A Theory of Proxy Advice when Investors Have Social Goals[*]

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This paper studies the conditions under which the proxy advice market helps and hinders corporate governance. A key assumption is that investors are heterogeneous, with some focusing only on returns while others also have nonpecuniary goals, such as environmental sustainability and protection of human rights. Proxy advisory firms compete for business by choosing a scale of production, price, and "slant" of advice. Heterogeneous demand creates pressure for the market to offer an array of advice, but there is a countervailing force: when demand is sufficiently large, suppliers adopt a "platform" technology and consolidate into a natural monopoly. Under conditions that seem empirically relevant, the platform monopolist slants its advice toward the preferences of investors with non-value-maximizing goals, thereby steering corporate elections away from value maximization. We characterize the conditions under which the proxy advice market succeeds and fails, discuss policy reforms that would help it succeed, and develop normative principles for assessing proxy advice when value maximization is not the sole objective of investors.

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1. Introduction

Nearly a century ago, Berle and Means (1932) called attention to the separation of ownership and control in modern corporations, which they attributed to the inability of dispersed shareholders to exert control over management. The situation has become even more complicated today, as the preponderance of stock in major corporations is now held by often-passive institutional investors with little interest in monitoring corporate management, and little capacity to make judgments about management quality or management decisions.[1] To fill the gap, proxy advisory firms have emerged that specialize in monitoring companies and advising shareholders how to vote. The hope is that these information intermediaries will allow dispersed shareholders to exercise effective control.

The proxy advisory industry, however, has not inspired confidence. In the last two decades, the American market has consolidated into effectively two companies that are believed to control 97 percent of advisory business, Institutional Shareholder Services Inc. (ISS) and Glass Lewis, resulting in little diversity of opinion.[2] Their recommendations have a big effect on corporate elections, but critics question the quality of their advice: proxy advisors maintain surprisingly small workforces for the number of elections they track, and they take positions on corporate governance issues about which the scholarly literature is divided, without explaining how they were able to reach conclusions that have eluded academic investigation.[3] A recent

[1] As of 2019, institutional investors held 70 percent of corporate equity, compared to 30 percent for retail investors (Broadridge + PwC, 2019).

[2] For an overview of institutions, laws, and issues, see Edelman et al. (2014) and Gallagher (2014). Actual market share data are unavailable, but 97 percent is the current "best guess", presumably divided about 2-to-1 between ISS and Glass Lewis. Shu (2021) finds that ISS and Glass Lewis together had 91 percent of the mutual fund business as of 2017.

[3] Sharfman (2020) notes that in 2017 ISS produced recommendations for 250,000 elections across 40,000 shareholder meetings with a research and data staff of 460 persons. For evidence that proxy advisor recommendations influence corporate elections and policy, see Ertimur et al. (2013), Iliev and Lowry (2015), Larcker et al. (2015), Malenko and Shen (2016), McCahery et al. (2016), and Filali Adib

analysis of thousands of proxy votes using methods from political science found that proxy advice is slanted toward social and environmental causes that are ideologically to the left of the position of most of investors, and may even reduce corporate value.[4]

The purpose of this paper is to provide a model of the proxy advice market that can help understand both the structure of the industry and the nature of the advice it provides. Our approach is grounded in several assumptions that are not standard in the theoretical literature but that have a strong empirical justification – indeed, one of our goals is to highlight the importance of these neglected assumptions for how we understand the industry. Perhaps the most critical assumption is that investors have heterogeneous preferences over the type of advice they wish to purchase: some care only about the financial returns generated by the issuer, while others care about nonfinancial aspects of a company's business, such as its environmental and human rights policies (we call these "socially responsible investment (SRI) funds" although they could also represent unions or public pensions).[5] Because of heterogeneous demand for advice, a proxy advisor does not necessarily make recommendations that would maximize corporate value, but rather offers the advice that maximizes the financial and nonfinancial outcomes that matter to its customers. With this as the starting point, we study the type of recommendations that emerge in equilibrium when advice suppliers compete for business. We are interested in how well the advice supplied to the market corresponds to the preferences of the investors, and therefore whether proxy advice enables or impedes investors from achieving their goals.

An important feature of the market is that proxy advisors sell their voting advice bundled with vote execution services. Because of the sheer number of votes that they must cast, vote execution services are more valuable for some funds than the advice itself. TIAA-CREF reported having to vote on 80,000 unique agenda items annually, and Vanguard reported voting on

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(2019). For criticisms of proxy advisor recommendations, see Larcker et al. (2013) and U. S. House of Representatives (2013).

[4] Specifically, Bolton et al. (2020) find that the largest investment funds, such as BlackRock and Vanguard, tend to vote in a center-right direction, similar to the position taken by Glass Lewis. Pension and SRI funds vote more to the left. ISS's recommends are between the two, that is, to the left of where most of the investment money is. Underscoring that ISS does not focus only on returns, Sharfman (2020) notes that none of ISS's six reports on each company list shareholder wealth maximization as the sole objective of its voting recommendations.

[5] According to one recent estimate, funds with SRI goals managed $30 trillion in assets in 2018, about one-quarter of all assets under management (Global Sustainable Investment Alliance, 2018).

169,000 items.[6] Evidence suggests that the price of vote execution services is as much as twice the price of the proxy advice itself.[7] Our model assumes that services are bundled, which creates the possibility that an investment fund may purchase voting advice that is not congruent with its preferences if the advisory firm provides vote execution at a sufficiently low cost.

We also incorporate the fact that advice is supplied by profit-maximizing competitive firms, something that has been neglected or deemphasized in the theoretical literature. This is important because, as we show, the nature of advice depends on the equilibrium market structure. In our model, competition can produce three industry structures:

- **Boutique firms.** When demand is sufficiently low, a perfectly competitive set of "boutique" advisory firms survive, collectively offering a full menu of advice options so that all investors can find an advisor aligned with their preferences. Corporate voting is then "representative", in the sense that votes reflect the distribution of investor preferences.

- **Platform firm with boutique fringe.** When demand is sufficiently high, the industry can support the existence of a "platform" firm that takes advantage of economies of scale in vote execution. If investors with purely financial motives ("return-only" investors) are willing to pay for voting advice, the platform firm tailors its recommendations to their preferences, and a fringe of boutique firms exists to advise the SRI funds. The advice market is effective in allowing investors to vote their preferences.

- **Platform monopoly.** When demand is sufficiently high and return-only investors are unwilling to pay for high-quality voting advice, the platform technology becomes a

[6] The major advisory firms all provide vote execution services. For a description of the services sold by proxy advisory firms, see U.S. Government Accountability Office (2016). On the importance of vote execution services, see Edelman et al. (2014), who quotes TIAA-CREF (p. 1398): "Though we dedicate a significant amount of resources to corporate governance research and the voting of proxies, we still would have difficulty processing the 80,000 plus unique agenda items voted by our staff annually without using [vote execution services]." Sharfman (2020) provides the number of votes cast by Vanguard.

[7] The prices charged by proxy advisors are typically confidential. Shu (2020, Appendix D) collected price information from 11 public pension funds through Freedom of Information Act requests. The average payment for proxy advice was $69,080, with an additional charge of $161,290 to use the proxy voting system.

monopoly. The platform firm offers recommendations that appeal to both types of investors and sets the price low enough to prevent the fringe of boutique firms from existing. The advice offered by the monopolist is slanted toward the preferences of SRI funds even if they are outnumbered by return-only funds. Intuitively, if return-only funds place little value on how their votes are cast, the advisor designs its recommendation policy to satisfy the SRI funds that do care. Because all investors follow the monopolist's advice, corporate elections are distorted toward the preferences of SRI funds and votes are not representative.

By connecting the nature of advice with market structure, which emerges through the interaction of market size and production technologies, we provide a link between conventional economic fundamentals – demand and technology – and the nature of voting in corporate elections. Our analysis implies that the proxy advice market may distort corporate elections when demand is sufficiently large and return-only investors are not willing to pay enough for voting advice. There is some risk that those conditions may prevail. In 2003, the SEC began requiring mutual funds, many of which previously abstained, to cast their votes; this followed a 1988 declaration by the Department of Labor requiring pension funds to vote. The 2003 regulation in particular caused a surge in demand for vote execution services by mutual funds – many of which may not have been interested in precisely how their votes were cast. In our model, requiring passive funds to vote could lead to consolidation of the proxy advisory industry by making the platform technology feasible, providing an explanation for the market dominance of ISS and Glass Lewis. Because passive funds are unwilling to pay for high-quality advice – being primarily interested in vote execution services – our model implies that the consolidated proxy advisory firms would tilt their advice *away* from policies that maximize issuer value toward policies that give more weight to social issues. This provides an explanation for why proxy advisor recommendations may be disconnected from value maximization, and potentially slanted toward policy positions favored by SRI funds.

Tilting corporate elections toward minority shareholders that are willing to forego financial returns in order to advance social goals is not necessarily wrong from a normative perspective. It could well be "socially" optimal to trade off corporate profits for improved human rights or employee welfare, as recently called for by the Business Roundtable.[8] Unfortunately,

[8] In August 2019, the Business Roundtable revised its decades-old *Statement on the Purpose of a Corporation* to redirect business's focus from stockholders alone to stakeholders broadly defined – customers, employees, suppliers, communities, and shareholders:

the standard normative metric in financial economics – value maximization – loses its force when investors care about nonpecuniary consequences, and the literature has not settled on a workable alternative. We propose alternative normative metrics related to the "representativeness" of voting. "Individual representation" is the extent to which each investor's votes accurately the investor's preferences. By this metric, outcomes are good when a fringe of boutique firms exists because each investor's votes are perfectly aligned with its preference; while outcomes are poor under a platform monopoly because voting converges on a single position, the one favored by SRI funds. A similar but distinct metric is "collective representation", the degree to which the distribution of votes mirrors the distribution of preferences. A monopolized advisory industry fares poorly in this regard as well.

In order to bring out the main economic forces in a simple manner, we derive the main results using a fairly simple benchmark model. We then show that the implications extend to more complicated models. Specifically, consider extensions in which: proxy advisors are allowed to customize their advice to individual customers; funds are allowed to purchase proxy services for vote execution alone, and vote based on their own information; and funds are allowed to abstain.

Our analysis is connected to a broader discussion that is taking place about the appropriate objective function for firms in a world where some investors care about more than financial returns (Zingales et al., 2020). When investors care only about monetary returns, standard neoclassical principles imply that firms should maximize value or profit, as famously argued by Milton Friedman (Friedman, 1970; Fama and Miller, 1972). As mentioned, however, when some investors care about nonpecuniary issues such as human rights, there is no compelling theoretical basis for adopting value maximization as the appropriate goal. Hart and Zingales (2017) argue that shareholder *welfare* maximization would be more appropriate. This idea is appealing, but requires managers to determine shareholder preferences. At first glance, voting seems like a natural way to do this as argued by Hart and Zingales (2017) – voters can simply reveal their preferences in elections – but our analysis highlights that one cannot assume that proxy advice will automatically provide reliable recommendations. Indeed, under some conditions advice will be slanted toward a minority group of investors. In this sense, our model identifies conditions that must be satisfied in order for stakeholder capitalism to work. Our discussion of normative considerations also highlights the difficulty of welfare analysis in an environment when some investors are not focused only on financial returns.

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https://www.businessroundtable.org/business-roundtable-redefines-the-purpose-of-a-corporation-to-promote-an-economy-that-serves-all-americans.

Theoretical research on the proxy advisory industry is in its early stages. Malenko and Malenko (2019) develop a strategic voting model in which funds buy advice from a single proxy advisor, where the core economic problem is one of communication, and explore how proxy advice can crowd out the fund's own acquisition of information. The proxy advisor is assumed to provide unbiased advice. Ma and Xiong (2021) also study a strategic voting model with a single advisor, in which the advisor may offer biased advice in order to overcome false priors or risk aversion among its customers. They consider a case in which investors are not value-maximizers, but not the case of heterogeneous investors. Levit and Tsoy (forthcoming) explore the consequences of proxy advisor conflicts of interests in the context of a cheap talk communication game; they show how an advisor may adopt one-size-fits-all recommendations in order to obscure its biases. These models assume that the ultimate goal of corporate elections is to maximize firm value, implicitly ruling out nonpecuniary objectives, and do not explore the structure of the advice industry. We see our approach as complementary by calling attention to the disciplining role of competition in the type of advice that is offered, and by examining the potentially distorting influence of funds that seek non-value-maximizing advice.

2. Model

The model includes a company that issues shares ("issuer"), investment funds that hold the shares ("funds"), and proxy advisors ("advisors"). The market for proxy advice consists of an exogenous number of funds (demanders) and an endogenous number of proxy advisors (suppliers). Competition is in the form of a Hotelling model with a pricing decision, a product differentiation decision, and free entry.

A. Issuer

The issuer is the subject of proxy votes. The company issues a mass of M shares and chooses an operating policy $x \in \{A, B\}$ in response to shareholder votes. The issuer's value $V(x; S)$ depends on the operating policy x and the state $S \in [-.5, .5]$, distributed $G(S)$. Denote $x^*(S)$ as the value-maximizing policy in state S, where

$$x^*(S) = \begin{cases} A & \text{if } S \leq 0; \\ B & \text{if } S > 0. \end{cases}$$

We can then speak of a value-maximizing "cutoff rule" $y = 0$ that selects A or B depending on whether the state is less or greater than zero. Investors focused only on financial returns want the issuer to adopt a cutoff rule of zero, but some funds may favor other cutoffs, as discussed below.

B. Demanders: Investment Funds

The issuer's stock is held entirely by atomistic investment funds. All funds care about the stock's financial return, and some funds – which we label "SRI funds" – also care about nonpecuniary aspects of the issuer's business, such as its impact on climate change or human rights.[9] Because SRI funds receive private benefits from how they vote, in some states of the world they prefer a non-value-maximizing policy: an SRI fund with a "slant" of β prefers policy A if and only if $S \leq \beta$. Therefore, if purchasing advice, the fund prefers it to be based on a cutoff rule of $y = \beta$. We adopt the convention that $\beta > 0$. Funds that care only about financial returns are called "return-only" (RO) funds, and have a preferred cutoff of zero.

A fund can (i) abstain from voting; (ii) on its own collect information about the state and vote at a cost $k > 0$; or (iii) purchase proxy advice and vote execution services with a cutoff of y from an advisor at a price p. The payoff Π_j for fund $j \in \{RO, SRI\}$ with a slant of y' that purchases proxy advice y is:

(1) $$\Pi_j(\text{proxy advice}) = E[V] + \lambda_j \cdot \Pr(\text{"correct vote"}|y, y') - p.$$

The payoff for a fund that self-informs and self-executes its votes is

(2) $$\Pi_j(\text{self-vote}) = E[V] + \lambda_j - k.$$

For a fund that purchases proxy advice, the payoff depends on how well the vote aligns with the fund's policy preference. The difference between (1) and (2) is that a self-informing/self-voting fund casts a correct vote with probability one (see below), and pays a cost k instead of the market price p.

The nonstandard element here is the direct utility or "expressive benefit" from voting, $\lambda \cdot \Pr(\,)$. The parameter λ indicates the importance of voting for a fund, and is what distinguishes

[9] Examples of SRI funds include Parnassus Investments, Calvert, and Trillium Asset Management that explicitly state SRI goals. "SRI funds" could also capture labor union and public pension funds, such as CalPERS and the New York City funds, that also pursue goals other than value maximization (Matsusaka et al., 2019; Min and You, 2019).

SRI from RO funds.[10] We have in mind that part of an SRI fund's business model is a commitment to vote according to certain values or principles. Trillium Asset Management, a well-known SRI fund, declares on its web site: "[W]e're proud of the responsibility we've taken to develop and communicate to clients our proxy voting policies, and we take that voting seriously," immediately below which it provides its proxy votes for the last 13 years.[11] In contrast, RO funds typically do not emphasize voting on corporate matters. If forced to vote, their value from employing a proxy advisory firm comes from low-cost vote execution services (and as a safe harbor for fiduciary responsibilities). Empirically, a particularly plausible case is $\lambda_{SRI} > \lambda_{RO} \approx 0$. We discuss the expressive voting assumption in more detail below.

In our benchmark model, we assume that all ϕ_{SRI} of SRI funds vote and a subset ϕ_{RO} of RO funds vote, and refer to these as "engaged" funds. We later analyze an extension in which funds have random utilities associated with abstaining, and the voting decision is endogenous. The remaining $M - \phi_{SRI} - \phi_{RO}$ funds do not vote, and we call them "disengaged." Empirically, $\phi_{SRI} < \phi_{RO}$. Define $\Phi = \phi_{RO} + \phi_{SRI}$.

A fund with a slant of y' casts a "correct vote" if it votes for A when $S \le y'$ and votes for B when $S > y'$. Then the probability of casting a correct vote when using a cutoff rule of y is

$$\Pr(\text{"correct vote"}|y', y) = \int (\mathbf{I}\{S \le y' \text{ and } S \le y\} + \mathbf{I}\{S > y' \text{ and } S > y\}) \, \mathrm{d}G(S) \equiv H(y', y),$$

where $\mathbf{I}\{\ \}$ is an indicator function. It follows that $H(y, y) = 1$ and the probability is decreasing in the distance between the preferred cutoff and the rule that is employed: $\frac{\mathrm{d}H(y',y)}{\mathrm{d}|y'-y|} < 0$. The probability function is symmetric so that $H(y', y) = H(y, y')$.[12]

C. Comments on Voting

[10] Bolton et al. (2020) conclude that "[t]he issue that most separates institutional investors is the degree to which they weigh social responsibility."

[11] https://www.trilliuminvest.com/esg/advocacy-policy, accessed September 20, 2020. SEC rules require funds to report their votes, so this information is relatively easy for investors to track. The model does not assume that the payoff from voting depends on whether it actually changes the issuer's policy, which in practice would be quite costly for investors to determine.

[12] Formally, $H(y, y') = \begin{cases} 1 + G(y) - G(y') & \text{if} \quad y < y'; \\ 1 + G(y') - G(y) & \text{if} \quad y > y'; \\ 1 & \text{if} \quad y = y'. \end{cases}$

There is a large political science literature on the question of why people vote. At its heart is a puzzle – why do people vote given that the probability of casting a pivotal vote is negligible for any but the smallest electorates? In our context, the puzzle is: why are funds willing to pay for information about elections given that their votes are unlikely to be pivotal? Why wouldn't they choose to remain "rationally ignorant" in the language of Downs (1957)? Our model follows a widely accepted assumption in political science – that people (funds, our case) have an "expressive," or consumption, benefit from voting. In contrast, finance theory so far has tended to assume that funds pay for information for strategic or "instrumental" reasons, that is, because they expect their vote to be pivotal with some probability.[13]

Since our approach is different, it may be helpful to explain our modeling decision and its consequences. First, it seems self-evident that a typical fund's chance of casting a decisive vote in a typical election is negligible. The vast majority of corporate elections are one-sided – in only 2.7 percent of elections is the margin of victory less than 5 percent, and the typical margin is 67 percent.[14] Of course, for rare elections when an activist accumulates a sizeable block, such as for a contentious merger, the chance of the blockholder casting a pivotal vote can be substantial. Our model is about the vast majority of elections and the vast majority of small and medium-sized funds for which there is no realistic likelihood that their votes will tip the outcome.[15]

Second, investing in information acquisition runs counter to the business model of passive funds. Index funds do not invest in information about the stocks they hold in order to keep costs down. The key assumption for our analysis is that SRI funds have a stronger incentive to collect information about voting than RO funds. As mentioned above, SRI funds explicitly market and publicize their voting decisions; while index funds simply offer a product that tracks an index.

If voting is mainly for expressive reasons, we would expect most RO funds not to vote if the choice were left to them. Most of our analysis assumes that they are compelled to vote, either

[13] Downs (1957) famously identified the logical problem with instrumental voting theories. Riker and Ordeshook (1968) provide a classic setup of the calculus of voting. Fiorina (1976) is the first statement of the expressive voting theory; Brennan and Lomasky (1993) is another notable work on the idea.

[14] These are our calculations using data from 489,657 elections during 2003-2018.

[15] Another piece of evidence for the nonpivotality of votes is that value of the control rights attached to a stock is extremely small, except when a control block is exchanged or there is a meeting involving a control contest (Kalay et al., 2014). Also, the fact that the SEC found it necessary to require mutual funds to vote strongly suggests that regulators doubt they have strong instrumental reasons for voting.

by SEC rules, or because of a general pressure from investors. What is critical is that they do not benefit significantly from casting *informed* votes – it is enough simply that they vote.

Our assumption of expressive motives for information collection would not apply to blockholders that have the potential to swing an election. There is abundant evidence that blockholding is common, for example, Dasgupta et al. (2021) find a typical American corporation had one blockholder with at least 5 percent ownership during the period 1999-2017. As we note above, however, even a 5 percent block would not have been pivotal in 97.3 percent of elections. But more to the point, we view our model as being about non-blockholding investors, especially passive funds that avoid concentrating their ownership. Given that passive investment funds now account for more than half of equity investments according to Morningstar (Whyte, 2021), understanding their voting behavior seems an important task.

Finally, we should reiterate that we use the idea of expressive voting as a way to structure the demand for information. In terms of the vote *choice* – vote for A or B – we assume the fund votes as if it mattered, what political scientists call "sincere" voting. Given that a vote is not likely to be pivotal, there is no reason for a fund not to vote for the outcome that it prefers.

D. Suppliers: Proxy Advisory Firms

The supply side of the market consists of an endogenously determined set of proxy advisory firms. Each firm publicly announces the cutoff rule y it uses when advising and executing votes, and a price p that it charges for executing votes according to this advice. Voting advice and vote execution services are sold as a bundled package.[16] In principle, a proxy advisor could conduct research for two different cutoffs, and sell two types of advice. We consider that

[16] Proxy voting services include notifying clients of upcoming shareholder meetings, receiving proxy ballots from third-party proxy distributors, generating consolidated proxy ballots, executing and tabulating client votes, maintaining voting records, and providing voting reports. Spatt (2019, p. 7) observes that "a significant source of scale economy for the proxy advisory firms is their development of tools to process proxy information and implement voting decisions." The cost of vote execution can be sizeable: ISS reports that it executes 9.6 million ballots annually, for 2000 institutional clients; if each ballot contains 10 items, this represents about 48,000 separate votes per client: https://www.issgovernance.com/solutions/proxy-voting-services/. RiskMetrics, the precursor of ISS, reported that "although some of our proxy research and voting clients purchase our proxy research on a stand-alone basis, the vast majority purchase a comprehensive research and voting product." (RiskMetrics Annual Report 2008, p. 10).

possibility in an extension below, but for now assume that a proxy advisor chooses to sell only one type of advice.

There are two technologies, $t = 1$ is a "boutique" technology while $t = 2$ is a "platform" technology with a higher fixed cost and lower marginal cost, that is, with significant economies of scale. The platform technology represents use of an automated vote processing platform (for example, ISS's ProxyExchange). Technology $t \in \{1,2\}$ is defined by a fixed cost F_t and an increasing, convex variable cost function $C_t(q)$, where q is the number of shares voted, which we refer to as the number of customers. The fixed cost includes the proxy advisor's cost of becoming informed. In an extension, we break the cost into two components, a cost of acquiring information and a cost of executing votes. To capture the scale economy, we assume that $F_1 < F_2$ and $C_1'(0) > C_2'(M)$; the first condition incorporates the large fixed cost of setting up the platform and the second condition implies that the platform has a lower marginal cost for all relevant scales. For short, we refer to $t = 1$ as technology T1 or a "boutique firm", and $t = 2$ as technology T2 or a "platform firm." These assumptions imply that the efficient scale of T1 is smaller than the efficient scale of T2.

To economize on notation, define q_k as the solution to $k = C_1'(q_k)$, and $q_0 = \text{argmin}\left(\frac{F_1+C_1(q)}{q}\right)$. We make two assumptions on the technology to accentuate the idea that T1 firms operate best at a small scale while T2 firms operate best at a large scale:

Technology Assumptions:

A1. *T1 firms are small:* $q_k < \phi_{SRI}$.

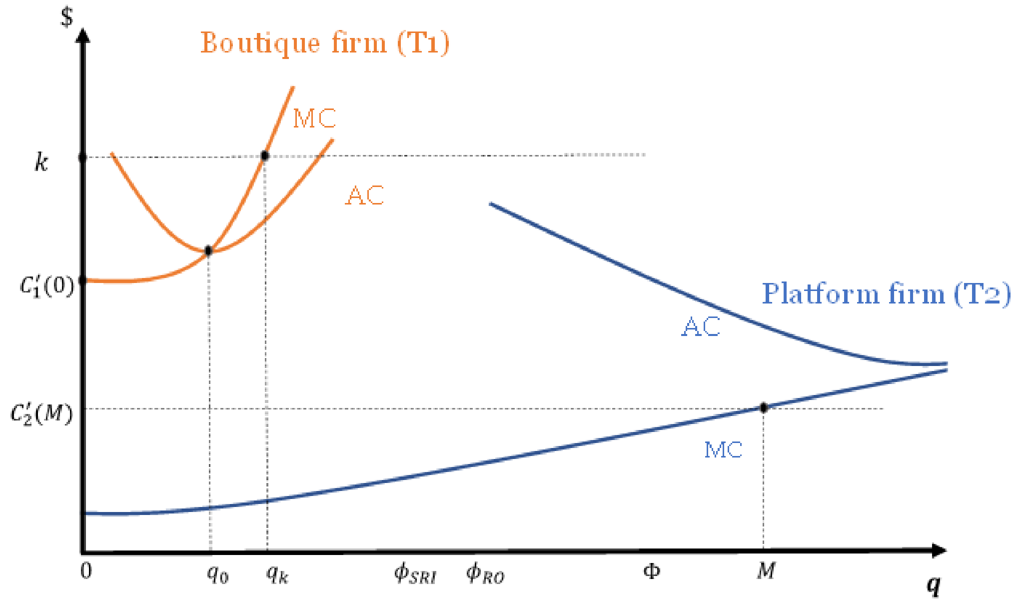
A2. *For T2, marginal cost is less than average fixed cost:* $C_2'(M) < F_2/M$.

Figure 1 illustrates our technology assumptions. A1 limits the scale economies of T1 firms. A2 ensures that a T2 firm operates in the region where scale economies appear.

E. Policy Choice/Voting

Our model can be interpreted as voting on policies or voting on directors who choose policies. Either way, we have in mind that there is a positive relation between votes and policy outcomes, but do not formally model the connection since it turns out not to be critical for normative analysis, as discussed below.

Figure 1



F. Timing and Definition of Equilibrium

The sequence of actions is:

Stage 1. Each of $n = 1, \ldots, N$ potential proxy advisory firms simultaneously chooses whether to enter and with what technology. The decision of firm n is t_n, where $t_n \in \{0,1,2\}$ represents entry with the indicated technology or non-entry ($t_n = 0$).

Stage 2. Each advisory firm n that entered simultaneously chooses a price p_n and a cutoff y_n.

Stage 3. Each fund chooses to self-inform, acquire advice/vote execution services from a proxy advisory firm, or abstain. If two or more advisory firms chose the same price and cutoff, they share the quantity demanded evenly.

Stage 4. Voting occurs, and the issuer chooses a policy.

Voting and the policy choice occur mechanically in Stage 4. In Stage 3, each fund takes as given the prices and cutoff points of the advisory firms in the market. Fund i with cutoff y_i buys from adviser $j^* = \underset{j}{\operatorname{argmax}}\{\lambda_i H(y_i, y_j) - p_j\}$ if $\lambda_i H(y_i, y_{j^*}) - p_{j^*} > \lambda_i - k$; otherwise fund i self-votes. We assume that once a price is quoted, the proxy advisor must service the full quantity demanded.[17]

In stage 2, each advisor chooses its price and cutoff as a best response, taking as given its technology t, the (p, y) choices of the other firms, and the equilibrium purchase behavior of funds in stage 3. With equilibrium prices and cutoffs denoted with asterisks, this can be expressed as: $\pi(p_n^*, y_n^* \mid \boldsymbol{p}_{-\boldsymbol{n}}^*;\ \boldsymbol{y}_{-\boldsymbol{n}}^*;\ t_n) \geq \pi(p', y' \mid \boldsymbol{p}_{-\boldsymbol{n}}^*; \boldsymbol{y}_{-\boldsymbol{n}}^*;\ t_n)$ for all p', y', and n. Here $\pi_n = p_n q_n - C_{t_n}(q_n)$ if $t_n \in \{1,2\}$ and $\pi_n = 0$ if $t_n = 0$. We refer to each distinct configuration of firm technology choices $\boldsymbol{T} = \{t_1, t_2, \dots, t_N\}$ as a (p, y) subgame.

In Stage 1, advisory firm n chooses to enter or not with technology t_n, taking as given the entry and technology choices of the other advisory firms, and taking as given optimal price, cutoff, and purchase decisions in the subgames. The entry conditions are: (i) each advisory firm earns a nonnegative profit; (ii) each entrant cannot earn a higher profit with a different technology, and (iii) each nonentrant would earn a nonpositive profit upon entering. For any technology choices $\boldsymbol{T}$, the equilibrium price and cutoff decisions in the stage 2 subgame are indicated as $\boldsymbol{p}^*(\boldsymbol{T})$ and $\boldsymbol{y}^*(\boldsymbol{T})$. Conditions (i)-(iii) can be summarized as: $\pi\big(p_n^*(\boldsymbol{T}^*), y_n^*(\boldsymbol{T}^*) \,\big|\, t_n^*\big) \geq \pi\big(p_n^*(\boldsymbol{T}'); y_n^*(\boldsymbol{T}') \,\big|\, t'\big)$ for all t' and n, where $\boldsymbol{T}' = \{t_1, \dots, t_{n-1}, t', t_{n+1}, \dots, t_N\}$.

We focus on pure strategy equilibria. For parameter configurations that allow multiple equilibria in a (p, y) subgame, we select the equilibrium that is preferred by all advisory firms.

3. Equilibrium in the Proxy Advisory Market

A. Potential Equilibria

To characterize the equilibrium structure of the industry, we must find the (p, y) subgame equilibrium for each $\boldsymbol{T}$, and then determine when entry occurs under those conditions. Let N_1 be the number of T1 firms and N_2 be the number of T2 firms. From symmetry, the duplet (N_1, N_2) exhausts all possibilities of $\boldsymbol{T}$. The first proposition shows that there are only three possible equilibrium industry structures, and which one prevails depends on the parameters. The proof is in the appendix; we allow non-integer N for ease of exposition.

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[17] This is a common assumption, without which equilibria sometimes do not exist; see Tirole (1988, Chapter 5.3.2) and Dastidar (1995).

Proposition 1. *There are three possible equilibrium industry structures:*

- ***E1.*** *The number of firms is $N_1 \geq 2$ and $N_2 = 0$, of which $N_1(0) = \frac{\phi_{RO}}{q_0}$ choose $y = 0$, $N_1(\beta) = \frac{\phi_{SRI}}{q_0}$ choose $y = \beta$, all choose $p_1^* = C_1'(q_0)$, and all sell $q_1^* = q_0$.*
- ***E2.*** *The number of firms is $N_1 = 0$ and $N_2 = 1$. The platform firm chooses $y_2^* = \hat{y}$ and $p_2^* = k - \lambda_{RO} \cdot \big(1 - H(0, \hat{y})\big)$, and sells $q_2^* = \Phi$, where $\hat{y}$* is *the solution to: $\lambda_{RO}\big(1 - H(0, \hat{y})\big) = \lambda_{SRI}\big(1 - H(\beta, \hat{y})\big)$.*
- ***E3.*** *The number of firms is $N_1 = \frac{\phi_{SRI}}{q_k}$ and $N_2 = 1$. The firms choose $y_1^* = \beta$, $y_2^* = 0$, $p_1^* = p_2^* = k$, and sell $q_1^* = q_k$ and $q_2^* = \phi_{RO}$.*[18]

The E1 equilibrium contains only boutique firms. As in a competitive neoclassical industry, they enter until profit is driven to zero, which is where price = marginal cost = average cost. Some of them offer advice $y = 0$ and sell to RO funds, while others offer advice $y = \beta$ and sell to SRI funds. No firm can survive by offering any other type of advice because funds prefer to buy advice from an advisor with a perfectly aligned cutoff, given that all advisors charge the same price.

In the E2 equilibrium, there is only a single platform firm providing advice. There cannot be more than one platform firm because when two or more platform firms compete over price, they drive it down to marginal cost, which does not allow them to cover their fixed costs. Similarly, boutique firms cannot survive in this equilibrium because price competition with the platform firm would make boutique firms unprofitable. The platform monopolist survives because it can charge a supracompetitive price, and the industry is akin to a natural monopoly.

An interesting feature of the E2 equilibrium is the advice given by the monopolist. One might expect the monopolist to set $y = 0$ because most of the demanders are RO funds that prefer a cutoff of zero, but this is not the case. The monopolist chooses its advice cutoff in order to charge the highest price consistent with selling to both RO and SRI funds. RO funds are willing to pay up to $p = k - \lambda_{RO} \cdot \big(1 - H(0, y)\big)$; SRI funds are willing to pay up to $p = k - \lambda_{SRI} \cdot \big(1 - H(\beta, y)\big)$. The advisory firm chooses its cutoff to maximize the minimum of these two prices, which occurs at $\hat{y}$ that solves: $\lambda_{RO}\big(1 - H(0, \hat{y})\big) = \lambda_{SRI}\big(1 - H(\hat{y}, \beta)\big)$. Somewhat surprisingly, the cutoff $\hat{y}$ does not depend on the relative market shares of RO and SRI funds.

[18] With slight abuse of notation, we denote (p_1^*, y_1^*) as the (p, y) chosen by all T1 firms and (p_2^*, y_2^*) as the (p, y) chosen by all T2 firms.

Rather, it depends on their relative willingness to pay for advice aligned with their preferences. In the case where $\lambda_{RO} \approx 0$, the monopolist's advice is $\hat{y} \approx \beta$. Even if SRI funds make up a minority of investors, the monopolist tailors its advice to them.

In the E3 equilibrium, a platform firm monopolizes sales to RO funds, and a competitive fringe of boutique firms sells to SRI funds. In this equilibrium, the platform earns more from selling only to RO funds at $p_2 = k$ than selling to the entire market at the price in E2. This leaves a space for T1 firms to fill by selling to SRI funds. The size of the boutique fringe is limited by the fact that if enough enter to push the price below $p_1 = k$, at least one boutique firm would prefer to sell instead to RO funds – competition with the platform firm, however, would drive prices below the level needed to sustain the boutique firm.

The three equilibria vary in terms of the effectiveness of their proxy advice. In E1, each fund secures advice that is perfectly aligned with its preferences. In this sense, corporate elections are fully "representative", leaving aside potential abstainers. E2 is much worse. In this case, all funds purchase and follow the advice that is tilted toward the preferences of the funds with the highest expressive benefits. Proxy advice thus distorts the market: votes no longer represent the distribution of investor preferences. The one-size-fits-all distortion here is not the conventional one that advice fails to take into account company differences but that it fails to take into account investor differences. In E3, corporate elections are again fully "representative" even with a platform firm.

The next proposition characterizes the conditions under which each equilibrium prevails.

Proposition 2. *Define the following three conditions:*

(C1) $\left(k - \lambda_{RO} \cdot \left(1 - H(0, \hat{y})\right)\right) \Phi - C_2(\Phi) \geq F_2;$

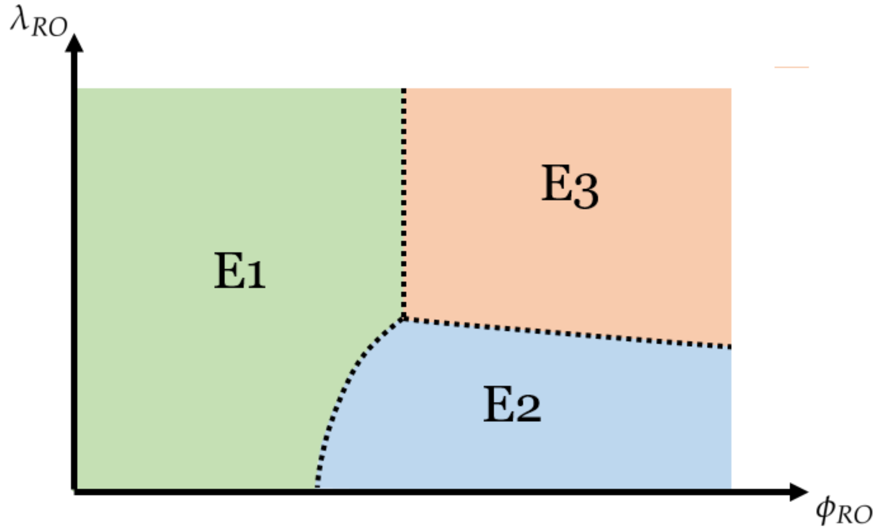
(C2) $k \cdot \phi_{RO} - C_2(\phi_{RO}) \geq F_2;$

(C3) $\left(k - \lambda_{RO} \cdot \left(1 - H(0, \hat{y})\right)\right) \Phi - C_2(\Phi) \geq k \cdot \phi_{RO} - C_2(\phi_{RO}).$

Then the equilibrium is: E1 if (C1) and (C2) fail; E2 if (C1) and (C3) are satisfied; and E3 if (C2) is satisfied and (C3) fails.

Figure 2 depicts the prevailing equilibrium under different parameter configurations of ϕ_{RO} and λ_{RO}. The boundary between E1 and E2 is determined by the break-even condition for the T2 firm to enter if it sells to both types of fund: $\left(k - \lambda_{RO} \cdot \left(1 - H(0, \hat{y})\right)\right) \Phi - C_2(\Phi) - F_2 = 0$. The boundary between E1 and E3 is determined by the break-even condition for the T2 firm to enter if it sells only to RO funds: $k \cdot \phi_{RO} - C_2(\phi_{RO}) - F_2 = 0$. The boundary between E2 and E3

Figure 2



is where the platform's profit from selling to the entire market is equal to its profit from selling only to RO funds: $\left(k - \lambda_{RO} \cdot \left(1 - H(0, \hat{y})\right)\right) \Phi - C_2(\Phi) = k \cdot \phi_{RO} - C_2(\phi_{RO})$.

Two implications follow immediately from Figure 2. First, as the number of RO funds in the proxy advice market grows, eventually the industry consolidates into a platform firm. The emergence of a platform firm follows naturally from the fact that it becomes economically feasible only when demand is sufficiently large. (We could also express this in terms of the overall size of the market, Φ.) Second, whether the platform firm becomes a monopoly or co-exists with a fringe of boutique firms depends on the expressive benefits from voting of RO funds. If their expressive benefits are small, then the industry becomes a monopoly.

Intuitively, if RO funds have a low expressive benefit from voting, then the platform can sell to the entire market at a high price by slanting advice toward the SRI funds. The monopolist proxy advisor caters to SRI funds because they are willing to pay for "slanted" advice, while RO funds pay the price p primarily to secure low cost vote execution services. Conversely, if RO funds care about voting, then the platform is better off specializing on those customers.

Empirically, we expect RO funds to care about vote execution services because of the large number of votes they must execute to comply with regulations, but casting quality votes may not be a priority. "Institutional investors simply don't want better recommendations if it means having to spend more money," observes Sharfman (2020, p. 7). This suggests that $\lambda_{RO} \approx 0$ may be the empirically relevant case for many funds, in which case the industry tends toward monopoly as demand grows, and advice is slanted toward SRI funds.

When RO funds do have an expressive benefit from voting, high demand leads to a platform firm, but not to a monopoly. The platform firm gives RO funds representative advice, and a fringe of boutique firms give SRI funds representative advice. In this equilibrium, all funds are charged $p = k$ so they are indifferent between buying proxy advice and self-advising. The virtue of this equilibrium is that all funds are accurately represented, and therefore voting mirrors the preferences of the shareholders, but it does not benefit funds because they pay the same price as if they self-advised; the only gain is to the proxy advisory firms themselves.

The figure brings out that it is not the existence of the platform firm alone that leads to problems, but rather the conjunction of the platform with "apathetic" RO-funds. Put differently, a growth in the size of the market is a problem if and only if the demand side is dominated by investors with weak policy preferences.

The analysis offers a perspective on the evolution of the American proxy advice market over the last few decades: In 1988, the Department of Labor declared that pension fund managers had a fiduciary obligation to vote. Together with the growth of institutional ownership, this stimulated demand for proxy services, leading to the emergence of small proxy advisors. In 2003, with mutual funds emerging as the largest shareholders in many companies, the SEC asserted that mutual funds had a fiduciary duty to vote – and allowed them to satisfy their fiduciary duty by relying on proxy advice. This triggered a large increase in demand for proxy advice by RO funds. We do not have reliable market share information going back to that period, but we did observe exit and consolidation after 2003, such as ISS's acquisition of IRRC's commercial business in 2005 and Glass Lewis's acquisition of the customer base of Proxy Governance, Inc., when the latter exited the business. Our model suggests that the increased demand for advice/vote-execution services may have spurred consolidation of the proxy advisory industry into a platform monopoly (what we see is actually a duopoly). More recently, SRI funds have become a significant part of the demand for proxy advice. The model suggests that a platform monopolist would slant its advice toward the preferences of SRI funds, thereby pushing corporate elections in the direction of SRI fund preferences. This is painting with broad brushstrokes, but the story raises the interesting possibility that SEC policies intended to increase the influence of RO funds in corporate elections could have had the opposite effect through equilibrium responses in the proxy advice market.[19]

[19] Similarly, the fragmentation of demand in Europe offers a possible explanation for why its proxy advisory industry has not consolidated in the same way. ISS and Glass Lewis are active in Europe, but many European proxy advisory firms are small and focused on specific countries, and overall the industry displays "greater fragmentation" (European Securities and Markets Authority, 2013, p. 32).

Our analysis does not consider the case of funds that hold sufficiently large blocks of stock that their votes have a chance of being pivotal. Such funds may be willing to pay for good advice for instrumental as opposed to expressive reasons.[20] The analysis of this case would be similar to E3, except that it would introduce strategic interactions: the decision of one fund to vote would affect the probability that another fund is pivotal, and hence its incentive to acquire information. The idea that large funds vote strategically raises some interesting theoretical issues, but does not easily fit with what looks like more passive voting behavior in practice. For example, Doyle (2018) shows that AQR, the second-largest hedge fund in the world, follows ISS recommendations more than 99.5 percent of the time.

To sum up, the model implies that competition in the proxy advice market can produce recommendations that allow funds to vote their preferences, but it can also produce a monopoly outcome in which all funds vote according to recommendations that are slanted toward the preferences of SRI funds. The monopoly outcome prevails for parameters that seem empirically relevant: when demand for advice is "high" and the return-only funds have a "low" expressive benefit of voting.

B. Market Failure? Normative Perspectives on Proxy Advice

Proxy recommendations are often criticized because they do not seem to maximize issuer value. In a world where some investors have social goals, however, maximizing issuer value is not necessarily the correct criteria by which to evaluate proxy advice. Here we discuss normative criteria when investors have social goals.

- *Pareto optimality and value maximization.* Pareto optimality provides no traction in this context because the choices $x \in \{A, B\}$ cannot be Pareto-ranked. In states where RO funds and SRI funds disagree, neither choice is preferred to the other by the Pareto criterion. Since neither outcome is normatively superior, there is no sense in which proxy advice can be said to produce a better or worse outcome.

  The Kaldor-Hicks criterion of maximizing the sum of utilities also offers little help. According to this criterion, it is possible to rank the company choices: if SRI funds place sufficient value on the nonpecuniary payoffs associated with A and B, then it is optimal to follow their preference; otherwise it is optimal to follow the preference of RO

[20] Although BlackRock, Vanguard, and State Street advertise the monitoring and research of their internal governance groups, there is reason to be skeptical: employee pay is not tied to performance, they are understaffed, and they still outsource many voting decisions to ISS and Glass Lewis (Lund, 2018).

funds. The equilibrium outcome that prevails, however, is completely independent of these nonpecuniary payoffs (indeed, the model does not even specify them). Whether proxy advice helps nor hinders the occurrence of a utility-maximizing outcome is thus entirely coincidental.[21]

Value maximization – the conventional normative principle in financial economics – is plainly inadequate in a world where some investors have social goals (Hart and Zingales, 2017). When some investors have nonpecuniary payoffs, firm value is an incomplete metric of the welfare consequences of corporate choices. Proxy advice cannot be assessed normatively based on its value consequences alone.

Because of the limitations of traditional normative principles, we supplement our analysis by proposing some novel normative principles, described next.

- *Individual Representation.* A different approach to evaluate voting is in terms of the "representativeness" of the votes that are cast.[22] The more that votes reflect the underlying preferences of the investors, the more representative is the election.

  This can be operationalized at the individual level in terms of the probability that an individual vote reflects the investor's underlying preferences. Consider the voting choices of an RO fund. If the fund voted with no information at all, effectively at random, its probability of casting a vote aligned with its preference would be 0.5. If instead the fund purchased proxy advice with a cutoff $y > 0$, its probability of casting an aligned vote would be $H(0, y) = 1 + G(0) - G(y) > 0.5$, so even biased advice would be better than no advice. With this intuition in mind, we can define "individual representativeness" (RI) as the mean probability of aligned votes across all funds. Funds that do not vote are

[21] Drawing welfare conclusions based on the sum of investor utilities also seems problematic at a deeper level when the issues involve matters like whether to invest in countries that violate human rights, or matters with potentially large externalities, such as climate change. Making evaluations to maximize the sum of utilities in many applications boils to favoring the policy for which investors are willing to pay the most. A normative theory that says "right" outcome for human rights or climate change is the one that investors are most willing to pay for seems overly facile.

[22] Representation is a complicated topic that raises issues beyond the scope of our study. Most scholars agree that there is some normative value in having outcomes reflect underlying preferences. The classic book by Pitkin (1967) provides a philosophical discussion of concepts of representation.

classified as not being represented at all (we could identify an analogous measure in terms of only those that vote).

Using this criterion, equilibrium E1 and E3 are reasonably representative: each voting fund perfectly represents its preferences ($RI = \frac{\Phi}{M}$); the only representation "failure" is from abstentions. In contrast, the E2 equilibrium is highly unrepresentative: SRI funds cast votes that are closely aligned with their interests, but RO funds vote according to the interests of SRI funds rather than their own interests. Individual representation is approximately $RI = \left(\frac{\phi_{RO}}{M}\right) H(0, \beta) + \frac{\phi_{SRI}}{M} < \frac{\Phi}{M}$. Clearly, E1 and E3 are more representative than E2 in this sense.

The value of the proxy advisory industry depends on what would happen if proxy advisors did not exist. If funds self-informed, then votes would be fully representative. In E1 and E3 the proxy advisory industry brings about the same voting pattern as self-informing, so the outcome is equally representative (and arguably a better outcome overall because of cost savings and reduced abstention, below). In E2 voting is less representative so the outcome is less representative. The E2 equilibrium is increasingly undesirable as ϕ_{RO} increases and as β increases.[23]

- *Collective Representation*. Even if individual votes are unrepresentative, the aggregate distribution of votes could be representative. For example, suppose that half of the voters prefer policy A and half prefer policy B but they vote at random. Then representation at the individual level would be low because votes correctly represent a voter's preferences only half the time ($RI = 0.5$). However, representation in the aggregate would be high: 50 percent of votes would be cast for each option, accurately reflecting the preference distribution in the population.

  This suggests another criterion, which we call "collective representation": the degree to which the distribution of votes represents the distribution of preferences. Formally, define this measure of representation as $RC = 1 - E[|\%(\text{votes for } A) -$

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[23] One could arrive at a measure like IR by focusing instead on the amount of information brought to bear on the decision. The closer a fund's cutoff is to the advice cutoff, the more informed is a vote. Malenko and Malenko (2019) develop a model in which information is more in the foreground, and show how advice from the proxy advisory industry leads to less information collection by funds themselves and less informed voting. The problem in our analysis is not crowding out but funds' willingness to purchase distorted advice.

%(voters preferring A)|]. For ease of exposition, we have defined representation only in terms of those who vote, but it could also be defined in terms of all investors.

Collective representation in equilibrium E1 and E3 is $RC = 1$ because voting is fully aligned with preferences. In equilibrium E2, the distribution of votes is fully aligned except when $S \in (0, \beta)$. If $S \in (0,\ \hat{y})$, all investors vote A while only ϕ_{SRI} of them actually prefer A. If $S \in (\hat{y},\ \beta)$, no investors vote A even though ϕ_{SRI} of them prefer A. Then

$$RC = 1 - [G(\hat{y}) - G(0)] \cdot (1 - \phi_{SRI}) - [G(\beta) - G(\hat{y})] \cdot (\phi_{SRI} - 0);$$

E2 is less representative than E1 and E3 at the collective as well as individual level.

Our analysis abstracts away from the possibility that elections can improve representation by exploiting the law of large numbers. The Condorcet Jury Theorem or, more colloquially, the "wisdom of crowds", is the idea that in environments where voters have common values but are uncertain about the effects of a given policy, elections leverage the law of large numbers to cancel idiosyncratic errors, producing (in the limit) accurate estimates of the value of the underlying policies. [24] In our model, voters do not have common values – disagreement stems from different values rather than different information – so the act of aggregating votes does resolve the underlying conflict. Intuitively, however, if one were to extend the model to include uncertainty about policy consequences, the E2 equilibrium would be undesirable in another respect: elections would be determined based on only one signal, that of the monopolist, rather than a dispersion of signals. This relates to the information externality explored in Malenko and Malenko (2019).

Our framing of normative implications in terms of representation is incomplete in that it does not consider costs. Ideally, we would like an approach that balances the value of representation against the costs of producing it. Unfortunately, welfare theory does not yet offer a path forward in a case like this with heterogeneous preferences and preferences over nonpecuniary goods, and it seems beyond our scope to do much more than we have done. The problem is not in our model, but the field's lack of a framework to handle investors with social goals. This theoretical uncertainty is at the heart of discussions about what should be the objective of the firm when investors do not necessarily seek to maximize value (Zingales et al., 2020). While our normative analysis is thus somewhat incomplete and informal, we believe that

[24] Nitzan and Paroush (2017) surveys the theoretical literature.

representative is one desirable attribute of voting in corporate elections, and our analysis is able to identify some stark differences between the quality of representative across different equilibria.

4. Extension: Customized Advice

One of our main findings is that as the market grows, it leads to creation of a platform advisory firm that monopolizes at least one segment of the market. In the case where it monopolizes the entire market (when RO funds receive small expressive benefits from voting), all funds receive identical slanted advice and corporate elections are distorted. This unfortunate outcome could be mitigated if the monopolist offered different advice to different customers, for example, if it sold two advice packages, $y = 0$ and $y = \beta$.

In fact, proxy advisory firms do offer some customized options.[25] Here we extend the model to allow customization. This is partly a robustness exercise to show that the distortion of advice is not a mechanical consequence of assuming that a proxy advisor offers only one type of advice. As one would expect, allowing customization can attenuate some of the distortions in our benchmark model. However, there is no guarantee that allowing customization will help: proxy advisors have weak incentives to customize their advice for the same reason that they slant their advice – RO funds do not emphasize voting.

Since we are interested in whether customization can mitigate the distortions from a monopoly platform, we focus on the case where such a platform emerges, when (C3) holds. Formally, advisory firms are now permitted to sell two advice packages instead of just one. Each advice package requires a research cost of k^R. A firm's fixed cost can be divided into a research component and a vote execution component, k^V: $F_t = k^R + k_t^V$ for a firm with one advice product and $F_t = 2k^R + k_t^V$ for a firm with two advice products. The idea is that the information a firm collects when researching for one cutoff is not applicable for making recommendations on another cutoff. For example, if a firm is seeking to determine whether director candidates are labor-friendly it will look at certain information; if it wishes to determine if candidates are pro-green it will have to collect different information.[26]

[25] Nevertheless, in a recent survey 30 percent of investors agreed that proxy advisors' advice is too standardized (McCahery et al., 2016).

[26] It not essential that the cost of research is additive, only that it is greater when offering two products compared to one.

We assume that firms choose the number of advice packages as well as cutoffs and prices in Stage 2, while the fixed cost for vote execution k_t^V is paid at stage 1 as in the benchmark model. The technology assumption A2 is replaced with $C_2'(M) < \frac{k^R + k^V}{M}$. In all other respects the game is the same as before.

Proposition 3. *When (C3) holds and firms can offer two advice packages, there are three possible equilibria:*

- ***E1.*** *The number of firms is $N_1 \geq 2$ and $N_2 = 0$, of which $N_1(0) = \frac{\phi_{RO}}{q_0}$ choose $y = 0$, $N_1(\beta) = \frac{\phi_{SRI}}{q_0}$ choose $y = \beta$, all choose $p_1^* = C_1'(q_0)$, and all sell $q_1^* = q_0$.*
- ***E2.*** *The number of firms is $N_1 = 0$ and $N_2 = 1$.*
  - ***(a)*** *The platform firm offers one advice package: $y_2^* = \hat{y}$ and $p_2^* = k - \lambda_{RO} \cdot \big(1 - H(0, \hat{y})\big)$, where $\hat{y}$ is the solution to: $\lambda_{RO} \cdot \big(1 - H(0, \hat{y})\big) = \lambda_{SRI} \cdot \big(1 - H(\beta, \hat{y})\big)$. All funds purchase advice and $q_2^* = \Phi$.*
  - ***(b)*** *The platform firm offers two advice packages: $y_2^* = 0$ and $y_2^* = \beta$, both with $p_2^* = k$. All funds purchase advice tailored to their preferences and $q_2^* = \Phi$.*

Proposition 3 shows that customization of advice is a possible equilibrium when the market is monopolized. When advice is customized, the proxy advice market works well by the representation criteria. The condition for E2(b) to prevail over E2(a) is $\lambda_{RO} \cdot \big(1 - H(0, \hat{y})\big)\Phi > k^R$, the increased profit from customization exceeds the cost of customization. If $\lambda_{RO} \approx 0$, this condition is never satisfied: because RO funds place a low value on voting according to their preferences, the potential gain from customizing is small. Hence, in this case, it does not pay for the proxy advisor to produce a customized recommendation for RO funds.

In a more complicated model where SRI funds have a distribution of cutoff points, customization would be more likely. The logic of Proposition 3 suggests that the proxy advisor would offer some customization to extreme funds, but funds with similar preferences would be offered only one report. It is important to note that in no case would the proxy advisor offer a report tailored just to the RO funds if $\lambda_{RO} \approx 0$, so their preferences still would not be well represented.

5. Extension: Endogenous Voting

The basic framework assumes that RO funds vote or abstain for exogenous reasons. This is motivated primarily by the institutional fact that mutual funds are essentially required to vote by the SEC. Here we consider the case where funds have some flexibility; formally, we allow nonvoting funds to become voters if the price of voting is low enough. One insight is that competition, by driving down the price of proxy services, can increase the representativeness ofvotes.

To focus on the case of a monopoly platform, we continue to assume that (C3) holds. As before, SRI funds vote regardless of the price, but now the remaining $M - \phi_{SRI} \equiv \phi_{RO}$ funds are assumed to have a utility payoff (benefit or cost) associated with abstaining of z, which is distributed $F(z)$. These funds choose to vote with proxy advice y and price p if

$$E[V] + \lambda_{RO} \cdot \Pr(\text{“correct vote"}|0, y) - p \geq E[V] + z.$$

Our basic model can be recast in terms of this formulation as having assumed that $z < \lambda_{RO} - k$ for a subset of RO funds. The SEC's rule imposing a fiduciary duty for funds to vote can be modeled as a large negative z, as can the case of an RO fund wishing to be perceived as a good fiduciary.

Proposition 4. *There are two possible equilibria:*

- ***E1*.*** *The number of firms is $N_1 \geq 2$ and $N_2 = 0$, of which: $N_1(0) = \frac{\phi_{RO}F(\lambda_{RO} - p_1^*)}{q_0}$ choose cutoff $y = 0$; $N_1(\beta) = \frac{\phi_{SRI}}{q_0}$ choose cutoff $y = \beta$; all choose $p_1^* = C_1'(q_0)$; and all sell $q_1^* = q_0$.*
- ***E2*.*** *The number of firms is $N_1 = 0$ and $N_2 = 1$. The platform firm chooses cutoff $y_2^* = \hat{y}$, sells $q_2^* = \phi_{SRI} + \phi_{RO}F(\lambda_{RO} \cdot H(0, \hat{y}) - p_2^*)$, and sets price*

  $$p_2^* = \text{argmax}\{p_2[\phi_{SRI} + \phi_{RO} \cdot F(\lambda_{RO}H(0, \hat{y}) - p_2)] - C_2(\phi_{SRI} + \phi_{RO} \cdot F(\lambda_{RO}H(0, \hat{y}) - p_2))\},$$

  where $p_2 \leq k - \lambda_{RO} \cdot (1 - H(0, \hat{y}))$.

The equilibria are qualitatively similar to those in the basic model. As before, the E2* equilibrium prevails over the E1* equilibrium for sufficiently large ϕ_{RO} (or for a distribution F

that induces a sufficiently large number of RO funds to participate). The platform monopolist continues to choose a cutoff that is skewed toward the preferences of SRI funds.

As in the basic model, E1* is relatively representative while E2* is relatively unrepresentative. The following proposition compares the representation of voting with and without a proxy advisory industry:

Proposition 5. *Representation (at both the individual level and collective level) is highest in E1*, second-highest when there is no proxy advisory industry, and lowest in E2*.*

This result, which differs from the basic model, appears here due to complementarity between the cost savings from proxy advice and representation of votes in equilibrium E1*. Competition among proxy advisors drives down the price of advice, causing more funds to vote, and their votes represent their preferences. To see this, note that without proxy advice, $\phi_{RO}F(\lambda_{RO}-k)$ of the RO funds vote according to the cutoff $y=0$ and all SRI funds vote according to $y=\beta$. The average probability of an investor casting a representative vote is

$$RI_0 = \frac{\phi_{RO}F(\lambda_{RO}-k)+\phi_{SRI}}{M}.$$

In E1*, $\phi_{RO}F(\lambda_{RO}-p_1^*)$ of the RO funds vote according to the cutoff $y=0$ and all SRI funds vote according to $y=\beta$, leading to a mean probability of a representative vote of

$$RI_1 = \frac{\phi_{RO}F(\lambda_{RO}-p_1^*)+\phi_{SRI}}{M}.$$

In E2*, $\phi_{RO}F(\lambda_{RO}\cdot H(0,\hat{y})-p_2^*)$ of the RO funds and all SRI funds vote according to the cutoff $y=\hat{y}$, yielding a mean probability of a representative vote of

$$RI_2 = \tfrac{\phi_{RO}F()}{M}\big(1+G(0)-G(\hat{y})\big)+\tfrac{\phi_{SRI}}{M}\big(1+G(\hat{y})-G(\beta)\big).$$

where $F(\,)=F(\lambda_{RO}\cdot H(0,\hat{y})-p_2^*)$.

Because $p_1^*<k$, we can conclude that $RI_1>RI_0$: voting is more representative with than without proxy advisors in E1*. In contrast, $RI_2<RI_0$: voting is less representative with than without proxy advisors in E2*. Somewhat paradoxically, when advice is provided by a platform

firm the availability of advice leads to less representation. The results for collective representation, $RC_1 > RC_0 > RC_2$, follow immediately from the fact that in our model individually representative votes are collectively representative.

6. Extension: Proxy Advice Customers with Their Own Information

The benchmark model assumes that proxy advice customers do not collect their own information when voting. This assumption allows us to bring out the main economic tradeoffs in a transparent way but leads to the unrealistic assumption that every proxy service customer blindly follows the recommendations of the advisory firm.

In fact, a substantial number of funds do in fact appear to "robo-vote." Perhaps the most direct evidence comes from Shu (2021), which appears to be the first study to link fund votes with the proxy advice they receive. That study finds that the fraction of ISS customers robo-voting (defined as following ISS recommendations 99.9 percent of the time) grew from 8 percent in 2007 to 23 in 2017. Even more striking, in the most recent year (2017), over 40 percent of small funds and over 50 percent of small index funds robo-voted. As noted above, even AQR, one of the world's largest hedge funds, appears to robo-vote. Robo-voting appears to be less common among Glass-Lewis customers.[27] A recent survey by American Council for Capital Formation concluded that 175 asset managers, with over $5 trillion in assets, automatically vote in alignment with ISS's recommendations, including Blackstone, AQR, and Virginia Retirement System (Doyle, 2018). At the same time, it is clear that many proxy advice customers do not robo-vote, meaning they use their own information for some votes.

In this section, we explore an extension of the model in which funds can collect information even if they purchase proxy services. In this case, some funds may purchase proxy services entirely for low-cost vote execution, and cast their votes based on their own information. We show that the potential equilibria retain the structure of Figure 2, and votes in the E2 equilibrium are still distorted, although not as completely as in the benchmark model.

Suppose that after subscribing to a proxy advisor, investors can self-inform by paying an information cost k^I to learn the exact state of nature S. The information cost can take on two values, $k^I \in \{\underline{k^I}, \overline{k^I}\}$ where $\underline{k^I} < \overline{k^I}$; as a shorthand we describe these as "low-cost" and "high-

[27] The evidence on robo-voting in Shu (2021) confirms a similar conclusion based on more indirect methods from Iliev and Lowry (2015) for the period 2006-2010 ("indirect" because Iliev and Lowry do not observe which funds are ISS customers so cannot directly determine which funds are following advice.)

cost" funds. The number of low-cost RO funds is $\underline{\phi}_{RO}$ and the number of high-cost RO funds is $\overline{\phi}_{RO}$; similarly, the number of low-cost and high-cost SRI funds is $\underline{\phi}_{SRI}$ and $\overline{\phi}_{SRI}$, respectively.

An investor that purchases proxy services chooses to self-inform if $\lambda_j \cdot H(y, y') < \lambda_j - k^I$. To allow for the possibility that self-informing is sometimes but not necessarily always optimal, we assume that $\underline{k^I} < \lambda_{RO} \cdot (1 - H(0, \hat{y})) < \overline{k^I}$. We do not allow proxy firms to sell advice and vote execution services separately. If a fund intends to follow the proxy advisor's recommendation, it will pay at most $p = k - \lambda \cdot (1 - H(y, y'))$; if it intends to self-inform it will pay at most $p = k - k^I$. Therefore, if it is optimal for high-cost funds of a given type choose to purchase proxy services, it is also optimal for low-cost funds of that type to purchase proxy services. The implication that funds with low information costs are more likely to conduct independent research before voting is consistent with evidence in Iliev and Lowry (2015), Iliev et al. (2021), and Shu (2021).

Proposition 6. *Define the following three conditions (C1 is the same as before):*

(C1) $\left(k - \lambda_{RO} \cdot (1 - H(0, \hat{y}))\right)\Phi - C_2(\Phi) \geq F_2$;

(C2') $\min\left[(k - \underline{k^I}) \cdot \left(\phi_{RO} + \underline{\phi}_{SRI}\right) - C_2\left(\phi_{RO} + \underline{\phi}_{SRI}\right), k \cdot \phi_{RO} - C_2(\phi_{RO})\right] \geq F_2$;

(C3') $\left(k - \lambda_{RO} \cdot (1 - H(0, \hat{y}))\right)\Phi - C_2(\Phi) \geq \max\left[(k - \underline{k^I}) \cdot (\phi_{RO} + \underline{\phi}_{SRI}) - C_2\left(\phi_{RO} + \underline{\phi}_{SRI}\right), k \cdot \phi_{RO} - C_2(\phi_{RO})\right]$.

Then there are three possible equilibria (E1 is the same as before):

- ***E1.*** *The number of firms is $N_1 \geq 2$ and $N_2 = 0$, of which $N_1(0) = \frac{\phi_{RO}}{q_0}$ choose $y = 0$, $N_1(\beta) = \frac{\phi_{SRI}}{q_0}$ choose $y = \beta$, all choose $p_1^* = C_1'(q_0)$, and all sell $q_1^* = q_0$. All funds vote according to proxy advice.*
- ***E2'.*** *The number of firms is $N_1 = 0$ and $N_2 = 1$. The platform firm chooses $y_2^* = \hat{y}$ and $p_2^* = k - \lambda_{RO} \cdot (1 - H(0, \hat{y}))$, and sells $q_2^* = \Phi$, where $\hat{y}$* is *the solution to: $\lambda_{RO} \cdot (1 - H(0, \hat{y})) = \lambda_{SRI} \cdot (1 - H(\beta, \hat{y}))$. All funds purchase proxy services; high-cost funds vote according to the proxy advisor's recommendations; low-cost funds self-inform and vote according to their own information.*
- ***E3'.*** *Advice is $y_1^* = \beta$ and $y_2^* = 0$, and $N_2 = 1$. (i) If $(k - \underline{k^I}) \cdot \left(\phi_{RO} + \underline{\phi}_{SRI}\right) - C_2\left(\phi_{RO} + \underline{\phi}_{SRI}\right) < k \cdot \phi_{RO} - C_2(\phi_{RO})$, then $N_1 = \frac{\phi_{SRI}}{q_k}$, $p_1^* = p_2^* = k$, $q_1^* = q_k$, and $q_2^* = \phi_{RO}$.*

(ii) If $\left(k - \underline{k}^I\right) \cdot \left(\phi_{RO} + \underline{\phi}_{SRI}\right) - C_2\left(\phi_{RO} + \underline{\phi}_{SRI}\right) \geq k \cdot \phi_{RO} - C_2(\phi_{RO})$, *then* $N_1 = \overline{\phi}_{SRI}/q_k$, $p_1^* = k$, $p_2^* = k - \underline{k}^I$, $q_1^* = q_k$, *and* $q_2^* = \phi_{RO} + \underline{\phi}_{SRI}$.

The prevailing equilibrium is: E1 if (C1) and (C2') fail; E2' if (C1) and (C3') are satisfied; and E3' if (C2') is satisfied and (C3') fails, where:

Equilibrium E1 in Proposition 6 is the same as in our benchmark configuration: a competitive array of boutique proxy advisors provide both RO and SRI funds advice that is perfectly aligned with their preferences. All funds purchase proxy services and all of them follow the voting advice they receive.

Equilibrium E2', as in the benchmark case, features a platform monopolist that offers advice slanted toward the preferences of SRI funds, and all funds purchase proxy services. However, low-cost funds of both type choose to self-advise and do not follow the proxy advisor's recommendation. Thus, in this equilibrium high-cost proxy advice customers robo-vote in a way that does not accurately reflect their preferences, while low-cost customers use only vote execution services and self-inform so as to vote in alignment with their preferences.

Equilibrium E3', as in the benchmark case, features a single platform advisor selling to RO funds and a competitive fringe of boutique advisors selling to SRI funds. However, now there are two possibilities. In one situation, all RO funds buy from the platform advisor and all SRI funds buy from boutique advisors; all funds received perfectly aligned advice and follow advisor recommendations. In the other situation, all RO funds and low-cost SRI funds buy from the platform advisor while the high-cost SRI funds buy from boutique advisors; low-cost SRI funds ignore the platform advisor's recommendations and collect their own information when voting. In either case, voting is aligned with fund preferences.

The equilibria continue to be partitioned as in Figure 2, meaning that some key implications continue to hold: When the size of the market becomes sufficiently large, a platform proxy advisor emerges; and if RO funds are sufficiently "apathetic" ($\lambda_{RO} \rightarrow 0$), then the platform advisor slants its recommendations toward the preference of SRI funds. When advice is slanted, as before votes do not fully reflect fund preferences. However, the distortion in voting is smaller than before because low-cost funds choose to self-inform and do not follow the advisor's slanted recommendation. The total distortion in votes depends on the prevalence of low-cost vs. high-cost funds.

7. Policy Implications

A. Antitrust

The structure of the proxy advisory industry is an ongoing subject of policy debate. As the industry consolidates into something close to a monopoly, it is natural to ask whether this creates market power and, if so, what that means for consumers of proxy advice.

Our model suggests two potential problems when the market consolidates into a monopoly. The traditional welfare consequences are straightforward. The monopolist charges a supra-competitive price that transfers wealth from consumer surplus to the monopoly producer, and there is a deadweight loss (in the model with endogenous voting) because the high price deters some funds from voting. Beyond traditional price effects, there is also a distortion in corporate elections as the preferences of SRI funds end up driving the outcome. Whether this is good or bad is a normative question that is unanswerable using current theory, but it does mean that election outcomes do not represent the preferences of all investors.[28]

The fact that this is a *natural* monopoly complicates regulatory solutions. If a regulator were to break up the monopolist into two firms, for example, we would expect to see fierce price competition between the two survivors until one of them exited. The surviving monopolist would expand internally, returning to the monopoly equilibrium. Breaking them up, then, would offer only a short-run patch. The monopoly does not cause the dearth of competition; it is the consequence of a competitive entry market.

A price ceiling imposed on the monopolist would reduce the transfer from consumer to producer surplus, and reduce the deadweight cost. The monopolist is willing to stay in the market for a price above what it would charge in an unregulated equilibrium. The effect on the nature of advice is uncertain. If unable to raise the price, the monopolist would not need to cater its recommendations to SRI funds. Formally, there is a range of y that it could adopt that would produce identical profit. So a price regulation could, but need not, reduce the slant in advice.

Another policy would be to limit the size (market share) of any one proxy advisory firm. If a maximum size $\bar{q}$ was established such that $k\bar{q} - C_2(\bar{q}) - F_2 < 0$, then no advisory firm could be profitable using the platform technology T2. In this case, the market would be comprised of T1 firms, and the E1 equilibrium would prevail. This equilibrium uses an inefficient technology but advice customers are better off, and voting is representative individually and collectively.

[28] We should reiterate that "SRI funds" is a shorthand for funds that place a high value on voting their preferences. This could also include labor unions and public pensions, with the implication being that their preferences are overweighted in corporate elections.

Another approach would be to inhibit formation of the natural monopoly by prohibiting proxy advisory firms from providing vote execution services, which we conjecture is the primary source of scale economies. For example, ISS might be forced to divest its ProxyExchange platform. The complications of such a policy are illustrated by Glass Lewis. Glass Lewis offers its advisory services "fully integrated" with proxy voting services from Broadridge. In effect, Glass Lewis operates an advice platform that transmits recommendations to Broadridge, which transmits them to the issuer. If the advice part of this chain has platform efficiencies, as seems likely (especially in transmitting recommendations to the vote executor), then the advice industry will tend to monopolize even if advisory firms are banned from transmitting votes directly to issuers.

B. Regulation of Voting

The calculus of voting pushes most funds in the direction of abstaining. Because their votes are unlikely to be pivotal, their gain from investing in information and paying vote execution costs exceeds their private benefit from voting. To counteract this, government regulations force funds to vote: the Department of Labor ruled in 1988 that pensions had a fiduciary duty to vote under ERISA, and the SEC issued in a no-action letter in 2003 that mutual funds had a fiduciary duty to vote. These rulings led to a significant increase in voting by institutional investors and reliance on proxy advisory services.[29]

Our analysis shows that such regulations can improve corporate governance, but can also make it worse by decoupling votes from fund preferences. If the E1 or E3 equilibrium prevails, then the more funds that vote, the more that corporate elections represent the preferences of investors. If enough passive funds vote to tip the equilibrium to E2, however, there is a deterioration in the representativeness of corporate elections at both individual and collective level: the requirement to vote ends up amplifying the voting power of SRI funds. Because the current market displays some features of the E2 equilibrium, our analysis raises the question of whether requiring institutional investors to vote may be harming corporate governance.

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[29] Department of Labor: *Letter from Alan D. Lebowitz, Deputy Assistant Secretary, Pension and Welfare Benefits Administration of the U.S. Department of Labor, to Helmuth Fandl, Chair of the Retirement Board, Avon Products, Inc., February 23, 1988*. SEC: *Proxy Voting by Investment Advisors, 68 Federal Register 6585, February 7, 2003*. Investment advisors, strictly speaking, are not required to vote their proxies and enforcement actions are rare, yet 90 percent of them choose to do so (SEC Staff Legal Bulletin No. 20, June 30, 2014; Broadridge + PwC, 2019). It is widely believed that funds can satisfy their fiduciary responsibilities by following the recommendations of a proxy advisor.

Lund (2018) is also skeptical of voting by passive investors, and goes even farther by proposing that passive funds should be prohibited from voting. Her logic is that these funds have such weak incentives to be informed that their votes are likely to introduce noise rather than information to corporate elections and they may side too often with management. Our analysis also suggests that participation of passive funds may be harmful for governance, but through a different channel: it may lead to a concentration of proxy advice and a disproportionate influence of SRI funds in corporate elections.

Another possible policy would be to allow funds to satisfy their fiduciary obligations by delegating their votes to the issuer's directors (Sharfman, 2019a). In our model, this would mean casting their vote according to the directors' recommendations. If directors seek to maximize value, then following their advice increases value. If there are significant agency problems among directors, then the effect of following director recommendations depends on whether directors or SRI funds place more weight on value maximization.

Yet another idea would be to hold proxy advisor's accountable in some way for the recommendations, or in the extreme impose a fiduciary duty on *proxy advisors to the companies about which they provide advice*. The SEC's amendments to federal proxy rules, adopted July 22, 2020, seems to inch in this direction by requiring proxy advisors to notify issuers of their recommendations and allow issuers to respond to their recommendations.[30] Our analysis suggests a conceptual difficulty with holding advisory firms accountable for the quality of their advice: what exactly is "responsible advice" for a company in which shareholders disagree about the course of action? If some shareholders would like the company to invest in abating greenhouse gas emissions while others do not want money to be spent this way, by what criterion is one action to be classified as more responsible than the other? These questions go far beyond the scope of our paper, but have attracted some interest among legal scholars.[31]

8. Discussion

This paper develops a model of the proxy advice market to understand when proxy advice supports or undermines shareholder governance. A critical assumption is that investors differ in the type of advice they seek – and some investors are willing to trade off financial returns for "social" goals, such as mitigating climate change and protecting human rights. When some investors have social goals, it may not be optimal (privately or socially) for proxy advisors

[30] The SEC's amendment is available at: https://www.sec.gov/rules/final/2020/34-89372.pdf.

[31] Strine (2006) observes that the lack of such a fiduciary duty for proxy advisors is another layer of agency that can interfere with effective governance. Sharfman (2019b) discusses the legal issues involved.

to issue recommendations that increase the issuer's value. Evidence that proxy advice reduces issuer value may not be an indicator of market failure but of optimal responsiveness to market demand.[32]

In our model, when the demand for proxy advice is sufficiently large, the proxy advisory industry consolidates into a monopolist that exploits economies of scale in information collection and vote execution. A central result is that if return-only funds are unwilling to pay for high-quality advice, the monopolist's recommendations are closely aligned with the preferences of SRI funds, even if SRI funds comprise only a small fraction of investors. In this sense, our analysis complements other research showing that while empowering shareholders seems essential for good governance, some governance processes can lead to unanticipated distortions in corporate decisions.[33]

From a theoretical perspective, some of the forces at work in our model are applications of conventional economic principles. We believe that part of the novelty of our model lies not so much in the interplay of those forces but in the assumptions that we use to frame the analysis. Most important, we believe the assumption of heterogeneous investors, and especially the presence of investors with social goals, fundamentally changes how we think about advice, the goals of proxy advisory firms, and normative issues.[34] The conventional approach of theorizing from the viewpoint of value-maximizing investors leads to very different conclusions about shareholder voting. We believe that recognization of the expressive nature of voting by many funds is also important when it comes to the decision to acquire information and cast an informed vote. The alternative approach of assuming strategic voting, while relevant for large blockholders, can lead to an underemphasis on the factors that determine information acquisition by passive funds, which are becoming the dominant owner of public corporations. Finally, the widespread fact that proxy services are bundled with vote execution services, and that vote execution services may be the most valuable part of the package, has not been

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[32] Daines et al. (2010) and Larcker et al. (2015), among others, provide evidence that the recommendations of proxy advisory firms do not increase value. Kaplan and Larcker (2019) suggest that the dominance of ISS and Glass Lewis reveals a failure in the proxy advice market.

[33] For examples of potential downsides from shareholder proposals, see Stratmann and Verret (2012), Matsusaka and Ozbas (2017), Matsusaka et al. (2019), and Min and You (2019).

[34] Levit et al. (2021) is another attempt to grapple with heterogeneous shareholders, although it is not concerned with proxy advice per se. That paper – similar to ours in some respects but quite different in others – underscores how consideration of heterogeneous investors changes some of basic intuitions about market behavior.

recognized by researchers previously, and we believe should color the way we think about the function of proxy advisory firms.

Our analysis brings to the front the need for more thinking about the appropriate normative criteria for evaluating the proxy advice market. Discussions of the proxy advisory industry tend to revolve around unstated normative criteria imported from traditional economic theory that does not fit this context well. Value maximization is simply not the appropriate criterion when some market participants receive nonpecuniary benefits from corporate actions. As a starting point for discussion, we suggest two criteria. An equilibrium is "representative" at the *individual level* if individual votes accurately reflect the voter's preference. An equilibrium is "representative" at the *collective level* if the distribution of votes represents the underlying distribution of shareholder preferences. Presumably, a complete normative theory would need to consider representation as well as traditional economic costs and benefits.

In terms of the broad issue that motivates this study – whether a market for proxy advice can overcome investor free-rider problems and enable effective monitoring of corporations – the answer is inconclusive. Competition among advice suppliers can lead to lower costs and well-informed voting, but it can also lead to a lack of diversity in advice and slanted corporate elections. Perhaps our main message is that one cannot assume that information intermediaries will emerge to seamlessly fill the knowledge gap in the market. This is due to the presence of investors with heterogeneous goals; their growing importance in practice suggests the importance of bringing them more into the center of discussions about the proxy advice market.

Appendix. Proofs

A. Proof of Proposition 1

We begin by describing the (p, y) choices in each subgame.

- ***Subgame S1(a).*** *Suppose $N_1 \leq \Phi/q_k$ and $N_2 = 0$. Let $N_1(y)$ denote the number of T1 firms choosing cutoff y. Then any combination of $N_1(0)$ and $N_1(\beta)$ that satisfies $q_k N_1(0) \leq \phi_{RO}$, $q_k N_1(\beta) \leq \phi_{SRI}$, and $N_1(0) + N_1(\beta) = N_1$ can be supported in an equilibrium in which all firms choose $p^* = k$ and $q^* = q_k$. All firms earn strictly positive profit.*

  Proof:

  The maximum price that a fund with cutoff y' would pay for advice y is $k - \lambda \cdot (1 - H(y', y))$. Therefore, the maximum price that the advisory firm can charge is $p^* = k$, and only if $y^* \in \{0, \beta\}$. The indirect profit function $\pi(p) = \max_q \{pq - C_1(q)\}$ is increasing in p, so the optimal price is $p^* = k$. The associated optimal quantity is $q^* = q_k$, which is less than the size of the market by A1. Funds with the same cutoff as the advisor are indifferent between purchasing advice and self-voting. Firms are sorted in equilibrium to meet the demand from RO and SRI funds. ■

- ***Subgame S1(b).*** *Suppose $N_1 > \Phi/q_k$ and $N_2 = 0$. Then all firms charge the same price and sell the same quantity, and p^*, q^*, $N_1(0)$, and $N_1(\beta)$ solve $p^* = C_1'(q^*)$, $N_1(0) = \phi_{RO}/q^*$, $N_1(\beta) = \phi_{SRI}/q^*$, and $N_1(0) + N_1(\beta) = N_1$. All active funds purchase proxy advice. If $q^* > q_0$ then all firms earn positive profit; if $q^* < q_0$ then all firms earn negative profit; if $q^* = q_0$ then all firms earn zero profit.*

  Proof:

  The equilibrium price and quantities clear the market at the profit-maximizing price for each firm. This is a textbook perfectly competitive equilibrium at each of the two cutoff points $y = 0$ and $y = \beta$. Adopting a cutoff different from $y \in \{0, \beta\}$ is disadvantageous because no fund will pay the price $p = p^*$. ■

- ***Subgame S2(a).*** *Suppose $N_1 = 0$ and $N_2 = 1$. Let $\hat{y}$ be the solution to: $\lambda_{RO}\big(1 - H(0,\hat{y})\big) = \lambda_{SRI}\big(1 - H(\beta,\hat{y})\big)$.*
  - *If (C3) is satisfied, $y^* = \hat{y}$, $p^* = k - \lambda_{RO} \cdot \big(1 - H(0,\hat{y})\big)$, and $q^* = \Phi$. Profit is positive, excluding entry costs.*
  - *If (C3) fails, $y^* = 0$, $p^* = k$, and $q^* = \phi_{RO}$. Profit is positive, excluding entry costs.*

  Proof:

  The Intermediate Value Theorem implies that $\hat{y}$ exists and $\hat{y} \in (0,\beta)$. The firm has three options: sell entirely to RO funds, sell entirely to SRI funds, or sell to both. It is never optimal to sell only to SRI funds because $\phi_{SRI} < \phi_{RO}$. If the firm sells only to RO funds, it would choose $y = 0$ and $p = k$, with the quantity $q = \phi_{RO}$. If the firm sells to both types of fund, its price must be low enough that they prefer not to self-vote: $p(y) \le \min\big[k - \lambda_{RO}\big(1 - H(0,y)\big), k - \lambda_{SRI}\big(1 - H(\beta,y)\big)\big]$. The price is then maximized with $y^* = \hat{y}$. The optimal strategy is then either (i) $y^* = 0$ and $p^* = k$, or (ii) $y^* = \hat{y}$ and $p^* = k - \lambda_{RO} \cdot \big(1 - H(0,\hat{y})\big)$. Strategy (ii) is better than (i) if and only if (C3) holds. ■

- ***Subgame S2(b).*** *Suppose $N_1 = 0$ and $N_2 = 2$. Define condition Z1: $C_2'\left(\frac{\Phi}{2}\right) < k - \lambda_{SRI} \cdot \big(1 - H(0,\beta)\big)$.*

  (i) *If Z1 holds then there is an equilibrium with both firms choosing $y^* = 0$, $p^* = C_2'\left(\frac{\Phi}{2}\right)$, and $q^* = \frac{\Phi}{2}$ (and all funds purchase advice).*

  (ii)(a) *If Z1 does not hold and $C_2'\left(\frac{\phi_{RO}}{2}\right) \ge k - \lambda_{SRI} \cdot \big(1 - H(0,\beta)\big)$, then there is an equilibrium with both firms choosing $y^* = 0$, $p^* = C_2'\left(\frac{\phi_{RO}}{2}\right)$, and $q^* = \frac{\phi_{RO}}{2}$. RO funds purchase advice and SRI funds self-vote.*

  (ii)(b) *If Z1 does not hold and $C_2'\left(\frac{\phi_{RO}}{2}\right) < k - \lambda_{SRI} \cdot \big(1 - H(0,\beta)\big)$, then there is an equilibrium with both firms choosing $y^* = 0$, $p^* = k - \lambda_{SRI} \cdot \big(1 - H(0,\beta)\big)$, and quantity satisfying $p^* = C_2'(q^*)$. All RO funds and some SRI funds purchase advice.*

  In all cases, both advisory firms earn the competitive profit rate, excluding fixed costs.

  Proof:

(i) Suppose both firms choose $y^* = 0$ and $p^* = C_2'\left(\frac{\Phi}{2}\right)$. If Z1 holds, then both types of fund are willing to purchase proxy advice and $q^* = \frac{\Phi}{2}$. Prevention of deviation to $y = \beta$ is discussed below.

(ii) If Z1 does not hold, then only RO funds are willing to purchase advice at $p = C_2'\left(\frac{\Phi}{2}\right)$. This cannot be an equilibrium because the quantity demanded (ϕ_{RO}) would be less than the quantity supplied, and firms would benefit from cutting the price. If $p = C_2'\left(\frac{\phi_{RO}}{2}\right)$, then RO funds are willing to purchase because $C_2'\left(\frac{\phi_{RO}}{2}\right) < k$. There are two cases depending on whether SRI funds also are willing to purchase at this price:

(a) If $C_2'\left(\frac{\phi_{RO}}{2}\right) \geq k - \lambda_{SRI} \cdot \left(1 - H(0,\beta)\right)$, then SRI funds are not willing to purchase at $p^* = C_2'\left(\frac{\phi_{RO}}{2}\right)$. Given p^*, all RO funds will purchase, so $q^* = \frac{\phi_{RO}}{2}$.

(b) If instead $C_2'\left(\frac{\phi_{RO}}{2}\right) < k - \lambda_{SRI} \cdot \left(1 - H(0,\beta)\right)$ then SRI funds would purchase at $p = C_2'\left(\frac{\phi_{RO}}{2}\right)$ so this cannot be an equilibrium price. If $p^* = k - \lambda_{SRI} \cdot \left(1 - H(0,\beta)\right)$, then both types of fund are willing to purchase advice. Each advice firm sells q^* that satisfies $p^* = C_2'(q^*)$, and has no incentive to deviate to another price. All RO funds purchase advice and SRI funds, which are indifferent between purchasing advice and self-voting, purchase enough advice to clear the market; specifically, SRI funds purchase $2q^* - \phi_{RO}$. The availability of a sufficient number of SRI funds is implied because the Z1 condition does not hold.

Deviation to different advice. In all three cases, the only plausible deviation in the cutoff point would involve $y' = \beta$. With this cutoff, the maximum price that an SRI fund would pay for service from the deviator is $p' = p^* + \lambda_{SRI} \cdot \left(1 - H(0,\beta)\right)$, producing profit $\pi' = p'\phi_{SRI} - C_2(\phi_{SRI})$. To sustain the equilibrium requires that $\pi^* \geq \pi'$, or $C_2'\left(\frac{\phi_{RO}}{2}\right)\left(\frac{\phi_{RO}}{2}\right) - C_2\left(\frac{\phi_{RO}}{2}\right) \geq \left(C_2'\left(\frac{\phi_{RO}}{2}\right) + \lambda_{SRI} \cdot \left(1 - H(0,\beta)\right)\right)\phi_{SRI} - C_2(\phi_{SRI})$ for case (ii). We assume this condition holds for technical reasons; otherwise, there is no equilibrium.[35] This condition also implies $C_2'\left(\frac{\Phi}{2}\right)\left(\frac{\Phi}{2}\right) - C_2\left(\frac{\Phi}{2}\right) \geq \left(C_2'\left(\frac{\Phi}{2}\right) + \lambda_{SRI} \cdot \left(1 - H(0,\beta)\right)\right)\phi_{SRI} - C_2(\phi_{SRI})$, which guarantees $\pi^* \geq \pi'$ for case (i).

35 D'Aspremont et al. (1979) show that an equilibrium exists in a Hotelling model with fixed locations only if the locations are not too close. Our condition is the reverse in that it requires that the preferences of RO

There are no equilibria in which both platforms locate between 0 and β. For any $y \in (0, \beta)$, a firm could profit by deviating to $y' < y$ and charging a higher price, breaking the equilibrium. Similar arguments establish that there is no equilibrium where the two firms choose different cutoffs. ■

- ***Subgame S3(a).*** *Suppose $N_1 = 1$ and $N_2 = 1$.*
  - *If (C3) is satisfied, there is an equilibrium: $y_1^* = y_2^* = \hat{y}$, $p_1^* = p_2^* = C_1'(0) - \lambda_{SRI} \cdot (1 - H(\beta, \hat{y}))$, $q_1^* = 0$, $q_2^* = \Phi$. The T2 firm earns positive profit, excluding entry costs. The T1 firm earns zero profit, excluding entry costs.*
  - *If (C3) fails, $y_1^* = \beta$, $y_2^* = 0$, $p_1^* = p_2^* = k$, $q_1^* = q_k$, $q_2^* = \phi_{RO}$. Both the T1 and the T2 firm earn positive profit, excluding entry costs.*

Proof:

Under the first scenario where $p_2^* = C_1'(0) - \lambda_{SRI} \cdot (1 - H(\beta, \hat{y}))$, the T1 firm earns zero profit and cannot earn a higher profit at another price or cutoff because there is no price above its marginal cost that would attract any business. Holding fixed the cutoff point, the platform firm expects to lose all sales at a higher price so would not deviate to a higher price; there is no gain to charging a lower price since it already sells to the entire market. This equilibrium requires condition (C3). If (C3) fails, the platform will deviate to $y_2' = 0$ and charge $p_2' = C_1'(0)$ and sell $q_2' = \phi_{RO}$.

If (C3) fails, the equilibrium will be $y_1^* = \beta$, $y_2^* = 0$, $p_1^* = p_2^* = k$, $q_1^* = q_k$, $q_2^* = \phi_{RO}$. The T1 firm earns the maximum possible profit so has no incentive to deviate. The T2 firm does not benefit from deviating to $y_2 = \hat{y}$ because of (C3) fails. ■

- ***Subgame S3(b).*** *Suppose $N_1 \geq 2$ and $N_2 = 1$.*
  - *If (C3) is satisfied, the platform firm chooses $y_2^* = \hat{y}$ and $p_2^* = C_1'(0) - \lambda_{SRI} \cdot (1 - H(\beta, \hat{y}))$. At least one T1 firm locates at $y_1^* = 0$ and sets $p_1^* = C_1'(0)$*, and at least one T1 firm locates at *$y_1^* = \beta$ and sets $p_1^* = C_1'(0)$. The platform sells $q_2^* = \Phi$ and each of the T1 firms sells $q_1^* = 0$. The T1 firms earn zero profit and the T2 firm earns positive profit, both excluding entry costs.*
  - *If (C3) fails, there are two scenarios*

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and SRI funds are not too far apart, which can be seen by noting that $1 - H(0, \beta)$ proxies for the effective distance in their preferences.

(i) *If* $N_1 \leq \frac{\phi_{SRI}}{q_k}$ *then the T1 firms identically choose* $y_1^* = \beta$*, the T2 firm chooses* $y_2^* = 0$*, and* $p_1^* = p_2^* = k$.

(ii) *If* $N_1 > \frac{\phi_{SRI}}{q_k}$*, then at least one T1 firm locates at* $y_1^* = 0$ *and sets* $p_1^* = C_1'(0) - \lambda_{SRI} \cdot (1 - H(\beta, 0))$*, and one locates at* $y_1^* = \beta$ *and sets* $p_1^* = C_1'(0)$*; the T2 firm chooses* $y_2^* = 0$ *and* $p_2^* = C_1'(0) - \lambda_{SRI} \cdot (1 - H(\beta, 0))$*. Sales are* $q_1^* = 0$ *and* $q_2^* = \Phi$.

Proof:

Under the first scenario where the platform firm chooses $y_2^* = \hat{y}$ and $p_2^* = C_1'(0) - \lambda_{SRI} \cdot (1 - H(\beta, \hat{y}))$, the platform firm would lose from deviating to a lower price, due to a decline in revenue with no change in costs; it would lose from deviating to a higher price because it cannot charge a price above p_2^* without losing all of its business. The T1 firms cannot increase the price, and a lower price would yield negative profit, excluding fixed costs. Their profit is zero regardless of their cutoff points. This equilibrium will require condition (C3). If (C3) fails, the platform will deviate to $y_2' = 0$ and charge $p_2' = C_1'(0)$ and sell $q_2' = \phi_{RO}$.

If (C3) fails, for (i), the proof is the same as for Subgame S3(a) above. T1 firm earns the maximum possible profit so has no incentive to deviate. The T2 firm does not benefit from deviating to $y_2 = \hat{y}$ because of (C3) fails. For (ii), there is no longer enough demand such that every T1 firm charges k, and as a result price competition starts. In equilibrium, T1 firms earn zero and no alternative cutoff or price does better. The T2 firm cannot increase its price without losing all business. ■

Proposition 1. *There are three possible equilibrium industry structures:*

- ***E1.*** *The number of firms is* $N_1 \geq 2$ *and* $N_2 = 0$*, of which* $N_1(0) = \frac{\phi_{RO}}{q_0}$ *choose* $y = 0$*,* $N_1(\beta) = \frac{\phi_{SRI}}{q_0}$ *choose* $y = \beta$*, all choose* $p_1^* = C_1'(q_0)$*, and all sell* $q_1^* = q_0$.
- ***E2.*** *The number of firms is* $N_1 = 0$ *and* $N_2 = 1$*. The platform firm chooses* $y_2^* = \hat{y}$ *and* $p_2^* = k - \lambda_{RO} \cdot (1 - H(0, \hat{y}))$*, and sells* $q_2^* = \Phi$*, where* $\hat{y}$ is *the solution to:* $\lambda_{RO}(1 - H(0, \hat{y})) = \lambda_{SRI}(1 - H(\beta, \hat{y}))$.
- ***E3.*** *The number of firms is* $N_1 = \frac{\phi_{SRI}}{q_k}$ *and* $N_2 = 1$*. The firms choose* $y_1^* = \beta$*,* $y_2^* = 0$*,* $p_1^* = p_2^* = k$*, and sell* $q_1^* = q_k$ *and* $q_2^* = \phi_{RO}$.

Proof:

S1(a), S1(b), S2(a), S2(b), S3(a), and S3(b) comprise the relevant subgame possibilities.[36] Hence, the proof proceeds, roughly speaking, by eliminating those subgames that cannot survive the three entry conditions defined above.

If (C3) is satisfied: The only S1 equilibrium that survives entry is the one in which each T1 firm earns zero profit, i.e., S1(b) with $p^* = C_1'(q_0)$. Intuitively, the entry condition drives the economic profit down to zero. So S1(a) and S1(b) with $p^* \neq C_1'(q_0)$ can be eliminated. S2(b) cannot constitute an equilibrium because the firms earn profit $C_2'\left(\frac{\Phi}{2}\right)\left(\frac{\Phi}{2}\right) - C_2\left(\frac{\Phi}{2}\right) - F_2$, which is negative by A2. S3(a) and S3(b) can be eliminated because the T1 firms earn $\pi_1 = -F_1$.

If (C3) fails: The only S1 equilibrium that survives entry is the one in which each T1 firm earns zero profit. S2(a) is not an equilibrium since T1 firms will enter against a monopolist (S3(a)). S2(b) cannot constitute an equilibrium because the firms earn profit $C_2'\left(\frac{\Phi}{2}\right)\left(\frac{\Phi}{2}\right) - C_2\left(\frac{\Phi}{2}\right) - F_2$, which is negative by A2. The only S3 equilibrium that survives entry is S3(b) with $N_1 = \phi_{SRI}/q_k$. ■

B. Proof of Proposition 2

Define the following three conditions:

(C1) $\quad \left(k - \lambda_{RO} \cdot \left(1 - H(0, \hat{y})\right)\right)\Phi - C_2(\Phi) \geq F_2$

(C2) $\quad k \cdot \phi_{RO} - C_2(\phi_{RO}) \geq F_2$

(C3) $\quad \left(k - \lambda_{RO} \cdot \left(1 - H(0, \hat{y})\right)\right)\Phi - C_2(\Phi) \geq k \cdot \phi_{RO} - C_2(\phi_{RO})$

If both (C1) and (C2) fail, E2 and E3 cannot be equilibria because the T2 firm would earn a negative profit. E1 is the equilibrium because all T1 firms earn non-negative profit.

If (C1) and (C3) are satisfied, then E3 cannot be an equilibrium because the T2 firm would deviate to choose $y_2^* = \hat{y}$ in the (p, y) subgame. E2 is an equilibrium; the T2 firm will not deviate and T1 firms won't enter.

If (C2) is satisfied and (C3) fails, then E2 cannot be an equilibrium because the T2 firm will deviate to choose $y_2^* = 0$ in the (p, y) subgame. E3 is an equilibrium; the T2 firm won't deviate and no additional T1 firms will enter. ■

[36] In the interest of space, we have not characterized $N_1 > 0$ and $N_2 \geq 2$, which are straightforward to eliminate.

C. Proof of Proposition 3

The proof is a slight extension of that for Proposition 1 with condition (C3) satisfied. Note first that in subgames S1(a) and S1(b) there is no incentive for any firm to offer more than one type of advice since they cannot increase the price and are already selling the profit-maximizing quantity at that price.

In subgame S2(a), the monopolist can offer advice $\hat{y}$, defined as the solution to $\lambda_{RO}\big(1 - H(0, \hat{y})\big) = \lambda_{SRI}\big(1 - H(\beta, \hat{y})\big)$, and sell to all funds at a price of $p = k - \lambda_{RO} \cdot \big(1 - H(0, \hat{y})\big)$, as in the proof of Proposition 1. Alternatively, it can offer two types of advice. If it offers two types of advice, it can charge a maximum price of k if it sells $y = 0$ advice to RO funds and $y = \beta$ advice to SRI funds. Profit from offering one cutoff $\hat{y}$ exceeds profit from offering two cutoffs $\{0, \beta\}$ if $(k - \lambda_{RO} \cdot \big(1 - H(0, \hat{y})\big)\Phi - k^R > k\Phi - 2k^R$, or $\lambda_{RO}\big(1 - H(0, \hat{y})\big)\Phi < k^R$.

In subgame S2(b), there are three possible subgame equilibria as in the proof of Proposition 1. In case (i), both firms would choose $y = 0$ and $p = C_2'\left(\frac{\Phi}{2}\right)$ if they sell only a single product. If one firm were to deviate and offer a second advice product with $y = \beta$, it could attract the business of all SRI funds at a price $p = C_2'\left(\frac{\Phi}{2}\right) + \lambda_{SRI}\big(1 - H(0, \beta)\big)$. This deviation would be profitable, and hence destroy the equilibrium, if $k^R < \phi_{SRI}\left(.5C_2'\left(\frac{\Phi}{2}\right) + \lambda_{SRI}\big(1 - H(0, \beta)\big)\right)$. In such a case, the equilibrium is the following: both firms offer both types of advice and charge $p = C_2'\left(\frac{\Phi}{2}\right)$, again dividing the market between them. In either case, S2(b) can be eliminated because both firms earn negative profit by assumption A2. The argument is similar in cases S2(b)(ii) and S2(b)(iii).

In subgame S3(a), there is an equilibrium in which both firms choose $y = \hat{y}$ and charge a price $p = C_1'(0) - \lambda_{SRI}\big(1 - H(\beta, \hat{y})\big)$ and the platform firms sells to the entire market. If the platform firm offered a second advice product to RO funds, it could charge $p = C_1'(0)$. This would be a profitable deviation if $k^R < \lambda_{SRI}\big(1 - H(\beta, \hat{y})\big)\phi_{RO}$. In such a case, the equilibrium is the following: the platform offers both types of advice $\{0, \beta\}$ and charges $p_2 = C_1'(0)$; the boutique firm offers advice $y = \hat{y}$ and charges $p_1 = C_1'(0) - \lambda_{SRI}\big(1 - H(0, \hat{y})\big)$; and all funds purchase from the platform firm. In either case, S3(a) can be eliminated because the T1 firms earn $\pi_1 = -F_2$. In subgame S3(b), the platform firm may choose to offer both types of advice if $k^R < k^R < \lambda_{SRI}\big(1 - H(\beta, \hat{y})\big)\phi_{RO}$, as in the preceding cases. Either way, S3(b) can be eliminated because the T1 firms earn $\pi_1 = -F_2$.

Only S1(b) with $p^* = C_1'(q_0)$ and the two cases of S2(a) can survive entry. ■

D. Proof of Proposition 4

The proof is similar to that of Proposition 1.

Disengaged funds are willing to purchase advice and execution services (p, y) rather than abstain if $z < \lambda_{RO} \cdot H(0, y) - p$. In the E1* equilibrium, there are proxy advisory firms that provide advice perfectly aligned with the disengaged funds, so they will vote if $z < \lambda_{RO} - p_1^*$.

In the E2* equilibrium, (C3) continues to imply that the platform monopolist earns more by selling to both RO and SRI funds rather than only RO funds. As before, the platform prefers to choose $y_2^* = \hat{y}$ over any other cutoff. A monopolist with price p_2 sells to those disengaged funds with $z \leq \lambda_{RO} \cdot H(0, \hat{y}) - p_2$. Its profit is

$$\pi = p_2 \cdot \left(\phi_{SRI} + \phi_{RO} \cdot F(\lambda_{RO} \cdot H(0, \hat{y}) - p_2)\right) - C_2\left(\phi_{SRI} + \phi_{RO} \cdot F(\lambda_{RO} \cdot H(0, \hat{y}) - p_2)\right),$$

so $p_2^* = \text{argmax}\ \Pi(p_2)$ subject to $p_2^* \leq k - \lambda_{RO} \cdot \left(1 - H(0, \hat{y})\right)$. The elimination of other subgames is similar to that of Proposition 1. ■

E. Proof of Proposition 6

- **Subgames S1(a), S1(b), S2(b)**. These are the same as in the proof of Proposition 2. Because all funds buy advice that is perfectly aligned with their preferences, all funds follow advice and none self-inform.

- **Subgame S2(a).** The advisory firm has three broad options: sell only to RO funds, only to SRI funds, or sell to both; within these options, for a given type of fund the firm can sell to low-cost funds only or to both low-cost and high-cost funds. As before, it is never be optimal to sell only to SRI funds. Note also that if high-cost funds of a given type purchase proxy services then low-cost funds will purchase as well.

  (i) If the firm sells only to RO funds, it sets $y = 0$ and $p = k$. All funds purchase and none of them self-inform. Profit is $k\phi_{RO} - C_2(\phi_{RO})$.

  (ii) The firm can sell to both type of funds in two ways. One way is by setting advice $y = \hat{y}$ and $p = k - \lambda_{RO}\left(1 - H(0, \hat{y})\right)$, as in Proposition 2. Profit is $\left(k - \lambda_{RO} \cdot \left(1 - H(0, \hat{y})\right)\right) \Phi - C_2(\Phi)$. Because the high-cost funds are indifferent about purchasing proxy services, it follows that the low-cost funds will purchase proxy services but self-inform and vote based on their own information.

(iii) The other way is to set $y = 0$, selling to all RO funds, and also selling to low-cost SRI funds. In order for those SRI funds to purchase, $p = k - \underline{k}^I$. Profit is then $\left(k - \underline{k}^I\right) \cdot \left(\phi_{RI} + \underline{\phi}_{SRI}\right) - C_2(\phi_{RO} + \underline{\phi}_{SRI})$. In this case, the low-cost SRI funds self-inform.

If (C3') holds, then (ii) is optimal. If (C3') does not hold then (i) is superior to (iii) if

$$k\phi_{RO} - C_2(\phi_{RO}) > \left(k - \underline{k}^I\right) \cdot \left(\phi_{RO} + \underline{\phi}_{SRI}\right) - C_2\left(\phi_{RO} + \underline{\phi}_{SRI}\right).$$

- **Subgame S2(b).** *Suppose $N_1 = 0$ and $N_2 = 2$. Define condition Z1: $C_2'\left(\frac{\Phi}{2}\right) < k - \lambda_{SRI} \cdot \left(1 - H(0,\beta)\right)$.*

  (i) If Z1 holds then there is an equilibrium with both firms choosing $y^* = 0$, $p^* = C_2'\left(\frac{\Phi}{2}\right)$, and $q^* = \frac{\Phi}{2}$ (and all funds purchase advice).

  (ii)(a) If Z1 does not hold and $k - \underline{k}^I \le C_2'\left(\frac{\phi_{RO}}{2}\right)$, then there is an equilibrium with both firms choosing $y^* = 0$, $p^* = C_2'\left(\frac{\phi_{RO}}{2}\right)$, and $q^* = \frac{\phi_{RO}}{2}$. RO funds purchase advice and SRI funds self-vote.

  (ii)(b) If Z1 does not hold and $C_2'\left(\frac{\phi_{RO}}{2}\right) < k - \lambda_{SRI} \cdot \left(1 - H(0,\beta)\right)$ then there is an equilibrium with both firms choosing $y^* = 0$, $p^* = k - \lambda_{SRI} \cdot \left(1 - H(0,\beta)\right)$, and quantity satisfying $p^* = C_2'(q^*)$. All RO funds and some SRI funds purchase proxy services.

  (ii)(c) If Z1 does not hold and $k - \lambda_{SRI}(1 - H(0,\beta) < C_2'\left(\frac{\phi_{RO}}{2}\right) < k - \underline{k}^I$, then there is an equilibrium with both firms choosing $y^* = 0$, $p^* = \min\left\{k - \underline{k}^I, C_2'\left(\frac{\phi_{RO}+\underline{\phi}_{SRI}}{2}\right)\right\}$, and quantity satisfying $p^* = C_2'(q^*)$. All RO funds and some low-cost SRI funds purchase proxy services.

In all cases, both advisory firms earn the competitive profit rate, excluding fixed costs.

(i) Suppose both firms choose $y^* = 0$ and $p^* = C_2'\left(\frac{\Phi}{2}\right)$. If Z1 holds, then all funds are willing to purchase proxy advice and $q^* = \frac{\Phi}{2}$. Prevention of deviation to $y = \beta$ is discussed below.

(ii) If Z1 does not hold, then high-cost SRI funds are unwilling to purchase advice at $p = C_2'\left(\frac{\Phi}{2}\right)$. This cannot be an equilibrium because the quantity demanded would be less than the quantity supplied, and firms would benefit from cutting the price. If $p = C_2'\left(\frac{\phi_{RO}}{2}\right)$, then RO funds are willing to purchase because $C_2'\left(\frac{\phi_{RO}}{2}\right) < k$. There are three cases depending on whether SRI funds also are willing to purchase at this price:

(a) If $k - \underline{k^I} \leq C_2'\left(\frac{\phi_{RO}}{2}\right)$, then no SRI funds are willing to purchase at $p^* = C_2'\left(\frac{\phi_{RO}}{2}\right)$. Given p^*, all RO funds will purchase, so $q^* = \frac{\phi_{RO}}{2}$.

(b) If $C_2'\left(\frac{\phi_{RO}}{2}\right) < k - \lambda_{SRI} \cdot \big(1 - H(0, \beta)\big)$ then all SRI funds are willing to purchase at $p = C_2'\left(\frac{\phi_{RO}}{2}\right)$ so that cannot be an equilibrium price. If $p^* = k - \lambda_{SRI} \cdot \big(1 - H(0, \beta)\big)$, then all funds fund are willing to purchase proxy services. Each advice firm sells q^* that satisfies $p^* = C_2'(q^*)$, and they have no incentive to deviate to another price. All RO funds purchase proxy services and enough SRI funds purchase proxy services to clear the market. There will be enough SRI funds willing to purchase because Z1 does not hold.

(c) If $k - \lambda_{SRI}(1 - H(0, \beta) < C_2'\left(\frac{\phi_{RO}}{2}\right) < k - \underline{k^I}$, then low-cost SRI are willing to purchase at $p = C_2'\left(\frac{\phi_{RO}}{2}\right)$ so that cannot be an equilibrium. If $p^* = \min\left\{k - \underline{k^I}, C_2'\left(\frac{\phi_{RO}+\phi_{SRI}}{2}\right)\right\}$, then RO funds and low-cost SRI funds are willing to purchase proxy services. Each firm sells q^* that satisfies $p^* = C_2'(q^*)$, and they have no incentive to deviate to another price. All RO funds purchase proxy services and enough low-cost SRI funds purchase proxy services to clear the market. Specifically, low-cost SRI funds purchase $2q^* - \phi_{RO}$.

Deviation to different advice. In all cases, the only plausible deviation in the cutoff point would involve $y' = \beta$. With this cutoff, the maximum price that SRI funds would pay for service from the deviator is $p' = p^* + \lambda_{SRI} \cdot \big(1 - H(0, \beta)\big)$, producing profit $\pi' = p'\phi_{SRI} - C_2(\phi_{SRI})$. To sustain the equilibrium requires that $\pi^* \geq \pi'$, or $C_2'\left(\frac{\phi_{RO}}{2}\right) \cdot \left(\frac{\phi_{RO}}{2}\right) - C_2\left(\frac{\phi_{RO}}{2}\right) \geq \left(C_2'\left(\frac{\phi_{RO}}{2}\right) + \lambda_{SRI} \cdot \big(1 - H(0, \beta)\big)\right)\phi_{SRI} - C_2(\phi_{SRI})$ for case (ii). We assume this condition holds for technical reasons; otherwise, there is no equilibrium.[37]

37 D'Aspremont et al. (1979) show that an equilibrium exists in a Hotelling model with fixed locations only if the locations are not too close. Our condition is the reverse in that it requires that the preferences of RO and SRI funds are not too far apart, which can be seen by noting that $1 - H(0, \beta)$ proxies for the effective distance in their preferences.

This condition also implies $C_2'\left(\frac{\Phi}{2}\right)\cdot\left(\frac{\Phi}{2}\right) - C_2\left(\frac{\Phi}{2}\right) \geq \left(C_2'\left(\frac{\Phi}{2}\right) + \lambda_{SRI}\cdot\left(1 - H(0,\beta)\right)\right)\phi_{SRI} - C_2(\phi_{SRI})$, which guarantees $\pi^* \geq \pi'$ for case (i).

There are no equilibria in which both platforms locate between 0 and β. For any $y \in (0,\beta)$, a firm could profit by deviating to $y' < y$ and charging a higher price, breaking the equilibrium. Similar arguments establish that there is no equilibrium where the two firms choose different cutoffs.

- **Subgame S3(a).** Suppose $N_1 = 1$ and $N_2 = 1$.

(i) *If (C3') is satisfied, there is an equilibrium:* $y_1^* = y_2^* = \hat{y}$, $p_1^* = p_2^* = C_1'(0) - \lambda_{SRI}\cdot\left(1 - H(\beta,\hat{y})\right)$, $q_1^* = 0$, $q_2^* = \Phi$. *The T2 firm earns positive profit, excluding entry costs. The T1 firm earns zero profit, excluding entry costs.*

(ii) *If (C3') fails and* $(k - \underline{k^I})\cdot\left(\phi_{RO} + \underline{\phi}_{SRI}\right) - C_2\left(\phi_{RO} + \underline{\phi}_{SRI}\right) < k\cdot\phi_{RO} - C_2(\phi_{RO})$, $y_1^* = \beta$, $y_2^* = 0$, $p_1^* = p_2^* = k$, $q_1^* = q_k$, $q_2^* = \phi_{RO}$. *Both the T1 and the T2 firm earn positive profit, excluding entry costs.*

(iii) *If (C3') fails and* $(k - \underline{k^I})\cdot\left(\phi_{RO} + \underline{\phi}_{SRI}\right) - C_2\left(\phi_{RO} + \underline{\phi}_{SRI}\right) \geq k\cdot\phi_{RO} - C_2(\phi_{RO})$, $y_1^* = \beta$, $y_2^* = 0$, $p_1^* = k$, $p_2^* = k - \underline{k^I}$, $q_1^* = q_k$, $q_2^* = \phi_{RO} + \underline{\phi}_{SRI}$. *Both the T1 and the T2 firm earn positive profit, excluding entry costs.*

The proof follows the argument in Proposition 2.

- **Subgame 3(b).** Suppose $N_1 \geq 2$ and $N_2 = 1$.

If (C3') is satisfied, the platform firm chooses $y_2^* = \hat{y}$ and $p_2^* = C_1'(0) - \lambda_{SRI}\cdot\left(1 - H(\beta,\hat{y})\right)$. At least one T1 firm locates at $y_1^* = 0$ and sets $p_1^* = C_1'(0)$, and at least one T1 firm locates at $y_1^* = \beta$ and sets $p_1^* = C_1'(0)$. The platform sells $q_2^* = \Phi$ and each of the T1 firms sells $q_1^* = 0$. The T1 firms earn zero profit and the T2 firm earns positive profit, both excluding entry costs. The proof is the same as in Proposition 2.

If (C3') fails and $(k - \underline{k^I})\cdot\left(\phi_{RO} + \underline{\phi}_{SRI}\right) - C_2\left(\phi_{RO} + \underline{\phi}_{SRI}\right) < k\phi_{RO} - C_2(\phi_{RO})$,

then there are two scenarios identical to S3(b) of Proposition 2: (i) If $N_1 \leq \frac{\phi_{SRI}}{q_k}$, then the T1 firms identically choose $y_1^* = \beta$, the T2 firm choose $y_2^* = 0$, and $p_1^* = p_2^* = k$. (ii) If $N_1 > \frac{\phi_{SRI}}{q_k}$, then at least one T1 firm locates at $y_1^* = 0$ and sets $p_1^* = C_1'(0) - \lambda_{SRI}\cdot\left(1 - H(0,\beta)\right)$, and at least one T1 firm locates at $y_1^* = \beta$ and set $p_1^* = C_1'(0)$; the T2 firm chooses $y_2^* = 0$ and $p_2^* = C_1'(0) - \lambda_{SRI}\cdot\left(1 - H(0,\beta)\right)$. Sales are $q_1^* = 0$ and $q_2^* = \Phi$.

If (C3') fails and $\left(k - \underline{k}^I\right) \cdot \left(\phi_{RO} + \underline{\phi}_{SRI}\right) - C_2\left(\phi_{RO} + \underline{\phi}_{SRI}\right) \geq k\phi_{RO} - C_2(\phi_{RO})$,

then there are two scenarios: (i) If $N_1 \leq \frac{\overline{\phi}_{SRI}}{q_k}$ then the T1 firms identically choose $y_1^* = \beta$, the T2 firm chooses $y_2^* = 0$, $p_1^* = k$ and, $p_2^* = k - \underline{k}^I$. (ii) If $N_1 > \frac{\overline{\phi}_{SRI}}{q_k}$ then at least one T1 firm chooses $y_1^* = 0$ and sets $p_1^* = C_1'(0) - \lambda_{SRI} \cdot \left(1 - H(0, \beta)\right)$; at least on T1 firm chooses $y_1^* = \beta$ and sets $p_1^* = C_1'(0)$; the T2 firm chooses $y_2^* = 0$ and $p_2^* = C_1'(0) - \lambda_{SRI} \cdot \left(1 - H(0, \beta)\right)$; sales are $q_1^* = 0$ and $q_2^* = \Phi$.

Prevalence of E1, E2, E3

If both (C1) and (C2') fail, then E2' and E3' cannot be equilibria because the T2 firm would earn a negative profit. E1 is the equilibrium because all T1 firms can earn non-negative profits.

If (C1) and (C3') are satisfied, then E3' cannot be an equilibrium because the T2 firm would deviate to choose $y_2^* = \hat{y}$ in the (p, y) subgame. E2' is an equilibrium; the T2 firm will not deviate and T1 firms will not enter.

If (C2') is satisfied and (C3') fails, then E2' cannot be an equilibrium because the T2 firm would deviate to choose $y_2^* = 0$ in the (p, y) subgame. E3' is an equilibrium; the T2 firm will not deviate and no additional T1 firms will enter. ■

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