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Corporate Governance, Meritocracy and Careers

Finance Working Paper N° 821/2022
Revised January 2025

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This paper can be downloaded without charge from:
https://doi.org/10.67929/ecgi-fin-821-2022

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ECGI Working Paper Series in Finance

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Keywords: corporate governance, careers, meritocracy, job selection, skill development

JEL Classifications: D21, D23, M50, M51

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Corporate Governance, Meritocracy and Careers *

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December 13, 2024

Abstract

Firms may pursue non-meritocratic promotion policies at the cost of lower profitability, if they yield private benefits of control. Corporate governance standards that limit these private benefits favor meritocratic promotions, and thereby encourage workers' skill acquisition. Managerial incentive pay has ambiguous effects on workers' skill acquisition: it fosters the supply of skilled labor, while reducing firms' willingness to promote skilled workers to managerial positions. Social welfare increases with the share of meritocratic firms, but not necessarily with governance standards: small reforms generate losers and gainers, and may on balance lower welfare, while drastic enough reforms can generate Pareto improvements.

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1. Introduction

The productive efficiency of firms greatly hinges on appointing the right person to the right job (Coraggio et al., 2022). Hence, the power to hire, fire, promote and demote employees is a key aspect of corporate control. Whether or not this power is used efficiently depends on the alignment of controlling shareholders' interests with those of outside investors. If there is significant misalignment, appointments and promotions may not be driven by merit, resulting in inefficient organizational design and task assignment. Thus, corporate governance standards contribute to determining whether the careers of employees develop on the basis of merit or not. We show that this point has far-reaching implications: by affecting personnel policies, corporate governance standards impact the careers of employees, their matching with employers and their incentive to acquire skills before entering the labor market.

We consider a setting where firms are externally funded, and entrepreneurs may draw private benefits from non-meritocratic promotions, creating misalignment with external financiers. Promoting a low-skill rather than a high-skill employee enables the entrepreneur to retain power over the firm, without the risk of flawed decisions being challenged or disclosed by a competent manager. However, failing to promote on the basis of merit has a cost in terms of forgone managerial efficiency and profitability. The firm's external financiers anticipate this cost, by offering less favorable financing terms to entrepreneurs who are expected to place a greater value on power retention, and therefore to adopt less meritocratic promotion criteria. Likewise, workers take into account the criteria that firms adopt in promotions when they apply for jobs: high-skill employees are keener to apply for jobs in the more meritocratic firms, as these not only promote for merit, but also offer higher pay upon promotion to provide sufficient incentives to skilled managers.

Since corporate governance standards limit the extraction of private benefits of control, improving them increases the fraction of meritocratic firms, which in turn attract high-skill employees. We show that, for a given distribution of skills across possible hires, there is a unique sorting equilibrium in which skilled workers apply to meritocratic firms and the unskilled to non-meritocratic ones. In equilibrium, employment of high-skill workers and aggregate productivity are increasing in corporate governance standards, as these increase firms' incentives to promote based on merit. But promoting skilled workers to managerial positions requires firms to offer them an incentive pay scheme: the more severe are incentive problems within the firm, the larger the required wage increase upon promotion, and thus the lower are firms' benefits from meritocratic promotions. Hence, the model highlights

that meritocratic promotions can be hindered not only by entrepreneurs' taste for private benefits of control, which create an agency problem in firm financing, but also by managers' incentive to shirk, which requires large enough performance pay upon promotion.

The extent to which these two incentive problems are overcome affects the skill composition of the workforce. As workers' decisions to acquire skills are based on their expected earnings and promotions, better corporate governance stimulates the acquisition of the skills prized by meritocratic firms, and thereby raises the equilibrium fraction of skilled workers. The magnitude of managers' incentive pay, instead, has an ambiguous effect: on the one hand, it encourages employees' skill acquisition and thus the supply of skilled labor; on the other hand, it raises the cost of promoting skilled workers, and thus reduces the fraction of firms that can afford meritocratic promotions. In short, while better corporate governance unambiguously increases the equilibrium fraction of skilled workers, steeper incentive pay for managers may reduce it.

A higher equilibrium fraction of meritocratic firms, employing a greater number of skilled workers, is associated with higher productivity, wages and profits. This may be expected to provide an efficiency rationale for improving corporate governance standards, due to their repercussions on the skill composition of employment and on workers' skill acquisition choices. However, we show that this is not always the case for reforms that entail a small improvement in corporate governance standards. Such reforms raise social welfare only if the initial level of corporate governance standards is high enough and/or entrepreneurs place a low enough value on private benefits of control. Intuitively, if this is not the case, raising corporate governance standards will curtail the expected private benefits extracted by a large number of (infra-marginal) non-meritocratic entrepreneurs, while benefiting only a small number of (marginal) entrepreneurs who switch to meritocratic policies. In contrast, imposing corporate governance standards so drastic as to induce all entrepreneurs to switch to meritocratic promotions may entail a Pareto improvement, as they effectively precommit all entrepreneurs to efficient promotion policies, and thus eliminate altogether the inefficiency stemming from the agency problem between firms and financiers. Accordingly, such a drastic reform should find greater political support than a more moderate one.

The model's prediction that meritocracy in firms' employment policies correlates positively with corporate governance standards is consistent with cross-country stylized facts, as illustrated by Figure 1. The figure plots a questionnaire-based index of firm meritocracy against an index measuring the protection of minority investors against abuses by controlling shareholders, for a sample of 55 countries. The meritocracy index is the average of the

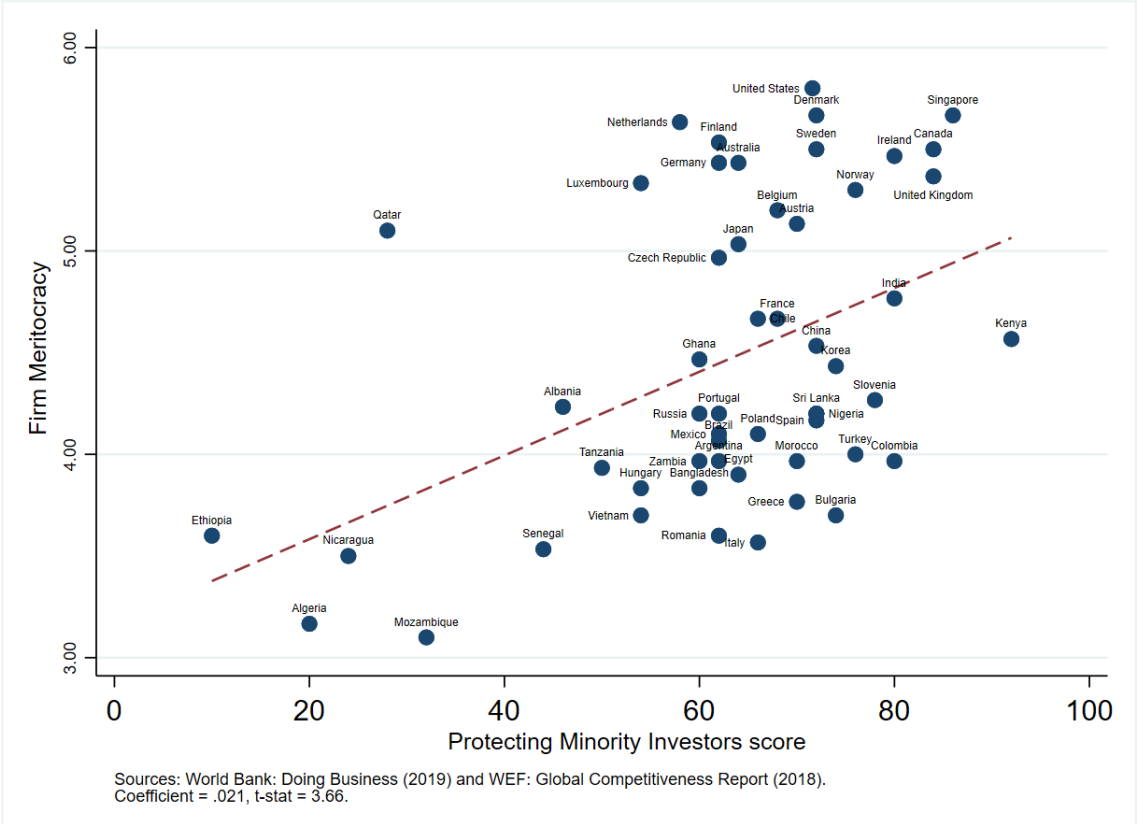

Figure 1: Firm Meritocracy and Corporate Governance Standards

numerical responses to three questions contained in the 2018 WEF Global Competitiveness Report, which respectively measure the extent to which senior managers are chosen based on merit, the degree of delegation of corporate decisions to junior managers, and the dependence of workers' pay on productivity. The corporate governance measure is the Protecting Minority Investors score from the 2019 Doing Business report by the World Bank.[1] The

[1]The firm meritocracy index is based on replies by 12,274 managers in 140 countries to the following questions: 1) Question 8.09 (Reliance on professional management): In your country, who holds senior management positions in companies? [1 = usually relatives or friends without regard to merit; 7 = mostly professional managers chosen for merit and qualifications]; 2) Question 11.06 (Willingness to delegate authority): In your country, to what extent does senior management delegate authority to subordinates? [1 = not at all; 7 = to a great extent]; and 3) Question 8.10 (Pay and productivity): In your country, to what extent is pay related to employee productivity? [1 = not at all; 7 = to a great extent]. This index was first proposed by Pellegrino and Zingales (2022), who compute it based on 2011 data drawn from the 2012 WEF Global Competitiveness Report. The World Bank minority investor protection score is based on indicators that measure the protection of minority investors from conflicts of interest and others that capture shareholders rights in corporate governance. The data come from a questionnaire administered to corporate and securities lawyers, based on securities regulations, company laws, civil procedure codes and court rules of evidence.

slope of the OLS regression line fitted between these two variables is positive and statistically significant.

The firm meritocracy index is also positively and significantly associated with the average management score produced by Bloom et al. (2016), the correlation between the two being 72%: more meritocratic firms tend to rely more on formal management practices. Recalling that these practices robustly and positively correlate with productivity and with employees' human capital (Bloom and Van Reenen, 2007, 2010), this indicates that in countries where pay and promotion decisions rely more heavily on merit, firms tend to be more productive and to have a better educated workforce, exactly as predicted by our model. This is also consistent with the evidence by Bandiera et al. (2024) that higher-income countries are more meritocratic, in the sense that workers are matched to jobs based on their skills rather than on idiosyncratic characteristics unrelated to productivity: using a representative sample of over 120,000 individuals from 28 countries providing consistent information about worker skills and job requirements, they estimate that a large share (36 percent) of the gains from adopting frontier technology are obtained through enhanced skill-based sorting. A similar relationship between the quality of job-worker matches and productivity is also present in firm-level cross-sectional data: Coraggio et al. (2022) measure the quality of job-worker matches by applying machine-learning methods to Swedish employer-employee administrative data, and find that firms where workers are better matched to their jobs feature higher productivity and a greater fraction of highly educated employees, as predicted by our model.

The paper is organized as follows. Section 2 presents the related literature. Section 3 lays out the model's structure. Section 4 analyzes the wage-setting process. Section 5 analyzes firms' financing and equilibrium promotion rules. Section 6 analyzes workers' choice to apply for jobs in meritocratic or in non-meritocratic firms. Section 7 describes workers' endogenous skill acquisition before entering the job market. Section 8 investigates how reforms of corporate governance standards affect social welfare. Section 9 shows that the results of the model remain valid even where firms raise funds via risky debt rather than equity. Section 10 concludes.

2. Related Literature

Our paper contributes to various strands of research. First, it relates to the normative debate regarding the objective function of firms. The traditional view, dating back to Fried-

man (1962, 1970) and restated by Shleifer and Vishny (1997), is that firms should maximize shareholder value. However, this view has been challenged by theories contending that firms should also consider the welfare of non-financial stakeholders (employees, customers and local communities): Magill et al. (2015) show that shareholder value maximization is inefficient if competitive firms generate negative externalities, and that the resulting inefficiencies can be corrected by the appropriate assignment of control rights to other stakeholders. While acknowledging this point, Tirole (2001) cautions that conferring control rights to non-financial stakeholders may ultimately tighten firms' financing constraints and lead to deadlocks in decision-making and lack of focus for management. Our paper instead points out that shareholder value maximization may generate positive externalities for non-financial stakeholders, rather than negative ones: reducing agency problems in corporate governance orients the employment policies towards meritocracy, and thereby encourages the acquisition of talent by workers, and results in higher productivity and wages. Hence, in our setting shareholder value maximization benefits non-financial stakeholders too. The rationale for these results is that agency problems in corporate governance can affect firms' employment policies, as in Bertrand and Mullainathan (2003) and Pagano and Volpin (2005): in those papers, managers have the incentive to overpay workers so as to reduce their monitoring effort and earn a "quiet life"; in our setting, entrepreneurs have the incentive to promote incompetent managers to be able to exert power over the firm without their misconduct being identified and reported to investors. In both cases, corporate governance affects financial as well as non-financial stakeholders.

Our work also relates to research on the allocation of talent and workers' careers in companies. There is much evidence that firm productivity correlates with the quality of management practices, including those on promotions (Bloom and Van Reenen, 2007, 2010). In particular, good management tends to improve the quality of job-worker matches and their career progression (Coraggio et al., 2022; Minni, 2023; Pastorino, 2024). Reliance on structured managerial practices also limits the impact of supervisors' discretion, which can contribute to favoritism in promotions (Prendergast and Topel, 1996; Friebel and Raith, 2004) and discrimination at the workplace, either in open forms (Becker, 1957) or subtle ones (Pikulina and Ferreira, 2023). Conversely, family firms' preference for dynastic managerial appointments leads to inefficient selection of managers (Burkart et al., 2003; Burkart and Panunzi, 2006; Bennedsen et al., 2007; Lippi and Schivardi, 2014; Bandiera et al., 2018) and offers fewer career opportunities to non-family employees (Di Porto et al., 2024), forgoing sizeable productivity gains (Lemos and Scur, 2019). In terms of our model, family firms' controlling shareholders can be viewed as placing a particularly high value on control

retention, and are therefore less inclined towards meritocratic appointments than controlling shareholders of non-family firms. However, in our setting even widely-held companies may deviate from merit-based promotion, if their controlling shareholders own a sufficiently small stake, absent strong corporate governance standards in their jurisdiction.[2]

The economy-wide effects of firms' promotion policies on managerial quality have also been analyzed in papers on corporate governance externalities by Acharya and Volpin (2010), Levit and Malenko (2016) and Dicks (2012), where a firm's choice to pay high bonuses to its managers induces its competitors to behave similarly in order to retain managerial talent. Our model also features a spillover effect of firm-level promotion policies, but instead of operating via the market for managers, it runs from firms' governance to the demand for skilled and unskilled workers, and thereby to the skill composition of the workforce, eventually feeding back to firms' productivity. Hence, unlike those papers, our model highlights general equilibrium interactions between corporate governance, firm promotion decisions, and labor market outcomes.

3. The Model

We present a model of careers where meritocracy arises endogenously, depending on firms' ownership and corporate governance. As we shall see, in our setting non-meritocratic promotions arise from the interaction between two incentive problems, one at the level of firms' governance and the other at the level of managers' employment relationship. On the one hand, entrepreneurs are willing to promote workers based on merit and bear the implied wage costs only if they value the net monetary benefits from such promotions more than private benefits stemming from the promotion of acquiescent subordinates. On the other hand, skilled workers can be incentivized to invest effort in managerial tasks only via costly incentive schemes, so that meritocratic promotions are costly for firms.

The timeline of the model consists of five stages, as shown in Figure 2. At $t = 0$, workers choose whether to invest costly effort in education, determining the skill composition of the labor force. At $t = 1$, skilled and unskilled workers apply for jobs and firms hire some of

[2]The literature has highlighted that misallocation of talent in firms may also stem from asymmetric information about workers' talent, dating back to Waldman (1984) and more recently DeVaro and Waldman (2012), Dato et al. (2021), Bar-Isaac and Levy (2022). In those works, firms may fail to promote high-skill workers to avoid poaching by their competitors. But, unlike the present paper, this literature assigns no role to corporate governance standards in determining promotion rules and takes workers' skills to be exogenous.

them. At $t = 2$ each firm raises external funds $I - A$ by pledging a share of its profits to investors. At $t = 3$ firms choose their promotion policies, namely, whether to promote a skilled or an unskilled employee to a managerial position, and which salary to offer to the promoted employee. Finally, at $t = 4$, production occurs, profits and wages are paid out and non-meritocratic entrepreneurs extract private benefits.

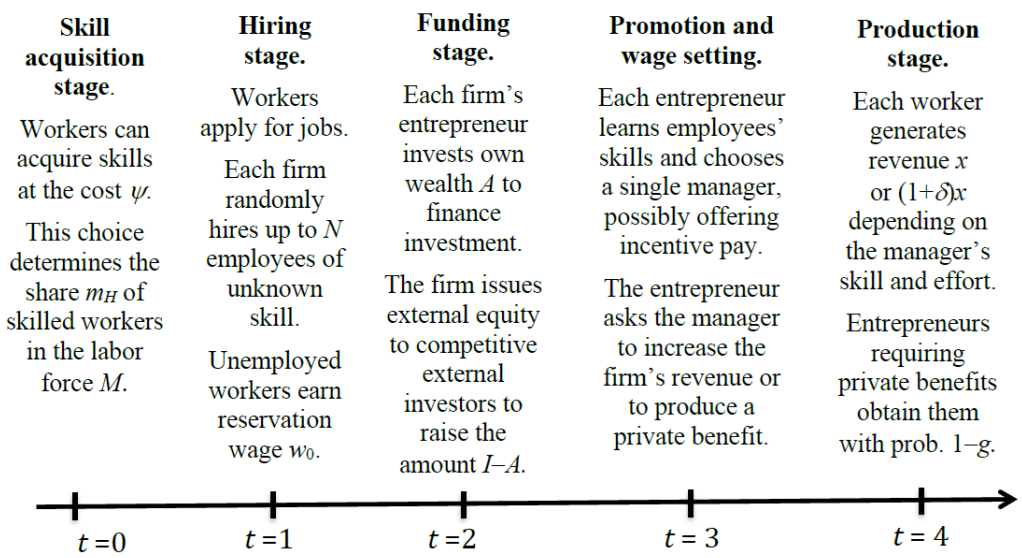

Figure 2: Timeline of the model

In what follows we detail the model's assumptions:

Preferences and discounting. Both firms and workers are assumed to be risk-neutral, and to feature no discounting of future payoffs. They are also assumed to be rational and forward-looking, so that optimal choices are derived by backward induction, in order to characterize subgame-perfect equilibria.

Technology. The economy comprises a mass 1 of firms with identical technology, each set up by an entrepreneur who has a controlling equity stake in the firm. The operation of a firm requires capital whose cost equals I. The firm's revenue is proportional to the number of its employees up to an upper bound N, with each worker contributing x to revenue. Hence, revenue is maximized if the firm hires N workers. Employees can be of two types: low-skill or high-skill, their respective numbers in each firm being denoted by N_L and N_H.

Each firm appoints a worker to a managerial position, while other workers perform production tasks. A high-skill manager can raise the productivity of each employee (including herself) by a proportion δ, by efficiently monitoring her $N-1$ subordinates, so as to elicit effort from them, as well as by identifying superior investment projects and production methods; instead, a low-skill manager leaves the productivity of the firm's workforce unaffected. The increase in productivity that skilled managers can produce depends on whether they exert unobservable effort at cost $c > 0$: if they do, their firm's revenue becomes $(1+\delta)Nx$; if instead they shirk, their firm's revenue is $(1+\delta)Nx$ with probability p, and Nx with probability $1-p$.[3] The parameter p measures the extent to which the manager can perform well without exerting effort, and therefore captures the severity of the agency problem between entrepreneurs and managers.

Labor market. The total labor force M is formed by M_H high-skill and M_L low-skill workers and exceeds the maximal number of job openings, i.e., $M > N$. Each worker can direct a job application to firms based on their expected promotion policies, i.e., towards meritocratic or non-meritocratic firms. Firms, instead, do not know the skill level of their job applicants and hire workers by drawing randomly from their pool of applicants and offering them non-negative wages. Due to search costs, each worker can apply for a single job, either in a meritocratic or a non-meritocratic firm. If the job application fails, the worker remains unemployed and earns a reservation wage $w_0 \geq 0$. If a worker is indifferent between jobs in two different firms, she is assumed to apply to the firm where she has the largest chance of being promoted. This tie-breaking assumption captures the non-monetary benefits of being promoted to a managerial position. As $M-N$ workers end up being unemployed after their job search, firms have all the bargaining power when setting the wages offered at the hiring stage. Since, at that stage, firms cannot distinguish between high and low-skill workers, they offer the reservation wage w_0 to all the workers they hire. We assume that the difference between employees' productivity and their reservation wage is large enough that firms can cover their cost of capital even when run by a low-skill manager, namely

$$N(x - w_0) > I, \tag{1}$$

so that they have positive NPV.

Promotion decision. After hiring, entrepreneurs learn the skill level of their employees

[3]The model's qualitative results stay unchanged if even low-skill managers could improve workers' productivity by exerting effort, provided they have a lower chance to do so with no effort than high-skill managers, i.e., they have a lower value of p, so that they are less productive in expectation.

and can contract internally with one of them, offering to promote her to a managerial position. Their promotion policies differ not only depending on the workers' skill level but also on the entrepreneur's objective. The entrepreneur can confer to the promoted employee power over the firm's project selection and execution, in which case the employee will be able to raise the firm's profitability if she is skilled; alternatively, the entrepreneur can formally appoint the manager but retain power over the firm, which bestows on him a non-monetary private benefit of control, B. As in Dessein and Holden (2022), the private benefit captures the entrepreneur's taste for decision-making power. This taste is assumed to differ across entrepreneurs: for simplicity, the value B that a given entrepreneur places on the private benefit is assumed to be uniformly distributed, i.e., $B \sim U\left[0, \bar{B}\right]$ and to be publicly observable.[4]

The entrepreneur is assumed to have no managerial talent so that when he retains decision power over the firm, he forgoes the productivity enhancement that skilled managers would generate: the extraction of private benefits implies that the firm's revenue equals Nx rather than $(1+\delta)Nx$, irrespective of the manager's skills and effort. However, forgoing productivity-enhancing actions exposes the entrepreneur to the risk of being reported by a skilled manager as breaching his fiduciary duty to outside investors. We capture the cost to the entrepreneur of such "whistle-blowing" by skilled managers by assuming that when he overrules a productivity-enhancing manager, the entrepreneur's private benefit of control drops to $(1-\lambda)B$, where λ reflects the legal or reputational cost, vis-à-vis external shareholders. Alternatively, λ may be interpreted as the fraction of private benefits that the entrepreneur must pay the skilled manager to buy her acquiescence so that she does not challenge the entrepreneur's authority and thus the extraction of private benefits.

As we shall see, it is precisely the cost from the scrutiny exerted by a skilled manager over the entrepreneur's choices that may deter him from promoting skilled employees to managerial positions. This scrutiny is always present if skilled managers exert effort, as in this case they can invariably identify fallacies in the entrepreneur's decisions, but may also arise by chance when a skilled manager exerts no effort, as in this case she may still happen to identify productivity-enhancing choices with probability p.

[4]In fact, the model's derivations require a less demanding assumption, namely, public knowledge of whether B exceeds the threshold B^* (defined below by expression 8) above which promotions are not based on merit. Moreover, the qualitative results of the model remain unchanged if the value of B featured by each entrepreneur is private information. The main difference resulting from this alternative assumption is that investors' decisions regarding firm financing and workers' decisions regarding their job applications would be based on the expected value of B and, therefore, would not vary across firms depending on the actual value of B of their respective entrepreneurs.

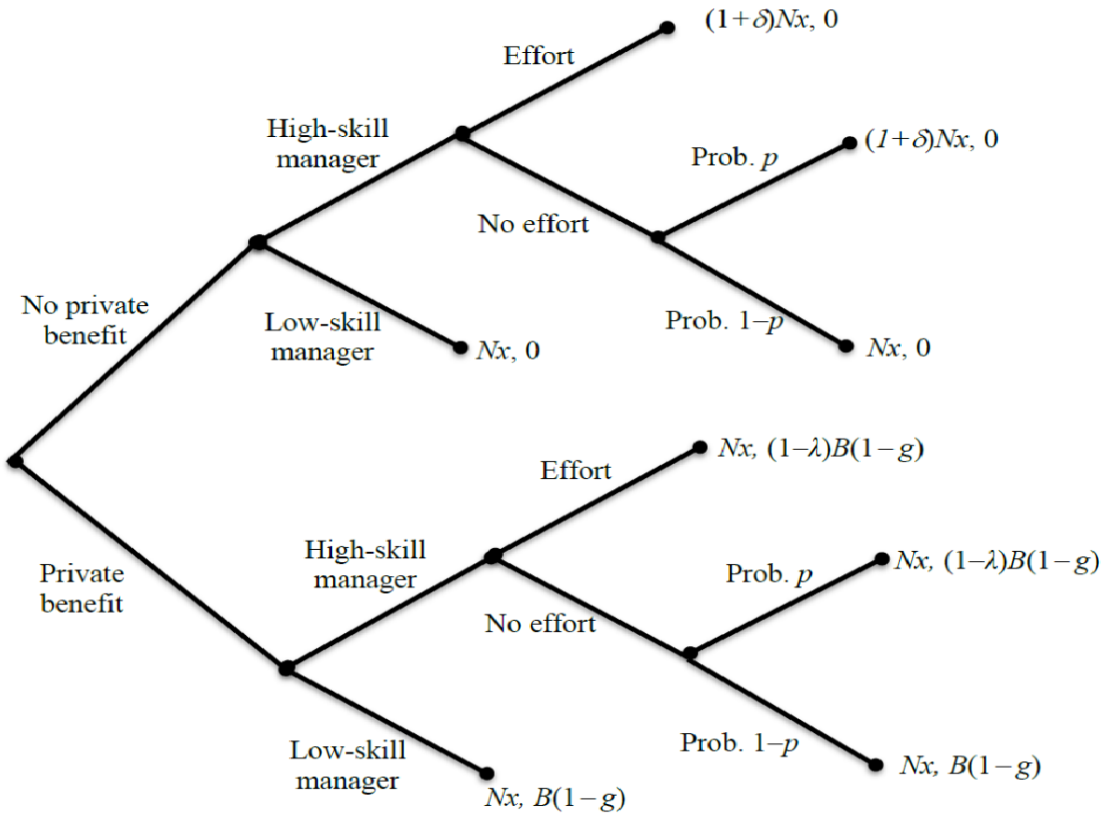

Figure 3: Firm revenue and private benefits conditional on entrepreneur's and manager's choices

Investment funding and corporate governance. The entrepreneur invests his wealth A in the firm. If A does not cover the investment cost I, the firm issues equity $I - A$ to a set of competing investors. The investors' participation constraint implies that outside investors are entitled to a fraction $1-\alpha$ of the firm's profits π at least equal to $I-A$. The entrepreneur is assumed to retain control over the firm irrespective of his fractional stake α. If an entrepreneur wishes to extract private benefits of control, he will succeed in doing so with a probability that is inversely correlated with the quality of corporate governance $g \in [0,1]$, so that the expected value of private benefits is $(1-g)B$. This captures the idea that better corporate governance standards, by protecting the interests of shareholders and enabling them to closely monitor the firm, reduce the entrepreneur's incentive to divert man-

agers' skills towards inefficient activities that benefit him at the expense of non-controlling shareholders. A higher g may for instance capture the stringency of internal control mechanisms like audit committees or the requirement to appoint independent directors on the company's board (Shleifer and Vishny, 1997).

Figure 3 summarizes how the firm's revenue and the entrepreneur's expected private benefits depend on his decision to extract private benefits, and on the manager's skill and effort choice. The two elements at the final nodes of the tree respectively indicate the firm's revenue and the entrepreneur's expected private benefit in the corresponding contingency. If the entrepreneur wishes to extract private benefits and/or the manager is low-skilled, the firm's revenue is Nx; otherwise, revenue is $(1+\delta)Nx$ if the manager exerts effort or performs well with no effort (which happens with probability p), and is Nx otherwise (with probability $1-p$). Instead, the entrepreneur's private benefit is by definition zero in the final nodes of the upper branch of the tree, while it is positive in those of the lower branch: it equals $(1-\lambda)B(1-g)$ in the final nodes where the manager would be capable to enhance the firm's revenue but would be overruled by the entrepreneur, and $B(1-g)$ in the nodes where the manager is unable to enhance the firm's revenue.

Skill acquisition. Initially, we solve the model assuming a given distribution of workers' abilities, i.e., treating the fraction $m_i \equiv M_i/M$ of workers of each quality $i = \{H, L\}$ as a parameter. But in Section 7 we endogenize the workforce skill distribution, by assuming that before entering the labor market workers can acquire productive skills by exerting effort $e = \{0, 1\}$ at a cost $\psi \cdot e$, for $\psi > 0$. The choice of effort determines the fraction of high-skill workers m_H and is forward-looking: workers' beliefs are consistent with the equilibrium distribution of skills among applicants across firms at stage $t = 1$ and about their expected career prospects at stage $t = 3$.

Parametric assumptions. To focus on situations where meritocracy can occur in equilibrium, we restrict the parameter space to the region where at least some workers are willing to invest in productive skills before entering the labor market (i.e., at $t = 0$), as this is the only region where the choice of meritocratic promotions is relevant. To this purpose, we make two parametric assumptions. (Appendix B shows that relaxing either one of these assumptions implies that no worker becomes skilled in equilibrium.)

The first assumption guarantees that the expected net payoff of high-skill managers faced with a pay-for-performance contract exceeds the reservation wage. As we shall see, in equilibrium high-skill managers receive expected total pay $c/(1-p)$, while bearing the cost

of effort c. Hence their net expected payoff exceeds the reservation wage if:

$$\frac{c}{1-p} - c \geq w_0. \tag{2}$$

This ensures that the prospect of potential promotion makes careers in meritocratic firms more attractive to skilled workers than that in non-meritocratic firms, so that at least some workers will want to invest in skill acquisition at $t = 0$.

The second assumption ensures instead that at least some entrepreneurs have the incentive to promote according to merit, i.e., to offer pay-for-performance contracts that elicit effort by skilled managers. This requires

$$(1-p)N\delta x \geq \frac{c}{1-p} - w_0 \tag{3}$$

where, as we shall see below, the left-hand side is the incremental revenue that a skilled manager generates under a pay-for-performance contract rather than under a fixed wage, and the right-hand side expression is the incremental cost of this contract to the firm, i.e., the manager's pay gap over the reservation wage. By ensuring that some entrepreneurs will promote according to merit, this assumption also implies that, ex ante. skilled workers have better career prospects than unskilled ones. Condition (3) also implies that $\delta N x > c$, i.e., that skilled managers' effort is efficient, as the incremental revenue that it generates exceeds its cost.[5]

4. Wage Setting and Promotions

We now solve the model by backward induction, starting from the promotion and wage setting decision of firms at stage $t = 3$, and prove all lemmas and propositions in Appendix A. As previously mentioned, there are fewer jobs than workers in the labor market, so that entrepreneurs seeking employees have all the bargaining power in the wage setting process. However, when promoting high-skill managers, entrepreneurs may want to induce them to exert costly effort to raise their firm's productivity, subject to their participation and limited liability constraints. We show that firms' optimal wage offer is contingent on their promotion decision and the quality of promoted workers:

[5] To see this, consider that (3) implies condition $N\delta x > \frac{c}{1-p} - w_0$ which, by condition (2), yields that $N\delta x > c$.

Lemma 1 (Optimal Wage Schedule)**.** *In equilibrium, firms offer the following wage schedule:*

$$w = \begin{cases} \frac{c}{1-p} > w_0 & \textit{to high-skill promoted workers,} \\ w_0 & \textit{otherwise.} \end{cases} \tag{4}$$

Intuitively, since firms have all the bargaining power in the wage setting, workers dealing with the production task are paid their reservation wage w_0. Upon promotion, high-skill workers face an incentive problem as they can improve the firms' productivity by exerting unobservable effort at cost c but manage to do so with probability p even while shirking. In equilibrium, the incentive-compatible wage for high-skill managers is $\frac{c}{1-p}$. This wage is increasing in the cost of effort c and in the "luck" parameter p, which captures the severity of the moral hazard problem. Hence $\rho \equiv \frac{c}{1-p} - w_0$ is the pay gap relative to the reservation wage required to induce skilled managers to exert effort.

After promotion, the entrepreneur can accord to the manager control over the firm or instead retain it, extracting private benefits and thus overruling any productivity enhancing choices she may propose. The following lemma describes how the entrepreneur's decision to extract private benefits affects the firm's promotion policy.

Lemma 2 (Optimal Private Benefit Extraction)**.** *If the entrepreneur wants to extract private benefits of control, he optimally promotes low-skill workers. If instead the entrepreneur aims at maximizing profits, he promotes high-skill workers providing them with incentives to exert effort.*

The reason why only low-skill workers are asked to generate the private benefit B upon promotion, is that asking the same from a high-skill worker exposes the entrepreneur to a loss $\lambda B(1-g)$ with probability p: even when she is not incentivized with incentive pay, there is still the chance that a high-skill manager will identify and divulge the entrepreneur's shortcomings in running the firm (in terms of forgone productivity). In other words, discriminating in favor of less skilled workers in promotions protects the entrepreneur from the risk of them challenging his control over the firm. This is reminiscent of the result by Friebel and Raith (2004) that top managers have the incentive to hire unproductive subordinates as these will not pose a threat to their authority. By appointing low-skill managers, the entrepreneur makes sure to extract the full value of his private benefits, $B(1-g)$, rather than $(1-\lambda)B(1-g)$.

In contrast, if the entrepreneur is willing to delegate authority over the firm to a manager,

it is in his best interest not only to promote a high-skill worker, but also to incentivize her in production, as the resulting productivity enhancement exceeds the cost of her effort.

To choose between these two alternative promotion policies, each entrepreneur will weigh the expected private benefit of control $B(1-g)$ against the monetary gain from the greater productivity associated with meritocracy. Opting for meritocratic promotions will increase the firm's profits by the difference between the resulting additional revenue $N\delta x$ and the additional wage cost from promoting a high-skill worker, ρ. As an entrepreneur owning a fraction α of the firm's equity is entitled to a commensurate share of the firm's profits, his monetary gain will be $\alpha(N\delta x - \rho)$. Hence, the firm will base promotions on merit if the entrepreneur's fractional stake exceeds a threshold value $\widehat{\alpha}$:

$$\alpha \geq \frac{B(1-g)}{N\delta x - \rho} \equiv \widehat{\alpha}, \tag{5}$$

and opt for non-meritocratic promotions otherwise. The entrepreneur's gain from meritocracy is increasing in his stake in the firm's equity, as this determines the alignment of his personal objective to share value maximization. The threshold stake $\widehat{\alpha}$ above which the entrepreneur opts for meritocratic promotions is increasing in the severity of both the incentive problems present in the firm, namely, (i) the moral hazard in the relationship between the firm and its financiers, captured by the expected private benefit $B(1-g)$, and (ii) the moral hazard in the relationship between the firm and managers, captured by the size of the managers' pay gap ρ, and thus by the manager's effort cost c and by her "luck" parameter p.

5. External Funding

If the firm's investment cannot be entirely financed out of the entrepreneur's wealth ($A < I$), at $t = 2$ the firm must raise external funds $I - A$ by pledging a share $1-\alpha$ of its profit π to outside financiers.[6] The rate of return that outside investors require on their funding $I - A$ is zero, given the assumptions of no discounting, risk neutrality and perfect competition. Hence, the stake they require to fund the firm is given by their participation constraint:

$$(1-\alpha)\pi = I - A, \tag{6}$$

[6]In the baseline version of the model, the firm is assumed to obtain external funding in the form of equity. Section 9 explores the robustness of our results to different capital structures.

which implicitly defines the fractional stake $\alpha \in [0, 1]$ in the firm's total cash flow that the entrepreneur is entitled to receive after raising external funds.

The firm's profit depends on its promotion rule:

$$\pi = \begin{cases} \pi_H = N[(1+\delta)x - w_0] - \rho & \text{with meritocratic promotions,} \\ \pi_L = N(x - w_0) & \text{otherwise.} \end{cases} \tag{7}$$

Condition (1) guarantees that, even if the manager is not promoted based on merit, the firm's capital investment is viable: $\pi_L \geq I$. This will be *a fortiori* true if the firm has a meritocratic promotion rule: $\pi_H > \pi_L$, since $N\delta x > \rho$.

The entrepreneur decides on promotions by comparing his payoff $\alpha\pi_H$ under meritocratic promotions with that under non-meritocratic promotions, $\alpha\pi_L + (1-g)B$, as in both cases his equity stake is determined by investors' participation constraint (6). This determines his promotion policy:

Proposition 1 (Optimal Promotion Rule)**.** *Entrepreneurs promote high-skill workers if they place low enough value on private benefits of control, i.e., $B \leq B^*$, and low-skill workers otherwise, where*

$$B^* \equiv \frac{N\delta x - \rho}{1-g}\left(1 - \frac{I - A}{\pi_H}\right). \tag{8}$$

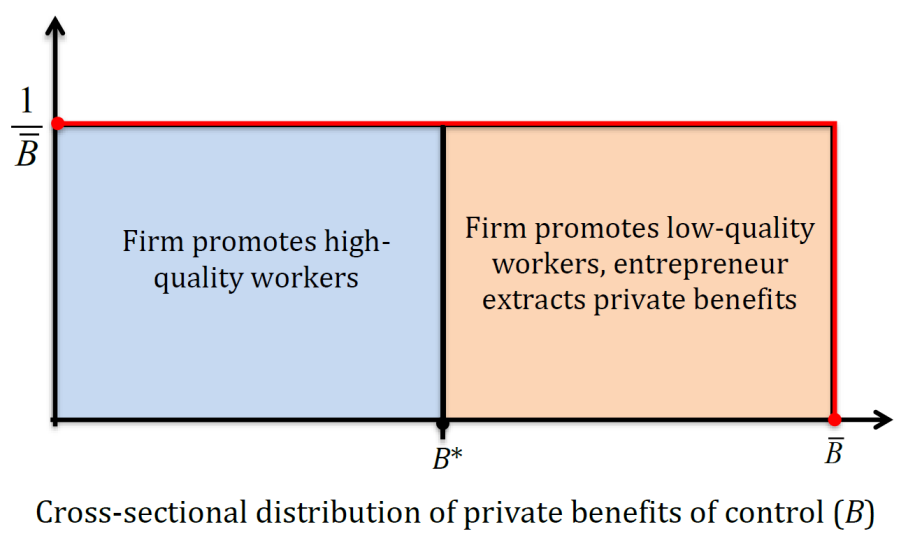

Figure 4: Private Benefits and Promotion Rules

In Figure 4, the fraction of meritocratic firms $q \equiv B^*/\bar{B}$ corresponds to the area to the left of the cutoff B^* in the cross-sectional distribution of private benefits, so that:

Corollary 1 (Determinants of Meritocratic Promotions)**.** *The fraction of meritocratic firms (q) is increasing in the quality of corporate governance (g), in the incremental productivity of promoted high-skill workers (δ) and in the entrepreneur's wealth (A), and it is decreasing in the managerial pay gap (ρ) and in the maximum value of private benefits ($\bar{B}$).*

Hence, the model predicts that meritocratic promotions should be more common in countries with better corporate governance standards (g), and less common in countries with more severe incentive problems, requiring excessive compensation to incentivize managers (ρ). The first of these predictions is consistent with cross-country evidence: Figure 1 shows that a survey-based index of firm meritocracy is positively correlated across countries with the protection of minority investors against abuses by controlling shareholders (which are known to correlate negatively with private benefits of control: see Dyck and Zingales (2004) and Desai et al. (2007)). The prediction is also consistent with the finding (noted in Section 1) that this corporate governance index is positively correlated with firms' reliance on incentive pay and structured managerial practices, as measured by the average management score of Bloom et al. (2016): firms tend to rely more on meritocratic incentive schemes in countries where controlling shareholders can extract lower private benefits. The corollary also implies that, in a cross-section of firms, failing to promote deserving employees should be more common when the owner has a smaller inside equity stake, so that the entrepreneur's incentives are less aligned with the maximization of shareholders' value.

These effects of corporate governance standards rest on the idea that, when they seek external funding at $t = 2$, entrepreneurs cannot commit to a meritocratic promotion policy at $t = 3$, so that corporate governance regulation is required to tie the their hands regarding promotion policies. In principle, however, entrepreneurs might be able to precommit to meritocratic promotions by contracting either with investors, via binding firm-level governance mechanisms limiting their ability to extract private benefits, or with employees, by including clauses regarding promotions and incentive pay in labor contracts. The availability of such precommitment devices would be equivalent to reversing the order of moves in $t = 2$ and $t = 3$ in the timeline of Figure 2, whereby firms would choose their promotion policies before funding investment. An entrepreneur who were to precommit to forgo private benefits of control would effectively set $g = 1$. Clearly, entrepreneurs will want to do so only if their taste for private benefits of control falls short of the monetary gains from meritocracy,

namely, $B \leq N\delta x - \rho$.[7]

An alternative precommitment mechanism would exist if the model's timeline were to include a further stage before the $t = 2$ funding stage, where entrepreneurs with different wealth or tastes could trade control over their firms (yet to be funded). If such a market for corporate control were to exist, an entrepreneur could sell out to another entrepreneur with deeper pockets or lower taste for private benefits (i.e., larger A and/or lower B), such that the buyer's stake after the funding stage would be $\alpha \geq \widehat{\alpha}$. Under this condition, the buyer would promote based on merit, by condition (5), whereas the seller would have not done so. Hence, the shift in control effectively precommits the firm to a meritocratic employment policy. The sale will be beneficial for the seller if the resulting monetary gain exceeds the expected value of his private benefits: assuming that competition between bidders for the firm's equity were to drive its price up to the value of its expected profits under the new management, the divesting entrepreneur will gain if $B < B^{**} \equiv \frac{N\delta x - \rho}{1-g}$. In this case, the net monetary gain to the seller $N\delta x - \rho$, i.e., the firm's value increase from meritocratic promotions, exceeds his expected private benefits $(1-g)B$.[8]

Hence, a competitive market for corporate control populated by entrepreneurs with sufficiently deep pockets would increase the number of firms that adopt meritocratic criteria in promotions. Interestingly, the threshold B^{**} is increasing in the quality of corporate governance standards: by restraining private benefits of control, better corporate governance standards expand the set of entrepreneurs who are willing to sell out their control stake to others with deeper pockets. This underscores that, if a market for corporate control were to exist, it would act as a complement to corporate governance standards in precommitting firms to efficient promotions: it would enable control rights to shift to the hands of shareholders with less diluted equity stakes, reducing inefficiencies as in the setting of Aghion and Bolton (1992).

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[7] To identify the entrepreneurs for whom the extraction of private benefits is not privately efficient, consider an entrepreneur with taste for private benefits B: if she precommits not to extract private benefits (setting its own corporate governance parameter $g = 1$), her payoff would be $\alpha_H \pi_H + (1-g)g = \alpha_H \pi_H$, while if he does not wish to precommit, his payoff would be $\alpha_L \pi_L + B$, as he would choose the lowest possible corporate governance standard (i.e., $g = 0$). Hence, the entrepreneur will want to precommit to meritocratic promotions if his taste for private benefit is $B \leq N\delta x - \rho$.

[8] The value of the entrepreneur's stake under meritocratic promotion policy is $\alpha_H \pi_H = \pi_H - (I - A)$ while under a non-meritocratic promotion policy is $\alpha_L \pi_L = \pi_L - (I - A)$, so that his net gain from the sale is $\alpha_H \pi_H - \alpha_L \pi_L = \pi_H - \pi_L = N\delta x - \rho$.

6. Labor Market Allocation

At $t = 1$, workers allocate themselves across firms: they choose which jobs to apply for, and firms hire randomly from the pool of applicants. When they apply for jobs, workers are aware of their own quality and of firms' future promotion policies and wages, i.e., they can distinguish between meritocratic and non-meritocratic firms. Since within each group all firms offer the same wages and promotion policies, workers simply choose whether to apply to one group or the other.

We denote by $m_i = M_i/M$, for $i = \{H, L\}$, the fraction of workers of type i seeking jobs, and by $a_M = A_M/M$ the fraction of applicants for jobs in meritocratic firms, A_M being their absolute number. Let $\widehat{a}_M$ denote the expected fraction of applicants for jobs in meritocratic firms. Workers choose whether to apply to a given firm on the basis of their belief about the number of applicants competing for jobs there: the larger the expected fraction $\widehat{a}_M$ of meritocratic firms applicants, the lower the chance of being hired by these firms, hence the higher their probability of unemployment. Recall that unemployed workers earn the reservation wage w_0.[9]

High-skill workers will apply for jobs in meritocratic firms if they expect to earn more there than in non-meritocratic ones, i.e.:

$$\underbrace{\left(1 - \frac{qN}{\widehat{a}_M M}\right)}_{\text{Pr(no hire)}} w_0 + \underbrace{\frac{qN}{\widehat{a}_M M}}_{\text{Pr(hire)}} \left[\underbrace{\frac{1}{N_H}}_{Pr(\text{prom.})} (w_0 + \rho - c) + \underbrace{\left(1 - \frac{1}{N_H}\right)}_{Pr(\text{no prom.})} w_0 \right] \geq w_0, \tag{9}$$

The left-hand side of inequality (9) is a skilled worker's expected payoff from applying for jobs in meritocratic firms, which includes both the payoff that worker obtains if she is not hired and thus remains unemployed and the expected wage paid by meritocratic firms weighted by the probability of being hired. This second term in turn comprises the wage conditional on promotion and that conditional on no promotion, weighted by their respective probabilities. The right-hand side of inequality (9), instead, is a high-skill worker's expected payoff from applying for a job in a non-meritocratic firm, where she will never be promoted, thus earning her reservation wage w_0 irrespective of whether she lands a job or is unemployed. Clearly, the left-hand side is increasing in the fraction q of meritocratic firms and decreasing in the

[9] The model could easily accommodate the assumption that workers also bear a utility loss from unemployment: this would be equivalent to a lower reservation wage.

fraction $\widehat{a}_M$ of workers expected to apply to these firms: high-skill workers' incentive to apply for jobs in meritocratic firms is increasing in the fraction of such firms and decreasing in the fraction of their job applicants. Condition(9) boils down to

$$\frac{qN(\rho - c)}{\widehat{a}_M M N_H} \geq 0,$$

The above condition holds since $\rho \geq c$ by assumption (2). Hence, all high-skill workers apply to meritocratic firms, i.e. $a_M = m_H$ and, as beliefs are rational, $a_M = \widehat{a}_M$. Therefore, a meritocratic firm will end up hiring only high-skill workers ($N_H = N$), so that for each of them the probability of being promoted upon being hired by a meritocratic firm is $1/N$. Thus the previous condition simplifies to

$$\frac{q(\rho - c)}{m_H M} \geq 0.$$

The problem faced by low-skill workers is simpler, since they earn the reservation wage w_0 whether promoted or not. Hence, they are indifferent on whether to apply for jobs in meritocratic or non-meritocratic firms. As workers break this tie by applying for jobs in firms where they have a greater chance of being promoted, all low-skill workers will apply for jobs in non-meritocratic firms, i.e. $1 - a_M = 1 - m_H$. Since workers sort themselves across firms according to their beliefs, their actual allocation in the labor market at $t = 1$ is a subgame perfect equilibrium: their beliefs are rational, as $\widehat{a}_M = m_H$, and $1 - \widehat{a}_M = 1 - m_H = m_L$. Summing up, the labor market equilibrium at $t = 1$ can be characterized as follows:

Proposition 2 (Equilibrium Labor Market Allocation)**.** *High-skill and low-skill workers respectively apply to meritocratic and non-meritocratic firms, so that in equilibrium the fractions of applicants for jobs in the two types of firms respectively equal the fractions of high- and low-skill workers in the labor force:* $a_M = m_H$ *and* $1 - a_M = m_L$.

In this sorting equilibrium, meritocratic firms collectively hire qN high-skill workers and non-meritocratic firms $(1 - q)N$ low-skill workers. Hence a larger fraction q of meritocratic firms translates into greater total employment of skilled workers and higher aggregate productivity. Recalling that, by Corollary 1, q is increasing in the quality of corporate governance and decreasing in the incentive pay that high-skill managers receive to exert effort, the equilibrium skill composition of the workforce can be characterized as follows:

Corollary 2 (Equilibrium Skill Composition of the Workforce)**.** *In equilibrium, employment*

of high-skill workers and aggregate productivity are increasing in the quality of corporate governance (g) and decreasing in the pay gap accruing to high-skill managers (ρ).

7. Endogenous Skill Acquisition

So far, the analysis was predicated on an exogenous distribution of workers' abilities, treating the fraction m_i of workers of each quality i as a parameter. However, workers' skill distribution can be endogenized at the initial stage $t = 0$ of the timeline by positing that before entering the labor market workers can become highly skilled by investing effort $e = \{0, 1\}$ in education at a cost $\psi \cdot e$, for $\psi > 0$.[10]

Workers' educational choices at $t = 0$ determine the fraction of high-skill workers m_H and are forward-looking, i.e., they take into account the career prospects opened by education and therefore workers' belief $\widehat{a}_M$ about the fraction of applicants to jobs in meritocratic firms. In equilibrium this fraction will in turn equal the fraction of high-skill job applicants, i.e., $a^*_M = m_H$. We now turn to characterizing workers' skill acquisition:

Proposition 3 (Equilibrium Skill Acquisition)**.** *The equilibrium fraction of skilled workers m^*_H is uniquely defined by the indifference condition that balances the expected benefit of skill acquisition with its cost:*

$$\frac{q(\rho - c)}{m^*_H M} = \psi. \tag{10}$$

The equilibrium fraction of skilled workers m^*_H is increasing in corporate governance standards g. An increase in high-skilled managers' incentive pay gap ρ has an ambiguous effect on the fraction of high-skill workers m_H: the net effect is positive if ρ is below a threshold ρ^* and negative otherwise.

The effect of corporate governance on the fraction m^*_H of high-skill workers stated by Proposition 3 is quite intuitive: better corporate governance increases the fraction of meritocratic firms, and thereby improves the expected career profile of skilled workers, thus increasing their incentive to acquire skills.

The impact of high-skill managers' incentive pay gap on the equilibrium fraction m^*_H of educated workers is ambiguous because two effects are at play. On the one hand, more

[10] Assuming the skill acquisition process to be stochastic rather than deterministic and effort to increase workers' probability of acquiring skills would not change the results qualitatively.

severe moral hazard (higher ρ) increases skilled workers' rents upon promotion, and thus their expected wage, which encourages skill acquisition, expanding the supply of skilled labor. On the other hand, a higher managerial pay gap ρ tends to discourage firms from promoting high-skill workers, thus decreasing the share of meritocratic firms q and thereby the demand for skilled labor. The net effect depends on the balance between the positive effect on the supply of skilled labor and the negative effect on the demand for it. The first prevails if initially the moral hazard problem for high-skill managers is not too severe ($\rho \leq \rho^*$), as this limits the managerial pay offered by meritocratic firms. Otherwise ($\rho > \rho^*$), the second effect dominates, so that a rise in the managerial pay gap reduces the equilibrium fraction m_H^* of skilled workers.

8. Social Welfare

As better corporate governance standards result in a greater equilibrium fraction of high-skill managers, average productivity and wages, one could expect a corporate governance reform to be invariably associated with a higher level of social welfare. However, this is not necessarily the case. It turns out that in this economy a small reform of corporate governance never brings about a Pareto improvement, as it invariably generates gainers and losers, the latter being the entrepreneurs who have such a strong preference for non-meritocratic promotions that they do not switch to meritocratic ones even after the reform. Moreover, if these entrepreneurs are a large enough fraction of the total, their utility losses will exceed the gains of those who switch to meritocratic policies. In contrast, a sufficiently drastic reform, which raises corporate governance standards to the point of inducing all firms to adopt meritocratic employment policies may generate a Pareto gain, if it (weakly) raises the utility of all the entrepreneurs.

Let us first consider an "incremental reform", consisting of an infinitesimal increase in g, and measure social welfare via a utilitarian function, denoted SW, which assigns the same weight not only to profits and wages, but also to private benefits. In equilibrium, social welfare is:

$$SW = q[N(1+\delta)x - c] + (1-q)\left[Nx + (1-g)\frac{B^* + \bar{B}}{2}\right]. \tag{11}$$

The first term in (11) is the surplus produced by meritocratic firms, whose fraction is $q = \frac{B^*}{\bar{B}}$. The second term is the surplus produced by non-meritocratic firms plus the average private benefits accruing to the corresponding entrepreneurs. Such a reform harms entrepreneurs

placing a large enough value on private benefits, and their utility loss may exceed the benefits from greater productivity, profits and wages for firms that switch to meritocratic policies:

Proposition 4 (Incremental reforms)**.** *(i) Small increases in corporate governance standards never yield a Pareto improvement, and raise social welfare SW if and only if the initial governance standard is high enough, namely:*

$$g \geq 1 - \sqrt{\frac{\beta}{\bar{B}^2}[2(N\delta x - c) - \beta]},$$

where $\beta \equiv (N\delta x - \rho)\big(1 - \frac{I-A}{\pi_H}\big)$*. This condition holds for any* g *if the maximal value of private benefits is low enough, i.e.,* $\bar{B} \leq \sqrt{\beta[2(N\delta x - c) - \beta]}$*.*

(ii) An increase in the skilled managers' incentive pay gap ρ *reduces social welfare, as well as the increase in social welfare arising from better governance standards.*

The intuition for the first result is that improving corporate governance has two effects: at the margin, it induces some entrepreneurs to switch to meritocratic promotion policies, but it also affects infra-marginal entrepreneurs who value private benefits so highly that they stick to non-meritocratic promotions. The former benefit from the reform (their switch stemming precisely from the resulting increase in utility), while the latter are hurt, being less likely to obtain private benefits from non-meritocratic promotions. The latter group is small in an economy where corporate governance standards are initially high and/or the maximal value placed on private benefits is sufficiently low: as a result, in this situation better corporate governance raises the value of an utilitarian social welfare function. This is not the case, instead, in the opposite situation where non-meritocratic entrepreneurs are sufficiently numerous.

To understand the second result in Proposition 4, recall that the pay gap ρ captures the severity of the agency problem within the firm: as this discourages meritocratic promotions, it leads to a lower fraction of meritocratic firms and thus to lower social welfare. By the same token, a higher incentive pay reduces the net benefit from better governance standards, as it shrinks the expected profits that meritocratic firms can attain.

In contrast to the incremental reforms analyzed in Proposition 4, increasing corporate governance standards to the point of inducing all entrepreneurs to adopt meritocratic promotion policies can yield a Pareto improvement, by raising the utility of entrepreneurs who switch policy and leaving other entrepreneurs indifferent:

Proposition 5 (Pareto-improving reforms)**.** *If the initial corporate governance standard is*

$g \in [\underline{g}, \overline{g}]$, where $\underline{g} \equiv 1 - \frac{N\delta x - \rho}{\overline{B}}$ and $\overline{g} \equiv 1 - \frac{\beta}{\overline{B}}$, then initially not all entrepreneurs rely on meritocratic promotions, but raising corporate governance standards above $\bar{g}$ induces all of them to adopt meritocratic promotions, and yields a Pareto improvement.

To grasp the intuitive rationale of this proposition, note that the condition defining the lower bound on the pre-reform corporate governance (i.e., $g \geq \underline{g}$), is equivalent to requiring incremental profits from meritocratic promotions to exceed the maximal expected private benefit (i.e., $N\delta x - \rho \geq (1 - \underline{g})\bar{B}$). Under this condition, entrepreneurs who are sole owners of their firms would want to promote employees based on merit, as $\widehat{\alpha} \leq 1$ for any possible private benefit B in (5): inefficient promotions originate only from entrepreneurs owning a fractional stake of their firms' share capital, and thus from their conflict of interest with outside shareholders. Hence, in this situation raising corporate governance standards so as to elicit meritocratic promotions in all firms (i.e., above $\bar{g}$) effectively acts as a collective precommitment device, tying all firms to a meritocratic promotion rule, and thus eliminates the conflict of interest between entrepreneurs and external financiers, irrespective of the value placed on private benefits. This explains why it yields a Pareto improvement.

In such scenario, if entrepreneurs were asked *ex ante* to vote on a drastic corporate governance reform such as that described in Proposition 5, they would all support it. Instead, at least some entrepreneurs will reject an incremental reform, especially if the initial corporate governance standards are low enough, as stated in Proposition 4. This seeming paradox can be intuitively understood by considering that an improvement in corporate governance standards that induces all firms to promote according to merit effectively removes universally the incentive problem between entrepreneurs and their financiers, while after an incremental reform entrepreneurs who place a sufficiently high value on their private benefits will still want to extract them, yet will be less likely to do so, due to the more demanding corporate governance standards, and at the same time will not benefit from reduced equity dilution at the financing stage.

9. Allowing for Debt Financing

So far firms have been assumed to raise all external funding in the form of equity. In this section, we extend the model to allow for debt financing, and show that it has quite different implications for promotion decisions (and therefore for the extraction of private benefits) depending on whether the firm's debt is safe or risky.

In the baseline model presented so far there is no risk: the firm is always able to repay outside investors. Insofar as it is risk-free, debt has no impact on promotion decisions, unlike equity. This is because, when debt is risk-free, creditors receive a fixed amount irrespective of profit, in contrast to external shareholders, who receive a fraction of the firm's profit, and thus bear that fraction of the opportunity cost stemming from non-meritocratic promotions. Hence, unlike equity, safe debt does not encourage deviations from meritocracy. To see this, suppose that in the framework we analyzed so far, firms fund investment by issuing safe debt, pledging to repay a fixed amount D to outside investors. In this case, entrepreneurs will promote high-skill rather than low-skill workers if

$$N[(1+\delta)x - w_0] - \rho - D \geq N(x - w_0) - D + B(1-g),$$

that is,

$$N\delta x - \rho \geq B(1-g),$$

which is independent of debt D. Hence, when safe investment projects are debt-financed, the entrepreneur follows the same promotion rule as under full ownership, irrespective of the firm's reliance on external funding.

By contrast, when equity and debt are equally risky, they both distort promotions away from meritocracy to the same extent. To see this, in what follows we make a single change to the model presented so far, namely, we assume that firms' profits are stochastic, but that better managers are able to mitigate their riskiness by choosing projects appropriately. In other words, managerial ability refers to the choice across projects of different risk, rather than across projects of different productivity as in the baseline model without risk.

Specifically, we now assume that firms can either undertake a comparatively safe project yielding output Nx with probability $\phi_H \in (0, 1]$ and zero otherwise, or a riskier project yielding Nx with probability $\phi_L < \phi_H$ and zero otherwise. In the state where they produce no output, firms do not repay external financiers. If they exert effort, high-skill managers are able to identify and undertake the safer project, while if they do not exert effort, they pick the safer project with probability p and the riskier one with probability $1 - p$. Instead low-skill managers invariably undertake riskier projects, irrespective of their effort level.

Under these assumptions, if firms were equity-financed, the analysis would be akin to that presented in the previous sections, as shown in Appendix C: entrepreneurs who wish to maximize expected profits would find it optimal to promote skilled managers and incentivize them to exert effort, while they would promote unskilled workers without eliciting effort from

them if they wish to extract private benefits of control. In this scenario, equity-financed entrepreneurs promote workers according to merit only if

$$\alpha \geq \widehat{\alpha} \equiv \frac{B(1-g)}{(\phi_H - \phi_L)Nx - \phi_H \rho}. \tag{12}$$

If instead firms obtain external funding in the form of debt that promises to repay D, entrepreneurs promote and incentivize high-skill workers only if

$$D \leq \widehat{D} \equiv \frac{(\phi_H - \phi_L)Nx - \phi_H \rho - B(1-g)}{\phi_H - \phi_L}. \tag{13}$$

Inspection of (12) and (13) shows that the two cutoffs are similar, in the sense that they both depend on the same parameters and respond to their magnitude in the same way. Specifically, if the expected private benefit of control $B(1-g)$ increases, then $\widehat{D}$ decreases and $\widehat{\alpha}$ increases, thus shrinking the region where the entrepreneur is willing to promote deserving workers. The same applies if the pay gap ρ increases, making meritocratic promotions more expensive, or if the two projects become more similar in their probability of success (i.e., ϕ_L increases and/or ϕ_H decreases), thus reducing the monetary benefit from meritocratic promotions. All these parameter changes make entrepreneurs less inclined to promote workers according to merit.

Summing up, while safe debt does not distort promotion decisions away from meritocracy, risky debt distorts them in the same way as equity does.[11]

10. Conclusions

Employees' careers may be shaped by firms' lack of meritocracy, however costly this may be to the firm's profitability. We show that promoting low-skill employees enables entrepreneurs to retain power over the firms' investment choices, without the risk of flawed decisions being challenged or disclosed by a competent manager. Failing to promote on the basis of merit has a cost in terms of forgone managerial efficiency and profitability, but this cost is to some extent borne by external financiers. Hence, entrepreneurs' incentive to deviate from merit-

[11] In intermediate cases where debt is safe up to some threshold level and increasingly risky beyond it, external debt financing tends to distort promotion decisions away from meritocracy less than equity financing, as can be shown by assuming that the firm produces a positive surplus also in the bad state or, equivalently, owns some safe assets whose value can be pledged to creditors.

based promotions also depends on their reliance on external funding: entrepreneurs with less skin in the game have greater incentive to pursue power-related non-monetary benefits rather than maximize profitability.

However, corporate governance standards may constrain the possibility of engaging in non-meritocratic practices. Our model predicts that at the aggregate level the share of meritocratic companies increases with the quality of corporate governance standards, which turns out to be consistent with cross-country evidence. By the same token, in a cross-section of firms, structured managerial practices should be inversely correlated with the owner-managers' taste for power, and therefore with the value that they place on the private benefits of control, which conforms to the evidence on managerial selection in family versus non-family firms.

By increasing the fraction of meritocratic firms, higher corporate governance standards also affect workers' incentives to acquire skills by investing in their human capital before entering the labor market, as this enables them to apply for jobs with better career prospects. Conversely, poorer governance standards increase the fraction of firms that promote unskilled workers, which depresses the incentive to acquire skills. Our model accordingly predicts that good corporate governance will ultimately improve the skill composition of the workforce, via career incentives and labor market equilibrium, and thereby raise aggregate productivity.

Our model captures the fact that not only entrepreneurs, but workers too may face an incentive issue: promoted high-skill workers are more likely to increase their firm's productivity and profits if they exert costly unobservable effort. Addressing this moral hazard problem requires offering incentive pay to skilled managers, which has an ambiguous effect on workers' skill acquisition: higher pay upon promotion increases their incentives to acquire skills, but raises the cost of promoting skilled workers, thus reducing the fraction of meritocratic firms and thereby the promotion probability for skilled workers. As a result, the severity of managerial moral hazard may either turn out to increase or decrease the equilibrium fraction of skilled workers in the economy.

We show that the effect of a corporate governance reform on social welfare differs greatly depending on whether it entails a small improvement in governance standards or a sufficiently large one. In the first case, the reform invariably generates gainers and losers, as it benefits entrepreneurs who change their promotion policies but harms those who do not, as it reduces their expected private benefits of control. Indeed, the gains accruing to the former exceed the losses inflicted on the latter only if the initial corporate governance standards are sufficiently high and/or the maximal value they place on private benefits of control are sufficiently low:

these conditions increase the share of entrepreneurs who gain from the policy relative to that of the losers, leading to a net increase in a utilitarian social welfare function, yet not to a Pareto gain.

In contrast, a reform entailing such a large increase in governance standards as to induce all entrepreneurs to adopt meritocratic promotion policies may generate a Pareto improvement: such reform effectively removes the incentive problem between entrepreneurs and financiers, enabling them to collectively precommit to efficient promotions. Hence, ironically a more timid corporate governance reform may face stronger political opposition than a more drastic one.

Data availability

The data needed to reproduce figure 1 are available upon request.

References

Acharya, V., and P. Volpin. 2010. "Corporate governance externalities". *Review of Finance* 14:1–33.

Aghion, P., and P. Bolton. 1992. "An incomplete contracts approach to financial contracting". *The Review of Economic Studies* 59:473–494.

Bandiera, O., A. Kotia, I. Lindenlaub, C. Moser, and A. Prat. 2024. "Meritocracy across countries". CEPR Discussion Paper No. 19007.

Bandiera, O., R. Lemos, A. Prat, and R. Sadun. 2018. "Managing the family firm: Evidence from CEOs at work". *The Review of Financial Studies* 31:1605–1653.

Bar-Isaac, H., and R. Levy. 2022. "Motivating employees through career paths". *Journal of Labor Economics* 40:95–131.

Becker, G. 1957. *"The economics of discrimination"*. 1st ed. University of Chicago Press.

Bennedsen, M., K. M. Nielsen, F. Perez-Gonzalez, and D. Wolfenzon. 2007. "Inside the family firm: The role of families in succession decisions and performance". *The Quarterly Journal of Economics* 122:647–691.

Bertrand, M., and S. Mullainathan. 2003. "Enjoying the Quiet Life? Corporate Governance and Managerial Preferences". *Journal of Political Economy* 111:1043–1075.

Bloom, N., R. Sadun, and J. Van Reenen. 2016. "Management as a technology?". NBER Working Paper No. 22327.

Bloom, N., and J. Van Reenen. 2007. "Measuring and explaining management practices across firms and countries". *The Quarterly Journal of Economics* 122:1351–1408.

Bloom, N., and J. Van Reenen. 2010. "Why do management practices differ across firms and countries?"". *Journal of Economic Perspectives* 24:203–24.

Burkart, M., and F. Panunzi. 2006. "Agency conflicts, ownership concentration, and legal shareholder protection". *Journal of Financial Intermediation* 15:1–31.

Burkart, M., F. Panunzi, and A. Shleifer. 2003. "Family firms". *The Journal of Finance* 58:2167–2201.

Coraggio, L., M. Pagano, A. Scognamiglio, and J. Tåg. 2022. "JAQ of all trades: Job mismatch, firm productivity and managerial quality". CEPR Discussion Paper No. 13794.

Dato, S., A. Grunewald, and M. Kräkel. 2021. "Worker visibility and firms' retention policies". *Journal of Economics & Management Strategy* 30:168–202.

Desai, M. A., A. Dyck, and L. Zingales. 2007. "Theft and taxes". *Journal of Financial Economics* 84:591–623.

Dessein, W., and R. Holden. 2022. "Organizations with power-hungry agents". *The Journal of Law and Economics* 65:S263–S291.

DeVaro, J., and M. Waldman. 2012. "The signaling role of promotions: further theory and empirical evidence". *Journal of Labor Economics* 30:91–147.

Di Porto, E., M. Pagano, V. Pezone, R. Saggio, and F. Schivardi. 2024. "Careers and wages in family firms: evidence from matched employer-employee data". *Unpublished Manuscript* .

Dicks, D. L. 2012. "Executive compensation and the role for corporate governance regulation". *The Review of Financial Studies* 25:1971–2004.

Dyck, A., and L. Zingales. 2004. "Private benefits of control: An international comparison". *The Journal of Finance* 59:537–600.

Friebel, G., and M. Raith. 2004. "Abuse of authority and hierarchical communication". *The RAND Journal of Economics* 35:224–244.

Friedman, M. 1962. *"Capitalism and freedom"*. University of Chicago Press.

Friedman, M. 1970. "A Friedman doctrine: The social responsibility of business is to increase its profits". *The New York Times Magazine* Section SM:17.

Lemos, R., and D. Scur. 2019. "The ties that bind: Implicit contracts and management practices in family-run firms". CEPR Discussion Paper No. 13794.

Levit, D., and N. Malenko. 2016. "The labor market for directors and externalities in corporate governance". *The Journal of Finance* 71:775–808.

Lippi, F., and F. Schivardi. 2014. "Corporate control and executive selection". *Quantitative Economics* 5:417–456.

Magill, M., M. Quinzii, and J.-C. Rochet. 2015. "A theory of the stakeholder corporation". *Econometrica* 83:1685–1725.

Minni, V. 2023. "Making the invisible hand visible: Managers and the allocation of workers to jobs". *CEPR discussion paper* n. 1948.

Pagano, M., and P. Volpin. 2005. "Managers, Workers, and Corporate Control". *The Journal of Finance* 60:841–868.

Pastorino, E. 2024. Careers in firms: The role of learning about ability and human capital acquisition. *Journal of Political Economy* 132:1783–2178.

Pellegrino, B., and L. Zingales. 2022. "Diagnosing the italian disease". NBER Working Paper No. 23964.

Pikulina, E. S., and D. Ferreira. 2023. "Subtle discrimination". *ECGI Working paper* n. 903.

Prendergast, C., and R. H. Topel. 1996. "Favoritism in organizations". *Journal of Political Economy* 104:958–978.

Shleifer, A., and R. W. Vishny. 1997. "A survey of corporate governance". *The Journal of Finance* 52:737–783.

Tirole, J. 2001. "Corporate governance". *Econometrica* 69:1–35.

Waldman, M. 1984. "Job assignments, signalling, and efficiency". *The RAND Journal of Economics* 15:255–267.

Appendix A: Proofs of Lemmas and Propositions

Proof of Lemma 1

To determine firms' optimal wage schedule, first notice that non-promoted workers earn the reservation wage w_0 as they do not exert effort to produce their output. For promoted workers, instead, let the entrepreneur design the menu of wages $\{\underline{w}, \bar{w}\}$ contingent on output realization, such that $\bar{w}$ is paid to managers who raise the firm's productivity to $N(1+\delta)x$ while $\underline{w}$ is paid to managers who do not raise the firm's productivity, which is then Nx. Consider first the case in which a low-skill worker is promoted. If so, the manager will not increase the firm's output, irrespective of her effort choice. Hence the entrepreneur maximizes profits only subject to worker's participation constraint (PC):

$$\begin{aligned} \max_{\underline{w}} \quad & Nx - (N-1)w_0 - \underline{w} \\ \text{s.t.} \quad & \underline{w} \geq w_0. \qquad (PC) \end{aligned}$$

Since the objective function is linearly decreasing in $\underline{w}$, the unique optimal solution is $\underline{w} = w_0$, so that all employees earn the reservation wage irrespective of whether they are promoted or not so that the firm's profit is $N(x - w_0)$.

Next, consider the case in which a high-skill worker is promoted to the managerial position. Since such a manager can be induced to exert effort, the entrepreneur will present her with a wage schedule that maximizes the firm's profit subject to her participation, incentive compatibility (IC) and limited liability (LL) constraints:

$$\begin{aligned} \max_{\underline{w};\overline{w}} \quad & (1+\delta)Nx - (N-1)w_0 - \overline{w} \ , \\ \text{s.t.} \quad & \overline{w} - c \geq w_0, & (PC) \\ & \overline{w} - c \geq p\overline{w} + (1-p)\underline{w}, & (IC) \\ & \underline{w} \geq 0. & (LL) \end{aligned}$$

As the optimal $\underline{w}$ is the lowest possible, the (LL) condition binds, so that $\underline{w} = 0$. Furthermore, by the (PC) and (IC) conditions, $\overline{w} = \max\{\frac{c}{1-p}, w_0 + c\}$ which by assumption (2) yields $\overline{w} = \frac{c}{1-p}$. Hence in equilibrium the incentive compatibility constraint binds, while the (PC) is slack. ■

Proof of Lemma 2

First, let us show that, if the entrepreneur wishes to extract private benefits of control and were to promote high-skill workers, he would not want to elicit effort from them. As can be seen by looking at the lower branch of the tree in Figure 3, if the entrepreneur were to promote a skilled worker and provide her with incentives to exert effort, his payoff would be

$$\alpha[N(x - w_0) - \rho] + (1 - \lambda)B(1 - g), \tag{14}$$

while if he were not to provide her with such incentive, his payoff would be

$$\alpha N(x - w_0) + (1 - p)B(1 - g) + p(1 - \lambda)B(1 - g). \tag{15}$$

Clearly, expression (15) exceeds (14). Hence, if the entrepreneur wishes to extract private benefits of control, he will not find it optimal to offer a pay-for-performance contract to skilled workers.

The next step is to show that, if the entrepreneur wishes to extract private benefits of control, it is optimal for him to promote a low-skill worker rather than a high-skill one without an incentive contract. In the first case, the entrepreneur's payoff is

$$\alpha N(x - w_0) + B(1 - g), \tag{16}$$

while in the second case it is

$$(1 - p)[\alpha N(x - w_0) + B(1 - g)] + p[\alpha N(x - w_0) + (1 - \lambda)B(1 - g)]. \tag{17}$$

Since expression (16) exceeds (17), appointing a low-skill manager is optimal for an entrepreneur who wishes to extract private benefits.

If instead the entrepreneur does not wish to extract private benefits, his promotion policy aims at maximizing the firm's profits. As can be seen by looking at the upper branch of the tree in Figure 3, it is not optimal to induce low-skill managers to exert effort, as they always produce Nx. Instead, upon promoting a high-skill worker, the entrepreneur will want to elicit effort from her if

$$\alpha\{N[(1 + \delta)x - w_0] - \rho\} \geq \alpha\{(1 - p)N(x - w_0) + pN[(1 + \delta)x - w_0]\}, \tag{18}$$

where the left-hand side is the profit from eliciting effort from the skilled worker and the right-hand side is the profit from not doing so. This condition simplifies to $(1-p)N\delta x-\rho \geq 0$, which is satisfied under our assumption (3). Hence, upon promoting a high-skill worker, eliciting effort is optimal for an entrepreneur who does not wish to extract private benefits.

It remains to be shown that for an entrepreneur who does not wish to extract private benefits of control, promoting a high-skill worker and eliciting effort generates a larger monetary payoff than promoting a low-skill worker. In the first case, the monetary payoff to the entrepreneur is

$$\alpha\{N[(1+\delta)x - w_0] - \rho\}, \tag{19}$$

while, in the second case, it is

$$\alpha N(x - w_0). \tag{20}$$

Since $N\delta x > \rho$, to maximize profits, an entrepreneur should optimally promote and incentivize high-skill workers instead of promoting a low-skill one. ■

Proof of Proposition 1

To prove this proposition, note that the equilibrium stake that satisfies the investors' participation constraint (6) may either violate or satisfy the entrepreneurs' incentive constraint (5). Violation occurs if the stake that meets the participation constraint is $\alpha_L^* < \widehat{\alpha}$, which can be rewritten as a condition on B:

$$B > \frac{N\delta x - \rho}{1-g}\left(1 - \frac{I-A}{\pi_L}\right) \equiv B^{**} \tag{21}$$

Hence, an entrepreneur placing value $B > B^{**}$ on private benefits of control inefficiently promotes low-skill workers.

Satisfaction occurs if the stake that meets the participation constraint is $\alpha_H^* \geq \widehat{\alpha}$, which yields another condition on B:

$$B \leq \frac{N\delta x - \rho}{1-g}\left(1 - \frac{I-A}{\pi_H}\right) \equiv B^{*}. \tag{22}$$

Hence, if $B < B^*$, the entrepreneur promotes high-skill workers.

Comparing the two cutoffs B^* and B^{**}, one sees immediately that $B^* > B^{**}$, and

the interval (B^{**}, B^*) is non-empty. The entrepreneur's promotion strategy for any $B \in (B^{**}, B^*)$ is determined by comparing the payoffs $\alpha_H^* \pi_H$ and $\alpha_L^* \pi_L + (1-g)B$: in this interval, the entrepreneur promotes high-skill workers if

$$N\delta x - \rho > (1-g)B \iff B < \frac{N\delta x - \rho}{1-g}.$$

Notice that $B^* < \frac{N\delta x - \rho}{1-g}$, so that entrepreneurs promote high-skill workers if their valuation of private benefits of control is $B \leq B^*$ and low-skill workers otherwise. ■

Proof of Proposition 3

Denote the equilibrium fraction of skilled workers by m_H^*. Workers have an incentive to acquire skills if the marginal benefit from doing so exceeds the marginal cost, i.e.

$$\underbrace{\frac{q(\rho - c)}{M m_H^*}}_{\equiv \bar{\psi}} \geq \psi. \tag{23}$$

Denote by $\bar{\psi}(m_H^*, N, M, \delta, x, \bar{B}, \rho, w_0, g)$ the expected benefit from skill acquisition in equilibrium. If condition (23) is taken with equality, it defines a unique fraction of workers m_H^* acquiring skills, such that $\psi = \bar{\psi}(\cdot)$, as $\bar{\psi}(\cdot)$ is monotonically decreasing in m_H^*.

The equilibrium share of high-skill workers in the market is therefore

$$m_H^* = \frac{1}{M\psi\overline{B}(1-g)} \left[1 - \frac{I - A}{N[(1+\delta)x - w_0] - \rho} \right] (N\delta x - \rho)(\rho - c) \tag{24}$$

It is immediate to see that m_H^* is decreasing in $\overline{B}, M$ and ψ, while it is increasing in g and A. To determine the impact of the managers' pay gap (ρ) on m_H^*, let us compute the first and second derivatives of m_H^* with respect to ρ:

$$\frac{\partial m_H^*}{\partial \rho} = \frac{(N\delta x - 2\rho + c)}{M\psi\overline{B}(1-g)} \left(1 - \frac{I - A}{\pi_H} \right) - \frac{(I - A)(N\delta x - \rho)(\rho - c)}{\bar{B} M \psi m_H^* \pi_H^2} \tag{25}$$

and

$$\frac{\partial^2 m_H^*}{\partial \rho^2} = -\frac{2}{\pi_H \bar{B} M \psi (1-g)} \left[\pi_H - (I-A) \left(1 - \frac{N\delta x - 2\rho + c}{\pi_H} - \frac{(N\delta x - \rho)(\rho - c)}{\pi_H^2} \right) \right]. \quad (26)$$

Let us next consider the sign of this second derivative at a stationary level of ρ for the function m_H^* to determine whether the latter is concave or convex. The stationary point ρ^* is derived from the first-order condition $\partial m_H^* / \partial \rho = 0$:

$$N\delta x - 2\rho^* + c = \frac{(I-A)(N\delta x - \rho^*)(\rho^* - c)}{\pi_H [\pi_H - (I-A)]} \quad (27)$$

Using this condition in the second derivative (26) yields

$$-\frac{2}{\pi_H \bar{B} M \psi (1-g)} \left\{ \underbrace{\pi_H - (I-A)}_{>0} + \underbrace{\frac{(I-A)(N\delta x - \rho^*)(\rho^* - c)}{\pi_H^2} \left[1 + \frac{(I-A)}{\pi_H - (I-A)} \right]}_{\geq 0} \right\} < 0, \quad (28)$$

implying that at the stationary point the second derivative is strictly negative, so that m_H^* is strictly concave in ρ: $\frac{\partial m_H^*}{\partial \rho} \geq 0$ for any $\rho \leq \rho^*$ and $\frac{\partial m_H^*}{\partial \rho} < 0$ for any $\rho > \rho^*$. ■

Proof of Proposition 4

To prove this proposition, it is convenient to define the constant $\beta \equiv B^*(1-g)$.

(i) The first derivative of the social welfare function described by (11) with respect to g is

$$\frac{\partial SW}{\partial g} = \frac{B^*}{\bar{B}(1-g)} \left[N\delta x - c - (1-g)\frac{B^* + \bar{B}}{2} \right] - \frac{1-q}{2} \left(2B^* + \bar{B} \right). \quad (29)$$

Derivative (29) is positive if and only if

$$[\bar{B}(1-g)]^2 + \beta[\beta - 2(N\delta x - c)] \leq 0, \quad (30)$$

which holds for

$$g \in [g', g''] \equiv \left[1 - \sqrt{\frac{\beta}{\bar{B}^2}[2(N\delta x - c) - \beta]}, 1 + \sqrt{\frac{\beta}{\bar{B}^2}[2(N\delta x - c) - \beta]} \right]. \quad (31)$$

The inequality $g \geq g'$ defines the lower bound stated in part (i) of Proposition 4. This bound is always met if $g' < 0$, i.e., $\bar{B} \leq \sqrt{\beta[2(N\delta x - c) - \beta]}$. The inequality $g \leq g''$, instead, is always satisfied, since $g'' > 1$. To see this, note that $\beta \equiv (N\delta x - \rho)\left[1 - \frac{(I-A)}{\pi_H}\right] < N\delta x - \rho$ and $N\delta x - c \geq N\delta x - \rho$, implying $2(N\delta x - c) > \beta$.

(ii) The derivative of social welfare (11) with respect to ρ is

$$\frac{\partial SW}{\partial \rho} = \frac{\partial q}{\partial \rho}[N\delta x - c - \beta]. \tag{32}$$

Note that $N\delta x - c - \beta > 0$ since $\beta < N\delta x - \rho \leq N\delta x - c$. Hence:

$$\text{sign}\left(\frac{\partial SW}{\partial \rho}\right) = \text{sign}\left(\frac{\partial q}{\partial \rho}\right).$$

Differentiating expression (8) with respect to ρ yields

$$\frac{\partial q}{\partial \rho} = -\frac{1}{\bar{B}(1-g)}\left[1 - \frac{(I-A)\pi_L}{\pi_H^2}\right] < 0, \tag{33}$$

which proves that $\frac{\partial SW}{\partial \rho} < 0$.

The mixed derivative of social welfare with respect to g and ρ is also negative:

$$\frac{\partial^2 SW}{\partial g \partial \rho} = \frac{\partial^2 SW}{\partial \rho \partial g} = \underbrace{\frac{\partial q}{\partial \rho}}_{<0}\underbrace{\frac{N\delta x - c - \beta}{1-g}}_{>0} < 0. \tag{34}$$

■

Proof of Proposition 5

Proof. Let $\bar{g}$ be the threshold value of g such that for any $g \geq \bar{g}$ all entrepreneurs adopt meritocratic promotion policies, i.e., $\bar{g} : B^* = \bar{B}$. Recalling that B^* is defined by expression (8) and that $\beta \equiv B^*(1-g)$, we obtain

$$\bar{g} = 1 - \frac{\beta}{\bar{B}} > \underline{g}, \tag{35}$$

where $\bar{g} \in [0, 1)$ as $\beta \leq \bar{B}$.

Consider a reform increasing corporate governance standards from $g_0 < \bar{g}$ to $g_1 \geq \bar{g}$. Absent such reform, entrepreneurs that place sufficiently high value B on private benefits (i.e., such that $B > B^*$) would not promote according to merit, by Proposition 1. The expected payoff of entrepreneurs opting for non-meritocratic promotions is $\alpha_L^* \pi_L + B(1-g_0)$. As α_L^* is defined by (6), this payoff is

$$\pi_L - (I - A) + B(1 - g_0). \tag{36}$$

If instead the reform is passed, all entrepreneurs will promote according to merit, and their payoff becomes $\alpha_H^* \pi_H$, which by (6) is

$$\pi_H - (I - A). \tag{37}$$

The difference between payoffs (37) and (36) is

$$N\delta x - \rho - B(1 - g_0). \tag{38}$$

The reform shifting g from g_0 to g_1 yields a Pareto improvement if the difference in (38) is positive, i.e., if $N\delta x - \rho \geq \bar{B}(1 - g_0)$ which is true for any $g \geq \underline{g} \equiv 1 - \frac{N\delta x - \rho}{B}$. Thus, if $g_0 \in [\underline{g}, \bar{g}]$ and $g_1 \geq \bar{g}$, the reform makes every entrepreneur better off, i.e., it entails a Pareto improvement. ■

Appendix B: Relaxing Assumptions (2) or (3)

In this appendix we show that relaxing either assumption (2) or assumption (3) generates wages for skilled managers that will lead to a subgame-perfect Nash equilibrium where no worker has an incentive to acquire skills. First, consider relaxing assumption (2), so that $\frac{c}{1-p} - c < w_0$. By Lemma 1, the entrepreneur offers the contract $\{\overline{w}, \underline{w}\} = \{w_0 + c, 0\}$ to promoted high-type workers so as to elicit effort from them. Then, by Lemma 2 an entrepreneur who does not wish to extract private benefits will offer an incentive wage to high-skill managers if

$$\alpha\{N[(1+\delta)x - w_0] - \rho\} \geq \alpha\{(1-p)N(x - w_0) + pN[x(1+\delta) - w_0)\} \iff N\delta x \geq \frac{c}{1-p},$$

which is ensured by condition (3). The entrepreneur is then meritocratic in promotions if

$$\alpha(1-p)\{N[(x(1+\delta)-w_0]-c\} \geq \alpha N(x-w_0)+B(1-g) \iff \alpha \geq \widehat{\alpha} \equiv \frac{B(1-g)}{N\delta x - c}, \quad (39)$$

In the labor market equilibrium, high-skill workers are indifferent between applying for jobs in meritocratic or non-meritocratic firms. Hence, at stage 0 of the game, workers will not have an incentive to acquire skills at cost ψ, as this cost exceeds any later benefit, so that there will be no skilled worker in the economy, and therefore no meritocratic promotions are possible at stage 3.

Next, consider relaxing assumption (3), so that $N\delta x(1-p)+w_0-\frac{c}{1-p}<0$. In this case, the incentive-compatible contract for skilled managers is $\{\bar{w},\underline{w}\}=\{\frac{c}{1-p},0\}$. However, from Lemma 2, the entrepreneur's expected profit is greater if, rather than offering this incentive-compatible contract, pays the skilled manager the reservation wage w_0, so that the latter shirks and generates the productivity increase $N\delta x$ with probability p. Thus, skilled managers do not earn rents on top of the reservation wage, so that at $t=0$ no worker will be willing to acquire skills at cost ψ. Hence, as in the previous case, in equilibrium there will be no skilled workers in the economy.

Appendix C: Analysis of the Model with Risky Output

We now show that in a model with risky output outlined in section 9, debt and equity have a similar impact on firms' promotion strategies.

Let us first define optimal wages in this modified model, by proving the equivalent of Lemma 1. First, note that now workers' participation constraint requires workers' expected wage to equal their reservation wage, taking into account that the firm will not pay any wage to its employees in the state in which it produces no output. When promoting a low-skill worker, the firms does not provide her with incentives to exert effort, and therefore set the wage so as to meet workers' participation constraint:

$$\phi_L \bar{w} \geq w_0$$

implying that both workers and the manager earn $\bar{w}=\frac{w_0}{\phi_L}$.

Next, consider the case in which the firm promotes a skilled worker. In this case, all non-promoted workers earn a wage $w=\frac{w_0}{\phi_H}$, while the manager faces the participation

constraint:

$$\phi_H \bar{w} - c \geq w_0 \tag{PC}$$

and the incentive compatibility constraint:

$$\phi_H \bar{w} - c \geq p\phi_H \bar{w} + (1-p)\phi_L \bar{w}. \tag{IC}$$

By these two constraints, the skilled manager earns

$$\bar{w} = \max\left\{\frac{c}{(1-p)(\phi_H - \phi_L)}, \frac{w_0 + c}{\phi_H}\right\}.$$

Hence, in this modified model the manager's pay gap becomes $\rho \equiv \frac{c}{(1-p)(\phi_H-\phi_L)} - \frac{w_0}{\phi_H}$. Now, suppose that high-skill managers faced with a pay-for-performance contract will exert effort, as the resulting net payoff exceeds the reservation wage: $\rho \geq \frac{c}{\phi_H}$, as assumed in the baseline model with condition (2). Then, when the firm promotes a high-skill worker, the latter earns $\bar{w} = \frac{c}{(1-p)(\phi_H-\phi_L)}$ and other employees earn $w = \frac{w_0}{\phi_H}$.

Next, we derive firms' optimal promotion and incentive strategies, depending on whether entrepreneurs wish to maximize profits or extract private benefits, as done in Lemma 2 in the baseline model. We do so in two alternative scenarios: when the firm is equity-financed and when it is debt-financed, in order to show that the results of Lemma 2 obtain in both cases, and that the optimal promotion strategies are similar in the two cases.

Equity-Financed Firm

Suppose that the firm is equity-finance, and that the entrepreneur wishes to extract private benefits of control. If he were to promote a high-skill worker and to elicit effort from her, his payoff would be

$$\alpha[\phi_L(Nx - \rho) - Nw_0] + (1-\lambda)B(1-g), \tag{40}$$

while if he were not to provide the manager with such incentive, his payoff would be

$$\alpha N(\phi_L x - w_0) + (1-p)B(1-g) + p(1-\lambda)B(1-g). \tag{41}$$

As expression (41) exceeds (40), an entrepreneur who wishes to extract private benefits will not find it optimal to offer an incentive contract to skilled managers.

The next step is to show that an entrepreneur who is willing to extract private benefits of control finds it optimal to promote a low-skill worker rather than a high-skill one without an incentive contract. In the first case, the entrepreneur's payoff is

$$\alpha N(\phi_L x - w_0) + B(1-g), \tag{42}$$

while in the second it is

$$\alpha N(\phi_L x - w_0) + (1-p)B(1-g) + p(1-\lambda)B(1-g). \tag{43}$$

As expression (42) exceeds (43), appointing a low-skill manager is optimal for an entrepreneur who wishes to extract private benefits.

Suppose instead that the entrepreneur aims at maximizing the firm's profits. Then, it is not optimal to induce low-skill managers to exert effort, while upon promoting a high-skill worker the entrepreneur will want to elicit effort from her if

$$\alpha[\phi_H(Nx-\rho) - Nw_0] \geq \alpha N[p\phi_H x + (1-p)\phi_L x - w_0], \tag{44}$$

where the left-hand side is the profit from eliciting effort from the skilled worker and the right-hand side is the profit from not doing so. This condition simplifies to $(\phi_H - \phi_L)(1-p)Nx - \phi_H\rho \geq 0$: this is equivalent to condition (3) in the baseline model, which ensures that, when they do not wish to extract private benefits, at least some entrepreneurs have the incentive to promote according to merit and to elicit effort from promoted workers.

It remains to be shown that when the entrepreneur aims at profit maximization, promoting a high-skill worker and eliciting effort generates a larger monetary payoff than promoting a low-skill worker. In the first case, the monetary payoff to the entrepreneur is

$$\alpha[\phi_H(Nx-\rho) - Nw_0], \tag{45}$$

while, in the second case, it is

$$\alpha N(\phi_L x - w_0). \tag{46}$$

Since $(1-p)(\phi_H - \phi_L)N\delta x > \phi_H\rho$ by condition (44), an entrepreneur who does not wish to extract private benefits will promote and incentivize high-skill workers rather than promoting a low-skill one.

Finally, in an equity-financed firm the entrepreneur wishes to maximize profits rather

than extracting private benefits of control if

$$\alpha[\phi_H(Nx-\rho)-Nw_0] \geq \alpha N(\phi_L x - w_0) + B(1-g),$$

yielding the condition

$$\alpha \geq \widehat{\alpha} \equiv \frac{B(1-g)}{(\phi_H-\phi_L)Nx-\phi_H\rho}. \tag{47}$$

Debt-Financed Firm

Suppose now that the firm is debt-financed, and start again from the case in which the entrepreneur wishes to extract private benefits of control. If he were to promote high-skill workers and to elicit effort from them, his payoff would be

$$\phi_L(Nx-\rho-D)-Nw_0+(1-\lambda)B(1-g) \tag{48}$$

while if he were not to provide her with such incentive, his payoff would be

$$\phi_L(Nx-D)-Nw_0+(1-p)B(1-g)+p(1-\lambda)B(1-g). \tag{49}$$

As expression (49) exceeds (48), the entrepreneur will not offer an incentive contract to skilled managers in this scenario.

The next step is to show that an entrepreneur who wishes to extract private benefits of control will optimally promote a low-skill worker rather than a high-skill one without an incentive contract. In the first case, the entrepreneur's payoff is

$$\phi_L(Nx-D)-Nw_0+B(1-g), \tag{50}$$

while in the second case it is

$$\phi_L(Nx-D)-Nw_0+(1-p)B(1-g)+p(1-\lambda)B(1-g). \tag{51}$$

As expression (50) exceeds (51), appointing a low-skill manager is optimal for an entrepreneur who wishes to extract private benefits.

Suppose instead that the entrepreneur aims at maximizing the firm's profits. Then, it is not optimal to induce low-skill managers to exert effort, while upon promoting a high-skill

worker the entrepreneur will want to elicit effort from her if

$$\phi_H(Nx - \rho - D) - Nw_0 \geq p\phi_H(Nx - D) + (1-p)\phi_L(Nx - D) - Nw_0, \tag{52}$$

where the left-hand side is the profit from eliciting effort from the skilled worker and the right-hand side is the profit from not doing so. This condition simplifies to $(\phi_H - \phi_L)(1 - p)(Nx - D) - \phi_H\rho \geq 0$: again, this condition is equivalent to condition (3) in the baseline model, which ensures that, when they do not wish to extract private benefits, at least some entrepreneurs have the incentive to promote according to merit and to elicit effort from promoted workers.

It remains to be shown that when the entrepreneur aims at profit maximization, promoting a high-skill worker and eliciting effort generates a larger monetary payoff than promoting a low-skill worker. In the first case, the monetary payoff to the entrepreneur is

$$\phi_H(Nx - \rho - D) - Nw_0, \tag{53}$$

while, in the second case, it is

$$\phi_L(Nx - D) - Nw_0. \tag{54}$$

Since $(1-p)(\phi_H - \phi_L)(N\delta x - D) > \phi_H\rho$ by (52), an entrepreneur who does not wish to extract private benefits will promote and incentivize high-skill workers rather than promoting a low-skill one.

Finally, in a debt-financed firm the entrepreneur wishes to maximize profits rather than extracting private benefits of control if

$$\phi_H(Nx - \rho - D) - Nw_0 \geq \phi_L(Nx - D) - Nw_0 + B(1-g),$$

yielding the condition

$$D \leq \widehat{D} \equiv \frac{(\phi_H - \phi_L)Nx - \phi_H\rho - B(1-g)}{\phi_H - \phi_L}. \tag{55}$$

Comparing Cutoffs Under Debt and Equity Financing

We now show that conditions (47) and (55) are similar, in the sense that changes in parameter values have the same impact on firms' optimal promotion strategies in the two cases.

Notice that an increase in external funding implies a smaller value of the entrepreneur's stake α with equity financing and a larger value of the amount of debt issued by the firm D under debt financing, so if the comparative statics with respect to $\widehat{\alpha}$ and $\widehat{D}$ have opposite signs, they have the same qualitative impact on promotion policies in the two cases.

First, we differentiate the two cutoffs with respect to the expected private benefits of control $B(1-g)$. In this case,

$$\frac{\partial \widehat{\alpha}}{\partial B(1-g)} > 0 \text{ and } \frac{\partial \widehat{D}}{\partial B(1-g)} < 0,$$

so that in both cases the conditions in (47) and (55) are less likely to be met, i.e., the parameter region where the firm is meritocratic shrinks. Similarly, an increase in the pay gap ρ yields

$$\frac{\partial \widehat{\alpha}}{\partial \rho} > 0 \text{ and } \frac{\partial \widehat{D}}{\partial \rho} < 0,$$

and therefore reduces firms' incentive to promote according to merit. The same occurs if the probability of success of a low-skill manager ϕ_L increases and/or the probability of success of high-skill manager under incentive pay decreases:

$$\frac{\partial \widehat{\alpha}}{\partial \phi_L} > 0 \text{ and } \frac{\partial \widehat{D}}{\partial \phi_L} = -\frac{[\phi_H \rho + B(1-g)]}{(\phi_H - \phi_L)^2} < 0,$$

while

$$\frac{\partial \widehat{\alpha}}{\partial \phi_H} < 0 \text{ and } \frac{\partial \widehat{D}}{\partial \phi_H} = \frac{B(1-g) + \phi_L \rho}{(\phi_H - \phi_L)^2} > 0.$$

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