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## Impact Investment and Non-financial Incentives

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# Impact Investment and Non-financial Incentives<sup>\*</sup>

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## Abstract

We consider a framework in which both a principal and an agent care about a social mission, such as addressing social or environmental concerns. The agent requires financing and must satisfy a budget constraint. Under incomplete information, in addition to the usual quantity distortions for inefficient agents, the principal also distorts the mission upward for efficient agents and downward for inefficient ones. In our context, the existence of hidden types may improve total welfare compared to complete information, as screening incentivizes the principal to propose a contract with a higher mission to reduce the rent of more efficient types. Our results apply to social enterprises and triple bottom line environments, contributing to the theoretical understanding of the impact of non-financial incentives on optimal contracting.

**JEL codes:** D21, L21, L31, D82, M14.

**Keywords:** Impact investment, mission motivation, incentives, social enterprises, corporate social responsibility.

## 1 Introduction

In recent years, the traditional classification of institutions as nonprofit, for-profit, or governmental has increasingly revealed its limitations in explaining organizational behavior. Many organizations pursue multiple objectives, and both public and private entities often attend to a combination of financial performance (such as generating profits or minimizing costs) and non-financial goals (such as social and environmental outcomes). These broader dimensions are frequently addressed within the frameworks of Corporate Social Responsibility (CSR) and Environmental, Social, and Governance (ESG) standards,

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which seek to evaluate the wider societal and ecological impact of corporate activities. These considerations are closely connected to the concepts of the double and triple bottom lines. First introduced by John Elkington, these frameworks have gained traction in business discourse over the past two decades. They emphasize that firm performance should be evaluated not solely in economic terms, but across three interconnected dimensions -social, environmental, and economic- commonly referred to as the “three Ps”: People, Planet, and Profit.

The idea that organizations pursue both financial and non-financial objectives applies to both private and public institutions. It is naturally relevant for government-funded projects, for instance when a local government, focused on both controlling expenses and achieving social impact, finances a firm or organization with similar goals to fulfill a public objective.

Additionally, impact investment can also concern conventional private for-profit companies that commit to ambitious social responsibility goals. One often cited example is the ice cream brand Ben & Jerry’s, which has progressively elevated its corporate social responsibility standards to the point where they resemble the social enterprise model. More in general, as reported in Cassar and Meier (2018), between 2003 and 2009, the number of courses focused on “social entrepreneurship” - enterprises with a clear and explicit social mission - at top U.S. MBA programs increased by 110%, showing an increased interest in these issues within the corporate sector.

The actors in the impact investment market also include investors specifically targeting social enterprises, such as foundations, impact investing funds, intermediaries, and a smaller number of large financial institutions, including banks, pension funds, and governments, both in developed and developing countries. For example, the Tony Elumelu Foundation primarily aims to enhance the competitiveness and growth of the African private sector, including through impact investing. In the United States, Investors’ Circle is an “angel network” that has supported investments in firms like Zipcar (a sustainable car-sharing company), Honest Tea (an iced tea brand with an ethical supply chain), and numerous other enterprises that blend social impact with financial returns. In France, Citizen Capital sees its mission as channeling private capital towards high-impact organizations addressing humanity’s greatest challenges. It finances companies such as

Keon, Telegrafik, and Cardio Parc - all of which pursue particularly strong social and environmental objectives.

Recently, the study of impact investment has considered organizations that are explicitly neither traditional profit-maximizing firms, nonprofit organizations, nor government agencies. These hybrid organizations are often defined as social enterprises (see Besley and Ghatak, 2017, Besley and Ghatak, 2018). The goal of such enterprises is to balance profit-making with pursuing a social mission (Katz and Page, 2010). Unlike nonprofit firms, social enterprises are not subject to a formal non-distribution constraint prohibiting the distribution of profits to investors. However, these firms explicitly incorporate a social mission into their objectives. Prominent examples of social enterprises are documented in Clark et al. (2014) and Ghatak (2021). Among these, several are for-profit enterprises. For instance, Etsy is a well-known online marketplace committed to improving its impact on employees, the community, and the environment. d.light, a San Francisco-based firm, designs, manufactures, and distributes solar lighting and power products throughout the developing world. Evergreen Cooperatives is an integrated network of for-profit cooperatives operating green businesses in Cleveland. Other examples include Landstreet Financial, specializing in financial services; Dignified Mobile Toilet, operating in the African mobile toilet market; and Easy Being Green, which provides electricity services in Australia. Another noteworthy case is Altrushare Securities, a for-profit brokerage firm primarily owned by charitable organizations with a clear mission to support communities through its market-generated profits.

In general, the pursuit of social or environmental goals results in trade-offs between these missions and the financial performance. While it may be argued that social objectives do not always cause financial trade-offs, if no such trade-offs existed, there would be little need for a social orientation in the first place. Investors would naturally support socially or environmentally oriented organizations, just as they do profit-oriented projects (see also Morduch and Ogden, 2019). Indeed, the trade-off between financial and non-financial objectives is not necessarily at odds with observations that firms with ambitious corporate social responsibility missions can sometimes be highly successful. As the literature suggests, non-monetary incentives can enhance firm performance, even when they increase costs, by attracting more efficient workers, reducing turnover, and

encouraging workers to accept lower wages (see Cassar and Meier, 2018).

Our paper aims to study the relationship between socially oriented investors and social enterprises, seeking to understand how social and environmental goals influence the contractual environment.

We present a contract-theory framework in which a principal (impact investor) contracts with an agent (a social enterprise), while both the principal and the agent value both financial and social (or environmental) concerns. The firm has no private funds to finance the required investment (effort) necessary to produce the good/service and realize the social mission, so contracts must satisfy a budget constraint.

We first show that in some cases impact-orientation can make the perfect information feasible even when information on production costs is asymmetric, because agents care about the mission and are less tempted to mimic less efficient types than in standard frameworks. In many cases though, imperfect information requires distorting the contracts proposed to the agent to provide the right incentives. In this case, the second-best optimal contract implies that the principal, in order to deter efficient types from choosing the contract designed for inefficient ones, uses the size of the social mission as a screening tool. As an outcome, the more efficient agent will be offered a contract with a higher level of social impact, as compared to the complete information case, while less efficient agents will face a downward distortion of her mission. Globally, the expected level of social impact can be higher under asymmetric than under complete information.

By showing that social orientation can serve as a screening tool, the paper extends traditional principal-agent models to account for hybrid organizations that pursue both profit and social impact. Incorporating mission orientation into the contract, the principal is able to reduce the transfer to efficient types (and their information rent), by sharing the surplus created by both the principal and the agent's mission orientation. This allows to propose a contract that has a higher mission than the one preferred by the principal alone, while decreasing the net transfer to the agent, by reducing her information rent.

Our framework delivers an original welfare results, by showing that the presence of asymmetric information can increase total welfare with respect to symmetric information.

The paper proceeds as follows. Section 2 offers a review of the related literature. Section 3 presents the model. Section 4 develops the results under complete and asymmetric

information respectively. Section 5 develops comparative statics and welfare analysis. Section 6 considers an enriched version of the model by adding agents that are uniquely oriented towards profit. Section 7 concludes.

## 2 Related literature

The present paper relates to the literature on the link between motivation and incentives, as well as to the economic theories of the social sector. Empirical and experimental work has consistently shown that individuals are not exclusively driven by self-interest and often do not focus solely on the classic trade-off between financial returns and leisure in the job market (see Besley and Ghatak, 2017, Cassar and Meier, 2018, Mayer, 2021 for literature reviews). Recent empirical studies also show that investors in financial markets are willing to sacrifice returns to invest in projects with social or environmental impact. Bernal et al. (2021) compare impact investments to mainstream markets and find that investors sacrifice financial returns to align with their values. Similarly, Barber et al. (2021) find that investors in financial markets are willing to accept lower financial returns in exchange for the non-pecuniary benefits of intentional impact investing. Other studies highlight that pro-social incentives, such as charitable donations linked to work activities, increase worker productivity in both laboratory and field experiments. Examples are detailed in Tonin and Vlassopoulos (2015), Imas (2014), Charness et al. (2016), DellaVigna and Pope (2018), Cassar (2019) and Armouti-Hansen et al. (2024).

We present a theoretical framework to assess how non-financial motivations affect optimal contracts when firms and projects are heterogeneous and information is asymmetric. Our model provides a conceptual framework illustrating a channel through which mission motivation enhances the effort of efficient agents, leading to a larger social impact.

Our paper directly relates to the literature exploring the role of motivation in shaping organizations (Akerlof and Kranton, 2000, 2005; Bénabou and Tirole, 2006, 2010; Besley and Ghatak, 2005). Moreover, we also relate to the concepts of double and triple bottom lines (Elkington, 1997) and social enterprises (Besley and Ghatak, 2017; Katz and Page, 2010), defined as organizations aiming to balance profit-making with the pursuit of a social mission. We contribute to the literature by examining how social orienta-



tion modifies contractual environments when information is asymmetric and agents are heterogeneous. In their seminal model studying incentives with motivated agents, Besley and Ghatak (2005) study the effect of matching an organization’s mission with agents’ preferred missions. They assume that principals and agents can derive non-pecuniary benefits from non-financial motivations. They demonstrate that matching principals and agents with similar motivations increases overall efficiency. Moreover, they show that a principal can save on monetary incentives if he is matched with an agent who shares his mission preferences. This framework is extended to various scenarios in Besley and Ghatak (2018).

These papers take the level of the mission as exogenous, whereas we concentrate on the choice of the mission level as part of the proposed contracts. We study how mission motivation can be part of the contracts and how this impacts contractual outcomes.

Closer to our approach is the work of Cassar and Armouti-Hansen (2020), who proposes a principal-agent model in which the level of the mission is endogenous and can be used to provide incentives. They consider moral hazard and the possibility that the mission orientation of the agent is not observed by the principal. They assume that principal and agent preferences are misaligned, as the utility of the principal decreases with the level of the mission, while the utility of the agent increases. They find that the second-best contract can distort the mission toward agent preferences, but less so when the agent’s preferences for the mission are not observable, because more mission-oriented agents have an incentive to mimic less motivated types. Koch and Weinschenk (2021) also propose a model in which agents care about their influence on others, including principals and third parties, and differ in their social attentiveness. They show that although monetary incentives are also effective with socially attentive agents, the principal may optimally decide not to offer any financial incentives in the second-best contract.

Unlike Cassar and Armouti-Hansen (2020) and Koch and Weinschenk (2021), we do not focus on asymmetric information regarding the strength of social motivation or the impact of moral hazard. Instead, our approach complements theirs by concentrating on cost heterogeneity and on the impact of mission orientation on social costs and benefits. We assume that both the principal and the agent can positively evaluate the value of the mission, but that mission orientation directly impacts the production costs. Our frame-

work is thus adapted to describe situations in which, to reconcile production levels and social impact, firms have to bear higher production costs. A new finding in our analysis is that, at the second-best optimum, the utility of the principal increases with the mission orientation of the agent, even when the principal has no direct interest in the mission. The reason is that the mission can be used as a screening device, increasing the mission of the efficient types and reducing their monetary rents. As a result, the level of impact investment of the more efficient types is distorted upwards, while that of the inefficient types is distorted downwards compared to the symmetric information benchmark.

Our paper also connects more broadly to the literature on non-monetary incentives and work as a source of meaning. Pro-social incentives have been shown to increase effort and reduce reservation wages. For example, empirical and experimental evidence suggest that a firm's corporate social responsibility activities can lower employees' reservation wages (Nyborg and Zhang, 2013, Burbano, 2016, Armouti-Hansen et al., 2024). From a theoretical point of view, Baron (2007, 2008) analyzes the origin of corporate social responsibility as an imperfect substitute for direct donations. He shows that corporate social responsibility can emerge when firms are more efficient than charitable organizations to which citizens can donate directly. He also shows that an investor or an entrepreneur can sacrifice financial returns to develop corporate social responsibility programs. In particular, Baron (2008) proposes a principal-agent framework in which agents have heterogeneous ability. In his model, the expected social expenditure is not modified by screening under asymmetric information, but a more efficient agent can increase their social expenses in good times (when profits are high).

We illustrate a new mechanism through which principals can leverage agents' mission orientation to reduce transfers and rents by incorporating non-financial incentives into contracts. In our model, higher impact investments are solicited by the principal from efficient agents, who in turn earn higher rents or profits compared to inefficient agents. In this context, we demonstrate that the optimal second-best contract prescribes an upward distortion of the social mission for the more efficient types. Paradoxically, asymmetric information can increase the total social impact and, in some cases, social welfare.

### 3 The model

A principal (e.g., a financing institution, an investment fund, a platform, a government or a local authority) must finance an agent (e.g., a firm, an employee, or an NGO) to develop a project. The agent chooses both the quantity produced,  $q$ , and a *mission* level,  $m$ . Both elements are publicly observable and contractible.

Agents are heterogeneous: Some are more efficient than others. We denote the efficient type as  $L$  (for “low” cost) and the inefficient type as  $H$  (for “high” cost). The agent’s type is private information, while the principal only knows the distribution function characterized by  $p$ , the probability that the agent is of type  $L$ . Both the principal’s and the agent’s objectives depend on financial and social/environmental incentives.

The principal’s utility function is:

$$V_P = q(1 + \alpha_P m) - T, \quad (1)$$

Where  $\alpha_P$  represents the principal’s interest in the social/environmental mission (i.e., the weight of the mission in utility),  $m$  is the mission’s level, and  $T$  is the transfer to the agent. We assume that the principal is risk-neutral and maximizes the expected value of  $V_P$  based on the available information about the agent’s type.

This utility function has a natural interpretation: the principal maximizes the net value derived from production, with a normalized price of 1, minus the transfer to the agent. Additionally, the principal derives non-financial utility from the mission, proportional to the quantity produced and weighted by the parameter  $\alpha_P \geq 0$ . Following Besley and Ghatak (2005) and Cassar (2019), we assume that the principal values the mission, potentially to a different extent than the agent. Notably, we do not consider cases where the principal dislikes the mission, as in Cassar and Armouti-Hansen (2020).

The agent’s utility function is:

$$V_A = q(\alpha_A m) + T - \theta_i \frac{1 + m^2}{2} q^2, \quad (2)$$

The agent incurs costs that are increasing in both the quantity produced and the size of the mission, with the efficiency differences reflected in the parameter  $\theta_i$  (the inverse of productivity) with  $\theta_L < \theta_H$ .

The agent values the monetary transfer  $T$  and derives utility from the mission  $m$ . The parameter  $\alpha_A \geq 0$  captures the agent's weight for the mission, which may differ from that of the principal. This cost function differs from others in the literature, where costs are typically assumed to be quadratic in quantity and independent of the mission (see, e.g., Besley and Ghatak, 2005, Cassar, 2019). This formulation captures cases where mission pursuit raises costs or reduces profitability, such as adopting cleaner technologies, hiring disadvantaged workers, or investing in sustainable finance projects.

Let us notice that all parameters are common knowledge, except for the agent's type,  $\theta_i$  which is private information of the agent.

In addition, agents face a budget constraint, requiring funding from the principal to undertake their activities. The transfer must satisfy  $T_i \geq \theta_i \frac{1+m_i^2}{2} q_i^2$ , therefore the agent does not accept the contract.

To account for potential mission externalities, we define social welfare as:

$$W = V_P + V_A + \gamma m q, \quad (3)$$

Where the last term captures the externalities of the contract on society, with  $\gamma \geq 0$  measuring the importance of these objectives in the social welfare function.

## 4 Analysis

### 4.1 Complete information

We first consider a setting in which  $\theta_i$  is common knowledge. In this case, the principal fully controls the production and reimburses the agent's expenses through a transfer  $T_i = \theta_i \frac{1+m_i^2}{2} q_i^2$ .

The principal maximizes his utility:

$$V_P = q_i(1 + \alpha_P m_i) - \theta_i \frac{1 + m_i^2}{2} q_i^2,$$

with respect to  $q_i$  and  $m_i$ , for  $i \in \{L, H\}$ . The first-order conditions yield the optimal values of  $q_i$ ,  $m_i$ , and  $T_i$  for each type  $i \in \{L, H\}$ :

$$q_i^* = \frac{1}{\theta_i}, \quad (4)$$

$$m_i^* = \alpha_P, \quad (5)$$

$$T_i^* = \frac{1 + \alpha_P^2}{2\theta_i}. \quad (6)$$

The social welfare function is given by:

$$W = q_i(1 + \alpha_P m) + q_i \alpha_A m - \theta_i \frac{1 + m^2}{2} q_i^2 + \gamma m q_i. \quad (7)$$

Observe that the values of  $q_i$  and  $\alpha_m$  that maximize  $W$  are  $q_i = \frac{1}{\theta_i}$  and  $m = \alpha_P + \alpha_A + \gamma$ . Thus, even without external mission externalities ( $\gamma = 0$ ), the proposed contract does not maximize social welfare. The principal's choice of  $m = \alpha_P$  neglects the agent's preference for the mission,  $\alpha_A$ . Selecting  $m = \alpha_P + \alpha_A$  would increase social welfare, but the principal would need to compensate the agent for the additional costs. However, this compensation would exceed the principal's utility gain, leading to a welfare loss of  $\frac{\alpha_A^2 + \gamma^2}{2\theta_i}$ .

## 4.2 Hidden type

We now assume that the type  $\theta_i \in \{\theta_L, \theta_H\}$  is private information of the agent. The principal only knows  $p$ , the probability that  $\theta = \theta_L$  and thus offers a menu of contracts  $((q_H, m_H, T_H), (q_L, m_L, T_L))$ .

### Constraints

For the menu of contract to be accepted by the agent, it has to respect four constraints: two budget constraints (more restrictive than participation constraint imposing a positive utility for the agent because the budget constraint does not take into account the taste for the social mission of the agent) and two incentive constraints that do take into account the taste for the social mission of the agent.

Budget constraint of the less efficient type ( $BC_H$ ):

$$T_H \geq \theta_H \frac{1 + m_H^2}{2} q_H^2 \quad (8)$$

Budget constraint of the more efficient type ( $BC_L$ ):

$$T_L \geq \theta_L \frac{1 + m_L^2}{2} q_L^2 \quad (9)$$

The incentive compatibility constraint of the less efficient type is slightly different from the usual case. It is satisfied when one of the two following conditions is verified:

- 1) The utility of the less efficient agent is lower if she chooses the contract designed

for the more efficient agent. 2) The budget constraint of the less efficient agent is not satisfied if she chooses the contract designed for the more efficient one.<sup>1</sup> This constraint is represented by the two following conditions.

$$T_H + \alpha_A m_H q_H - \theta_H \frac{1 + m_H^2}{2} q_H^2 \geq T_L + \alpha_A m_L q_L - \theta_H \frac{1 + m_L^2}{2} q_L^2 \quad (10)$$

$$T_L - \theta_H \frac{1 + m_L^2}{2} q_L^2 < 0 \quad (11)$$

For the more efficient type, the situation is simpler. As a matter of fact, the budget constraint of the less efficient agent and the assumption that  $\theta_L < \theta_H$  implies that  $T_H - \theta_L \frac{1 + m_H^2}{2} q_H^2 \geq 0$ . Therefore, the incentive compatibility constraint of the more efficient type ( $IC_L$ ) is:

$$T_L + \alpha_A m_L q_L - \theta_L \frac{1 + m_L^2}{2} q_L^2 \geq T_H + \alpha_A m_H q_H - \theta_L \frac{1 + m_H^2}{2} q_H^2 \quad (12)$$

### Analysis

In the standard case, without any mission  $m$  and taste for this mission,  $\alpha_A$  and  $\alpha_P$ , when the principal ignores the private information of the agent (the value of  $\theta$ ), he cannot implement the perfect information contract, because the efficient agent would pretend to be inefficient if offered the two perfect information contracts.

Here, the situation is slightly different because of the cross-effects of  $m$  and  $q$ . As a matter of fact, in the perfect information case, the utility of an agent of type  $i$  is equal to  $q_i \alpha_A m = \frac{\alpha_A \alpha_P}{\theta_i} > 0$ . A more efficient agent obtains a higher utility,  $\frac{\alpha_A \alpha_P}{\theta_L} > \frac{\alpha_A \alpha_P}{\theta_H}$ , because the production is higher with the efficient type and the only utility derived by the agent is obtained through the mission, increasing with the quantity produced. Hence, if the principal proposes the perfect information contracts even though he does not know the type of the agent, if an efficient agent chooses the contract  $(q_H^*, m_H^*, T_H^*)$  rather than  $(q_L^*, m_L^*, T_L^*)$ , she would lose  $\frac{\alpha_A \alpha_P}{\theta_L} - \frac{\alpha_A \alpha_P}{\theta_H}$  on the mission dimension and gain  $(\theta_H - \theta_L) \frac{1 + \alpha_P^2}{2\theta_H}$  because she would receive the transfer designed for an inefficient agent. Therefore, if

$$\frac{\alpha_A \alpha_P}{\theta_L} - \frac{\alpha_A \alpha_P}{\theta_H} \geq (\theta_H - \theta_L) \frac{1 + \alpha_P^2}{2\theta_H^2} \quad (13)$$

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<sup>1</sup>In the standard case, if the budget constraint of the less efficient agent is binding, conditions 1 and 2 are equivalent. Here, it is no longer the case. For example, it is possible to satisfy condition 2 without satisfying condition 1 because of the mission that has an impact on the utility but not on the budget.

An efficient agent is better off with  $(q_L^*, m_L^*, T_L^*)$  than with  $(q_H^*, m_H^*, T_H^*)$  and the complete information contracts, which are not incentive-compatible when  $\alpha_A = 0$ , become feasible.

**Lemma 1** *Under asymmetric information, the complete information contracts  $(q_L^*, m_L^*, T_L^*)$  and  $(q_H^*, m_H^*, T_H^*)$  satisfy the incentive compatibility constraints (10), (11), (12) and the budget constraints (9) and (8) if:*

$$\alpha_A \geq \frac{1 + \alpha_P^2}{2\alpha_P} \frac{\theta_L}{\theta_H} \quad (14)$$

**Proof:** First, the complete information contracts satisfy the budget constraints. Otherwise, they would not be accepted by the agent, even with complete information. Second, because the budget constraint of the efficient type is bidding and  $q_L > 0$ , the incentive constraint of the inefficient type is satisfied.

Eventually, let us consider the incentive constraint of the efficient type. If the principal proposes the perfect information contracts, (12) can be rewritten as follows.

$$\frac{\alpha_A \alpha_P}{\theta_L} \geq \frac{\alpha_A \alpha_P}{\theta_H} + (\theta_H - \theta_L) \frac{1 + \alpha_P^2}{2} \frac{1}{\theta_H^2} \quad (15)$$

Equivalent to:

$$\alpha_A \alpha_P \left( \frac{1}{\theta_L} - \frac{1}{\theta_H} \right) \geq (\theta_H - \theta_L) \frac{1 + \alpha_P^2}{2\theta_H^2} \quad (16)$$

Equivalent to:

$$\alpha_A \geq \frac{1 + \alpha_P^2}{2\alpha_P} \frac{\theta_L}{\theta_H} \quad (17)$$

Q.E.D.

**Proposition 1** *Under asymmetric information, if condition (14) is satisfied, the principal will propose exactly the same contracts as with perfect information, a less efficient agent chooses  $(q_H^*, m_H^*, T_H^*)$  and a more efficient agent chooses  $(q_L^*, m_L^*, T_L^*)$ .*

**Proof:** We already showed that if condition (14) is satisfied, the perfect information contracts are enforceable. Now, it is obviously not possible for the principal to obtain

that the agent accepts a menu of contracts that would be more favorable to the principal than the ones proposed with perfect information. Therefore, the principal will propose the perfect information contracts.

Q.E.D.

Because of the existence of the mission and the cross-effects of  $m$  and  $q$ , if  $\alpha_A$  is sufficiently high, the principal can propose the same menu of contracts with perfect information or asymmetric information. The interest of the agent for the mission is clearly positive for the principal, no contract distortion and no information rent. This observation explains why a principal that cares for the mission is better off choosing agents (employees, subcontractors, subsidized NGO, ...) that also care sufficiently (i.e. condition (14)) for the mission. It is particularly striking that this motivation may completely annihilate the effects of the asymmetry of information.

Now, what happens if condition (14) is not satisfied? Let us first assume that, as in the standard case, if  $BC_H$  and  $IC_L$  are satisfied, the other two constraints are also satisfied. Following our previous remarks, when condition (14) is satisfied, we observe that the principal has access to an extra tool in order to satisfy  $IC_L$ . He can increase  $m_L - m_H$  so that an efficient agent will be less eager to pretend that she is inefficient because this would decrease the utility she derives from the mission. Hence, if we consider a modified version of the maximization program of the principal, removing  $BC_L$  and  $IC_H$ , we obtain the following solution (with  $\hat{T}_H$  and  $\hat{T}_L$  such that  $BC_H$  and  $IC_L$  are binding):

$$\hat{q}_L = \frac{1}{\theta_L} \tag{18}$$

$$\hat{q}_H = \frac{1}{\theta_H + \frac{p}{1-p}(\theta_H - \theta_L)} \tag{19}$$

$$\hat{m}_L = \alpha_P + \alpha_A \tag{20}$$

$$\hat{m}_H = \max(0, \alpha_P - \frac{p}{1-p}\alpha_A) \tag{21}$$

Let us first observe that  $IC_H$  is verified with these values (proof in appendix 8.1). Now, even though the budget constraint of the inefficient type is satisfied and the efficient type obtains a higher utility with the contract designed for her type, it is not obvious that the budget constraint of the efficient type is satisfied. This higher utility may be



obtained through a high level for the mission,  $\hat{m}_L$  and a budget constraint that is not satisfied. Using the fact that conditions (8) and (12) are binding, the budget constraint of the efficient type can be rewritten as follows:

$$\alpha_A(\hat{m}_L\hat{q}_L - \hat{m}_H\hat{q}_H) \leq \hat{q}_H^2 \frac{(1 + \hat{m}_H^2)}{2}(\theta_H - \theta_L) \quad (22)$$

The left part is equal to the extra utility that an agent obtains on the mission dimension of her utility function if she chooses the contract designed for the efficient type. The right part is equal to the monetary gain that an efficient agent obtains if she chooses the contract designed for the inefficient type. If condition (22) is satisfied, this means that the monetary gain is higher than the extra utility derived through the mission. Therefore, in order to satisfy the incentive constraint of the efficient type, the principal must give to the efficient agent a transfer  $\hat{T}_L$  higher than her cost so that the budget constraint of the efficient type is also satisfied. And this condition is satisfied when  $\alpha_A$  is not too large.

**Proposition 2** *If  $\alpha_A(\alpha_p + \alpha_A) \leq \frac{\theta_L(\theta_H - \theta_L)}{2(\theta_H + \frac{p}{1-p}(\theta_H - \theta_L))^2}$ , condition (22) is satisfied and the principal proposes contracts  $(\hat{q}_H, \hat{m}_H, \hat{T}_H)$  and  $(\hat{q}_L, \hat{m}_L, \hat{T}_L)$ .*

**Proof:** Let us first get rid of the *max* that appears in the formula of  $\hat{m}_H$  by observing that if condition (22) is satisfied when  $\hat{m}_H = 0$ , it is also satisfied when  $\hat{m}_H > 0$ . Therefore, it is sufficient to prove that condition 22 is satisfied with  $\hat{m}_H = 0$ . This can be rewritten:

$$\alpha_A\hat{m}_L\hat{q}_L \leq \frac{\hat{q}_H^2}{2}(\theta_H - \theta_L)$$

Equivalent to

$$\alpha_A(\alpha_p + \alpha_A) \leq \frac{\theta_L(\theta_H - \theta_L)}{2(\theta_H + \frac{p}{1-p}(\theta_H - \theta_L))^2}$$

Q.E.D.

If  $\alpha_A(\alpha_p + \alpha_A) \leq \frac{\theta_L(\theta_H - \theta_L)}{2(\theta_H + \frac{p}{1-p}(\theta_H - \theta_L))^2}$ , at the second-best optimal solution, the mission of the more efficient type is distorted upwards, and that of the less efficient type downwards. The described contract implies that the principal, in order to deter efficient types from choosing the contract designed for inefficient ones, uses the size of the social mission as a screening tool. Reducing the social mission is costly for the agent, who cares for social

outreach. Then, an efficient agent will prefer a contract with a higher  $m$  rather than the contract designed for inefficient agents with a lower level of the social mission.

Contrary to the usual result of *no distortion at the top*, here the contracts of both types are distorted when considering the second-best mission. The *no distortion at the top* rule, which usually applies in principal-agent contexts, implies that the contract designed for the most efficient type is unaffected by asymmetric information (except for the amount of the transfer). A natural interpretation of this rule in the environment we consider would be that the contract proposed to the efficient agent should specify an effort level and a level of  $m$  equivalent to the one we would observe with perfect information. This is not the case here as both levels of mission  $m_H$  and  $m_L$  are distorted with respect to the case of perfect information. The reason for this result is that, even under complete information, in the presence of a budget constraint and social orientation of the agent ( $\alpha_A > 0$ ), the principal cannot just impose the mission that maximizes the joint welfare and then share the surplus with the agent through the transfer (without imposing a loss on the agent). The complete information level of  $m$  does not correspond to the one that maximizes the joint surplus, namely  $\alpha_P + \alpha_A$ . In contrast, under asymmetric information, this level of the mission equal to  $\alpha_P + \alpha_A$  becomes feasible for the more efficient type, because the principal can reduce the information rent of this type by raising  $m$ , at least as long as the budget constraint is not binding. The effect on the expected value of the mission can be particularly important, as stated in the following result.

**Proposition 3** *If condition (22) is satisfied and  $\alpha_A > \frac{1-p}{p} \frac{\theta_L}{\theta_H} \alpha_P$ , the expected value of the mission is strictly higher with asymmetric information than with perfect information.*

**Proof:** If condition (22) is satisfied, the contracts  $(\hat{q}_L, \hat{m}_L, \hat{T}_L)$  and  $(\hat{q}_H, \hat{m}_H, \hat{T}_H)$  are implemented. In addition, if  $\alpha_A \geq \frac{1-p}{p} \frac{\theta_L}{\theta_H} \alpha_P$ ,  $\hat{m}_H = 0$ . Therefore, with asymmetric information, the expected value of the mission is equal to  $p \frac{1}{\theta_L} (\alpha_P + \alpha_A)$ . With perfect information, the expected value of the mission is  $\alpha_P (\frac{p}{\theta_L} + \frac{1-p}{\theta_H})$ . The expected value of the mission is strictly higher with asymmetric information if and only if:

$$\alpha_P \left( \frac{p}{\theta_L} + \frac{1-p}{\theta_H} \right) < p \frac{1}{\theta_L} (\alpha_P + \alpha_A)$$

Equivalent to:

$$\alpha_A > \frac{1-p}{p} \frac{\theta_L}{\theta_H} \alpha_P \quad (23)$$

Q.E.D.

We have first shown that the existence of the mission and its interest for both the principal and the agent allow, for certain values of the parameters, to maintain the same contracts with perfect information and asymmetric information. We now observe that, with other values of these parameters, the asymmetry of information allows to increase the expected level of the mission as compared to what gets realized with perfect information. This increase in the expected level of the mission is uniquely explained by the upward distortion of  $m_L$  with asymmetric information to the extent that the  $q$  of the efficient agent is the same in both cases and that of the inefficient agent is lower with asymmetric information than with perfect information.

We also note that the existence of the mission has no negative effect on the quantity chosen since  $\hat{q}_H$  and  $\hat{q}_L$  proposed by the principal are independent of the value of  $m$ .

Now, If condition (22) is not satisfied, the contracts  $(\hat{q}_H, \hat{m}_H, \hat{T}_H)$  and  $(\hat{q}_L, \hat{m}_L, \hat{T}_L)$  do not satisfy the budget constraint of the efficient agent. The second best optimal contract would have to additionally satisfy (9). This case is analytically more cumbersome and we did not manage to obtain a tractable analytical solution. However, we verified numerically that for many admissible values of the parameters, the shape of the optimal contracts is qualitatively similar<sup>2</sup>, so that the qualitative results of the paper should be preserved. Examples of these solutions are provided in Table 2 in Appendix 8.2.

For simplicity, in the remainder of the paper, we restrict our attention to the case in which condition 22 is satisfied.

## 5 Welfare considerations

In this section, we consider two different welfare issues. First, we study the effects of variations of  $\alpha_A$  and  $\alpha_P$  on the expected utilities of the principal and the agent. Second, we compare social welfare with complete or asymmetric information.

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<sup>2</sup>This has been verified numerically using the software Mathematica.

In this section, we assume that condition (22) is satisfied. This allows us to obtain an analytical solution for the principal optimization problem.

## 5.1 Effects of variations of $\alpha_A$ and $\alpha_P$ on utilities

We gather the results in table 1 and comment on them afterwards. Proofs are provided in Appendix 8.3.

	$\alpha_P$	$\alpha_A$
$E(V^P)$	Increasing	Increasing
$V_H^A$	Weakly increasing	Increasing, then decreasing and neutral
$V_L^A$	Weakly increasing	No general result

Table 1: Comparative Statics - Principal and agent's utility

### The principal's utility

By definition, the principal proposes the contracts. Therefore, the agent cannot exploit a greater interest of the principal for the mission and the expected utility of the principal is increasing in  $\alpha_P$ .

The surplus of the principal is also increasing in  $\alpha_A$ . This shows that the principal prefers to deal with agents with higher mission-orientation. This complements the result in Proposition 2, which shows that mission-orientation can allow to achieve the perfect information benchmark, increasing the total share of the pie for the principal and the agent, while reducing the transfer to the efficient type. Here, we show that, for any value of  $\alpha_P$ , the utility of the principal is increasing in  $\alpha_A$ .

### The agent's utility

Contrary to the principal case, it is not obvious that the expected utility of the agent is increasing in her interest in the mission, since the menu of contracts proposed by the principal depends on  $\alpha_A$ . The higher  $\alpha_A$ , the more distorted the contracts.

**The inefficient agent.** Her utility is equal to  $\alpha_A \hat{m}_H \hat{q}_H = \alpha_A \max(0, \alpha_P - \frac{p}{1-p} \alpha_A) \hat{q}_H$ , with  $\hat{q}_H$  independent of  $\alpha_P$  and  $\alpha_A$ . An increase of  $\alpha_A$  has two opposite effects on the utility of the agent. Positive: It increases the interest in the social mission. Negative: It reduces the level of the social mission. For low values of  $\alpha_A$  ( $< \frac{1-p}{2p} \alpha_P$ ), the first effect is stronger, for higher values ( $\alpha_A \in (\frac{1-p}{2p} \alpha_P, \frac{1-p}{p} \alpha_P)$ ), the second effect is stronger since

$\hat{m}_H$  becomes closer to 0 and for  $\alpha_A \geq \frac{1-p}{p}\alpha_P$ , there is no social mission the utility of the agent is equal to zero.

**The efficient agent.** Her mission level,  $\frac{\alpha_P + \alpha_A}{\theta_L}$  is increasing in  $\alpha_A$ . However, the utility of the efficient agent is not always increasing in  $\alpha_A$  since the transfer paid to the agent is decreasing in  $\alpha_A$ . Eventually, there is no clear-cut effect of an increase in  $\alpha_A$  on the utility of the efficient agent.

Eventually, the social orientation of the principal  $\alpha_P$  also has an impact on the welfare of both types of agent. Whatever the type of the agent the level of  $m$  is weakly increasing in  $\alpha_P$  and so is the utility (if  $\alpha_A$  and  $m$  are positive). Besides, Contrarily to agent  $H$ , agent  $L$  benefits from contracting with an impact-oriented agent even when her own impact orientation is null. The reason is that when  $\alpha_P$  increases, the principal increases the level of the mission in the contract. When  $\alpha_A = 0$ , the rent of the agent is reduced to the expression  $(\theta_H - \theta_L)(1 + m_H^2)q_H^2/2$ , increasing in  $\alpha_P$ . Thus, the efficient type gets more rent when the principal is more mission oriented, so that she always prefers to contract with a more mission-oriented principal even if she is not mission oriented.

These findings show that in our model, agents always (weakly) prefer working for principals who care for social impact. Moreover, for efficient agents, dealing with mission-oriented principals increases their rents and thus their utility, even if they do not care directly for the mission.

## 5.2 Welfare effect of asymmetric information

We showed that, because of the impact of the agent's social orientation on the optimal contract, it is possible that the asymmetric information second-best optimal contract is socially preferable to the one obtained under complete information. The reason is twofold. First, as we saw in Proposition 3, the level of the social mission can be larger under asymmetric information than under complete information, so that asymmetric information can increase the positive external social impact of the contract on society. Second, the existence of a mission orientation can help reducing the rent of the efficient agents, increasing efficiency.

Let us decompose these two effects to show how they can contribute to a positive welfare impact. Notations:  $W^{AI}$  is the expected welfare under asymmetric information and  $W^{CI}$  the expected welfare under complete information.

**Proposition 4** *If condition (23) is satisfied,  $\exists \tilde{\gamma} > 0$  such that, if  $\gamma > \tilde{\gamma}$ ,  $E(W^{AI}) > E(W^{CI})$ .*

**Proof:** Using equation (3), we first note that the expected welfare difference when comparing asymmetric information with complete information is given by:

$$E(W^{AI}) - E(W^{CI}) = E(V_P^{AI} - V_P^{CI} + V_A^{AI} - V_A^{CI}) + \gamma E(m^{AI} q^{AI} - m^{CI} q^{CI}), \quad (24)$$

Where the superscripts  $AI$  and  $CI$  indicate the values of the parameters in asymmetric information and complete information respectively. As long as equation (23) is satisfied, the last term, weighed by  $\gamma$ , is positive. Thus, independently of the sign and size of the sum of the other terms, when  $\gamma$  is sufficiently large, the right term of equation (24) is strictly positive. Thus,  $\exists \tilde{\gamma}$  such that if  $\gamma > \tilde{\gamma}$ ,  $E(W^{AI}) > E(W^{CI})$ .

Q.E.D.

This result is natural, as we have established in Proposition 3 that in our framework the expected mission can be increased under asymmetric information. If this mission generates a positive externality on society, welfare necessarily increases as long as the weight of this externality on the welfare function is large enough. However, the result is not straightforward as such, since asymmetric information distortions usually increase inefficiencies in more standard frameworks.

Maybe more surprisingly, even when  $\gamma$  is arbitrarily small, it is possible that welfare is larger under asymmetric information than with complete information. To see this, consider the case  $\gamma = 0$ . For simplicity, we restrict our attention to the case  $\alpha_p = 0^3$ .

**Proposition 5** *If  $\gamma, \alpha_P = 0$ , under condition (22),  $W^{AI} > W^{CI}$  if and only if:*

$$\alpha_A > \frac{(\theta_H - \theta_L)}{\theta_H - p\theta_L} \sqrt{\frac{(1-p)p\theta_L}{\theta_H}} \quad (25)$$

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<sup>3</sup>The model retains sufficient richness and departs from standard frameworks when  $\alpha_p = 0$ , allowing an analysis of the original impact of asymmetric information on mission and welfare levels within our framework.

Thus, there exist admissible values of the parameters such that welfare is larger with asymmetric information.<sup>4</sup>

**Proof:** Setting  $\alpha_P = 0$  and  $\gamma = 0$  in Equation (24), the difference in expected welfare is equal to:

$$E(W^{AI}) - E(W^{CI}) = \frac{1}{2}p \left( \frac{\alpha_A^2}{\theta_L} - \frac{(1-p)p(\theta_H - \theta_L)^2}{\theta_H(\theta_H - p\theta_L)^2} \right) \quad (26)$$

Therefore,  $E(W^{AI}) - E(W^{CI}) > 0$  is equivalent to:

$$\alpha_A^2 > (1-p)p \frac{\theta_L}{\theta_H} \frac{(\theta_H - \theta_L)^2}{(\theta_H - p\theta_L)^2} \quad (27)$$

Observing that all the terms are strictly positive, we obtain expression (25).

Q.E.D.

In order to obtain a simple condition, we assumed  $\alpha_P = 0$ . However, welfare may be higher with asymmetric information even when  $\alpha_P > 0$ <sup>5</sup>.

It is not usual to observe that the existence of hidden types may improve welfare. This is due to the existence of a budget constraint for the agent. If the agent had no budget constraint, even in the absence of asymmetric information she may *bargain* with the principal to set  $m = \alpha_P + \alpha_A$ , with a transfer that is lower than the costs supported by the agent. But this is not feasible because of the budget constraint. Now, with hidden types, the efficient type extracts an information rent so that her budget constraint is relaxed. This allows us to make a contract with a higher mission and a lower net income for the agent.

The finding that asymmetric information can improve welfare is original and contrasts with standard results on adverse selection. In the literature, a similar result, which suggests that asymmetric information can improve welfare, is found in de Garidel-Thoron (2005). They consider an insurance market in a two-period model where information sharing, by altering ex-post outside options, can decrease welfare by softening ex-ante competition. However, in their context, the result depends solely on the interaction between ex-ante and ex-post payoffs, as within each period (i.e., for given payoffs), in-

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<sup>4</sup>It can be easily verified that conditions (22) and (25) can be simultaneously satisfied for many admissible values of parameters  $\theta_H$ ,  $\theta_L$ ,  $\alpha_P$  and  $p$ .

<sup>5</sup>This appears clearly in a numerical example introduced in the last paragraph of Appendix 8.2.

formation sharing would always enhance welfare. In our case, asymmetric information can enhance welfare due to the presence of a non-monetary payoff, which pushes the principal to propose a contract more aligned with total welfare maximization than the one achievable by solely maximizing his utility under complete information.

## 6 Extension: heterogeneous agent's mission orientation

In the baseline model, we assumed that  $\alpha_A$  is the same for all types of agents and common knowledge. In this section, we show that this assumption can be relaxed without modifying the main findings of the paper, and, in particular, the impact of asymmetric information on the shape of the second best levels of mission and effort.

To illustrate this point, we assume that the mission orientation of the agent,  $\alpha_A$  can take two possible values,  $\alpha_{A_0} = 0$  and  $\alpha_{A_{so}} > 0$ , meaning that some agents have a lower mission-motivation, that we normalize to 0 and others are more socially oriented. We assume that the probability that the agent has a mission orientation of  $\alpha_{A_{so}}$  (resp:  $\alpha_{A_0} = 0$ ) is equal to  $z$  (resp:  $1 - z$ ). The probability distributions of  $\theta$  and  $\alpha_A$  are independent. We now have four possible types of agents:

- Agents with low cost  $\theta_L$  and mission orientation equal to  $\alpha_{A_{so}}$  (type  $L_{so}$ ).
- Agents with low cost  $\theta_L$  and mission orientation equal to  $\alpha_{A_0}$  (type  $L_0$ ).
- Agents with high cost  $\theta_H$  and mission orientation equal to  $\alpha_{A_{so}}$  (type  $H_{so}$ ).
- Agents with high cost  $\theta_H$  and mission orientation equal to  $\alpha_{A_0}$  ( $H_0$ ).

When the mission orientation of the agents is also private information, the second-best contracts still have to satisfy budget constraints and incentive constraints for all the types  $(L_{so}, L_0, H_{so}, H_0)$ . Hence, for all  $\{i, j\} \in \{H, L\}$  and  $\{k, l\} \in \{so, 0\}$ , the budget and incentive compatibility constraints of the different possible types write respectively:



$$T_{i_k} - \theta_i \frac{1 + m_{i_k}^2}{2} q_{i_k}^2 \geq 0 \quad (28)$$

$$T_{i_k} + \alpha_k m_{i_k} q_{i_k} - \theta_i \frac{1 + m_{i_k}^2}{2} q_{i_k}^2 \geq T_{j_l} + \alpha_k m_{j_l} q_{j_l} - \theta_i \frac{1 + m_{j_l}^2}{2} q_{j_l}^2 \text{ and/or} \quad (29)$$

$$T_{j_l} - \theta_i \frac{1 + m_{j_l}^2}{2} q_{j_l}^2 < 0 \quad (30)$$

Let us first notice that we can restrict our attention to a menu of contracts in which principal proposes the same contract to types  $H_{so}$  and  $H_0$  agents (see appendix 8.4). Therefore, the principal offers three different contracts to types  $L_{so}$ ,  $L_0$  and  $H$ .

In order to fully characterize these contracts, we consider the simplified case  $\alpha_P = 0$ .

We observe that the types of contracts presented in (18) – (21) do not satisfy (30) for  $i = J = L$ ,  $k = so$  and  $l = 0$  (see appendix 8.4). In other words, a low cost agent with mission orientation equal to  $\alpha_{A_{so}}$  (type  $L_{so}$ ) prefers to mimic an agent with mission orientation equal to 0 (type  $L_0$ ) when proposed a contract as in (18) – (21). This is in line with the literature, as Besley and Ghatak (2018) and Cassar and Armouti-Hansen (2020) show that, in similar situations, the main incentive is to mimic the lower mission-orientation to extract higher rents from the principal.

Moreover, since the principal's objective function decreases with the size of all transfers, under condition (22) (which ensures that the budget constraints for types  $L_0$  and  $L_{so}$  are satisfied), the budget constraint for type  $H$ , the incentive compatibility constraint for type  $L_0$ , and at least one of the incentive compatibility constraints for type  $L_{so}$  (either to prevent mimicking type  $L_0$  or type  $H$ ) must be binding.

If we solve the problem under the assumption that, for type  $L_{so}$ , only the incentive constraint related to type  $H$  is binding, then the constraint related to type  $L_0$  is not satisfied. Conversely, if we assume that only the incentive constraint related to type  $L_0$  is binding, then the constraint related to type  $H$  is not satisfied (see Appendix 8.4 for details).

Therefore, assuming that for type  $L_{so}$ , the incentive constraint related to type  $L_0$  is binding, together with the budget constraint for type  $H$ , and the incentive constraint for type  $L_0$ , we obtain the following solution:

$$\tilde{q}_{L_{so}} = \tilde{q}_{L_0} = \frac{1}{\theta_L} \quad (31)$$

$$\tilde{q}_H = \frac{1}{\theta_H + \frac{p}{1-p}(\theta_H - \theta_L)} \quad (32)$$

$$\tilde{m}_{L_{so}} = \alpha_{A_{so}} \quad (33)$$

$$\tilde{m}_H = \tilde{m}_{L_0} = 0 \quad (34)$$

As shown in Appendix 8.2, these contracts satisfy the budget constraint preventing type  $L_0$  from mimicking  $H$  with equality, as well as all other incentives and budget constraints, with the possible exception of the budget constraint of type  $L_{so}$ . Then, the following proposition holds.

**Proposition 6** *If  $\alpha_p = 0$  and  $\alpha_{A_{so}}^2 \leq \frac{\theta_L(\theta_H - \theta_L)}{2(\theta_H + \frac{p}{1-p}(\theta_H - \theta_L))^2}$ , all budget and incentive constraints are satisfied and the principal proposes  $(\tilde{q}_H, \tilde{m}_H, \tilde{T}_H)$ ,  $(\tilde{q}_{L_{so}}, \tilde{m}_{L_{so}}, \tilde{T}_{L_{so}})$ , and  $(\tilde{q}_{L_0}, \tilde{m}_{L_0}, \tilde{T}_{L_0})$ .*

**Proof:** See appendix 8.4

We note that, with these contracts,  $\tilde{q}_{L_{so}} = \tilde{q}_{L_0} = \hat{q}_L$ ,  $\tilde{m}_{L_0} = \tilde{m}_H = \hat{m}_H$ , and  $\tilde{q}_H = \hat{q}_H$ . Only the level of the mission of type  $L_0$  and  $L_{so}$  are modified in order to satisfy the additional incentive compatibility constraints. The mission of the more efficient type is distorted upwards when she is socially oriented. As  $\alpha_P = 0$ , the mission of the less efficient types cannot be distorted downwards, but it is equal to zero. As in the baseline model, the optimal contract implies an upward distortion of the social mission for efficient types, as pushing them to more ambitious non-financial mission relaxes their incentive compatibility constraints and allow to reduce their financial rents.

This section shows that including the presence of agents not concerned by the mission (i.e., standard profit-oriented agents) does not alter the main qualitative insights of the paper. In particular, for socially motivated efficient types, incentive compatibility pushes the principal to distort the mission upwards, as in the baseline case. Although socially motivated agents may prefer to mimic less motivated agents, the principal's approach to restoring incentives for truthful revelation still implies an increase in the mission level embedded in the contract for efficient types (as long as the agent is mission-oriented). This prevents them from mimicking a profit-oriented type (as well as an inefficient type).

The distortion follows the same direction, with the key difference that the mission is not distorted upwards if the efficient type is not socially motivated. For profit-oriented types, the only distortion implied in the proposed contract is the downward distortion of the produced quantity, as in standard models. As the mission-orientation is used by the principal to improve upon these standard contracts (which are still feasible when  $\alpha_A > 0$ ), the mission implied in the contract is only modified by asymmetric information when this allows to increase efficiency and decrease transfers (i.e. increasing the mission of the efficient agent if she is mission-oriented).

## 7 Conclusion

The paper proposes a model to analyze the impact of mission-orientation in principal-agent models. By analyzing a setting with incomplete information and a budget-constrained agent, our model illustrates the interplay between mission-driven incentives and efficient screening. We show that the principal strategically distorts the mission, pushing it upward for more efficient agents and downward for less efficient ones, beyond the standard quantity distortions arising from informational asymmetry when the principal and the agent only value financial performance and income.

A key finding of our analysis is the potential for hidden types to enhance total welfare compared to complete information. This seemingly counterintuitive result emerges because the principal, in an effort to mitigate the informational rent accruing to more efficient agents, optimally proposes contracts with a higher social mission. This strategic use of the mission as a screening device highlights the non-trivial role of non-financial incentives in shaping optimal contract design in impact-oriented settings.

Our findings have significant implications for understanding organizational behavior in social enterprises and triple bottom-line environments. They contribute to the theoretical literature on impact investment by formally modeling the impact of mission motivation on optimal contracting and by demonstrating how the pursuit of social goals can interact with and even improve economic efficiency under informational constraints.

Future research could extend this framework by incorporating dynamics, exploring the role of competition among multiple agents or principals with potentially divergent

mission preferences, or empirically testing the predicted contract distortions.

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## 8 Appendix

### 8.1 Non-binding incentive constraint of the less efficient type

With  $(\hat{q}_L, \hat{m}_L, \hat{T}_L, \hat{q}_H, \hat{m}_H, \hat{T}_H)$ ,  $IC_L$  is binding therefore:

$$\hat{T}_L + \alpha_A \hat{m}_L \hat{q}_L - \theta_L \frac{1 + \hat{m}_L^2}{2} \hat{q}_L^2 = \hat{T}_H + \alpha_A \hat{m}_H \hat{q}_H - \theta_L \frac{1 + \hat{m}_H^2}{2} \hat{q}_H^2$$

Which can be rewritten:

$$\hat{T}_L - \hat{T}_H + \alpha_A (\hat{m}_L \hat{q}_L^2 - \hat{m}_H \hat{q}_H^2) = \theta_L \left( \frac{1 + \hat{m}_L^2}{2} \hat{q}_L^2 - \frac{1 + \hat{m}_H^2}{2} \hat{q}_H^2 \right) \quad (35)$$

The  $IC_H$  constraint can be written:

$$\theta_H \left( \frac{1 + \hat{m}_L^2}{2} \hat{q}_L^2 - \frac{1 + \hat{m}_H^2}{2} \hat{q}_H^2 \right) \geq \hat{T}_L - \hat{T}_H + \alpha_A (\hat{m}_L \hat{q}_L - \hat{m}_H \hat{q}_H)$$

Using (35), we can rewrite it:

$$\theta_H \left( \frac{1 + \hat{m}_L^2}{2} \hat{q}_L^2 - \frac{1 + \hat{m}_H^2}{2} \hat{q}_H^2 \right) \geq \theta_L \left( \frac{1 + \hat{m}_L^2}{2} \hat{q}_L^2 - \frac{1 + \hat{m}_H^2}{2} \hat{q}_H^2 \right)$$

Since  $\theta_H > \theta_L > 0$ ,  $\hat{m}_L > \hat{m}_H \geq 0$  and  $\hat{q}_L > \hat{q}_H \geq 0$ , this condition is trivially satisfied.

Q.E.D.

### 8.2 Binding budget constraint of the efficient type

As stated in the paper, if condition (22) is not satisfied, we cannot provide an interpretable closed-form solution. However, we have solved the problem numerically using the software *Mathematica* for different values of the parameters, and the qualitative results described in Section 4 are preserved. To illustrate these results, Table 2 presents the solutions for  $(\alpha_P, \theta_L, p) = (0.3, 1, 0.5)$ , and selected values of the other parameters. In all cases, the principal proposes  $q_L = \frac{1}{\theta_L} = 1$ . The table shows the approximate values of the other elements of the proposed contracts, namely  $m_H, q_H$  and  $m_L$ .

As the table shows, when condition 22 is not satisfied, the second-best contract follows the same qualitative structure as the solution presented in equations (18) to (20). Specifically,  $m_H < \alpha_P < m_L$ , meaning that the mission of the more efficient type is distorted

	$\alpha_A = 0.2$	$\alpha_A = 0.3$	$\alpha_A = 0.4$
$\theta_H = 1.5$	$(m_H, q_H) \approx (0.15, 0.53)$ $m_L \approx 0.45$	$(m_H, q_H) \approx (0.18, 0.59)$ $m_L \approx 0.41$	$(m_H, q_H) \approx (0.21, 0.62)$ $m_L \approx 0.39$
$\theta_H = 2$	$(m_H, q_H) \approx (0.17, 0.38)$ $m_L \approx 0.43$	$(m_H, q_H) \approx (0.20, 0.43)$ $m_L \approx 0.40$	$(m_H, q_H) \approx (0.22, 0.45)$ $m_L \approx 0.37$
$\theta_H = 2.5$	$(m_H, q_H) \approx (0.19, 0.30)$ $m_L \approx 0.41$	$(m_H, q_H) \approx (0.21, 0.34)$ $m_L \approx 0.38$	$(m_H, q_H) \approx (0.24, 0.37)$ $m_L \approx 0.35$

Table 2: Proposed contracts for  $(\theta_L, \alpha_P, p) = (1, 0.3, 0.5)$ . In all cases,  $q_L = 1$ .

upwards, while the mission of the less efficient type is distorted downwards compared to the perfect information case. Similarly, the quantity for the more efficient type is not distorted ( $q_L = \frac{1}{\theta_L} = 1$ ), while the quantity for the less efficient type is distorted downwards ( $q_H < \frac{1}{\theta_H}$ ).

As  $\alpha_A$  increases, the distortions of the missions of the two types decrease, in order to satisfy both the budget and the incentive constraints of the more efficient types. As  $\alpha_A$  hits the threshold  $\frac{1+\alpha_P^2}{2\alpha_P} \frac{\theta_L}{\theta_H}$ , the solution converges to the complete information solution (see (4)-(5)). The same occurs when the difference  $(\theta_H - \theta_L)$  increases.

It is noteworthy that all the cases presented in Table 2 satisfy equation (23), so that the expected value of the social mission is higher with asymmetric information than with perfect information.

Moreover, when  $\alpha_A = 0.4$  and  $\theta_H = 2.5$  (bottom-right case), we find that  $E(W^{AI}) - E(W^{CI}) = 0.01 > 0$ . For larger values of  $\alpha_A$  ( $\alpha_A = 0.5, \alpha_A = 0.6 \dots$ ) the welfare difference  $E(W^{AI}) - E(W^{CI})$  becomes larger, consistent with the results in Proposition 5 stating that for high values of  $\alpha_A$ , welfare can be larger with asymmetric information than with complete information.

### 8.3 Comparative statics and welfare

#### The principal

If condition (22) is satisfied, the principal proposes contracts  $(\hat{q}_H, \hat{m}_H, \hat{T}_H)$  and  $(\hat{q}_L, \hat{m}_L, \hat{T}_L)$  (see Proposition 2). Thus, the expected value of the utility of the principal writes:

$$\begin{aligned}
E(V^P) = & p \left( \hat{q}_L(1 + \alpha_P \hat{m}_L) + \hat{T}_L - \theta_L \frac{1 + \hat{m}_L^2}{2} \hat{q}_L^2 \right) \\
& (1 - p) \left( \hat{q}_H(1 + \alpha_P \hat{m}_H) + \hat{T}_H - \theta_H \frac{1 + \hat{m}_H^2}{2} \hat{q}_H^2 \right)
\end{aligned} \tag{36}$$

Where:

$$\begin{aligned}
\hat{T}_H &= \theta_H \frac{1 + \hat{m}_H^2}{2} \hat{q}_H^2 \\
\hat{T}_L &= \hat{T}_H - \alpha_A(\hat{m}_L \hat{q}_L - \hat{m}_H \hat{q}_H) + \theta_L \left( \frac{1 + \hat{m}_L^2}{2} \hat{q}_L^2 - \frac{1 + \hat{m}_H^2}{2} \hat{q}_H^2 \right)
\end{aligned}$$

Replacing equations (19) to (21) in (36), we obtain the following results:

If  $\frac{1-p}{p}\alpha_P \leq \alpha_A$ ,  $\hat{m}_H = 0$ . Developing computations, equation (36) reduces to:

$$\frac{p(1 + (\alpha_A + \alpha_P)^2)\theta_H + (1 - p(2 + p(\alpha_A + \alpha_P)^2))\theta_L}{2\theta_L(\theta_H - p\theta_L)}$$

So that  $\frac{\partial E(V^P)}{\partial \alpha_A} = \frac{p}{\theta_L}(\alpha_A + \alpha_P)$  which is strictly positive if  $\alpha_A > 0$ .

If  $\frac{1-p}{p}\alpha_P \leq \alpha_A$ ,  $\hat{m}_H = \alpha_A - \frac{1-p}{p}\alpha_P$ . Developing computations, equation (36) reduces to:

$$\frac{p(1 + (\alpha_A + \alpha_P)^2)\theta_H + \theta_L(1 + \alpha_P^2) - 2p(1 + \alpha_P(\alpha_A + \alpha_P))\theta_L}{2\theta_L(\theta_H - p\theta_L)}$$

So that  $\frac{\partial E(V^P)}{\partial \alpha_A} = \frac{p(\alpha_A \theta_H + \alpha_P(\theta_H - \theta_L))}{\theta_L(\theta_H - p\theta_L)}$  which is strictly positive if  $\alpha_A > 0$ .

Q.E.D.

### Type H agent

With the second-best contract, her budget constraint is binding. The agent utility is equal to the utility she derives from the mission:  $\alpha_A \hat{m}_H \hat{q}_H$ .

If  $\frac{1-p}{p}\alpha_P \leq \alpha_A$ , this is equal to zero.

If  $\frac{1-p}{p}\alpha_P > \alpha_A$ , this is equal to  $\alpha_A(\alpha_P - \frac{p}{1-p}\alpha_A) \frac{1}{\theta_H + \frac{p}{1-p}(\theta_H - \theta_L)}$ .

Therefore, for lower values of  $\alpha_P$ , the utility of an inefficient agent is not affected by a raise of  $\alpha_P$  and, if  $\frac{1-p}{p}\alpha_P > \alpha_A$ , the utility of an inefficient agent is strictly increasing in  $\alpha_P$ .

Now, we observe that



$$\partial \left( \alpha_A \left( \alpha_P - \frac{p}{1-p} \alpha_A \right) \frac{1}{\theta_H + \frac{p}{1-p} (\theta_H - \theta_L)} \right) / \partial \alpha_A = \frac{\alpha_P - \frac{2p}{1-p} \alpha_A}{\theta_H + \frac{p}{1-p} (\theta_H - \theta_L)} \quad (37)$$

This means that, if  $\frac{1-p}{2p} \alpha_P > \alpha_A$ ,  $V_H^A$  is increasing in  $\alpha_A$ , if  $\frac{1-p}{2p} \alpha_P < \alpha_A < \frac{1-p}{p} \alpha_P$ ,  $V_H^A$  is decreasing in  $\alpha_A$  and, if  $\alpha_A > \frac{1-p}{p} \alpha_P$ ,  $V_H^A$  does not depend on  $\alpha_A$ .

Q.E.D.

### Type L agent

At the second best, the incentive contract is binding. Therefore, her utility is equal to the utility she would obtain if she were to choose the contract designed for the agent of type H:  $\alpha_A \hat{m}_H \hat{q}_H + (\theta_H - \theta_L) \frac{1+\hat{m}_H}{2} \hat{q}_H^2$ .

If  $\frac{(1-p)}{p} \alpha_P \leq \alpha_A$ ,  $\hat{m}_H = 0$  and the expression is equal to  $(\theta_H - \theta_L) \frac{\hat{q}_H^2}{2}$  with  $\hat{q}_H$  independent of  $\alpha_A$  and  $\alpha_P$  so that the utility of the efficient agent is independent of  $\alpha_A$  and  $\alpha_P$ .

If  $\frac{1-p}{p} \alpha_P > \alpha_A$ ,  $\hat{m}_H = \alpha_P - \frac{p}{1-p} \alpha_A$  and the utility of the efficient agent is equal to

$$\left( \alpha_P - \frac{p}{1-p} \alpha_A \right) \frac{\alpha_A}{\theta_H + \frac{p}{1-p} (\theta_H - \theta_L)} + \frac{\theta_H - \theta_L}{2(\theta_H + \frac{p}{1-p} (\theta_H - \theta_L))^2} \left( 1 + \left( \alpha_P - \frac{p}{1-p} \alpha_A \right)^2 \right) \quad (38)$$

The sign of the partial derivative of this formula with respect to  $\alpha_A$  depends on the values of all the parameters.

Q.E.D.

## 8.4 Heterogeneous $\alpha_A$

Let us first prove that we can restrict our attention to the case in which the principal proposes the same contract for the inefficient agent whether she is socially oriented or not.

Let us denote  $(q_{H_0}, m_{H_0}, T_{H_0})$  and  $(q_{H_{so}}, m_{H_{so}}, T_{H_{so}})$  these two contracts. Since the two types of inefficient agents face the same budget constraint, these two contracts must satisfy the budget constraint of the types of inefficient agent. Therefore, if only one of these two contracts were available, they would both choose this contract. This means that the principal's payoff must be the same with the two contracts; otherwise, he would only propose the contract that provides him a higher payoff. Now, since the principal's

payoff is the same with the two contracts and adding an extra contract can only increase the cost of the other constraints, there is no loss for the principal in proposing a unique contract for both types of inefficient agents:  $(q_H, m_H, T_H)$ .

If we solve the problem assuming that only the budget constraint of types  $H$  and the incentive constraint of type  $L_{so}$  preventing her from mimicking type  $L_0$  and the incentive constraint of type  $L_0$  preventing her from mimicking type  $H$  are binding, we obtain the following equalities:

$$T_H = \theta_H \frac{1 + m_H^2}{2} q_H^2 \quad (39)$$

$$T_{L_0} = T_H + \theta_L \left( \frac{1 + m_{L_0}^2}{2} q_{L_0}^2 - \frac{1 + m_H^2}{2} q_H^2 \right) \quad (40)$$

$$T_{L_{so}} = T_{L_0} - \alpha_{A_{so}}(m_{L_{so}} q_{L_{so}} - m_{L_0} q_{L_0}) + \theta_L \left( \frac{1 + m_{L_{so}}^2}{2} q_{L_{so}}^2 - \frac{1 + m_{L_0}^2}{2} q_{L_0}^2 \right) \quad (41)$$

Replacing these values of the transfers in the expected utility of the principal (1), and maximizing with respect to  $(q_H, q_{L_{so}}, q_{L_0}, m_H, m_{L_{so}}, m_{L_0})$ , for  $\alpha_P = 0$  and under condition (22) we obtain the contracts in (31)-(34):

$$\begin{aligned} \tilde{q}_{L_{so}} &= \tilde{q}_{L_0} = \frac{1}{\theta_L} \\ \tilde{q}_H &= \frac{1}{\theta_H + \frac{p}{1-p}(\theta_H - \theta_L)} \\ \tilde{m}_{L_{so}} &= \alpha_{A_{so}} \\ \tilde{m}_H &= \tilde{m}_{L_0} = 0 \end{aligned}$$

Now, we need to show that all other constraints are satisfied with the proposed solution:  $(\tilde{q}_{L_{so}}, \tilde{m}_{L_{so}}, \tilde{T}_{L_{so}}, \tilde{q}_{L_0}, \tilde{m}_{L_0}, \tilde{T}_{L_0}, \tilde{q}_H, \tilde{m}_H, \tilde{T}_H)$ .

First note that, as in the standard case, types  $H$  cannot mimic type  $L$ ,  $\alpha_{A_{so}}$  because picking contract  $m_L = \alpha_{A_{so}}$  and  $q_H = \frac{1}{\theta_L}$  they cannot satisfy their budget constraint. We also observe that the budget constraints of  $L_0$  is trivially satisfied. Besides, because both the incentive constraint of type  $L_{so}$  preventing her from mimicking type  $L_0$  and the incentive constraint of type  $L_0$  preventing her from mimicking type  $H$  are satisfied, the incentive constraint preventing type  $L_{so}$  from mimicking type  $H$  is also satisfied.

In addition, the incentive constraint preventing type  $L_0$  from mimicking  $L_{so}$  is equivalent to:

$$\frac{\alpha_{A_{so}}^2}{\theta_L} \geq 0 \quad (42)$$

Trivially satisfied.

Finally, the budget constraint of type  $L_{so}$  is satisfied when condition (22) holds. Following the same steps as in 2 we can conclude that, when  $\alpha_p = 0$ , a sufficient condition for condition (22) to be satisfied is  $\alpha_{A_{so}}^2 \leq \frac{\theta_L(\theta_H - \theta_L)}{2(\theta_H + \frac{p}{1-p}(\theta_H - \theta_L))^2}$ .

Eventually, we need to prove that the 3 constraints that we considered as binding must be bonding at the optimal menus of contracts of the principal.

**The budget constraint of the inefficient type.** It must be binding, otherwise, the principal could propose the same contracts with  $T_H$  lower by an  $\varepsilon$  and obtain exactly the same result at a strictly lower cost.

**The incentive constraint preventing type  $L_0$  agent from mimicking type  $H$  agent.** Because agent of type  $L_0$  derives no profit from the mission, if the incentive constraint preventing type  $L_0$  agent from mimicking agent  $H$  is not binding then the budget constraint of type  $L_0$  agent is also not binding. Besides reducing the value of  $T_{L_0}$  has no negative effect on the satisfaction of the other constraint. Therefore, if the incentive constraint preventing type  $L_0$  agent from mimicking agent  $H$  were not binding, the principal could propose the same contracts with  $T_{L_0}$  lower by an  $\varepsilon$  and obtain exactly the same result at a strictly lower cost. Hence, the incentive constraint preventing type  $L_0$  agent from mimicking agent type  $H$  agent must be binding.

**The incentive constraint preventing type  $L_{so}$  agent from mimicking type  $L_0$  agent.** Suppose that this constraint is not binding. If Condition (22) is satisfied, the budget constraint of type  $L_{so}$  is not binding either and the The incentive constraint preventing type  $L_{so}$  agent from mimicking type  $H$  agent is not binding either because the incentive constraint preventing type  $L_0$  agent from mimicking type  $H$  agent is satisfied. Therefore, the principal could propose the same contracts with  $T_{L_{so}}$  lower by an  $\varepsilon$  and obtain exactly the same result at a strictly lower cost. Hence, the incentive constraint preventing type  $L_{so}$  agent from mimicking type  $L_0$  agent must be binding.

Q.E.D.