Allocating voting rights under risk-shifting incentives *

Andres Fioriti†

Universidad Nacional del Sur – Conicet

Allan Hernández-Chanto‡

University of Queensland

Guillem Ordoñez-Calafí§

University of Bristol

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Abstract

Firms' issuance of non-linear securities, such as debt or options, creates risk-shifting incentives that may lead to inefficient outcomes. This widely accepted result rests on the assumption that firms' decision rights are coupled with the residual claims, and thus held by equity holders. In this paper, we relax this assumption and analyze a setting where cash-flow rights and decision rights, represented by voting rights, are allocated independently. Although payoffs are determined solely by rights over realized cash flows, decision rights hold value because they influence the probability distribution of those cash flows. This interdependence can make cash-flow and decision rights substitutes. We demonstrate that their independent allocation leads to Pareto-superior outcomes and can restore efficiency.

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†andres.fioriti@uns.edu.ar

‡a.hernandezchanto@uq.edu.au

§g.ordonez-calafi@bristol.ac.uk

1 Introduction

A fundamental problem in corporate finance is that non-linear securities, like debt or options, generate incentives to adopt inefficient levels of risk, creating a conflict of interests between the issuers and the investors of those securities. These forces, known as risk-shifting incentives, can increase the cost of capital and result in socially undesirable outcomes (Jensen and Meckling, 1976; Myers, 1977). But the consequences of risk-shifting incentives are ultimately determined by the decision makers, and our understanding often hinges on a rarely discussed assumption: that decision rights are bundled with the residual claims, i.e., with equity. Today, innovations like the tokenization of digital platforms facilitate the unbundling of cash flow and decision rights and have motivated a debate over the desirability of distinct organizational structures with financing and governance needs (Sockin and Xiong, 2023; Abadi and Brunnermeier, 2024). The main goal of this paper is to examine whether and how the independent allocation of cash-flow rights and decision rights, represented as voting power, can address the negative consequences of risk-shifting incentives.

To frame our analysis, consider an issuing firm called A that seeks raising debt capital to finance a valuable project. Meanwhile, a potential investing firm named B knows that the issuance of debt creates an incentive for firm A to take on excessive risk. This is inefficient, as well as undesirable for firm B, which therefore requires a higher price of capital, potentially making the transaction unviable. In this context, firm A would benefit from committing not to take on such excessive risk, but its incentives and decision power would make this an empty promise. Presumably, a transfer of decision rights to firm B could overcome the problem by enabling it to reduce risk-taking and in turn lower the price of its capital. But there is a downside to such a transfer: firm B, as a debtholder, has incentives to block value-creating strategies that it deems too risky, thus reducing firm value and the profitability of firm A, the residual claimant. Our main questions follow naturally. First, what are the equilibrium allocations of cash-flow and voting rights, and how are they determined by the primitives of the problem? Second, are these allocations efficient? In this paper we provide answers to these questions by developing a novel model in which cash-flow and voting rights are allocated independently.

Our analysis generates several key insights. First, when investors consider both cash flow and voting rights valuable, they act as substitutes with a decreasing marginal rate of substitution. Second, if the outside options of the two firms have sufficiently different values, the equilibrium is efficient, meaning that the company's decisions are not subject to risk-shifting. The allocation concentrates most cash-flow and voting rights on the same firm—the one with the most valuable outside option—and the firm with market power extracts all surplus of the operation. Third, as the value of outside options of the two firms becomes similar, a trade-off between efficiency and surplus extraction emerges. Then, the equilibrium is either inefficient or features positive rents for the firm with no market power. We show that the extent of this trade-off is directly related to the concavity or convexity of the securities issued.

We consider a model in which two firms, A and B, can combine their assets to unleash a valuable synergy. If the firms reach an agreement, then their investors must vote on whether to implement a policy with uncertain returns. Each firm is populated by a continuum of investors. Their valuation of the policy depends on a common component that all investors share and on a private signal that reflects investors' belief heterogeneity. Within firms, investors "agree to disagree"; across firms, the distribution of beliefs is identical.[1] At the initial stage, firm A, which has the market power, issues an offer to firm B consisting of a proposed allocation of cash flow and voting rights. Cash flow rights are claims over the final cash flows that are structured as standard securities like equity or debt. Voting rights assign the weight of the vote of their holder on the decision of whether to implement the policy. An offer can only be issued by firm A if the majority of its investors approve it, and it can only be accepted by firm B if the majority of its investors agree. After an offer is accepted, but before investors vote on the policy, they observe a signal on the common value. This signal is public and there is no asymmetric information. Our discussion of efficiency rests on the assumption that the median investors have the most accurate belief. Hence, we call an equilibrium efficient when it is such that the policy is implemented if, and only if, it has a positive net present value (NPV) based on the belief of the median investor. We refer to other investors as either pessimistic or optimistic based on their beliefs relative to the median investor.

In this setting, two frictions give rise to the value for voting rights. First, the risk-shifting incentives. The conflict of interests between investors in firms A and B leads them to seek voting power that increases their influence over policy implementation. The second source is belief heterogeneity, which smooths out the value of voting rights. Belief heterogeneity can, and often will, lead investors with equal claims to vote differently. The marginal voters within firms A and B pin down the mass

[1]An extensive literature studies the sources of investor belief heterogeneity and its consequences for financial markets (Diether et al., 2002; Allen et al., 2006; Banerjee et al., 2009; Banerjee, 2011; Ottaviani and Sørensen, 2015; Giglio et al., 2021; Meeuwis et al., 2022). Within the literature of corporate voting, papers departing from agency frictions and problems of information aggregation introduce heterogeneity of investor beliefs or preferences as a source of value of voting rights (e.g. Levit et al., 2022).

of support for the policy among each group of investors; voting rights determine the weight of this support for the voting outcome.[2] The support for the policy is, of course, determined by the public signal that investors receive after rights have been allocated. An efficient equilibrium is such that the policy is implemented if, and only if, it has $NPV \geqslant 0$ form the perspective of the median investor.

We start by analyzing the benchmark case where firm A's offer structures cash-flow rights as equity. The linearity of equity aligns investors' interests across firms and makes voting rights redundant. Moreover, the absence of risk-shifting incentives ensures that the unique equilibrium is efficient. In this equilibrium, firm A extracts all the surplus, whereas firm B retains the fraction of shares of the new company that leaves its median investor indifferent between accepting and rejecting the offer. This preliminary analysis highlights a perhaps trivial but relevant insight in our setting: voting rights have no value when they are restricted to investors with proportional claims.[3] By allowing distinct securities holders to possess voting rights, value emerges from their conflicts of interests.

Our main analysis considers the case where firm A issues debt to firm B and retains the complementary levered equity or call option (Black and Scholes, 1973), thereby debtholders to hold voting rights. This departs from the traditional coupling of residual cash-flow and voting rights, historically justified by agency problems since the foundational theories of the firm (Smith, 1937; Berle and Means, 1932; Fama and Jensen, 1983). We abstract from agency frictions and instead focus on risk-shifting incentives to analyze the efficiency gains of relaxing this coupling. A central idea is that the value of an asset is determined by the pricing of its claims, and vice versa (Green, 1984). Here, debt influences policy support, which determines the value of the new company and, in turn, of its debt. This results in interdependent valuations of cash-flow and voting rights, allowing us to characterize their substitutability.[4] In digital platforms, the issuance of governance tokens (Barbereau et al., 2023) and the emergence of tokenized debt (Tosato et al., 2024) may offer a

[2]For instance, if the mass of policy support within each investor group is firm $A = 0.75$ and firm $B = 0$, and the allocation of voting rights is 0.8 and 0.2 respectively, the voting outcome is 0.75 x 0.8 = 0.6.

[3]In studies where voting rights can be possessed by equity holder only, their value stems from tensions like agency problems, information aggregation, or preference heterogeneity. We refer the reader to Yermack (2010) and Brav, Malenko and Malenko (2025) for extensive reviews of the literature.

[4]The notion that decision rights can substitute for cash flow rights dates to, at least, Aghion and Bolton (1992), Hart (1995) and Hart and Moore (1998), and it is subsumed by Tirole (2001) as follows: "The transfer of control rights to investors increases the pledgeable income and facilitates financing. Or, put it differently, control rights may substitute for necessarily limited cash flow rights." Our analysis rests on the same idea; the fundamental difference is that we allow for these investors to hold claims different than equity.

laboratory for evaluating some of our insights.[5]

We first study voting decisions. Investors' risk-shifting incentives decrease with their cash-flow rights. Hence, when firm A issues little debt, its investors vote nearly efficiently, i.e. the median investor is almost indifferent about an $NPV = 0$ policy. As debt increases, however, progressively more investors favor $NPV < 0$ policies. The effect of risk-shifting incentives on the support for the policy is smoothed by belief heterogeneity, but only up to a point: as debt approaches the new company's distress level—the value of the new company absent a policy—the issuers' payoff shrinks, and they eventually support any policy. Beyond this point, further debt increases no longer affect firm A's voting. The voting of the debtholders (firm B) is the mirror image of firm A's investors.[6] This creates a range of debt face values around the distress level where the votes of both firms become completely polarized: all policies, regardless of value, are supported by all debt issuers and opposed by all debtholders.

Examining the interaction between cash-flow and voting rights delivers our first insight: when both are valuable, they act as substitutes with a decreasing marginal rate of substitution. Intuitively, payoffs are ultimately determined by claims on realized cash flows. Small claims heighten risk-shifting incentives but lessen the value of influencing policy. As cash-flow rights increase, policy implementation has a greater impact on payoffs, intensifying the conflict with investors at the other firm and raising the relative value of voting rights. This holds when investors value both classes of rights positively, but not always. In our framework, securities' payoffs need not be monotonic on their index in the sense of Nachman and Noe (1994) and DeMarzo et al. (2005). A higher price of debt may worsen risk-shifting incentives enough to reduce debtholders' payoff (Stiglitz and Weiss, 1981). Similarly, voting rights may also have zero or even negative marginal value. For instance, when most voting rights are cast either for or against the policy, marginal changes in their allocation become inconsequential.

We next explore the equilibrium allocation. At the offer stage, firm A aims to maximize the value of the new company while extracting all surplus of the operation. The independent allocation of cash flow and voting rights allows this when the standalone values of the two firms differ sufficiently. Specifically, firm A allocates voting rights across the two firms to fully balance out their risk-shifting

[5]Consistent with the well-established rationales for bundling residual cash-flow and decision rights, the recent initiatives of unbundling might be fostered by the reduced opportunities of rent extraction, particularly in the presence of smart contracts (Cong and He, 2019; John et al., 2023).

[6]For small face values, they all oppose any policy. And as their debt holdings increase beyond the default threshold in absence of a policy, a growing fraction of investors vote for $NPV > 0$ policies. At the limit, when they have a claim on all of the potential cash flows, they vote efficiently.

incentives for the face value of debt that leaves firm B's manager indifferent between accepting and rejecting the offer. This unique, efficient equilibrium formalizes Jensen and Meckling's observation that risk-shifting incentives can be addressed by allocating decision rights to bondholders.[7] More recently, analysts have linked the rise of corporate private debt with the greater ease of enhancing debtholders' influence over firm governance (Lalafaryan, 2024). We take this further by considering the allocation of residual control rights to debtholders as a mechanism for improving efficiency and reducing the cost of debt capital.

The outside option of firm B is important. It determines the debt firm A must issue for the offer to be accepted while transferring the voting rights necessary to balance out the risk-shifting incentives. This is feasible when firm B is either relatively small or large. In these cases, the equilibrium features a small (large) face value with most voting rights allocated to firm A (firm B). Investors holding the majority of cash-flow rights have little risk-shifting incentives, so efficiency is achieved by allocating only a small fraction of voting rights to the other firm's investors. This contrasts with the case where firms A and B have similar standalone values. Then, firm B's participation constraint requires both groups of investors to hold intermediate levels of cash-flow rights, which generates substantial risk-shifting incentives on both sides of the agreement. When an $NPV = 0$ policy is supported even by the most pessimistic issuer and opposed even by the most optimistic debtholder, no allocation of voting rights can yield efficiency. In particular, if the majority of rights are held by firm A, the new company will take excessive risk; if held by firm B, risk-taking will be insufficient. OK, you say it here but seems far away from the paragraph you discuss voting rights

Our third insight follows from this friction. The inability to extract all surplus from an efficient operation creates a trade-off for firm A: it can either achieve efficiency by issuing relatively large debt and ceding most voting rights, or it can capture the entire surplus of a less valuable operation where the new company will engage in excessive risk-taking. The equilibrium is determined by the interaction of two primitives of our model which have relevant interpretations in the corporate realm. First, the risk associated with implementing the new policy, often determined by the maturity of the firms and by their industry (Campbell et al., 2022), as well as the nature of their

[7]This quote from Jensen and Meckling (1976) captures the idea: "To completely protect the bondholders from the incentive effects, these provisions would have to be incredibly detailed [...] In fact, since management is a continuous decision making process it will be almost impossible to completely specify such conditions without having the bondholders actually perform the management function." By considering the transfer of residual decision rights to debtholders we effectively model their (partial) performance of management functions.

synergies (Gorbenko and Malenko, 2014). The higher the variance of the policy cash flows, the more sensitive implementation becomes to the allocation of cash-flow rights. This increases firm A's cost of extracting all surplus and makes the efficient allocation relatively more appealing. Second, the dispersion of beliefs among investors, which relates to the heterogeneity of the shareholder base (Li et al., 2022; Levit et al., 2022; Burkart et al., 2023). The greater the heterogeneity, the more smoothed is the effect of cash-flow rights on voting outcomes. This reduces the inefficiency incurred when capturing all surplus, making this outcome relatively more attractive. The balance between these two forces determines the nature of the equilibrium when the standalone values of the two firms are similar.

Our analysis of debt extends to other concave or convex securities (e.g. Green, 1984; DeMarzo et al., 2005)—in the Appendix we solve the model for a generic concave claim. As the concavity of the security issued decreases, risk-shifting incentives attenuate, and the efficient equilibrium with full surplus extraction is achievable for a larger range of standalone values. At the limit, the security becomes linear (i.e equity), rendering voting rights redundant and ensuring that the equilibrium is always efficient. For convex securities such as call options, the analysis mirrors that in the paper: convex claims reverse the risk-shifting incentives studied here, and the opposite intuition applies.

1.1 Relation to the literature

We study how the independent allocation of cash-flow and decision rights addresses the consequences of risk-shifting incentives for decisions that are not contractible at the time of financing. The literature have proposed alternative mechanisms to address similar frictions. Notably, Green (1984) and Hennessy and Tserlukevich (2008) show that the introduction of conversion and call features in debt-like securities can remove risk-shifting incentives before they lead to inefficient outcomes. Like Green (1984), our study is motivated by the interdependence between the value of an asset and the pricing of its claims. A different set of studies shows that introducing debt features in the compensation package of management can balance out the risk-shifting incentives stemming from representing the interests of shareholders (Brander and Poitevin, 1992; John and John, 1993; Dewatripont and Tirole, 1994; Edmans and Liu, 2011; Bolton et al., 2015). To our knowledge, ours is the first study that considers decision rights to be traded independently and thus to be held by different securities holders.

Many scholars have studied the implications of decoupling cash flow and decision rights. In the context of takeovers, Grossman and Hart (1988) and Harris and Raviv (1988) set out the conditions for the efficiency of the one-share-one-vote structure. Thereafter, several papers argue that relaxing the proportional bundling of shares and votes can help overcome the Grossman and Hart (1980) free-rider problem (Burkart et al., 1998; At et al., 2011; Marquez and Yılmaz, 2012; Burkart and Lee, 2015; Gromb and Acharya, 2025). Other studies consider the merits of vote trading among equity holders on addressing frictions in corporate decision-making, including Blair et al. (1989), Hu and Black (2007), Brav and Mathews (2011), and Dekel and Wolinsky (2012). In a similar spirit, Speit et al. (2023) study the interplay of trading and voting by shareholders in markets that facilitate the acquisition of voting rights without cash flow exposure. These papers have in common that they consider settings where, despite decoupling, decision rights are held by equity holders, i.e. the residual claimants. We further relax the link between cash flow and decision rights by allowing other claimants, like debtholders, to have decision rights.

Debtholders have decision rights in some circumstances. These circumstances are often determined by a contractible event or articulated around a specific outcome. A literature in financial contracting considers the state-contingent assignment of control rights. Zender (1991), Aghion and Bolton (1992), Dewatripont and Tirole (1994), and Berglöf and Von Thadden (1994) among others rationalize the transfer of decision rights from equity holders to debt holders in situations of financial distress. A distinct strand of literature studies the role of debt covenants in alleviating frictions in lending relationships. At the time of contracting, covenants restrict subsequent actions of the issuer and can define the state of the world that leads to a shift of control rights—see Chava et al. (2019) for a comprehensive review of this literature. In our model, decision rights are allocated to distinct security holders at the contracting stage and there are no future events that these rights can be contingent upon. Our study is concerned with the *residual* control rights.

Most often residual control rights are systematically coupled with residual cash flow rights, i.e., with equity. The rationales for such bundling relate to agency frictions and date back to, at least, Smith (1937) and Berle and Means (1932). Later, they were formalized by foundational papers in Corporate Finance like Jensen and Meckling (1976) and Fama and Jensen (1983). Our analysis complements this rarely discussed approach by modeling a downside of such bundling, and of how relaxing it can lead to Pareto superior allocations. The allocation of control rights is based on the incomplete contracts paradigm pioneered by Grossman and Hart (1986) and Hart and Moore (1990), which defines property rights as residual rights of control. Accordingly, our paper decouples the condition of ownership from holding equity.

2 The model

Two firms, A and B, can combine their assets to generate a profitable synergy. Neither firm has access to cash, so any deal must be structured as an allocation of cash-flow and voting rights on the combined assets.

Their strategic interaction unfolds over two periods, $t = 0$ and $t = 1$. At $t = 0$, firm A, referred to as the *issuer*, extends a rights offer to firm B, the *holder*. If firm B accepts the offer, the process advances to $t = 1$, where investors vote on whether to implement a risky policy, followed by the realization of cash flows. All agents are risk-neutral and place equal value on outcomes across periods, as they do not discount future payoffs.

Firm values The stand-alone values of the two firms are common knowledge and are denoted by α_k, where $k \in \{A, B\}$. If the firms agree to combine their assets, they generate a synergy $\sigma > 0$, which is also common knowledge.

After the agreement, the newly formed company, henceforth the *new company*, must decide whether to implement a corporate policy that yields uncertain cash flows $x + y$, where x and y are random variables that can potentially take negative values.[8]

We let μ_d represent the ex post value of the new company, where subscript d indicates the decision to either maintain the status quo ($d = 0$) or implement the policy ($d = 1$). The firm values are therefore given by:

$$\mu_d = \begin{cases} \mu_0 \equiv \alpha_A + \alpha_B + \sigma & \text{if the status quo is preserved} \\ \mu_1 \equiv \alpha_A + \alpha_B + \sigma + x + y & \text{if the policy is implemented.} \end{cases}$$

Investors and beliefs Firms A and B are each populated by a continuum of investors of mass one. The cash-flow and voting rights of each firm are homogeneously distributed among its investors (i.e. they all own an equal share of standard equity), and neither firm has other claims or liabilities.

All investors hold the same belief about the policy cash flow component x. At $t = 0$, this belief is represented by a common prior with an expected value that we normalize to zero, i.e., $\mathbb{E}[x] = 0$. If the merger occurs, at $t = 1$ all investors receive a public *non-contractible* signal θ over which they update beliefs before voting for the policy. The signal θ is drawn from a distribution F with

[8] For simplicity, we use the same notation for random variables and their realizations, denoting both with lower-case letters.

support $[\underline{\theta}, \overline{\theta}]$. For any realization of the signal θ, x has the conditional distribution $P(x \mid \theta)$ with a positive and continuous density $p(x \mid \theta)$ on $[\underline{x}, \overline{x}]$ with $\underline{x} < 0 < \overline{x}$, such that $\theta = \mathbb{E}[x \mid \theta]$.

The beliefs about the cash flow component of the policy y are heterogeneous, commonly known, and remain unchanged throughout the game. In other words, investors "agree to disagree." Specifically, each investor i of firm k begins the game with a private signal $\omega_{i,k}$ drawn independently from an atomless better to assume absolutely continuous de una vez distribution G_k with support $[\underline{\omega}, \overline{\omega}]$. The distribution of beliefs is identical across firms, implying $G_A = G_B = G$. Moreover, we assume that G is symmetric and denote ω_m the belief of the median investor, which we normalize to zero, i.e., $\omega_m = 0$.

Conditional on any realization ω, the random variable y follows the distribution $Q(y \mid \omega)$, which has a positive and continuous density function $q(y \mid \omega)$ defined on the interval $[\underline{y}, \overline{y}]$, where $\underline{y} < 0 < \overline{y}$. We assume the strict Monotone Likelihood Ratio (sMLR) property, which implies that the ratio $q(y \mid \omega)/q(y \mid \omega')$ is strictly increasing in y for all $\omega > \omega'$.[9]

Private signals are normalized such that $\omega_{i,k} = \mathbb{E}[y \mid \omega_{i,k}]$. Each firm's investors are represented by their respective managers, whose beliefs coincide with those of the median investor. Therefore, at time $t = 0$, both firm managers have a value-neutral expectation of the policy, i.e. $\mathbb{E}[\mu_1 \mid \omega_m] = \mu_0$. Meanwhile, half of the investors in each firm expect that the policy is value-creating $\mathbb{E}[\mu_1 \mid \omega_{i,k} > \omega_m] > \mu_0$, whereas the other half expect that it is value-destroying $\mathbb{E}[\mu_1 \mid \omega_{i,k} < \omega_m] < \mu_0$. We occasionally use the terms 'optimistic' and 'pessimistic' to refer to these investors, respectively.

After the assets of the two firms are combined, the common signal θ is realized at $t = 1$. Investors then update their beliefs, and their expectations about the value of the policy are determined by both the common and individual signals, $\mathbb{E}[\mu_1 \mid \theta, \omega_{i,k}]$. We denote the conditional distribution of the value of the new company when the policy is implemented $H(\mu_1 \mid \theta, \omega)$, which has support $[\underline{\mu}_1, \overline{\mu}_1]$, with $\underline{\mu}_1 \equiv \mu_0 + \underline{x} + \underline{y}$, and $\overline{\mu}_1 \equiv \mu_0 + \overline{x} + \overline{y}$. Its corresponding density $h(\mu_1 \mid \theta, \omega)$ is given by the convolution of $p(x \mid \theta)$ and $q(y \mid \omega)$.

We make the following parametric assumption to rule out uninteresting cases:

Assumption 1. $\mu_0 + \underline{\theta} + \underline{\omega} \geqslant 0$.

Assumption 1 ensures that the cash flows of the new company are expected to be non-negative at all times, even for the most pessimistic investors under the most adverse public signal.

[9] Additionally, we make the following assumptions: (i) the conditional density function $q(y \mid \omega)$ is twice differentiable in both y and ω; and (ii) the functions $yq(y \mid \omega)$, $|yq_\omega(y \mid \omega)|$, and $|q_{\omega\omega}(y \mid \omega)|$ are integrable over $y \in [\underline{y}, \overline{y}]$.

Rights offer At $t = 0$, the manager of firm A extends a take-it-or-leave-it (TIOLI) rights offer to the manager of firm B, who decides whether to accept or reject it. Since managers share the beliefs of the median investors, the offer is incentive-compatible for the majority of A investors. Analogously, acceptance occurs only if it also gains approval from the majority of B investors.[10]

The offer is a tuple (s, v). Here, $s \in [\underline{s}, \overline{s}]$ indexes the security S, such that $S : [\underline{\mu}_d, \overline{\mu}_d] \times [\underline{s}, \overline{s}] \to \mathbb{R}_+$ maps the cash flows of the new company μ_d and index s to the cash flow claim of B investors.[11] Meanwhile, $v \in [0, 1]$ represents the fraction of voting rights allocated to the same investors. The complementary cash-flow and voting rights are allocated to A investors. In the main text, we develop the analysis for two families of securities: equity and debt, which leave the issuer with equity and levered equity respectively. We argue, and show in Appendix A, that our qualitative results extend to a generic class of families of securities that satisfy the standard limited liability and monotonicity conditions of the security design literature (e.g. DeMarzo 2005; DeMarzo et al. 2005). We assume that investors of the same firm cannot be distinguished or discriminated for allocation purposes, so these rights are uniformly distributed across them.

Policy implementation After the two firms combine their assets and the public signal is realized, investors exercise their voting rights to decide whether to implement the policy or maintain the status quo. We assume that the policy is implemented if the majority of the *voting rights* (i.e., at least half) are cast to support it.

Timing A summary of the timing is presented here for the convenience of the reader. At the outset, all investors share the same prior over policy component x and have heterogeneous beliefs over component y, $\omega_{i,k} = \mathbb{E}[y \mid \omega_{i,k}]$. The next sequence of events follows:

$t = 0$ Firm A's manager makes a rights offer (s, v), where s indexes a family of securities S, to the manager of firm B. If B's manager accepts, rights are allocated accordingly, synergy $\sigma > 0$ is created, and the game moves to the next period. If B's manager rejects, the game ends.

[10]Our exposition follows Bernhardt et al. (2018). The results remain unchanged if we instead assume that the offer requires approval from at least half of the investor-owners for it to be issued. This equivalence relies on the Law of Large Numbers for a continuum of agents established by Sun (2006), which ensures that aggregate outcomes correspond almost surely to their expected values.

[11]In our setting, investors' payoffs are determined solely by their claims on realized cash flows. Therefore, heterogeneity arises only from differences in their beliefs, since preferences are identical. This contrasts with frameworks in which voting outcomes directly affect payoffs, rendering the distinction between preferences and beliefs is irrelevant for the analysis, e.g. Levit et al. (2022).

$t = 1$ Public signal $\theta = \mathbb{E}[x \mid \theta]$ realizes and investors update beliefs and vote on the policy. If the policy is approved, stochastic cash flows μ_1 realize; if it is blocked, certain cash flows μ_0 realize. Transfers are made according to cash-flow rights and the game ends.

3 Equilibrium analysis and definition

We solve the game using backward induction to determine the subgame perfect Nash equilibrium in weakly dominant strategies. This section introduces key equilibrium concepts and provides a characterization of the resulting equilibrium.

3.1 Voting and policy implementation

At $t = 1$, cash-flow and voting rights of the new company are allocated, with cash-flow rights structured by a given family of securities $S(\cdot, s)$. Public signal θ realizes and investors vote for or against the policy, which is implemented if the majority of voting rights support it.

It is weakly dominant for all investors to vote for the policy if, and only if, the payoff of implementing it exceeds the payoff under the status quo. Therefore, using the payoff monotonicity of securities, we can define a unique private signal threshold for each former firm such that, given the rights allocation and the public signal, makes an investor indifferent about implementing the policy. We call it the *policy-indifferent investor* and denote it by $\hat{\omega}_k(s, \theta)$, for $k \in \{A, B\}$. The two thresholds are implicitly characterized by

$$\begin{aligned} S(\mu_0, s) &= \mathbb{E}_{\mu_1}[S(\mu_1, s) \mid \hat{\omega}_B, \theta], \\ \mu_0 - S(\mu_0, s) &= \mathbb{E}_{\mu_1}[\mu_1 - S(\mu_1, s) \mid \hat{\omega}_A, \theta]. \end{aligned} \tag{1}$$

A formal derivation of the properties of the policy-indifferent investor thresholds is in the Appendix; here we provide the main intuition. The LHS of the two expressions above capture the payoff under the status quo for investors of former firms B and A respectively; the RHS represents the expected payoff from implementing the policy. The sMLR property guarantees that all investors with signals $\omega_{i,k} \geqslant \hat{\omega}_k(s, \theta)$ vote for the policy, whereas the remaining vote against it. Expressions in (1) are independent of the allocation of voting rights v because voting truthfully is strategically dominant. Indeed, the allocation of voting rights does not influence the desirability of the policy, but only whether the policy can be implemented by those who consider it desirable.

The allocation of cash-flow rights and the public signal determine the fraction of investors of each firm that vote for the policy, $1 - G(\hat{\omega}_k(s, \theta))$. Meanwhile, the allocation of voting rights determines the weight of these votes and hence the *effective* support for the policy. The payoff monotonicity of securities implies that thresholds $\hat{\omega}_k(s, \theta)$ decrease with the public signal—intuitively, a better signal about the policy increases the fraction of investors that vote for it. Therefore, we can define a unique threshold on the public signal $\hat{\theta}(s, v)$ such that the policy is implemented if, and only if, $\theta \geqslant \hat{\theta}(s, v)$. We call it *policy-implementation threshold* and it is implicitly characterized by

$$v\left[1 - G\left(\hat{\omega}_B(s, \hat{\theta})\right)\right] + (1 - v)\left[1 - G\left(\hat{\omega}_A(s, \hat{\theta})\right)\right] = 1/2, \tag{2}$$

where the value 1/2 on the RHS reflects the simple majority rule. It follows that, given a rights allocation, the ex-ante probability that the policy is implemented satisfies $1 - F\left(\hat{\theta}(s, v)\right)$.

The policy-implementation threshold has important efficiency implications because it determines which policies might be approved. For expositional purposes, we assume that a representative social planner shares the beliefs of median investors and firm managers, $\omega_m = 0$.[12] The planner maximizes total surplus and therefore aims that the policy is implemented if, and only if, it is (weakly) value-creating. We refer to the threshold $\hat{\theta}(s, v) = 0$ as the *efficient* policy-implementation threshold. An equilibrium with a negative threshold, $\hat{\theta}(s, v) < 0$, is inefficient because it results in the implementation of value-destroying policies. Conversely, if $\hat{\theta}(s, v) > 0$, inefficiency arises from the failure to implement value-creating policies.

3.2 Rights offer

At $t = 0$ all investors share prior $\mathbb{E}[x] = 0$ about the policy value component x but have heterogeneous beliefs about component y given by $\omega_{i,k} = \mathbb{E}[y \mid \omega_{i,k}]$. Firm A's manager can make a TIOLI rights offer (s, v) to the manager of firm B, where s indexes the cash flow rights of a given family of securities S. All investors anticipate the policy implementation threshold $\hat{\theta}(s, v)$ associated with the proposed allocation of rights and use it to determine their expected payoff.

Given a rights allocation (s, v), we denote $\mathbb{E}_\theta\big[\mathbb{E}_{\mu_1}[\mu_d(s, v) \mid \theta, \omega_m]\big]$ the aggregate value of the new company from the perspective of managers, and use $\mathbb{E}_\theta\big[\mathbb{E}_{\mu_1}[\pi_k(s, v) \mid \theta, \omega_m]\big]$ to denote their

[12]This formulation serves the purpose of introducing belief dispersion solely to smooth the impact of cash-flow rights on the value of voting rights. Alternative formulations are also possible. For example, the planner could receive a private signal ω smaller (larger) than the median investor, capturing that investors are, by nature, optimistic (pessimistic).

expected payoff. It follows that

$$\begin{aligned}\mathbb{E}_\theta\Big[\mathbb{E}_{\mu_1}[\mu_d(s,v)\mid\omega_m]\Big] &= \mathbb{E}_\theta\Big[\mathbb{E}_{\mu_1}[\pi_A(s,v)\mid\theta,\omega_m]\Big]+\mathbb{E}_\theta\Big[\mathbb{E}_{\mu_1}[\pi_B(s,v)\mid\theta,\omega_m]\Big]\\ &= F\left(\hat\theta(s,v)\right)\mu_0+\left[1-F\left(\hat\theta(s,v)\right)\right]\mathbb{E}_\theta\left[\mathbb{E}_{\mu_1}\left[\mu_1\mid\theta,\omega_m\right]\mid\theta\geqslant\hat\theta(s,v)\right].\end{aligned}\tag{3}$$

The first line in (3) shows that cash-flow rights split the value of the new company among investors of the two firms in complementary fractions.The second line decomposes the value of the new company based on the voting outcome. With probability $F\left(\hat\theta(s,v)\right)$ the status quo is preserved and cash flows are μ_0. With the remaining probability, the policy is implemented yielding expected cash flows $\mathbb{E}_\theta\left[\mathbb{E}_{\mu_1}\left[\mu_1\mid\theta,\omega_m\right]\mid\theta\geqslant\hat\theta(s,v)\right]$.

We are ready to state the problem of firm A's manager, which makes a rights offer to the manager of firm B for a given family of securities S:

$$\begin{aligned}(s^*,v^*) &= \arg\max_{\{s,v\}}\ \mathbb{E}_\theta\Big[\mathbb{E}_{\mu_1}[\pi_A(s,v)\mid\theta,\omega_m]\Big]\\ &\quad\text{s.t.}\quad \mathbb{E}_\theta\Big[\mathbb{E}_{\mu_1}[\pi_A(s,v)\mid\theta,\omega_m]\Big]\geqslant\alpha_A\quad\text{and}\quad\mathbb{E}_\theta\Big[\mathbb{E}_{\mu_1}[\pi_B(s,v)\mid\theta,\omega_m]\Big]\geqslant\alpha_B.\end{aligned}\tag{4}$$

That is, the manager of the issuing firm makes an offer to the manager of the (prospective) holder that maximizes its expected payoff subject to their individual rationality constraints. The payoff monotonicity of securities and the sMLR property of private signals guarantee that such offer also satisfies the individual rationality constraint of the majority of investors of each firm.

3.3 Equilibrium definition

We solve for the subgame perfect Nash equilibrium. An offer issued by the manager of firm A at $t=0$ is individually rational for the majority of its investors, and an offer accepted by the manager of firm B is individually rational for the majority of its investors. Given a realization of the public signal θ at $t=1$, investors with private signal $\omega_{i,k}\geqslant\hat\omega_k(s,\theta)$ vote for the policy, while the remaining investors vote against it. The policy is implemented if, and only if, $\theta\geqslant\hat\theta(s,v)$.

Definition 1. *Given a family of securities $S(\cdot,s)$, the subgame perfect Nash equilibrium comprises a cash-flow and voting rights allocation (s^*,v^*), and the associated policy-indifferent investors $\hat\omega_k(s^*,\theta)$ for $k\in\{A,B\}$, and policy-implementation threshold $\hat\theta(s^*,v^*)$, such that*

- *at $t=0$, the manager of firm A issues a TIOLI rights offer (s^*,v^*) aimed at maximizing the* *firm's expected payoff subject to the rationality constraint of firm B's manager;*

- *at $t = 1$, given rights allocation (s^*, v^*) and the realization of public signal θ, investors' voting decisions, $\hat{\omega}_k(s^*, \theta)$, maximize their expected payoff, inducing the policy to be implemented if, and only if $\theta \geqslant \hat{\theta}(s^*, v^*)$.*

We call an equilibrium 'efficient' when an offer (s^*, v^*) is accepted and the policy-implementation threshold satisfies $\hat{\theta}(s^*, v^*) = 0$.

4 Equity

When cash-flow rights are structured as equity—i.e., when S represents equity—the index $s \in [0, 1]$ denotes the fraction of cash flows or shares allocated to the security holders. Therefore, the realized payoff for firm A's investors is $(1 - s)\mu_d$, while firm B's investors receive the remaining $s\mu_d$.

4.1 Voting and policy implementation

Following the acceptance of an equity offer, all investors hold securities of the same family: *unlevered* equity. The equal structure of cash-flow rights aligns the interests of issuers and holders with respect to policy, rendering voting rights redundant. Moreover, because each investor retains a fraction of cash flows that does not depend on their realization, all investors seek to maximize the value of the new company. Lemma 1 formalizes this intuition within our model:

Lemma 1. *Suppose that all cash-flow rights are structured as equity. Then, policy-indifferent investors are identical and independent of the rights allocation, $\hat{\omega}_A(s, \theta) = \hat{\omega}_B(s, \theta) = -\theta$. Moreover, the policy-implementation threshold is efficient, $\hat{\theta}(s, v) = 0$.*

Lemma 1 is straightforward. The policy-indifferent investor of firm A is given by $(1 - s)\mu_0 = (1 - s)\left[\mu_0 + \theta + \hat{\omega}_A\right]$, while that of firm B satisfies $s\mu_0 = s\left[\mu_0 + \theta + \hat{\omega}_B\right]$. The linearity of equity ensures that issuers and holders share equally-structured cash-flow rights, dissociating the fraction of cash flows captured by each investor from the realization of those cash flows. This aligns their interests over corporate policy regardless of the stake of the company they own, equating the two policy-indifferent investor functions.

The result that policy implementation is both efficient and independent of the rights allocation (Lemma 1) follows directly from the argument above. Since both issuers and holders of unlevered equity claim a fixed fraction of the realized cash flows, they all seek to maximize the value of the new company. In other words, they support the implementation of a policy if, and only if, it creates value. Thus, unlevered equity leads to an efficient policy implementation strategy. Naturally, the alignment of interests of issuers and holders of unlevered equity means that policy implementation is independent of the allocation of voting rights v, which therefore become irrelevant. Intuitively, former A and B investors are indifferent between deciding on policy implementation and delegating the decision to their counterparts because they all pursue the same outcome. Formally, expression (2) reveals how voting rights become irrelevant for the policy-implementation threshold when the interests of A and B investors are aligned, i.e., when $\hat{\omega}_A(s, \hat{\theta}) = \hat{\omega}_B(s, \hat{\theta})$.

4.2 Rights offer

At the initial stage, investors anticipate the alignment of interests over policy implementation if the two firms combine their assets. Furthermore, they know that the implementation criterion will maximize the value of the new company from the perspective of managers, regardless of the allocation of rights. Taking this into consideration, firm A's manager issues a TIOLI rights offer to the manager of firm B that solves problem (4).

Proposition 1. *Suppose that cash-flow rights are structured as equity. Then, the manager of firm A issues an offer of cash-flow and voting rights (s^*, v^*) characterized respectively by*

$$\begin{aligned} s^* &= \frac{\alpha_B}{\mu_0 + \left(1 - F\left(\hat{\theta}(s^*, v^*)\right)\right) \mathbb{E}[\theta \mid \theta \geqslant \hat{\theta}(s^*, v^*)]}, \\ v^* &\in [0, 1], \end{aligned} \tag{5}$$

such that the new company operates efficiently, $\hat{\theta}(s^*, v^*) = 0$. Firm B's manager accepts the offer.

The offer in Proposition 1 is easily derived. The first line in equation (5) characterizes the proposed allocation of cash-flow rights, i.e., the fraction of shares of the new company offered to firm B. The denominator represents the expected cash flows of the new company when it is run efficiently, that is, when $\hat{\theta}(s^*, v^*) = 0$. The equity stake s^* is the proportion of this value that equates firm B's outside option, α_B. Therefore, A's investors capture all the surplus from the transaction, leaving B's investors indifferent between accepting and rejecting the offer. Importantly, the equilibrium allocation of cash-flow rights is independent of the allocation of voting rights. As argued above, voting rights are irrelevant. Indeed, the second line of (5) shows that any allocation of voting rights constitutes an equilibrium outcome.

The offer in Proposition 1 is individually rational for the managers of both firms. Using our representation in (3), we have that $\mathbb{E}_\theta\big[\mathbb{E}_{\mu_1}[\pi_B(s^*, v^*) \mid \theta, \omega_m]\big] = \alpha_B$, whereas $\mathbb{E}_\theta\big[\mathbb{E}_{\mu_1}[\mu_d(s^*, v^*) \mid \theta, \omega_m]\big] - \alpha_B > \alpha_A$. To see this, note that combining the assets of the two firms over an equity offer generates surplus from two sources. First, it unlocks synergy $\sigma > 0$. Second, it creates the possibility of implementing a policy which will be adopted if, and only if, it is expected to create value.

5 Debt

When cash flow rights are structured as debt—that is, when S represents a debt claim—the index $s \in [0, \overline{\mu}_1]$ corresponds to the debt's face value .[13] Under this structure, the payoff to firm B's investors (the debtholders) is given by $\min\{s, \mu_d\}$. Conversely, firm A's investors (the debt issuers) retain the residual claim, which yields a payoff of $\max\{0, \mu_d - s\}$. This residual claim represents the levered equity of the new company or, equivalently, a call option on the firm's cash flows with strike price s.

5.1 Voting and policy implementation

Once a debt offer is accepted, the desirability of a policy for both groups of investors (issuers and holders) depends on the face value of debt and on the policy's expected value. We first characterize the policy-indifferent investors $\hat{\omega}_k(s, \theta)$, which allows us to determine the votes in support for the policy as a function of both the public signal and the debt claim. We then use this voting support to establish how the allocation of voting rights determines the policy-implementation threshold $\hat{\theta}(s, v)$.

5.1.1 Policy-indifferent investors

The lemma below characterizes the key features of the debt issuer and the debt holder that are indifferent between preserving the status quo and supporting policy implementation.

[13] Although the face value s can in principle take any value in $\mathbb{R}_+$, a debt claim exceeding the maximum potential value of the new company, $s > \overline{\mu}_1$, would necessarily violate the issuers' individual rationality constraint and thus cannot be part of an equilibrium. To simplify the analysis, we exclude the case $s > \overline{\mu}_1$ from the outset.

Lemma 2. *Let $s = \underline{s}_A(\theta)$ denote the face value of debt such that the issuers' policy-indifferent investor is the most pessimistic investor, $\hat{\omega}_A(\underline{s}_A, \theta) = \underline{\omega}$, and let $s = \overline{s}_B(\theta)$ denote the face value such that the holders' policy-indifferent investor is the most optimistic investor, $\hat{\omega}_B(\overline{s}_B, \theta) = \overline{\omega}$. Then, both $\underline{s}_A(\theta)$ and $\overline{s}_B(\theta)$ decrease with the public signal θ and satisfy*

$$\underline{s}_A(\underline{\theta}) < \mu_0 < \overline{s}_B(\overline{\theta}).$$

The policy-indifferent investors of debt issuers and debt holders respectively satisfy

$$\begin{cases} \hat{\omega}_A(s, \theta) \in (\underline{\omega}, \overline{\omega}) & \textit{if} \quad s < \underline{s}_A(\theta) \\ \hat{\omega}_A(s, \theta) = \underline{\omega} & \textit{if} \quad s \geqslant \underline{s}_A(\theta) \end{cases} \qquad \textit{and} \qquad \begin{cases} \hat{\omega}_B(s, \theta) = \overline{\omega} & \textit{if} \quad s \leqslant \overline{s}_B(\theta) \\ \hat{\omega}_B(s, \theta) \in (\underline{\omega}, \overline{\omega}) & \textit{if} \quad s > \overline{s}_B(\theta) \end{cases} \tag{6}$$

and they are weakly decreasing in both the face value of debt and the public signal, i.e., $\frac{d}{ds}\hat{\omega}_k(s, \theta) \leqslant 0$ and $\frac{d}{d\theta}\hat{\omega}_k(s, \theta) \leqslant 0$ for $k \in \{A, B\}$. Moreover, the debt issuers' policy-indifferent investor always regards the policy as value-destroying, $\mathbb{E}_{\mu_1}[\mu_1 \mid \hat{\omega}_A, \theta] < \mu_0$, whereas that of debt holders always regards it as value-creating, $\mathbb{E}_{\mu_1}[\mu_1 \mid \hat{\omega}_B, \theta] > \mu_0$.

Proof. See Appendix A.1.

The policy-indifferent investors are determined jointly by the face value of debt and the beliefs about the policy, so Lemma 2 illustrates how these elements shape the voting behavior of both debt issuers and debt holders. We explain the main intuition here and provide a formal proof in the Appendix.

Consider first the debt issuers. When the face value of debt is below the distress level—the value of the new company under the status quo, μ_0—issuers weigh the certain, positive payoff from the status quo against a risky but potentially larger payoff from the policy. The resolution of this trade-off depends on the balance between their risk-shifting incentives and their beliefs about the policy. For small face values, risk-shifting incentives are limited, so issuers with the most negative views about the policy—the most pessimist—vote against it. As a result, the votes of debt issuers are split: $\hat{\omega}_A(s, \theta) \in (\underline{\omega}, \overline{\omega})$. As the face value rises, risk-shifting incentives strengthen, gradually reducing the share of investors who oppose the policy. Eventually, even the most pessimistic investor supports it: $\hat{\omega}_A(s, \theta) = \underline{\omega}$ for $s \geqslant \underline{s}_A(\theta)$.

Support for the policy is also shaped by the public signal θ. A higher signal increases the expected value of the policy, which raises the fraction of investors who support it. Thus, the policy-indifferent investor $\hat{\omega}_A(s,\theta)$ weakly decreases in θ, and the cutoff $\underline{s}_A(\theta)$ also decreases. The worse the signal, the higher the face value of debt required to ensure unanimous support among the issuers. Hence, no debt issuer ever opposes the policy once $s \geqslant \underline{s}_A(\underline{\theta})$. This threshold is below the distress level $s = \mu_0$, which reflects the fact that for any $NPV < 0$ policy, there exists a face value sufficiently close to μ_0 that creates enough risk-shifting incentives for issuers to support it.

Turning to debt holders, the intuition is the mirror opposite. When the face value of debt exceeds the distress level $s > \mu_0$, holders weigh the certain but limited payoff from the status quo against the potentially larger payoff from the policy. Risk-shifting incentives are weakest at the highest debt levels, where debt holders capture the entire cash flow of the new company. In this case, their votes are split and depend primarily on their beliefs about the policy. As the face value is reduced, risk-shifting incentives strengthen, and an increasing fraction of debt holders opposes the policy. Eventually even the most optimistic investor votes against it: $\hat{\omega}_B(s,\theta) = \overline{\omega}$ for $s \leqslant \overline{s}_B(\theta)$.

No debt holder ever supports the policy once $s \leqslant \overline{s}_B(\overline{\theta})$, and this cutoff lies above the distress level, $\overline{s}_B(\overline{\theta}) > \mu_0$. This inequality arises from the concavity of debt claims, which makes debt holders effectively risk averse: they demand a value premium to support a risky alternative over the certain payoff of the status quo. Together with the fact that all issuers support the policy for $s \geqslant \underline{s}_A(\underline{\theta})$, this implies that there is always a range of face values around the distress level where issuers and holders are polarized, regardless of the value of the policy: $s \in \left[\underline{s}_A(\underline{\theta}), \overline{s}_B(\overline{\theta})\right]$. We refer to this range as the *region of unconditional polarization*. In Appendix A.1 we show that the extent of this region is inversely related to the concavity or convexity of the security that structures the cash-flow rights.

Figure 1 illustrates the insights of Lemma 2 by plotting the policy support of issuers and holders as a function of the face value of debt, and for three realizations of the public signal: the value-neutral case and the two extremes of the distribution.

Consider the value-neutral signal, $\theta = 0$. When debt is almost null, $s \to 0$, the issuers capture all the new company's cash flows and effectively become *unlevered* equity holders. Then, their voting criterion is efficient: the median investor is indifferent to policy implementation, $\hat{\omega}_A(s,\theta) = \omega_m$, and votes are evenly split. As debt increases, risk-shifting incentives arise, leading a growing share of pessimistic issuers to support the policy. For debt holders, the pattern is reversed: when their claim captures all potential cash flows, $s \to \overline{\mu}_1$, they behave like unlevered equity holders. As the face value falls, risk-shifting incentives emerge, and an increasing share of optimistic holders vote against the policy.

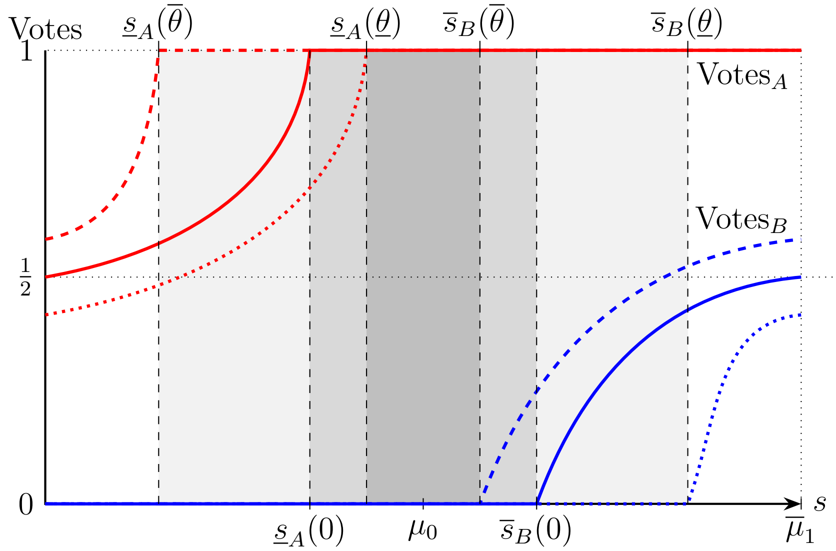

Figure 1: Percentage support among debt issuers (A) and debt holders (B) against the face value of debt s for public signals corresponding to the value-neutral policy $\theta = 0$ (solid), the most value-creating policy $\theta = \overline{\theta}$ (dashed), and the most value-destroying policy $\theta = \underline{\theta}$ (dotted).

Thus, under a value-neutral signal of the policy, the majority of issuers support the policy while the majority of holders oppose it, regardless of the debt level. Risk-shifting incentives push pessimistic issuers (optimistic holders) to support (oppose) the policy, but not the other way around. This is captured in Lemma 2 by $\mathbb{E}_{\mu_1}[\mu_1 \mid \hat{\omega}_A, \theta] < \mu_0$ and $\mathbb{E}_{\mu_1}[\mu_1 \mid \hat{\omega}_B, \theta] > \mu_0$. For the complementary minorities of these security holders, their strong beliefs outweigh the risk-shifting incentives, causing them to align their votes with investors on the opposite side of the capital structure.

Figure 1 also highlights the role of the public signal. A higher signal (dashed line) raises the expected policy value, weakly increasing support at any debt level. A lower signal (dotted line) has the opposite effect. The region of unconditional polarization is shaded in dark gray: within this range, changes in debt do not alter aggregate support. This region represents the limit of how far belief heterogeneity can smooth the impact of cash-flow rights allocations on policy support.

5.1.2 Policy-implementation threshold

When cash flow rights are structured as debt, the face value determines the desirability of the policy for debt issuers and holders, whose interests are in conflict. In contrast to equity offers, the policy-implementation threshold is a function of the rights allocation, $\hat{\theta}(s, v)$. The following lemma formalizes the effect of rights allocation on the policy-implementation threshold.

Lemma 3. *Suppose that the issuer's offer structures cash-flow rights as debt. Then, the policy-*

implementation threshold weakly decreases with the face value, $\frac{d}{ds}\hat{\theta}(s,v) \leqslant 0$*, and weakly increases with the voting rights allocated to debt holders,* $\frac{d}{dv}\hat{\theta}(s,v) \geqslant 0$*.*

Let $v = \underline{v}(s)$ *be the largest allocation of voting rights to debt holders such that any policy is implemented,* $\hat{\theta}(s,\underline{v}) = \underline{\theta}$*, and let* $v = \overline{v}(s)$ *be the smallest allocation such that no policy is implemented,* $\hat{\theta}(s,\overline{v}) = \overline{\theta}$*. Then, the policy-implementation threshold is interior for allocations between these cutoffs, i.e.* $\hat{\theta}(s,v) \in (\underline{\theta},\overline{\theta})$ *for* $v \in (\underline{v}(s),\overline{v}(s))$*, which are such that:*

- *For* $s < \underline{s}_A(\underline{\theta})$*, it holds that* $\underline{v}(s) < \overline{v}(s) \leqslant 1/2$*;*
- *For* $s \in \left[\underline{s}_A(\underline{\theta}), \overline{s}_B(\overline{\theta})\right]$*, we have* $\underline{v}(s) = \overline{v}(s) = 1/2$*;*
- *For* $s > \overline{s}_B(\overline{\theta})$*, it holds that* $1/2 \leqslant \underline{v}(s) < \overline{v}(s)$*.*

Proof. See Appendix A.2.

The first part of Lemma 3 follows directly form our previous analysis. The characterization of the policy-implementation threshold in (2) shows that the cutoff increases with the policy-indifferent investors, $\hat{\omega}_k(s,\theta)$, which are know to decrease with the face value s (Lemma 2). Therefore, as debt increases, the mass of investors supporting the policy also increases, lowering the signal required for approval: $\frac{d}{ds}\hat{\theta}(s,v) \leqslant 0$. Expression (2) also shows that voting rights v govern the relative influence of the two policy-indifferent investors on the implementation threshold. Since debt issuers are more supportive of the policy than debt holders (Figure 1), transferring voting rights from issuers to holders (weakly) reduces the set of implemented policies, or equivalently, raises the implementation threshold, $\frac{d}{dv}\hat{\theta}(s,v) \geqslant 0$. The opposing effects of cash-flow and voting rights on policy implementation impiles that they are complements in sustaining a given policy-implementation threshold.

The second part of Lemma 3 links the allocation of rights to the boundaries of the policy-implementation threshold. Cutoffs $\underline{v}(s)$ and $\overline{v}(s)$ delimit the range of voting rights allocations that result in an interior threshold, given a face value of debt. This distinction is important because voting rights are valuable at the *margin* only when changes in their allocation affect policy implementation—that is, when the policy-implementation threshold is interior.

Figure 2 illustrates the landscape of policy-implementation thresholds in the contracting space (s,v). The white area is the set of rights allocations that generate interior policy-implementation thresholds; the thick lines that delimit the area depict the functions $\underline{v}(s)$ and $\overline{v}(s)$.

For small debt levels $s < \underline{s}_A(\underline{\theta})$ (first bullet of Lemma 3), the policy is supported by a relatively large fraction of issuers. Consequently, when issuers hold most of the voting rights—that is, when

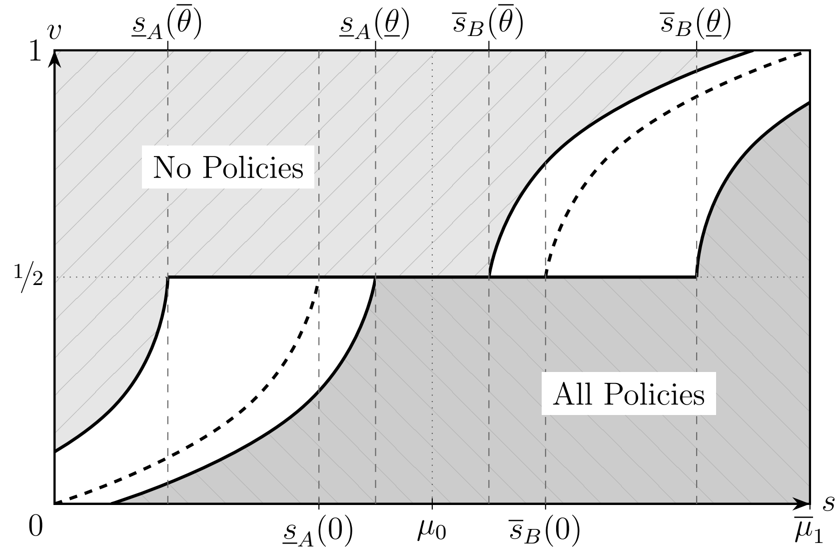

Figure 2: Policy-implementation thresholds over the contracting space. Thick lines correspond to functions $\underline{v}(s)$ and $\overline{v}(s)$; the dashed line represents the efficient implementation threshold $\hat{\theta}(s, v) = 0$.

v is small—the policy is implemented across a wide range of θ realizations. As voting rights are transferred to debt holders (i.e. as v increases), their unanimous opposition to the policy gains influence, raising the implementation threshold until it eventually reaches its upper bound $\hat{\theta}(v, s) = \overline{\theta}$. This upper bound arises when debt issuers still hold the majority of voting rights ($v \leqslant 1/2$). Since debt holders unanimously reject any policy (Figure 1), any allocation granting them the majority of voting rights ($v \geqslant 1/2$) systematically results in all policies being blocked.

The debt holders' unconditional opposition to the policy, combined with the majority approval rule, can generate a discontinuity in the implementation threshold around $v = 1/2$. For $s > \underline{s}_A(\overline{\theta})$, risk-shifting incentives are sufficiently strong that even the most pessimistic issuer supports the policy upon observing the most favorable public signal. As a result, there is always a fraction of issuers that votes for the policy, ensuring that some policies are implemented when issuers hold the majority of voting rights: $\hat{\theta}(v, s) < \overline{\theta}$ if $v \leqslant 1/2$. When the majority of voting rights shifts to debt holders ($v > 1/2$), however, all policies are systematically blocked, and the implementation threshold jumps discontinuously to $\hat{\theta}(v, s) = \overline{\theta}$.

The discontinuity in the policy-implementation threshold is largest for face values in the unconditionally polarized region, $s \in \left[\underline{s}_A(\underline{\theta}), \overline{s}_B(\overline{\theta})\right]$ (second bullet of Lemma 3). In this region, the threshold coincides with one of its two boundaries, and the voting-rights majority cutoff determines whether all policies are implemented ($v \leqslant 1/2$) or no policies are implemented ($v > 1/2$).

For higher face values, $s > \overline{s}_B(\overline{\theta})$ (third bullet of Lemma 3), the debt holders' claim is large enough that weaker risk-shifting incentives lead them to split their votes, with the most optimistic willing to support the best policies. Meanwhile, issuers unanimously support any policy. Consequently, the intuition developed above is reversed: interior policy-implementation thresholds arise when the majority of voting rights is held by debt holders ($v > 1/2$). The size of the discontinuity in the implementation threshold declines with the face value and disappears entirely once $s \geqslant \overline{s}_B(\underline{\theta})$.

Figure 2 depicts the policy-implementation threshold across the contracting space (s, v). We refer to the locus of points in (s, v) that yield the same implementation threshold as *iso-implementation curves*. For interior thresholds (white area), we have $\frac{d}{ds}\hat{\theta}(s, v) < 0$ and $\frac{d}{dv}\hat{\theta}(s, v) > 0$, implying that the curves are upward slopping and have no thickness. For corner thresholds (shaded areas), $\frac{d}{ds}\hat{\theta}(s, v) = \frac{d}{dv}\hat{\theta}(s, v) = 0$, so the curves are represented by an area rather than a line.

The expected value of the new company is constant along any given iso-implementation curve. The value is maximized on the *efficient* curve, $\hat{\theta}(s, v) = 0$, shown as a dashed line in Figure 2. This curve "originates" and "terminates" at the extremes of the contracting space, where either debt issuers or holders possess claims on all of the cash flows of the new company and thus become unlevered equity holders. In these cases, risk-shifting incentives vanish, and the new company is run efficiently when they also hold all voting rights (Lemma 1).

As cash-flow rights are split across the two classes of security holders (moving toward the center of the figure), both groups of investors become subject to opposing risk-shifting incentives. Voting rights must therefore be split to balance these incentives and achieve the efficient policy-implementation threshold. For $s \in (\underline{s}_A(0), \overline{s}_B(0))$, risk-shifting incentives on both sides polarize investors to the extent that is impossible for any allocation of voting rights to yield efficient policy implementation.

5.2 Rights offer

At the initial stage $t = 0$, firm A's manager anticipates the subgame equilibrium at the voting stage $t = 1$ and issues a rights offer to firm B's manager that solves problem (4). Our analysis begins with an examination of the marginal value of cash-flow and voting rights, as well as their interdependence. This allows us to represent investors' indifference curves within the contracting space and to provide corresponding graphical intuition. We then proceed with an analysis of the equilibrium allocations.

5.2.1 The marginal value of cash-flow and voting rights

Proposition 2. *Suppose that the issuer's offer structures cash-flow rights as debt. Then:*

- *Additional voting rights have a (weakly) positive effect on the payoffs of the debt issuer's manager,* $\frac{d}{dv}\Pi_{m,A}(s,v) \leqslant 0$*, and on those of the debt holder,* $\frac{d}{dv}\Pi_{m,B}(s,v) \geqslant 0$.
- *Additional cash-flow rights have an ambiguous effect on the payoffs of the debt issuer's manager,* $\frac{d}{ds}\Pi_{m,A}(s,v) \gtreqless 0$*, and on those of the debt holder,* $\frac{d}{ds}\Pi_{m,B}(s,v) \gtreqless 0$.

When a manager's increases with both cash-flow and voting rights, their marginal rate of substitution is decreasing.

Proof. See Appendix A.3.

Lemma 4. *Suppose that the issuer's offer structures cash-flow rights as debt. , and consider the marginal value of the cash-flow and the voting rights.*

- *The payoff of debt issuers and debt holders weakly increases with their voting rights respectively if, and only if,*

$$\mathbb{E}_{\mu_1}\left[\mu_1 - S(s,\mu_1) \mid \hat{\theta}(s,v),\, \omega_{i,A}\right] - \big(\mu_0 - S(s,\mu_0)\big) \geqslant 0, \tag{7}$$

$$S(s,\mu_0) - \mathbb{E}_{\mu_1}\left[S(s,\mu_1) \mid \hat{\theta}(s,v),\, \omega_{i,B}\right] \geqslant 0. \tag{8}$$

- *The payoff of debt issuers and debt holders may either increase or decrease with their cash-flow rights when voting rights are valuable, i.e., when conditions (7) and (8) hold respectively. Otherwise, the payoff increases with the cash-flow rights.*

Proposition 2 obtains from differentiating the payoff functions of the investors of the two firms with respect to their rights allocation. The payoffs correspond to their cash-flow rights (debt of face value s for Firm B, and the associated levered equity for Firm A) over the expected cash flows of the new company, characterized by equation (3).

Voting rights The first bullet of Proposition 2 lays out the conditions for investors of both firms to gain from additional voting rights. Importantly, voting has no intrinsic value for investors (only cash flows do). Hence, the impact of voting rights on their payoffs is exclusively determined by the effect that they have on the policy-implementation threshold, $\hat{\theta}(s,v)$, which in turn affects the expected cash flows. Lemma 3 shows that increasing the voting rights allocated to debt holders raises the implementation threshold, $\frac{d}{dv}\hat{\theta}(s,v) \geqslant 0$. Proposition 2 reveals that this *reduces* the payoff of debt issuers with beliefs $\omega_{i,A}$ that satisfy condition (7), and of *increases* the payoff of debt holders with beliefs $\omega_{j,B}$ that satisfy condition (8).

Conditions (7) and (8) relate the expected payoff of investors conditional on the lowest-value implementable policy, i.e., $\theta = \hat{\theta}(s,v)$, with their payoff under the status quo. Consider, for instance, debt issuers. When (7) holds with strict inequality, investor $\omega_{i,A}$ expects that the *marginally* blocked policy yields a higher payoff than the status quo. That is, it considers that the implementation threshold is excessively high. Increasing the allocation of voting rights to its own firm (reducing v) lowers the threshold, thus unblocking the implementation of policies of marginally lower value. Of course, the expected payoff conditional on the lowest-value implementable policy $\mathbb{E}_{\mu_1}\left[\mu_1 - \min\{s,\mu_1\} \mid \hat{\theta}(s,v),\, \omega_{i,A}\right]$ is reduced, narrowing the gap with the expected payoff under the status quo, $\mu_0 - \min\{s,\mu_0\}$. Eventually, the gap vanishes and condition (7) holds with an equality. At this point, investor $\omega_{i,A}$ does not seek additional voting rights allocated to its own firm. Indeed, violating condition (7) implies that the policy-implementation threshold is excessively low form the perspective of investor $\omega_{i,A}$, which therefore obtains a negative, not positive, payoff from possessing additional voting rights.

These forces work in opposite direction for debt holders: when condition (8) holds with strict inequality, investor $\omega_{i,B}$ expects to obtain a higher payoff under the status quo than with the marginally implemented policy, so it considers the implementation threshold excessively low. This can be raised by allocating more voting rights to its own firm (increasing v), which therefore has a positive impact on its payoff. But this impact vanishes when (8) holds with equality. Then, additional voting rights allocated to debt holders reduce the expected payoff of their investor $\omega_{i,B}$.

The same mechanisms can be evaluated from the lens of investor beliefs, for a given allocation of rights. For example, consider again the debt issuers. When their vote might be split, i.e., for $s < \underline{s}_A(\underline{\theta})$ (see Figure 1), the most pessimistic investors consider the implementation threshold excessively low, whereas the most optimistic find it excessively high. Specifically, condition (7) holds with equality for the policy-indifferent investor when the (future) realization of the public signal equals the implementation threshold, i.e., $\hat{\omega}_A\left(s, \hat{\theta}(s,v)\right)$. For investors with a lower private signal, a marginal increase of voting rights is costly, while for those with a higher signal it is valuable. As the face value of debt increases, more issuing investors are keen to implement the policy. That is, cutoff $\hat{\omega}_A\left(s, \hat{\theta}(s,v)\right)$ diminishes, so a larger fraction of investors hold beliefs that satisfy condition (7). For $s > \underline{s}_A(\underline{\theta})$ the condition holds for all issuers $\omega_{i,A} \in [\underline{\omega}, \overline{\omega}]$. Naturally, analogous arguments hold for debt holders.

Cash-flow rights The second bullet of Proposition 2 sheds light on the effect of cash-flow rights on investors' payoffs. Notably, it reveals that unlike traditional securities analyses, here there is no payoff monotonicity. Hence, perhaps counterintuitively, possessing more cash-flow rights can reduce investors' expected payoff even though cash flows are the only source of intrinsic value.

To understand the ambiguous effect of cash-flow rights on investors' payoffs, consider, for instance, the debt issuers. When investor with private signal $\omega_{i,A}$ values voting rights, i.e. when (7) holds, increasing its cash-flow rights (reducing the face value of debt s) generates two effects that work in opposite direction. First, the lower face value raises the fraction of cash flows retained by the issuer for every realization that exceeds the face value, i.e. it raises $\max\{\mu_d - s, 0\}$. That is, the issuer pays a lower price for debt capital which, all else equal, increases its payoff. However, all else is *not* equal: the lower face value of debt reduces the appetite for implementing the policy, thus increasing the policy-implementation threshold $\frac{d}{ds}\hat{\theta}(s,v) \leqslant 0$ (Lemma 3). Recall that issuing investors that value voting rights consider the policy-implementation threshold excessively high. Hence, the higher threshold causes a reduction of their payoffs. This is the second, counteracting effect. The overall impact of a marginal increase of cash-flow rights is determined by the balance between the positive price effect and the negative effect on risk-shifting incentives.

It follows that, for cash-flow rights to have an ambiguous effect on payoffs, investors must value voting rights. Continuing with the example of issuer $\omega_{i,A}$, consider now the case where it obtains a negative payoff from possessing additional voting rights, i.e., where (7) does not hold. Now, the issuing investor considers the policy-implementation threshold excessively low, so it benefits from the reduced support for the policy as a consequence of a lower face value of debt. Therefore, both the price and the risk-shifting effects work to increase the investors' payoff.

An analogous intuition applies for debt holders, which value voting rights when they consider the policy-implementation threshold excessively low, i.e., when (8) is satisfied. Then, as more cash-flow rights are allocated to them (higher face value s), the support for the policy increases, further lowering the implementation threshold and counteracting the positive price effect. As with their issuing counterparts, when debt holders do not value voting rights, cash-flow rights unambiguously increase their payoffs.

Indifference curves Studying the marginal value of cash-flow and voting rights leads us to an analysis of their marginal rate of substitution $MRS_{i,k}$ and, in turn, to the indifference curves of investors in the space (s,v). This exercise has much in common with the traditional Edgeworth box. Meanwhile, our setting features a third dimension consisting on the probability distribution of cash flows, i.e. the value of the new company. These change over the space (s,v) according to the iso-implementation curves depicted in Figure 2.

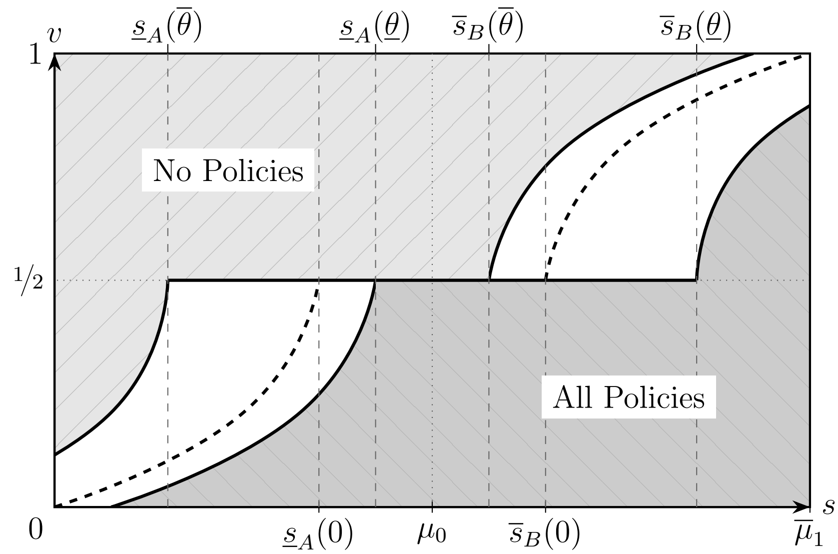

Figure 3: Indifference curves of the debt-holder of the median debt holder $\omega_{m,B}$ when it values cash-flow rights and (weakly) values voting rights.

The slope and direction of indifference curves are determined by the marginal value of cash-flow and voting rights. Lemma 3 establishes that the policy-implementation threshold is invariant to changes in allocation of voting rights whenever $v < \underline{v}(s)$ or $v > \overline{v}(s)$, represented by the shaded areas in Figure 2. Hence, for these allocations voting rights have no value *at the margin*. Meanwhile, cash-flow rights have value at the margin (either positive or negative) at any allocation. As a result, indifference curves have (non-infinite) slope for allocations $v \in \left[\underline{v}(s), \overline{v}(s)\right]$ (white area in Figure 2) and are vertical elsewhere.

We distinguish three cases regarding the slope and direction of indifference curves for allocations $v \in \left[\underline{v}(s), \overline{v}(s)\right]$ based on Proposition 2. First, when the payoff of an investor increases with both cash-flow and voting rights, its indifference curves are downward slopping and increase away from the origin. Figure 3 illustrates this case for a debt-holder investor $\omega_{i,B}$; in the next section we argue that this is the most plausible case in equilibrium. Second, when investor payoffs increase with cash-flow rights but decrease with voting rights, indifference curves are upward sloping and increase away from the origin. Last, when the payoff decreases with cash-flow rights but increases with voting rights, its indifference curves are upward sloping and increase toward the origin.

Indifference curves intersect with the same iso-implementation curve at most once for allocations $v \in [\underline{v}(s), \overline{v}(s)]$. Intuitively, voting rights have no intrinsic value for investors: they are a device to alter the policy-implementation threshold, which in turn determines the probability distribution of payoffs. Therefore, any valuable change in the allocation of voting rights shall have an impact on the policy-implementation threshold or, equivalently, should lead to a distinct iso-implementation curve. Graphically, iso-implementation curves are upward-slopping in the space (s, v). When indifference curves are also upward-slopping, their slope is strictly higher than that of iso-implementation curves. These arguments highlight the lack of payoff monotonicity of securities, which distinguishes our analysis from traditional studies of securities design. The reason is that here, changes in cash-flow rights alter the voting incentives and so the probability distribution of payoffs. Note that this does not apply *within* iso-implementation curves, where standard securities properties (Nachman and Noe, 1994; DeMarzo et al., 2005) hold.

Indifference curves are discontinuous at both $\underline{v}(s) = 1/2$ and $\overline{v}(s) = 1/2$. This is a direct consequence of the discontinuity of iso-implementation curves, discussed in Section 5.1.2. For instance, consider the second indifference curve (from the left) in Figure 3. For $v > 1/2$ no policy is implemented because the majority of voting rights are in possession of debt holders, which vote unanimously against all policies. Hence, their payoff is certain and equal to the face value of debt s. For $v = \overline{v}(s)$, the majority of voting power switches to the debt issuers, and a *significant* fraction of policies might implemented. Hence, most debt holders require a significantly larger claim (face value) to preserve the same utility, generating a discontinuity over cash-flow rights.[14] Naturally, for a given debt holder, the discontinuity is largest for indifference curves in the unconditionally polarized area (third curve in Figure 3). There, the switch over majority voting rights has the highest impact in voting outcomes: from no policy implementation to the implementation of all policies, or vice-versa.

[14]The discontinuity has negative sign (as voting rights increase) for the median debt holder and all those which are more pessimistic, $\omega_{i,B} \leqslant \omega_{m,B} = 0$. However, it might have a positive sign for debt holders that are sufficiently optimistic and therefore see their utility increased upon the implementation of some policies.

5.2.2 Equilibrium

We are now are equipped to derive the equilibrium rights offer (s^*, v^*), which solves Problem (4) when cash-flow rights are structured as debt. The next Proposition characterizes the offer as determined by the participation constraint of the manager of Firm B and lays out the key features regarding investor payoffs and efficiency.

Proposition 3. *There exist thresholds $0 < \underline{\alpha}_B < \overline{\alpha}_B < \mu_0$ such that if $\alpha_B \in [0, \underline{\alpha}_B) \cup [\overline{\alpha}_B, \mu_0]$, then the equilibrium (s^*, v^*) is efficient and Firm A extracts the whole surplus from Firm B, that is, $\hat{\theta}(s^*, v^*) = \theta_m^\dagger$ and $\Pi_{m,B}(s^*, v^*) = \alpha_B$.*

Proof. See Appendix.

A Proofs

A.1 Proof of Lemmas ?? and ??

A.2 Proof of Lemma 3

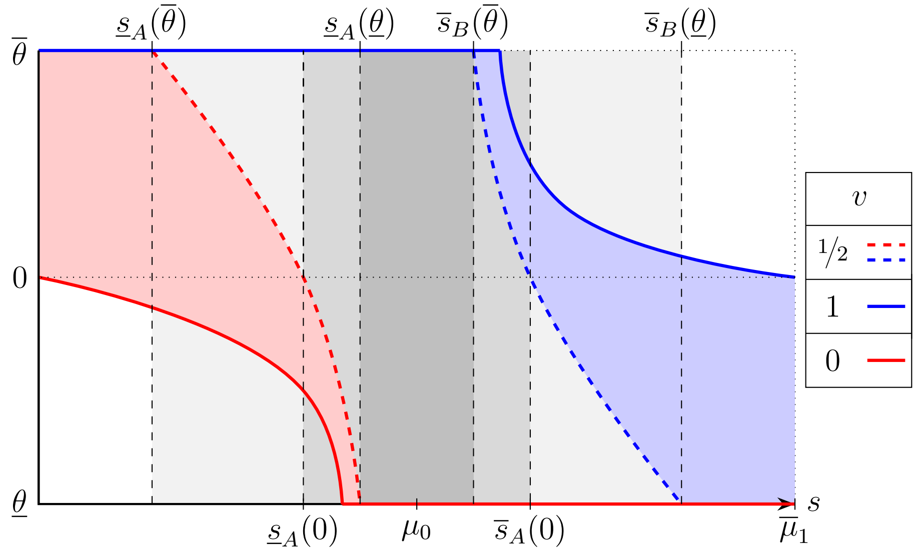

Figure 4: Possible policy implementation thresholds.

A.3 Proof of Proposition 2

Total differentiation of the issuer's manager expected payoff $\Pi_{m,A}(s,v)$ with respect to the allocation of cash-flow and voting rights yields respectively

$$\begin{aligned}
\frac{d}{ds}\Pi_{m,A}(s,v) = &\frac{d}{ds}\hat{\theta}(s,v)\, f\left(\hat{\theta}(s,v)\right)\left[\left(\mu_0 - S(\mu_0,s)\right) - \mathbb{E}_{\mu_1}\left[\mu_1 - S(\mu_1,s) \mid \hat{\theta}(s,v),\omega_m\right]\right] \\
&- F\left(\hat{\theta}(s,v)\right)\, \frac{d}{ds}S(\mu_0,s) \\
&- \left[1 - F\left(\hat{\theta}(s,v)\right)\right]\mathbb{E}_{\theta}\left[\mathbb{E}_{\mu_1}\left[\frac{d}{ds}S(\mu_1,s) \mid \theta,\omega_m\right] \mid \theta \geqslant \hat{\theta}(s,v)\right],
\end{aligned}$$

$$\frac{d}{dv}\Pi_{m,A}(s,v) = \frac{d}{dv}\hat{\theta}(s,v)\, f\left(\hat{\theta}(s,v)\right)\left[\left(\mu_0 - S(\mu_0,s)\right) - \mathbb{E}_{\mu_1}\left[\mu_1 - S(\mu_1,s) \mid \hat{\theta}(s,v),\omega_m\right]\right].$$

Corollary 3 shows $\frac{d}{ds}\hat{\theta}(s,v) \leqslant 0$ and $\frac{d}{dv}\hat{\theta}(s,v) \geqslant 0$; the payoff monotonicity of securities guarantees that $\frac{d}{ds}S(\mu_0,s) \geqslant 0$ and $\frac{d}{ds}S(\mu_1,s) \geqslant 0$.

The sign of $\frac{d}{dv}\Pi_{m,A}(s,v)$ is governed by term $\Big(\mu_0 - S(\mu_0,s)\Big) - \mathbb{E}_{\mu_1}\Big[\mu_1 - S(\mu_1,s) \mid \hat{\theta}(s,v), \omega_{m,A}\Big]$. Expected payoffs from the policy increase in the realization of the public signal, hence $\mathbb{E}_{\mu_1}\Big[\mu_1 - S(\mu_1,s) \mid \hat{\theta}(s,v), \omega_{m,A}\Big]$ increases in $\hat{\theta}(s,v)$ and attains a minimum for $v = 0$. Equation (2) shows that, for $v = 0$, the policy-indifferent investor for a signal $\theta = \hat{\theta}(s,v)$ is the manager: $G(\hat{\omega}_A(s,\hat{\theta})) = 1/2$. This implies that, for $v = 0$, we have $\Big(\mu_0 - S(\mu_0,s)\Big) = \mathbb{E}_{\mu_1}\Big[\mu_1 - S(\mu_1,s) \mid \hat{\theta}(s,v), \omega_{m,A}\Big]$ and therefore $\frac{d}{dv}\Pi_{m,A}(s,v) = 0$. It follows that, for $v > 0$, we have $\Big(\mu_0 - S(\mu_0,s)\Big) < \mathbb{E}_{\mu_1}\Big[\mu_1 - S(\mu_1,s) \mid \hat{\theta}(s,v), \omega_{m,A}\Big]$ and hence $\frac{d}{dv}\Pi_{m,A}(s,v) \leqslant 0$.

For the sign of $\frac{d}{ds}\Pi_{m,A}(s,v)$, note that the first line in the derivation is weakly positive whereas the second and third lines are weakly negative.

A.4 Proof of Lemma ??

A.5 Proof of Proposition 3

Because both firms are risk-neutral, the sum of each firm's expected payoff under any security $S(\cdot,s)$ equals the firm's value—conditional on the policy implementation decision and the beliefs of the median investors. That is,

$$\begin{aligned}\mathbb{E}_\theta\left[\mathbb{E}_{\mu_1}\left[\mu_d(s,v) \mid \theta, \omega_m\right]\right] =& \mathbb{E}_\theta\left[\mathbb{E}_{\mu_1}\left[\pi_A(s,v) \mid \theta, \omega_m\right]\right] + \mathbb{E}_\theta\left[\mathbb{E}_{\mu_1}\left[\pi_B(s,v) \mid \theta, \omega_m\right]\right] \\ =& F\left(\hat{\theta}(s,v)\right)\mu_0 + \left[1 - F\left(\hat{\theta}(s,v)\right)\right]\mathbb{E}_\theta\left[\mathbb{E}_{\mu_1}\left[\mu_1 \mid \theta, \omega_m\right] \mid \theta \geqslant \hat{\theta}(s,v)\right].\end{aligned} \tag{9}$$

For simplicity, define

$$\Pi_{m,k}(s,v) \equiv \mathbb{E}_\theta\left[\mathbb{E}_{\mu_1}\left[\pi_k(s,v) \mid \theta, \omega_m\right]\right] \quad \text{for } k \in \{A, B\}.$$

We denote by $\Pi_{m,k}(s,v)$ the ex-ante expected payoff of Firm $k \in \{A, B\}$ from the perspective of its median investor (manager), when she holds cash flow rights s and voting rights v.

Then,

$$\Pi_m(s,v) \equiv \mathbb{E}_\theta\left[\mathbb{E}_{\mu_1}\left[\mu_d(s,v) \mid \theta, \omega_m\right]\right] = \Pi_{m,A}(s,v) + \Pi_{m,B}(s,v).$$

Any TIOLI optimal offer of Firm A must satisfy individual rationality for both firms, which implies:

$$\Pi_{m,B}(s,v) \geqslant \alpha_B$$
$$\Pi_{m,A}(s,v) \geqslant \alpha_A.$$

Since Firm A is the issuer of the security and makes the take-it-or-leave-it offer to Firm B, it is optimal for its manager to maximize the value of the new company whenever feasible. In that case, it implements the policy only when it generates positive value and blocks it otherwise.

Because the offer is made by Firm A's manager, the efficiency threshold of the public signal—induced by the optimal offer $\theta^{\dagger}_m(s,v)$—is characterized by:

$$\begin{aligned}
&\mathbb{E}_{\mu_1}[\mu_1 \mid \omega_m,\, \theta^{\dagger}_m(s,v)] = \mu_0 \\
\Longrightarrow\ &\mu_0 + \theta^{\dagger}_m(s,v) + \omega_m = \mu_0 \\
\Longrightarrow\ &\theta^{\dagger}_m(s,v) = -\omega_m.
\end{aligned}$$

Importantly, this threshold is independent of the allocation of cash flow rights s and voting rights v, and we therefore write $\theta^{\dagger}_m(s,v) \equiv \theta^{\dagger}_m$, where the subscript m highlights the dependence on the beliefs of the median investor. In the main text, we focus on the case $\omega_m = 0$, which implies $\theta^{\dagger}_m(s,v) = 0$. Building on this notation, we define $\Pi^{\dagger}_{m,k}$ as the value of the offer (s,v) for firm $k \in \{A,B\}$ under efficient implementation.

Firm B's individual rationality under efficiency. Since the offer follows a take-it-or-leave-it (TIOLI) structure, the optimal allocation of cash flow rights s is determined by Firm B's individual rationality constraint *at equality* under efficient implementation—that is, when $\hat{\theta}_m(s,v) = \theta^{\dagger}_m$. This condition requires

$$\Pi^{\dagger}_{m,B}(s,v) = F(\theta^{\dagger}_m)S(\mu_0,s) + \left[1 - F(\theta^{\dagger}_m)\right]\left\{\mathbb{E}_{\theta}\left[\mathbb{E}_{\mu_1}[S(\mu_1,s) \mid \theta,\omega_m] \mid \theta \geqslant \theta^{\dagger}_m\right]\right\} = \alpha_B. \tag{10}$$

Let $s^{\dagger}_m(\alpha_B)$ denote the security index that satisfies equation (10).

Because $S(\cdot,s)$ is continuous in s, the distributions F and H are absolutely continuous (and hence atomless), and H satisfies the sMLRP, it follows that the expected payoff $\Pi^{\dagger}_{m,B}(s,v)$ is continuous in s. Moreover, since $S(\cdot,s)$ is increasing in s, the expected payoff is strictly increasing in s.

Since $s \in [\underline{s}, \overline{s}]$ and S is bounded, we have that

$$\Pi^{\dagger}_{m,B}(\overline{s}, v) = \Pi^{\dagger}_{m}(\overline{s}, v).$$

By construction, $\Pi^{\dagger}_{m}(\overline{s}, v) \geqslant \mu_0 > \alpha_B$.

Similarly, evaluating the left-hand side at $\underline{s}$ yields $\Pi^{\dagger}_{m,B}(\underline{s}, v) = 0 < \alpha_B$.

Therefore, by the Intermediate Value Theorem, there exists a unique $s^{\dagger}_{m}(\alpha_B)$ such that $\Pi^{\dagger}_{m,B}(s^{\dagger}_{m}(\alpha_B), v) = \alpha_B$.

Firm A's individual rationality under efficiency. Using equation (9) and the fact that Firm B's individual rationality (IR) condition must bind under efficient implementation, Firm A's IR constraint under efficiency can be expressed as:

$$\begin{aligned}
& F(\theta^{\dagger}_{m})\mu_0 + \left[1 - F(\theta^{\dagger}_{m})\right] \mathbb{E}_{\theta}\left[\mathbb{E}_{\mu_1}\left[\mu_1 \mid \theta, \omega_m\right] \middle| \, \theta \geqslant \theta^{\dagger}_{m}\right] - \alpha_B \geqslant \alpha_A \\
\implies \quad & F(\theta^{\dagger}_{m})\mu_0 + \left[1 - F(\theta^{\dagger}_{m})\right] \Big(\mu_0 + \omega_m + \mathbb{E}[\theta \mid \theta \geqslant \theta^{\dagger}]\Big) \geqslant \mu_0 - \sigma \\
\implies \quad & \left[1 - F(\theta^{\dagger}_{m})\right] \Big(\omega_m + \mathbb{E}[\theta \mid \theta \geqslant \theta^{\dagger}]\Big) + \sigma \geqslant 0.
\end{aligned}$$

which is always satisfied if the manager's private signal, the conditional expectation of the public signal to the right of the efficient threshold, and the synergy are all non-negative, as assumed in the main text.

In fact, since the ex-ante highest value of the new company is achieved under efficiency, the lowest value that the synergy can take is

$$-\left[1 - F(\theta^{\dagger}_{m})\right]\Big(\omega_m + \mathbb{E}[\theta \mid \theta \geqslant \theta^{\dagger}]\Big).$$

The analysis of both firms' individual rationality constraints makes clear that the central object of interest is the security index $s^{\dagger}_{m}(\alpha_B)$. In what follows, we turn to its role in shaping the equilibrium characterization.

Firm B's Leverage Shadow Premium From equation (10), it follows that if S is debt, then for any $s \in (\underline{s}, \overline{s})$, we have $\Pi^{\dagger}_{m,B}(s, v) < s$. In particular, this implies that $\Pi^{\dagger}_{m,B}(\alpha_B, v) < \alpha_B$. That is, the security index $s^{\dagger}_{m}(\alpha_B)$ that satisfies Firm B's individual rationality constraint under efficiency is always strictly greater than her standalone value α_B.

Furthermore, since $S(\mu_1, s)$ is concave in s for every μ_1, and integrable with respect to H and F (since both have finite expectation), it follows that $\Pi^{\dagger}_{m,B}(s, v)$ is concave in s, by the preservation of concavity under integration (Rockafellar, 1970, Theorem 5.5) .

Accordingly, we define the "leverage shadow premium" under efficiency as:

$$\rho^{\dagger}_{S}(\alpha_B) = s^{\dagger}(\alpha_B) - \alpha_B.$$

Notice that $\rho^{\dagger}_{S}$ is an increasing function of α_B since $\Pi_{m,B}$ is differentiable and $\frac{\partial}{\partial s}\Pi_{m,B}(s, v) < 1$ by the limited liability of the security S.

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