ISSN 0956-8549

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FINANCIAL MARKETS GROUP DISCUSSION PAPER NO. 932

FINANCING A SUSTAINABLE FUTURE WORKING PAPER NO. 11

July 2025

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June 16, 2025

Abstract

We present a model in which firms compete for workers who value nonpecuniary job attributes, such as purpose, sustainability, political stances, or working conditions. Firms adopt production technologies that enable them to offer jobs with varying levels of these desirable attributes. In a competitive assignment equilibrium, firms become polarized, catering to workers with extreme preferences. Firms not only reflect but also *amplify* the polarized preferences of the general population. Firm polarization is positively related to industry concentration. More polarized sectors exhibit higher profits, lower average wages, and a reduced labor share of value added. Sustainable investing amplifies firm polarization.

Keywords: Labor Markets; Job Design; Compensating Differentials; Socially Responsible Investment; Polarization

*We thank Jonathan Berk, Shaun Davies, Paolo Fulghieri, Bård Harstad, Magdalena Rola-Janicka, Dimitri Vayanos, seminar participants at the University of Bristol, EIEF, LSE, Queen Mary University of London, São Paulo School of Economics - FGV, Stanford GSB, and participants at the Delaware Corporate Governance Symposium, the HKU Summer Workshop, the CSEF-RCFS Conference on Finance, Labor and Inequality, and the EFA (Bratislava) for their comments. Ferreira: London School of Economics, CEPR and ECGI; d.ferreira@lse.ac.uk. Nikolowa: Queen Mary University of London; r.nikolowa@qmul.ac.uk.

1 Introduction

Many workers want their jobs to have a higher purpose (e.g., "changing the world," "saving the planet," "helping people," "promoting diversity and inclusion," etc). Purpose, sustainability, social responsibility, political stances, and working conditions in general are all examples of nonpecuniary job attributes that may be valuable to workers. Sorkin (2018) shows that *compensating differentials* (i.e., wage premiums or discounts that compensate workers for negative or positive nonpecuniary job attributes) account for two-thirds of the firm component of the variance of earnings.[1] Krueger, Metzger, and Wu (2023) find that workers earn nine percent lower wages in firms that operate in more sustainable sectors. Colonnelli et al. (2023) find that job applicants value ESG characteristics at about ten percent of average wages, which is more than what applicants value most other nonwage amenities.[2] There is also significant heterogeneity in workers' preferences for nonpecuniary job attributes (Cassar and Meier (2018)).[3]

We present a model in which firms compete for workers who value a nonpecuniary job attribute. We call this attribute *s-quality*. *S*-quality may refer to job purpose or meaning, sustainability, ESG/CSR attributes, a firm's political stance, working conditions, or any other positive job attribute with the following two features. First, workers vary in their willingness to pay for *s*-quality. Second, some investors (e.g., socially responsible investors) may also have preferences over *s*-quality in their portfolio firms.

Our model builds on Rosen's (1986) "equalizing differences" framework. Models in this tradition typically assume that firms pay a variable cost to tailor their job character-

[1]Further evidence of compensating differentials can be found in Stern (2004), Mas and Pallais (2017), Focke, Maug, and Niessen-Ruenzi (2017), Wiswall and Zafar (2018), Sockin (2022), and Ouimet and Tate (2022), among others.

[2]Hedblom, Hickman, and List (2019) find that advertising as a CSR firm increases job application rates by 24%. Similarly, Cen, Qiu, and Wang (2022) find that CSR investments improve employee retention.

[3]Krueger et al. (2023) find that about half of survey participants are willing to accept a wage cut to work for a more environmentally sustainable firm. Colonnelli et al. (2023) document that job applicants' ESG preferences vary with education, ethnic background, and political leanings. Hedblom et al. (2019) find that heterogeneous preferences for CSR cause workers to vary by their propensity to select different jobs.

istics to the preferences of their workers. Unlike the previous literature, we assume that firms' cost functions also have a fixed component. We can think of this cost as the cost of setting up a firm, investing in R&D, or entering a market. Because of this fixed cost, firms choose to cater only to some workers. Our main result shows that, in equilibrium, firms become polarized and hire only workers with extreme preferences—those with either strong or weak preferences for s-quality. This result implies that firms not only reflect but also *amplify* the polarized preferences of the general population.

The model is as follows. Entrepreneurs develop or acquire technologies that allow them to create firms offering jobs of varying s-quality levels. After investing in such technologies, firms compete for workers by offering contracts specifying a wage and an s-quality level. High s-quality jobs are costly for firms. For example, if workers prefer environmentally sustainable jobs, a firm may choose low-emission technologies even when they are not cost-efficient.

The ability to design jobs that align with workers' preferences allows firms to extract greater surplus from workers. This surplus is U-shaped in the underlying preferences for s-quality. Thus, firms' profits are higher when they employ workers with extreme preferences. Because firms must pay a fixed cost to operate, they choose to hire only those workers who derive the greatest value from the offered jobs—namely, those with the most extreme preferences. In contrast, firms shun workers with moderate preferences.

We show that firms become more polarized when the cost of acquiring the required technology is larger. We also show that more polarized sectors are more concentrated, with higher profits, lower average wages, and a reduced labor share of value added. Within a sector, all else held constant, wages decrease with s-quality. Thus, polarization in s-quality is positively related to wage polarization.

After modeling the labor market, we introduce financial markets. Entrepreneurs can sell shares of their firms to outside investors. There are two types of investors: profit-driven investors and socially responsible investors. Profit-driven investors care only about the financial return on their shares. Socially responsible investors are willing to sacrifice some financial gains to invest in companies with positive job attributes. Socially responsible investors may directly care about job quality because they prefer investing in companies offering better job conditions. They may also care about job quality indirectly if they share some of their employees' values, such as a concern for sustainability, environmental responsibility, or political activism. In this extension, we show that sustainable investing increases firm polarization.

The model has no frictions: competition is perfect, information is symmetric, capital is plentiful, risk sharing is perfect, and there are no agency problems, incentive issues, or financial constraints. We make these assumptions not for realism but to show that the results are theoretically robust. Thus, the model can be used as a benchmark to assess whether frictions are needed to explain existing or future evidence. Similar to models of the assignment of heterogeneous workers to firms, jobs, or tasks (see, e.g., Tinbergen (1956), Sattinger (1993), and Garicano and Rossi-Hansberg (2006)), our model considers the efficient allocation of workers to (endogenously) different firms. Similar to models of sustainable investment in which investors have preferences for some nonpecuniary characteristics of their portfolio firms (see, e.g., Heinkel, Kraus, and Zechner (2001), Pástor, Stambaugh, and Taylor (2021), and Pedersen, Fitzgibbons, and Pomorski (2021)), our model also considers the efficient allocation of heterogeneous investors to firms. Thus, our model integrates firms' real and financial sides in a simple competitive assignment framework.

Our model predicts firm polarization as an equilibrium outcome. Polarization may occur for any characteristic that employees value. An emerging empirical literature studies firm polarization in social and political stances. Di Giuli and Kostovetsky (2014) find an association between stakeholders' political views and firms' CSR policies. Conway and Boxell (2023) show that firms' public stances on controversial social issues align with the preferences of their consumers and employees. Giannetti and Wang (2023) show that heterogeneity in corporate cultures explains differences in corporate reactions to heightened public attention to gender equality. Colonnelli, Pinho Neto, and Teso (2025), Fos, Kempf, and Tsoutsoura (2023), and Duchin et al. (2023) analyze some of the economic consequences of firm political polarization. Steel (2024) provides evidence of growing polarization in the political preferences of companies and their executives.

The model generates cross-section relationships between employee satisfaction, firm value, and stock returns. While the link between employee satisfaction and stock returns does not need to be monotonic, the model implies that firms with the highest levels of employee satisfaction also deliver the highest returns. Similarly, firms with the lowest levels of employee satisfaction have the lowest returns. Edmans (2011) shows evidence that employee satisfaction is positively related to stock returns. His explanation is that the market does not fully recognize the value of intangibles. Our model provides an alternative explanation that does not require any friction or mispricing. This is not to say that frictions cannot explain some (or even all) of the evidence. Instead, the model illustrates that a link between employee satisfaction and stock returns can arise even without frictions. Edmans, Pu, Zhang, and Li (2024) show that the positive link between employee satisfaction and stock returns is stronger in countries with flexible labor markets. This finding is also consistent with our model of competition in a frictionless labor market.

In Section 2, we present our main model. In Section 3, we consider a version of the model where entrepreneurs choose among multiple productive technologies. Section 4 introduces outside investors. We briefly review the related theoretical literature in Section 5. Section 6 concludes. All proofs not in the text are in the Appendix. The Internet Appendix presents several extensions and generalizations.

2 Model

2.1 Preferences

We consider an economy with a continuum of workers with mass L. Workers care about two attributes of their jobs: the wage (w) and the job's *s-quality* (or *s-attribute*, s). A worker of type α has utility $u^\alpha(s,w) = \alpha s + (1-\alpha)w$, where $\alpha \in (0,1)$ measures the worker's relative taste for the s-attribute.[4] Workers are heterogeneous in their preferences for the s-attribute. We assume that α is a continuous random variable with density $p(\alpha) > 0$ for all $\alpha \in (0,1)$. That is, $L\int_0^\alpha p(x)dx = LP(\alpha)$ is the mass of workers with type lower than α.

The linearity of preferences simplifies the analysis but is not necessary for the results. In the Internet Appendix, we show that our results hold for quasi-concave differentiable utility functions of the form $u^\alpha(s,w) = f(g_1(\alpha)h_1(s,w) + g_2(1-\alpha)h_2(s,w))$, provided some conditions on the curvature of $g_1(.)$ and $g_2(.)$ hold. This family of functions includes most of the commonly used utility functions, such as Cobb-Douglas, CES, quasi-linear utilities, and many others.

2.2 Technology

There is a large number of potential entrepreneurs. Entrepreneurs are pure profit-maximizers.[5] At Date 0, an entrepreneur can pay $K > 0$ to set up a firm. At Date 1, the firm chooses its s-quality level, $s \geq 0$, at cost $c(s)$. We assume $c'(s) > 0$ and $c''(s) > 0$ for $s > 0$, and $c(0) = c'(0) = 0$, the latter being an Inada condition to avoid corner solutions. The firm hires one worker by offering contract (s,w) and generates revenue $y > 0$. The net profit of a firm offering contract (s,w) is $\Pi(s,w) = y - c(s) - w - K$. For simplicity, we impose no constraints on w; the qualitative results are unchanged if w is constrained to be non-negative (alternatively, we can interpret our analysis as the case in which non-negative wage constraints do not bind). Although we assume that all workers are equally productive, a natural extension—not pursued here—is to consider different correlation structures between α and worker productivity.[6]

[4] The results are qualitatively similar if we use the alternative utility $u^\alpha(s,w) = \alpha s + w$. The only significant difference is how to interpret the comparative statics with respect to α, because an increase in α unequivocally increases a worker's utility for any pair (s,w). Under our specification, the effect of α on utilities depends on whether $s \geq w$ or $s \leq w$.

[5] In the Internet Appendix we also consider the case where entrepreneurs have preferences for s-quality.

[6] For example, Colonnelli et al. (2023) find that workers with stronger preferences for ESG tend also to be more qualified.

2.3 Benchmark: Efficient Contracts

In this subsection, we characterize the set of efficient contracts between a worker and a firm. Such contracts serve as a benchmark for assessing the efficiency properties of the equilibrium contracts, which we will describe in the next subsection.

Suppose a firm matches with a worker of type α at Date 1. The firm (i.e., the entrepreneur) offers contract (s, w) to the worker. Let $\pi(s, w) := y - w - c(s)$ denote the firm's gross profit (i.e., ignoring the entry cost K, which is sunk at this stage) under this contract. Let $\underline{u} > 0$ denote the worker's outside utility if she does not accept the contract (she either works for another firm or stays unemployed). Similarly, let $\underline{\pi} \geq 0$ denote the firm's outside profit (the firm either hires another worker or shuts down). Because y is a free parameter in the model, we make the following assumption:

Assumption 1. $y = \underline{u} + c(\underline{u})$.

This assumption guarantees that at least one contract exists such that a firm with outside profit $\underline{\pi} = 0$ weakly prefers to hire the worker. This contract is $(s, w) = (\underline{u}, \underline{u})$, which gives gross profit exactly equal to zero. Assumption 1 is made only to streamline the presentation; it does not have any implications for the results.

To characterize the efficient contract set, we solve:

$$\begin{aligned} &\max\nolimits_{s,w} \omega f(u^{\alpha}(s, w)) + (1 - \omega)\pi(s, w) \\ &\text{s.t. } u^{\alpha}(s, w) \geq \underline{u} \text{ and } \pi(s, w) \geq \underline{\pi} \end{aligned} \tag{1}$$

where $\omega \in [0, 1]$ and $f(.)$ is some strictly increasing and strictly concave function. Any Pareto-efficient contract (s, w) is a solution to (1) for some ω.[7] Thus, changing ω allows

[7] See the Appendix for a formal proof. Intuitively, program (1) is akin to maximizing a concave social welfare function of u and π subject to a linear Pareto frontier. Changing ω changes the slope of the iso-welfare curves, shifting its tangency with the frontier. The reason for using a strictly concave transformation of $u^{\alpha}(s, w)$ is to allow for interior solutions. If we don't transform $u^{\alpha}(s, w)$, for any given ω, w will adjust to make at least one constraint bind, and the solution to (1) would not trace the whole Pareto frontier as we change ω.

us to trace the Pareto set of all efficient contracts. The first-order conditions for solving (1) imply:

$$\frac{\alpha}{1-\alpha} = c'(s_\alpha^*). \tag{2}$$

The left-hand side of (2) is the worker's marginal rate of substitution between s and w. In an efficient allocation, this rate must equal the marginal cost of producing s, which is the right-hand side of (2). Thus, the efficient quantity of s is at a tangency between a given indifference curve and an isoprofit, and is unique for a given worker type: $s_\alpha^* = h(\alpha) := c'^{-1}\left(\frac{\alpha}{1-\alpha}\right)$. The uniqueness of s_α^* results from two properties of the technology and preferences: (i) the profit function is quasi-linear, and (ii) the worker's utility is linear. While this uniqueness is convenient, it does not drive our main results. In the Internet Appendix, we show how to solve the model with preferences that do not imply a unique s for each α.

Let F denote the mass of firms at Date 1. If $F < L$, it is socially optimal for all existing firms to employ workers and offer s_α^*. Pareto efficiency alone does not impose further conditions. Therefore, there are multiple efficient allocations. In general, at Date 1, an allocation is efficient if and only if (i) the mass of employed workers is $\min\{L, F\}$ and (ii) a firm that employs a type-α worker offers s_α^*.

In (1), set $\underline{\pi} = 0$ and suppose the firm has all the bargaining power ($\omega = 0$). Then, the problem reduces to

$$v(\alpha) := \max_{s,w} \pi(s,w) \quad \text{s.t. } u^\alpha(s,w) \geq \underline{u}. \tag{3}$$

The value function $v(\alpha)$ is the maximum profit a firm could extract from a worker of type α. We call $v(\alpha)$ the *profit potential*. The profit potential is the actual profit a monopsonist firm would enjoy if matched with a worker of type α. We then have the following result:

Proposition 1 (Profit Potential). *The profit potential $v(\alpha)$ is strictly U-shaped.*

This result is economically meaningful. It implies that firms create more surplus when they match with workers with extreme preferences. To understand the intuition, note that firms' ability to choose s is a real option: it allows them to create value by adapting to the preferences of their workers. The option's value increases with the distance between the default position and the firm's employment contract.

The shape of the profit potential function is the main force behind our results. Because s_α^* increases in α in an efficient allocation, Proposition 1 implies that the profit potential is also U-shaped in "purpose," i.e., s_α^*. Intuitively, by offering jobs with higher s-quality, the firm pays higher direct costs but can also pay lower wages. We observe a U-shaped pattern because the firm can create (and thus extract) more surplus when matched with workers with extreme preferences.

We note that Proposition 1 is robust to different assumptions on preferences and technology. In particular, preferences do not need to be linear in (s, w). As we elaborate in the Internet Appendix, under some conditions on how α affects utility, any quasi-concave utility over (s, w) implies that $v(\alpha)$ is U-shaped. This implies that U-shaped profit potential functions are likely to feature in most compensating differentials models in the literature. However, to the best of our knowledge, this paper is the first to show this property.

2.4 Labor Market Equilibrium

We now characterize the equilibrium. There are two dates. At Date 0, entrepreneurs simultaneously choose whether to set up a firm and pay cost K. At Date 1, firms compete for workers as described below.

At Date 1, we consider a competitive equilibrium involving all firms and workers. We can think of the model as a location game in which each contract (s, w) on the plane $\Re^+ \times \Re$ is a feasible location. In a competitive equilibrium, a Walrasian auctioneer chooses a set $\Gamma \subseteq \Re^+ \times \Re$. Then, each firm chooses a location in Γ that maximizes its profit. Workers also choose their location (i.e., they apply for a job) by maximizing their utility over the contracts in Γ. For an allocation to be an equilibrium, the labor demand in each location must equal the labor supply.

Consider an equilibrium in which a worker of type α chooses contract (s, w). If $s \neq h(\alpha)$ (as given by (2)), the worker and a firm could renegotiate the contract so that both are better off. Thus, in equilibrium, if a worker of type α chooses to locate at (s, w), where a firm is also located, then we must have $s = h(\alpha)$. In addition, all agents of type α employed by firms must have the same w.[8] Thus, without loss of generality, we can represent a given location by contract (s_j, w_j), which is the contract *intended* for type $j \in (0, 1)$, where $s_j = h(j)$.

The Walrasian auctioneer chooses a set of contracts (or locations) $\Gamma = \{(s_j, w_j) \text{ for } j \in (0, 1)\}$. Define

$$A(\Gamma) := \arg \max_{(s,w)\in\Gamma} \pi(s, w) \text{ subject to } \pi(s, w) \geq 0. \tag{4}$$

$A(\Gamma)$ is the set of locations that maximize firms' profits, given the set of feasible locations Γ. Define

$$B_\alpha(\Gamma) := \arg \max_{(s,w)\in\Gamma} u^\alpha(s, w) \text{ subject to } u^\alpha(s, w) \geq \underline{u}. \tag{5}$$

$B_\alpha(\Gamma)$ is the set of locations that maximize type-α's utility, given the set of feasible locations Γ.

Define the function $p_d(s, w) : \Gamma \to [0, 1]$ such that $Fp_d(s, w)$ denotes the mass of firms that choose to locate at $(s, w) \in \Gamma$. In other words, $Fp_d(s, w)$ represents the labor demand at location (s, w). Similarly, define function $p_l(s, w) : \Gamma \to [0, 1]$ such that $Lp_l(s, w)$ denotes the mass of workers who choose to locate at $(s, w) \in \Gamma$. In other words, $Lp_l(s, w)$ represents the labor supply at location (s, w). We define a competitive equilibrium at Date 1 as follows.

Definition 1. For given $F > 0$, a *competitive equilibrium* is a set of locations Γ^* and functions $p_d^*(s, w)$ and $p_l^*(s, w)$ such that

1. Firms maximize profit: $p_d^*(s, w) > 0$ only if $(s, w) \in A(\Gamma^*)$.

[8] Suppose there are two locations, (s, w) and (s', w'), with $s = s'$ and $w' < w$. Then all firms would choose location (s', w'), and no worker would be employed at (s, w).

2. Workers maximize utility: $p_l^*(s,w) > 0$ only if $(s,w) \in B_\alpha(\Gamma^*)$ for some $\alpha \in (0,1)$.

3. Supply equals demand: $Fp_d^*(s,w) = Lp_l^*(s,w)$ for all $(s,w) \in A(\Gamma^*)$.

4. The assignment is efficient and feasible: (i) a worker of type α must choose location (s_α^*, w_α^*) such that $s_\alpha^* = h(\alpha)$, and (ii) the mass of employed workers must be:

$$F \int_{(s,w)\in\Gamma^*} p_d^*(s,w)d(s,w) = L \int_{(s,w)\in\Gamma^*} p_l^*(s,w)d(s,w) = \min\{L, F\}.$$

We first consider the case in which $F > L$, i.e., the mass of firms at Date 1 is larger than the mass of workers:

Lemma 1 (Excess Demand Implies Zero Profit). *In an equilibrium where $F > L$, firms have zero profit.*

This result follows because competition for scarce workers will dissipate profits. Because the cost of setting up a firm at Date 0 is positive ($K > 0$), firms must expect a strictly positive profit after entry. Lemma 1 thus implies that there is no equilibrium in which $F > L$. Thus, from now on, we consider only the case in which $F < L$ (ignoring the knife-edge case $F = L$ for simplicity of exposition).

The next lemma is a consequence of profit equalization in competitive markets:

Lemma 2 (Profit Equalization). *If $F < L$, firms have strictly positive profit, $\pi(s,w) = \pi^* > 0$, for all $(s,w) \in \Gamma$ such that $p_l^*(s,w) > 0$.*

Lemma 2 implies that profits are the same across all *active locations*, i.e., locations with positive labor supply, $p_l^*(s,w) > 0$. Note also that, in the cross-section of firms, there is no relation between profit and the s-attribute.

Let k denote the type that minimizes the profit potential, i.e., $k := \arg\min_{\alpha\in[0,1]} v(\alpha)$. The next proposition characterizes the equilibrium.

Proposition 2 (Labor Market Equilibrium). *The equilibrium is given by a unique type* $z \in (k, 1)$ *such that*

$$F = L\left(\int_0^{\phi(z)} p(\alpha)d\alpha + \int_z^1 p(\alpha)d\alpha\right) \tag{6}$$

where $\phi(\alpha) : (k, 1) \to [0, k]$ *is defined as*

$$\phi(\alpha) := \arg\max_{x\in[0,k]} v(x) \leq v(\alpha). \tag{7}$$

The equilibrium locations are given by $\Gamma^* = \{(s^*_\alpha, w^*_\alpha) \text{ for } \alpha \in (0, 1)\}$*, where* $s^*_\alpha = h(\alpha)$ *and*

$$w^*_\alpha = \begin{cases} y - v(z) - c(h(\alpha)) & \text{if } \alpha \notin (\phi(z), z) \\ w \in [y - v(z) - c(h(\alpha)), \frac{u-\alpha h(\alpha)}{1-\alpha}] & \text{if } \alpha \in (\phi(z), z) \end{cases}. \tag{8}$$

The supply and demand conditions imply $Fp^*_d(s, w) = Lp^*_l(s, w)$ *and*

$$p^*_l(s^*_\alpha, w^*_\alpha) = \begin{cases} p(\alpha) & \text{if } \alpha \notin (\phi(z), z) \\ 0 & \text{if } \alpha \in (\phi(z), z) \end{cases}. \tag{9}$$

The equilibrium implies unique employment levels in each location. Wages are also unique in all active locations (i.e., where $p^*_l(s^*_\alpha, w^*_\alpha) > 0$). Proposition 2 shows that the Walrasian auctioneer chooses a set of contracts that (i) equalizes profits in all active locations and (ii) maximizes the *profit potential* of firms. There are two thresholds: $z \in (k, 1)$ and $\phi(z) \in [0, k]$. In an interior equilibrium (i.e., $\phi(z) > 0$), (7) implies $v(z) = v(\phi(z)) = \pi^*$, which is the equilibrium profit. All types $\alpha \leq \phi(z)$ and $\alpha \geq z$ are employed.

Because in equilibrium there is a one-to-one mapping between α and s, we can also describe the equilibrium by a *wage function*, $w^*(s)$. The wage function is not uniquely determined in inactive locations. For simplicity and without loss of generality, we assume that all locations (active or inactive) are equally profitable. Thus, the equilibrium wage function becomes $w^*(s) = y - \pi^* - c(s)$, which is the isoprofit for profit level $\pi^* = v(k)$. Figure 1 depicts the wage function on the (s, w) plane. Note that $c''(s) > 0$ implies that

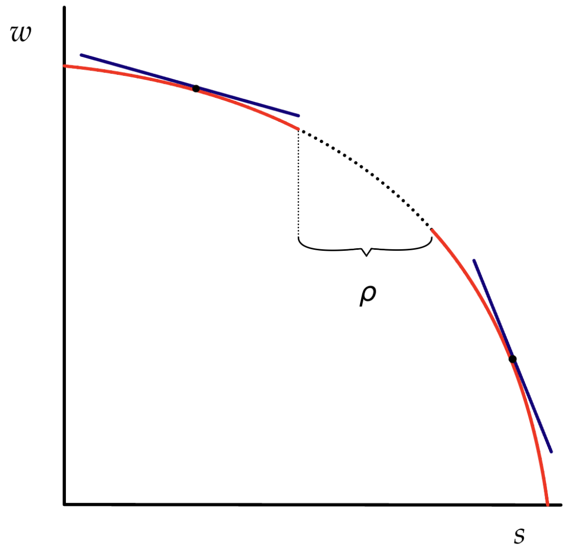

Figure 1: Equilibrium Wage Function and Polarization

the wage function is concave. For a given wage function, firms decide where to locate themselves. Since profits are the same everywhere, firms are indifferent about where they are located.

The wage function $w^*(s)$ is also a menu of choices for workers. A type-α worker solves the problem

$$\max_s \alpha s + (1-\alpha)w^*(s) \text{ s.t. } \alpha s + (1-\alpha)w^*(s) \geq \underline{u}. \tag{10}$$

As shown in Figure 1, the worker will choose the highest indifference curve given the wage function, and will thus choose $s^*_\alpha = h(\alpha)$, where the (absolute value of the) slope of her indifference curve, $\alpha/(1-\alpha)$, equals the slope of the wage function, $c'(s^*_\alpha)$. Because there are fewer firms than workers, there must be empty regions where workers and firms are not located. Because workers with extreme preferences enjoy greater surplus, that region must be an interval. Thus, the equilibrium is such that only the extreme types are employed in the sector.

Our main result is:

Corollary 1 (Polarization). *The equilibrium is polarized: firms cater to the most extreme preferences. That is,* $p_d^*(s_\alpha^*, w_\alpha^*) > 0$ *if and only if* $\alpha \notin (\phi(z), z)$.

This corollary is simply a restatement of (9). We define the equilibrium *degree of polarization* in s-quality as $\rho^* = s_z^* - s_{\phi(z)}^*$, which is the length of the interval shown in Figure 1, where s_z^* is the minimum s among high-s firms and $s_{\phi(z)}^*$ is the maximum s among low-s firms. The degree of firm polarization is a potentially observable equilibrium outcome. Thus, we use it as one of the outcome variables in our comparative statics exercises. Note that a corner solution may exist where $s_{\phi(z)}^* = 0$, in which case the degree of polarization is $\rho^* = s_z^*$.

Because firms are scarce ($F < L$), there must be some worker types who are not employed. Corollary 1 shows that firms do not employ workers of intermediate types. Because firms cater to those with extreme preferences, these firms are polarized in equilibrium. That is, firms are more extreme than the underlying worker preferences for the s-attribute. The next corollary makes precise the statement that firms amplify any underlying preference polarization.

Corollary 2 (Amplification of Polarized Preferences). *Suppose* $p(\alpha) = 0$ *for* $\alpha \in [\underline{\alpha}, \overline{\alpha}]$. *That is, the "underlying preference polarization" is* $\overline{\alpha} - \underline{\alpha}$. *In equilibrium, we must have either* $\phi(z) < \underline{\alpha}$ *or* $z > \overline{\alpha}$, *or both. Thus, firms amplify the polarized preferences of the underlying population:* $p_d^*(s_\alpha^*, w_\alpha^*) > 0$ *if and only if* $\alpha \notin (\min\{\phi(z), \underline{\alpha}\}, \max\{z, \overline{\alpha}\})$.

The next result confirms that wages fall with the s-attribute:

Corollary 3 (Compensating Differentials). *The equilibrium displays compensating differentials: for* $\alpha' > \alpha$, *if* $p_d^*(s_\alpha^*, w_\alpha^*) > 0$ *and* $p_d^*(s_{\alpha'}^*, w_{\alpha'}^*) > 0$, *then* $s_\alpha^* < s_{\alpha'}^*$ *and* $w_\alpha^* > w_{\alpha'}^*$.

That is, in the cross-section, firms with higher levels of the s-attribute offer lower wages to their employees.

Let $u^{\alpha *}$ denote the equlibrium utility of a type-α worker and $U_\alpha^* := u^{\alpha *} - \underline{u}$ denote the equilibrium surplus enjoyed by a type-α worker. The next corollary summarizes the equilibrium welfare implications for workers:

Corollary 4 (Workers' Surplus Inequality). *Workers with extreme preferences have higher surpluses: For any employed worker α, if $\alpha < k$, $U^*_{\alpha'} > U^*_\alpha$ for $\alpha' < \alpha$; if $\alpha > k$, $U^*_{\alpha'} > U^*_\alpha$ for $\alpha' > \alpha$.*

In equilibrium, workers with extreme preferences benefit more from working in the sector than workers with more moderate preferences toward the s-attribute. Workers in jobs with more surplus have a higher willingness to pay to keep their jobs. Thus, Corollary 4 implies the following empirical prediction.

Prediction 1. *Employee satisfaction is higher in firms with extreme levels of the s-attribute.*

To complete the characterization of the equilibrium, we now consider the firms' entry decision at Date 0. We have the following result.

Proposition 3 (Equilibrium Number of Firms). *The equilibrium mass of firms is*

$$F^* = L\left(\int_0^{\phi(z^*)} p(\alpha)d\alpha + \int_{z^*}^{1} p(\alpha)d\alpha\right), \tag{11}$$

where z^* is given by $v(z^*) = K$ with $v(\alpha)$ restricted to $[k, 1)$.

The proof is straightforward. Suppose that, at Date 0, entrepreneurs expect a mass F of firms to enter. As discussed earlier, if $F > L$, post-entry profits are zero. In this case, no entrepreneur would choose to enter. Thus, in equilibrium, we must have $F \leq L$. Let z denote the equilibrium type as given by Proposition 2. If $v(z) > K$, all entrepreneurs prefer to enter. If $v(z) < K$, all entrepreneurs prefer to stay out. For an equilibrium with $0 < F < L$ to exist, we thus need $v(z^*) = K$. This solution exists because Assumption 1 implies $v(k) = 0$ and because $v(\alpha)|_{\alpha \to 1} \to \infty$. The case $F = L$ cannot happen because $v(k) = 0$ implies that profit would be zero in this case, and no firm would be willing to pay the entry cost $K > 0$. Thus, $F^* < L$.

Finally, we note that we can generalize the model by allowing workers to view s as a positive or negative attribute. In this case, s is a *controversial good*, such as political partisanship or stances.[9] Suppose a firm invests in s by donating to a specific political party. In a two-party system, $s < 0$ represents donations to one party, and $s > 0$ donations to the other party. We let $\alpha \in (-1, 1)$ so that negative (positive) α represents support for the first (second) party. In this case, the utility function becomes $u^{\alpha}(s, w) = \alpha s + (1 - |\alpha|)w$. In this context, firms will either make significant donations to one party or the other. Again, we obtain that firms amplify the polarized preferences of the underlying population. We consider this generalization in the Internet Appendix.

3 A Model with Endogenous Technology Choice

In this section, we consider a version of the model where entrepreneurs choose among multiple productive technologies. This allows us to endogenize the workers outside utility as well as to consider how the available technologies affect polarization.

At Date 0, entrepreneurs can choose from a set of technologies $\iota \in \{0, ..., m\}$ to set up a firm. A firm with technology ι chooses its s-quality level, $s \in [\underline{s}_{\iota}, \overline{s}_{\iota}]$, at cost $c(s)$.[10] Technologies are indexed by their *degree of flexibility*: $\iota > \iota' \Rightarrow [\underline{s}_{\iota'}, \overline{s}_{\iota'}] \subset (\underline{s}_{\iota}, \overline{s}_{\iota})$, that is ι is more flexible than ι'. A firm with a more flexible technology can design jobs with a broader range of s-qualities. For example, the flexible technology may allow a firm to produce goods with more or less emissions.[11] Similarly, some flexible organizational forms make it possible for workers to work either at home or at the office. Because a more flexible technology can deliver anything that a less flexible one can, more flexible technologies are

[9] See Wu and Zechner (2024) for a model of firm polarization when investors have positive or negative preferences over political stances (see also the discussion in Section 5).

[10] We can easily generalize the model to allow the cost function to depend on ι.

[11] An example of an industry with high emissions flexibility is PET plastic bottle production. The dirtiest methods of producing PET bottles involve petroleum-based feedstocks and incineration, leading to high emissions. However, the cleanest methods, using bio-based feedstocks and recycled materials, can significantly reduce emissions. In contrast, an industry with low emissions flexibility is cement production, which is inherently carbon-intensive due to the energy-intensive clinker production and calcination process. Even with the cleanest methods, such as innovative materials and carbon capture, cement production remains more challenging to decarbonize. Thus, PET plastic bottles offer a wider range of emissions outcomes than cement production.

(weakly) more valuable. Our key assumption is that technological flexibility is costly to develop or acquire. Specifically, let K_ι denote the cost of acquiring technology ι. Then, $\iota > \iota' \Rightarrow K_\iota > K_{\iota'}$. Without loss of generality, we set $K_0 = 0$. When two technologies cannot be ranked by flexibility (e.g., $\underline{s}_\iota < \underline{s}_{\iota'}$ and $\bar{s}_\iota < \bar{s}_{\iota'}$), which one is more valuable depends on the underlying distribution of worker types. Our main results (firm polarization and amplification of polarized preferences) are unchanged in this case, provided that more valuable technologies are costlier to acquire.

To simplify the analysis, we assume that there are only two types of technologies. Technology 0 is completely inflexible: $\underline{s}_0 = \bar{s}_0 =: s_0$. Technology 1 is perfectly flexible, that is, $\underline{s}_1 = 0$ and $\bar{s}_1 = \infty$. In the Internet Appendix, we consider the more general case in which both types have some (but incomplete) flexibility and the case in which there are more than two technologies.

We refer to the set of firms adopting technology ι as *Sector* ι. We call Sector 1 the *flexible sector* and Sector 0 the *inflexible sector*. Workers can work for a firm in one of the sectors or remain unemployed. We normalize the "unemployment contract" to $(s = 0, w = 0)$, thus workers of any type have zero utility when unemployed.

Now, at Date 1, firms with the inflexible technology all choose the same location. Let (s_0, w_0) denote a contract *intended* for inflexible firms. We expand the definition of Γ to include one such contract (s_0, w_0) and several contracts (s_1, w_1), which are intended for flexible firms. We assume that $y \geq c(s_0)$ to ensure that inflexible firms always prefer to operate. Our results remain unchanged if we assume that costs differ across technologies.

We note that the profit potential $v(\alpha)$ of flexible firms is again U-shaped; the proof is similar to that in the one-sector model (we provide a proof in the Internet Appendix). In addition, the profit potential is minimized at $h(k) = s_0$, with $v(s_0) = 0$. Thus, Assumption 1 is no longer needed.

Workers choose a contract in Γ or unemployment (with outside utility normalized to zero, $\underline{u} = 0$). Let F_ι denote the mass of firms in Sector $\iota \in \{0, 1\}$ a Date 1. We now use $A(\Gamma)$ to denote the set of profit-maximizing locations for flexible (i.e., Sector 1) firms. Next, we define the competitive equilibrium in the case of endogenous technology choice.

Definition 2. For given F_0 and F_1, a *competitive equilibrium* is a set of locations Γ^* and functions $p^*_{d0}(s_0, w_0)$, $p^*_{d1}(s_1, w_1)$, $p^*_{l0}(s_0, w_0)$, and $p^*_{l1}(s_1, w_1)$ such that

1. Firms maximize profit: $p^*_{d1}(s_1, w_1) > 0$ only if $(s_1, w_1) \in A(\Gamma^*)$, and $p^*_{d0}(s_0, w_0) > 0$ only if $\pi(s_0, w_0) \geq 0$.
2. Workers maximize utility: For $\iota \in \{0, 1\}$, $p^*_{l\iota}(s_\iota, w_\iota) > 0$ only if $(s_\iota, w_\iota) \in B_\alpha(\Gamma^*)$ for some $\alpha \in (0, 1)$.
3. Supply equals demand: $F_\iota p^*_{d\iota}(s_\iota, w_\iota) = L p^*_{l\iota}(s_\iota, w_\iota)$, for all $(s_\iota, w_\iota) \in \Gamma^*$, $\iota \in \{0, 1\}$.
4. The assignment is efficient and feasible: (i) if a worker of type α chooses location $(s^*_{1\alpha}, w^*_{1\alpha})$, then $s^*_{1\alpha} = h(\alpha)$; (ii) $p^*_{d0}(s_0, w_0) = 1$ (all inflexible firms choose the same location); and (iii) the mass of employed workers in each sector $\iota \in \{0, 1\}$ must be

$$F_\iota \int_{(s_\iota, w_\iota) \in \Gamma^*} p^*_{d\iota}(s_\iota, w\iota) d(s_\iota, w_\iota) = L \int_{(s_\iota, w_\iota) \in \Gamma^*} p^*_{l\iota}(s_\iota, w_\iota) d(s_\iota, w_\iota).$$

The argument of Lemma 1 continues to hold in the case where the entrepreneur chooses between the two technologies, which implies $F_1 < L$. Because there is no cost in setting up an inflexible firm ($K_0 = 0$), then we must have $F_0 + F_1 = L$, that is, all workers must be employed in equilibrium.[12]

We can now write the equivalent of Lemma 2 for the case with endogenous technology choice.

Lemma 3. *Firms in the inflexible sector have zero profit (i.e. $\pi(s_0, w_0) = 0$) and firms in the flexible sector have strictly positive profit $\pi(s_1, w_1) = \pi^* > 0$.*

The next proposition shows the existence and uniqueness of the equilibrium.

[12] If $K_0 > 0$, then we can have $F_0 + F_1 < L$ in equilibrium. Because our main results are the same in this case, we leave the analysis of this case to the Internet Appendix.

Proposition 4 (Equilibrium Existence and Uniqueness). *A competitive equilibrium exists for any $K_1 > 0$. The equilibrium is given by a unique type $z^* \in (k, 1)$ such that $v(z^*) = K_1$, and F_1^* is given by (6) and (7). The equilibrium locations are $\Gamma^* = \{(s_{1\alpha}^*, w_{1\alpha}^*)$ for $\alpha \in (0,1)\} \cup \{(s_0, w_0^*)\}$, where $s_{1\alpha}^* = h(\alpha)$, $w_0^* = y - c(s_0)$, and*

$$w_{1\alpha}^* = \begin{cases} y - c(s_{1\alpha}^*) - v(z^*) & \text{if } \alpha \notin (\phi(z^*), z^*) \\ w \in \left[y - c(s_{1\alpha}^*) - v(z^*), \frac{\alpha s_0 + (1-\alpha) w_0^* - \alpha s_{1\alpha}^*}{1-\alpha} \right] & \text{if } \alpha \in (\phi(z^*), z^*) \end{cases}. \tag{12}$$

The supply and demand conditions imply $p_{d1}^*(s_1, w_1) = \frac{F_1^*}{L} p_{l1}^*(s_1, w_1)$,

$$p_{l1}^*(s_{1\alpha}^*, w_{1\alpha}^*) = \begin{cases} p(\alpha) & \text{if } \alpha \notin (\phi(z^*), z^*) \\ 0 & \text{if } \alpha \in (\phi(z^*), z^*) \end{cases}, \tag{13}$$

$p_{d0}^*(s_0, w_0^*) = 1$, and $F_0^* = L p_{l0}^*(s_0, w_0^*) = L(P(z^*) - P(\phi(z^*)))$.

The proof of this proposition essentially replicates the steps in the proof of Proposition 2 and is thus omitted. In equilibrium, entrepreneurs in the flexible sector make zero *ex-ante* profit: $\Pi_1^* = \pi_1^* - K_1 = 0$. Similarly, entrepreneurs will enter the inflexible sector until their ex-post profits are zero. Only workers end up with positive surpluses in equilibrium. This makes sense: Labor is the only scarce resource in this economy. As before, the equilibrium degree of polarization is $\rho^* = s_{z^*}^* - s_{\phi(z^*)}^*$.

When there are two sectors, it is natural to ask how the equilibrium changes with s_0, the s-quality in the inflexible sector. The next corollary shows that a corner solution arises when s_0 is sufficiently low.

Corollary 5 (Corner Solution). *There exists s_0' such that, if $s_0 \leq s_0'$, $s_{\phi(z)}^* = 0$.*

For s_0 sufficiently low (i.e., $s_0 \leq s_0'$), no low-α worker works in the flexible sector. The degree of polarization in the flexible sector becomes $\rho^* = s_z^*$. Thus, the flexible sector becomes "the high-s sector" and the inflexible sector "the low-s sector."[13] In that case,

[13] In this case, flexible firms match with workers with large α's. If we had multiple technologies with

a more appropriate polarization measure is $\rho_b^* := s_z^* - s_0$, which captures the "between-sector" polarization.

The next result shows how the degree of polarization changes with the cost of acquiring the flexible technology:

Corollary 6 (Technology Cost and Polarization). *A higher cost of acquiring the flexible technology, K_1, increases equilibrium polarization, ρ^* (or ρ_b^*, in case of a corner solution), and decreases the equilibrium mass of flexible firms, F_1^*.*

Intuitively, an increase in the cost of flexibility reduces the equilibrium supply of flexibility. As flexibility becomes scarcer, it is allocated only to workers with extreme preferences, thus increasing polarization. An increase in K_1 also increases the degree of polarization between sectors, ρ_b^*. Although polarization increases with K_1, Sector 1 becomes smaller. Thus, the effect of K_1 on the "average dispersion" in job attributes across sectors, $\frac{F_1^*}{F_1^*+F_0^*}\rho^* + \frac{F_0^*}{F_1^*+F_0^*} \times 0 = \frac{F_1^*}{L}\rho^*$, is ambiguous.

The distribution of preferences over the s-attribute may change over time. For example, some workers may become more concerned about the environmental impact of their firms. If s measures the extent to which firms use green technologies, such workers would now have higher α. At the same time, it is possible that some workers become *less* concerned about the environment, for example, if they think that environmental concerns have been overblown and politicized. Such workers would then have a lower α.

What would happen if workers became more polarized in their tastes for the s-attribute? To answer this question, we consider changes in $P(.)$ that shift density away from moderate preferences. Mas-Colell et al. (1995, p. 198) define an elementary increase in risk as follows: "*$G(.)$ constitutes an elementary increase in risk from $F(.)$ if $G(.)$ is generated from $F(.)$ by taking all the mass that $F(.)$ assigns to an interval $[x', x'']$ and transferring it to the end-points*

varying degrees of flexibility, more flexible firms would match with workers with stronger preferences for s. Thus, the equilibrium would display assortative matching. This special corner-solution case does not arise in a more general model where $\alpha \in [-1, 1]$, as discussed in the Internet Appendix. Generally, under an interior equilibrium, no intrinsic worker characteristic matches monotonically with firm characteristics. Thus, our model typically does not display positive or negative assortative matching.

x' and x'' in such a manner that the mean is preserved." We generalize the notion of increase in risk and say that $\widehat{P}(.)$ is a *generalized increase in risk* from $P(.)$ if $\widehat{P}(.)$ is generated from $P(.)$ by taking some of the mass that $P(.)$ assigns to an interval $[x', x'']$ and transferring it to points smaller than x' and greater than x'' in such a manner that the mean is preserved. Formally, $\widehat{P}(.)$ is a generalized increase in risk from $P(.)$ if (i) $\int_{x'}^{x''} p(\alpha)d\alpha > \int_{x'}^{x''} \hat{p}(\alpha)d\alpha$ and (ii) $\int_0^1 \alpha p(\alpha)d\alpha = \int_0^1 \alpha \hat{p}(\alpha)d\alpha$. It is immediate that a generalized increase in risk is a mean-preserving spread (and thus $P(.)$ second-order stochastically dominates $\widehat{P}(.)$). Then, we have the following result:

Corollary 7 (Taste Dispersion and Number of Firms). *If $\widehat{P}(.)$ is a generalized increase in risk from $P(.)$ for $x' = \phi(z^*)$ and $x'' = z^*$, then the equilibrium mass of flexible firms is larger under $\widehat{P}(.)$ than under $P(.)$.*

Intuitively, all else equal, an increase in taste dispersion increases the benefit of acquiring the flexible technology. Thus, more firms want to enter Sector 1. Notice that an increase in taste dispersion has no effect on equilibrium firm polarization. This result shows that firm polarization is primarily a technological phenomenon driven by the scarcity of flexible technologies.

To derive further predictions, we now consider a parametric version of the model with a closed-form solution. The cost function is quadratic: $c(s) = \frac{s^2}{2}$. Let $a := \frac{\alpha}{1-\alpha}$ denote the marginal rate of substitution between s and w. For convenience, from now on, we refer to a as the worker's type. Zero profit in the inflexible sector (Lemma 3) implies $w_0^* = y - \frac{s_0^2}{2}$. The optimal level of the s-attribute in the flexible sector is $s^* = a$. The profit potential as a function of a is $v(a) = y - w_0^* - as_0 + \frac{a^2}{2} = \frac{s_0^2}{2} - as_0 + \frac{a^2}{2}$, which is strictly U-shaped in a (consistent with Proposition 1). The type that minimizes $v(a)$ is $a_k = s_0$. Let a_z^* denote the equilibrium threshold for a given K_1, assuming an interior equilibrium. That is, $v(a_z^*) = v(a^*_{\phi(z)}) = K_1$. Solving these conditions proves the next result.

Proposition 5 (Equilibrium in the Quadratic Cost Case). *In an interior equilibrium of the quadratic cost case, types $a \in \left(s_0 - \sqrt{2K_1}, s_0 + \sqrt{2K_1}\right)$ work in the inflexible sector and are paid* *wage* $w_0^* = y - \frac{s_0^2}{2}$*, and types* $a \leq s_0 - \sqrt{2K_1}$ *and* $a \geq s_0 + \sqrt{2K_1}$ *work in the flexible sector and are paid wage* $w^*(a) = y - K_1 - \frac{a^2}{2}$.

Wages decrease with a (consistent with Corollary 3). Consistent with Corollary 1, flexible firms are polarized. The equilibrium degree of polarization is

$$\rho^* = 2\sqrt{2K_1}. \tag{14}$$

Consistent with Corollary 6, the degree of polarization increases with K_1.

To understand the effect of K_1 on the average dispersion in s across sectors, as well as the relation between polarization and average wages, we now assume that a is uniformly distributed on $[a_k - \Delta, a_k + \Delta]$.[14] Parameter Δ measures the dispersion of preferences for s around the mean a_k. We focus on the case where $\Delta > \sqrt{2K_1}$, that is, an interior solution exists.

With uniform preferences the average dispersion in s across sectors is $\frac{F_1^*}{L}\rho^* = \big(1 - \frac{\sqrt{2K_1}}{\Delta}\big)2\sqrt{2K_1}$. The effect of K_1 on the average dispersion is $2(1 - \frac{\rho^*}{\Delta})(2K_1)^{-\frac{1}{2}}$, which is positive if and only if $\rho^* < \Delta$. That is, the average dispersion in s depends on the distribution of the underlying preferences for the s-attribute. Intuitively, if the underlying preferences are extreme (i.e., sufficiently high Δ), an increase in K_1 increases both within-sector polarization and the average dispersion in s across sectors.

Averaging $w^*(a)$ over all types employed in the flexible sector defines the average wage in that sector:

$$\overline{w}^* := y - K_1 - M^*, \tag{15}$$

where M^* is the average monetary cost of producing s:

$$M^* := \frac{\int_{a_k-\Delta}^{a_{\phi(z^*)}} a^2 da + \int_{a_{z^*}}^{a_k+\Delta} a^2 da}{4\Big(\Delta - \sqrt{2K_1}\Big)} = \frac{s_0^2}{2} + \frac{\Delta^2}{6} + \frac{\Delta}{6}\sqrt{2K_1} + \frac{K_1}{3}. \tag{16}$$

[14]Equivalently, α is distributed according to c.d.f. $P(\alpha) = \frac{\alpha}{1-\alpha}$ on $[\frac{a_k-\Delta}{1+a_k-\Delta}, \frac{a_k+\Delta}{1+a_k+\Delta}]$.

Because a larger K_1 implies a smaller number of flexible firms in equilibrium, we interpret an increase in K_1 as an increase in "concentration." Then, we have the following prediction:

Prediction 2. In more concentrated sectors, firms are more polarized, the profit is higher, and the average wage is lower.

In more concentrated sectors, i.e., sectors with higher entry costs and therefore fewer firms (F_1), there is less competition for those workers qualified to work in the sector. Because firms first target workers with extreme preferences, polarization in s-quality is more pronounced when there are fewer firms.

The dispersion in worker preferences for s-quality, measured by Δ, has no impact on polarization or profits because entry into the flexible sector offsets the effect of Δ on profits. However, Δ affects the average wage:

Prediction 3. In sectors with more dispersion in worker preferences for s-quality, the average wage is lower.

This result is closely related to Corollary 7. An increase in Δ is an increase in risk: it removes mass from intermediate values of a and reallocates this mass to the tails without changing the mean. The average wage decreases because the average cost of producing s increases due to the convexity of the cost function.

An extensive empirical literature documents a decline in the labor share of value added (Autor et al. (2020); Covarrubias, Gutiérrez, and Philippon (2019); Barkai (2020)). Here, we consider the relationship between the flexible sector's labor share and firm polarization in job quality. Formally, the flexible sector's labor share is defined (in the general model) as

$$\text{Labor share} := \frac{L\int_0^{\phi(\alpha_z)} w(\alpha)dP(\alpha) + L\int_{\alpha_z}^{1} w(\alpha)dP(\alpha)}{F_1\pi^* + L\int_0^{\phi(\alpha_z)} w(\alpha)dP(\alpha) + L\int_{\alpha_z}^{1} w(\alpha)dP(\alpha)}, \tag{17}$$

where the numerator is the sector's aggregate wage bill, and the denominator is the sector's (financial) value added. In the quadratic-uniform case, we can rewrite the labor share as

$$\text{Labor share} = \frac{y - K_1 - M^*}{y - M^*}, \tag{18}$$

which is the average wage over the average value added. The next proposition shows that firm polarization is negatively related to the labor share.

Proposition 6 (**Polarization and the Labor Share**). *In the quadratic-uniform case, the labor share decreases with K_1 and Δ.*

If K_1 increases, fewer firms enter the flexible sector, polarization increases, and the post-entry profit increases, pushing the labor share down. An increase in the dispersion in preferences for s reduces the average wage (see Prediction 3) without changing profits, thus reducing the labor share.

4 Outside investors

In this section, we introduce a new type of agent: outside investors. Just like entrepreneurs and workers, investors are atomistic. For simplicity, we assume that the outside investors' identities do not overlap with those of other agents (workers and entrepreneurs). In the Internet Appendix, we consider the possibility of such an overlap. Outside investors can buy shares from entrepreneurs; we normalize the number of shares in each firm to one. After acquiring shares, outside investors hold them until the end of the period, when firms are liquidated and profits are paid out as dividends. There is no time discounting or uncertainty.[15]

We assume that an investor who holds a share of a firm that offers contract (s, w) and pays $\pi(s, w)$ as a dividend enjoys utility $\Omega(s, w) = \beta s + (1 - \beta)\pi(s, w)$, where $\beta \in [0, 1]$. Just as with α, we can interpret β as an investor's relative preference over s-quality and

[15]The lack of risk in our model can be alternatively interpreted as perfect risk sharing. Suppose that each firm produces $y + \epsilon$, with ϵ idiosyncratic. One can perfectly diversify away all risks by holding shares in a mass of firms.

money.[16] Investors may care about s-quality directly if they prefer to invest in companies offering better job conditions. They may also care about s-quality indirectly if they share some of their employees' values, such as a concern for sustainability or environmental responsibility.

To simplify the analysis while conveying the main message, we assume only two types of outside investors: $\beta = 0$ and $\beta > 0$. We call investors of the first type "profit-driven investors" (or *π-investors*) and the second "socially responsible investors" (or *s-investors*). Using Stark's (2023) terminology, profit-driven investors care about financial *value*, while socially responsible investors also care about *values*.[17] We assume that both investor types are in large supply. This assumption implies that, unlike much (but not all) of the literature, introducing socially responsible investors expands the set of financing choices, thus increasing the options available to all flexible entrepreneurs.

Outside investors can buy shares in both flexible and inflexible firms. To introduce a trading stage, we assume that entrepreneurs first set up their firms and then sell shares to outside investors. Operating costs, $w + c(s)$, are paid out of current cash flows, y, whenever possible. If $y < w + c(s)$, the firm uses its working capital to plug the difference. To invest in working capital, a firm needs to raise funds from outside investors. Let $e_1(s, w) + e_2(s, w)$ denote the total amount that outside investors pay in exchange for one share of a company that offers contract (s, w), where $e_1(s, w)$ is the amount raised in a primary offering (i.e., the funds stay in the firm) and $e_2(s, w)$ is the secondary offering amount (i.e., the proceeds go to the entrepreneur). Suppose first that $\pi(s, w) = y - w - c(s) \geq 0$, so that there is no need to raise primary funds (i.e., $e_1(s, w) = 0$). Then, an investor may acquire a share by paying $e_2(s, w)$ to the entrepreneur. The investor later collects $\pi(s, w)$

[16] More generally, let $\Omega(s, w) = \pi(s, w) + \beta H(s, w)$. Here we consider the case of $H(s, w) = s - \pi(s, w)$. In the Internet Appendix, we also consider two alternative cases: $H(s, w) = s - s_0$ and $H(s, w) = s + w - s_0 - w_0$. In the latter case, investors may care about wages due to concerns about workers' welfare.

[17] This preference is of a "warm-glow" type. Investors may also care about the aggregate value of s in the economy, regardless of their shareholdings (in Oehmke and Opp's (2025) language, they could have a "broad mandate"). However, because investors are atomistic, such preferences would have no impact on firm outcomes. Pástor et al. (2021) reach a similar conclusion in an asset pricing model with atomistic investors; Dangl et al. (2023) also make a similar point.

as a dividend. If $\pi(s,w) < 0$, the investor funds the expected loss by paying $e_1(s,w) = -\pi(s,w)$ into the firm when acquiring the share and later receives zero dividends. In either case, the shareholder's net utility from buying one share is $\Omega(s,w) - e_2(s,w)$.

For simplicity, we proceed with the quadratic cost function (none of the results in this section depend on the type distribution). To characterize the equilibrium, we note first that the efficient s level for a firm owned by a socially responsible investor depends on β. Suppose a socially responsible investor matches with a worker of type a. Using the same reasoning as before, we can show that, under a quadratic cost function ($c(s) = \frac{s^2}{2}$), $s^*(a,b) = a + b$, where $b = \frac{\beta}{1-\beta}$. The socially responsible investor increases the efficient s level by b.

Do socially responsible investors affect s levels through "impact" (i.e., voice) or "divestment" (i.e., exit)? Because the model has no frictions, either channel delivers the same result. To see this, suppose the entrepreneur cannot commit to a contract; any contract between a worker and an entrepreneur can be renegotiated after the firm is sold to a socially responsible investor, and either party can unilaterally exit. In this case, the socially responsible investor and the worker will always renegotiate the contract and agree to the efficient s level, $s^*(a,b)$. Under this interpretation, socially responsible investors are "impact investors."

Suppose, instead, an entrepreneur commits to a contract (s,w). To maximize the price of the share, the entrepreneur should choose contract $(s^*(a,b), w^*(a,b))$ because it maximizes the surplus for a socially responsible investor. That is, the most profitable way of attracting investors is choosing the efficient s level. Socially responsible investors would not invest at an attractive price unless the entrepreneur commits to $(s^*(a,b), w^*(a,b))$.

The next result characterizes the equilibrium outcomes in the inflexible sector.

Proposition 7 (Inflexible Sector Equilibrium). *In an equilibrium with two types of shareholders and $c(s) = \frac{s^2}{2}$, only s-investors buy shares of inflexible firms. The equilibrium wage in the inflexible sector is $w_0^* = bs_0 + y - \frac{s_0^2}{2}$ and firm profit is $\pi(s_0, w_0^*) = -bs_0$.*

Proposition 7 shows two important results. First, because socially responsible investors accept lower profits in exchange for "purpose," zero-entry costs in the inflexible sector imply that the equilibrium profit in that sector is negative. Second, because the profit is negative, profit-driven investors do not buy shares in inflexible firms.

We now consider the equilibrium in the flexible sector. Let $v(a,b)$ denote the profit potential when an s-investor matches with a type-a worker. As in Proposition 1, it is easy to verify that $v(a,b)$ is U-shaped in a. We use $v(a,0)$ to denote the profit potential under a π-investor. We have the following result:

Proposition 8 (Profit Potential and Investor Type). *Let $c(s) = \frac{s^2}{2}$. We have $v(a,b) \geq v(a,0)$ if and only if $a \in [a^-, a^+]$, where*[18]

$$\{a^-, a^+\} := 1 + s_0 \pm \sqrt{\frac{1+2s_0}{1-\beta}}.$$

This proposition implies that s-investors create more value if matched with workers with intermediate preferences, while π-investors create more value if matched with workers with extreme preferences. This result holds because the profit potential function is U-shaped; workers with intermediate preferences should be matched with socially responsible investors because such investors care less about profits. Figure 2 illustrates $v(a,0)$ (solid line) and $v(a,b)$ (dashed line). The unique equilibrium is given by $v(a) = K_1$, once we define $v(a)$:[19]

$$v(a) := \max\{v(a,0), v(a,b)\} = \begin{cases} v(a,0) & \text{for } a \notin (a^-, a^+) \\ v(a,b) & \text{for } a \in (a^-, a^+) \end{cases}. \tag{19}$$

That is, $v(a)$ is the upper envelope (in red) in Figure 2.

Let a_z denote the equilibrium marginal worker type. Firm $(s^*(a_z), w^*(a_z))$ will be sold

[18] Equivalently, we have $\alpha \in [\alpha^-, \alpha^+]$, where $\alpha^- := \max\{\frac{a^-}{1+a^-}, 0\}$ and $\alpha^+ := \frac{a^+}{1+a^+}$.

[19] The analysis can be easily generalized to any number m of different types of investors, $\{b_1, ..., b_m\}$, by defining $v(a) = \max\{v(a,b_1), ..., v(a,b_m)\}$.

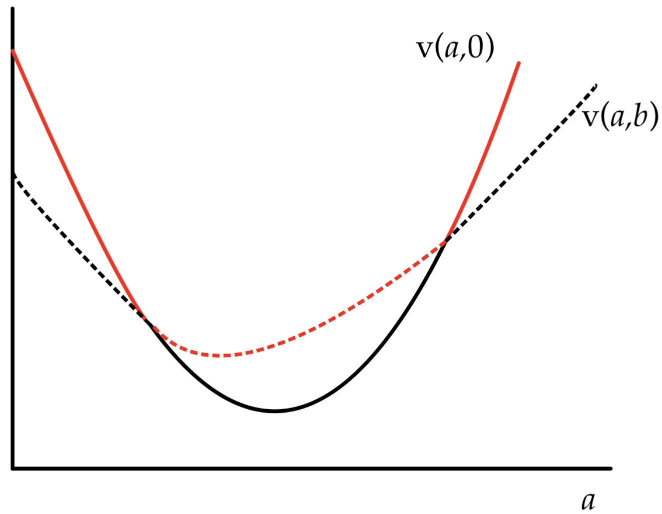

Figure 2: Profit Potential with Socially-Responsible Investors

for $e_2(s^*(a_z), w^*(a_z)) = v(a_z)$, which will also be the price for all other flexible firms (all flexible entrepreneurs must make the same profit from selling their shares). Because $v(a) \geq v(a, 0)$, the entrepreneurs' are (weakly) better off when s-investors are available.

If $a_z \geq a^+$, then s-investors do not invest in the flexible sector. If $a_z < a^+$, s-investors buy shares in firms that hire workers of types $a \in [\min\{a^-, \phi(a_z)\}, a^+]$, while π-investors buy shares in firms that hire workers of types $a \leq \min\{a^-, \phi(a_z)\}$ and $a \geq a^+$. In either case, the equilibrium displays *perfect segmentation*: π-investors buy shares in firms where workers have extreme preferences for s and s-investors buy shares in firms matched with workers with intermediate preferences.[20] Figure 3 illustrates this result for the case in which $a_z < a^+$ and $\phi(a_z) < a^-$. At first glance, the equilibrium in Figure 3 may seem counterintuitive. Why wouldn't socially responsible investors be more likely to buy shares in

[20]Perfect segmentation is a consequence of the assumption of no uncertainty (or, equivalently, perfect risk-sharing). If we instead assume that risk exists and the number of firms is finite, then diversification would give investors incentives to hold shares of all firms. In that case, s-investors would "tilt" their portfolios towards stocks in which $a \in [a^-, a^+]$, while π-investors would tilt their portfolio away from such stocks.

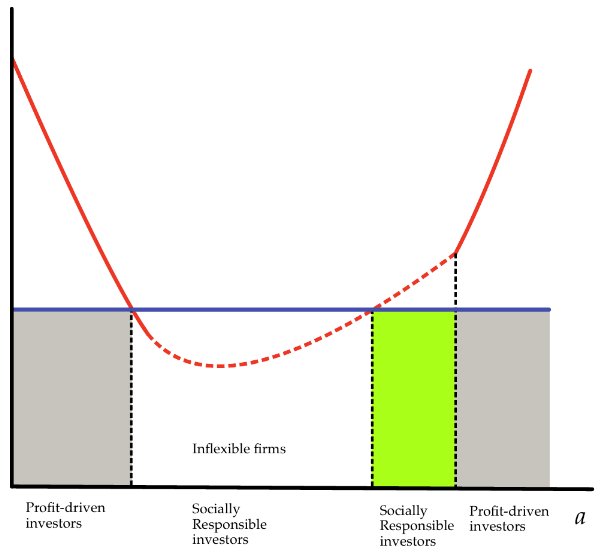

Figure 3: Perfect Segmentation in Equilibrium

high-a firms? Aren't they willing to pay more for firms with high s levels? Our model reveals that the equilibrium effects are subtler than this intuition. Firms that hire workers with very strong preferences for s create large surpluses (see Proposition 1). Thus, profit-driven investors will target such firms because of the potential to extract large profits. Although competition among profit-driven investors will drive their returns to zero,[21] profit-driven investors have a comparative advantage over socially responsible investors in companies where the profit potential is high. Similarly, socially responsible investors have a comparative advantage in the market for low-profit firms.[22]

An increase in b – the intensity of socially responsible investors' preferences for the s-attribute – decreases a^- and increases a^+, thus widening the range of worker types for which s-investors have an advantage relative to π-investors. A larger b also indicates more

[21]Note there is no risk or time discounting in our environment, thus zero return is the fair compensation for their investments.

[22]In the Internet Appendix, we show that when workers are also investors, they typically do not invest in firms of the same type of the firms they work for.

extreme shareholder preferences with respect to the s attribute. Thus, all else constant, an increase in risk in shareholder preferences increases the number of entrepreneurs willing to sell shares to s-investors and the flexible firms' market values. Conversely, a generalized increase in risk in worker preferences would reduce the number of entrepreneurs who sell to socially responsible investors but also increases market values.

Our main result in this section is:

Proposition 9. *Sustainable investing amplifies firm polarization.*

With sustainable investing, some investors have greater tolerance for financial losses, which increases the workers' relative bargaining power. Thus, for a given location j, flexible firms are less profitable when the economy features both s-investors and π-investors. Fewer firms find it profitable to acquire the flexible technology, reducing the equilibrium supply of flexibility. Because flexible firms cater to workers with more extreme preferences, polarization increases when the number of flexible firms decreases.

The next proposition compares market valuations and stock returns between flexible and inflexible firms.

Proposition 10 (Flexibility, Firm Value, and Stock Returns). *Relative to inflexible firms, flexible firms have higher market valuations and higher expected stock returns.*

While it is not always clear which sectors or industries have flexible technologies, such sectors can be empirically identified by their within-sector s-attribute polarization (i.e., how polarized they are in their s choices), which can be measured by ESG metrics or other similar variables. The model then predicts high firm valuations in sectors with high polarization in ESG scores. Similarly, expected stock returns should be higher in sectors where firms are more polarized in their ESG choices (or other similar variables that are viewed positively by both workers and investors).

If s_0 is sufficiently low, in equilibrium we have $s^*(\phi(a_z), b) = 0$, implying that the flexible sector has only high s-quality firms. Thus, if the inflexible sector has very low

s-quality or if the cost of producing s falls sufficiently, we have a segmented equilibrium that is also monotonic: all firms with $a < a_z$ are held by socially responsible investors and those with $a > a_z$ are held by traditional investors (in Figure 3, the first region disappears). In that case, expected returns are (weakly) increasing in s and *predictable*: even if s is not observed by investors, wages are.

The model also predicts a link between employee satisfaction and expected stock returns. In particular, firms with the highest stock returns are flexible firms sold to profit-driven investors. These firms also have the highest levels of employee satisfaction (measured by U^*_α, which is the willingness to pay for a job). Because employee satisfaction is also U-shaped in equilibrium, the firms with the lowest employee satisfaction scores are inflexible firms. Such firms also have the lowest stock returns. While the relationship between firm-level employee satisfaction and stock returns does not need to be monotonic, the model predicts that firms at the upper end of employee satisfaction will have higher returns than firms at the low end of employee satisfaction.

5 Related Literature

While the empirical literature on compensating differentials is vast, there are few works on the theory of compensating differentials. Our model is inspired by Rosen (1986), who models firms that compete by offering bundles of wages and non-wage attributes (see Lavetti (2023) for a recent review of the Rosen framework). Unlike Rosen (1986) and the subsequent literature, we assume that firms need to pay a fixed cost to operate. As a consequence, firms will not employ workers with intermediate preferences. Thus, firm polarization arises in our setup, but not elsewhere in the compensating differentials literature.

Berk, Stanton, and Zechner (2010) make an important contribution to the theory of compensating differentials in competitive markets by developing a model in which risk-averse workers accept lower wages in exchange for job stability. They show that firms that commit to job stability choose lower debt levels. If workers are heterogeneous in risk aversion, firms will cater to them by offering different bundles of wages and debt levels. In our model, firms cater to heterogeneous workers by offering different bundles of s-quality and wages, but this catering is incomplete because workers with intermediate preferences are excluded. Because of this exclusion, firms become polarized.[23]

Our paper is also related to the vast theoretical literature on socially responsible investing, which has developed since the pioneering work of Heinkel, Kraus, and Zechner (2001). As in the compensating differentials literature, in those models, firms typically can choose the level of some nonpecuniary attribute, such as ESG levels, to cater to investor preferences (see, e.g., Heinkel, Kraus, and Zechner (2001); Pástor, Stambaugh, and Taylor (2021); Berk and van Binsbergen (2024); Pedersen, Fitzgibbons, and Pomorski (2021); Goldstein, Kopytov, Shen, and Xiang (2022); Landier and Lovo (2024); Piatti, Shapiro, and Wang (2023)).[24] Our paper contributes to this literature in three ways. First, we analyze the interaction between labor markets and financial markets, and show that if workers also have social preferences, in equilibrium, firms will cater to both workers and investors. Second, we show that firms become polarized in equilibrium and employ only workers with extreme preferences. Third, socially responsible investing amplifies firm polarization.

Related to our work, Wu and Zechner (2024) develop a model in which firms cater to the political preferences of their investors. A political stance is a "controversial good:" it is liked by some and disliked by others. Firms become polarized by catering to these different preferences. In our model, s-quality is an uncontroversial good. Firm polarization arises only because the cost of entering an industry implies that workers with moderate preferences are excluded. Thus, firms amplify the polarization in underlying preferences.

[23]Ferreira and Nikolowa (2024) provide another example of a compensating differentials model à la Rosen. In a dynamic model of careers within firms, firms compete for workers who have preferences over money and prestige.

[24]A related literature considers the consequences of socially responsible investing on corporate outcomes, for example, Chowdry, Davies, and Waters (2019); Oehmke and Opp (2025); Edmans, Levit, and Schneemeier (2023); Dangl, Halling, Yu, and Zechner (2023).

Our model is related to models of sustainable investing that consider the interactions between financial markets and corporate insiders, such as employees and managers (e.g., Davies and Van Wesep (2018); Stoughton, Wong, and Yi (2020); Xiong and Yang (2023); Albuquerque, Koskinen, and Zhang (2019); Bisceglia, Piccolo, and Schneemeier (2022); Bucourt and Inostroza (2023)). Our paper is also related to a small theoretical literature on the impact of organization and job design on labor market sorting (Van den Steen (2005) Van den Steen (2010); Henderson and Van den Steen's (2015); Song, Thakor, and Quinn (2023); Geelen, Hajda, and Starmans (2022)). Different from these works, our focus is on firm polarization.

Our model is related to models of product differentiation and spatial competition. In particular, our model resembles Hotelling's (1929) in that firms choose a location along a straight line. In strategic models of spatial competition, such as Hotelling (1929) and Salop (1979), firms have incentives to "maximally differentiate" themselves by locating as far apart from one another to gain local market power. Such incentives are absent in our model because there are no strategic interactions. Thus, the model is closer to Rosen's (1974) model of product differentiation under pure competition. Our firms are price-takers and, thus, most firms choose to locate near or at the same point as others. Firm polarization nevertheless arises in equilibrium because workers (or in the case of product differentiation, consumers) do not enter the market in intermediate locations.

6 Conclusion

When workers prefer purposeful or socially responsible jobs, profit-maximizing firms will cater to these preferences. By designing jobs with these positive attributes, firms can reduce their wage bills. Conversely, firms may also benefit from making a job less socially responsible or sustainable, as it may be cheaper to produce using "dirty" technologies. When dealing with workers who have heterogeneous preferences for job attributes, firms will target those with the most extreme preferences, thereby amplifying the polarized preferences of the underlying population.

Firm polarization has several normative and positive implications. In the cross-section, firms in more polarized sectors are more valuable. This polarization is particularly advantageous for workers with extreme preferences. As the distribution of worker preferences becomes more polarized, more firms will enter a market, resulting in a greater surplus for workers in polarized sectors. Consequently, workers with extreme preferences may welcome the dissemination of conflicting information that polarizes opinions and entrenches extreme views.

Our model is relevant to the discussion on corporate greenwashing and sustainability disclosures by companies. Concerned about firms engaging in "climate cheap talk," the SEC has adopted rules to standardize climate-related disclosures.[25] However, firms have few credible signals of green credentials at their disposal. Since workers are better informed about firms' green initiatives, if they value these efforts, wage concessions can act as a credible signal of such commitments.

Appendix

Pareto-efficient contracts. The Lagrangian for the problem in (1) is:

$$\max_{s,w} \omega f(u^{\alpha}(s,w)) + (1-\omega)\pi(w,s) - \lambda(\underline{u} - u^{\alpha}(s,w)) - \mu(\underline{\pi} - \pi(s,w)). \tag{A.1}$$

The first-order conditions are:

$$\begin{aligned} &\omega\alpha f'(u^{\alpha}(s,w)) - (1-\omega)c'(s) + \lambda\alpha - \mu c'(s) = 0 \\ &\omega(1-\alpha)f'(u^{\alpha}(s,w)) - (1-\omega) + \lambda(1-\alpha) - \mu = 0. \end{aligned} \tag{A.2}$$

Only one of the two participation constraints can bind, so there are three cases: $\lambda = \mu = 0$, $\lambda > 0$ and $\mu = 0$, or $\lambda = 0$ and $\mu > 0$. In each of these three cases, from (A.2) we find that

[25] https://www.sec.gov/news/press-release/2024-31

$\frac{\alpha}{1-\alpha} = c'(s_\alpha)$, and therefore $s^*_\alpha = h(\alpha) = c'^{-1}\big(\frac{\alpha}{1-\alpha}\big)$.

The Pareto frontier is given by $\pi = y - \frac{u}{1-\alpha} + \frac{\alpha}{1-\alpha}s^*(\alpha) - c(s^*(\alpha))$. Replacing π into $\omega f(u^\alpha(s,w)) + (1-\omega)\pi(w,s)$ and maximizing it with respect to u implies the first-order condition (assuming an interior solution):

$$\frac{\omega}{1-\omega} f'(u^*) = \frac{1}{1-\alpha}. \tag{A.3}$$

The right-hand side is the slope of the Pareto frontier. By construction, u^* is on the Pareto frontier. If ω increases, then u^* must increase. Thus, by changing ω, we have $\frac{\omega}{1-\omega}$ varies from zero to infinity, thus we can obtain any value for u^* on the frontier. This implies that any point on the Pareto frontier can be achieved as we vary ω. □

Proof of Proposition 1. For $\omega = 0$, the worker's participation constraint binds, i.e., $u^\alpha(s^*_\alpha, w^*_\alpha) = \underline{u}$. Thus, using the envelope theorem, we obtain

$$v'(\alpha) = \lambda(s^*_\alpha - w^*_\alpha). \tag{A.4}$$

Since $w^*_\alpha = \frac{\underline{u}}{1-\alpha} - \frac{\alpha}{1-\alpha}s^*_\alpha$, we can simplify equation (A.4) as follows

$$v'(\alpha) = \lambda(s^*_\alpha - w^*_\alpha) = \frac{s^*_\alpha - \underline{u}}{(1-\alpha)^2}. \tag{A.5}$$

Define k such that $\underline{u} = h(k)$. For $\alpha < k$, $v'(\alpha) < 0$, and for $\alpha > k$, $v'(\alpha) > 0$, that is $v(\alpha)$ is strictly U-shaped and reaches its minimum value at k. □

Proof of Lemma 1. If $F > L$, some firms will not employ any workers and thus must have zero profit. If firms operating in a location $(s,w) \in \Gamma$ have positive profits, then profit maximization implies that firms without workers should instead locate at (s,w), implying that demand is greater than supply and thus not an equilibrium. We conclude that if $F > L$, profits must be zero in all active locations (i.e., locations where firms operate). □

Proof of Lemma 2. To show that $\pi(s,w) = \pi^* > 0$ for all $(s,w) \in \Gamma^*$ such that $p^*_d(s,w) >$

0, note first that profit maximization implies that all firms must have the same profit in equilibrium, i.e., $\pi(s,w) = \pi^*$ for all $(s,w) \in \Gamma^*$ such that $p_d^*(s,w) > 0$. Suppose (s_j^*, w_j^*) is an equilibrium location such that $\pi(s_j^*, w_j^*) = 0$ and $p_d^*(s_j, w_j) > 0$. Then, profits must be zero in all active markets. Note that the profit potential at its minimum is $v(k) = y - \underline{u} - c(\underline{u}) = 0$ (from Assumption 1). Because $v(.)$ is U-shaped and reaches its minimum at k, we have $v(j) > \pi(s_j^*, w_j^*) = 0$ for all $j \neq k$. This implies that, for a contract (s_j^*, w_j^*), workers of type $j \neq k$ must enjoy a surplus relative to their outside utility: $u^j(s_j^*, w_j^*) - \underline{u} > 0$. Such workers strictly prefer to apply for work. Thus, the only workers who do not strictly prefer to apply for positions are those of type k. Because these workers have measure zero, the aggregate labor supply is L. Because $L > F$, the labor supply must exceed labor demand, and this is not an equilibrium. Thus, we must have $\pi^* > 0$. $\square$

Proof of Proposition 2. Lemma 2 implies that all active firms must have the same profit $\pi^* > 0$. Assumption 1 and equation (A.5) imply $v(k) = \min_{\alpha \in (0,1)]} v(\alpha) = 0$. So we must have $\pi^* > v(k)$ in equilibrium. By continuity, there exists $z > k$ such that $v(z) = \pi^*$. Suppose that $\pi(s_z, w_z) < v(z) = \pi^*$. Then, no firm will locate at (s_z, w_z) (i.e., $p_d(z) = 0$), but the workers with $\alpha = z$ would strictly prefer (s_z, w_z) to being unemployed, implying that the labor supply exceeds the labor demand at location (s_z, w_z). Thus, we cannot have $\pi(s_z, w_z) < v(z)$. Suppose, instead, that $\pi(s_z, w_z) > v(z)$. Then, all firms would like to locate at (s_z, w_z), implying that the labor demand exceeds the labor supply at that location. We thus conclude that location (s_z, w_z) must be such that $\pi(s_z, w_z) = v(z)$.

Since $\pi(s_z, w_z) = v(z)$, $z > k$ implies that z is in the increasing region of the profit potential. Then, from equation (A.5), we have $s_z > w_z$. The utility of a worker of type α who chooses contract (s_z, w_z) is $u^\alpha(s_z, w_z) = w_z + \alpha(s_z - w_z)$. It then follows that $u^\alpha(s_z, w_z) > u^z(s_z, w_z) = \underline{u}$ for any $\alpha > z$, implying that all $\alpha > z$ must be employed.

Define

$$\phi(\alpha) := \arg\max_{x \in [0,k]} v(x) \leq v(\alpha). \tag{A.6}$$

If $\phi(z) > 0$, then the same argument applies and $\pi(s_{\phi(z)}, w_{\phi(z)}) = v(\phi(z)) = v(z)$. Since

$\phi(z) < k$ then $s_{\phi(z)} < w_{\phi(z)}$. It then follows that $u^{\alpha}(s_{\phi(z)}, w_{\phi(z)}) > u^{\phi(z)}(s_{\phi(z)}, w_{\phi(z)}) = \underline{u}$ for any $\alpha < \phi(z)$. It then follows that all $\alpha < \phi(z)$ must also be employed.

For $\alpha \in (\phi(z), z)$, $v(\alpha) < v(k) = \pi^*$ and $p_d^*(s_\alpha^*, w_\alpha^*) = 0$. Because supply must be equal to demand, z must be given by

$$F = L\left(\int_0^{\phi(z)} p(\alpha)d\alpha + \int_z^1 p(\alpha)d\alpha\right). \tag{A.7}$$

Note that the right-hand side of (A.7) is continuous and is strictly decreasing in z. For $z = k$ the right-hand side is equal to $L > F$, and for $z = 1$, the right-hand side is equal to $0 < F$. Thus, a unique z must exist. The equilibrium wages in (8) then follow from the equality of profits condition. □

Proof of Corollary 2. In equilibrium, $F < L$, and z and $\phi(z)$ are such that

$$F = L\Big(\int_0^{\phi(z)} p(\alpha)d\alpha + \int_z^1 p(\alpha)d\alpha\Big). \tag{A.8}$$

For $z = \overline{\alpha}$ and $\phi(z) = \underline{\alpha}$, the right-hand side of equation (A.8) is equal to L, which then contradicts $L > F$. It then follows that either $\phi(z) < \underline{\alpha}$ or $z > \overline{\alpha}$, or both. □

Proof of Corollary 3. Since profits are the same across all active locations, the equilibrium wages in locations α and α' are such that:

$$w_\alpha^* = w_{\alpha'}^* + c(h(\alpha')) - c(h(\alpha)), \tag{A.9}$$

where $h(\alpha') > h(\alpha)$, and $c(h(\alpha')) > c(h(\alpha))$. It follows that $w_\alpha^* > w_{\alpha'}^*$. □

Proof of Corollary 4. Define the *utility surplus potential* as

$$\vartheta(\alpha) := \max_{(s,w)} U_\alpha(s, w) \text{ subject to } y - w - c(s) = \pi^*. \tag{A.10}$$

In an equilibrium with profit π^*, the surplus of a type-α employed by a firm is $\vartheta(\alpha)$. By the Envelope Theorem, $\vartheta'(\alpha) = s^*_\alpha - w^*_\alpha$, where $w^*_\alpha = y - \pi^* - c(s^*_\alpha)$. We have $\vartheta''(\alpha) = \frac{ds^*_\alpha}{d\alpha}(1 + c'(s^*_\alpha)) > 0$, thus the utility surplus potential is strictly convex in α.

Suppose first that the equilibrium is such that type $\alpha \in (0, \epsilon)$ for $\epsilon > 0$ arbitrarily small is employed (i.e., $\phi(k) > 0$). As $\alpha \to 0$, we have $\vartheta'(\alpha) \to -w^*_\alpha = -y + \pi^*$. We must have $y > \pi^*$ otherwise $\lim_{\alpha\to 0} U(s^*_\alpha, w^*_\alpha) = y - \pi^* - \underline{u} < 0$, implying that locations intended for worker types close to 0 cannot simultaneously support profit π^* and a non-negative worker surplus. Thus, $\vartheta'(\alpha) < 0$ for $\alpha \to 0$. Because $\lim_{\alpha\to 1} \vartheta'(\alpha) = \infty$, $\vartheta(\alpha)$ is strictly U-shaped, and the result follows.

Suppose, instead, type $\alpha \in (0, \epsilon)$ for for $\epsilon > 0$ arbitrarily small is not employed (i.e., $\phi(k) = 0$). The equilibrium threshold type z is such that $s^*_z > s^*_k$. (A.5) implies $s^*_k = \underline{u}$. Because $\vartheta(k) < 0$ (because otherwise a worker of type k would want to be employed), it then follows that $w^*_k < \underline{u} = s^*_z$. Thus, $0 < \vartheta'(k) < \vartheta'(z)$ (the latter inequality follows from the strict convexity of $\vartheta(\alpha)$), and the result follows. □

Proof of Lemma 3. Firms in Sector 0 have zero entry costs. Thus, an infinite amount of these firms would enter unless their profits are zero after entry. The proof for $\pi^*_1 > 0$ in Sector 1 is the same as in Lemma 2. □

Proof of Corollary 5. Use $w_0 = y - c(s_0)$ to write the profit potential as $v(\alpha) = c(s_0) - c(h(\alpha)) + \frac{\alpha}{1-\alpha}(h(\alpha) - s_0)$. The profit potential's intercept is $v(0) = c(s_0)$, which is positive and strictly increasing in s_0. As $s_0 \to 0$, $c(s_0) \to 0$. Because $\pi^* > 0$, we have $v(z) = \pi^*$ and $\phi(z) = 0$ (i.e., a corner solution). □

Proof of Corollary 6. From $v(z^*) = K_1$ and $v'(\alpha) > 0$ for $\alpha > k$, it follows that $\frac{\partial z^*}{\partial K_1} > 0$. From equation (7) and $v'(\alpha) < 0$ for $\alpha < k$, it follows that $\frac{\partial \phi(z^*)}{\partial K_1} \leq 0$. It then immediately follows that polarization (i.e., $\rho^* = s^*_z - s^*_{\phi(z)}$) increases with K_1. As the equilibrium mass of firms in the flexible sector is given by (6), it then follows that $\frac{\partial F^*_1}{\partial K_1} < 0$. □

Proof of Corollary 7. First, we show that for a given $F_1 < L$, if $\widehat{P}(.)$ is a generalized increase in risk from $P(.)$ for $x' = \phi(z)$ and $x'' = z$, then the equilibrium under $\widehat{P}(.)$ has higher profits than under $P(.)$.

Note that $v(\alpha)$ does not depend on the distribution and, thus, it is not affected by a generalized increase in risk. Let z denote the equilibrium threshold when the distribution is $P(.)$. From the definition of a generalized increase in risk, we have $\int_z^{\phi(z)} p(\alpha)d\alpha > \int_z^{\phi(z)} \hat{p}(\alpha)d\alpha$, and therefore

$$F_1 < L\left(\int_0^{\phi(z)} \widehat{p}(\alpha)d\alpha + \int_z^1 \widehat{p}(\alpha)d\alpha\right). \tag{A.11}$$

Since the right-hand side of equation (A.11) is continuous and strictly decreasing in z, it follows that $\widehat{z} > z$, where $\widehat{z}$ is given by: $F_1 = L\left(\int_0^{\phi(\widehat{z})} \widehat{p}(\alpha)d\alpha + \int_{\widehat{z}}^1 \widehat{p}(\alpha)d\alpha\right)$. Parts (ii) and (iii) of the proposition follow directly from $\widehat{z} > z$.

If F_1^* did not change, Date 1 profits would have increased. Thus, the number of firms must increase, so that competition brings the profit back to $\pi^* = K_1$. □

Proof of Predictions 2 and 3. Polarization is $\rho^* = 2\sqrt{2K_1}$ and the average wage is

$$\overline{w}^* = y - K_1 - \frac{s_0^2}{2} - \frac{\Delta^2}{6} - \frac{\Delta}{6}\sqrt{2K_1} - \frac{K_1}{3} \tag{A.12}$$

From Proposition 5, we see that if K_1 increases, less employees work for flexible firms, that is there are less flexible firms entering Sector 1. From equation (A.12) it follows that $\frac{\partial \overline{w}^*}{\partial K_1} < 0$ and $\frac{\partial \overline{w}^*}{\partial \Delta} < 0$. □

Proof of Proposition 6. The expression for the Labor share can be rewritten as follows:

$$\text{Labor share} = \frac{y - K_1 - \frac{s_0^2}{2} - \frac{\Delta^2}{6} - \frac{\Delta}{6}\sqrt{2K_1} - \frac{K_1}{3}}{y - \frac{s_0^2}{2} - \frac{\Delta^2}{6} - \frac{\Delta}{6}\sqrt{2K_1} - \frac{K_1}{3}} \tag{A.13}$$

We now find the effect of K_1 and Δ on the labor share.

$$\frac{\partial \text{Labor share}}{\partial K_1} = \frac{-(y-M^*) - \left(\frac{\Delta}{6\sqrt{2K_1}} + \frac{1}{3}\right)K_1}{\left(y - \frac{s_0^2}{2} - \frac{\Delta^2}{6} - \frac{\Delta}{6}\sqrt{2K_1} - \frac{K_1}{3}\right)^2} < 0 \tag{A.14}$$

$$\frac{\partial \text{Labor share}}{\partial \Delta} = \frac{-\left(\frac{\Delta}{3}+\frac{\sqrt{2K_1}}{6}\right)K_1}{\left(y-\frac{s_0^2}{2}-\frac{\Delta^2}{6}-\frac{\Delta}{6}\sqrt{2K_1}-\frac{K_1}{3}\right)^2} < 0 \tag{A.15}$$

□

Proof of Proposition 7. Suppose that $\pi(s_0, w_0^*) = 0$. While π-investors would pay zero for an inflexible firm, s-investors would be willing to pay up to $\beta s_0 > 0$. Thus, only s-investors buy shares in inflexible firms in equilibrium and $\pi(s_0, w_0^*) < 0$. These investors are in excess supply and will thus pay to the entrepreneur $e_2(s_0, w_0^*) = \beta s_0 + (1-\beta)\pi(s_0, w_0^*)$ for each share. Competition among inflexible entrepreneurs should drive their profits from selling shares to zero: $e_2(s_0, w_0^*) = 0$, implying $\pi(s_0, w_0^*) = -\frac{\beta s_0}{1-\beta}$ and $w_0^* = \frac{\beta s_0}{1-\beta} + y - \frac{\sigma_0 s_0^2}{2}$. □

Proof of Proposition 8. The profit potential function of the socially responsible investors

$$v(a,b) = y - w_0 + \frac{a^2}{2} - as_0 - \frac{b^2}{2} + \beta(a + b - y + w_0 - \frac{a^2}{2} + as_0 + \frac{b^2}{2})$$

is U-shaped in a and reaches a minimum at $a = s_0 - b$. $v(a,0) = y - w_0 + \frac{a^2}{2} - as_0$ is the profit potential of a profit-driven investor. From Proposition 7, we know that $w_0 = y - \frac{s_0^2}{2} + bs_0$. It then follows that $v(a,b) \geq v(a,0)$ for any $a \in [a^-, a^+]$, where

$$\{a^-, a^+\} := 1 + s_0 \pm \sqrt{\frac{1+2s_0}{1-\beta}} \tag{A.16}$$

□

Proof of Proposition 9. The equilibrium values for a_z and $a_{\phi(z)}$ are given by $v(a) = K_1$. From $v(a,0) = K_1$, we have $a_{1,2} = s_0 \pm \sqrt{2K_1 + 2bs_0}$, from $v(a,b) = K_1$ we have $a_{1,2} = s_0 - b \pm \sqrt{\frac{2K_1}{1-\beta}}$. It follows that $a_z = \min\{s_0 + \sqrt{2K_1 + 2bs_0}, s_0 - b + \sqrt{\frac{2K_1}{1-\beta}}\}$ and $\phi(a_z) =$

$\max\{s_0 - \sqrt{2K_1 + 2bs_0}, s_0 - b - \sqrt{\frac{2K_1}{1-\beta}}\}$. In all possible scenarios for the values of $s^*(a(s))$ and $s^*(\phi(a_z))$, the degree of polarization in s-quality (ρ^*) is increasing in β. □

Proof of Proposition 10. After investment $e_1(s, w)$ is made, all flexible firms can be sold for $e_2(s, w) = v(a_k) > 0$, while inflexible firms are sold for $e_2(s, w) = 0$. Thus, flexible firms have higher market valuations than inflexible firms. To prove that flexible firms have higher expected stock returns, note first that inflexible firms cost bs_0 and return $-bs_0$ in profit (see Proposition 7). Thus, investors in such firms obtain a -100% return, i.e., they lose all their (financial) investment. For flexible firms, we have both π-investors and s-investors. π-investors always get zero return (which is the fair risk-adjusted return), otherwise, they do not invest. s-investors earn negative returns, which can be no lower than -100%. □

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Internet Appendix for "Polarization, Purpose and Profit"

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June 16, 2025

1 Profit potential with endogenous technology choice

Here we prove that the profit potential function is also U-shaped in the case where firms endogenously choose whether to adopt the flexible or inflexible technology. The profit potential function is

$$v(\alpha) = \max_{s,w} \pi(s, w) \text{ s.t. } u^{\alpha}(s, w) \geq \alpha s_0 + (1 - \alpha) w_0. \tag{IA.1}$$

The first-order conditions are:

$$\begin{aligned} -c'(s) + \lambda \alpha_i &= 0 \\ -1 + \lambda(1 - \alpha_i) &= 0, \end{aligned} \tag{IA.2}$$

where λ is the Lagrange multiplier of the participation constraint. We use the envelope theorem and obtain

$$v'(\alpha_i) = \lambda(s_i^* - w_i^* - s_0 + w_0). \tag{IA.3}$$

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Since $w_i^* = w_0 + \frac{\alpha}{1-\alpha}(s_0 - s_i^*)$, we can simplify equation (IA.3) as follows

$$v'(\alpha_i) = \lambda(s_i^* - w_i^* - s_0 + w_0) = \frac{s_i^* - s_0}{(1-\alpha_i)^2}. \tag{IA.4}$$

Define k such that $s_0 = h(k)$. For $\alpha < k$, $v'(\alpha) < 0$, and for $\alpha > k$, $v'(\alpha) > 0$, that is $v(\alpha)$ is strictly U-shaped and reaches its minimum value at k.

2 General Utility Function

Here we show that our main results hold for a large family of utility functions. By "main results" we mean the existence of a unique equilibrium as described in Proposition 2 (characterized in an analogous way) and Corollaries 1 to 4. We make the derivations in the case with endogenous technology choice.

For utility $u^i(s,w)$, define the *utility surplus potential* as

$$\vartheta(\alpha_i) := \max_{(s,w)} u^i(s,w) - u^i(s_0,w_0) \text{ subject to } y - w - c(s) = \pi^*. \tag{IA.5}$$

In an equilibrium with profit π^*, the surplus of a type-i worker employed in the flexible sector is $\vartheta(\alpha_i)$. A sufficient (but not necessary) condition for our results to hold is a strictly convex $\vartheta(\alpha_i)$. To see this, notice that strict convexity implies that $\vartheta(\alpha_i)$ is increasing, decreasing, or U-shaped. If it is U-shaped, it is immediate that the profit potential is also U-shaped, and our results follow. If it is increasing or decreasing, only high-α workers or low-α workers will be employed in the flexible sector. In either case, polarization occurs, and the other corollaries hold as well. Thus, here we focus on establishing sufficient conditions for $\vartheta(\alpha_i)$ to be strictly convex.

We consider a utility function $u^i(s,w)$ with the following properties.

Condition IA.1. *Utility $u^i(s,w)$ is strictly increasing in (s,w) and quasi-concave.*

Condition IA.1 simply says that both s and w are goods and indifference curves are convex.

Condition IA.2. *We can write* $u^i(s,w) = f\big(g_1(\alpha_i)h_1(s,w) + g_2(1-\alpha_i)h_2(s,w)\big)$, *where* $f(.)$, $g_1(.)$ *and* $g_2(.)$ *are strictly increasing, and*

$$\begin{aligned} g_1'(\alpha_i)\tfrac{\partial h_1(s,w)}{\partial s} - g_2'(1-\alpha_i)\tfrac{\partial h_2(s,w)}{\partial s} > 0 \\ g_1'(\alpha_i)\tfrac{\partial h_1(s,w)}{\partial w} - g_2'(1-\alpha_i)\tfrac{\partial h_2(s,w)}{\partial w} < 0 \end{aligned} \tag{IA.6}$$

for all $s > 0$, w, *and* $\alpha \in (0,1)$.

Note that (IA.6) is merely definitional: it defines α as a parameter that increases the marginal utility of s and decreases the marginal utility of w. Without this condition, we would not be able to interpret α.

There are several families of utility functions that satisfy Conditions 1 and 2, including all the standard functions commonly used in consumer theory. Note that the linear utility used in the main text is a special case where $f(x) = x$, $g_1(x) = g_2(x) = x$, $h_1(s,w) = s$ and $h_2(s,w) = w$. Note that all Cobb-Douglas functions such as $u(s,w) = Ks^{g_1(\alpha)}w^{g_2(1-\alpha)}$ also satisfy these conditions, because they can be equivalently written as $g_1(\alpha)\ln s + g_2(1-\alpha)\ln w$. Similarly, CES functions of the type $\big(g_1(\alpha)s^r + g_2(1-\alpha)w^r\big)^{\frac{v}{r}}$ also satisfy these properties (for $r < 1$). An example of a nonstandard function that also satisfies Conditions 1 and 2 is $u(s,w) = g_1(\alpha)h(s+kw) + g_2(1-\alpha)h(ks+w)$ where $h(.)$ is concave and strictly increasing and $k \in (0,1)$.

Not all functions satisfying Conditions IA.1 and IA.6 imply a convex utility surplus potential. As we will show, we need to impose further conditions on the second derivative of $g_1(.)$ and $g_2(.)$. First, we begin with a simple example.

Example: Cobb-Douglas. Suppose $u(s,w) = s^\alpha w^{1-\alpha}$. For this example, we need to restrict the domain to $s > 0$ and $w > 0$. As we will see below, we can impose this condition indirectly by choosing α_1 and α_n (i.e., the min and the max types) suitably. Working with the log transformation, the first-order condition for (IA.5) is

$$\frac{\alpha}{s} - \frac{(1-\alpha)c'(s)}{y - \pi^* - c(s)} = 0 \tag{IA.7}$$

and the second-order condition is

$$-\frac{\alpha}{s^2} - \frac{(1-\alpha)c''(s)(w + c'(s)^2)}{w^2} < 0. \tag{IA.8}$$

Note that (IA.7) defines function $s(\alpha)$ and that $s'(\alpha) > 0$. Replacing $s(\alpha)$ in the constraint yields $w(\alpha) = y - \pi^* - c(s(\alpha))$, implying $w'(\alpha) < 0$. By the Envelope Theorem, we have

$$\vartheta'(\alpha) = \ln s - \ln w - \ln s_0 + \ln w_0 \tag{IA.9}$$

and

$$\vartheta''(\alpha) = \frac{1}{s}s'(\alpha) - \frac{1}{w}w'(\alpha) > 0. \tag{IA.10}$$

Thus, $\vartheta(\alpha)$ is strictly convex. In this case, we can also show that $\vartheta(\alpha)$ is strictly U-shaped. As $\alpha \to 0$, $s \to 0$ and $w \to y - \pi^* > 0$. Thus, $\lim_{\alpha \to 0} \vartheta'(\alpha) = -\infty$, implying that $\vartheta(\alpha)$ is initially decreasing. As $\alpha \to 1$, the lower bound $w = 0$ eventually binds for some $\hat{\alpha}$, implying that as $\lim_{\alpha \to \hat{\alpha}} \vartheta'(\alpha) = \infty$. Thus, as long as α_1 is close to zero and α_n is close to $\hat{\alpha}$, $\vartheta(\alpha)$ is strictly U-shaped in its relevant domain. We also note that the strict convexity of $c(s)$ is not necessary here; the problem is also well-behaved if $c(s)$ is, e.g., linear everywhere. Thus, the strict convexity of the utility surplus potential (and the profit potential) does not hinge on $c(s)$ being convex. In general, if the utility function is *strictly* quasi-concave, strict cost convexity is not necessary for a unique solution.

We now consider more general functions. We first show that, if $g_1(.)$ and $g_2(.)$ are linear, Conditions IA.1 and IA.6 are sufficient to guarantee that $\vartheta(\alpha)$ is strictly convex. Write the utility as $u(s, w) = \alpha h_1(s, w) + (1-\alpha)h_2(s, w)$. To simplify notation, we write condition (IA.6) as $h_{1s}(s, w) - h_{2s}(s, w) > 0$ and $h_{1w}(s, w) - h_{2w}(s, w) < 0$. The first-order condition is

$$\alpha\big(h_{1s}(s, w) - h_{1w}(s, w)c'(s)\big) + (1-\alpha)\big(h_{2s}(s, w) - h_{2w}(s, w)c'(s)\big) = 0. \tag{IA.11}$$

Quasi-concavity plus strict convexity of $c(s)$ imply that the problem is globally (strictly) concave, thus there is a unique solution, which we denote by $s(\alpha)$. Differentiating IA.11 with respect to α yields

$$h_{1s}(s,w) - h_{2s}(s,w) + \big(h_{2w}(s,w) - h_{1w}(s,w)\big)c'(s) > 0 \tag{IA.12}$$

which is positive because of (IA.6). Thus, we have that $s'(\alpha) > 0$ and $w'(\alpha) < 0$. By the Envelope Theorem, we have

$$\vartheta'(\alpha) = h_1(s,w) - h_2(s,w) - h_1(s_0,w_0) + h_2(s_0,w_0) \tag{IA.13}$$

and

$$\vartheta''(\alpha) = \big(h_{1s}(s,w) - h_{2s}(s,w)\big)s'(\alpha) + \big(h_{1w}(s,w) - h_{2w}(s,w)\big)w'(\alpha) > 0. \tag{IA.14}$$

Thus, $\vartheta(\alpha)$ is strictly convex.

The case for general $g_1(.)$ and $g(.)$ is solved similarly. Quasi-concavity and $c'' > 0$ imply a unique solution for each α and (IA.6) implies $s'(\alpha) > 0$ and $w'(\alpha)$. By the Envelope Theorem, we have

$$\vartheta'(\alpha) = g_1'(\alpha)h_1(s,w) - g_2'(1-\alpha)h_2(s,w) - g_1'(\alpha)h_1(s_0,w_0) + g_2'(1-\alpha)h_2(s_0,w_0) \tag{IA.15}$$

and

$$\begin{aligned}\vartheta''(\alpha) =& \big(g_1'(\alpha)h_{1s}(s,w) - g_2'(1-\alpha)h_{2s}(s,w)\big)s'(\alpha) + & \text{(IA.16)}\\ & \big(g_1'(\alpha)h_{1w}(s,w) - g_2'(1-\alpha)h_{2w}(s,w)\big)w'(\alpha) + & \text{(IA.17)}\\ & g_1''(\alpha)\big(h_1(s,w) - h_1(s_0,w_0)\big) + g_2''(1-\alpha)\big(h_2(s,w) - h_2(s_0,w_0)\big). & \text{(IA.18)}\end{aligned}$$

We have that (IA.16) and (IA.17) are positive for all values. Thus, the utility surplus potential is convex at all points where (IA.18) is not "too negative." In particular, if $g_1(.)$ and $g_2(.)$ are linear, then (IA.18) is zero everywhere and $\vartheta(\alpha)$ is convex, as we showed before.

Thus, if the absolute value of g_1'' and g_2'' is small, $\vartheta(\alpha)$ is convex.

Alternatively, we can verify Proposition 1 directly. Without loss of generality, set $f(x) = x$. Conditions IA.1 and IA.6 apply. The maximum profit a flexible firm could extract from a worker of type α_i whose outside option is to work for an inflexible firm is:

$$v(\alpha_i) := \max_{s,w} \pi(s,w) \quad \text{s.t. } u^i(s,w) \geq u^i(w_0, s_0). \tag{IA.19}$$

The Lagrangian for the problem is:

$$L = \pi(s,w) - \lambda(u^i(s_0,w_0) - u^i(s,w)). \tag{IA.20}$$

The first-order conditions are:

$$\begin{aligned} \tfrac{\partial L}{\partial w} &= -1 + \lambda u^i_w(s,w) = 0 \\ \tfrac{\partial L}{\partial s} &= -c'(s) + \lambda u^i_s(s,w) = 0. \end{aligned} \tag{IA.21}$$

From the two first-order conditions we have $c'(s) = \frac{u^i_s(s,w)}{u^i_w(s,w)}$. From $\lambda = \frac{1}{u^i_w(s,w)} > 0$, it follows that the participation constraint holds with equality. Therefore

$$u^i(s,w) = u^i(s_0,w_0) \Leftrightarrow h_2(s,w) - h_2(s_0,w_0) = -\frac{g_1(\alpha_i)}{g_2(1-\alpha_i)}(h_1(s,w) - h_1(s_0,w_0)) \tag{IA.22}$$

and

$$\begin{aligned} v'(\alpha_i) &= \lambda\big(\tfrac{\partial u^i(s,w)}{\partial \alpha_i} - \tfrac{\partial u^i(s_0,w_0)}{\partial \alpha_i}\big) \\ &= \tfrac{1}{u^i_w(s,w)}\big(g_1'(\alpha_i)h_1(s,w) - g_2'(1-\alpha_i)h_2(s,w) - g_1'(\alpha_i)h_1(s_0,w_0) + g_2'(1-\alpha_i)h_2(s_0,w_0)\big) \\ &= \tfrac{1}{u^i_w(s,w)}\big(g_1'(\alpha_i) + g_2'(1-\alpha_i)\tfrac{g_1(\alpha_i)}{g_2(1-\alpha_i)}\big)(h_1(s,w) - h_1(s_0,w_0)) \end{aligned} \tag{IA.23}$$

We now derive sufficient conditions under which there exists a unique α_i^* for which

$v'(\alpha_i^*) = 0$. For this we need: $\frac{\partial h_1(s,w)}{\partial \alpha} > 0$ and for $\alpha = 0$, $h_1(s,w) < h_1(s_0, w_0)$ and

$$\frac{\partial}{\partial \alpha}\left(\frac{1}{u_w^i(s,w)}\left(g_1'(\alpha_i) + g_2'(1-\alpha_i)\frac{g_1(\alpha_i)}{g_2(1-\alpha_i)}\right)\right) > 0.$$

that is

$$\begin{aligned} &\tfrac{-u_{w\alpha}^i(s,w)}{(u_w^i(s,w))^2}\left(g_1'(\alpha_i) + g_2'(1-\alpha_i)\tfrac{g_1(\alpha_i)}{g_2(1-\alpha_i)}\right) \\ &+\tfrac{1}{u_w^i(s,w)}\left(g_1''(\alpha_i) + \tfrac{g_1'(\alpha_i)g_2'(1-\alpha_i)+g_2'(1-\alpha_i)^2}{g_2(1-\alpha_i)} - g_2''(1-\alpha_i)\tfrac{g_1(\alpha_i)}{g_2(1-\alpha_i)}\right) > 0. \end{aligned} \tag{IA.24}$$

As before, note that if $g''(.) = g''(.) = 0$ (i.e., linearity in α), the expression above is positive. A sufficient condition for (IA.24) to hold is

$$\frac{g_1''(\alpha_i)}{g_2''(1-\alpha)} \geq \frac{g_1(\alpha_i)}{g_2(1-\alpha_i)}. \tag{IA.25}$$

3 Equilibrium with excess supply of workers

In this section, we extend the analysis to the where in equilibrium, workers are in excess supply. This would be the case if the cost of the inflexible technology is also positive $K_0 > 0$. This assumption implies that some workers will remain unemployed in equilibrium. The contract of an unemployed worker is normalized to $(0,0)$. For simplicity we derive the results in the quadratic-uniform case presented in Section 4. Let's assume that in Date 1 some firms are flexible (F_1) and some are inflexible (F_0). Below we will discuss the Date 0 entry conditions in Sector 1 and in Sector 0.

At Date 1, we solve by taking F_1 and F_0 as given. The profit potential function is $v(a) = y - w_0^* - as_0 + \frac{a^2}{2}$. For a given F_1 the equilibrium conditions are as in Proposition 2 (where $\underline{u} = \alpha s_0 + (1-\alpha)w_0$): $v(a_z) = v(\phi(a_z))$ and $\frac{1}{2\Delta}(2\Delta - a_z + \phi(a_z)) = \tau_1$, where $\tau_1 = \frac{F_1}{L}$. Solving these conditions we find $a_z = a_k + \Delta(1-\tau_1)$ and $\phi(a_z) = a_k - \Delta(1-\tau_1)$. The wage function is thus $w(a) = w_0^* + \frac{s_0^2}{2} - \frac{\Delta^2}{2}(1-\tau_1)^2 - \frac{a^2}{2}$. To solve for the equilibrium, we need to determine w_0^*. Because all inflexible firms will now hire workers, we also need to determine which workers are hired. Firms in the inflexible sector prefer to hire workers with higher a. Thus, for a given equilibrium a_z, there exists a threshold type $a_0 = a_z - 2\Delta\tau_0 = a_k + \Delta(1 - \tau_1 - 2\tau_0)$, where $\tau_0 = \frac{F-F_1}{L}$. The inflexible firms hire all types in (a_0, a_z). Because we normalize the utility of unemployed workers to zero, we find that $w_0^* = -s_0 a_0 = -s_0(a_k + \Delta(1 - \tau_1 - 2\tau_0))$. This case has the same qualitative properties as when workers are in short supply. In addition, wages and profits in the flexible sector now depend on the inflexible sector market tightness, τ_0, and the profit in the inflexible sector is given by $\pi_0^* = y + \frac{s_0^2}{2} + s_0\Delta(1 - \tau_1 - 2\tau_0)$.

At Date 0, suppose that entrepreneurs expect a mass F_1 of firms to enter Sector 1 and F_0 to enter Sector 0. For an equilibrium with $F_1 > 0$ to exist, we need $v(\phi(a_z^*)) - K_1 = v(a_z^*) - K_1 = \pi_0^* - K_0 = 0$. It follows that $w_0 = y - K_0 + \frac{s_0^2}{2}$. We fins a_z and $\phi(a_z)$ from

$$K_0 + \frac{s_0^2}{2} - as_0 + \frac{a^2}{2} = K_1$$

$a_z^* = a_k + \sqrt{2(K_1 - K_0)}$ and $\phi(a_z^*) = a_k - \sqrt{2(K_1 - K_0)}$. The equilibrium level of polarization is $\rho^* = 2\sqrt{2(K_1 - K_0)}$.

4 Political partisanship

In this section we allow for s to be perceived as either a positive or a negative attribute. One possible interpretation is to consider s as political partisanship. That is we allow for $\alpha \in (-1, 1)$ and the utility function is $u^i(s, w) = \alpha_i s + (1 - |\alpha_i|)w$. We now show that our key result regarding the shape of the profit potential function continues to hold.

Proposition IA.1. *The profit potential $v(\alpha_i)$ is strictly U-shaped in α_i, for $\alpha_i \in (-1, 1)$.*

Proof. The profit potential function is:

$$v(\alpha_i) := \max_{s,w} \pi(s, w) \quad \text{s.t. } u^i(s, w) \geq u^i(s_0, w_0). \tag{IA.26}$$

The Lagrangian for the problem is:

$$\max_{s,w} \pi(w,s) - \lambda(\alpha_i s_0 + (1-|\alpha_i|)w_0 - \alpha_i s_i - (1-|\alpha_i|)w_i). \tag{IA.27}$$

The first-order conditions are:

$$\begin{aligned} -c'(s) + \lambda\alpha_i &= 0 \\ -1 + \lambda(1-|\alpha_i|) &= 0. \end{aligned} \tag{IA.28}$$

Thus the solution for (s, w) for an agent of type α_i is given by:

$$\begin{cases} c'(s_i) = \frac{\alpha_i}{1-|\alpha_i|} \\ w_i = w_0 - \frac{\alpha_i}{1-|\alpha_i|}(s_i - s_0), \end{cases} \tag{IA.29}$$

that is for $\alpha_i < 0$, $s_i < 0$.

We now derive the profit potential function with respect to α_i.

$$v'(\alpha_i) = \begin{cases} \lambda(s_i - s_0 + w_i - w_0) & \text{if } \alpha_i < 0 \\ \lambda(s_i - s_0 - w_i + w_0) & \text{if } \alpha_i > 0 \end{cases} \tag{IA.30}$$

Since $w_i = w_0 - \frac{\alpha_i}{1-|\alpha_i|}(s_i - s_0)$ and $\lambda = \frac{1}{1-|\alpha_i|}$, we can further simplify (IA.30) as follows:

$$v'(\alpha_i) = \begin{cases} \frac{1-|\alpha_i|-\alpha_i}{(1-|\alpha_i|)^2}(s_i - s_0) & \text{if } \alpha_i < 0 \\ \frac{1-|\alpha_i|+\alpha_i}{(1-|\alpha_i|)^2}(s_i - s_0) & \text{if } \alpha_i > 0 \end{cases} \tag{IA.31}$$

In the context of political partisanship, it is natural to think that the inflexible firms are politically neutral and $s_0 = 0$. The derivative of the profite potential then becomes: That is $v'(\alpha_i) = \frac{1}{(1-|\alpha_i|)^2}s_i$. It then follows that for $\alpha_i < 0$, $v'(\alpha_i) < 0$ and for $\alpha_i > 0$, $v'(\alpha_i) > 0$, that is the profit potential function is strictly U-shaped. □

As the shape of the profit potential function is the main force driving our results, all results would continue to hold in the case where $\alpha \in (-1, 1)$.

5 The case where both sectors have some flexibilty

In this section, we relax the assumption that the inflexible sector is fully inflexible. We now assume that the firms that adopt the inflexible technology can offer $s \in [\underline{s}_0, \overline{s}_0]$. For simplicity only, we keep the assumption that Sector 1 is fully flexible (i.e., $\underline{s}_1 = 0$ and $\overline{s} = \infty$).

The optimal s offered by firms in the inflexible sector is:

$$s^{\star}_{0i} = \begin{cases} \underline{s}_0 & \text{for } \alpha_i \leq \underline{\alpha}_k \\ h(\alpha_i) & \text{for } \underline{\alpha}_k < \alpha_i < \overline{\alpha}_k \\ \overline{s}_0 & \text{for } \alpha_i \geq \overline{\alpha}_k, \end{cases} \tag{IA.32}$$

where $\underline{s}_0 = h(\underline{\alpha}_k)$ and $\overline{s}_0 = h(\overline{\alpha}_k)$. Lemma 2 continues to hold and therefore $\pi_{0i}(s_{0i}, w_{0i}) = 0$ and the wages offered by the inflexible firms are $w^{\star}_{0i} = y - c(s^{*}_{0i})$. We can now write the profit potential function of the flexible firms:

$$v_1(\alpha_i) = \begin{cases} c(\underline{s}_0) + \frac{\alpha}{1-\alpha}(s^*_i - \underline{s}_0) - c(s^*_i) & \text{for } \alpha_i \leq \underline{\alpha}_k \\ 0 & \text{for } \underline{\alpha}_k < \alpha_i < \overline{\alpha}_k \\ c(\overline{s}_0) + \frac{\alpha}{1-\alpha}(s^*_i - \underline{s}_0) - c(s^*_i) & \text{for } \alpha_i \geq \overline{\alpha}_k, \end{cases} \tag{IA.33}$$

where $s^*_i = h(\alpha_i)$. The profit potential is decreasing in α for $\alpha_i < \underline{\alpha}_k$ and increasing in α for $\alpha_i > \overline{\alpha}_k$. Since $v(\overline{\alpha}_k) = 0$, $v'(\alpha) > 0$ for $\alpha > \overline{\alpha}_k$, and $v(\alpha)|_{\alpha \to 1} \to \infty$, the equilibrium is as follows.

Proposition IA.2. *If the distribution of types, $P(.)$, is continuous, for any $K_1 > 0$, a competitive equilibrium exists. The equilibrium is given by a unique type $z^* \in (\overline{\alpha}_k, 1)$ such that $v(z^*) = K_1$, $\phi(z^*)$ is given by*

$$\phi(\alpha) = \alpha' \textit{ such that } \max_{\alpha' \in [0, \underline{\alpha}_k]} v(\alpha') \leq v(\alpha), \tag{IA.34}$$

$F^*_1 < L$ and is given by

$$F^*_1 = L\Big(\int_0^{\phi(z)} p(\alpha) d\alpha + \int_z^1 p(\alpha) d\alpha\Big), \tag{IA.35}$$

and wages are given by

$$w^*(\alpha_i) = \begin{cases} y - c(s_i^*) - v(\alpha_z) & \textit{for } \alpha_i \in [0, \alpha_{\phi(z)}] \cup [\alpha_z, 1] \\ w \in [y - c(s_i^*) - v(\alpha_z), w_{0i}^* - \frac{\alpha_i}{1-\alpha_i}(s_i^* - s_{0i}^*)] & \textit{for } \alpha_i \in [\alpha_{\phi(z)}, \alpha_z]. \end{cases} \tag{IA.36}$$

The degree of polarization in this case is:

$$\rho = s_z^* - \bar{s}_0 + \underline{s}_0 - s_{\phi(z)}^* \tag{IA.37}$$

In the case of quadratic cost function $c(s) = \frac{s^2}{2}$. In this case $s_i^* = a_i$, where $a_i \equiv \frac{\alpha_i}{1-\alpha_i}$ and a_z^* is given by:

$$\frac{\bar{s}_0^2}{2} + \frac{a^2}{2} - a\bar{s}_0 = K_1 \Rightarrow a_z^* = \min\{\bar{s}_0 + \sqrt{2K_1}, \bar{a}\} \tag{IA.38}$$

and $\phi(a_z)^*$ is given by:

$$\frac{\underline{s}_0^2}{2} + \frac{a^2}{2} - a\underline{s}_0 = K_1 \Rightarrow \phi(a_z)^* = \max\{\underline{s}_0 - \sqrt{2K_1}, \underline{a}\}, \tag{IA.39}$$

It then follows that in the quadratic cost function case with interior solutions, the degree of polarization is $\rho = 2\sqrt{2K_1}$.

6 More than two technologies

In this Section we consider the case where there are three available technologies, $\iota \in \{0, 1, 2\}$. We assume that technology $\iota = 0$ is fully inflexible $\underline{s}_0 = \bar{s}_0 = s_0$ and technology $\iota = 2$ is fully flexible $\underline{s}_2 = 0$ and $\bar{s}_2 = \infty$. We also assume that $K_2 > K_1 > K_0 = 0$.

The profit potential of firms adopting technology $\iota = 1$ is:

$$v_1(\alpha_i) = \begin{cases} y - w_0 + \frac{\alpha_i}{1-\alpha_i}(\underline{s}_1 - s_0) - c(\underline{s}) & \text{for } \alpha_i \leq \underline{\alpha}_k \\ y - w_0 + \frac{\alpha_i}{1-\alpha_i}(s_i^* - s_0) - c(s_i^*) & \text{for } \underline{\alpha}_k < \alpha_i < \bar{\alpha}_k \\ y - w_0 + \frac{\alpha_i}{1-\alpha_i}(\bar{s}_1 - s_0) - c(\underline{s}) & \text{for } \alpha_i \geq \bar{\alpha}_k, \end{cases} \tag{IA.40}$$

where $\underline{s}_1 = h(\underline{\alpha}_k)$ and $\bar{s}_1 = h(\bar{\alpha}_k)$. The profit potential function is U-shaped. If

$\max\{v_1(\underline{\alpha}_k), v_1(\bar{\alpha}_k))\} < K_1$, then no entrepreneurs decide to adopt technology 1 and we are back to the two-sector solution presented in the paper. We now consider the most interesting case where $\min\{v_1(\underline{\alpha}_k), v_1(\bar{\alpha}_k))\} > K_1$ then some firms will adopt technology $\iota = 1$ and the solutions for z_1 and $\phi(z_1)$ are interior, i.e., $z_1 < \bar{\alpha}_k$ and $\phi(z_1) > \underline{\alpha}_k$.

If technology $\iota = 1$ is adopted by some firms the profit potential of firms that adopt technology $\iota = 2$ is:

$$v_2(\alpha_i) = \begin{cases} w_1(\alpha) + \frac{\alpha}{1-\alpha}(s_i^* - \underline{s}_0) - c(s_i^*) & \text{for } \alpha_i \leq \underline{\alpha}_k \\ K_1 & \text{for } \underline{\alpha}_k < \alpha_i < \bar{\alpha}_k \\ c(\bar{s}_0) + \frac{\alpha}{1-\alpha}(s_i^* - \underline{s}_0) - c(s_i^*) & \text{for } \alpha_i \geq \bar{\alpha}_k. \end{cases} \tag{IA.41}$$

The profit potential is decreasing in α for $\alpha_i < \underline{\alpha}_k$ and increasing in α for $\alpha_i > \bar{\alpha}_k$. Since $v(\bar{\alpha}_k) = K_1$, $v'(\alpha) > 0$ for $\alpha > \bar{\alpha}_k$, and $v(\alpha)|_{\alpha \to 1} \to \infty$, the equilibrium is as follows.

Proposition IA.3. *If the distribution of types, $P(.)$, is continuous, for any $K_2 > K_1$, a competitive equilibrium exists. There exists a unique type $z_2^* \in (\bar{\alpha}_k, 1)$ such that $v_2(z_2^*) = K_2$, $\phi_2(z_2^*)$ is given by*

$$\phi_2(\alpha) = \alpha' \text{ such that } \max_{\alpha' \in [0, \underline{\alpha}_k]} v_2(\alpha') \leq v_2(\alpha), \tag{IA.42}$$

and a unique pair of types $(z_1^\star, \phi(z_1^\star))$, $z_1^* \in [a_k, \bar{\alpha}_k]$ and $\phi(z_1^*) \in [\underline{a}_k, a_k]$, is given by $v_1(z_1^\star) = v_1(\phi(z_1^*)) = K_1$. F_2^* is given by

$$F_2^* = L\Big(\int_0^{\phi_2(z_2^\star)} p(\alpha) d\alpha + \int_{z_2^\star}^1 p(\alpha) d\alpha \Big), \tag{IA.43}$$

F_1^* is given by

$$F_1^* = L\Big(\int_{\phi_2(z_2^\star)}^{\phi_1(z_1^\star)} p(\alpha) d\alpha + \int_{z_1^\star}^{z_2^\star} p(\alpha) d\alpha \Big), \tag{IA.44}$$

and wages are given by

$$w_2^*(\alpha_i) = \begin{cases} y - c(s_i^*) - v_2(\alpha_{z_2}) & \textit{for } \alpha_i \in [0, \alpha_{\phi_2(z_2^\star)}] \cup [\alpha_{z_2^\star}, 1] \\ w \in [y - c(s_i^*) - v_2(\alpha_{z_2}), w_{1i}^* - \frac{\alpha_i}{1-\alpha_i}(s_i^* - s_{i1}^*)] & \textit{for } \alpha_i \in [\alpha_{\phi_2(z_2^\star)}, \alpha_{z_2^\star}] \end{cases} \tag{IA.45}$$

and

$$w_1^*(\alpha_i) = \begin{cases} y - c(s_{i1}^*) - v_1(\alpha_{z_1^*}) & \textit{for } \alpha_i \in [\alpha_{\phi_2(z_2^*)}, \alpha_{\phi_1(z_1^*)}] \cup [\alpha_{z_1^\star}, \alpha_{z_2^\star}] \\ w \in [y - c(s_i^*) - v_1(\alpha_{z_1^\star}), w_0^* - \frac{\alpha_i}{1-\alpha_i}(s_{i1}^* - s_0)] & \textit{for } \alpha_i \in [\alpha_{\phi_1(z_1^*)}, \alpha_{\phi_1(z_1^*)}], \end{cases} \tag{IA.46}$$

where

$$s_{i1}^* = \begin{cases} \underline{s}_1 & \textit{for } \alpha_i \leq \underline{\alpha_k} \\ h(\alpha_i) & \textit{for } \alpha_i \in (\underline{\alpha_k}, \overline{\alpha}_k) \\ \overline{s}_1 & \textit{for } \alpha_i \geq \overline{\alpha_k}. \end{cases} \tag{IA.47}$$

7 Entrepreneurs with taste for s-quality

In this section we consider the case where the entrepreneurs payoff is $\beta s + (1-\beta)\pi$. That is entrepreneurs have a preference for the s-attribute, captured by β. We solve for the special case of $c(s) = \frac{s^2}{2}$.

The equilibrium s for each α is $s^* = a + b$, where $a = \frac{\alpha}{1-\alpha}$ and $b = \frac{\beta}{1-\beta}$, and therefore the profit potential is:

$$v(a,b) = \beta(a+b) + (1-\beta)(y - w_0 - as_0 + \frac{a^2}{2} - \frac{b^2}{2}) \tag{IA.48}$$

Since $\frac{\partial v(a,b)}{\partial a} = a + \beta - (1-\beta)s_0$, $v(a,b)$ is U-shaped in a and reaches its minimum for $a = (1-\beta)s_0 - \beta$.

Proposition IA.4. *In an interior equilibrium of the quadratic cost case, types* $a \in (s_0 - b - \sqrt{\frac{2K_1}{1-\beta}}, (s_0 - b + \sqrt{\frac{2K_1}{1-\beta}}))$ *work in the inflexible sector and are paid wage* $w_0 = y - \frac{s_0^2}{s} + bs_0$*, and types* $a \leq (s_0 - b - \sqrt{\frac{2K_1}{1-\beta}})$ *and* $a \geq (s_0 - b + \sqrt{\frac{2K_1}{1-\beta}})$ *work in the flexible sector and are paid* *wage* $w^*(a) = y - \frac{a^2}{2} - \frac{K_1}{1-\beta}$

Proof. The entrepreneur's payoff in the inflexible sector is $v(s_0, \beta) = \beta s_0 + (1-\beta)(y - w_0 - \frac{s_0^2}{2})$ and it must be equal to zero in equilibrium, therefore $w_0 = y - \frac{s_0^2}{s} + bs_0$. We can rewrite $v(a, b)$ as follows:

$$v(a,b) = \beta(a+b) + (1-\beta)(\frac{s_0^2}{2} - (a+b)s_0 + \frac{a^2}{2} - \frac{b^2}{2}) \tag{IA.49}$$

From $v(a, b) = K_1$ we find the values for a_z and $a_\phi(z)$. Finally, the equilibrium wage for those working in the flexible sector is given by $\beta(a+b) + (1-\beta)(y - w - \frac{(a+b)^2}{2}) = K_1$. $\square$

The degree of polarization in the case where the entrepreneurs have a taste for s-quality the degree of polarization is $\rho = 2\sqrt{\frac{2K_1}{1-\beta}}$. The degree of polarization is increasing in β.

8 Worker-Investors

While we interpret investors as being different from workers, conceptually it makes no difference if investors are also workers. To see this, consider the case in which all workers are born with an endowment ε, which they can use to buy shares. Without loss of generality, we assume that an agent invests in only one firm (because there is no risk, there is no reason to diversify investment). To retain the assumption that investors of all types are in large supply, we assume that ε is large. Now, worker-investors (from now on, *agents*) derive utility from working for a firm with contract (s, w) and from investing in a firm with contract (s', w'). That is, agents can work for one firm and invest in another if they wish.

An agent's utility is thus

$$u^i(s, w, s', w') = \alpha_i s + (1-\alpha_i)w + \varepsilon - e_2(s', w') + \beta_i s' + (1-\beta_i)\pi(s', w'). \tag{IA.50}$$

Because all agents are atomistic, their investment and working decisions are independent, and the equilibrium is the same regardless of whether agents have a dual role or not.

Note that this conclusion is independent of the correlation between α_i and β_i. It is natural to assume a positive correlation: workers who care about s in their own firms may also prefer to invest in firms with high s'.[1] Thus, suppose that $\alpha_i = \beta_i$. We can rewrite the utility function as

$$u^i(s, w, s', w') = \alpha_i(s + s') + (1 - \alpha_i)(w + \pi(s', w')) + \varepsilon - e_2(s', w'). \tag{IA.51}$$

A natural question now is: Will workers invest in firms similar to their own firms? Consider a simple example with three types, where $a_1 = 0$, $a_2 = s_0$, and $a_3 > s_0$, where $a = \frac{\alpha}{1-\alpha}$. We assume a quadratic cost function ($c(s) = \frac{s^2}{2}$). Agents make their labor supply and investment decisions independently, thus the equilibrium is just as described in the article. Because the worker type that minimizes $v(a, b)$ is $s_0 - b$, we have that both $v(a, a_2)$ and $v(a, a_3)$ are strictly increasing in a, while $v(a, a_1)$ is U-shaped. We also have that $v(0, a_2) < v(0, a_3)$ and $v'(a, a_2) > v'(a, a_3)$, thus there exists a unique $\hat{a}$ such that $v(\hat{a}, a_2) = v(\hat{a}, a_3)$. Algebra show that

$$\hat{a} = 1 + s_0 + \sqrt{(1 + s_0)^2 - 2(y - w_0^*) - A} \tag{IA.52}$$

where $A := \left(\alpha_3 a_3 - \alpha_2 a_2\right) / \left(\alpha_3 - \alpha_2\right)^{-1}$. Thus, labor market allocations are as follows. First, type $a_1 = 0$ is hired by investors of type a_1. Thus, any worker of type a_1 matches with investors of the same type. Second, if F is large enough so that some workers of type a_2 are hired by flexible firms, these workers match with investors of type a_3. Intuitively, type a_3 investors are those who care less about money, thus they should match with workers with low profit potential (in this case, type a_2). Third, type a_3 workers are hired by either type a_1 or type a_2. Finally, we note that, as before, firms in the inflexible sector are owned by type a_3 investors.

To conclude, workers typically do not invest in the same type of firms they work for.

[1] There are other realistic cases. For example, "effective altruism" is the idea that one should make money first and then invest it in projects with social benefits. We can model an effective altruist as an agent with $\alpha_i = 0$ and large $\beta_i > 0$.

Intuitively, workers with low α prefer to work for firms with low s, but would like to invest in firms with either very low or very high s, because these firms have the highest profit potential. Similarly, workers with high α prefer to work for firms with high s, but, as investors, their comparative advantage is to invest in firms with intermediate levels of s.

9 Alternative preferences for outside investors

In this section we make alternative assumptions for the pro-social preferences of the outside investors.

Case 1: $H(s, w) = s - s_0$. In this case, we have that socially responsible investors value one share at $\Omega(s, w) = \pi(s, w) + \beta(s - s_0)$. These investors value firms with higher than the "reference" or "average" s-quality (which, for simplicity, is normalized to s_0) more than profit-driven investors. Conversely, socially responsible investors have a distaste for firms that are less purposeful than the average.

To characterize the equilibrium, we note first that the efficient s level for a firm owned by a socially responsible investor depends on β. Suppose a socially responsible investor matches with a worker of type a. Using the same reasoning as before, we can show that, under a quadratic cost function, $s^*_{a\beta} = a + \beta$.

The following proposition characterizes the equilibrium in the presence of both socially responsible investors and profit-driven investors. For simplicity, we focus on interior solutions: $F_1 < L$ and $a_{\phi(z)} > 0$.

Proposition IA.5 (Equilibrium with Outside investors: $I = s$**).** *Suppose* $H(s, w) = s - s_0$*. In an interior equilibrium of the quadratic cost case, types* $a \in \left(s_0 - \sqrt{2K_1}, s_0 - \beta + \sqrt{2K_1}\right)$ *work in the inflexible sector and are paid wage* $w^*_0 = y - \frac{s_0^2}{2}$*. Types* $a \leq s_0 - \sqrt{2K_1}$ *work for flexible firms owned by profit-driven investors and are paid wage* $w(a) = y - K_1 - \frac{a^2}{2}$*. Types* $a \geq s_0 - \beta + \sqrt{2K_1}$ *work for flexible firms owned by socially responsible investors and are paid wage* $w(a) = y - K_1 - \frac{(a+\beta)^2}{2}$*. The degree of polarization is* $\rho = 2\sqrt{2K_1}$*.*

Proof. Consider the inflexible sector contract, (s_0, w_0^*). Both profit-driven and socially responsible investors derive the same utility $\pi(s_0, w_0^*)$ from this contract. Thus, because $L < F$, competition among entrepreneurs drives profits to zero, $\pi(s_0, w_0^*) = 0$, implying $w_0^* = y - \frac{s_0^2}{2}$.

The profit potential function of the socially responsible investors is $v(a, \beta) = y - w_0 + \frac{(a+\beta)^2}{2} - (a+\beta)s_0$ and is U-shaped in a. $v(a, 0) = y - w_0 + \frac{a^2}{2} - as_0$ is the profit potential of a profit-driven investor. It follows that $v(a, \beta) \geq v(a, 0)$ for any $a \geq \max\{0, s_0 - \frac{\beta}{2}\}$. We assume that $s_0 > \frac{\beta}{2}$, otherwise $a_{\phi(z)} = 0$, i.e., the solution is not interior. Define $v(a) := \max\{v(a, 0), v(a, \beta)\}$, that is,

$$v(a) = \begin{cases} v(a,0) & \text{for } a \leq s_0 - \frac{\beta}{2} \\ v(a,\beta) & \text{for } a > s_0 - \frac{\beta}{2} \end{cases} . \tag{IA.53}$$

Define $a_{min} = s_0 - \frac{\beta}{2}$. We have the following properties for $v(a)$ at $a = a_{min}$, $v(a_{min}, 0) = v(a_{min}, \beta)$, $v'(a_{min}, 0) < 0$, and $v'(a_{min}, \beta) > 0$. It then follows that $v(a_{min})$ is the minimum profit potential. To guarantee $F_1 < L$, the following condition must hold:

$$K_1 > v(a_{min}) \quad \Leftrightarrow K_1 > \frac{\beta^2}{8}. \tag{IA.54}$$

The equilibrium values for a_z and $a_{\phi(z)}$ are given by $v(a) = K_1$, implying $a_z = s_0 - \beta + \sqrt{2K_1}$ and $a_{\phi(z)} = s_0 - \sqrt{2K_1}$, where $a_z > a_{\phi(z)}$ is implied by (IA.54).

An interior solution also requires $s_0 > \sqrt{2K_1}$. The s-quality levels are $s_z = s_0 + \sqrt{2K_1}$ and $s_{\phi(z)} = s_0 - \sqrt{2K_1}$. The degree of polarization is $\rho = 2\sqrt{2K_1}$. Wages are $w(a) = y - K_1 - \frac{1}{2}s_{a\beta}^{*2}$, where $s_{a\beta}^{*2} = a$ for profit-driven firms and $s_{a\beta}^{*2} = a + \beta$ for socially responsible firms. $\square$

This proposition implies that socially responsible investors create more value if matched with workers with strong preferences for s. In contrast, profit-driven investors create more value if matched with workers with weak preferences for s. Figure 1 shows the profit potential of profit-driven investors, $v(a, 0)$ (solid line), and the profit potential of socially

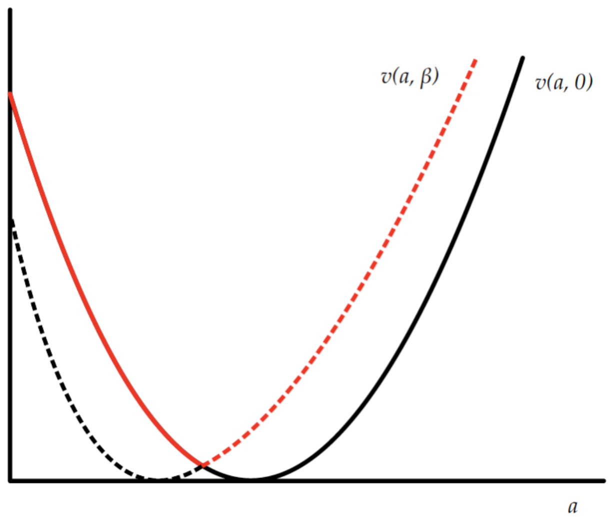

Figure 1: Profit Potential with Socially Responsible Investors: Case 1

responsible investors, $v(a, \beta)$ (dashed line). The unique equilibrium is given by the roots of $v(a) = K_1$, once we define $v(a) := \max\{v(a, 0), v(a, \beta)\}$.[2] That is, $v(a)$ is the upper envelope (in red) in Figure 1.

The presence of socially responsible investors increases labor demand in the flexible sector. To see this, recall that the minimum of $v(a, 0)$ is at $a = s_0$. Figure 1 shows that to the right of $a = s_0$, $v(a, \beta) > v(a, 0)$. Thus, given K_1, a_z such that $v(a_z, \beta) = K_1$ is lower than a'_z such that $v(a'_z, 0) = K_1$, which implies that the introduction of socially responsible investors brings types in (a_z, a'_z) into the flexible sector. In addition, for types larger than a_z, the profit potential increases after socially responsible investors buy shares in these firms. Because competition keeps investors' utility at K_1, workers capture all the increase in surplus. We conclude that workers with types larger than a_z are strictly better off when socially responsible investors buy shares of flexible firms. Workers of types smaller than a_z are not affected by socially responsible investors. Thus, socially responsible investors improve workers' welfare, but only for those with sufficiently strong preferences for the s-attribute.

[2] The analysis can be easily generalized to any number m of different types of investors, $\{\beta_1, ..., \beta_m\}$, by defining $v(a) = \max\{v(a, \beta_1), ..., v(a, \beta_m)\}$.

Case 2: $H(s,w) = s + w - s_0 - w_0$. In this case, we have that socially responsible investors value shares at $\Omega(s,w) = \pi(s,w) + \beta(s + w - s_0 - w_0)$. The efficient s level is $s^*_{a\beta} = (1-\beta)(a+b)$, where $b := \frac{\beta}{1-\beta}$. For a profit-driven investor, $\beta = 0$, implying $s^*_{a0} = a$. The following proposition characterizes the equilibrium.

Proposition IA.6 (Equilibrium with Outside investors: $I = s + w$**).** *Suppose* $H(s,w) = s + w - s_0 - w_0$. *In an interior equilibrium of the quadratic cost case, types* $a \in \left(a_{\phi(z)}, a_z\right)$ *work in the inflexible sector and are paid wage* $w^*_0 = y - \frac{s_0^2}{2}$. *All other types work for flexible firms and are paid wage* $w(a) = y - K_1 - \frac{s^{*2}_{a\beta}}{2}$. *The degree of polarization is* $\rho = 2\sqrt{2K_1}$. *There are two cases:*

1. *If* $s_0 < 1$, *then* $a_{\phi(z)} = s_0 - \sqrt{2K_1}$ *and* $a_z = \min\{\frac{s_0-\beta}{1-\beta} + \frac{\sqrt{2K_1}}{1-\beta}, s_0 + \sqrt{2K_1}\}$. *Types* $a \in \left(\min\{a_z, 1\}, 1\right)$ *work for flexible firms owned by socially responsible investors.*

2. *If* $s_0 \geq 1$, *then* $a_{\phi(z)} = \max\{\frac{s_0-\beta}{1-\beta} - \frac{\sqrt{2K_1}}{1-\beta}, s_0 - 2\sqrt{2K_1}\}$ *and* $a_z = s_0 + \sqrt{2K_1}$. *Types* $a \in \left(1, \max\{1, a_{\phi(z)}\}\right)$ *work for flexible firms owned by socially responsible investors.*

Proof. The profit potential of the socially-responsible investor is $v(a,\beta) = y - w_0 + 0.5[(1-\beta)^2(a+b)^2] - s_0(1-\beta)(a+b)$ and is U-shaped in a. The profit potential of the profit-driven investor is $v(a,0) = y - w_0 + \frac{a^2}{2} - as_0$.

Suppose $s_0 < 1$. Then, it follows that $v(a,\beta) \geq v(a,0)$ for any $a \in [\frac{2s_0-\beta}{2-\beta}, 1]$. The overall profit potential function is the upper envelope of $v(a,\beta)$ and $v(a,0)$:

$$v(a) = \begin{cases} v(a,0) & \text{for } a \leq \frac{2s_0-\beta}{2-\beta} \\ v(a,\beta) & \text{for } \frac{2s_0-\beta}{2-\beta} < a < 1 \\ v(a,0) & \text{for } a \geq 1 \end{cases}. \tag{IA.55}$$

Define $a_{min} = \frac{2s_0-\beta}{2-\beta}$. We have $v(a_{min},0) = v(a_{min},\beta)$, $v'(a_{min},0) < 0$, and $v'(a_{min},\beta) > 0$. It then follows that $v(a_{min})$ is the minimum profit potential. It must be that $a_{min} > 0$, otherwise $a_{\phi(z)} = 0$, i.e., the solution is not interior. This implies $s_0 > \frac{\beta}{2}$. To guarantee

$F_1 < L$, we need

$$K_1 > v(a_{min}) \quad \Leftrightarrow K_1 > \frac{(a_{min}-s_0)^2}{2} \qquad \Leftrightarrow K_1 > \frac{1}{2}\left(\frac{\beta(1-s_0)}{2-\beta}\right)^2. \tag{IA.56}$$

The equilibrium is determined by $v(a) = K_1$, which gives solutions $a_{\phi(z)}$ and a_z. $a_{\phi(z)}$ is the lowest root such that $v(a,0) = K_1$, which is $a_{\phi(z)} = s_0 - \sqrt{2K_1}$. To ensure $a_{\phi(z)} > 0$, $K_1 < \frac{s_0^2}{2}$. Now we have two cases to consider. If $K_1 > v(1)$, then a_z is the largest root of $v(a,0) = K_1$, which is $a_z = s_0 + \sqrt{2K_1}$. If, instead, $K_1 < v(1)$, then a_z is the largest root of $v(a,\beta) = K_1$, which is $a_z = \frac{s_0-\beta}{1-\beta} + \frac{\sqrt{2K_1}}{1-\beta}$. It follows from (IA.55) that workers with types $a \in (a_z, 1)$ work for socially responsible firms.

If $s_0 > 1$, we follow the same procedure and find that $a_{\phi(z)} = \max\{\frac{s_0-\beta}{1-\beta} - \frac{\sqrt{2K_1}}{1-\beta}, s_0 - 2\sqrt{2K_1}\}$ and $a_z = s_0 + \sqrt{2K_1}$. □

Proposition IA.6 implies that profit-driven investors match with workers with either very high or low a. In contrast, socially responsible investors match with workers with intermediate values of a. Thus, socially responsible investors appear more moderate in their investment choices than profit-driven investors. Figure 2 shows that the profit potential for socially responsible investors is flatter than that of profit-driven investors, which explains why socially responsible investors appear more moderate.

Figure 2 shows the profit potential function in the case of $s_0 < 1$. In this case, socially responsible investors will locate to the right of the minimum of $v(a)$. That is, they will buy relatively high-s firms. The presence of socially responsible investors increases the employment of moderate but right-of-center workers. If $s_0 > 1$ instead, the presence of socially responsible investors increases the employment of moderate but left-of-center workers in the flexible sector. As before, the presence of socially responsible investors increases workers' welfare by increasing labor demand.

In both cases, profit-driven investors pay K_1 and receive $\pi(s,w)$ as dividends. In equilibrium, $K_1 = \pi(s,w)$; thus ,such investors always get zero returns.[3] By contrast, we have

[3]Note there is no risk or time discounting in our environment; thus, zero return is the fair compensation for their investments.

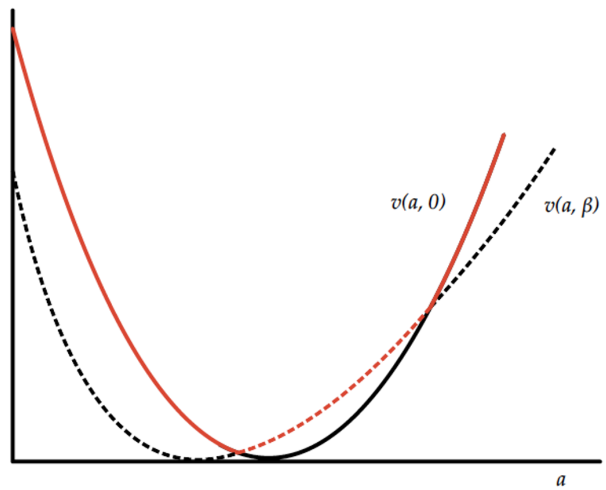

Figure 2: Profit Potential with Socially Responsible Investors: Case 2

that $K_1 = \pi(s, w) + \beta H(s, w)$ for socially responsible investors. That is, these investors have negative stock returns. The relationship between purpose and stock returns thus depends on investors' preferences. If $H(s, w) = s - s_0$, then high-purpose firms have lower stock returns than low-purpose firms. If $H(s, w) = s + w - s_0 - w_0$, firms with either very high or very low levels of s have higher stock returns than firms with intermediate levels of s. In this case, the model also predicts a link between employee satisfaction and expected stock returns. In particular, firms with the highest stock returns are flexible firms sold to profit-driven investors. These firms also have the highest levels of employee satisfaction (measured by U_i^*, which is the willingness to pay for a job). Because employee satisfaction is U-shaped in a, firms with the lowest stock returns have relatively low levels of employee satisfaction.

10 Minimum Standards Regulation

Here we consider the effect of a simple regulatory proposal, such as a minimum requirement for s. For example, regulators can impose a minimum environmental standard, require a minimum provision of workplace amenities, or impose a minimum quota on workforce diversity. Let $\tilde{s}$ be the minimum s-quality requirement. We assume that the requirement is binding only for low-s firms.

Proposition IA.7 (Minimum standards). *Let z denote an unconstrained equilibrium. If a minimum standard $\tilde{s} \in \left(s^*_{\phi(z)}, s_0\right)$ is introduced, then the new equilibrium, $\tilde{z}$, is such that $\tilde{z} < z$, $\pi(\tilde{z}) < \pi(z)$, and $\tilde{w}^*(\alpha) > w^*(\alpha)$ for $\alpha > \tilde{z}$.*

Proof. For any $\alpha \leq \tilde{\alpha}$, where $h(\tilde{\alpha}) = \tilde{s}$, the firms are constrained to offer a sustainability level $\tilde{s}$. The maximum profit under the minimum standard is as follows: For $\alpha \leq \tilde{\alpha}$, $\tilde{v}(\alpha) = y - \tilde{w}(\alpha) - c(\tilde{s})$, where $\tilde{w}(\alpha) = w_0 + \frac{\alpha}{1-\alpha}(s_0 - \tilde{s})$; For $\alpha \geq \tilde{\alpha}$, $\tilde{v}(\alpha) = v(\alpha)$ (i.e., the minimum standard does not bind). It follows that $\tilde{v}(\alpha)$ is decreasing in α for $\alpha < k$ and increasing in α for $\alpha > k$. Thus the new equilibrium is determined by conditions in Corollary 4 for the function $\tilde{v}(\alpha)$.

Because $\tilde{s} > s^*_{\phi(z)}$ the minimum standard constraint binds at point $\phi(z)$ and therefore $\tilde{v}(\phi(z)) < v(z)$. This implies that $\tilde{\phi}(z) < \phi(z)$ and therefore

$$F > L\left(\int_0^{\tilde{\phi}(z)} p(\alpha)d\alpha + \int_z^1 p(\alpha)d\alpha\right), \tag{IA.57}$$

so the equilibrium $\tilde{z}$, must be such that $\tilde{z} < z$. This implies $\pi(\tilde{z}) < \pi(z)$, and $\tilde{w}(\alpha) > w(\alpha)$ for $\alpha > \tilde{z}$. □

The introduction of a binding minimum standard implies that low-s firms can no longer offer the efficient levels of the s-attribute to workers with low-s preferences. This constraint leads to a decrease in the equilibrium profits of all flexible firms. High-s workers benefit from the introduction of $\tilde{s}$ because they now earn higher wages and consume more. The next corollary describes the effect of the introduction of a minimum standard on the average s level in the flexible sector.

Corollary IA.1 (Minimum Standards and Average S-Quality). *The minimum standard increases the average s in the flexible sector by*

$$\int_0^{\tilde{\phi}(z)} (\tilde{s} - s_\alpha)p(\alpha)d\alpha + \int_{\tilde{z}}^{z} s_\alpha p(\alpha)d\alpha - \int_{\phi(z)}^{\tilde{\phi}(\tilde{z})} s_\alpha p(\alpha)d\alpha. \tag{IA.58}$$

Proof. The difference in the average s level with and without the minimum standard $\tilde{s}$ is:

$$\int_0^{\tilde{\phi}(\tilde{z})} \tilde{s} p(\alpha) d\alpha + \int_{\tilde{z}}^1 s_\alpha p(\alpha) d\alpha - \int_0^{\phi(z)} s_\alpha p(\alpha) d\alpha - \int_z^1 s_\alpha p(\alpha) d\alpha. \tag{IA.59}$$

Since $\int_{\tilde{z}}^z p(\alpha) d\alpha = \int_{\tilde{\phi}(\tilde{z})}^{\phi(z)} p(\alpha) d\alpha$, equation (IA.59) becomes:

$$\int_0^{\phi(z)} \tilde{s} p(\alpha) d\alpha + \int_{\tilde{z}}^z s_\alpha p(\alpha) d\alpha - \int_0^{\phi(z)} s_\alpha p(\alpha) d\alpha - \int_{\tilde{z}}^z \tilde{s} p(\alpha) d\alpha \tag{IA.60}$$

The increase in the average s in the flexible sector is:
$\int_0^{\phi(z)} (\tilde{s} - s_\alpha) p(\alpha) d\alpha + \int_{\tilde{z}}^z (s_\alpha - \tilde{s}) p(\alpha) d\alpha.$ □

As expected, the introduction of a binding minimum standard leads to an increase in the average s level in the flexible sector. However, the low-s firms' reaction to introducing a minimum standard is heterogeneous. Some firms adjust on the intensive margin by increasing their s levels to meet the minimum standard (i.e., $\tilde{s}$). This effect is measured by $\int_0^{\tilde{\phi}(z)} (\tilde{s} - s_\alpha) p(\alpha) d\alpha$. Other firms adjust on the extensive margin by becoming high-s firms. This effect is measured by $\int_{\tilde{z}}^z s_\alpha p(\alpha) d\alpha - \int_{\phi(z)}^{\tilde{\phi}(\tilde{z})} s_\alpha p(\alpha) d\alpha$. As more firms now choose to locate at the high-s end, high-s workers benefit from an increase in the demand for their types.