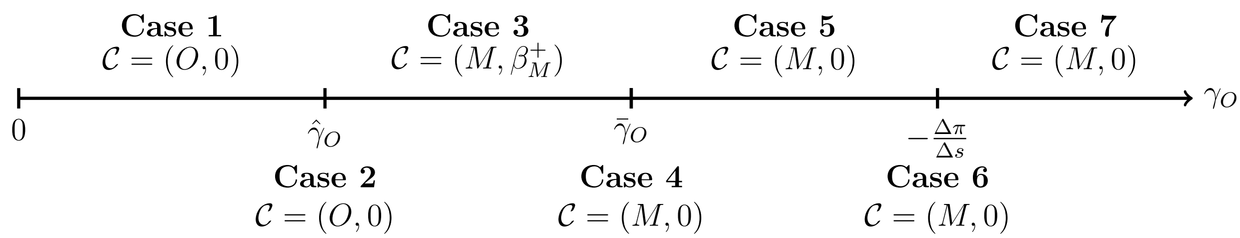

Figure B.2: **Optimal contract as a function of γ_O.** In this figure, $\mathcal{C} = (d^*, \beta_M^*)$ is the optimal contract offered to the manager, where β_M^+ denotes a strictly positive equity stake.

A preliminary result is that when a brown owner delegates control rights, the organization's sustainability can be written as

$$\mathbb{E}[\tilde{s}] = s_B + q_M(M, \beta_M^*)\Delta s = s_B + \min\left\{\frac{\beta_M^*\Delta\pi + \gamma_M\Delta s}{\phi_M}, 1\right\}\Delta s$$

since the owner always chooses the brown project (as $\beta_M^* < \bar{\beta}_M^O$, see the proof of Proposition 3) and the manager chooses the green project when exerting effort and becoming informed ($\beta_M^* < \bar{\beta}_M^M$) or exerts no effort ($\beta_M^* = \bar{\beta}_M^M$).

Since $\hat{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$, three parameter constellations can arise: (1) $\hat{\gamma}_O = \bar{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$, (2) $\hat{\gamma}_O < \bar{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$, and (3) $\hat{\gamma}_O < \bar{\gamma}_O = -\frac{\Delta\pi}{\Delta s}$, which we discuss separately below.

Parameter Values 1 ($\hat{\gamma}_O = \bar{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$): In this situation, Cases 2-4 collapse.

Case 1. In this case, the owner always chooses the brown project and therefore $\mathbb{E}[\tilde{s}] = s_B$.

Cases 2-4. The brown owner starts delegating control rights at $\hat{\gamma}_O$ and therefore

$$\lim_{\gamma_O \uparrow \hat{\gamma}_O} \mathbb{E}[\tilde{s}] = s_B \leq s_B + q_M(M, 0)\Delta s = \lim_{\gamma_O \downarrow \hat{\gamma}_O} \mathbb{E}[\tilde{s}].$$

Case 5. In this case, $q_M(M, 0)$ is independent of γ_O and therefore the organization's sustainability remains constant.

Case 6. In this case, the brown owner switches from the brown to the green project as their preferred project, which weakly increases the organization's sustainability.

Case 7. In this case, the owner and manager prefer the green project and therefore $\mathbb{E}[\tilde{s}] = s_G$.

Parameter Values 2 ($\hat{\gamma}_O < \bar{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$):

Case 1. Follows from Case 1 in Parameter Values 1.

Case 2. The brown owner starts delegating control rights at $\hat{\gamma}_O$ and therefore

$$\lim_{\gamma_O \uparrow \hat{\gamma}_O} \mathbb{E}[\tilde{s}] = s_B \leq \lim_{\gamma_O \downarrow \hat{\gamma}_O} s_B + q_M(M, \beta_M^*)\Delta s = \lim_{\gamma_O \downarrow \hat{\gamma}_O} \mathbb{E}[\tilde{s}].$$

Case 3. From Proposition 9 it follows that β_M^* is weakly decreasing in γ_O and therefore $q_M(M, \beta_M^*)$ is weakly increasing, as is the organization's sustainability.

Case 4. At $\bar{\gamma}_O$, the manager's compensation weakly drops, which causes the manager to exert weakly more effort, which weakly increases the organization's sustainability.

Case 5. Follows from Case 5 in Parameter Values 1.

Case 6. Follows from Case 6 in Parameter Values 1.

Case 7. Follows from Case 7 in Parameter Values 1.

Parameter Values 3 ($\hat{\gamma}_O < \bar{\gamma}_O = -\frac{\Delta\pi}{\Delta s}$): In this situation, Cases 4-6 collapse.

Case 1. Follows from Case 1 in Parameter Values 1.

Case 2. Follows from Case 2 in Parameter Values 2.

Case 3. Follows from Case 3 in Parameter Values 2.

Cases 4-6. In this case, the brown owner switches from the brown to the green project, which weakly increases the organization's sustainability.

Case 7. Follows from Case 7 in Parameter Values 1.

As a result, the organization's sustainability weakly increases in the owner's green preferences.

The organization's sustainability is strictly increasing in the owner's green preferences in some cases, as demonstrated by the following numerical example. Solving the model for $(\pi_G, s_G, \pi_B, s_B, \phi_M, c, \gamma_M) = (0.1, 3, 0.8, 1, 0.6, 0.3, 0.05)$ shows that moving γ_O from 0.025 to 0.05 causes the organization's sustainability to strictly increase from 1.22619 to 1.30952. $\square$

Sustainable Organizations: Internet Appendix

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Contents

A Welfare

A natural question is whether changes in the manager's or owner's green preferences that increase sustainability also enhance welfare. As we show in this section, the answer is nuanced: sustainability and welfare are distinct objectives that can diverge.

We define welfare as the sum of the utilities of the owner, the manager, and an outside stakeholder. The outside stakeholder assigns a weight $\gamma_R \geq 0$ to the social payoff. The outside stakeholder captures externalities not taken into account by the organization's decision-makers—such as toxic emissions that affect local communities or environmental damage that affects broader society. With the outside stakeholder included, the green project maximizes

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social welfare if and only if

$$\Delta\pi + (\gamma_O + \gamma_M + \gamma_R)\Delta s \geq 0.$$

Equilibrium welfare, denoted by W, equals

$$\begin{aligned} W &= U_O(d^*, \beta_M^*) + U_M(d^*, \beta_M^*) + \gamma_R \mathbb{E}[\tilde{s}] \\ &= \mathbb{E}\left[\pi + (\gamma_O + \gamma_M + \gamma_R)\tilde{s}\right] - \frac{\phi_M}{2}(q_M)^2 - c, \end{aligned}$$

where (d^*, β_M^*) is the equilibrium contract, q_M is the manager's equilibrium effort level, and $\mathbb{E}$ denotes the expectation given the equilibrium project choice and effort level.

The following proposition shows how welfare is affected by changes in stakeholders' green preferences when the delegation decision remains unchanged.

Proposition 10 (Welfare and Green Preferences)**.** *The impact of a change in green preferences $\gamma \in \{\gamma_O, \gamma_M, \gamma_R\}$ on welfare when the delegation decision d^* remains unchanged is given by*

$$\frac{\partial W}{\partial \gamma} = \mathbb{E}[\tilde{s}] + \frac{\partial q_M}{\partial \gamma}\left((1 - \beta_M^*)\Delta\pi + (\gamma_O + \gamma_R)\Delta s\right)$$

almost everywhere.[23]

This decomposition of the welfare impact shows that changes in green preferences affect welfare through two channels: changes in society's valuation of the organization's social payoffs—the *level effect*—and changes in optimal contracting and the manager's behavior—the *effort effect*. The level effect captures how changes in green preferences directly alter welfare by changing the total weight placed on social payoffs, independent of any contractual or behavioral responses. This effect is positive if and only if the organization's expected social payoff is positive. Intuitively, when an organization is expected to generate negative externalities, increasing a stakeholder's weight on them mechanically reduces welfare.

The effort effect captures how changes in green preferences affect welfare through their impact on optimal contracting and managerial effort. This term equals the change in man-

[23]If welfare is only left- and right-differentiable, then the formula applies to the left or right derivative. The formula fails to hold when welfare is not continuous, which may be the case when changing the manager's preferences γ_M at $\gamma_M = \bar{\gamma}_M$ (see Proposition 2) or changing the owner's preferences γ_O at $\gamma_O \in \{\bar{\gamma}_O, -\frac{\Delta\pi}{\Delta s}\}$ (see Proposition 3) since the manager's effort may not be continuous.

agerial effort, $\frac{\partial q_M}{\partial \gamma}$, multiplied by the combined utility change for the owner and outside stakeholder from implementing the green rather than brown project: $(1-\beta_M^*)\Delta\pi + (\gamma_O + \gamma_R)\Delta s$. Intuitively, the manager's utility change does not appear in this expression because any benefit from higher effort is exactly offset by the additional disutility of effort at the margin—a direct application of the envelope theorem.

This effort effect can enhance or diminish welfare. Consider strengthening the manager's green preferences ($\gamma = \gamma_M$) under a brown owner (i.e., $(1-\beta_M^*)\Delta\pi + \gamma_O\Delta s < 0$). When the manager increases effort, $\frac{\partial q_M}{\partial \gamma_M} > 0$ (Proposition 8), and the outside stakeholder has sufficiently weak green preferences (small γ_R), then the impact on welfare is negative since $(1-\beta_M^*)\Delta\pi + (\gamma_O + \gamma_R)\Delta s < 0$. Conversely, with a sufficiently green outside stakeholder (large γ_R), the same increase in managerial green preferences enhances welfare since $(1 - \beta_M^*)\Delta\pi + (\gamma_O + \gamma_R)\Delta s > 0$.

We next examine welfare effects when changes in green preferences trigger shifts in control rights.

Proposition 11 (Welfare, Green Preferences, and Changes in Delegation)**.** *The impact of a change in green preferences $\gamma \in \{\gamma_O, \gamma_M, \gamma_R\}$ on welfare when the delegation decision d^* changes is given by*

$$\begin{aligned} \Delta W &= W(d=M) - W(d=O) \\ &= \underbrace{\beta_M^* \left(\pi_B + q_M\Delta\pi\right) + q_M\gamma_M\Delta s - \frac{\phi_M}{2}\left(q_M\right)^2}_{\textit{Control effect}\geq 0} \quad \underbrace{-c}_{\substack{\textit{Implementation} \\ \textit{cost effect}<0}} \quad + \underbrace{\gamma_R q_M \Delta s}_{\substack{\textit{Externality} \\ \textit{effect}\geq 0}}. \end{aligned} \tag{IA.1}$$

The impact of a shift in control rights towards the manager is given by ΔW, whereas the impact of a shift in control rights towards the owner is given by $-\Delta W$. The owner's utility does not appear in equation (IA.1) because the owner is indifferent between delegating and retaining control rights when changing their delegation decision. The manager and the outside stakeholder, however, are not necessarily indifferent. Gaining control rights creates a tradeoff for the manager: the ability to affect project choice increases the manager's utility—the *control effect*—while the implementation cost reduces utility—the *implementation cost effect*—with the net effect potentially positive or negative.[24] For the outside stakeholder,

[24] Since the owner is indifferent at the delegation threshold, the owner's implementation cost exactly equals the owner's utility loss from ceding project choice to the manager, and therefore c does not cancel out in the

managerial control weakly increases utility by making the green project weakly more likely—the *externality effect*—since the outside stakeholder prefers the green project given their exclusive focus on social payoffs.

While the control and externality effects move in the same direction as the organization's sustainability, which weakly increases as control rights shift to the manager, the implementation cost effect moves in the opposite direction. As a result, changes in a stakeholder's green preferences that shift control rights from the owner to the manager, thereby weakly increasing the organization's sustainability, can either increase or reduce total welfare. Conversely, when control rights shift from the manager to the owner, sustainability weakly decreases, but welfare may increase or decrease depending on the relative magnitudes of these effects.

The main result from this analysis is that organizational sustainability and welfare are distinct objectives. Changes in green preferences that increase an organization's sustainability need not enhance welfare; they may actually reduce it. Our results decompose the economic forces driving changes in welfare, revealing the mechanisms underlying the divergence between these two distinct objectives.

Proofs

Proof of Proposition 10. We want to derive the formula for any $\gamma \in \{\gamma_O, \gamma_M, \gamma_R\}$ excluding when the owner changes its delegation decision, when changing the owner's preferences γ_O at $\gamma_O \in \{\bar{\gamma}_O, -\frac{\Delta\pi}{\Delta s}\}$, or when changing the manager's preferences γ_M at $\gamma_M = \bar{\gamma}_M$. We will do this for every parameter $\gamma \in \{\gamma_O, \gamma_M, \gamma_R\}$ separately. If welfare is only left- and right-differentiable, then the formula applies to the left or right derivative.

As a first step, we show the following auxiliary result: When the owner is a brown owner and β_M^* is left- and right-differentiable in γ, then the formula holds. From Proposition 2 it follows that $\beta_M^* \leq \underline{\beta}_M$ and therefore $q_M = \min\left\{\frac{\beta_M^*\Delta\pi + \gamma_M\Delta s}{\phi_M}, 1\right\}$. As a consequence, q_M is left- and right-differentiable in γ. If the first-order condition for effort is satisfied in that

decomposition. For example, when a brown owner is indifferent between delegation and retaining control rights, then $0 = U_O(M, \beta_M^*) - U_O(O, 0) = (1 - \beta_M^*)(\pi_B + q_M\Delta\pi) + \gamma_O(s_B + q_M\Delta s) - (\pi_B + \gamma_O s_B - c)$ and therefore

$$c = \underbrace{\pi_B + \gamma_O s_B}_{\text{Owner's Project Utility under } d=O} - \underbrace{(1 - \beta_M^*)(\pi_B + q_M\Delta\pi) + \gamma_O(s_B + q_M\Delta s)}_{\text{Owner's Project Utility under } d=M},$$

where q_M and β_M^* are under the delegation contract.

$\phi_M q_M = \beta_M^* \Delta\pi + \gamma_M \Delta s$, then

$$\begin{aligned}\frac{\partial W}{\partial \gamma} &= \mathbb{E}[\tilde{s}] + \frac{\partial q_M}{\partial \gamma}\left(\Delta\pi + (\gamma_M + \gamma_O + \gamma_R)\Delta s\right) - \frac{\partial q_M}{\partial \gamma}\phi_M q_M \\ &= \mathbb{E}[\tilde{s}] + \frac{\partial q_M}{\partial \gamma}\left((1-\beta_M^*)\Delta\pi + (\gamma_O + \gamma_R)\Delta s\right).\end{aligned}$$

If the first-order condition for effort is not satisfied in that $\phi_M q_M < \beta_M^* \Delta\pi + \gamma_M \Delta s$ then $q_M = 1$ and therefore $\frac{\partial q_M}{\partial \gamma} = 0$ and $\frac{\partial W}{\partial \gamma} = \mathbb{E}[\tilde{s}]$.

As a next step, we will show when the formula applies, separately for every parameter $\gamma \in \{\gamma_O, \gamma_M, \gamma_R\}$. *Manager's green preferences* γ_M: Figure B.1 summarizes the optimal contract from Proposition 2. Three parameter constellations can arise: (1) $\underline{\gamma}_M = \bar{\gamma}_M = \hat{\gamma}_M$ such that $\beta_M^* = 0$ for all γ_M, (2) $\underline{\gamma}_M < \bar{\gamma}_M = \hat{\gamma}_M$, and (3) $\underline{\gamma}_M < \bar{\gamma}_M < \hat{\gamma}_M$, which we discuss separately below.

Parameter Values 1 ($\underline{\gamma}_M = \bar{\gamma}_M = \hat{\gamma}_M$): In this situation, Cases 2-6 collapse.

Case 1. In this case, the brown owner offers $\beta_M^* = 0$. As a consequence, the result follows from the auxiliary result at the beginning of the proof.

Cases 2-6. Our formula may not apply since there is a change of control rights.

Case 7. In this case, the owner does not delegate control rights and $q_M = 0$. As a result, $\frac{\partial q_M}{\partial \gamma} = 0$ and $\frac{\partial W}{\partial \gamma} = \mathbb{E}[\tilde{s}]$.

Parameter Values 2 ($\underline{\gamma}_M < \bar{\gamma}_M = \hat{\gamma}_M$): In this situation, Cases 4-6 collapse.

Case 1. Follows from Case 1 in Parameter Values 1.

Case 2. The proof of Proposition 5 (Case 2 of Parameter Values 2) shows that β_M^* and effort are continuous at $\underline{\gamma}_M$. Therefore, welfare is as well. The left derivative follows from Case 1 and the right derivative from Case 3.

Case 3. Proposition 7 shows that the brown owner's equity-compensation offer $\beta_M^* > 0$ satisfies $F'(\beta_M) = 0$ or $\beta_M = \underline{\beta}_M$. We then know that $\beta_M^* = \min\{\beta_M^0, \underline{\beta}_M\}$ since $F(\beta_M)$ (and therefore the owner's utility on the relevant interval) is strictly concave. Therefore, β_M^* is continuous and left- and right-differentiable. As a consequence, the result follows from the auxiliary result at the beginning of the proof.

Cases 4-6. Our formula may not apply since there is a change of control rights.

Case 7. Follows from Case 7 in Parameter Values 1.

Parameter Values 3 ($\underline{\gamma}_M < \bar{\gamma}_M < \hat{\gamma}_M$):

Case 1. Follows from Case 1 in Parameter Values 1.

Case 2. Follows from Case 2 in Parameter Values 2.

Case 3. Follows from Case 3 in Parameter Values 2.

Case 4. Our formula may not apply since the manager's equity stake and therefore the manager's effort may not be continuous.

Case 5. Follows from Case 1 in Parameter Values 1.

Case 6. Our formula may not apply since there is a change of control rights.

Case 7. Follows from Case 7 in Parameter Values 1.

Owner's green preferences γ_O: Figure B.2 summarizes the optimal contract from Proposition 3. Since $\hat{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$, three parameter constellations can arise: (1) $\hat{\gamma}_O = \bar{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$, (2) $\hat{\gamma}_O < \bar{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$, and (3) $\hat{\gamma}_O < \bar{\gamma}_O = -\frac{\Delta\pi}{\Delta s}$, which we discuss separately below.

Parameter Values 1 ($\hat{\gamma}_O = \bar{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$): In this situation, Cases 2-4 collapse.

Case 1. In this case, $q_M = 0$ and therefore $\frac{\partial q_M}{\partial \gamma} = 0$ and $\frac{\partial W}{\partial \gamma} = \mathbb{E}[\tilde{s}]$.

Cases 2-4. Our formula may not apply since there is a change of control rights.

Case 5. In this case, $q_M(M, 0)$ is independent of γ_O and therefore $\frac{\partial q_M}{\partial \gamma} = 0$ and $\frac{\partial W}{\partial \gamma} = \mathbb{E}[\tilde{s}]$.

Case 6. Our formula may not apply since the brown owner becomes a green owner, and therefore the manager's effort may not be continuous.

Case 7. In this case, $q_M = 0$ and therefore $\frac{\partial q_M}{\partial \gamma} = 0$ and $\frac{\partial W}{\partial \gamma} = \mathbb{E}[\tilde{s}]$.

Parameter Values 2 ($\hat{\gamma}_O < \bar{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$):

Case 1. Follows from Case 1 in Parameter Values 1.

Case 2. Our formula may not apply since there is a change of control rights.

Case 3. Follows from the same arguments as in Case 3 when changing the manager's green preferences.

Case 4. Our formula may not apply since the manager's equity stake may not be continuous, and therefore the manager's effort may not be continuous.

Case 5. Follows from Case 5 in Parameter Values 1.

Case 6. Our formula may not apply since the brown owner becomes a green owner, and therefore the manager's effort may not be continuous.

Case 7. Follows from Case 7 in Parameter Values 1.

Parameter Values 3 ($\hat{\gamma}_O < \bar{\gamma}_O = -\frac{\Delta\pi}{\Delta s}$): In this situation, Cases 4-6 collapse.

Case 1. Follows from Case 1 in Parameter Values 1.

Case 2. Our formula may not apply since there is a change of control rights.

Case 3. Follows from Case 3 in Parameter Values 2.

Cases 4-6. Our formula may not apply since the brown owner becomes a green owner, and therefore the manager's effort may not be continuous.

Case 7. Follows from Case 7 in Parameter Values 1.

Outside stakeholder's green preferences γ_R: These preferences do not affect q_M and therefore $\frac{\partial q_M}{\partial \gamma} = 0$ and $\frac{\partial W}{\partial \gamma} = \mathbb{E}[\tilde{s}]$. □

Proof of Proposition 11. We know that a green owner always delegates control rights (Proposition 3) and therefore the delegation decision never changes under a green owner. This is true even at the threshold where a green owner becomes a brown owner (or vice versa) since $\hat{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$ (from the proof of Proposition 3). As a result, we can focus on the case with a brown owner.

From the proof of Proposition 2, it follows that when the brown owner delegates control rights $d = M$ then $\beta_M^* \leq \underline{\beta}_M$ (Step 1 of Proposition 2) and when the brown owner does not delegate control rights $d = O$ then $\beta_M^* = 0$ (Step 4 of Proposition 2). Therefore, the brown owner's utility conditional on the delegation decision d and given the optimal equity stake β_M^* is continuous in $\gamma \in \{\gamma_O, \gamma_M, \gamma_R\}$. For $d = M$, this result follows from equation (A.1) in case $\beta \leq \underline{\beta}_M$, which is continuous in γ, the fact that $\beta_M^* \leq \underline{\beta}_M$, and Berge's theorem, which implies that the optimum is also continuous in γ. For $d = O$, this follows from equation (A.6), which is continuous in γ, and the fact that $\beta_M^* = 0$. As a result, at the point where the delegation decision changes, the owner is indifferent between delegating and retaining control rights, so the owner's contribution to ΔW is zero.

The manager's utility when the brown owner does not delegate control rights, given the owner's optimal equity stake, is $\gamma_M s_B$ since the owner offers no equity compensation and the brown owner implements the brown project. The manager's utility when the owner delegates control rights, given the optimal equity stake ($\beta_M^* \leq \underline{\beta}_M$), is

$$\beta_M^* \pi_B + \gamma_M s_B + q_M(\beta_M^* \Delta\pi + \gamma_M \Delta s) - \frac{\phi_M}{2} (q_M)^2 - c,$$

where q_M is the manager's optimal effort given delegation. The manager's utility is the expected utility from the project undertaken minus the effort and implementation costs.

Observe that the manager picks q_M to maximize its utility and therefore,

$$\beta_M^* \pi_B + \gamma_M s_B + q_M(\beta_M^* \Delta\pi + \gamma_M \Delta s) - \frac{\phi_M}{2} (q_M)^2 - c \geq \beta_M^* \pi_B + \gamma_M s_B - c \geq \gamma_M s_B - c.$$

Therefore,

$$\beta_M^* \pi_B + \gamma_M s_B + q_M(\beta_M^* \Delta\pi + \gamma_M \Delta s) - \frac{\phi_M}{2}(q_M)^2 \geq \gamma_M s_B.$$

The non-negativity of the control effect follows from subtracting $\gamma_M s_B$ from both sides.

The difference in utility for the manager between the owner delegating and retaining control rights is

$$\begin{aligned}
&\beta_M^* \pi_B + \gamma_M s_B - c + q_M(\beta_M^* \Delta\pi + \gamma_M \Delta s) - \frac{\phi_M}{2}(q_M)^2 - \gamma_M s_B \\
&= \underbrace{\beta_M^* (\pi_B + q_M \Delta\pi) + q_M \gamma_M \Delta s - \frac{\phi_M}{2}(q_M)^2}_{\textit{Control effect} \geq 0} \qquad \underbrace{-c}_{\substack{\textit{Implementation} \\ \textit{cost effect} < 0}}.
\end{aligned}$$

For the outside stakeholder, the utility when the brown owner retains control rights is $\gamma_R s_B$, while when the owner delegates control rights, it is $\gamma_R(s_B + q_M \Delta s)$, where q_M is the manager's optimal effort given delegation. As a result, the difference in utility for the outside stakeholder between the owner delegating and retaining control rights is $\gamma_R q_M \Delta s \geq 0$. Combining the results for the owner, manager, and outside stakeholder yields the result. □

B Social Compensation

In our setup, the owner can offer the manager compensation that is related to the organization's monetary payoff π. In this section, we demonstrate that offering compensation related to the social payoff s, in addition to that related to the monetary payoff, is never optimal.

We extend the contract that the owner can offer to the manager by including social compensation $\lambda_M \geq 0$. To ensure the compensation is positive, we assume that $s_G > s_B \geq 0$.[25] This formulation implies that the manager receives an additional monetary payoff $\lambda_M s$ when the organization generates social payoff s. The owner thus offers the manager a contract (d, β_M, λ_M) containing the delegation decision d, the equity stake β_M, and the social compensation λ_M. Given this contract, the owner's and manager's utility from undertaking a project (π, s) are given by $u_O(\pi, s) = \beta_O \pi + (\gamma_O - \lambda_M)\, s$ and $u_M(\pi, s) = \beta_M \pi + (\gamma_M + \lambda_M)\, s$,

[25] We focus on contracts in which social compensation is linear in s, nonnegative, and rewards the manager more for the green project than for the brown project. These three features naturally restrict attention to $s_G > s_B \geq 0$: when this is not the case, a linear contract either generates negative compensation for at least one project or rewards the manager more for the brown project, neither of which constitutes ESG-linked compensation. Thus, $s_G > s_B \geq 0$ is the only configuration consistent with the defining features of ESG-linked compensation.

respectively.

The owner may want to offer social compensation for two reasons: to induce the manager to change their project or to induce the manager to change their effort. As we show in Proposition 12, this is never optimal.

Proposition 12 (No Social Compensation)**.** *In equilibrium, the owner never offers the manager social compensation,* $\lambda_M^* = 0$.[26]

Absent any compensation, the manager prefers to implement the green project. Therefore, the only reason the owner would want to offer any compensation is to induce the manager to select the brown project or to reduce the manager's effort. Social compensation achieves exactly the opposite, and therefore, the owner has no incentives to offer this type of compensation to the manager. This result highlights that the presence of variable pay dependent on both monetary and social dimensions in executive contracts may be inefficient. In line with our result, Efing et al. (2025) find that the amount of ESG compensation in CEO contracts is immaterial.

Proofs

Proof of Proposition 12. Assume the owner offers the manager compensation $(\tilde{\beta}_M, \tilde{\lambda}_M)$ with $\tilde{\lambda}_M > 0$. Given that $\tilde{\lambda}_M > 0$, it must be that the owner delegates control rights, $d = M$. Otherwise, the owner would not offer any compensation.

There are two cases:

Green Owner ($\gamma_O \geq -\frac{\Delta\pi}{\Delta s}$): For a green owner,

$$U_O(M, \tilde{\beta}_M, \tilde{\lambda}_M) < \pi_G + \gamma_O s_G = U_O(M, 0, 0).$$

Therefore, a green owner would never offer a contract with positive social compensation.

Brown Owner ($\gamma_O < -\frac{\Delta\pi}{\Delta s}$): If $(\tilde{\beta}_M, \tilde{\lambda}_M)$ causes the brown owner to weakly prefer the green project, then

$$U_O(M, \tilde{\beta}_M, \tilde{\lambda}_M) < \pi_G + \gamma_O s_G \leq U_O(M, 0, 0).$$

[26] Similar to in the baseline model, we assume the owner is indifferent between a set of contracts, then it first selects the subset of contracts with the lowest λ_M, after which it picks the contract with the lowest β_M from this subset.

Therefore, if $(\tilde{\beta}_M, \tilde{\lambda}_M)$ is optimal, then the brown owner must strictly prefer the brown project.

There are two cases:

1. Consider the case in which the manager weakly prefers the brown project. We must have that the equity stake is larger than the manager's indifference equity stake, $\tilde{\beta}_M > \bar{\beta}_M^M$, otherwise the manager would not prefer the brown project given $(\tilde{\beta}_M, \tilde{\lambda}_M)$. It then follows that

$$\begin{aligned} U_O(M, \tilde{\beta}_M, \tilde{\lambda}_M) &= (1 - \tilde{\beta}_M)\pi_B + (\gamma_O - \tilde{\lambda}_M)s_B \\ &\leq (1 - \tilde{\beta}_M)\pi_B + \gamma_O s_B \\ &< (1 - \bar{\beta}_M^M)\pi_B + \gamma_O s_B \\ &= U_O(M, \bar{\beta}_M^M, 0). \end{aligned}$$

   Therefore, $(\tilde{\beta}_M, \tilde{\lambda}_M)$ cannot be optimal.

2. Consider the case in which the manager strictly prefers the green project. Take the following alternative contract:

$$(\hat{\beta}_M, \hat{\lambda}_M) = \left(\frac{\gamma_M}{\gamma_M + \tilde{\lambda}_M}\tilde{\beta}_M, 0\right),$$

   which induces the manager to make the same project choice and has $\hat{\beta}_M \leq \tilde{\beta}_M$ and $\hat{\lambda}_M < \tilde{\lambda}_M$.

   For $(\tilde{\beta}_M, \tilde{\lambda}_M)$, the manager's effort is given by equation (2). Given the results derived above, the following inequalities are satisfied (in this case, we must have $\gamma_M > 0$):[27]

$$
\begin{aligned}
&\frac{u_M\left(\pi_G, s_G|\tilde{\beta}_M, \tilde{\lambda}_M\right) - u_M\left(\pi_B, s_B|\tilde{\beta}_M, \tilde{\lambda}_M\right)}{\phi_M} \\
&= \frac{\tilde{\beta}_M \Delta\pi + (\gamma_M + \tilde{\lambda}_M)\Delta s}{\phi_M} \\
&= \frac{\frac{\gamma_M+\tilde{\lambda}_M}{\gamma_M}\left(\tilde{\beta}_M \frac{\gamma_M}{\gamma_M+\tilde{\lambda}_M}\Delta\pi + \gamma_M \Delta s\right)}{\phi_M} \\
&= \frac{\frac{\gamma_M+\tilde{\lambda}_M}{\gamma_M}\left(\hat{\beta}_M \Delta\pi + \gamma_M \Delta s\right)}{\phi_M} \\
&> \frac{\hat{\beta}_M \Delta\pi + \gamma_M \Delta s}{\phi_M} \\
&= \frac{u_M\left(\pi_G, s_G|\hat{\beta}_M, 0\right) - u_M\left(\pi_B, s_B|\hat{\beta}_M, 0\right)}{\phi_M}, \\
&> 0,
\end{aligned}
$$

where the inequalities follow from the fact that given $(\hat{\beta}_M, 0)$, the manager strictly prefers the green project. As a consequence, while the project choice is the same under $(\tilde{\beta}_M, \tilde{\lambda}_M)$ and $(\hat{\beta}_M, 0)$, the manager exerts strictly less effort under $(\hat{\beta}_M, 0)$.

From these results, it then follows that

$$
\begin{aligned}
&U_O\left(M, \tilde{\beta}_M, \tilde{\lambda}_M\right) \\
&= q_M\left(M, \tilde{\beta}_M, \tilde{\lambda}_M\right) u_O\left(\pi_G, s_G|\tilde{\beta}_M, \tilde{\lambda}_M\right) + \left(1 - q_M\left(M, \tilde{\beta}_M, \tilde{\lambda}_M\right)\right) u_O\left(\pi_B, s_B|\tilde{\beta}_M, \tilde{\lambda}_M\right) \\
&\leq q_M\left(M, \hat{\beta}_M, 0\right) u_O\left(\pi_G, s_G|\tilde{\beta}_M, \tilde{\lambda}_M\right) + \left(1 - q_M\left(M, \hat{\beta}_M, 0\right)\right) u_O\left(\pi_B, s_B|\tilde{\beta}_M, \tilde{\lambda}_M\right) \\
&< q_M\left(M, \hat{\beta}_M, 0\right) u_O\left(\pi_G, s_G|\hat{\beta}_M, 0\right) + \left(1 - q_M\left(M, \hat{\beta}_M, 0\right)\right) u_O\left(\pi_B, s_B|\hat{\beta}_M, 0\right) \\
&= U_O\left(M, \hat{\beta}_M, 0\right).
\end{aligned}
$$

Therefore, the owner prefers to offer the manager $(\hat{\beta}_M, 0)$ over $(\tilde{\beta}_M, \tilde{\lambda}_M)$ and as result $(\tilde{\beta}_M, \tilde{\lambda}_M)$ cannot be optimal.

[27] When $\gamma_M = 0$, the owner can offer no compensation and the organization will always implement the brown project.

Therefore, it cannot be optimal for the owner to offer the manager social compensation. □

C Complementarity of Delegation and Compensation

A distinguishing feature of our model relative to the existing literature is that it jointly considers delegation and compensation. In this section, we demonstrate that these two governance mechanisms are complements in our framework—having access to one mechanism makes the owner more willing to use the other. Delegation creates value for compensation because equity stakes only affect project choice when the manager has control rights. Conversely, compensation enables delegation by allowing the owner to mitigate conflicts of interest that arise from the transfer of control rights to the manager.

To formalize this complementarity, we compare outcomes when the owner has access to both instruments versus when one instrument is restricted.

Proposition 13 (Complementarity of Delegation and Compensation)**.** *Delegation and compensation are complements:*

- (i) *When the owner can offer an equity stake $\beta_M \in [0,1]$, they are more likely to delegate control rights than when restricted to $\beta_M = 0$.*[28]
- (ii) *When the owner can delegate control rights $d \in \{O, M\}$, they are more likely to offer an equity stake than when restricted to $d = O$.*

The first part of Proposition 13 shows that equity compensation makes delegation more likely. The intuition is that without equity compensation, a brown owner facing a green manager may face conflicts of interest that are too large to manage. The manager would exert significant effort to implement the green project, which the brown owner dislikes. However, with equity compensation available, the owner can mitigate this conflict by offering equity stakes that shift the manager's preferences toward the owner's preferred brown project. This makes delegation viable in situations where it otherwise would not be.

The second part of Proposition 13 highlights that delegation makes a positive equity stake more likely. When the owner retains control rights, they choose their preferred project regardless of the manager's preferences, making equity compensation serve no purpose. Only

[28] By "more likely," we mean that the set of parameter values under which delegation occurs is strictly larger when equity compensation is available. Formally, $\Psi_M^{NC} \subset \Psi_M$, where Ψ_M (Ψ_M^{NC}) denotes the set of model parameters under which the owner delegates with (without) access to equity compensation.

when the manager can influence project choice through delegation does aligning incentives through compensation become worthwhile. This explains why we never have positive equity compensation in our model without delegation.

This complementarity has different implications for green and brown owners. When it comes to delegating control rights, green owners do not rely on the complementarity between delegation and compensation as they achieve perfect alignment of incentives by exploiting the public good nature of social payoffs. They would delegate even without access to equity compensation. Brown owners, in contrast, rely on this complementarity. Without the ability to offer equity compensation, a brown owner may be forced to retain control rights due to excessive conflicts of interest with a green manager. This asymmetry in how the complementarity affects different types of owners further reinforces our main finding that green and brown owners face fundamentally different trade-offs in our framework.

Proofs

Let ψ be a vector of model parameters:

$$\psi = (\gamma_O, \gamma_M, \pi_G, s_G, \pi_B, s_B, \phi_M, c) \in \Psi,$$

where Ψ is the set of all admissible model parameters. Let Ψ_M be the set of all model parameters such that the owner delegates control rights: $d^* = M$. Furthermore, let Ψ_M^{NC} be the set of model parameters where the owner delegates control rights when the owner cannot offer the manager an equity stake, that is, restricting $\beta_M = 0$.

Similarly, let $\Psi_{\beta_M^*>0}$ be the set of model parameters where the owner offers a positive equity stake $\beta_M^* > 0$. Furthermore, let $\Psi_{\beta_M^*>0}^{ND}$ be the set of model parameters where the owner offers a positive equity stake when the owner cannot delegate control rights, that is, restricting $d = O$.

Proof of Proposition 13. Consider any $\psi \in \Psi_M^{NC}$. Then $U_O(M, 0) \geq U_O(O, 0)$. It follows that

$$\max_{\beta_M \in [0,1]} U_O(M, \beta_M) \geq U_O(M, 0) \geq U_O(O, 0) = \max_{\beta_M \in [0,1]} U_O(O, \beta_M)$$

since an owner who retains control rights never offers equity compensation. Therefore, $\psi \in \Psi_M$. As a consequence, $\Psi_M^{NC} \subseteq \Psi_M$.

Consider the parameter values

$$\hat{\psi} = (\gamma_O, \gamma_M, \pi_G, s_G, \pi_B, s_B, \phi_M, c) = (0.25, 0.245, 0.1, 3, 0.8, 1, 0.5, 0.195).$$

Then $\hat{\psi} \in \Psi_M$ but $\hat{\psi} \notin \Psi_M^{NC}$. Therefore, $\Psi_M^{NC} \subset \Psi_M$.

We know that an owner who does not delegate does not offer an equity stake, as the owner's utility is strictly decreasing in the equity stake. Therefore, $\Psi^{ND}_{\beta^*_M>0} = \emptyset$ and as a result $\Psi^{ND}_{\beta^*_M>0} \subseteq \Psi_{\beta^*_M>0}$. The example above has that $\hat{\psi} \in \Psi_{\beta^*_M>0}$ and therefore $\emptyset = \Psi^{ND}_{\beta^*_M>0} \subset \Psi_{\beta^*_M>0}$.[29] $\square$

D Manager's Span of Influence

Free-rider problems are a fundamental challenge in organizations: when outcomes depend on the collective efforts of multiple agents, individual incentives to contribute may be insufficient. In this section, we explore how such free-rider problems affect organizational governance by allowing managers to have only *partial span of influence* over organizational outcomes. Our analysis reveals an asymmetry between owner types: green owners are unaffected by free-rider problems because they can leverage the public-good nature of social payoffs, whereas brown owners adjust their compensation and delegation decisions in response, with consequences for the organization's sustainability.

To formalize the free-rider problem, we introduce a parameter $\alpha \in (0, 1]$ representing the manager's span of influence. When $\alpha < 1$, the manager only influences a fraction α of organizational outcomes, while other agents or factors determine the remainder. This framework applies broadly: in owner-manager relationships, the fraction $(1 - \alpha)$ may represent the influence of other members of the management team; in firm-worker relationships, it may capture the collective impact of other workers involved in production. Our baseline model corresponds to $\alpha = 1$ (full span of influence). The manager's impact on organizational outcomes is therefore captured by $\alpha \times \mathbb{I}_{\{d=M\}}$, the product of their span of influence and whether they hold control rights.

The fraction of organizational outcomes outside the manager's span of influence yields a fixed monetary payoff $(1 - \alpha)\bar{\pi}$ with $\bar{\pi} > 0$ and a social payoff $(1 - \alpha)\bar{s}$ that are both

[29] The fact that $\hat{\psi} \in \Psi_M$ implies that $d^* = M$ and $\beta^*_M \geq 0$. If $\beta^*_M = 0$ then $\hat{\psi}$ would be in Ψ_M^{NC} but $\hat{\psi} \notin \Psi_M^{NC}$ and therefore $\beta^*_M > 0$.

independent of the manager's project choice. The manager-controlled fraction generates payoffs that depend on the project: $(\alpha\pi_G, \alpha s_G)$ for the green project and $(\alpha\pi_B, \alpha s_B)$ for the brown project. Under this setup, the organization's total payoffs are

$$(\tilde{\pi}_G, \tilde{s}_G) = (\alpha\pi_G + (1-\alpha)\bar{\pi}, \alpha s_G + (1-\alpha)\bar{s}),$$
$$(\tilde{\pi}_B, \tilde{s}_B) = (\alpha\pi_B + (1-\alpha)\bar{\pi}, \alpha s_B + (1-\alpha)\bar{s}),$$

for the green and brown projects, respectively. As in the baseline model, we assume that $\pi_B > \pi_G > 0$ and $s_G > s_B$. The differences in payoffs between projects become $\alpha\Delta\pi < 0$ for monetary payoffs and $\alpha\Delta s > 0$ for social payoffs. As α decreases, these payoff differences shrink, reducing the manager's incentives to exert effort and influence project choice, thereby intensifying the free-rider problem.

For a given span of influence α, the qualitative structure of the optimal contract (Propositions 1 and 2) remains unchanged since we can solve our model using the new payoffs $(\tilde{\pi}_G, \tilde{s}_G)$ for the green project and $(\tilde{\pi}_B, \tilde{s}_B)$ for the brown project.

The question that remains is: How do changes in the manager's span of influence α affect the optimal contract? First, observe that changes in α do not affect the owner's project preference (given $\beta_O = 1$) since the owner's utility difference between the projects,

$$u_O(\tilde{\pi}_G, \tilde{s}_G) - u_O(\tilde{\pi}_B, \tilde{s}_B) = \alpha\left[\Delta\pi + \gamma_O\Delta s\right], \tag{IA.2}$$

is linear in α. Therefore, an owner remains green or brown regardless of the value of α.

As a consequence, the contract offered by a green owner (Proposition 1) is independent of α since the green owner delegates control without relying on equity compensation. For a brown owner, by contrast, the incentive to offer equity compensation decreases as α decreases: the shrinking conflict of interest reduces the benefit of such compensation while its cost remains positive, leading to the following result.

Proposition 14 (Span of Influence and Equity Compensation)**.** *There exists an $\bar{\alpha} > 0$ such that when $\alpha < \bar{\alpha}$, a brown owner does not offer the manager a positive equity stake.*

The manager has weaker incentives to exert effort, $q_M(d, \beta_M)$, as their span of influence, α, decreases. The reason is that the manager's utility difference between the green and brown projects is given by

$$u_M(\tilde{\pi}_G, \tilde{s}_G) - u_M(\tilde{\pi}_B, \tilde{s}_B) = \alpha(\beta_M \Delta\pi + \gamma_M \Delta s). \tag{IA.3}$$

For a given β_M in the relevant range, this difference decreases as α goes down, and therefore the manager's effort declines.[30] These factors lower the owner's incentives to offer equity compensation β_M since it carries a strictly positive cost of at least $\beta_M \tilde{\pi}_G$. Therefore, when the manager has sufficiently little influence over the organization's outcomes, $\alpha < \bar{\alpha}$, the owner stops offering equity compensation.

The manager's span of influence also affects the organization's sustainability. As α increases—the manager becomes more important for the organization's outcomes—the conflict of interest between the manager and owner intensifies, as seen in equations (IA.2) and (IA.3). As a result, there may exist a threshold $\hat{\alpha}$ at which the brown owner stops delegating control rights to the manager, negatively impacting the organization's sustainability.

Proposition 15 (Span of Influence and Organization's Sustainability)**.** *Assume that for $\alpha = 1$ the brown owner retains control rights. Then there exists an $\hat{\alpha} \in [0, 1)$ such that the organization's sustainability weakly decreases when the manager's span of influence α increases at $\hat{\alpha}$, and strictly decreases in some cases due to a shift in control rights.*

This result is in line with our earlier findings (Section IV) in that the conflict of interest between the owner and manager determines the delegation of control rights and therefore the organization's sustainability. Mergers or organizational growth initiatives that expand managerial authority provide natural settings in which this effect can be observed: our model predicts that such expansions of managerial influence reduce delegation in organizations with brown owners while leaving green-owner organizations unaffected.

Proofs

Proof of Proposition 14. We know that the project payoffs $(\tilde{\pi}_G, \tilde{s}_G)$ and $(\tilde{\pi}_B, \tilde{s}_B)$ for any $\alpha \in (0, 1]$ satisfy $\tilde{\pi}_B > \tilde{\pi}_G > 0$ and $\tilde{s}_G > \tilde{s}_B$. Therefore, we can apply the results from the baseline model to this setting. Furthermore, the utility difference between the green and

[30] As we show in the proof of Proposition 2, the owner always sets β_M such that the manager weakly prefers the green project.

brown projects given any β_M is

$$u_O(\tilde{\pi}_G, \tilde{s}_G) - u_O(\tilde{\pi}_B, \tilde{s}_B) = \alpha\left[(1-\beta_M)\Delta\pi + \gamma_O \Delta s\right], \tag{IA.4}$$

$$u_M(\tilde{\pi}_G, \tilde{s}_G) - u_M(\tilde{\pi}_B, \tilde{s}_B) = \alpha\left[\beta_M \Delta\pi + \gamma_M \Delta s\right]. \tag{IA.5}$$

We know that the brown owner may only offer equity compensation when delegating control rights (Step 4 in the proof of Proposition 2). Furthermore, when the brown owner delegates control rights, then the optimal equity stake causes the owner to select the brown project and the manager to select the green project since $\beta_M \leq \underline{\beta}_M$ (Step 1 of the proof of Proposition 2).[31] Therefore, the brown owner's utility when delegating control rights—the expected utility from the project undertaken—given that $\beta_M \leq \underline{\beta}_M$ is

$$U_O(M, \beta_M) = u_O(\tilde{\pi}_B, \tilde{s}_B) + q_M(M, \beta_M)\left(u_O(\tilde{\pi}_G, \tilde{s}_G) - u_O(\tilde{\pi}_B, \tilde{s}_B)\right),$$

where effort is given by

$$q_M(M, \beta_M) = \min\left\{\frac{u_M(\tilde{\pi}_G, \tilde{s}_G) - u_M(\tilde{\pi}_B, \tilde{s}_B)}{\phi_M}, 1\right\} = \min\left\{\alpha\frac{\beta_M \Delta\pi + \gamma_M \Delta s}{\phi_M}, 1\right\}. \tag{IA.6}$$

The derivative of the owner's utility with respect to β_M is

$$\frac{\partial U_O(M, \beta_M)}{\partial \beta_M} = -\tilde{\pi}_B + \frac{\partial q_M(M, \beta_M)}{\partial \beta_M}\alpha\left[(1-\beta_M)\Delta\pi + \gamma_O \Delta s\right] - q_M(M, \beta_M)\alpha\Delta\pi.$$

We know that $q_M(M, \beta_M) \in [0, 1]$, $\frac{\partial q_M(M,\beta_M)}{\partial \beta_M} = \alpha\frac{\Delta\pi}{\phi_M}$ or $\frac{\partial q_M(M,\beta_M)}{\partial \beta_M} = 0$, and $\tilde{\pi}_B \geq \min\{\pi_B, \bar{\pi}\} > 0$. These results imply that $\lim_{\alpha\to 0} \frac{\partial U_O(M,\beta_M)}{\partial \beta_M} = -\lim_{\alpha\to 0} \tilde{\pi}_B < 0$. As a result, there exists an $\bar{\alpha} > 0$ such that for $\alpha < \bar{\alpha}$ we have that $\frac{\partial U_O(M,\beta_M)}{\partial \beta_M} < 0$ for any $\beta_M \in [0, \underline{\beta}_M]$. Therefore, $\beta_M^* = 0$ when $\alpha < \bar{\alpha}$. □

Proof of Proposition 15. We are dealing with a brown owner for $\alpha = 1$, and therefore we are dealing with a brown owner for any $\alpha \in (0, 1]$ (see equation (IA.2)).

We know that for $\beta_M \leq \underline{\beta}_M$ $U_O(O, \beta_M)$ is the owner's expected utility from the brown project minus the implementation cost. This observation in combination with equation

[31] Observe that $\underline{\beta}_M$ given the projects $(\tilde{\pi}_G, \tilde{s}_G)$ and $(\tilde{\pi}_B, \tilde{s}_B)$ does not depend on α since the utility differences between the two projects are linear in α (see equations (IA.4) and (IA.5)).

(IA.6) implies that for $\beta_M \leq \underline{\beta}_M$

$$
\begin{aligned}
& U_O(M, \beta_M) - U_O(O, \beta_M) \\
& = [u_O(\tilde{\pi}_B, \tilde{s}_B) + q_M(M, \beta_M)\left(u_O(\tilde{\pi}_G, \tilde{s}_G) - u_O(\tilde{\pi}_B, \tilde{s}_B)\right)] - [u_O(\tilde{\pi}_B, \tilde{s}_B) - c] \\
& = q_M(M, \beta_M)\alpha\left[(1-\beta_M)\Delta\pi + \gamma_O \Delta s\right] + c.
\end{aligned}
$$

For $\alpha \to 0$, this difference converges to $c > 0$ since $q_M(M, \beta_M) \in [0, 1]$. Therefore, when $\alpha \to 0$, the owner delegates control rights to save on the implementation cost.

As a consequence, there exists an $\hat{\alpha}$ such that for α just below $\hat{\alpha}$ the owner delegates control rights, while for α just above $\hat{\alpha}$ the owner retains control rights.

When the owner retains control rights $\lim_{\alpha \downarrow \hat{\alpha}} \mathbb{E}[\tilde{s}] = \tilde{s}_B$, and the weak result for the organization's sustainability follows.

The result is strict in some cases, as demonstrated by the following example. Solving the model for

$$
(\pi_G, s_G, \pi_B, s_B, \phi_M, c, \gamma_O, \gamma_M, \bar{\pi}, \bar{s}) = (0.1, 3, 0.8, 1, 0.6, 0.08, 0.05, 0.05, 0.5, 1.5)
$$

shows that increasing α from 0.5 to 1 strictly decreases the organization's sustainability from 1.33333 to 1. $\square$

E Manager's Participation Constraint

We extend our baseline model to incorporate a participation constraint that ensures the manager receives a minimum level of compensation regardless of their green preferences. We show that our main qualitative results remain robust when we introduce this constraint, while also generating additional testable predictions about how a more stringent participation constraint differentially affects organizations with green versus brown owners.

We extend our framework to include a participation constraint that ensures that the manager receives a minimum level of monetary compensation. Specifically, we extend the contract space to allow the owner to offer a fixed wage $w \geq 0$ in addition to an equity stake $\beta_M \in [0, 1]$. The manager's participation constraint requires a minimum compensation of $P \geq 0$ under both the green and brown projects, regardless of whether the owner delegates control rights:

$$w + \beta_M \pi_B \geq P \quad \text{and} \quad w + \beta_M \pi_G \geq P.$$

Since $\pi_B > \pi_G$, the second constraint is sufficient to ensure participation regardless of project choice.

This participation constraint is a generalized limited liability constraint, which is standard in the contracting literature (e.g., Sappington, 1983; Oyer, 2000; Jewitt et al., 2008). It extends the classic limited liability constraint—where agent compensation must be non-negative—that underlies much of the theoretical corporate finance and governance literature (e.g., Innes, 1990; Holmström and Tirole, 1997). The generalized limited liability constraint captures several real-world constraints, such as wealth and legal constraints that prevent managers from receiving negative compensation, subsistence requirements that ensure minimum living standards, and outside options available to managers.[32]

Our baseline model corresponds to the special case where $P = 0$. In this case, offering only equity compensation (i.e., $\beta_M \in [0, 1]$ and $w = 0$) is optimal, which confirms that extending the contract space does not affect our baseline model's results. When $P > 0$, the owner can satisfy the participation constraint through a fixed wage, equity compensation, or a combination of both, which creates different trade-offs for green versus brown owners as discussed below. When indifferent between contracts offering different equity stakes, we assume the owner chooses the lowest equity stake.

As formally shown below, introducing the participation constraint preserves our main results. Proposition 17 demonstrates that a green owner optimally delegates control rights and sets a fixed wage $w = P$ to satisfy the participation constraint while maintaining zero equity compensation. Green owners rely exclusively on fixed pay to ensure participation because equity compensation would tilt the manager toward the brown project, undermining the owner's preference for the green project. This preserves our finding that green owners can align incentives without sharing ownership by leveraging the public good nature of social payoffs.

Proposition 18 establishes that a brown owner's optimal contract retains the same quali-

[32]We use a monetary participation constraint rather than a utility-based participation constraint. A utility-based outside option would be endogenous to γ_M since green preferences affect outcomes across all employment relationships. Formally studying this would require a general equilibrium framework. Our monetary participation constraint provides a tractable way to ensure that managers receive a minimum level of compensation within our framework.

tative features as in our baseline model, with the fixed wage potentially supplementing equity compensation to ensure participation. In contrast to a green owner, adding a participation constraint makes equity compensation more attractive for a brown owner. Equity compensation now serves two purposes: it ensures participation and steers the manager toward the brown project. This preserves our finding that brown owners use equity compensation to align incentives but may withdraw control rights when conflicts of interest become too severe.

As a consequence, our core results regarding how green preferences affect organizational sustainability are qualitatively robust (Propositions 24 and 25). Top-down changes driven by owners' green preferences affect sustainability in the intended direction—stronger green preferences increase sustainability, whereas weaker ones reduce it. In contrast, bottom-up changes driven by managers' green preferences can backfire when they trigger the reallocation of control rights. This can make organizations less sustainable, even as managers become greener.

We obtain an additional theoretical insight about how a more stringent participation constraint interacts with the owner's type to affect organizational outcomes.

Proposition 16 (Minimum Compensation, Delegation, and Equity Compensation)**.** *Increasing minimum compensation P has asymmetric effects on green and brown owners:*

- (i) *A green owner's delegation decision and equity compensation are unaffected by changes in P.*
- (ii) *A brown owner is more likely to delegate control rights, $d^* = M$, and more likely to offer a positive equity stake, $\beta_M^* > 0$, as P increases.*

Proposition 16 shows that a more stringent participation constraint (a higher P) increases a brown owner's propensity to delegate control rights and offer an equity stake. This occurs because equity compensation becomes increasingly attractive as it serves the dual purpose of ensuring participation and reducing green project implementation. In contrast, a more stringent participation constraint does not affect a green owner's delegation and equity compensation decisions, since fixed wages alone are sufficient to align incentives.

Proofs

This appendix contains the proofs for the model extension with a participation constraint introduced. First, we characterize the optimal contract for green and brown owners as a function of the manager's green preferences (Propositions 17 and 18, the counterparts of Propositions 1 and 2 in the baseline model). We then examine how changes in the manager's green preferences affect the optimal equity stake under a brown owner when positive (Proposition 19, the counterpart of Proposition 7 in the baseline model) and the manager's effort level (Proposition 20, the counterpart of Proposition 8 in the baseline model). Second, we study the impact of changes in the owner's green preferences on the optimal contract (Proposition 21, the counterpart of Proposition 3 in the baseline model), followed by an analysis of how these preference changes affect the optimal equity stake when positive (Proposition 22, the counterpart of Proposition 9 in the baseline model). Third, we examine how changes in the participation constraint P affect delegation and compensation (Proposition 16). Fourth, we study how changes in both managers' and owners' green preferences affect the organization's sustainability (Propositions 23, 24, and 25, the counterparts of Propositions 4, 5, and 6 in the baseline model).

Proposition 17 (Optimal Contract with Green Owner)**.** *A green owner delegates control rights to the manager, $d^* = M$, offers no equity stake, $\beta_M^* = 0$, and offers a fixed wage to satisfy the manager's participation constraint, $w^* = P$.*

Proof of Proposition 17. The green owner needs to pay the manager at least P in each state. Therefore,

$$U_O(d, \beta_M, w) \leq \pi_G + \gamma_O s_G - P,$$

since the owner's utility is less than the maximum utility they get from the project, $\pi_G + \gamma_O s_G$, minus the minimum compensation they need to offer the manager in each state, P.

Observe that for $(d, \beta_M, w) = (M, 0, P)$ we have that

$$U_O(M, 0, P) = \pi_G + \gamma_O s_G - P.$$

Therefore, when delegating control rights, the optimal contract with the smallest β_M is $(d, \beta_M, w) = (M, 0, P)$.[33]

Furthermore, retaining control rights and offering a contract such that $w + \beta_M \pi_G \geq P$

[33] Recall that we assume the owner chooses the smallest equity stake if indifferent.

and $w \geq 0$ (or equivalently $w \geq \max\{P - \beta_M \pi_G, 0\}$) yields

$$\begin{aligned} U_O(O, \beta_M, w) &\leq U_O(O, \beta_M, (P - \beta_M \pi_G)^+) \\ &= \max\{(1-\beta_M)\pi_G + \gamma_O s_G, (1-\beta_M)\pi_B + \gamma_O s_B\} - c - (P - \beta_M \pi_G)^+ \\ &\leq \pi_G + \gamma_O s_G - c - P \\ &< \pi_G + \gamma_O s_G - P \\ &= U_O(M, 0, P), \end{aligned}$$

and therefore, a contract in which the owner retains control rights cannot be optimal. Therefore, the optimal contract with the smallest β_M is $(d^*, \beta_M^*, w^*) = (M, 0, P)$. □

Proposition 18 (Optimal Contract with Brown Owner)**.** *There exist three thresholds $\underline{\gamma}_M$, $\bar{\gamma}_M$, and $\hat{\gamma}_M$, where $0 \leq \underline{\gamma}_M \leq \bar{\gamma}_M \leq \hat{\gamma}_M$,*[34] *such that a brown owner:*

- *(i) Delegates control rights to the manager, $d^* = M$, if and only if the manager is not too green, that is, $\gamma_M < \hat{\gamma}_M$.*
- *(ii) Offers a positive equity stake to the manager, $\beta_M^* > 0$, if and only if delegating control rights and the manager is green but not too green, that is, $\gamma_M \in (\underline{\gamma}_M, \bar{\gamma}_M)$.*
- *(iii) Offers a fixed wage to satisfy the manager's participation constraint, $w^* = \max\{P - \beta_M^* \pi_G, 0\}$.*

Proof of Proposition 18. Before proceeding with the proof, we define $\bar{\beta}_M^M := -\gamma_M \frac{\Delta s}{\Delta \pi}$ and $\bar{\beta}_M^O := 1 + \gamma_O \frac{\Delta s}{\Delta \pi}$, which are the values of β_M for which the manager and the owner are indifferent between the green and the brown project, respectively. Further, define $\underline{\beta}_M := \min\{\bar{\beta}_M^M, \bar{\beta}_M^O\}$ and $\bar{\beta}_M := \max\{\bar{\beta}_M^M, \bar{\beta}_M^O\}$. Note that since we consider a brown owner, $\gamma_O < -\frac{\Delta \pi}{\Delta s}$, we have $\bar{\beta}_M^O \in (0, 1]$.

The owner's utility when the manager holds control rights, $U_O(M, \beta_M, w)$, is given by

$$\begin{cases} (1-\beta_M)\pi_B + \gamma_O s_B + q_M(M, \beta_M)((1-\beta_M)\Delta\pi + \gamma_O \Delta s) - w, & \text{if } \beta_M \leq \underline{\beta}_M, \\ \max\{(1-\beta_M)\pi_G + \gamma_O s_G, (1-\beta_M)\pi_B + \gamma_O s_B\} - w, & \text{if } \underline{\beta}_M < \beta_M < \bar{\beta}_M, \\ (1-\beta_M)\pi_G + \gamma_O s_G - q_M(M, \beta_M)((1-\beta_M)\Delta\pi + \gamma_O \Delta s) - w, & \text{if } \beta_M \geq \bar{\beta}_M, \end{cases} \tag{IA.7}$$

[34] Note that we can have $\hat{\gamma}_M = \infty$ when the implementation cost c is sufficiently high, in which case the owner always delegates control rights.

where

$$q_M(M,\beta_M) = \begin{cases} \min\left\{\frac{\beta_M\Delta\pi+\gamma_M\Delta s}{\phi_M}, 1\right\}, & \text{if } \beta_M < \underline{\beta}_M, \\ 0, & \text{if } \underline{\beta}_M \le \beta_M \le \bar{\beta}_M, \\ \min\left\{\frac{\beta_M(-\Delta\pi)+\gamma_M(-\Delta s)}{\phi_M}, 1\right\}, & \text{if } \beta_M > \bar{\beta}_M. \end{cases}$$

The owner's utility is strictly decreasing in w, and we know that the contract must satisfy $w + \beta_M\pi_G \ge P$ and $w \ge 0$. Therefore, $w = (P - \beta_M\pi_G)^+$, where $(x)^+ = \max\{x, 0\}$, and equation (IA.7) can be rewritten as

$$\begin{cases} (1-\beta_M)\pi_B + \gamma_O s_B + q_M(M,\beta_M)((1-\beta_M)\Delta\pi + \gamma_O\Delta s) - (P-\beta_M\pi_G)^+, & \text{if } \beta_M \le \underline{\beta}_M, \\ \max\{(1-\beta_M)\pi_G + \gamma_O s_G, (1-\beta_M)\pi_B + \gamma_O s_B\} - (P-\beta_M\pi_G)^+, & \text{if } \underline{\beta}_M < \beta_M < \bar{\beta}_M, \\ (1-\beta_M)\pi_G + \gamma_O s_G - q_M(M,\beta_M)((1-\beta_M)\Delta\pi + \gamma_O\Delta s) - (P-\beta_M\pi_G)^+, & \text{if } \beta_M \ge \bar{\beta}_M. \end{cases} \tag{IA.8}$$

With a slight abuse of notation, we define

$$U_O(d,\beta_M) := U_O(d,\beta_M,(P-\beta_M\pi_G)^+).$$

We want to show that $U_O(M,\beta_M)$ is continuous in β_M. Observe that the optimal fixed wage $(P-\beta_M\pi_G)^+$ is continuous in β_M. We can thus focus our attention on the remainder of the owner's utility. For $\beta_M \notin \{\underline{\beta}_M, \bar{\beta}_M\}$, the result follows directly from the functions. At $\underline{\beta}_M$, there are two cases. First, $\underline{\beta}_M = \bar{\beta}_M^M$ and then $q_M(M,\underline{\beta}_M) = 0$ and $\max\{(1-\underline{\beta}_M)\pi_G + \gamma_O s_G, (1-\underline{\beta}_M)\pi_B + \gamma_O s_B\} = (1-\underline{\beta}_M)\pi_B + \gamma_O s_B$, which ensures continuity at $\underline{\beta}_M$. Second, $\underline{\beta}_M = \bar{\beta}_M^O$ and then $(1-\underline{\beta}_M)\Delta\pi + \gamma_O\Delta s = 0$, which ensures continuity. Similar arguments imply continuity at $\bar{\beta}_M$.

The proof proceeds in several steps. We first establish optimal compensation conditional on control rights (Steps 1-4), and then optimal delegation of control rights (Step 5).

Step 1. We first establish that an optimal equity stake given the delegation of control rights $\beta_M^*(M)$ satisfies $\beta_M^*(M) \le \bar{\beta}_M^M$ and $\beta_M^*(M) \le \bar{\beta}_M^O$. It is straightforward to show that $U_O(M,\beta_M) \le U_O(M,\underline{\beta}_M)$ for all $\beta_M \ge \underline{\beta}_M$.[35] In particular, this result and the fact that

[35] For $\beta_M \in (\underline{\beta}_M, \bar{\beta}_M)$ (the second case in equation (IA.8)), it follows that for the derivative of $U_O(M,\beta_M)$ with respect to β_M the first term is either $-\pi_G$ or $-\pi_B$ and the second term is either π_G or 0, which means that the owner's utility is weakly decreasing in β_M for $\beta_M \in (\underline{\beta}_M, \bar{\beta}_M)$. For $\beta_M \ge \bar{\beta}_M$ (the third case in equation (IA.8)), the derivative of $U_O(M,\beta_M)$ with respect to β_M is $-\pi_G - \frac{\partial q_M(M,\beta_M)}{\partial \beta_M}((1-\beta_M)\Delta\pi + \gamma_O\Delta s) + q_M(M,\beta_M)\Delta\pi + \pi_G\mathbb{I}_{\{P>\beta_M\pi_G\}} \le 0$ since $\frac{\partial q_M(M,\beta_M)}{\partial \beta_M} \ge 0$ and $(1-\beta_M)\Delta\pi + \gamma_O\Delta s \ge 0$ in this case. Note that the function is left- and right-differentiable at $\beta_M = \frac{P}{\pi_G}$. Therefore, $U_O(M,\beta_M)$ is weakly decreasing for $\beta_M \ge \underline{\beta}_M$.

the owner picks the smallest β_M when indifferent implies that $\beta_M^*(M) \leq \underline{\beta}_M$ such that we can restrict attention to the first case of the owner's utility function in equation (IA.8) when determining the optimal equity stake.

The result also implies that when $\gamma_M = 0$, we have $\beta_M^*(M) = 0$ since $\bar{\beta}_M^M = 0$ in this case. For the remainder of the proof, we therefore consider the case $\gamma_M > 0$.

Step 2. In this second step, we establish several properties of the owner's utility function $U_O(M, \beta_M)$. To do so, it is helpful to define the following auxiliary function for $\beta_M \in [0, \underline{\beta}_M]$:

$$F(\beta_M) := (1-\beta_M)\pi_G + \gamma_O s_G - (1 - \tilde{q}_M(M,\beta_M)) \underbrace{((1-\beta_M)\Delta\pi + \gamma_O \Delta s)}_{\leq 0}, \tag{IA.9}$$

where

$$\tilde{q}_M(M, \beta_M) = \frac{\beta_M \Delta\pi + \gamma_M \Delta s}{\phi_M}.$$

That is, F is the owner's utility adjusted by not imposing the maximum effort of 1 and by ignoring the wage $w = (P - \beta_M \pi_G)^+$ paid to the manager.

We have $U_O(M, \beta_M) = F(\beta_M) - (P - \beta_M \pi_G)^+$ when $q_M(M, \beta_M) < 1$. Note that $\tilde{q}_M(M, \beta_M) \geq 0$ for $\beta_M \leq \underline{\beta}_M$ as $\tilde{q}_M(M, \beta_M) \geq \tilde{q}_M(M, \underline{\beta}_M) \geq \tilde{q}_M(M, \bar{\beta}_M^M) = 0$. When $q_M(M, \beta_M) = 1$, then $U_O(M, \beta_M) = (1-\beta_M)\pi_G + \gamma_O s_G - (P - \beta_M \pi_G)^+$. From equation (IA.9) it follows that for $\beta_M \leq \underline{\beta}_M$ and $\beta_M < \bar{\beta}_M^O$, we have

$$(1-\beta_M)\pi_G + \gamma_O s_G \geq F(\beta_M) \quad \Leftrightarrow \quad \tilde{q}_M(M, \beta_M) \geq 1 \quad \Leftrightarrow \quad q_M(M, \beta_M) = 1.$$

For $\beta_M = \bar{\beta}_M^O$, we have $F(\beta_M) = (1-\beta_M)\pi_G + \gamma_O s_G$. In particular, we have

$$U_O(M, \beta_M) = \max\left\{F(\beta_M), (1-\beta_M)\pi_G + \gamma_O s_G\right\} - (P - \beta_M \pi_G)^+.$$

Note further that the function F has the form

$$F(\beta_M) = A\beta_M^2 + B\beta_M + C,$$

where $A < 0$. Thus, $F(\beta_M)$ is strictly concave and so is $F(\beta_M) - (P - \beta_M \pi_G)^+$.

In addition, $\tilde{q}_M(M, \beta_M)$ is strictly decreasing in β_M. As a result, there are three cases:

1. If $\tilde{q}_M(M, 0) < 1$, then $q_M(M, \beta_M) < 1$ for all $\beta_M \in [0, \underline{\beta}_M]$.

2. If $\tilde{q}_M(M,0) = 1$, then $q_M(M,0) = 1$ and $q_M(M,\beta_M) < 1$ for all $\beta_M \in (0, \underline{\beta}_M]$.

3. If $\tilde{q}_M(M,0) > 1$, then there exists an interval $[0,\eta] \subseteq [0, \underline{\beta}_M]$ such that $q_M(M,\beta_M) = 1$ for all $\beta_M \in [0,\eta]$ and $q_M(M,\beta_M) < 1$ for all $\beta_M \in (\eta, \underline{\beta}_M]$.

Note that we have $\tilde{q}_M(M,0) > 1 \Leftrightarrow \gamma_M > \frac{\phi_M}{\Delta s}$. In particular, if $\gamma_M \leq \frac{\phi_M}{\Delta s}$, then

$$U_O(M,\beta_M) = F(\beta_M) - (P - \beta_M \pi_G)^+. \tag{IA.10}$$

If $\gamma_M > \frac{\phi_M}{\Delta s}$, then

$$U_O(M,\beta_M) = \begin{cases} (1-\beta_M)\pi_G + \gamma_O s_G - (P - \beta_M \pi_G)^+, & \text{if } \beta_M \leq \eta, \\ F(\beta_M) - (P - \beta_M \pi_G)^+, & \text{if } \eta < \beta_M \leq \underline{\beta}_M. \end{cases} \tag{IA.11}$$

Note that the interval $(\eta, \underline{\beta}_M]$ may be empty.

Step 3. A necessary condition for $\beta_M > 0$ to be optimal is that

$$F'(0) + \pi_G \mathbb{I}_{\{P>0\}} = \frac{\Delta\pi(\Delta\pi + \Delta s(\gamma_O - \gamma_M))}{\phi_M} - \pi_B + \pi_G \mathbb{I}_{\{P>0\}} > 0. \tag{IA.12}$$

The reason is that, since $F(\beta_M) - (P - \beta_M \pi_G)^+$ is strictly concave, if $F'(0) + \pi_G \mathbb{I}_{\{P>0\}} \leq 0$, then $F(\beta_M) - (P - \beta_M \pi_G)^+$ is strictly decreasing for $\beta_M \in (0, \underline{\beta}_M]$ and $U_O(M,\beta_M) = \max\{F(\beta_M), (1-\beta_M)\pi_G + \gamma_O s_G\} - (P - \beta_M \pi_G)^+$ is weakly decreasing for $\beta_M \in (0, \underline{\beta}_M]$. The condition $F'(0) + \pi_G \mathbb{I}_{\{P>0\}} > 0$ can be rewritten as

$$\gamma_M > \underline{\gamma}_M = \frac{\Delta\pi\,(\Delta\pi + \Delta s \gamma_O) - \pi_B \phi_M + \pi_G \mathbb{I}_{\{P>0\}} \phi_M}{\Delta\pi \Delta s}.$$

Note that the derivative $F'(0)$ is strictly increasing in γ_M.

There are several cases:

1. Consider the case $\underline{\gamma}_M \leq 0$. When $\gamma_M \in (0, \frac{\phi_M}{\Delta s}]$, then $U_O(M,\beta_M)$ has the form in equation (IA.10) and therefore $\beta_M^*(M) > 0$ since $F'(0) + \pi_G \mathbb{I}_{\{P>0\}} > 0$. When $\gamma_M > \frac{\phi_M}{\Delta s}$, then $U_O(M,\beta_M)$ has the form in equation (IA.11). Since the function is weakly decreasing for $\beta_M \leq \eta$ ($\frac{\partial U_M(M,\beta_M)}{\partial \beta_M} = -\pi_G + \mathbb{I}_{\{P>\beta_M\pi_G\}}\pi_G \leq 0$), the optimum of $U_O(M,\beta_M)$ is either $\beta_M^*(M) = 0$ or $\beta_M^*(M) \in (\eta, \underline{\beta}_M]$. Recall that we assume that the owner chooses the smallest $\beta_M = 0$ if indifferent.

As a next step, we show that $\max_{\beta_M \in [0,\underline{\beta}_M]} U_O(M,\beta_M)$ is continuous and weakly decreasing in γ_M when $\gamma_M > \frac{\phi_M}{\Delta s}$. Note that while the optimal equity stake will be in the interval $[0,\underline{\beta}_M]$, it is convenient to consider $U_O(M,\beta_M)$ up to $\bar{\beta}_M^O$, which is extending the interval of consideration if $\bar{\beta}_M^M < \bar{\beta}_M^O$. Specifically, note that

$$\max_{\beta_M \in [0,\underline{\beta}_M]} U_O(M,\beta_M) = \max_{\beta_M \in [0,\bar{\beta}_M^O]} U_O(M,\beta_M),$$

since $U_O(M,\beta_M)$ is weakly deceasing in β_M for $\beta_M \in [\bar{\beta}_M^M, \bar{\beta}_M^O]$ so that we can consider the latter maximum.

For every $\eta < \beta_M < \underline{\beta}_M$, $\tilde{q}_M(M,\beta_M)$ is strictly increasing in γ_M. As a result, $F(\beta_M) - (P - \beta_M \pi_G)^+$ is strictly decreasing in γ_M. Further, note that for $\beta_M < \eta$ and, for $\beta_M \in (\bar{\beta}_M^M, \bar{\beta}_M^O]$, $U_O(M,\beta_M)$ is independent of γ_M. At $\beta_M = \eta$, we have $\tilde{q}_M(M,\beta_M) = 1$. If γ_M increases marginally, then $U_O(M,\beta_M)$ is constant, and $U_O(M,\beta_M)$ strictly increases when γ_M decreases marginally since $\tilde{q}_M(M,\beta_M)$ is strictly increasing in γ_M. If $\bar{\beta}_M^M < \bar{\beta}_M^O$, then at $\beta_M = \bar{\beta}_M^M$, we have $\tilde{q}_M(M,\beta_M) = 0$. If γ_M increases marginally, then $U_O(M,\beta_M)$ is strictly decreasing since $\tilde{q}_M(M,\beta_M)$ is strictly increasing in γ_M. It is constant when γ_M decreases marginally. If $\bar{\beta}_M^M \geq \bar{\beta}_M^O$, then at $\beta_M = \bar{\beta}_M^O$, $U_O(M,\beta_M)$ is independent of γ_M. In all cases, $U_O(M,\beta_M)$ is continuous in γ_M. Thus, applying Berge's Maximum Theorem, the maximum value of $U_O(M,\beta_M)$ is continuous and weakly decreasing in γ_M on $[0,\bar{\beta}_M^O]$ (and therefore on $[0,\underline{\beta}_M]$).

The results above combined with the fact that $U_O(M,0)$ is independent of γ_M when $\gamma_M > \frac{\phi_M}{\Delta s}$ and the fact that $\beta_M^*(M) > 0$ when $\gamma_M = \frac{\phi_M}{\Delta s}$ implies that there exists a threshold $\bar{\gamma}_M > \frac{\phi_M}{\Delta s}$ such that $\beta_M^*(M) > 0$ for all $\gamma_M \in (\frac{\phi_M}{\Delta s}, \bar{\gamma}_M)$ and $\beta_M^*(M) = 0$ for all $\gamma_M \geq \bar{\gamma}_M$. Note that when indifferent between $\beta_M = 0$ and some $\beta_M > 0$, the owner picks $\beta_M = 0$.

Taken together, the results imply that when $\underline{\gamma}_M \leq 0$, then $\beta_M^*(M) > 0$ for $(0,\bar{\gamma}_M)$. To ensure the formulation in the proposition is correct, we redefine $\underline{\gamma}_M$ in the case $\underline{\gamma}_M \leq 0$ as $\underline{\gamma}_M = 0$.

2. Consider the case $0 < \underline{\gamma}_M < \frac{\phi_M}{\Delta s}$. Then we have $\beta_M^*(M) = 0$ for all $\gamma_M \in [0,\underline{\gamma}_M]$, and $\beta_M^*(M) > 0$ for all $\gamma_M \in (\underline{\gamma}_M, \frac{\phi_M}{\Delta s}]$. For $\gamma_M > \frac{\phi_M}{\Delta s}$, the same arguments as in Case 1 apply. In particular, there exists a $\bar{\gamma}_M > \frac{\phi_M}{\Delta s}$ such that $\beta_M^*(M) > 0$ for all $\gamma_M \in (\frac{\phi_M}{\Delta s}, \bar{\gamma}_M)$ and

$\beta^*_M(M) = 0$ for all $\gamma_M \geq \bar{\gamma}_M$.

Taken together, this implies that when $\gamma_M \in (\underline{\gamma}_M, \bar{\gamma}_M)$, then $\beta^*_M(M) > 0$, and $\beta^*_M(M) = 0$ otherwise.

3. Consider the case $\underline{\gamma}_M \geq \frac{\phi_M}{\Delta s}$. Then we have $\beta^*_M(M) = 0$ for all $\gamma_M \in [0, \underline{\gamma}_M]$. Observe that at $\gamma_M = \underline{\gamma}_M$, the owner cannot be indifferent between a zero and positive equity stake as $F'(0) + \pi_G \mathbb{I}_{\{P>0\}} = 0$. Therefore, at $\underline{\gamma}_M$, the owner must strictly prefer a zero equity stake such that $\beta^*_M(M) = 0$. When $\gamma_M > \underline{\gamma}_M \geq \frac{\phi_M}{\Delta s}$, then $U_O(M, \beta_M)$ has the form in equation (IA.11). We further know from Case 1 that the maximum value of $U_O(M, \beta_M)$ on $[0, \underline{\beta}_M]$ is continuous and weakly decreasing in γ_M and that $U_O(M, 0)$ is independent of γ_M. Thus, it must be that $\beta^*_M(M) = 0$ for $\gamma_M > \underline{\gamma}_M$. Therefore, if $\underline{\gamma}_M \geq \frac{\phi_M}{\Delta s}$, then we have $\beta^*_M(M) = 0$ for all $\gamma_M \geq 0$.

Step 4. When retaining control rights, the owner offers no equity compensation, $\beta^*_M(O) = 0$, and $w = P$, as their utility given the fixed wage $w = (P - \beta_M \pi_G)^+$ is weakly decreasing in β_M:

$$U_O(O, \beta_M) = \max\{(1 - \beta_M)\pi_B + \gamma_O s_B, (1 - \beta_M)\pi_G + \gamma_O s_G\} - c - (P - \beta_M \pi_G)^+. \quad \text{(IA.13)}$$

Step 5. Finally, we determine the owner's delegation decision. The owner's utility when retaining control rights is $U_O(O, 0) = \pi_B + \gamma_O s_B - c - P$, since the owner does not offer any equity compensation when retaining control rights. In particular, the owner's utility is independent of γ_M in this case.

From the arguments in Step 3, we know that $\max_{\beta_M \in [0, \underline{\beta}_M]} U_O(M, \beta_M)$ is weakly decreasing in γ_M. Furthermore, for $\gamma_M = 0$, the owner delegates control rights. Therefore, there exists a $\hat{\gamma}_M > 0$ such that the owner delegates control rights if and only if $\gamma < \hat{\gamma}_M$.[36] Note that we can have $\hat{\gamma}_M = \infty$ if c is sufficiently high.

We redefine $\bar{\gamma}_M$ as $\min\{\bar{\gamma}_M, \hat{\gamma}_M\}$ and after that $\underline{\gamma}_M = \min\{\underline{\gamma}_M, \bar{\gamma}_M\}$ to control for the fact that, without delegation, there is no compensation. This completes the proof. □

Proposition 19 (Manager's Equity Stake with Brown Owner)**.** *The manager's equity stake is continuous and weakly increasing in the manager's green preferences γ_M whenever it is positive, $\beta^*_M > 0$, and is strictly increasing in some cases.*

[36] Recall that we assume that if the owner is indifferent, they retain control rights.

Proof of Proposition 19. From Proposition 18 it follows that $\beta_M^* > 0$ is offered only on the open interval $\gamma_M \in (\underline{\gamma}_M, \bar{\gamma}_M)$. This result implies that when $\beta_M^* > 0$, there always exists an interval around γ_M such that the equity stake remains positive $\beta_M^* > 0$.

Observe that if $\beta_M^* > 0$, then $d^* = M$ and β_M^* solves

$$\max_{\beta_M \in [\max\{\eta, 0\}, \underline{\beta}_M]} F(\beta_M) - (P - \beta_M \pi_G)^+ \tag{IA.14}$$

since $U_O(M, \beta_M)$ is weakly decreasing in β_M on $[0, \max\{\eta, 0\})$, and if indifferent the owner picks the contract with the lowest β_M.[37] In the proof of Proposition 18, we already established that $F(\beta_M) - (P - \beta_M \pi_G)^+$ is strictly concave, continuous in γ_M, and differentiable in β_M except at $\beta_M = \frac{P}{\pi_G}$ where it is just continuous. Applying Berge's Maximum Theorem, the continuity of the function in γ_M in combination with the concavity in β_M as well as the compactness and continuity of the constraint set $[\max\{\eta, 0\}, \underline{\beta}_M]$ in γ_M implies that $\beta_M^* > 0$ is continuous in γ_M.[38]

We know that $\beta_M^* = \eta > 0$ is not possible, since in that case the owner would choose $\beta_M^* = 0$, which yields the same or higher utility. Therefore, the optimizer $\beta_M^* > 0$ solves one of the following four equations: (i) $F'(\beta_M) + \pi_G = 0$, (ii) $\beta_M = \frac{P}{\pi_G}$, (iii) $F'(\beta_M) = 0$, or (iv) $\beta_M = \underline{\beta}_M$ as the optimum either solves the first-order condition (cases (i) and (iii)), corresponds to the point where the derivative is discontinuous (case (ii)), or is given by the boundary of the interval (case (iv)). In case (i),

$$\beta_M^* = \frac{\Delta\pi(\Delta\pi - \Delta s(\gamma_M - \gamma_O)) + \Delta\pi\phi_M}{2(\Delta\pi)^2}, \tag{IA.15}$$

which is strictly increasing in γ_M since $-\Delta\pi\Delta s > 0$. In case (ii), $\beta_M^* = \frac{P}{\pi_G}$, which does not depend on γ_M. In case (iii),

$$\beta_M^* = \frac{\Delta\pi(\Delta\pi - \Delta s(\gamma_M - \gamma_O)) - \pi_B\phi_M}{2(\Delta\pi)^2}, \tag{IA.16}$$

[37] Here, η solves $\tilde{q}_M(M, \eta) = 1$, and we have $\eta > 0 \iff \gamma_M > \frac{\phi_M}{\Delta_s}$ (see Step 2 in the proof of Proposition 18).

[38] Intuitively, if $\beta_M^* > 0$ were not continuous, then this would imply that there exists a γ_M such that there are two $\beta_M > 0$ which solve equation (IA.14), which contradicts the strict concavity of this function and therefore the uniqueness of the optimizer.

which is strictly increasing in γ_M since $-\Delta\pi\Delta s > 0$. Finally, in case (iv),

$$\beta_M^* = \underline{\beta}_M = \min\left\{-\gamma_M \frac{\Delta s}{\Delta \pi}, 1 + \gamma_O \frac{\Delta s}{\Delta \pi}\right\},$$

which is weakly increasing in γ_M since $\frac{\Delta s}{\Delta \pi} < 0$. Therefore, $\beta_M^* > 0$ is weakly increasing in γ_M.

If positive, the equity stake β_M^* is strictly increasing in some cases, as demonstrated by the following numerical example. Solving the model for $(\pi_G, s_G, \pi_B, s_B, \phi_M, c, P, \gamma_O) = (0.1, 3, 0.8, 1, 0.6, 0.3, 0, 0.05)$ shows that moving γ_M from 0.05 to 0.1 strictly increases β_M^* from 0.0102041 to 0.0816327. $\square$

Proposition 20 (Equilibrium Effort Level under Brown Owner)**.** *When a brown owner offers a positive equity stake, $\beta_M^* > 0$, the manager's equilibrium effort level $q_M(M, \beta_M^*)$ is weakly increasing in the manager's green preferences γ_M, and is strictly increasing in some cases.*

Proof of Proposition 20. From Proposition 18 it follows that $\beta_M^* > 0$ is offered only on the open interval $\gamma_M \in (\underline{\gamma}_M, \bar{\gamma}_M)$. This result implies that when $\beta_M^* > 0$, there always exists an interval around γ_M such that the equity stake remains positive $\beta_M^* > 0$.

From the proof of Proposition 19 it follows that $\beta_M^* > 0$ is continuous in γ_M when positive. As a result, $q_M(M, \beta_M^*)$ is continuous in γ_M when $\beta_M^* > 0$. Furthermore, it solves one of the four following equations: (i) $F'(\beta_M) + \pi_G = 0$, (ii) $\beta_M = \frac{P}{\pi_G}$, (iii) $F'(\beta_M) = 0$, or (iv) $\beta_M = \underline{\beta}_M$. Note further that when $\beta_M^* > 0$, we have $q_M(M, \beta_M^*) < 1$. If $\beta_M^* > \eta$ then $q_M(M, \beta_M^*) < 1$ by construction. Observe that $0 < \beta_M^* \leq \eta$ is not possible since the owner's utility is weakly decreasing on the interval $[0, \eta]$ (Step 2 of the proof of Proposition 18) and therefore the optimal equity share cannot be strictly positive. We now show that for each of these cases $q_M(M, \beta_M^*)$ is weakly increasing in γ_M. In case (i),

$$q_M(M, \beta_M^*) = \frac{1}{2}\left(\frac{\Delta\pi + \Delta s(\gamma_M + \gamma_O) + \phi_M}{\phi_M}\right).$$

In case (ii),

$$q_M(M, \beta_M^*) = \frac{\frac{P}{\pi_G}\Delta\pi + \gamma_M \Delta s}{\phi_M}.$$

In case (iii),

$$q_M(M, \beta_M^*) = \frac{1}{2}\left(\frac{\Delta\pi + \Delta s(\gamma_M + \gamma_O)}{\phi_M} - \frac{\pi_B}{\Delta\pi}\right).$$

In case (iv),

$$q_M(M, \beta_M^*) = \frac{\underline{\beta}_M \Delta\pi + \gamma_M \Delta s}{\phi_M}.$$

For the first three cases, a direct calculation shows they are strictly increasing in γ_M. For the fourth case, notice that when $\underline{\beta}_M = \bar{\beta}_M^M$, then $q_M(M, \bar{\beta}_M^M) = 0$, which is independent of γ_M, and when $\underline{\beta}_M = \bar{\beta}_M^O$, then $q_M(M, \bar{\beta}_M^O)$ is weakly increasing in γ_M. Therefore, the manager's equilibrium effort is weakly increasing in γ_M when $\beta_M^* > 0$.

If the manager's equity stake is positive, then the manager's equilibrium effort is strictly increasing in some cases, as demonstrated by the following numerical example. Solving the model for $(\pi_G, s_G, \pi_B, s_B, \phi_M, c, P, \gamma_O) = (0.1, 3, 0.8, 1, 0.6, 0.3, 0, 0.05)$ shows that moving γ_M from 0.05 to 0.1 strictly increases $q_M(d^*, \beta_M^*) = q_M(M, \beta_M^*)$ from 0.154762 to 0.238095. □

Proposition 21 (Optimal Contract and Owner's Green Preferences)**.** *There exist two thresholds $\hat{\gamma}_O$ and $\bar{\gamma}_O$, where $\hat{\gamma}_O \leq \bar{\gamma}_O \leq -\frac{\Delta\pi}{\Delta s}$, such that the owner:*

(i) *Delegates control rights to the manager, $d^* = M$, if and only if the owner is sufficiently green, $\gamma_O > \hat{\gamma}_O$.*

(ii) *Offers a positive equity stake to the manager, $\beta_M^* > 0$, if and only if delegating control rights and the owner is brown but not too brown, $\gamma_O \in (\hat{\gamma}_O, \bar{\gamma}_O)$.*

(iii) *Offers a fixed wage to satisfy the manager's participation constraint, $w^* = \max\{P - \beta_M^* \pi_G, 0\}$.*

Proof of Proposition 21. A green owner ($\gamma_O \geq -\frac{\Delta\pi}{\Delta s}$) always delegates control rights to the manager and offers no equity compensation and a fixed wage $w = P$ (Proposition 17).

For a brown owner ($\gamma_O < -\frac{\Delta\pi}{\Delta s}$), we first show that, conditional on delegation, the owner only offers equity compensation when $\gamma_O < \bar{\gamma}_O$. When the brown owner retains control rights, the owner does not offer any equity compensation and offers a fixed wage $w = P$ (see Step 4 in the proof of Proposition 18). We then show that the owner only delegates control rights when $\gamma_O > \hat{\gamma}_O$.

Compensation: From the proof of Proposition 18 it follows that $\beta_M^* \leq \underline{\beta}_M$. There are two cases:

1. Consider the case $\gamma_M \leq \frac{\phi_M}{\Delta s}$, which does not depend on γ_O. In this case, $U_O(M, \beta_M)$ has the form in equation (IA.10). Following the arguments in the proof Proposition 18, $\beta_M^* > 0$ if and only if $F'(0) + \pi_G \mathbb{I}_{\{P>0\}} > 0$ (see equation (IA.12)), which can be rewritten as
$$\gamma_O < \frac{\Delta\pi(\gamma_M \Delta s - \Delta\pi) + \pi_B \phi_M - \pi_G \mathbb{I}_{\{P>0\}} \phi_M}{\Delta\pi \Delta s} = \bar{\gamma}_O.$$

2. Consider the case $\gamma_M > \frac{\phi_M}{\Delta s}$. In this case, $U_O(M, \beta_M)$ has the form in equation (IA.11), where $\eta > 0$ is independent of γ_O as it solves $\tilde{q}_M(M, \eta) = 1$. Observe that for $\beta_M \in [\eta, \underline{\beta}_M]$,
$$\begin{aligned}
&U_O(M, \beta_M) - U_O(M, 0) \\
&= U_O(M, \beta_M) - U_O(M, \eta) + U_O(M, \eta) - U_O(M, 0) \\
&= (F(\beta_M) - (P - \beta_M \pi_G)^+) - (F(\eta) - (P - \eta\pi_G)^+) - \eta\pi_G - (P - \eta\pi_G)^+ + P \\
&= \int_\eta^{\beta_M} \left(F'(\beta) + \pi_G \mathbb{I}_{\left\{\beta < \frac{P}{\pi_G}\right\}} \right) d\beta - \eta\pi_G - (P - \eta\pi_G)^+ + P.
\end{aligned}$$
Note that
$$\frac{\partial F'(\beta_M)}{\partial \gamma_O} = \frac{\Delta\pi \Delta s}{\phi_M} < 0,$$
since $\Delta\pi < 0$ and $\Delta s > 0$. Therefore, for $\beta_M > \eta$, we have that $U_O(M, \beta_M) - U_O(M, 0)$ is strictly decreasing in γ_O. Furthermore, $\underline{\beta}_M$ is weakly decreasing in γ_O and $\max_{\beta_M \in [\eta, \underline{\beta}_M]} U_O(M, \beta_M) - U_O(M, 0)$ is continuous in γ_O. Assume that for some γ_O, we have $\max_{\beta_M \in [\eta, \underline{\beta}_M]} U_O(M, \beta_M) - U_O(M, 0) > 0$, then the optimizer must be strictly larger than $\eta > 0$ since $U_O(M, \beta_M)$ is weakly decreasing for $\beta_M \in [0, \eta]$. This implies that $\max_{\beta_M \in [\eta, \underline{\beta}_M]} U_O(M, \beta_M) - U_O(M, 0) > 0$ is strictly decreasing in γ_O. Therefore, $\max_{\beta_M \in [\eta, \underline{\beta}_M]} U_O(M, \beta_M) - U_O(M, 0)$ reaches zero from above at most once. We then have that $\beta_M^* > 0 \Leftrightarrow \gamma_O < \bar{\gamma}_O$. Note that at $\gamma_O = \bar{\gamma}_O$, the owner is indifferent between $\beta_M = 0$ and some $\beta_M > 0$ that is the unique maximum of $U_O(M, \beta_M)$ on $[\eta, \underline{\beta}_M]$ and in this case the owner selects $\beta_M^* = 0$.

Delegation: Assume that $\bar{\beta}_M^O \leq \bar{\beta}_M^M$. In this case, the brown owner's utility from delegating and offering $\beta_M = \bar{\beta}_M^O = 1 + \gamma_O \frac{\Delta s}{\Delta \pi} > 0$ is
$$U_O(M, \bar{\beta}_M^O) = (1 - \bar{\beta}_M^O)\pi_G + \gamma_O s_G - (P - \bar{\beta}_M^O \pi_G)^+ \leq \pi_G + \gamma_O s_G - P = U_O(M, 0).$$

Therefore, when $\underline{\beta}_M = \bar{\beta}_M^O$, we can let the owner select $\beta_M \in [0, \underline{\beta}_M)$ instead of $\beta_M \in [0, \underline{\beta}_M]$ without loss of generality.

From the proof of Proposition 18, it follows that for $\beta_M \in [0, \underline{\beta}_M]$, we have[39]

$$\frac{\partial U_O(M, \beta_M)}{\partial \gamma_O} = s_B + q_M(M, \beta_M)\Delta s \geq s_B,$$

When the owner retains control rights, the owner optimally does not offer any equity compensation (see Step 4 in the proof of Proposition 18) and $\frac{\partial U_O(O,0)}{\partial \gamma_O} = s_B$. From the envelope theorem, it then follows that

$$\frac{\partial \max_{\beta_M \in [0, \underline{\beta}_M]} U_O(M, \beta_M)}{\partial \gamma_O} = \frac{\partial U_O(M, \beta_M^*)}{\partial \gamma_O} \geq \frac{\partial U_O(O, 0)}{\partial \gamma_O}.$$

Note that we can ignore changes in $\underline{\beta}_M$ because it either does not bind when $\bar{\beta}_M^O \leq \bar{\beta}_M^M$ or it is independent of γ_O when $\bar{\beta}_M^O > \bar{\beta}_M^M$.

As a consequence there exists a threshold $\hat{\gamma}_O < -\frac{\Delta \pi}{\Delta s}$ such that

$$d^* = O \quad \Leftrightarrow \quad U_O(O, 0) \geq \max_{\beta_M \in [0, \underline{\beta}_M]} U_O(M, \beta_M) \quad \Leftrightarrow \quad \gamma_O \leq \hat{\gamma}_O.$$

Remark: Observe that there could be a region for γ_O where

$$\max_{\beta_M \in [0, \underline{\beta}_M]} U_O(M, \beta_M) = U_O(O, 0).$$

Recall that we assume that the owner does not delegate control rights in this case.

We redefine $\bar{\gamma}_O$ as $\max\{\bar{\gamma}_O, \hat{\gamma}_O\}$ to account for the fact that without delegation, there is no equity compensation. From these results, it follows that for $\gamma_O > \hat{\gamma}_O$, the owner delegates control rights, and for $\gamma_O \in (\hat{\gamma}_O, \bar{\gamma}_O)$ they offer a positive equity stake. □

Proposition 22 (Manager's Equity Stake and Owner's Green Preferences)**.** *The manager's equity stake is continuous and weakly decreasing in the owner's green preferences γ_O whenever it is positive, $\beta_M^* > 0$, and is strictly decreasing in some cases.*

Proof of Proposition 22. From Proposition 21 it follows that $\beta_M^* > 0$ is offered only on the

[39]Note that when $\underline{\beta}_M = \bar{\beta}_M^O$, then the intervals considered in the proof become open to the right since $\beta_M^* < \bar{\beta}_M^O$ in this case.

open interval $\gamma_O \in (\hat{\gamma}_O, \bar{\gamma}_O)$. This result implies that when $\beta_M^* > 0$, there always exists an interval around γ_O such that the equity stake remains positive $\beta_M^* > 0$.

From the proof of Proposition 19, it follows that if $\beta_M^* > 0$, then it is given by one of four cases (i) $F'(\beta_M) + \pi_G = 0$, (ii) $\beta_M = \frac{P}{\pi_G}$, (iii) $F'(\beta_M) = 0$, or (iv) $\beta_M = \underline{\beta}_M$. Applying Berge's Maximum Theorem, the continuity of $F(\beta_M) - (P - \beta_M \pi_G)^+$ in γ_O in combination with the concavity of this function in β_M as well as the compactness and continuity of the constraint set $[\max\{\eta, 0\}, \underline{\beta}_M]$ in γ_O implies that $\beta_M^* > 0$ is continuous in γ_O.

In case (i), from equation (IA.15) and the fact that $\Delta\pi\Delta s < 0$ it follows that $\beta_M^* > 0$ is strictly decreasing in γ_O. In case (ii), $\beta_M^* > 0$ is independent of γ_O. In case (iii), from equation (IA.16) and the fact that $\Delta\pi\Delta s < 0$ it follows that $\beta_M^* > 0$ is strictly decreasing in γ_O. We know from the proof of Proposition 21 that $\bar{\beta}_M^O$ is never chosen, as in this case, the owner would weakly prefer $\beta_M = 0$. Therefore, if case (iv) applies it must be that $\underline{\beta}_M = \bar{\beta}_M^M < \bar{\beta}_M^O$ and $\beta_M^* > 0$ is independent of γ_O. Therefore, $\beta_M^* > 0$ is weakly decreasing in γ_O.

If positive, the equity stake β_M^* is strictly decreasing in some cases, as demonstrated by the following numerical example. Solving the model for $(\pi_G, s_G, \pi_B, s_B, \phi_M, c, P, \gamma_M) = (0.1, 3, 0.8, 1, 0.6, 0.3, 0, 0.05)$ shows that moving γ_O from 0.025 to 0.05 strictly decreases β_M^* from 0.0459184 to 0.0102041. $\square$

Proof of Proposition 16. From Proposition 17 it follows that a green owner always offers $(d, \beta_M, w) = (M, 0, P)$ and therefore their delegation decision and equity compensation is unaffected by changes in P.

For a brown owner, from equation (IA.10), (IA.11), (IA.13), and the fact that η does not depend on P it follows that

$$\frac{\partial U_O(O,0)}{\partial P} = -1,$$
$$\frac{\partial U_O(M,0)}{\partial P} = -1,$$
$$\frac{\partial U_O(M,\beta_M)}{\partial P} \geq -1,$$

where the last derivative does not exist for $\beta_M = \frac{P}{\pi_G}$, in which case we consider the right-side and left-side derivatives. Therefore, a brown owner is more likely to offer an equity stake as P increases and more likely to delegate control rights. $\square$

Proposition 23 (Organization's Sustainability with Green Owner)**.** *With a green owner, the organization's sustainability is independent of the manager's green preferences γ_M and given by $\mathbb{E}[\tilde{s}] = s_G$.*

Proof of Proposition 23. As shown in Proposition 17, a green owner ($\gamma_O \geq -\frac{\Delta\pi}{\Delta s}$) always delegates control rights, $d^* = M$, and sets $\beta_M^* = 0$ and $w^* = P$. Since there is no conflict of interest, the manager exerts no effort ($q_M = 0$), and the green project is always implemented. Thus, the organization's sustainability is constant and given by $\mathbb{E}\left[\tilde{s}\right] = s_G$. □

Proposition 24 (Organization's Sustainability with Brown Owner)**.** *For a brown owner, for all $\gamma_M \neq \hat{\gamma}_M$, the organization's sustainability is weakly increasing in the manager's green preferences γ_M and strictly increasing in some cases. The organization's sustainability is weakly decreasing at $\hat{\gamma}_M$, and is strictly decreasing in some cases.*

Proof of Proposition 24. Figure IA.1 summarizes the optimal contract (omitting the fixed wage) from Proposition 18.

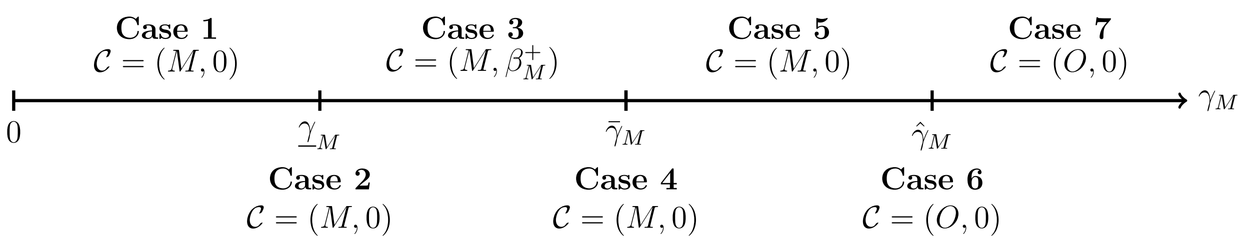

Figure IA.1: **Optimal contract as a function of γ_M.** In this figure, $\mathcal{C} = (d^*, \beta_M^*)$ is the optimal contract (omitting the fixed wage) offered to the manager, where β_M^+ denotes a strictly positive equity stake.

A preliminary result is that when a brown owner delegates control rights, the organization's sustainability can be written as

$$\mathbb{E}\left[\tilde{s}\right] = s_B + q_M(M, \beta_M^*)\Delta s = s_B + \min\left\{\frac{\beta_M^*\Delta\pi + \gamma_M \Delta s}{\phi_M}, 1\right\}\Delta s$$

since the owner always chooses the brown project (as $\beta_M^* < \bar{\beta}_M^O$; see the proof of Proposition 21) and the manager chooses the green project when exerting effort and becoming informed ($\beta_M^* < \bar{\beta}_M^M$) or exerts no effort ($\beta_M^* = \bar{\beta}_M^M$).

Three parameter constellations can arise: (1) $\underline{\gamma}_M = \bar{\gamma}_M = \hat{\gamma}_M$ such that $\beta_M^* = 0$ for all γ_M, (2) $\underline{\gamma}_M < \bar{\gamma}_M = \hat{\gamma}_M$, and (3) $\underline{\gamma}_M < \bar{\gamma}_M < \hat{\gamma}_M$, which we discuss separately below.

Parameter Values 1 ($\underline{\gamma}_M = \bar{\gamma}_M = \hat{\gamma}_M$): In this situation, Cases 2-6 collapse.

Case 1. In this case, $\beta_M^* = 0$ and the organization's sustainability is

$$\mathbb{E}[\tilde{s}] = s_B + q_M(M,0)\Delta s = s_B + \min\left\{\frac{\gamma_M \Delta s}{\phi_M}, 1\right\}\Delta s,$$

which is weakly increasing in γ_M.

Cases 2-6. Observe that $\hat{\gamma}_M > 0$ since at $\gamma_M = 0$, the owner strictly prefers to delegate control rights as $c > 0$. At $\gamma_M = \hat{\gamma}_M$, we have

$$\lim_{\gamma_M \uparrow \hat{\gamma}_M} \mathbb{E}[\tilde{s}] = s_B + q_M(M,0|\hat{\gamma}_M)\Delta s > s_B = \lim_{\gamma_M \downarrow \hat{\gamma}_M} \mathbb{E}[\tilde{s}],$$

since $\lim_{\gamma_M \uparrow \hat{\gamma}_M} q_M(M,0) = \min\left\{\frac{\hat{\gamma}_M \Delta s}{\phi_M}, 1\right\} > 0$. The last equality follows from Case 7, in which the owner retains control rights and always chooses the brown project.

Case 7. In this case, the owner does not delegate control rights and always chooses the brown project, such that the organization's sustainability is $\mathbb{E}[\tilde{s}] = s_B$.

Parameter Values 2 ($\underline{\gamma}_M < \bar{\gamma}_M = \hat{\gamma}_M$): In this situation, Cases 4-6 collapse.

Case 1. Follows from Case 1 in Parameter Values 1.

Case 2. We show that the organization's sustainability is continuous in γ_M at $\underline{\gamma}_M$. We first show that $\lim_{\gamma_M \downarrow \underline{\gamma}_M} \beta_M^* = 0$. For $\underline{\gamma}_M = 0$, this is true since $\beta_M^* \leq \underline{\beta}_M \leq -\gamma_M \frac{\Delta s}{\Delta \pi}$ and $-\gamma_M \frac{\Delta s}{\Delta \pi} \to 0$ as $\gamma_M \to 0$. To show this for $\underline{\gamma}_M > 0$, note that from the proof of Proposition 18, we need to have $\underline{\gamma}_M < \frac{\phi_M}{\Delta s}$ as otherwise $\beta_M^* = 0$ for all γ_M. This implies that in an interval around $\underline{\gamma}_M$, $\beta_M^* \in [0, \underline{\beta}_M]$ maximizes $F(\beta_M) - (P - \beta_M \pi_G)^+$. The fact that $\underline{\beta}_M$ and $F(\beta_M) - (P - \beta_M \pi_G)^+$ are continuous in γ_M, and that $F(\beta_M) - (P - \beta_M \pi_G)^+$ is strictly concave in β_M in combination with Berge's Maximum Theorem ensures that β_M^* is continuous in γ_M in this region. Since the equity stake is continuous in γ_M at $\underline{\gamma}_M$ and $\beta_M^* \leq \underline{\beta}_M$, so is the manager's effort, and therefore, the organization's sustainability is as well.

Case 3. From Proposition 20 it follows that $q_M(M, \beta_M^*)$ is weakly increasing in γ_M. As a consequence, the organization's sustainability weakly increases in γ_M.

Cases 4-6. At $\gamma_M = \hat{\gamma}_M$,

$$\lim_{\gamma_M \uparrow \hat{\gamma}_M} \mathbb{E}[\tilde{s}] = \lim_{\gamma_M \uparrow \hat{\gamma}_M} s_B + q_M(M, \beta_M^*)\Delta s \geq s_B = \lim_{\gamma_M \downarrow \hat{\gamma}_M} \mathbb{E}[\tilde{s}].$$

Case 7. Follows from Case 7 in Parameter Values 1.

Parameter Values 3 ($\underline{\gamma}_M < \bar{\gamma}_M < \hat{\gamma}_M$):

Case 1. Follows from Case 1 in Parameter Values 1.

Case 2. Follows from Case 2 in Parameter Values 2.

Case 3. Follows from Case 3 in Parameter Values 2.

Case 4. Observe that the manager's compensation weakly decreases at $\gamma_M = \bar{\gamma}_M$ and therefore

$$\lim_{\gamma_M \uparrow \bar{\gamma}_M} q_M(M, \beta_M^*) \leq \lim_{\gamma_M \downarrow \bar{\gamma}_M} q_M(M, 0),$$

and as a consequence

$$\lim_{\gamma_M \uparrow \bar{\gamma}_M} \mathbb{E}\left[\tilde{s}\right] = \lim_{\gamma_M \uparrow \bar{\gamma}_M} s_B + q_M(M, \beta_M^*)\Delta s \leq \lim_{\gamma_M \downarrow \bar{\gamma}_M} s_B + q_M(M, 0)\Delta s = \lim_{\gamma_M \downarrow \bar{\gamma}_M} \mathbb{E}\left[\tilde{s}\right].$$

Case 5. Follows from Case 1 in Parameter Values 1.

Case 6. Observe that

$$\lim_{\gamma_M \uparrow \hat{\gamma}_M} \mathbb{E}\left[\tilde{s}\right] = \lim_{\gamma_M \uparrow \hat{\gamma}_M} s_B + q_M(M, 0)\Delta s > s_B = \lim_{\gamma_M \downarrow \hat{\gamma}_M} \mathbb{E}\left[\tilde{s}\right].$$

Case 7. Follows from Case 7 in Parameter Values 1.

As a result, the organization's sustainability weakly increases in the manager's green preferences, except in cases where the owner withdraws control rights at $\hat{\gamma}_M$.

The organization's sustainability is strictly increasing in the manager's green preferences in some cases, as demonstrated by the following numerical example. Solving the model for $(\pi_G, s_G, \pi_B, s_B, \phi_M, c, P, \gamma_O) = (0.1, 3, 0.8, 1, 0.6, 0.3, 0, 0.05)$ and varying γ_M from 0.05 to 0.1 causes the organization's sustainability to strictly increase from 1.30952 to 1.47619. Furthermore, increasing γ_M to 0.17 causes the organization's sustainability to drop to 1 (since $\hat{\gamma}_M \approx 0.161786$). $\square$

Proposition 25 (Organization's Sustainability and Owner's Green Preferences). *The organization's sustainability weakly increases in the owner's green preferences γ_O and is strictly increasing in some cases.*

Proof of Proposition 25. Figure IA.2 summarizes the optimal contract from Proposition 21 (omitting the fixed wage).

A preliminary result is that when a brown owner delegates control rights, the organiza-

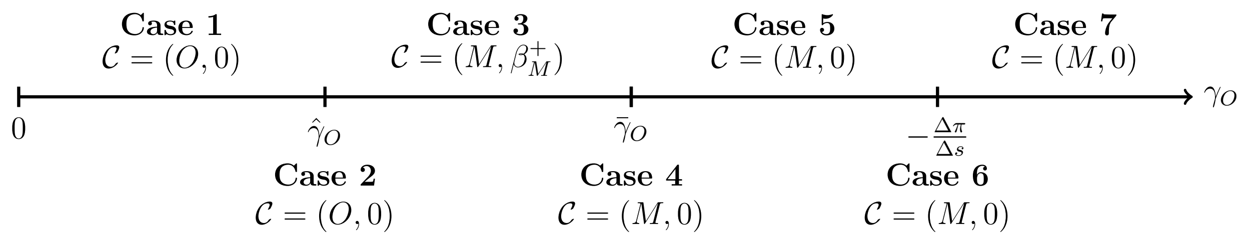

Figure IA.2: **Optimal contract as a function of γ_O.** In this figure, $\mathcal{C} = (d^*, \beta_M^*)$ is the optimal contract (omitting the fixed wage) offered to the manager, where β_M^+ denotes a strictly positive equity stake.

tion's sustainability can be written as

$$\mathbb{E}[\tilde{s}] = s_B + q_M(M, \beta_M^*)\Delta s = s_B + \min\left\{\frac{\beta_M^*\Delta\pi + \gamma_M \Delta s}{\phi_M}, 1\right\}\Delta s$$

since the owner always chooses the brown project (as $\beta_M^* < \bar{\beta}_M^O$, see the proof of Proposition 21) and the manager chooses the green project when exerting effort and becoming informed ($\beta_M^* < \bar{\beta}_M^M$) or exerts no effort ($\beta_M^* = \bar{\beta}_M^M$).

Since $\hat{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$, three parameter constellations can arise: (1) $\hat{\gamma}_O = \bar{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$, (2) $\hat{\gamma}_O < \bar{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$, and (3) $\hat{\gamma}_O < \bar{\gamma}_O = -\frac{\Delta\pi}{\Delta s}$, which we discuss separately below.

Parameter Values 1 ($\hat{\gamma}_O = \bar{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$): In this situation, Cases 2-4 collapse.

Case 1. In this case, the owner always chooses the brown project and therefore $\mathbb{E}[\tilde{s}] = s_B$.

Cases 2-4. The brown owner starts delegating control rights at $\hat{\gamma}_O$ and therefore

$$\lim_{\gamma_O \uparrow \hat{\gamma}_O} \mathbb{E}[\tilde{s}] = s_B \leq s_B + q_M(M, 0)\Delta s = \lim_{\gamma_O \downarrow \hat{\gamma}_O} \mathbb{E}[\tilde{s}].$$

Case 5. In this case, $q_M(M, 0)$ is independent of γ_O and therefore the organization's sustainability remains constant.

Case 6. In this case, the brown owner switches from the brown to the green project as their preferred project, which weakly increases the organization's sustainability.

Case 7. In this case, the owner and manager prefer the green project and therefore $\mathbb{E}[\tilde{s}] = s_G$.

Parameter Values 2 ($\hat{\gamma}_O < \bar{\gamma}_O < -\frac{\Delta\pi}{\Delta s}$):

Case 1. Follows from Case 1 in Parameter Values 1.

Case 2. The brown owner starts delegating control rights at $\hat{\gamma}_O$ and therefore

$$\lim_{\gamma_O \uparrow \hat{\gamma}_O} \mathbb{E}\left[\tilde{s}\right] = s_B \leq \lim_{\gamma_O \downarrow \hat{\gamma}_O} s_B + q_M(M, \beta_M^*)\Delta s = \lim_{\gamma_O \downarrow \hat{\gamma}_O} \mathbb{E}\left[\tilde{s}\right].$$

Case 3. From Proposition 22 it follows that β_M^* is weakly decreasing in γ_O and therefore $q_M(M, \beta_M^*)$ is weakly increasing, as is the organization's sustainability.

Case 4. At $\bar{\gamma}_O$, the manager's compensation weakly drops, which causes the manager to exert weakly more effort, which weakly increases the organization's sustainability.

Case 5. Follows from Case 5 in Parameter Values 1.

Case 6. Follows from Case 6 in Parameter Values 1.

Case 7. Follows from Case 7 in Parameter Values 1.

Parameter Values 3 ($\hat{\gamma}_O < \bar{\gamma}_O = -\frac{\Delta\pi}{\Delta s}$): In this situation, Cases 4-6 collapse.

Case 1. Follows from Case 1 in Parameter Values 1.

Case 2. Follows from Case 2 in Parameter Values 2.

Case 3. Follows from Case 3 in Parameter Values 2.

Cases 4-6. In this case, the brown owner switches from the brown to the green project, which weakly increases the organization's sustainability.

Case 7. Follows from Case 7 in Parameter Values 1.

As a result, the organization's sustainability weakly increases in the owner's green preferences.

The organization's sustainability is strictly increasing in the owner's green preferences in some cases, as demonstrated by the following numerical example. Solving the model for $(\pi_G, s_G, \pi_B, s_B, \phi_M, c, P, \gamma_M) = (0.1, 3, 0.8, 1, 0.6, 0.3, 0, 0.05)$ shows that moving γ_O from 0.025 to 0.05 causes the organization's sustainability to strictly increase from 1.22619 to 1.30952. □

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