THE JOURNAL OF FINANCE • VOL. LXIV, NO. 2 • APRIL 2009

Work Ethic, Employment Contracts, and Firm Value

BRUCE IAN CARLIN and SIMON GERVAIS*

ABSTRACT

We analyze how the work ethic of managers impacts a firm's employment contracts, riskiness, growth potential, and organizational structure. Flat contracts are optimal for diligent managers because they reduce risk-sharing costs, but they attract egoistic agents who shirk and unskilled agents who add no value. Stable, bureaucratic firms with low growth potential are more likely to gain value from managerial diligence. Firms that hire from a virtuous pool of agents are more conservative in their investments and have a horizontal corporate structure. Our theory also yields several testable implications that distinguish it from standard agency models.

EVER SINCE BERLE AND MEANS (1932) recognized that the separation of ownership and control impacts firm value, economists have focused on ways to mitigate the agency problems that arise between shareholders and managers. Agency theory is now ubiquitous in corporate finance as an important determinant of firm size, capital structure, corporate governance, and firm value.[1]

Traditionally, agency theory is founded on the principle that managers are egoistic and must be given incentives to act in the best interests of the firm.[2] However, this framework largely ignores the possibility that some managers are innately diligent and do not pose a moral hazard threat. This shortcoming is highlighted by Brennan (1994), who argues that there is a significant difference between being rational and being self-interested. That is, to assume that

*Bruce Carlin is from the University of California at Los Angeles; Simon Gervais is from Duke University. The authors thank the anonymous Acting Editor, who provided valuable advice. The authors would also like to thank Alon Brav, Pino Lopomo, and David Robinson for helpful discussions throughout the project. Also providing useful comments and suggestions were Michael Brandt, Amil Dasgupta, Paolo Fulghieri, Shimon Kogan, Tracy Lewis, Rich Mathews, Curtis Taylor, two anonymous referees, and seminar participants at Duke University, Singapore Management University, National University of Singapore, Hong Kong University of Science and Technology, the University of California at Irvine, INSEAD, the University of North Carolina at Chapel Hill, and the annual conference of the Financial Research Association. All remaining errors are the authors' responsibility.

[1] For the effect on firm size, see Walkling and Long (1984), Jensen (1986), Shleifer and Vishny (1989), and Morck, Shleifer, and Vishny (1990). For that on capital structure, see Jensen and Meckling (1976), Myers (1977), Myers and Majluf (1984), Stulz (1990), and Dewatripont and Tirole (1994). For that on corporate governance, see Fama and Jensen (1983a, 1983b), Williamson (1988), and Shleifer and Vishny (1997). For that on firm value, see Fama (1980), Morck, Shleifer, and Vishny (1988), and Bolton and Scharfstein (1990).

[2] Key papers that formally develop this theory of agency include Ross (1973), Jensen and Meckling (1976), Harris and Raviv (1979), and Holmström (1979).

rational beings are necessarily egoistic in an agency framework needlessly narrows the scope of the analysis. Indeed, as far back as Aristotle (in *Nicomachean Ethics*), it was proposed that individuals in a civilized society incorporate ethical standards into the decisions that they make (Aristotle, 2004). Similarly, Akerlof (2007) suggests that social norms can impact the overall economy by affecting the choices that people make. This interplay between personal incentives and societal pressures (or morals) has been studied in the fields of psychology (e.g., Judge and Ilies (2002)), law (e.g., Bohnet, Frey, and Huck (2001) and Shavell (2002)), political science (e.g., Rose-Ackerman (1999)), and economics (e.g., Frank (1987) and Sen (1987)). The common theme in all of this literature is that ethical individuals make decisions within a self-imposed moral confine.[3] Applying this to an agency framework, this means that diligent employees have a self-imposed moral constraint that prevents them from shirking, but they rationally internalize the utility costs of this constraint when they accept the job.

With this in mind, we study how managerial diligence and employee work ethic affect the predictions of traditional agency theory and its implications for firm value. We show that the propensity for virtue impacts the employment contracts that firms offer, the expected growth and riskiness of firms, and their corporate structure. More specifically, we address the following questions: When managers are possibly virtuous, what is the optimal employment contract? What is the value of virtuous behavior for the firm and for the agent? Is it possible to screen managers for virtue? How does the manager's level of dedication affect the firm's project choice, growth potential, and riskiness? How does diligence impact incentives and profitability in projects that require teamwork?

To address these questions, we consider a principal-agent model in which agents may be either *egoistic* or *virtuous*. The egoistic agent is the "classic" manager who acts in his own best interest and requires incentives to exert high effort. The egoistic agent is subject to both a participation and an incentive compatibility constraint. In contrast, the virtuous agent always exerts high effort and does not require extra incentives: His word is his bond. This does not mean that virtuous agents give economic surplus away; rather, they anticipate and internalize the fact that they will exert costly effort in some situations when it is not optimal for them to do so. As such, they charge the firm ex ante for this expected effort. From the firm's perspective, hiring a virtuous agent amounts to hiring one whose incentive compatibility constraint is never binding. However, the participation constraint, which ensures that

[3] Closely related ideas about the ethics of agents have been discussed elsewhere. For example, Friedman (1988) argues that managers have a moral obligation to maximize profits and shareholder wealth. Similarly, Arrow (1979) argues that agents will not always act in their own self-interest and instead tend to conform to ethical codes that are more efficient economically. Finally, Akerlof (1982) treats the employment relationship between an employer and his employees as a partial gift exchange in which norms for effort provision are the basis of employment contracts.

the virtuous agent does not foolishly give up economic surplus, still has to be satisfied.

In equilibrium, the firm optimally offers an agent known to be virtuous an employment contract that is different from that offered to an agent that is known to be egoistic. Since a virtuous agent is not bound by an incentive compatibility constraint, the firm can reduce the incentive portion of compensation and offer a larger fixed wage (i.e., offer a flatter compensation contract), which saves the risk-neutral firm the costs of imposing compensation risk onto a risk-averse agent. In this case, firm value increases and the virtuous agent is equally well-off (because his participation constraint must still be satisfied). First-best is achieved and the firm captures the increase in surplus. With an egoistic agent, the firm cannot offer such a contract as the agent would shirk, decreasing the probability that the firm's endeavors are successful.

In general, the firm does not know ex ante whether the agent is virtuous or egoistic because the agent's morality is private information. The firm also faces an adverse selection problem based on the skill of the agent. Thus, agents can be skilled or unskilled, in addition to virtuous or egoistic. We show that firms may use incentive contracts to screen for skill and to guarantee the provision of effort by the managers they do hire. This is not possible with a fixed-wage contract because such a compensation contract is appealing to all types of workers. We also show that it is impossible for the firm to profitably screen for virtuous agents. That is, the firm can never be sure that all managers will exert effort unless it provides them with the appropriate incentives. Therefore, when the firm chooses the optimal employment contract to offer an agent, it faces a tradeoff. Contracts that rely on agents' ethics (i.e., fixed-wage contracts or *ethics-based contracts*) have better risk-sharing properties, whereas incentive contracts screen out unskilled workers and motivate the skilled, egoistic workers to exert effort. There exist conditions under which each type of contract is optimal. Incentive contracts are preferred to fixed-wage contracts when agency costs are relatively low, when the moral standards of the labor population are relatively poor, and when the firm's production relies heavily on labor input, especially for jobs that require specialized skills. As a result, our model predicts that compensation contracts should be more sensitive to performance in small, high-growth firms heavily invested in research and development (R&D). In contrast, compensation contracts in large, mature, low-growth firms with large investments in property, plant, and equipment (PP&E) should offer flatter contracts.

After analyzing how these tradeoffs affect the firm's optimal employment contract, we consider the effect of virtue on the firm's choice of projects and potential for growth. Surprisingly, we find that employee virtue drives firm conservatism. That is, firms are less aggressive in their choice of projects when they know that the pool of agents from which they hire is highly ethical. Because virtuous agents are better matched with safer projects, firms switch from a high-risk strategy that requires incentive contracts and costly risk-sharing to a low-risk strategy and cheaper ethics-based contracts when the labor population's ethics improve. Thus, firms located in areas or countries known for their high morality standards should not only offer flatter compensation contracts, but also pursue a real investment strategy that is less aggressive and less volatile.

Next we consider the situation in which a firm must hire two agents for production. When the production technology requires cooperation between the agents (i.e., when the effort of one agent makes the effort of the second agent more productive), the firm is less likely to offer ethics-based contracts to both agents. This is because, for such a firm, little is gained from only one agent's effort, and so the opportunity cost of shirking is high. To avoid this possibility, the firm relies on incentive contracts that ensure joint effort. The opposite is true when the agents' efforts are substitutes for one another. In this case, the firm gains a lot from the first agent who exerts effort, but much less from the effort of a second agent. The firm is then more likely to rely on the virtue of its agents and offer fixed-wage contracts. Indeed, bureaucratic firms that essentially require the effort of only one of their agents for successful production can offer fixed-wage contracts and hope to have at least one virtuous agent in their ranks. Thus, whereas incentive compensation drives value in firms that require a concerted effort from their agents, virtue is more likely to drive value in more bureaucratic firms.

Finally, we consider optimal employment contracts in a competitive labor market. We analyze two versions of the model, namely a sequential hiring game and a simultaneous hiring game. In both cases, firms are less likely to use ethics-based contracts because this type of employment agreement makes them vulnerable to predatory hiring by their competitors. We show that if one firm offers a fixed-wage contract, their rivals can "cream-skim" away the virtuous types. The intuition is that when a firm offers a fixed-wage contract, the expected utility of egoistic agents is higher than that of otherwise identical but virtuous agents. Indeed, both types of agents receive the fixed wage payment but egoistic agents shirk and save on effort costs. This wedge between the reservation utility of the two types of agents then makes it possible for competitors to steal the virtuous types by offering a contract that meets their reservation utility but not that of the egoistic workers. This leaves the initial firm with egoistic agents who shirk under an ethical contract. Realizing this threat ex ante, the initial firm is more likely to offer incentive contracts in the first place. Therefore, competition for skilled, scarce labor reduces the possibility that ethics-based contracts survive and makes it less likely that virtue creates value in the economy.

At a general level, our results are consistent with Bewley's (1995, 1999) survey evidence that firms use contracts that rely on workers' ethics, and with Schmidt and Hunter's (1998) empirical evidence that employee ethics affect job performance. The novel contribution of our model is to establish a link between population ethics, compensation contracts, and firm characteristics. Indeed, many of the model's empirical implications cannot be generated by classic principal-agent models. For example, firms that draw their labor force from a more diligent population are predicted to use flatter compensation contracts, adopt a safer investment policy, observe a lower rate of growth, and implement a more bureaucratic organizational structure.[4]

To our knowledge, these predictions have never been formally tested previously. Although we do not perform such tests in the paper, we provide the following guidance for future empirical work. The psychology literature has developed several measures of integrity,[5] and these measures have been shown to proxy for diligence (e.g., Murphy and Lee (1994) and Marcus, Lee, and Ashton (2007)). Importantly, these measures also appear to be uncorrelated with skill, job complexity, and the general mental aptitude of employees (e.g., Ones, Viswesvaran, and Schmidt (1993) and Mount, Barrick, and Strauss (1999)), which has the benefit of alleviating some of the potential endogeneity problems that may arise in empirical testing. Our theory predicts that measures of integrity in the population are correlated with firm decisions such as contract choice and investment policy.[6] Ideally, however, to isolate work ethic as an important determinant of agency relationships and to further differentiate our model from standard agency theory, one would want to control for the degree of moral hazard across firms when performing these tests.[7] One way to proceed would be to study firms that employ agents in many locales to perform similar tasks with similar employee discretion. Another test might involve contrasting the decisions and incentives of a firm's agents who have similar jobs in the same location, but who originate from different regions.[8]

Another novel prediction of our model is that competition in the labor market may lead to higher-powered incentives. That is, although fixed-wage contracts can be optimal when the firm has a monopoly on labor, performance-based contracts are more likely to survive as competition increases. This prediction is consistent with the observation made by Shleifer (2004) that competition discourages firms from relying on ethics. However, whereas Shleifer (2004) postulates that this is due to an increase in unethical behavior, we show that

[4] At a macroeconomic level, high virtue societies are predicted to have a smaller proportion of growth firms, slower economic growth, a smaller fraction of individuals with high powered incentives and, as a result, a more skewed distribution of (realized) income across individuals and a lower skill premium (the total compensation of skilled labor relative to that of unskilled labor).

[5] For a review of these measures, see Sackett and Harris (1984) and Sackett, Burris, and Callahan (1989). The validity of these measures has been widely tested (Ones, Viswesvaran, and Schmidt (1993)), and the large number of existing data sets may even render the hand-collection of new observations unnecessary to test our model.

[6] Interestingly, a recent paper by Kaplan, Klebanov, and Sorensen (2007) uses similar data about the assessment of CEO candidates by private equity firms to show that various individual characteristics, including work ethic, correlate with their eventual decisions and performance.

[7] Ackerberg and Botticini (2002) develop an econometric procedure designed to control for the endogenous matching of agents and firms in tests of the relationship between contract choice and firm/agent characteristics.

[8] At a more macroeconomic level, a test of our theory would correlate the social characteristics of a culture or country with economic growth, the shape of compensation contracts, and the wage disparity between skilled and unskilled employees. In fact, Huo and Steers (1993) argue that historical events, political structure, and geography all affect the natural tendency towards work of people in a country. The experimental results of Henrich et al. (2001) also show that the extent of cooperation is different across countries and cultures.

this may arise from the optimal behavior of firms competing for labor. In other words, competition reduces the economic value of virtue, but not necessarily the extent of it.

Our paper is closely related to the work of Noe and Rebello (1994), but is distinct in several respects. They focus on how ethics evolve dynamically over time in business situations. In contrast, we address the issues of optimal employment contracts, project choice, firm strategy and structure, and firm value. Noe and Rebello model ethical behavior as a large disutility for shirking once a project is undertaken by an agent. We instead follow Etzioni (1988) and Sen (1997) and model diligence as a self-imposed constraint. According to Rabin (1995), either modelling technique is acceptable. We have made sure that this distinction does not change the results in our paper. Our model of virtue is also similar to how Somanathan and Rubin (2004) model honesty in the sense that agents keep their commitments. However, the value of this commitment is assumed exogenously in their work, whereas the value of diligence emerges endogenously through contracting in ours.

In our model, diligence arises from a moral obligation. Another common source of diligence is from intrinsic motivation. The two concepts are related but affect the decisions that people make in different ways. Intrinsic motivation captures the idea that some people find effort-costly activities rewarding, even in the absence of external rewards (e.g., DeCharms (1968) and Deci (1975)). That is, people who are intrinsically motivated derive extra utility from merely participating in the activity.[9] In contrast, diligence that originates from morality arises because of self-imposed constraints, and does not directly affect the amount of utility that a person achieves. In particular, the utility cost that a moral agent incurs when performing an effort-intensive job is the same as that for any other agent. Work ethic and intrinsic motivation also differ in how they are affected by external incentives. Psychologists (e.g., Deci (1971) and Lepper and Greene (1978)) and economists (e.g., Baron and Kreps (1999) and Bénabou and Tirole (2003)) have shown that extrinsic (e.g., monetary) rewards can crowd out intrinsic motivation.[10] In contrast, Etzioni (1986, 1988) argues that morality cannot be traded off with monetary payoffs. Thus, whereas external rewards can make agents disinterested and remove the impetus for them to innately exert effort, motivating bonuses do not affect a person's ethics.

The rest of the paper is organized as follows. In Section I, we set up our benchmark principal-agent model and formally introduce the notion of a virtuous agent. We also derive the equilibrium contracts that the firm offers, first in the case in which agent types are common knowledge, and then in the case in which types are privately known by agents. Section II analyzes how a population's work ethic can affect a firm's choice of project and growth prospect. Section III studies the role of work ethic when multiple agents are required and

[9] Economists such as Baron (1988) and Kreps (1997) have considered the possibility that a worker's intrinsic motivation makes the disutility of effort negligible or even negative (i.e., the exertion of effort yields positive utility).

[10] Bénabou and Tirole (2006) also show that extrinsic incentives can reduce the propensity for pro-social behavior.

must interact for production. Section IV studies the effect of competition on the survival of ethics-based contracts. Section V concludes. The Appendix contains all the proofs.

I. The Model

A. Shareholders and Managers

Consider an unlevered firm, owned by risk-neutral shareholders (the *principal*), which initially consists of F dollars in cash and a risky project that expires at the end of one period. The shareholders have the opportunity to hire a manager (the *agent*) to potentially improve the project's expected profitability. The shareholders face an adverse selection problem because managers may be skilled or unskilled, and only a skilled agent can improve the probability that the project succeeds. A manager's ability (or skill) is a random variable denoted by $\tilde{A}$, which takes a value $a \in (0, 1)$ with probability ϕ_a and zero with probability $1 - \phi_a$. Managers privately observe their ability, but cannot credibly communicate it to the shareholders.

The shareholders also face a moral hazard problem because a manager's ability gets impounded into firm value only if they exert effort, which is unobservable. The end-of-period payoff of the firm's project is given by

$$\tilde{v} = \begin{cases} \sigma, & \text{prob. } \tilde{A}\tilde{e} \\ 0, & \text{prob. } 1 - \tilde{A}\tilde{e}, \end{cases} \tag{1}$$

where $\tilde{e} \in \{0, 1\}$ is the manager's choice of effort.[11] Only skilled managers ($\tilde{A} > 0$) who exert effort ($\tilde{e} = 1$) increase the likelihood that the firm's project is successful. Otherwise, if the manager is unskilled or does not exert effort, the project fails with certainty.

In this specification, σa is the expected contribution of a skilled agent to firm value. Because σ is a characteristic of the firm and not the agent, we interpret it as the extent to which the firm depends on labor for its production (as opposed to other factors of production that are not modelled here). For example, a firm with a large σ could be one that relies heavily on R&D, whose assets are less tangible, and/or whose products are more service-oriented. In contrast, a firm with a small σ is one in which less innovation takes place, and/or that is more heavily invested in PP&E. Given the empirical evidence that human capital is a key source of growth (e.g., Schultz (1960) for some early evidence, and Glaeser et al. (2004) for more recent evidence), we sometimes refer to σ as a measure of a firm's growth potential. Parameter a is specific to the agent and measures the potential impact that he can have on firm value, given the firm's growth potential. Because the impact that an employee can have on the firm's

[11] Throughout the paper, we use tildes to denote random variables. The tilde on $\tilde{e}$ is meant to capture the fact that the agent's effort decision is in general a random variable from the firm's perspective.

production varies according to his position, we can also think of a as the agent's rank in the corporate hierarchy of the firm.

Managers also differ in their work ethic (or *ethics* for short). They may be virtuous ($\tilde{t} = 1$) or egoistic ($\tilde{t} = 0$) with probabilities ϕ_t and $1 - \phi_t$. Managers privately observe their level of work ethic, but cannot credibly communicate it ex ante to the shareholders. If hired, egoistic managers only exert effort when the benefits exceed their cost of effort, $c > 0$. They are free to choose $\tilde{e} \in \{0, 1\}$ based on the incentives offered by the firm (to be described shortly). In contrast, virtuous agents face a moral obligation to choose $\tilde{e} = 1$ and to incur the utility cost c of their effort once they accept the position. Like egoistic agents, virtuous agents accept the firm's employment contract only if their expected utility from doing so exceeds their best alternative, that is, if their participation constraint is satisfied. In making this assessment, virtuous agents account for the instances in which they expect to exert effort without proper incentives to do so.

In this model, every agent's type is a pair $\{\tilde{A}, \tilde{t}\}$, which is unobservable by the firm. This two-dimensional type space, and the dual adverse selection problem that accompanies it, contrasts an agent's potential to contribute to firm value ($\tilde{A}$) and his innate propensity to do so ($\tilde{t}$). Although our analysis focuses on $\tilde{t}$ throughout the paper, we will show that the addition of $\tilde{t}$ affects the solution to the more traditional adverse selection problem that only considers agents' skills. In particular, contracts tailored for high ethics types ($\tilde{t} = 1$) tend to attract low skill employees ($\tilde{A} = 0$). As such, the firm must trade off the gains from the natural propensity of some agents to contribute and the deadweight loss imposed by agents whose potential to contribute is low.

In modelling the agent's preferences and ethics this way, we are guided by the work of Etzioni (1986, 1988), who argues that morality cannot be ranked or traded off like the pleasure that one gets from goods or (lottery) payoffs. Instead, he, Prelec (1991), and Sen (1997) suggest that values and principles come in the form of self-imposed constraints in the maximization of one's utility. In particular, the pain and associated utility cost of effort is felt by all; only the propensity to exert effort varies across individuals.[12] Our representation of virtuous behavior as a morality constraint is also consistent with the work of Schelling (1960) and Frank (1987), who argue that the conscience can act as a commitment device (in our case, the commitment to exert effort). As pointed out by Frank (1987), it is not enough that one has a conscience to solve any commitment problem; indeed, it is crucial that others know about it as well. In our model, this last aspect is captured by ϕ_t, which measures the population's moral standards and the extent to which the firm can rely on the agent's ethics.

Because the agent's choice of effort is unobservable, it is noncontractible. This means that the firm can only offer contracts that specify the agent's compensation in the two possible end-of-period states of the world. We denote an

[12] In fact, Nagin et al. (2002) empirically document that agents in employment relationships differ in terms of their moral hazard temptations. In particular, whereas some agents systematically take advantage of shirking opportunities, others act in the best interest of the principal even when it is not personally advantageous.

employment contract in this setting as the pair $\mathcal{C} \equiv \{\omega, \beta\}$, where the manager receives ω in the bad state ($\tilde{v} = 0$) and $\omega + \beta$ in the good state ($\tilde{v} = \sigma$). As such, ω is the manager's fixed wage and β is a lump-sum incentive bonus if the project succeeds.[13] We assume that the agent has no initial wealth and has limited liability, so we restrict ω and $\omega + \beta$ to be nonnegative.

In the spirit of Jensen and Meckling (1976) and Treynor and Black (1976), we assume that because the manager's human capital is less diversified than that of the shareholders, he is risk averse about the outcome of his compensation. The manager's utility from a compensation contract $\mathcal{C} = \{\omega, \beta\}$ is

$$\tilde{u} \equiv \omega + (1 - r)\mathbf{1}_{\{\tilde{v}=\sigma\}}\beta - c\tilde{e}, \tag{2}$$

where the parameter $r \in (0, 1)$ captures the manager's risk aversion. The manager receives ω for sure, but only receives β if the project succeeds and only incurs the cost c if effort is exerted ($\tilde{e} = 1$). Multiplying the second term by $(1 - r)$ measures how much less utility the manager gets from a stochastic bonus versus certain compensation. As $r \to 0$, the manager approaches risk neutrality, and as $r \to 1$, he only values the riskless portion of his compensation and effectively becomes infinitely risk averse. This utility function is similar to that used by Dow (2004) in that it is piecewise linear with a single change of slope. It captures all of the effects that risk aversion has on the agent's choices while maintaining the model's tractability. Finally, we assume that all managers have a reservation utility of $\bar{u} > 0$.

B. Equilibrium with Observable Types

From the firm's perspective, the compensation that it pays the manager is a random variable $\tilde{w} \equiv \omega + \mathbf{1}_{\{\tilde{v}=\sigma\}}\beta$. For simplicity, we assume that the risk associated with the firm's project is idiosyncratic and that the risk-free rate is zero. Therefore, the value of the firm at the beginning of the period, $\bar{V}$, is simply F plus the expected value of $\tilde{\pi} \equiv \tilde{v} - \tilde{w}$, given the endogenous actions taken by the agent if he is hired by the firm. Without a manager, the firm pays no wage (i.e., $\tilde{w} = 0$) and is assumed to be unskilled (i.e., $\tilde{A} = 0$), so that firm value is simply $\bar{V} = F$. For the firm to consider hiring the manager, it is sufficient that σa be large enough relative to c and $\bar{u}$. We assume this to be the case as, otherwise, no hiring ever takes place.[14] The following proposition derives the optimal contracts and resultant firm value when agent types are observable.

PROPOSITION 1: *Suppose that the firm can observe the agent's type $\{\tilde{A}, \tilde{t}\}$. The firm never hires an agent with $\tilde{A} = 0$. If $\tilde{A} = a$ and $\tilde{t} = 0$, then the firm offers an incentive contract $\mathcal{C}_{\mathrm{I}} = \{\omega_{\mathrm{I}}, \beta_{\mathrm{I}}\}$, where $\omega_{\mathrm{I}} = \bar{u}$ and $\beta_{\mathrm{I}} = \frac{c}{a(1-r)}$, and the value*

[13] Making F large enough will ensure that the fixed wage is paid in either state.

[14] As our later derivations will make clear, the technical condition ensuring that hiring the agent is optimal for the firm is $\sigma a > \bar{u} + \frac{c}{1-r}$. This condition is reached by making sure that (3), which is derived in Proposition 1, exceeds F.

of the firm is

$$\bar{V} = F + \sigma a - \bar{u} - \frac{c}{1-r}. \quad (3)$$

If $\tilde{A} = a$ *and* $\tilde{t} = 1$, *then the firm offers an ethics-based contract* $\mathcal{C}_{\mathrm{E}} = \{\omega_{\mathrm{E}}, \beta_{\mathrm{E}}\}$, *where* $\omega_{\mathrm{E}} = \bar{u} + c$ *and* $\beta_{\mathrm{E}} = 0$, *and the value of the firm is*

$$\bar{V} = F + \sigma a - \bar{u} - c. \quad (4)$$

Clearly, the firm never hires an unskilled agent, as such an agent can never improve the firm's value. When the firm knows it is hiring a skilled agent, it maximizes value by finding the cheapest way to compensate the agent and make sure that he chooses $\tilde{e} = 1$. For an egoistic agent, the optimal contract involves the usual tradeoff between incentives and risk-sharing. The contract provides the agent with enough incentive to exert effort. As such, β_{I} is strictly positive. Since compensation is not the same in both states of the world, risk is transferred from the risk-neutral firm to the risk-averse agent, which is costly to the firm.

The tradeoff between incentives and risk-sharing does not apply when the firm knows it is hiring a virtuous agent. Such an agent does not require incentives to exert effort once he accepts the position. This is why $\beta_{\mathrm{E}} = 0$. This does not mean that the virtuous agent gives up surplus; rather, he anticipates his "nonincentivized" effort and requires a larger fixed wage. This is why $\omega_{\mathrm{E}} > \omega_{\mathrm{I}}$. Ex ante, both agents expect the exact same utility, which the firm restricts to be exactly $\bar{u}$ to meet their participation constraint. A simple comparison of (3) and (4) shows that the loss to risk-sharing is $\frac{cr}{1-r}$. This loss is higher when agents are more risk averse and face a larger cost of effort.

C. Equilibrium with Unobservable Types

By Proposition 1, the firm prefers to hire a skilled, virtuous agent and economize on risk-sharing costs. However, the firm does not observe the skill or the ethics of the agent. Instead it only knows the distribution of the various types. As such, contracts are not only used to motivate effort but also to screen agent types.

Our first result shows that the firm cannot profit from screening agents based on their ethics. This is due to the fact that any contract that is attractive to a skilled, virtuous agent is also attractive to an otherwise identical but egoistic agent. First, when such a contract includes a bonus incentive large enough to motivate the egoistic agent to exert effort, both types receive the same expected utility from the contract. Second, when the contract does not motivate the egoistic agent to exert effort, the expected utility of the egoistic agent is larger than that of the virtuous agent. This is because the egoistic agent saves c on effort costs and loses an expected bonus that is worth less than c (since the bonus does not meet his incentive compatibility constraint). In short, if the participation constraint of the virtuous type is satisfied, so is the egoistic type's. This is formalized in the following proposition.

PROPOSITION 2: *Any contract that attracts a virtuous agent of a given skill also attracts an egoistic agent of the same skill. All contracts that attract an egoistic agent of a given skill but do not attract a virtuous agent of the same skill do not motivate any effort provision.*

It is possible for the firm to offer a contract that is attractive to the egoistic agent, but not to an otherwise identical virtuous agent.[15] As Proposition 2 shows, all such contracts fail to meet the egoistic agent's incentive compatibility constraint. This means that the firm could select out egoistic agents and hire them, but the contract that accomplishes this would induce the agent to shirk. Realizing this, the firm never offers these contracts as they represent a deadweight loss.[16]

Given Proposition 2, the firm can limit its choice of contracts to either $\mathcal{C}_{\mathrm{I}}$ or $\mathcal{C}_{\mathrm{E}}$ from Proposition 1. First, since only agents with $\tilde{A} = a$ add value, the firm will hire a skilled type only if the contract meets their participation constraint. That is, it must be that $\mathrm{E}[\tilde{u} \mid \tilde{A} = a] \geq \bar{u}$. Second, firm value is created only if these skilled agents exert effort. We already know from Proposition 1 that both $\mathcal{C}_{\mathrm{I}}$ and $\mathcal{C}_{\mathrm{E}}$ achieve this in the cheapest manner for each of the two ethics types. The following proposition characterizes the tradeoffs faced by the firm when it chooses the contract to offer a prospective agent.

PROPOSITION 3: *When the firm does not know the agent's skill and ethics, it offers the incentive contract $\mathcal{C}_{\mathrm{I}}$ as long as*

$$(1-\phi_a)(\bar{u}+c)+\phi_a(1-\phi_t)\sigma a > \frac{\phi_a c r}{1-r}. \tag{5}$$

Otherwise, the firm offers the ethics-based contract $\mathcal{C}_{\mathrm{E}}$.

The tradeoff in (5) can be appreciated as follows. The two left-hand terms measure the relative benefits of an incentive contract (over an ethics-based contract), whereas the right-hand side measures its relative cost. The first term on the left-hand side measures the firm's gain from screening for skill.[17] This benefit is computed as the probability that agents are unskilled $(1-\phi_a)$ times the inefficient wage that would be lost if the firm had offered an ethics-based contract $\omega_{\mathrm{E}} = \bar{u} + c$ to an unskilled agent. The second term on the left-hand side of (5) measures the extra value created by inducing skilled, egoistic agents to exert effort. This benefit is calculated as the probability that agents are

[15] A trivial example is a contract with $\omega = \bar{u}$ and $\beta = 0$.

[16] Note that allowing the firm to change the terms of the contract after its initial offer would not affect our conclusion as agents would anticipate such changes in their decision to accept or reject the initial offer.

[17] To be technically precise, although it is the case that $\mathrm{E}[\tilde{u} \mid \tilde{A} = 0] = \omega_{\mathrm{I}} = \bar{u}$, it is possible for the firm to screen away unskilled agents by increasing β_{I} by $\frac{\epsilon}{1-r}$ and decreasing ω_{I} by less than $a\epsilon$. We can then make ϵ arbitrarily close to zero for the results to obtain.

skilled and egoistic $\phi_a(1-\phi_t)$ times the expected value of the project in their presence, σa. Finally, the right-hand side of (5) measures the loss in value due to suboptimal risk-sharing. Because the unskilled agents are screened away when the firm offers the incentive contract, the loss from suboptimal risk-sharing is only incurred with skilled agents (i.e., with probability ϕ_a). As such, the expected loss from risk-sharing is calculated as $\frac{\phi_a cr}{1-r}$. Thus, the firm's decision to offer an incentive contract versus an ethics-based contract weighs the benefits of screening and incentives against the cost of suboptimal risk-sharing.

Upon inspection of (5), it is clear that the use of incentive contracts increases with low r, c, and ϕ_t, and with high σ and a. If the agent has a low cost of effort (low c) and a low level of risk aversion (low r), risk-sharing is inexpensive and so incentive contracts are more valuable. If the fraction of agents available who are virtuous is low (low ϕ_t), then it is foolish for the firm to rely on agent ethics for value creation. Finally, if the expected value of the project is high (large σ and large a), then shirking represents a big opportunity cost for the firm. In this case, an incentive contract is preferred.

These comparative statics are quite instructive about the types of firms that will be characterized by flatter contracts, which rely mostly on the ethics of agents. Firms whose production depends more on labor inputs (large σ) will offer contracts that have a stronger dependence on firm performance. Such firms simply cannot afford to rely on the expected ethics of their employees as their main factor of production. Similarly, agents who can affect a firm's production more significantly (large a), either through their skill or their rank in the firm's hierarchy, will receive a larger fraction of their compensation in the forms of stocks, options, and performance-related bonuses. Finally, jobs that require skill-specific labor will be associated with incentive contracts whereas less specialized labor will be paid with fixed wages. This can be seen in (5) if we decrease ϕ_a while keeping $a\phi_a$ constant.

These predictions are largely consistent with the existing literature on compensation contracts.[18] Mehran (1995), Aggarwal and Samwick (1999), Core and Guay (2001), and Palia (2001) all find a positive relationship between incentive compensation and various proxies for growth opportunities, including R&D, market-to-book, and the intangibility of assets as measured by the (inverse-) ratio of PP&E to assets. Ittner, Lambert, and Larcker (2003) also find that "new economy firms" (which they define as firms in the computer, software, internet, telecommunication, and networking industries) provide their nonexecutive labor force with more equity grants. Because the profitability of such firms is largely driven by the quality and effort of labor, relying on virtuous behavior is too risky and done to a lesser extent. The empirical evidence that managerial compensation in larger firms is less sensitive to performance, as documented by Demsetz and Lehn (1985), Hall and Liebman (1998), and Core and Guay (2002), is also consistent with the idea that any one agent cannot affect the profitability of these firms as much as that of small firms. As such, the reliance on ethical behavior becomes more appealing for large firms.

[18] For an excellent survey of this literature, see Core, Guay, and Larcker (2003).

Proposition 3 also yields predictions that further differentiate our model from traditional agency models. In particular, the use of ethics-based contracts does not depend only on the potential contribution of an agent to firm profitability; through ϕ_t, it also depends on the moral characteristics of the population from which the firm draws its labor. This has a number of implications. First, the shape of compensation contracts offered for the same job and the same required skill should vary with the social context of the firm.[19] Second, when ϕ_t is large, we see from (5) that the minimum skill a that justifies an incentive contract is larger. This implies that the skill premium, the total compensation of skilled labor (above a threshold $\bar{a}$, say) relative to that of unskilled labor (below $\bar{a}$), should be smaller in morally sound cultures.[20]

II. Ethics, Project Choice, and Growth

So far, we have assumed that the growth potential of the firm σ is given exogenously. In this section we consider what happens when the firm has access to multiple projects with various levels of reward and risk. In particular, we allow the firm to pick the project profile that puts the characteristics of the agent population to their most profitable use. Counterintuitively, we find that virtue leads to firm conservatism. That is, we show that if the agent population is highly virtuous, it is optimal for a firm to be conservative and choose low-growth, low-risk projects. The opposite holds for a firm that only has access to an agent population that is highly egoistic.

Because we focus the rest of our analysis on the effects of privately known ethics, we assume hereforward on that all agents are equally skilled. That is, we assume that $\phi_a = 1$, so that screening for skill is no longer required ($\tilde{A} = a$) and an agent's type is simply $\tilde{t}$. Also suppose that, instead of being assigned the project $\tilde{v}$ described by (1), the firm can pick one project from a family of available projects $\tilde{v}_\mu$ indexed by $\mu \in [0, 1-a]$ and that this choice occurs before the agent is hired. For any given μ, the end-of-period payoff is

$$\tilde{v}_\mu = \begin{cases} \sigma_\mu, & \text{prob. } a\tilde{e} + \mu \\ 0, & \text{prob. } 1 - (a\tilde{e} + \mu), \end{cases} \tag{6}$$

where σ_μ is calculated so that the mean payoff of any project is the same given that the agent exerts effort. More precisely, $\mathrm{E}[\tilde{v}_\mu \mid \tilde{e} = 1] = (a + \mu)\sigma_\mu$ is equal to the same value m for all $\mu \in [0, 1-a]$. This means that $\sigma_\mu = \frac{m}{a+\mu}$ for any μ. Even though all of the projects have the same expected value given that the agent exerts effort, they differ along three important and related dimensions: the amount of firm growth when the project succeeds, the riskiness of the project,

[19] Of course, this is assuming that the same job in two different locations attracts agents with similar skills and risk aversion.

[20] See Katz and Autor (1999) and Acemoglu (2002) for recent overviews of the literature on wage inequality and the skill premium.

and the total cost that the firm incurs to motivate the agent. Projects with a high μ are less risky, as

$$\mathrm{Var}[\tilde{v}_\mu \mid \tilde{e} = 1] = \sigma_\mu^2 (a+\mu)[1-(a+\mu)] = m^2\left(\frac{1}{a+\mu} - 1\right)$$

is decreasing in μ. However, these projects yield a lower payoff when successful, as σ_μ is decreasing in μ.

We assume that the firm is committed to its choice of project μ when it makes its contractual offer to the agent, that is, the firm does not revise its choice of μ once the agent accepts the contract. Otherwise, the agent could, in his decision to accept or reject the contractual offer, anticipate and undo any project-shifting behavior on the part of the firm. In this sense, the choice of μ captures the idea that firms set their general strategy (e.g., the industry in which they operate or their location) before acquiring all the labor resources that they require for production.

As in Section I.C, for any project μ the firm may limit its scope of contracts to one incentive contract, which we denote by $\mathcal{C}_\mathrm{I}(\mu)$, and the ethics-based contract derived in Proposition 1. The argument for this follows a similar logic as before. Specifically, $\mathcal{C}_\mathrm{I}(\mu)$ is the cheapest incentive contract that induces all agents to exert high effort for a given μ. If the firm intends to rely only on virtuous agents, then the most efficient contract is $\mathcal{C}_\mathrm{E}$. The following lemma formally establishes this result and derives the $\mathcal{C}_\mathrm{I}(\mu)$ contract.

LEMMA 1: *Conditional on undertaking project μ, the firm may limit its contract choice to the following contracts: An incentive contract $\mathcal{C}_\mathrm{I}(\mu) \equiv \{\omega_\mathrm{I}(\mu), \beta_\mathrm{I}\}$ with*

$$\omega_\mathrm{I}(\mu) = \bar{u} - \frac{c\mu}{a} \quad \text{and} \quad \beta_\mathrm{I} = \frac{c}{a(1-r)}, \tag{7}$$

or the ethics-based contract $\mathcal{C}_\mathrm{E}$ of Proposition 1.

It is clear from Lemma 1 that the firm's choice of μ will affect the total cost of the associated incentive contract as well as the relative contributions of the fixed wage and bonus to this cost. For a given μ, the expected wage that is paid with $\mathcal{C}_\mathrm{I}(\mu)$ is

$$E[\tilde{w}] = \left(\bar{u} - \frac{c\mu}{a}\right) + \frac{c}{a(1-r)}(a+\mu).$$

The fixed wage portion of the firm's cost (the first term) is monotonically decreasing in μ, whereas the expected bonus (the second term) is monotonically increasing in μ. This is because any incentive created through β comes with some expected bonus compensation that is not tied to the agent's effort but to other factors of production implicitly included in μ. More precisely, the smallest bonus that motivates an egoistic agent's effort, β_I, implies that the agent not only recoups his effort cost of c but also receives an expected bonus of $\beta_\mathrm{I}\mu$. When μ is high, more of the agent's compensation and expected utility comes from this expected bonus. This makes risk-sharing more costly and the firm more likely to use ethics-based contracts. In contrast, when μ is close to zero, the bonus β_{I} required for effort incentives is lower as the agent's effort is the main input to production and the agent cannot free-ride on other factors. As such, the risk-sharing costs of inducing an egoistic agent to exert effort are smaller for such projects, and the firm is more likely to use incentive contracts.

This relationship between projects and contracts impacts the firm's optimal project choice, given the population of agents it faces. For a given project μ, the firm will choose $\mathcal{C}_{\mathrm{I}}(\mu)$ and $\mathcal{C}_{\mathrm{E}}$ based on the tradeoff between the benefits of incentives and the cost of risk-sharing. Then, in choosing the optimal μ to maximize firm value, the firm not only considers the characteristics of the agent population, but also which employment contract maximizes value. The following proposition characterizes the firm's optimal strategy.

PROPOSITION 4: *The firm chooses the project $\mu = 0$ and offers the manager the incentive contract $\mathcal{C}_{\mathrm{I}}(0) = \mathcal{C}_{\mathrm{I}}$ if and only if*

$$m > \frac{cr}{a(1-r)(1-\phi_t)}. \tag{8}$$

Otherwise, the firm chooses the project $\mu = 1 - a$ and offers the manager the ethics-based contract $\mathcal{C}_{\mathrm{E}}$.

Condition (8) tells us that the firm will choose to be a risky growth firm ($\mu = 0$) when agents are highly skilled (large a), have low aversion to risk (low r), and a low cost of effort (low c). More interestingly and less intuitively, it also tells us that such projects are less likely to be undertaken when the firm can rely on a highly ethical population of potential agents (large ϕ_t). In that case, the firm prefers the better risk-sharing properties and lower cost of the ethics-based contract, and accordingly chooses a project that is safer and does not depend as heavily on the agent's effort for its success. In other words, the firm chooses to rely on the effort of virtuous types as well as on the fact that the project $\mu = 1 - a$ still succeeds with probability $1 - a$ when the egoistic agent shirks. In short, virtue leads to firm conservatism. Interestingly, empirical support for this prediction can be found in the work of Hilary and Hui (2006), who show that firms whose headquarters are located in areas of high religion membership tend to be more conservative on average in their investment and financing decisions.

We can see from (8) that, as before, a virtuous population (large ϕ_t) will tend to be associated with a flatter relationship between wages and performance. Proposition 4 also shows that such a population will prompt local firms to adopt a safer investment policy and, given our previous arguments, these firms will experience lower growth on average. Again, this is consistent with the aforementioned empirical evidence of a positive relationship between incentive compensation and growth. However, the implications of our model can now be further refined: In high-virtue cultures, we should see a smaller proportion of growth firms, slower economic growth, and a smaller fraction of individuals with high-powered incentives. Also, since a smaller fraction of skilled employees will receive bonus compensation, the cross-sectional distribution of wages should be more skewed and the skill premium should be lower.

As in Prendergast (2002), our theory predicts that the relationship between risk and incentives is affected by other decisions that are endogenously made by the firm. Whereas he posits that the monitoring mechanisms that the firm puts in place will differ according to environment risk, we argue that the actual choice of making the environment risky will be endogenously driven by the morality of the labor pool. Indeed, firms that have access to an ethical population of agents will make their operations less risky and rely on flat contracts. Firms in less morally driven cultures must motivate their workers through incentives and these incentives are more powerful when the firms' underlying operations are riskier in the sense that they depend more on labor and less on other factors of production.

III. Multi-Agent Projects and Firm Organization

Up to this point, we have focused on a situation in which only one agent is required to improve the firm's profitability and value. In this section we analyze how ethics affect the firm's choice of employment contracts when multiple managers work towards a common goal. When agents work in teams, they not only affect each other's productivity, but also their incentives to exert high effort (e.g., Anderson and Schmittlein (1984) and Holmström and Milgrom (1991)). In what follows, we consider two general types of projects: those that require cooperative effort (synergy-intensive projects) and those in which synergy is not required to create value. As we show, the proportion of virtuous agents in the population and the synergy required in the project drive both the employment contracts that are offered and the firm's organizational structure.

As in Section I, let us assume that the firm has F dollars in cash and that it owns a project with a random payoff whose prospect can be affected by labor. The firm now must hire two agents, $i \in \{1, 2\}$, to implement a project with a payoff given by

$$\tilde{v} = \begin{cases} \sigma, & \text{prob. } a\tilde{e}^{\gamma} \\ 0, & \text{prob. } 1 - a\tilde{e}^{\gamma}, \end{cases} \tag{9}$$

where $\gamma > 0$, $\tilde{e} = \frac{1}{2}\tilde{e}_1 + \frac{1}{2}\tilde{e}_2$, and $\tilde{e}_i \in \{0, 1\}$ represents the effort decision of agent i. As such, the prospects of the project depend both on the effort exerted by the two agents and the degree of synergy required, which is parameterized by γ. When $\gamma > 1$, the effort of the first agent is less valuable than the effort of the second agent, as $(\frac{1}{2})^{\gamma} < \frac{1}{2}$ but $1 - (\frac{1}{2})^{\gamma} > \frac{1}{2}$. When γ is large, the project requires cooperation by the agents since the effort of only one agent is worth very little to the firm. The opposite is true for $\gamma < 1$. For example, as $\gamma \to 0$, the effort of one agent is enough for $\tilde{e} = (\frac{1}{2})^{\gamma}$ to approach one, and the second agent's effort then has very little impact on the project's probability of success.

As before, because the effort of each agent is unobservable, the compensation contracts that the firm offers each of the two agents only depend on the two possible realizations of $\tilde{v}$. Thus, each agent i receives a contract $\mathcal{C}_i \equiv \{\omega_i, \beta_i\}$ that specifies the fixed-wage (ω_i) and bonus (β_i) portions of their compensation. The agents simultaneously accept or reject these contracts, and we assume that the terms of both contracts are common knowledge to each agent when they make their decisions.

Because the effort of one agent affects the productivity of the other, the two agents effectively engage in a coordination game. As we know from standard game theory, multiple equilibria often occur in these circumstances.[21] In particular, the usual definition of a Nash equilibrium often allows for both of the agents to work or both of the agents to shirk.[22] We adopt the convention that, in these circumstances, agents coordinate to pick the Pareto-dominant equilibrium. As our analysis will show, when multiple equilibria are possible, the two agents always get symmetric expected utility in all equilibria. As such, the Pareto-dominant equilibrium could arise simply from Schelling's (1960) focal-point effect.

The following lemma defines the choice set that the firm faces when it decides what types of contracts to offer each agent. To make the notation simpler, we define the parameter $g \equiv 2^{-\gamma}$ as the group effort $\tilde{e}$ when only one of the two agents exerts effort.

LEMMA 2: *When choosing the contracts to offer the two agents, the firm can restrict its decision to three sets of contracts:*

(i) $\mathcal{C}_{\mathrm{EE}} \equiv \{\mathcal{C}_{\mathrm{E}}, \mathcal{C}_{\mathrm{E}}\}$. *Two ethics-based contracts, as defined in Proposition 1.*

(ii) $\mathcal{C}_{\mathrm{EI}} \equiv \{\mathcal{C}_{\mathrm{E}}, \mathcal{C}_{\mathrm{I1}}\}$. *One ethics-based contract as defined in Proposition 1, and one incentive contract with*

$$\omega_{\mathrm{I1}} = \bar{u} - \frac{c\phi_t g}{\alpha} \quad \text{and} \quad \beta_{\mathrm{I1}} = \frac{c}{a\alpha(1-r)}, \tag{10}$$

where $\alpha \equiv \phi_t(1-g) + (1-\phi_t)g$.

(iii) $\mathcal{C}_{\mathrm{II}} \equiv \{\mathcal{C}_{\mathrm{I2}}, \mathcal{C}_{\mathrm{I2}}\}$. *Two incentive contracts with*

$$\omega_{\mathrm{I2}} = \bar{u} - \frac{gc}{1-g} \quad \text{and} \quad \beta_{\mathrm{I2}} = \frac{c}{a(1-g)(1-r)}. \tag{11}$$

As before, when offering incentive contracts, the firm always uses the smallest possible bonus required to motivate an egoistic agent to exert effort and otherwise uses fixed-wage compensation that satisfies the agents' participation constraint. If the firm offers both agents the same fixed-wage contract with $\mathcal{C}_{\mathrm{EE}}$, it essentially treats them as equals. In this case, the organizational structure of the firm is strictly horizontal. In contrast, when the firm offers

[21] See, for example, Myerson (1991). For an example of a coordination game centering around effort provision, see Bryant (1983).

[22] Note that, because virtuous agents always exert effort, these coordination issues only affect the egoistic agents in our model.

$\mathcal{C}_{\text{EI}}$, it does not treat its agents equally and the firm has a more hierarchical organizational structure. More specifically, the firm induces one agent to work hard by paying an incentive bonus, but pays the other a fixed wage and relies on his virtue. The agent receiving the bonus can be considered the "leader" in the organization, whereas the agent with flatter incentives is the "underling." With $\mathcal{C}_{\text{II}}$, the firm treats the two agents the same by offering them the same incentive contract. In this case, there is no natural leader, but the bonus incentives provided to each agent are reminiscent of those seen in partnerships, as the agents share the value that their joint effort creates.

It is easy to verify that $\beta_{\text{I2}} > \beta_{\text{I1}}$ if and only if $g > \frac{1}{2}$, that is, if the firm's project does not require much synergy between the two agents (i.e., when $\gamma < 1$). Because bonus incentives reduce the efficiency of risk-sharing between the firm and its agents, this means that it will be expensive to sustain cooperation between the two agents when that cooperation is not critical to the firm's success. We therefore expect firms with low levels of synergy across their agents to rely more heavily on ethics-based contracts. This is formalized in the following proposition, which characterizes the conditions under which the firm optimally chooses the different contracts.

PROPOSITION 5: *The firm chooses to offer $\mathcal{C}_{\text{EI}}$ over $\mathcal{C}_{\text{EE}}$ if and only if*

$$\frac{\sigma a(1-r)}{cr} > \frac{\phi_t + (1-\phi_t)g}{(1-\phi_t)\alpha^2} \equiv \Sigma_{\text{EE}}^{\text{EI}}, \tag{12}$$

it chooses to offer $\mathcal{C}_{\text{II}}$ over $\mathcal{C}_{\text{EE}}$ if and only if

$$\frac{\sigma a(1-r)}{cr} > \frac{2}{\left[1-\phi_t(\alpha+g)\right](1-g)} \equiv \Sigma_{\text{EE}}^{\text{II}}, \tag{13}$$

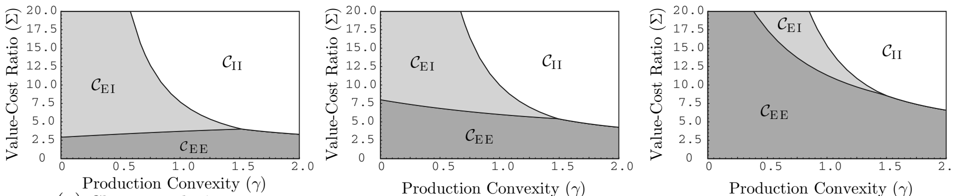
and it chooses to offer $\mathcal{C}_{\text{II}}$ over $\mathcal{C}_{\text{EI}}$ if and only if

$$\frac{\sigma a(1-r)}{cr} > \frac{\phi_t(1-g) + (1-\phi_t)g(1+g)}{(1-\phi_t)(1-g)^2\alpha} \equiv \Sigma_{\text{EI}}^{\text{II}}. \tag{14}$$

Moreover, there is a unique $\hat{g} \in (0, 1)$ such that $\Sigma_{\text{EI}}^{\text{II}} > \Sigma_{\text{EE}}^{\text{II}} > \Sigma_{\text{EE}}^{\text{EI}}$ for $g > \hat{g}$, and $\Sigma_{\text{EI}}^{\text{II}} < \Sigma_{\text{EE}}^{\text{II}} < \Sigma_{\text{EE}}^{\text{EI}}$ otherwise.

It follows from Proposition 5 that as the ratio (denoted by Σ) of project value (σa) to the cost of incentive provision ($\frac{cr}{1-r}$) rises, the firm tends to increase the incentives that it provides to its agents. Holding all else constant, when this ratio is low, the firm tends to offer both agents an ethics-based contract. As the ratio rises, the firm offers one agent an incentive contract as long as $g > \hat{g}$, that is, as long as the synergy between the two agents is low (low γ). Eventually, regardless of the level of synergy between the two agents, if Σ rises sufficiently, the firm provides both agents an incentive contract.

To better grasp the results of Proposition 5, it is useful to illustrate the regions in which each set of contracts is used by the firm. We do this in Figure 1, which has three graphs corresponding to different levels of ϕ_t (0.3, 0.5, 0.7).



(a) Choices with $\phi_t = 0.3$ (b) Choices with $\phi_t = 0.5$ (c) Choices with $\phi_t = 0.7$

Figure 1. Firm's choice of contract set as a function of labor synergies and the value-cost ratio. The above figures show the set of compensation contracts ($\mathcal{C}_{\mathrm{EE}}$, $\mathcal{C}_{\mathrm{EI}}$, or $\mathcal{C}_{\mathrm{II}}$) that the firm chooses as a function of labor synergies (γ) and the ratio of project value to incentive costs ($\Sigma = \frac{\sigma a(1-r)}{cr}$), where σ denotes the payoff of a successful project, and a, r and c denote the agent's skill, risk aversion, and effort cost respectively. Only the probability that the agent is virtuous (ϕ_t) changes across the three figures. In the $\mathcal{C}_{\mathrm{EE}}$ region, it is optimal for the firm to offer ethics-based contracts to both agents. In the $\mathcal{C}_{\mathrm{EI}}$ region, it is optimal for the firm to offer an ethics-based contract to one agent and an incentive contract to the other agent. In the $\mathcal{C}_{\mathrm{II}}$ region, it is optimal for the firm to offer incentive contracts to both agents.

The synergy parameter γ is measured on the x-axis and the ratio $\Sigma = \frac{\sigma a(1-r)}{cr}$ is measured on the y-axis. As can be seen from the three graphs, the firm will tend to rely more heavily on ethics as γ and Σ decrease and as ϕ_t increases. That is, firms whose production relies mainly on the effort of only one of its workers (i.e., firms with low γ) will offer ethics-based contracts and take the chance that one of the two agents is virtuous. Firms that can only be successful when both of its agents exert effort (i.e., firms with high γ) do not have the same luxury. Unless ϕ_t is close to one, they must use incentive-based contracting to ensure that both agents exert effort as, otherwise, little is gained from the agents' presence.

With multiple agents, it is the nature of the production process that predicts how much economic value is created by virtue. Firms that do not require much cooperation between their agents tend to offer flatter contracts and rely on diligence. As a result, virtue is a key driver of performance for these firms. In contrast, firms that strongly depend on the synergistic interactions of their agents prefer to offer incentive contracts and rely less on diligence. This should be the case for firms that depend on the joint reputation of their human capital (e.g., law firms), whose divisions depend on each other's production (e.g., vertically integrated firms), or are involved in strategic alliances. For these firms, virtue is not likely to be a significant driver of value. Note that the integrity measures discussed in the introduction could serve to test this prediction as well. Indeed, when measures of incentives and integrity are used to explain production in a regression model, we would expect incentives (integrity) to dominate the relationship for firms that are more (less) synergy driven.

IV. Ethics and the Competition for Labor

In previous sections, we analyze the tradeoffs between incentive and ethics-based contracts, given that the firm is a monopolist in the labor market. In this section, we consider how firms optimally choose their employment contracts when they compete for labor. We show that competition makes it harder for ethics-based contracts to survive as it renders ethics screening possible. Specifically, competition makes it possible for firms to steal the agents that are virtuous. We demonstrate this first with a sequential hiring game in which an entrant firm arrives with positive probability and has the option to steal an agent from the incumbent firm. Subsequently, we consider a simultaneous game in which both firms bid for the services of a single agent.

A. Sequential Hiring

Suppose that only one agent is available and that the firm modelled in Section I (the incumbent firm, firm 1) is now potentially followed by another firm (the entrant firm, firm 2), which can steal its agent. Each firm j has access to a project whose payoff $\tilde{v}_j$ has the same distribution as $\tilde{v}$ in (1) (with the appropriate subscript j for $\tilde{e}$, but the same $\tilde{A} = a$ and the same σ for both firms). Assume that $\tilde{v}_1$ and $\tilde{v}_2$ are independently distributed given any $\tilde{e}_1$ and $\tilde{e}_2$.

The probability that an entrant shows up to steal the incumbent's agent is assumed to be an exogenous constant $q \in [0, 1]$. Endogenizing this quantity would require us to add a random shock to the entrant's production function (e.g., make σ_2 random and observable only to the entrant) or to make the two firms compete in the product market (e.g., make $\tilde{v}_1$ negatively correlated with $\tilde{v}_2$). Doing this would unnecessarily complicate the analysis without affecting the economics of the model. As such, we keep q exogenous and assume that firm 1's decisions do not affect it. The variable q can then be interpreted as a measure of how broad the agent's skills are. If q is low, the agent's skills are highly specialized and can be productive only for a few firms. If q is high, the agent's skills are broader, and the agent can be hired to do many jobs.

The order of play is as follows. First, firm 1 offers a contract to the agent, who is free to accept or reject it. With probability q, a second firm enters and is free to make a take-it-or-leave-it offer to the first firm's agent. Until Section IV.B, we assume that the incumbent firm cannot respond with a better offer in order to persuade the agent to stay or change the terms of its contract with the agent if he does choose to stay. If no firm enters (with probability $1 - q$), firm 1 keeps its agent. Once the hiring game is over, $\tilde{v}_1$ and $\tilde{v}_2$ are realized based on the agent's effort.

In equilibrium, the incumbent firm will never offer any contract other than $\mathcal{C}_{\mathrm{I}}$ or $\mathcal{C}_{\mathrm{E}}$, as they are defined in Proposition 1. Indeed, because the entrant's production function is identical to that of the incumbent, it is always possible for the entrant to steal the agent by offering the same compensation contract as the incumbent. Therefore, the best that the incumbent can hope for is that no entry occurs and that the agent stays put. Thus, using the same reasoning as in Section I.C, the optimal contract must be either $\mathcal{C}_{\mathrm{I}}$ or $\mathcal{C}_{\mathrm{E}}$. However, as we show next, the tradeoff for selecting one versus the other is different from that derived in Proposition 3. To derive the equilibrium of this game, we proceed by backward induction. The following lemma characterizes the entrant's contractual offer depending on whether the incumbent's contract is $\mathcal{C}_{\mathrm{I}}$ or $\mathcal{C}_{\mathrm{E}}$.

LEMMA 3: *(i) Suppose that the compensation contract between the incumbent firm and the agent is $\mathcal{C}_{\mathrm{I}}$. Then the entrant also offers $\mathcal{C}_{\mathrm{I}}$ as long as*

$$(1-\phi_t)\sigma a > \frac{cr}{1-r}, \tag{15}$$

and offers $\mathcal{C}_{\mathrm{E}}$ otherwise. In either case, the entrant steals the agent with probability one. (ii) Suppose instead that the compensation contract between the incumbent firm and the agent is $\mathcal{C}_{\mathrm{E}}$. Then the entrant offers $\mathcal{C}_{\mathrm{I}}'$, with $\omega_{\mathrm{I}}' = \bar{u} + c$ and $\beta_{\mathrm{I}}' = \frac{c}{a(1-r)}$, as long as

$$\sigma a > \bar{u} + c + \frac{c}{(1-\phi_t)(1-r)}, \tag{16}$$

and offers $\mathcal{C}_{\mathrm{E}}$ otherwise. With $\mathcal{C}_{\mathrm{I}}'$, the entrant steals the agent with probability one. With $\mathcal{C}_{\mathrm{E}}$, it steals the agent if and only if the agent is virtuous, that is, with probability ϕ_t.

The intuition for part (i) of this lemma is as follows. When the incumbent firm hires the agent with $\mathcal{C}_{\mathrm{I}}$, the expected utility of the agent is $\bar{u}$, regardless of his ethics. By construction, this incentive contract exactly meets the participation constraint of the agent. As such, the problem faced by the entrant is the same as that of the firm in Proposition 3. This agent can therefore be stolen away from the incumbent by offering him $\mathcal{C}_{\mathrm{I}}$ or $\mathcal{C}_{\mathrm{E}}$ with any small increase $\epsilon > 0$ in the fixed-wage portion of the contract. Since ϵ can be made arbitrarily small, the resulting tradeoff between $\mathcal{C}_{\mathrm{I}}$ and $\mathcal{C}_{\mathrm{E}}$ for the entrant boils down to (5) with $\phi_a = 1$, which is given by (15).

Part (ii) of Lemma 3 is a bit trickier. When the incumbent firm offers the agent $\mathcal{C}_{\mathrm{E}}$, the expected utility of the agent is different, depending on his ethical type: The virtuous agent's expected utility is $\mathrm{E}[\tilde{u} \mid \tilde{t} = 1] = \omega_{\mathrm{E}} - c = \bar{u}$, whereas the egoistic agent's expected utility is $\mathrm{E}[\tilde{u} \mid \tilde{t} = 0] = \omega_{\mathrm{E}} = \bar{u} + c$. That is, the egoistic agent saves on effort cost and benefits more from the ethics-based contract. This difference in endogenous reservation utility makes it possible for the entrant firm to steal the virtuous type only, if it is optimal for it to do so, and $\mathcal{C}_{\mathrm{E}}$ is the contract that does this in the most economical manner.[23]

The alternative to stealing just the virtuous agent is for the entrant to offer a contract that will convince both ethics types to jump ship. As shown in (16), this will be the case, for example, when the opportunities for growth (σa) are so large that the entrant firm cannot rely on stealing just the virtuous type, as the probability of successfully doing so is only ϕ_t. Because the egoistic agent's

[23] Technically speaking, the entrant firm can steal the virtuous type by offering any contract that has a bonus of $\beta_{\mathrm{E}}' = \beta_{\mathrm{E}} + \frac{2\epsilon}{1-r}$ and a fixed wage of $\omega_{\mathrm{E}}' = \omega_{\mathrm{E}} - a\epsilon$ with a small $\epsilon > 0$. The result is obtained by making ϵ arbitrarily close to zero.

expected utility with the incumbent firm is $\bar{u} + c$, it is expensive for the entrant firm to convince this agent to switch. Also, it is never optimal for the entrant firm to convince this agent to join its ranks without effort provision, so only incentive contracts are considered when the entrant seeks to steal both types from the incumbent. The contract that meets these requirements is the incentive contract $\mathcal{C}'_{\mathrm{I}}$, which corresponds to $\mathcal{C}_{\mathrm{I}}$ with $\bar{u}$ replaced by $\bar{u} + c$.

Interestingly, when it is optimal for the entrant to steal only the virtuous type, the incumbent firm is sure to be left with an egoistic agent. With $\mathcal{C}_{\mathrm{E}}$, this agent does not work, and so the original idea of relying on the agent's ethics for effort provision backfires. This makes the ethics-based contract less attractive to start with for the incumbent firm. The following proposition further characterizes the equilibrium of this game.

PROPOSITION 6: *In equilibrium, the incumbent firm offers $\mathcal{C}_{\mathrm{I}}$ to the agent as long as*

$$\frac{q}{1-q}(1-\phi_t)(\bar{u}+c) + (1-\phi_t)\sigma a > \frac{cr}{1-r}, \tag{17}$$

and it offers $\mathcal{C}_{\mathrm{E}}$ otherwise. If a new firm enters following $\mathcal{C}_{\mathrm{I}}$ by the incumbent, its strategy is to also offer $\mathcal{C}_{\mathrm{I}}$ if (15) holds, and to offer $\mathcal{C}_{\mathrm{E}}$ otherwise. In both cases, egoistic and virtuous agents leave the incumbent to work for the entrant. If a new firm enters following $\mathcal{C}_{\mathrm{E}}$ by the incumbent, its strategy is to also offer $\mathcal{C}_{\mathrm{E}}$. In this case, only the virtuous agent leaves the incumbent to work for the entrant.

Recall from Proposition 3 (with $\phi_a = 1$) that the firm offers the incentive contract $\mathcal{C}_{\mathrm{I}}$ to the agent when $(1-\phi_t)\sigma a > \frac{cr}{1-r}$. A simple comparison of this condition to (17) shows that the incumbent firm is more likely to offer $\mathcal{C}_{\mathrm{I}}$ as the threat of entry (q) increases. As discussed above, offering $\mathcal{C}_{\mathrm{I}}$ instead of $\mathcal{C}_{\mathrm{E}}$ protects the incumbent firm from having a virtuous agent cherry-picked by the new entrant and being stuck with an egoistic agent who shirks. Interestingly, although the entrant can follow $\mathcal{C}_{\mathrm{I}}$ by the incumbent with $\mathcal{C}_{\mathrm{I}}$ or $\mathcal{C}_{\mathrm{E}}$ depending on the size of σa, it always follows $\mathcal{C}_{\mathrm{E}}$ by the incumbent with the same contract. Indeed, because the incumbent chooses to offer the agent $\mathcal{C}_{\mathrm{E}}$ only when the benefits of this ethics-based contract are great, it is never optimal for the entrant to follow such a contract with anything but $\mathcal{C}_{\mathrm{E}}$, that is, (16) never holds when (17) does not hold.

As discussed previously, a low value of q can be interpreted as a situation in which the worker's skills are specialized and are useful only to a few firms, whereas a high value of q corresponds to a situation in which the worker's skills are useful to a large cross-section of firms. In this light, (17) implies that we should observe workers with unique expertise receiving flatter compensation than workers whose skills have a wider appeal, keeping everything else equal. Indeed, when the agent's expertise is less specific, the provision of incentive contracts allows the firm to better protect itself from competition aimed at stealing the more virtuous agents.

B. Simultaneous Hiring

The sequential hiring game of Section IV.A shows how firms that use ethics-based contracts and rely on their agents' ethics for effort provision are likely to lose the very types that make such contracts successful. Of course, firms that are about to lose an agent to a competing firm can be proactive and try to retain that agent by changing the terms of their contractual relationship. This section studies the outcome of such contractual counteractions by looking at a game with simultaneous bidding by two firms for a single agent. That is, each firm j simultaneously offers a contract that specifies the agent's compensation in each of the two outcomes for $\tilde{v}_j$. The agent then chooses which firm he will work for based on the utility he can expect from the two contracts. In the case of a tie, he picks either with equal probability. The following proposition characterizes the equilibrium in this bidding game.

PROPOSITION 7: *An equilibrium in pure strategies exists only if (15) holds. In that event, both firms offer the agent an incentive contract $\mathcal{C}_{\mathrm{C}} \equiv \{\omega_{\mathrm{C}}, \beta_{\mathrm{C}}\}$ with $\omega_{\mathrm{C}} = \sigma a - \frac{c}{1-r}$ and $\beta_{\mathrm{C}} = \frac{c}{a(1-r)}$. Otherwise, there is no pure-strategy equilibrium.*

Interestingly, there is no pure strategy equilibrium in which firms use ethics-based contracts. If this were the case, a rival firm would have the opportunity to create a contract that only attracts the virtuous agents. Proposition 7 implies that competition for skilled labor erodes the likelihood that firms will depend on the work ethic of agents and save the costs of suboptimal risk-sharing. Note that this does not mean that ethics-based contracts do not survive the forces of competition altogether. Our model does not include any search costs or switching costs. With such frictions, it may be possible for the firms to achieve a local monopoly in the labor market and use ethics-based contracts to their advantage. Furthermore, Proposition 7 only rules out the use of ethics-based contracts when (15) holds. If (15) is not satisfied, it may be possible for the firms to engage in a mixed-strategy equilibrium in which ethics-based contracts are used with positive probability. While we do not derive such equilibria, a similar mixed strategy equilibrium was postulated by Rothschild and Stiglitz (1976) in competitive insurance markets and later derived by Dasgupta and Maskin (1986).

Together Propositions 6 and 7 also imply that more competition for labor leads to more incentive compensation. Several factors can affect the degree to which local firms compete for labor. For example, a higher number of firms (or, for a fixed number of firms, a lower Herfindahl index) in a given industry gives local workers more negotiating power over their compensation. Our model predicts that this competition will lead to a steeper relationship between compensation and performance as well as a larger proportion of total compensation paid as incentive compensation. Similarly, high labor mobility increases competition in the labor market. Indeed, when employees can move from one job to another in relatively frictionless fashion, it is harder for firms to retain their services. According to our model, more incentive compensation is required. In fact, as the labor pool of a given skill becomes more mobile over time, the reliance on ethics-based contracts should be concentrated more towards the lower echelons of firms' hierarchies.

V. Conclusion

According to classic contract theory, all agents are inherently egoistic and will shirk whenever possible. This behavior is often attributed to Adam Smith, who writes: "it is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard in their own interest (Smith, 2003, p. 23–24)." However, Adam Smith is also responsible for advancing the proposition that individuals are at times guided by moral principles that motivate selfless acts. In fact, he also writes: "...a man ought to regard himself, not as something separated and detached, but as a citizen of the world, a member of the vast commonwealth of nations [...] and to the interest of this great community, he ought at all times to be willing that his own little interest be sacrificed."

This paper explores the same duality between self-interested and virtuous behavior in the context of the firm. Specifically, we assume that some agents are virtuous and give their best effort without the need for extra incentives. In this context, we analyze the firm's optimal decisions with regard to the employment contracts they offer, the expected payoff and riskiness of the projects they undertake, the way they organize multiple agents into teams to maximize production, and the way in which they compete with other firms in the labor market. The model yields several novel empirical predictions that cannot be generated by a standard agency framework. Testing these predictions is the subject of future research.

Brennan (1994) calls for financial economists to incorporate a role for ethical standards into the agency theory of the firm. Our paper answers this call. As these issues are largely ignored in the existing corporate finance literature, this paper hopefully represents a first step towards a greater understanding of the effect that corporate and societal culture has on firms and on the overall economy.

Appendix: Proofs

Proof of Proposition 1: Of course, the firm never hires an agent when $\tilde{A} = 0$, as the probability that such an agent makes the firm's project successful is zero. Suppose that the agent is skilled ($\tilde{A} = a$) and egoistic ($\tilde{t} = 0$), and that the firm offers him a compensation contract $\mathcal{C} = \{\omega, \beta\}$. If the agent chooses to exert effort ($\tilde{e} = 1$), then his expected utility from this contract is

$$\mathrm{E}[\tilde{u} \mid \tilde{A} = a, \tilde{e} = 1] = \omega + (1 - r)a\beta - c.$$

If instead the agent chooses not to exert effort ($\tilde{e} = 0$), then his expected utility from the same contract is

$$\mathrm{E}[\tilde{u} \mid \tilde{A} = a, \tilde{e} = 0] = \omega.$$

Thus, the egoistic agent's incentive compatibility constraint requires that

$$\beta \geq \frac{c}{a(1-r)}. \tag{A1}$$

The same agent's participation constraint requires that

$$\mathrm{E}[\tilde{u} \mid \tilde{A} = a, \tilde{e} = 1] = \omega + (1-r)a\beta - c \geq \bar{u},$$

or equivalently that

$$\omega \geq \bar{u} + c - (1-r)a\beta. \tag{A2}$$

The firm must therefore choose the contract $\mathcal{C} = \{\omega, \beta\}$ that maximizes

$$\mathrm{E}[\tilde{\pi}] = -\omega + (\sigma - \beta)a \tag{A3}$$

subject to (A1) and (A2). Because it is always advantageous for the firm to make (A2) bind, the firm's problem reduces to choosing β to maximize

$$\mathrm{E}[\tilde{\pi}] = \sigma a - (\bar{u} + c) - \beta a r, \tag{A4}$$

subject to (A1) only. Since this last expression is decreasing in β, the firm will set $\beta = \frac{c}{a(1-r)} \equiv \beta_{\mathrm{I}}$ and $\omega = \bar{u} + c - (1-r)a\beta_{\mathrm{I}} = \bar{u} \equiv \omega_{\mathrm{I}}$. The value of the firm is then

$$\bar{V} \equiv F + \mathrm{E}[\tilde{\pi}] = F - \omega_{\mathrm{I}} + (\sigma - \beta_{\mathrm{I}})a = F + \sigma a - \bar{u} - \frac{c}{1-r}.$$

Now suppose that the agent is skilled ($\tilde{A} = 1$) and virtuous ($\tilde{t} = 1$). Then it is still the case that the firm's problem is to choose β to maximize (A4). However, because the virtuous agent always exerts effort, the firm does not face an incentive compatibility constraint. Thus, the firm sets $\beta = 0 \equiv \beta_{\mathrm{E}}$ and $\omega = \bar{u} + c - (1-r)a\beta_{\mathrm{E}} = \bar{u} + c \equiv \omega_{\mathrm{E}}$. The value of the firm is

$$\bar{V} \equiv F + \mathrm{E}[\tilde{\pi}] = F - \omega_{\mathrm{E}} + (\sigma - \beta_{\mathrm{E}})a = F + \sigma a - \bar{u} - c.$$

This completes the proof. Q.E.D.

Proof of Proposition 2: Suppose that the firm offers a contract $\mathcal{C} = \{\omega, \beta\}$ that satisfies the participation constraint of a virtuous agent with $\tilde{A} = a$. Such a contract satisfies

$$\mathrm{E}[\tilde{u} \mid \tilde{A} = a, \tilde{t} = 1] = \mathrm{E}[\tilde{u} \mid \tilde{A} = a, \tilde{e} = 1] = \omega + (1-r)a\beta - c \geq \bar{u}.$$

If $\beta \geq \frac{c}{a(1-r)}$, the contract satisfies the incentive compatibility constraint of the egoistic agent, and thus his expected utility is also $\mathrm{E}[\tilde{u} \mid \tilde{A} = a, \tilde{e} = 1] \geq \bar{u}$. If $\beta < \frac{c}{a(1-r)}$, then

$$\mathrm{E}[\tilde{u} \mid \tilde{A} = a, \tilde{t} = 0] = \mathrm{E}[\tilde{u} \mid \tilde{A} = a, \tilde{e} = 0] = \omega > \omega + (1-r)a\beta - c \geq \bar{u}.$$

This establishes the first part of the result. Suppose now that $\mathcal{C} = \{\omega, \beta\}$ satisfies the participation constraint of an egoistic agent with $\tilde{A} = a$, but not that of an otherwise identical but virtuous agent. Suppose also that $\beta \geq \frac{c}{a(1-r)}$, so that the incentive compatibility constraint of an egoistic type is satisfied. We then have

$$\bar{u} \leq \mathrm{E}[\tilde{u} \mid \tilde{A} = a, \tilde{t} = 0] = \mathrm{E}[\tilde{u} \mid \tilde{A} = a, \tilde{e} = 1] = \mathrm{E}[\tilde{u} \mid \tilde{A} = a, \tilde{t} = 1] < \bar{u},$$

which is impossible. Therefore, it must be the case that $\beta < \frac{c}{a(1-r)}$ and that the contract fails to motivate the agent's effort. Q.E.D.

Proof of Proposition 3: Suppose that the firm offers $\mathcal{C}_{\mathrm{E}}$, as defined in Proposition 1. Since $\mathrm{E}[\tilde{u} \mid \tilde{t} = 1] = \omega_{\mathrm{E}} - c = \bar{u}$ and $\mathrm{E}[\tilde{u} \mid \tilde{t} = 0] = \omega_{\mathrm{E}} = \bar{u} + c > \bar{u}$, this contract meets the reservation utility of all agents, regardless of their skill. Thus, all agents accept the offered contract, but only the skilled, virtuous agents ($\tilde{A} = a$ and $\tilde{t} = 1$) exert effort. Such agents come with probability $\phi_a\phi_t$, so the firm's value is

$$\bar{V} = F + \mathrm{E}[\tilde{\pi}] = F - \omega_{\mathrm{E}} + (\sigma - \beta_{\mathrm{E}})a\phi_a\phi_t = F + \phi_a\phi_t\sigma a - (\bar{u} + c). \quad \text{(A5)}$$

Suppose instead that the firm offers a contract $\mathcal{C} = \{\omega, \beta\}$ with $\beta = \beta_{\mathrm{I}} + \frac{\epsilon}{1-r}$, $\omega = \omega_{\mathrm{I}} - a\epsilon$, $\epsilon > 0$ small, and β_{I} and ω_{I} as defined in Proposition 1. It is easy to verify that the incentive compatibility constraint of unskilled, egoistic agents is not satisfied. This further implies that their participation constraint is not met either as

$$\mathrm{E}[\tilde{u} \mid \tilde{A} = 0, \tilde{e} = 0] = \omega = \bar{u} - a\epsilon < \bar{u}.$$

The participation constraint of unskilled, virtuous agents is also not satisfied as

$$\mathrm{E}[\tilde{u} \mid \tilde{A} = 0, \tilde{e} = 1] = \omega - c = \bar{u} - a\epsilon - c < \bar{u}.$$

Because $\beta > \beta_{\mathrm{I}}$, the incentive compatibility constraint of skilled, egoistic agents is satisfied. This implies that the participation constraint of all skilled agents is satisfied as

$$\begin{aligned} \mathrm{E}[\tilde{u} \mid \tilde{A} = a] &= \mathrm{E}[\tilde{u} \mid \tilde{A} = a, \tilde{e} = 1] = \omega + (1-r)a\beta - c \\ &= \omega_{\mathrm{I}} - a\epsilon + (1-r)a\beta_{\mathrm{I}} + a\epsilon - c = \bar{u}. \end{aligned}$$

Thus, for any $\epsilon > 0$, it is the case that unskilled agents are screened away by the firm. By letting ϵ go to zero, we conclude that $\mathcal{C}_{\mathrm{I}} = \{\omega_{\mathrm{I}}, \beta_{\mathrm{I}}\}$ succeeds in screening unskilled agents, and so the firm is without a manager with probability $1 - \phi_a$; in that event, the firm's value is F. With probability ϕ_a, the manager is skilled and we know from Proposition 1 that the firm's value is given by (3). Therefore, when the firm offers $\mathcal{C}_{\mathrm{I}}$, its value is given by

$$\bar{V} = F + \phi_a\left(\sigma a - \bar{u} - \frac{c}{1-r}\right). \quad \text{(A6)}$$

Comparing (A5) and (A6), it will be the case that the firm will offer $\mathcal{C}_{\mathrm{I}}$ as long as (5) holds, and $\mathcal{C}_{\mathrm{E}}$ otherwise. Q.E.D.

Proof of Lemma 1: For any given project $\mu \in [0, 1-a]$, we can follow the same steps as in the proof of Propositions 1 and 3 (with $\phi_a = 1$). Since the egoistic agent's effort adds a probability a to the project being successful and since his effort costs him c in utility, the cheapest contract $\mathcal{C} = \{\omega, \beta\}$ that meets this agent's incentive constraint has $\beta = \frac{c}{a(1-r)}$. His participation constraint requires that

$$\mathrm{E}[\tilde{u} \mid \tilde{e} = 1] = \omega + (1-r)(a+\mu)\beta - c = \omega + \frac{c\mu}{a} \geq \bar{u},$$

and so the firm sets $\omega = \bar{u} - \frac{c\mu}{a}$. With this contract, both types of agents exert effort. If instead the firm chooses a contract $\mathcal{C} = \{\omega, \beta\}$ that will only have virtuous agents exert effort, it is cheapest to set $\beta = 0$. The virtuous agent's participation constraint is met as long as

$$\mathrm{E}[\tilde{u} \mid \tilde{e} = 1] = \omega - c \geq \bar{u},$$

and so the firm sets $\omega = \bar{u} + c$. Q.E.D.

Proof of Proposition 4: We know from Lemma 1 that, for any project $\mu \in [0, 1-a]$, the firm will offer one of two contracts: $\mathcal{C}_{\mathrm{I}}(\mu)$ or $\mathcal{C}_{\mathrm{E}}$. With $\mathcal{C}_{\mathrm{I}}(\mu)$, the firm's expected profits are given by

$$\mathrm{E}[\tilde{\pi}] = -\omega_{\mathrm{I}}(\mu) + (\sigma_\mu - \beta_{\mathrm{I}})(a+\mu) = -\bar{u} - \frac{c}{1-r} + m - \frac{cr\mu}{a(1-r)}. \tag{A7}$$

Since this quantity is decreasing in μ, the best project to associate with the incentive contract $\mathcal{C}_{\mathrm{I}}(\mu)$ is the one with $\mu = 0$, which is $\mathcal{C}_{\mathrm{I}}$, as defined in Proposition 1. With $\mu = 0$, (A7) reduces to

$$\mathrm{E}[\tilde{\pi}] = -\bar{u} - \frac{c}{1-r} + m. \tag{A8}$$

With $\mathcal{C}_{\mathrm{E}}$, the firm's expected profits are given by

$$\mathrm{E}[\tilde{\pi}] = -\omega_{\mathrm{E}} + (\sigma_\mu - \beta_{\mathrm{E}})(a\phi_t + \mu) = -\bar{u} - c + m - \frac{(1-\phi_t)am}{a+\mu}. \tag{A9}$$

Since this quantity is increasing in μ, the best project to associate with the ethics-based contract $\mathcal{C}_{\mathrm{E}}$ is the one with $\mu = 1-a$. In this case, (A9) reduces to

$$\mathrm{E}[\tilde{\pi}] = -\bar{u} - c + m - (1-\phi_t)am. \tag{A10}$$

Therefore, the firm will offer $\mathcal{C}_{\mathrm{I}}$ and pick project $\mu = 0$ when (A8) exceeds (A10), which is equivalent to (8). Otherwise, it will offer $\mathcal{C}_{\mathrm{E}}$ and pick project $\mu = 1-a$. Q.E.D.

Proof of Lemma 2: For the same reason as in Section I.C, we can restrict our attention to contracts that have the smallest possible bonus incentive for a given incentive level. Since the agents are a priori identical from the firm's perspective and $\tilde{e}_i \in \{0, 1\}$, this means that the firm must decide whether to motivate the effort of zero, one, or two of its agents.

(i) Zero. When the firm offers contracts that motivate neither agent, these contracts are identical and must satisfy the participation constraint of a virtuous agent. The cheapest contract $\mathcal{C} = \{\omega, \beta\}$ that meets the participation constraint of a virtuous agent has $\beta = 0 = \beta_{\mathrm{E}}$ and satisfies

$$\mathrm{E}[\tilde{u}_i \mid \tilde{t} = 1] = \mathrm{E}[\tilde{u}_i \mid \tilde{e} = 1] = \omega - c = \bar{u},$$

so that $\omega = \bar{u} + c = \omega_{\mathrm{E}}$.

(ii) One. If the firm seeks to motivate the effort of only one of its two agents (agent 1, say), then one incentive contract must meet an egoistic agent's incentive compatibility constraint. The other contract (for agent 2) is clearly the same as in (i). From the perspective of agent 1, agent 2 exerts effort if and only if $\tilde{t}_2 = 1$, that is, with probability ϕ_t. If agent 2 exerts effort, his effort increases the probability of project success by g, and so the effort of agent 1 increases the probability of success by $1 - g$. If instead agent 2 does not exert effort, the effort of agent 1 increases the probability of success by g. This means that

$$\mathrm{E}[\tilde{u}_1 \mid \tilde{e}_1 = 1] - \mathrm{E}[\tilde{u}_1 \mid \tilde{e}_1 = 0] = (1 - r)a[\phi_t(1 - g) + (1 - \phi_t)g]\beta - c,$$

and so the incentive compatibility constraint is satisfied as long as $\beta \geq \frac{c}{a\alpha(1-r)}$, where $\alpha \equiv \phi_t(1 - g) + (1 - \phi_t)g$. The cheapest such contract will have $\beta = \frac{c}{a\alpha(1-r)} = \beta_{\mathrm{I1}}$ and will satisfy agent 1's participation constraint as long as

$$\mathrm{E}[\tilde{u}_1 \mid \tilde{e}_1 = 1] = \omega + (1 - r)a[\phi_t(1) + (1 - \phi_t)g]\beta_{\mathrm{I1}} - c = \omega + \frac{c\phi_t g}{\alpha} = \bar{u},$$

that is, as long as $\omega = \bar{u} - \frac{c\phi_t g}{\alpha} = \omega_{\mathrm{I1}}$.

(iii) Two. The contract that motivates the two agents to exert effort in a Nash equilibrium must satisfy (taking the perspective of agent 1)

$$\mathrm{E}[\tilde{u}_1 \mid \tilde{e}_1 = 1, \tilde{e}_2 = 1] - \mathrm{E}[\tilde{u}_1 \mid \tilde{e}_1 = 0, \tilde{e}_2 = 1] = (1 - r)a(1 - g)\beta - c \geq 0.$$

The cheapest such contract must have $\beta = \frac{c}{a(1-g)(1-r)} = \beta_{\mathrm{I2}}$. The agents' participation constraint is satisfied as long as

$$\mathrm{E}[\tilde{u}_i \mid \tilde{e}_1 = 1, \tilde{e}_2 = 1] = \omega + (1 - r)a\beta_{\mathrm{I2}} - c = \omega + \frac{cg}{1 - g} = \bar{u},$$

that is, as long as $\omega = \bar{u} - \frac{cg}{1-g} = \omega_{I2}$. Q.E.D.

Proof of Proposition 5: With $\mathcal{C}_{\mathrm{EE}}$, the agents exert effort only if they are virtuous, and so the firm's expected profits are given by

$$\begin{aligned} \mathrm{E}[\tilde{\pi}] &= -2\omega_{\mathrm{E}} + \sigma a\big[\phi_t^2 \cdot 1 + 2\phi_t(1-\phi_t)\cdot g + (1-\phi_t)^2 \cdot 0\big] \\ &= -2(\bar{u}+c) + \sigma a \phi_t[\phi_t + 2(1-\phi_t)g]. \end{aligned} \tag{A11}$$

With $\mathcal{C}_{\mathrm{EI}}$, the agent with $\mathcal{C}_{\mathrm{I1}}$ always exert effort whereas the agent with $\mathcal{C}_{\mathrm{E}}$ exerts effort only if he is virtuous. The firm's expected profits are therefore given by

$$\begin{aligned} \mathrm{E}[\tilde{\pi}] &= -\omega_{\mathrm{E}} - \omega_{\mathrm{I1}} + (\sigma - \beta_{\mathrm{I1}})a[\phi_t \cdot 1 + (1-\phi_t)\cdot g] \\ &= -(\bar{u}+c) - \left(\bar{u} - \frac{c\phi_t g}{\alpha}\right) + \left(\sigma a - \frac{c}{\alpha(1-r)}\right)[\phi_t + (1-\phi_t)g] \\ &= -2(\bar{u}+c) + c\left(1 + \frac{\phi_t g}{\alpha}\right) + \left(\sigma a - \frac{c}{\alpha(1-r)}\right)[\phi_t + (1-\phi_t)g] \\ &= -2(\bar{u}+c) + \frac{c}{\alpha}[\phi_t + (1-\phi_t)g] + \left(\sigma a - \frac{c}{\alpha(1-r)}\right)[\phi_t + (1-\phi_t)g] \\ &= -2(\bar{u}+c) + \left(\sigma a - \frac{cr}{\alpha(1-r)}\right)[\phi_t + (1-\phi_t)g]. \end{aligned} \tag{A12}$$

With $\mathcal{C}_{\mathrm{II}}$, both agents are provided with incentive contracts, and so they both always exert effort. The firm's expected profits are then given by

$$\begin{aligned} \mathrm{E}[\tilde{\pi}] &= -2\omega_{\mathrm{I2}} + (\sigma - 2\beta_{\mathrm{I2}})a \\ &= -2\left(\bar{u} - \frac{cg}{1-g}\right) + \left[\sigma - \frac{2c}{a(1-g)(1-r)}\right]a \\ &= -2\left(\bar{u} + c - \frac{c}{1-g}\right) + \sigma a - \frac{2c}{(1-g)(1-r)} \\ &= -2(\bar{u}+c) + \sigma a - \frac{2cr}{(1-g)(1-r)}. \end{aligned} \tag{A13}$$

The appropriate comparisons between (A11), (A12), and (A13) yield (12), (13), and (14). Using (12) and (13), it is easy to show that

$$\Sigma_{\mathrm{EE}}^{\mathrm{EI}} - \Sigma_{\mathrm{EE}}^{\mathrm{II}} = \frac{cr[2\phi_t g^3 - 3(1-\phi_t)g^2 + (1-4\phi_t)g + \phi_t]}{(1-g)(g+\phi_t - 2g\phi_t)^2[1+(1-2g)\phi_t]}.$$

Because $g \in (0, 1)$ and $\phi_t \in (0, 1)$, the denominator of this expression is always positive, and so this quantity always has the same sign as the bracketed part of its numerator,

$$N(g) \equiv 2\phi_t g^3 - 3(1-\phi_t)g^2 + (1-4\phi_t)g + \phi_t.$$

It is clear that $N(g)$ is negative as g approaches $-\infty$ and positive as g approaches ∞. Because $N(0)$ is positive, there can only be two positive roots (in g). Because

$$N(1) = 2\phi_t - 3(1-\phi_t) + (1-4\phi_t) + \phi_t = -2(1-\phi_t) < 0,$$

there is one and only one root in (0, 1). This is $\hat{g}$. Similar manipulations show the same results for the comparisons between $\Sigma^{\text{II}}_{\text{EE}}$ and $\Sigma^{\text{II}}_{\text{EI}}$, and between $\Sigma^{\text{EI}}_{\text{EE}}$ and $\Sigma^{\text{II}}_{\text{EI}}$. Q.E.D.

Proof of Lemma 3:

(i) Suppose that the incumbent firm (firm 1) has offered $\mathcal{C}_{\text{I}}$ to the agent. This means that the agent's expected utility, regardless of his virtue, is equal to $\bar{u}$, and so the entrant firm (firm 2) can steal him by offering any compensation contract that yields any positive amount of extra expected utility, however small. In other words, the entrant solves the exact same problem as in Proposition 3, and thus always ends up hiring the agent (since there are no unskilled agents any longer). The condition for offering $\mathcal{C}_{\text{I}}$ over $\mathcal{C}_{\text{E}}$ is therefore given by (5), which, with $\phi_a = 1$, reduces to (15).

(ii) Suppose now that the incumbent has offered $\mathcal{C}_{\text{E}}$ to the agent. In this case, the expected utility of the virtuous agent is

$$\text{E}[\tilde{u} \mid \tilde{e} = 1] = \omega_{\text{E}} - c = \bar{u},$$

and that of the egoistic agent is

$$\text{E}[\tilde{u} \mid \tilde{e} = 0] = \omega_{\text{E}} = \bar{u} + c.$$

Because these numbers are different, the entrant firm can choose to attract the virtuous agent only by offering a compensation contract that yields at least $\bar{u}$ but less than $\bar{u} + c$ in expected utility to the virtuous agent. From Proposition 1, we know that the cheapest way to achieve this is with $\mathcal{C}_{\text{E}}$. Because the egoistic agent then stays with the incumbent, the probability that the entrant steals an agent is ϕ_t, and it always ends up with a virtuous one when it does. Its expected profits are therefore given by

$$\text{E}[\tilde{\pi}_2] = (1 - \phi_t)(0) + \phi_t(-\omega_{\text{E}} + \sigma a) = \phi_t[\sigma a - (\bar{u} + c)]. \tag{A14}$$

The entrant firm can also choose to attract both ethics types (i.e., attract an agent with probability one). Again, it could do so with an ethics-based contract or with an incentive contract. Doing so with an ethics-based contract is useless, however, as egoistic types always shirk with such contracts, and so there is then no point in attracting them. The incentive contract that steals an egoistic agent from the incumbent and ensures that he exerts effort is the same as that in Proposition 1 with $\bar{u}$ replaced by $\bar{u} + c$, that is, $\mathcal{C}'_{\text{I}} = \{\omega'_{\text{I}}, \beta'_{\text{I}}\}$, where $\omega'_{\text{I}} = \bar{u} + c$ and $\beta'_{\text{I}} = \frac{c}{a(1-r)}$. The entrant firm's expected profits are then given by

$$\text{E}[\tilde{\pi}_2] = -\omega'_{\text{I}} + (\sigma - \beta'_{\text{I}})a = \sigma a - (\bar{u} + c) - \frac{c}{1 - r}. \tag{A15}$$

The entrant will therefore choose to attract both types when (A15) exceeds (A14), and it is straightforward to show that this is equivalent to (16). Q.E.D.

Proof of Proposition 6: Consider the expected profits of the incumbent firm:

$$\mathrm{E}[\tilde{\pi}_1] = \phi_t \mathrm{E}[\tilde{\pi}_1 \,|\, \tilde{t} = 1] + (1 - \phi_t)\mathrm{E}[\tilde{\pi}_1 \,|\, \tilde{t} = 0]. \quad \text{(A16)}$$

When (16) is satisfied and the incumbent firm offers the agent an incentive contract $\mathcal{C}_{\mathrm{I}}$, it knows that the entrant will steal the agent, regardless of his ethical type, with probability one when entry does occur. Moreover, because virtuous and egoistic agents exert effort and are equally productive with $\mathcal{C}_{\mathrm{I}}$, we have

$$\mathrm{E}[\tilde{\pi}_1 \,|\, \tilde{t} = 1] = \mathrm{E}[\tilde{\pi}_1 \,|\, \tilde{t} = 0] = (1 - q)\underbrace{[-\omega_{\mathrm{I}} + (\sigma - \beta_{\mathrm{I}})a]}_{\equiv \bar{\pi}_{\mathrm{I}}} = (1 - q)\bar{\pi}_{\mathrm{I}},$$

and so, using (A16),

$$\mathrm{E}[\tilde{\pi}_1] = (1 - q)\bar{\pi}_{\mathrm{I}}. \quad \text{(A17)}$$

When (16) is not satisfied, the incumbent firm initially offers the agent the ethics-based contract $\mathcal{C}_{\mathrm{E}}$, realizing that only the virtuous type will leave when entry occurs. Since only the virtuous type exerts effort with $\mathcal{C}_{\mathrm{E}}$, we have

$$\mathrm{E}[\tilde{\pi}_1 \,|\, \tilde{t} = 1] = (1 - q)\overbrace{(-\omega_{\mathrm{E}} + \sigma a)}^{\equiv \bar{\pi}_{\mathrm{E}}^1} = (1 - q)\bar{\pi}_{\mathrm{E}}^1, \text{ and}$$
$$\mathrm{E}[\tilde{\pi}_1 \,|\, \tilde{t} = 0] = -\omega_{\mathrm{E}} \equiv \bar{\pi}_{\mathrm{E}}^0.$$

Using (A16), we have

$$\mathrm{E}[\tilde{\pi}_1] = \phi_t(1 - q)\bar{\pi}_{\mathrm{E}}^1 + (1 - \phi_t)\bar{\pi}_{\mathrm{E}}^0. \quad \text{(A18)}$$

For the incumbent firm, the decision to offer $\mathcal{C}_{\mathrm{I}}$ or $\mathcal{C}_{\mathrm{E}}$ therefore amounts to a comparison of (A17) and (A18), using the fact that

$$\begin{aligned}
\bar{\pi}_{\mathrm{I}} &= -\omega_{\mathrm{I}} + (\sigma - \beta_{\mathrm{I}})a = \sigma a - (\bar{u} + c) - \frac{cr}{1 - r},\\
\bar{\pi}_{\mathrm{E}}^1 &= -\omega_{\mathrm{E}} + \sigma a = \sigma a - (\bar{u} + c), \quad \text{and}\\
\bar{\pi}_{\mathrm{E}}^0 &= -\omega_{\mathrm{E}} = -(\bar{u} + c).
\end{aligned}$$

It is straightforward to show that (A17) exceeds (A18) as long as (17) holds. The rest of the proposition follows from Lemma 3 as it is easy to show that, when (17) does not hold (i.e., the incumbent offers $\mathcal{C}_{\mathrm{E}}$), then (16) does not hold either (i.e., the entrant follows by offering $\mathcal{C}_{\mathrm{E}}$ as well). Q.E.D.

Proof of Proposition 7: To prove this result, we first rule out various sets of contracts in a series of lemmas (A1 through A3). Before we turn to these lemmas, notice that since $\bar{u} > 0$ and $\sigma a > \bar{u} + \frac{c}{1-r}$ (see footnote 14), it is the case that $\sigma > \frac{c}{a(1-r)}$.

LEMMA *A1: No contract $\mathcal{C} = \{\omega, \beta\}$ with $\beta > \frac{c}{a(1-r)}$ can be an equilibrium contract.*

Proof of Lemma A1: Suppose that such a $\mathcal{C}$ is an equilibrium contract. Because $\beta > \frac{c}{a(1-r)}$, this contract motivates the egoistic type to exert effort. Because no firm can extract rents in equilibrium, it must also be the case that

$$\mathrm{E}[\tilde{\pi}_i] = \frac{1}{2}[-\omega + (\sigma - \beta)a] = 0.$$

Suppose that firm 2 deviates from the equilibrium by offering $\mathcal{C}' = \{\omega', \beta'\}$, with $\omega' = \omega + (1 - \frac{r}{2})a\epsilon$ and $\beta' = \beta - \epsilon$ for some small $\epsilon > 0$ such that $\beta' > \frac{c}{a(1-r)}$. This contract attracts the agent away from firm 1 as

$$\begin{aligned}\mathrm{E}[\tilde{u} \mid \tilde{e} = 1] &= \omega' + (1-r)a\beta' - c\\ &= \omega + (1-r)a\beta + -c + \frac{r}{2}a\epsilon > \omega + (1-r)a\beta - c.\end{aligned}$$

Furthermore, the contract is a profitable deviation for firm 2 as

$$\mathrm{E}[\tilde{\pi}_2] = -\omega' + (\sigma - \beta')a = -\omega + (\sigma - \beta)a - \left(1 - \frac{r}{2}\right)a\epsilon + a\epsilon = \frac{r}{2}a\epsilon > 0.$$

This rules out $\mathcal{C}$ as an equilibrium contract.

LEMMA *A2: No contract $\mathcal{C} = \{\omega, \beta\}$ with $\omega > 0$ and $\beta < \frac{c}{a(1-r)}$ can be an equilibrium contract.*

Proof of Lemma A2: Suppose that such a $\mathcal{C}$ is an equilibrium contract. Because $\beta < \frac{c}{a(1-r)}$, this contracts fails to motivate the egoistic type to exert effort. In equilibrium, the expected profits of both firms must be zero, and so it must be the case that

$$\mathrm{E}[\tilde{\pi}_i] = \frac{1}{2}[-\omega + (\sigma - \beta)\phi_t a] = 0,$$

or equivalently, that $\omega = (\sigma - \beta)\phi_t a$ and $\beta < \sigma$. Suppose that firm 2 deviates from the equilibrium and offers $\mathcal{C}' = \{\omega', \beta'\}$, with $\beta' = \omega - (1-r)a\epsilon$ and $\beta' = \beta + 2\epsilon$ for some small $\epsilon > 0$ such that $\beta' < \frac{c}{a(1-r)}$. This contract attracts the virtuous type away from firm 1 as

$$\begin{aligned}\mathrm{E}[\tilde{u} \mid \tilde{t} = 1] &= \mathrm{E}[\tilde{u} \mid \tilde{e} = 1] = \omega' + (1-r)a\beta' - c\\ &= \omega + a(1-r)\beta - c + (1-r)a(2\epsilon - \epsilon) > \omega + a(1-r)\beta - c.\end{aligned}$$

However, it does not attract the egoistic type away from firm 1 as

$$\mathrm{E}[\tilde{u} \mid \tilde{t} = 0] = \mathrm{E}[\tilde{u} \mid \tilde{e} = 0] = \omega' = \omega - (1-r)a\epsilon < \omega.$$

Furthermore, this contract is a profitable deviation for firm 2 as

$$\begin{aligned} \mathrm{E}[\tilde{\pi}_2] &= \phi_t[-\omega' + (\sigma - \beta')a] \\ &= \phi_t[-\omega + (\sigma - \beta)a + (1-r)a\epsilon - 2a\epsilon] \\ &= \phi_t[-(\sigma - \beta)\phi_t a + (\sigma - \beta)a - (1+r)a\epsilon] \\ &= \phi_t a[(\sigma - \beta)(1-\phi_t) - (1+r)\epsilon] \end{aligned}$$

is greater than zero for ϵ small enough.

LEMMA *A3: The contract $\mathcal{C} = \{\omega, \beta\}$ with $\omega = 0$ and $\beta < \frac{c}{a(1-r)}$ cannot be an equilibrium contract.*

Proof of Lemma A3: Suppose that such a $\mathcal{C}$ is an equilibrium contract. Because $\beta < \frac{c}{a(1-r)}$, this contracts fails to motivate the egoistic type to exert effort, and thus

$$\mathrm{E}[\tilde{\pi}_i] = \frac{1}{2}(\sigma - \beta)\phi_t a > \frac{1}{2}\left(\frac{c}{a(1-r)} - \beta\right)\phi_t a > 0.$$

This cannot be an equilibrium as firm 2 (say) can deviate by offering $\mathcal{C}' = \{\omega', \beta'\}$, with $\beta' = \epsilon > 0$ and $\beta' = \beta$. Because $\mathcal{C}' \geq \mathcal{C}$, this contract would attract all agent types away from firm 1. Moreover, for ϵ small enough,

$$\mathrm{E}[\tilde{\pi}_2] = -\omega' + (\sigma - \beta')\phi_t a = -\epsilon + (\sigma - \beta)\phi_t a > \frac{1}{2}(\sigma - \beta)\phi_t a,$$

and so $\mathcal{C}'$ is a profitable deviation for firm 2.

Jointly, Lemmas A1, A2, and A3 imply that the only candidate $\mathcal{C} = \{\omega, \beta\}$ for a Nash equilibrium in pure strategies will have $\beta = \frac{c}{a(1-r)} \equiv \beta_{\mathrm{C}}$ and motivates the egoistic type to exert effort. In equilibrium, it must be the case that

$$\mathrm{E}[\tilde{\pi}_i] = \frac{1}{2}[-\omega + (\sigma - \beta)a] = 0,$$

or equivalently, that

$$\omega = (\sigma - \beta)a = \left(\sigma - \frac{c}{a(1-r)}\right)a = \sigma a - \frac{c}{1-r} \equiv \omega_{\mathrm{C}}.$$

The expected utility of both agent types is then

$$\mathrm{E}\big[\tilde{u} \,|\, \tilde{e} = 1\big] = \omega_{\mathrm{C}} + (1-r)a\beta_{\mathrm{C}} - c = \sigma a - \frac{c}{1-r}.$$

We now show that no deviations $\mathcal{C}' = \{\omega', \beta'\}$ with $\beta' > \frac{c}{a(1-r)}$ are profitable. In order for such a deviation to be profitable for firm 2 (say), it must attract both agent types away from firm 1. That is, it must be that

$$\mathrm{E}[\tilde{u} \,|\, \tilde{e} = 1] = \omega' + (1-r)a\beta' - c \geq \sigma a - \frac{c}{1-r},$$

or equivalently, that $\omega' \geq \sigma a - \frac{cr}{1-r} - (1-r)a\beta'$. This implies that

$$\mathrm{E}[\tilde{\pi}_2] = -\omega' + (\sigma - \beta')a \leq -\left(\sigma a - \frac{cr}{1-r}\right) + (1-r)a\beta' + (\sigma - \beta')a = r\left(\frac{c}{1-r} - a\beta'\right) < 0.$$

Finally, let us consider deviations $\mathcal{C}' = \{\omega', \beta'\}$ with $\beta' < \frac{c}{a(1-r)}$. To be profitable, such a deviation by firm 2 (say) must attract the virtuous type away from firm 1. That is, it must be that

$$\mathrm{E}[\tilde{u} \mid \tilde{t} = 1] = \mathrm{E}[\tilde{u} \mid \tilde{e} = 1] = \omega' + (1-r)a\beta' - c \geq \sigma a - \frac{c}{1-r},$$

or equivalently, that $\omega' \geq \sigma a - \frac{cr}{1-r} - (1-r)a\beta'$. Since $\beta' > \omega_{\mathrm{C}}$, this contract also attracts the egoistic type away from firm 1 as

$$\mathrm{E}[\tilde{u} \mid \tilde{t} = 0] = \mathrm{E}[\tilde{u} \mid \tilde{e} = 0] = \omega' > \omega_{\mathrm{C}}.$$

The cheapest deviation with $\beta' < \frac{c}{a(1-r)}$ will have $\beta' = 0$ (which has better risk-sharing properties than any other such β') and $\omega' = \sigma a - \frac{cr}{1-r}$. The expected profits of firm 2 are then given by

$$\mathrm{E}[\tilde{\pi}_2] = -\omega' + (\sigma - \beta')\phi_t a = -\left(\sigma a - \frac{cr}{1-r}\right) + \sigma\phi_t a,$$

which is negative if and only if (15) holds. This is the necessary and sufficient condition for $\{\omega_{\mathrm{C}}, \beta_{\mathrm{C}}\}$ to be a pure-strategy equilibrium. Q.E.D.

REFERENCES

Acemoglu, Daron, 2002, Technical change, inequality, and the labor market, *Journal of Economic Literature* 40, 7–72.

Ackerberg, Daniel A., and Maristella Botticini, 2002, Endogenous matching and the empirical determinants of contract form, *Journal of Political Economy* 110, 564–592.

Aggarwal, Rajesh K., and Andrew A. Samwick, 1999, Executive compensation, strategic competition, and relative performance evaluation: Theory and evidence, *Journal of Finance* 54, 1999–2043.

Akerlof, George A., 1982, Labor contracts as partial gift exchange, *Quarterly Journal of Economics* 97, 543–569.

Akerlof, George A., 2007, The missing motivation in macroeconomics, *American Economic Review* 97, 5–36.

Anderson, Erin, and David C. Schmittlein, 1984, Integration of the sales force: An empirical examination, *RAND Journal of Economics* 15, 385–395.

Aristotle, 2004, *Nicomachean Ethics*, J. A. K. Thomson trans, ed. (Penguin Books, London).

Arrow, Kenneth J., 1979, Business codes and economic efficiency, in Tom L. Beauchamp and Norman E. Bowie, eds.: *Ethical Theory and Business* (Prentice Hall, NJ).

Baron, James N., 1988, The employment relation as a social relation, *Journal of the Japanese and International Economies* 2, 492–525.

Baron, James N., and David M. Kreps, 1999, *Strategic Human Resources: Frameworks for General Managers* (John Wiley, New York, NY).

Bénabou, Roland, and Jean Tirole, 2003, Intrinsic and extrinsic motivation, *Review of Economic Studies* 70, 489–520.

Bénabou, Roland, and Jean Tirole, 2006, Incentives and prosocial behavior, *American Economic Review* 96, 1652–1678.

Berle, Adolph, and Gardiner Means, 1932, *The Modern Corporation and Private Property* (Macmillan, New York, NY).

Bewley, Truman F., 1995, A depressed labor market as explained by participants, *American Economic Review* 85, 250–254.

Bewley, Truman F., 1999, *Why Wages Don't Fall During a Recession* (Harvard University Press, MA).

Bohnet, Iris, Bruno S. Frey, and Steffen Huck, 2001, More order with less law: On contract enforcement, trust, and crowding, *American Political Science Review* 95, 131–144.

Bolton, Patrick, and David S. Scharfstein, 1990, A theory of predation based on agency problems in financial contracting, *American Economic Review* 80, 94–106.

Brennan, Michael J., 1994, Incentives, rationality, and society, *Journal of Applied Corporate Finance* 7, 31–39.

Bryant, John, 1983, A simple rational expectations Keynes-type model, *Quarterly Journal of Economics* 98, 525–528.

Core, John E., and Wayne R. Guay, 2001, Stock option plans for nonexecutive employees, *Journal of Financial Economics* 61, 253–287.

Core, John E., and Wayne R. Guay, 2002, The other side of the trade-off: The impact of risk on executive compensation: A revised comment, Working paper, Wharton School.

Core, John E., Wayne R. Guay, and David F. Larcker, 2003, Executive equity compensation and incentives: A survey, *Economic Policy Review—Federal Reserve Bank of New York* 9, 27–50.

Dasgupta, Partha, and Eric Maskin, 1986, The existence of equilibrium in discontinuous economic games. Part II: Applications, *Review of Economic Studies* 53, 27–41.

DeCharms, Richard, 1968, *Personal Causation: The Internal Affective Determinants of Behavior* (Academic Press, New York, NY).

Deci, Edward L., 1971, The effects of externally mediated rewards on intrinsic motivation, *Journal of Personality and Social Psychology* 18, 105–115.

Deci, Edward L., 1975, *Intrinsic Motivation* (Plenum Press, New York, NY).

Demsetz, Harold, and Kenneth Lehn, 1985, The structure of corporate ownership: Causes and consequences, *Journal of Political Economy* 93, 1155–1177.

Dewatripont, Mathias, and Jean Tirole, 1994, A theory of debt and equity: Diversity of securities and manager-shareholder incongruence, *Quarterly Journal of Economics* 109, 1027–1054.

Dow, James, 2004, Is liquidity self-fulfilling? *Journal of Business* 77, 895–908.

Etzioni, Amitai, 1986, The case for a multiple-utility conception, *Economics and Philosophy* 2, 159–183.

Etzioni, Amitai, 1988, *The Moral Dimension: Toward a New Economics* (Macmillan, New York, NY).

Fama, Eugene F., 1980, Agency problems and the theory of the firm, *Journal of Political Economy* 88, 288–307.

Fama, Eugene F., and Michael C. Jensen, 1983a, The separation of ownership and control, *Journal of Law and Economics* 26, 301–325.

Fama, Eugene F., and Michael C. Jensen, 1983b, Agency problems and residual claims, *Journal of Law and Economics* 26, 327–349.

Frank, Robert H., 1987, If Homo Economicus could choose his own utility function, would he want one with a conscience? *American Economic Review* 77, 593–604.

Friedman, Milton, 1988, The social responsibility of business is to increase its profits, in Thomas Donaldson and Patricia H. Werhare, eds.: *Ethical Issues in Business: A Philosophical Approach* (Prentice Hall, NJ).

Glaeser, Edward L., Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2004, Do institutions cause growth? *Journal of Economic Growth* 9, 271–303.

Hall, Brian J., and Jeffrey B. Liebman, 1998, Are CEOs really paid like bureaucrats? *Quarterly Journal of Economics* 113, 653–691.

Harris, Milton, and Artur Raviv, 1979, Optimal incentive contracts with imperfect information, *Journal of Economic Theory* 20, 231–259.

Henrich, Joseph, Robert Boyd, Samuel Bowles, Colin Camerer, Ernst Fehr, Herbert Gintis, and Richard McElreath, 2001, In search of Homo Economicus: Behavioral experiments in 15 small-scale societies, *American Economic Review* 91, 73–78.

Hilary, Gilles, and Kai Wai Hui, 2006, The influence of corporate culture on economic behavior: Does religion matter in corporate decision making in America? Working paper, Hong Kong University of Science and Technology.

Holmström, Bengt, 1979, Moral hazard and observability, *Bell Journal of Economics* 10, 74–91.

Holmström, Bengt, and Paul Milgrom, 1991, Multitask principal-agent analyses: Incentive contracts, asset ownership, and job design, *Journal of Law, Economics, and Organization* 7, 24–52.

Huo, Y. Paul, and Richard M. Steers, 1993, Cultural influences on the design of incentive systems: The case of East Asia, *Asia Pacific Journal of Management* 10, 71–85.

Ittner, Christopher D., Richard A. Lambert, and David F. Larcker, 2003, The structure and performance consequences of equity grants to employees of new economy firms, *Journal of Accounting and Economics* 34, 89–127.

Jensen, Michael C., 1986, Agency costs of free cash flows, corporate finance, and takeovers, *American Economic Review* 76, 323–329.

Jensen, Michael C., and William H. Meckling, 1976, Theory of the firm: Managerial behavior, agency costs and ownership structure, *Journal of Financial Economics* 3, 305–360.

Judge, Timothy A., and Remus Ilies, 2002, Relationship of personality to performance motivation: A meta-analytic review, *Journal of Applied Psychology* 87, 797–807.

Kaplan, Steven N., Mark M. Klebanov, and Morten Sorensen, 2007, Which CEO characteristics and abilities matter? Working paper, University of Chicago.

Katz, Lawrence F., and David H. Autor, 1999, Changes in the wage structure and earnings inequality, in Orley C. Ashenfelter and David Card, eds.: *The Handbook of Labor Economics, Vol. 3A* (North-Holland).

Kreps, David M., 1997, Intrinsic motivation and extrinsic incentives, *American Economic Review* 87, 359–364.

Lepper, Mark R., and David Greene, 1978, *The Hidden Costs of Reward: New Perspectives on the Psychology of Human Motivation* (L. Erlbaum Associates, Hillsdale, NJ).

Marcus, Bernd, Kibeom Lee, and Michael C. Ashton, 2007, Personality dimensions explaining relationships between integrity tests and counterproductive behavior: Big five, or one in addition? *Personnel Psychology* 60, 1–34.

Mehran, Hamid, 1995, Executive compensation structure, ownership, and firm performance, *Journal of Financial Economics* 38, 163–184.

Morck, Randall, Andrei Shleifer, and Robert W. Vishny, 1988, Management ownership and market valuation: An empirical analysis, *Journal of Financial Economics* 20, 293–315.

Morck, Randall, Andrei Shleifer, and Robert W. Vishny, 1990, Do managerial objectives drive bad acquisitions? *Journal of Finance* 45, 31–48.

Mount, Michael K., Murray R. Barrick, and J. Perkins Strauss, 1999, The joint relationship of conscientiousness and ability with performance: Test of the interaction hypothesis, *Journal of Management* 25, 707–721.

Murphy, Kevin R., and Sandra L. Lee, 1994, Personality variables related to integrity test scores: The role of conscientiousness, *Journal of Business and Psychology* 8, 413–424.

Myers, Stewart C., 1977, The determinants of corporate borrowing, *Journal of Financial Economics* 5, 147–175.

Myers, Stewart C., and Nicholas S. Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187–221.

Myerson, Roger B., 1991, *Game Theory: Analysis of Conflict* (Harvard University Press, Cambridge, MA).

Nagin, Daniel S., James B. Rebitzer, Seth Sanders, and Lowell J. Taylor, 2002, Monitoring, motivation, and management: The determinants of opportunistic behavior in a field experiment, *American Economic Review* 92, 850–873.

Noe, Thomas H., and Michael J. Rebello, 1994, The dynamics of business ethics and economic activity, *American Economic Review* 84, 531–547.

Ones, Deniz S., Chockalingam Viswesvaran, and Frank L. Schmidt, 1993, Comprehensive meta-analysis of integrity test validities: Findings and implications for personnel selection and theories of job performance, *Journal of Applied Psychology* 78, 679–703.

Palia, Darius, 2001, The endogeneity of managerial compensation in firm valuation: A solution, *Review of Financial Studies* 14, 735–764.

Prelec, Drazen, 1991, Values and principles: Some limitations on traditional economic analysis, in Amitai Etzioni and Paul R. Lawrence, eds.: *Socio-Economics: Toward a New Synthesis* (M. E. Sharpe).

Prendergast, Canice, 2002, The tenuous trade-off between risk and incentives, *Journal of Political Economy* 110, 1071–1102.

Rabin, Matthew, 1995, Moral preferences, moral constraints, and self-serving biases, Working paper, University of California at Berkeley.

Rose-Ackerman, Susan, 1999, *Corruption and Government: Causes, Consequences, and Reform* (Cambridge University Press, Cambridge, MA).

Ross, Stephen A., 1973, The economic theory of agency: The principal's problem, *American Economic Review* 63, 134–139.

Rothschild, Michael, and Joseph Stiglitz, 1976, Equilibrium in competitive insurance markets: An essay on the economics of imperfect information, *Quarterly Journal of Economics* 90, 629–649.

Sackett, Paul R., Laura R. Burris, and Christine Callahan, 1989, Integrity testing for personnel selection: An update, *Personnel Psychology* 42, 491–529.

Sackett, Paul R., and Michael M. Harris, 1984, Honesty testing for personnel selection: A review and critique, *Personnel Psychology* 37, 221–245.

Schelling, Thomas C., 1960, *The Strategy of Conflict* (Harvard University Press, Cambridge, MA).

Schmidt, Frank L., and John E. Hunter, 1998, The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 85 years of research findings, *Psychological Bulletin* 124, 262–274.

Schultz, Theodore W., 1960, Capital formation by education, *Journal of Political Economy* 68, 571–583.

Sen, Amartya, 1987, *On Ethics and Economics* (Blackwell, Oxford).

Sen, Amartya, 1997, Maximization and the act of choice, *Econometrica* 65, 745–779.

Shavell, Steven, 2002, Law versus morality as regulators of conduct, *American Law and Economics Review* 4, 227–257.

Shleifer, Andrei, 2004, Does competition destroy ethical behavior? *American Economic Review* 94, 414–418.

Shleifer, Andrei, and Robert W. Vishny, 1989, Management entrenchment: The case of manager-specific investments, *Journal of Financial Economics* 25, 123–139.

Shleifer, Andrei, and Robert W. Vishny, 1997, A survey of corporate governance, *Journal of Finance* 52, 737–783.

Smith, Adam, 2003, *The Wealth of Nations* (Random House, New York, NY).

Somanathan, E., and Paul H. Rubin, 2004, The evolution of honesty, *Journal of Economic Behavior and Organization* 54, 1–17.

Stulz, René, 1990, Managerial discretion and optimal financing policies, *Journal of Financial Economics* 26, 3–27.

Treynor, Jack L., and Fischer Black, 1976, Corporate investment decisions, in Stewart C. Myers, ed.: *Modern Developments in Financial Management* (Praeger, New York).

Walkling, Ralph A., and Michael S. Long, 1984, Agency theory, managerial welfare, and takeover bid resistance, *RAND Journal of Economics* 15, 54–68.

Williamson, Oliver E., 1988, Corporate finance and corporate governance, *Journal of Finance* 43, 567–591.