

Profit with Purpose? A Theory of Social Enterprise with Experimental Evidence*

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November 6, 2013

Abstract

When social benefits cannot be measured, a hybrid organization which selects managers based on motivation can be used to balance profits with a social purpose. This paper develops a model of social enterprise based on selection of citizen-managers with this goal in mind. It develops the implications of matching between founders and managers based on their preferences for the mission. The main trade-offs suggested by the theory are tested experimentally and these are used to calibrate a matching outcome. This makes precise the parameter range in which social enterprises based on selection will be observed in a market setting; we show that they achieve gains in efficiency of around 10% over non-profit enterprise.

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1 Introduction

While the pursuit of profit and private reward can generate wealth and benefits in the form of new goods and gains in economic efficiency, there are many well-known downsides to profit-seeking activities. So how to structure firms to balance profits with social purpose remains an open question.

At one extreme, non-profit firms adopt a rigid mission which commits them to the pursuit of a well-defined good cause, the *ultra vires* principle. Such organizations play an important role in some sectors of the economy such as health and education. A predominant view is that the non-profit form reduces the freedom among managers to pursue private ends, as emphasized in Hansmann (1980) and Glaeser and Shleifer (2001) among others. However, it is often suggested that non-profits can also benefit by selecting employees who are committed to the cause as observed by Weisbrod (1988) who notes that

“Non-profit organizations may act differently from private firms not only because of the constraint on distributing profit but also, perhaps, because the motivations and goals of managers and directors ... differ. If some non-profits attract managers whose goals are different from those managers in the proprietary sector, the two types of organizations will behave differently.” (page 31).

Managers in such instances can be called “motivated agents” (Besley and Ghatak, 2005, and Benabou and Tirole, 2006).

Standard for profit firms also have a rigid mission, to maximize the profit of their owners. This may be reinforced by selecting managers who care solely about money – the usual *homo economicus* assumption. These managers are rewarded with bonuses based on profitability to encourage effort.

But, there is increasing interest in hybrid forms of organization, often referred to as “social enterprises”. Even though, as Martin and Osberg (2007) acknowledge, there are many different types of firms which travel under this banner, the mantra of social enterprise is to balance making profits with a social mission (Katz and Page, 2010).¹ This eschews the rigidity of either non-profit or for-profit enterprise. Despite great interest in the topic of social enterprise, we do not have an economic framework to analyze them. This paper aims to fill this gap.

To be effective, social enterprises have to solve the problem of achieving the right trade-off between the dual objectives of profit and purpose. We call this the *mission integrity problem*. One solution would be to contract with managers to ensure this. But, as in the classic multi-tasking problem of Holmstrom and Milgrom (1991), many aspects of performance are hard to measure, especially those that

¹Terms like “public benefit corporations” (Shiller, 2012), “social enterprise” (Dees, 1998, Bornstein, 2004) or “social business” (Yunus, 2007) are part of the lexicon but all stand for somewhat different organizational forms.

determine the realization social benefits.² There is a therefore a role for what Katz and Page (2010) call “mission-sympathetic parties” who we refer to here as “citizen-managers” who are appointed to achieve an optimal trade-off between mission and profit. When social benefits cannot be measured, a hybrid organization which selects managers based on motivation can be used to achieve mission integrity.

This paper develops a model of social enterprise based on selection of citizen-managers who balance profit with purpose. The model has four key features. First, profitability and social payoffs sometimes diverge; however, only profit can be measured or contracted upon. Second, the enterprise requires a manager to put in effort to improve overall efficiency, as well as to decide whether to pursue profit or social purpose in its key decisions depending on the situation (the mission integrity problem). Third, organization design determines whether there is a rigid mission or it is left to the discretion of the manager, and the allocation of any residual cash flow. Fourth, firms or “founders” employ managers who are heterogeneous in terms of how much they care about the mission and who are selected from a competitive labor market.

We focus on three organizational forms: for profits, non-profits, and social enterprises. With a for-profit or social enterprise, the manager is a full residual claimant on profits, whereas with a non-profit the manager’s wage is flat. For-profits and non-profits curb the autonomy of managers by stipulating the mission. In a social enterprise, the manager has discretion over the balance of profits and purpose.

The heterogeneity of motivation of managers plays an important role in our analysis. We show that in a social enterprise, for low motivation and high motivation managers, mission integrity is not achieved - they always choose the pro-profit or pro-social mission, but for moderately motivated managers mission integrity is achieved. The effort level in a social enterprise is (weakly) higher than in a for-profit or a non-profit, strictly so for moderately motivated managers. In terms of mission choice and effort, for low motivation managers, for-profits and social enterprises are equivalent, and for high motivation managers, non-profits and social enterprises are equivalent.

The choice of organizational form depends on the motivation of both the manager and the founder. Depending on how motivated the founder is, for managers with either low or high motivation, the choice will be between a for-profit or a non-profit, and for managers with moderate motivation, the choice will be between a social enterprise and non-profit. We provide a condition for founders and managers to match assortatively: highly motivated founders hire motivated managers in non-profits, low motivation founders hire low motivation managers in for-profits while moderately motivated founders hire moderately motivated managers in either social enterprises or non-profits. In an extension, we allow founders to put a negative weight on the social mission, in which case the manager’s motivation becomes sim-

²At the time of writing, 20 US states have passed laws recognizing benefit corporations as distinct legal entities. In the UK, the law was changed to allow the formation of Community Interest Companies which are similar in spirit to B-corporations. These attempt to solve the mission integrity problem through contracts.

ilar to private benefits in standard agency models and for-profits that stipulate a rigid mission to maximize financial profits, may be preferred to non-profits or social enterprise.

To test the underlying ideas of the theory, we conducted a laboratory experiment. This serves two purposes. First, it is used to explore the trade-off between mission and profit at the heart of the model. Second, to establish empirically the degree of heterogeneous motivation among participants to investigate to what extent there exist motivated agents who balance money and mission in the lab. We found that 8% of the population always choose to donate their earnings, even when their donations had lower monetary value than what they could keep as earnings, about 18% choose to donate when the monetary value of donations exceed what they can keep as earnings, but not otherwise. The remaining 74% of the population appear to behave more like *homo economicus*, namely, they always kept their money as earnings. We use the experimental findings to calibrate the model to the data in order to examine a matching model of firm formation. This allows us to assess, for our experimental population, how far social enterprises will emerge in a competitive market place. We find around 10% efficiency gains when individuals whose degree of motivation would achieve mission integrity work in social enterprises rather than non-profits.

The remainder of the paper is organized as follows. The next section discusses some related literature. Section three lays out the theoretical framework where firms employ motivated managers to make decisions which affect profits and some social objective. In section four, we use the model to compare three organizational forms: for-profits, non-profits, and social enterprises. We then consider what happens when organizations compete for managers. Section five describes the lab experiment that we use to test some of the core ideas in the theoretical framework and, in section six, we use this to look at alternative organizational forms and their merits using the experimental evidence as means of calibrating the model. In section seven, we discuss the links between the current approach and more standard models of agency. Concluding comments are in section eight.

2 Related Literature

There is significant popular discussion of the role of social enterprise in the economy and these are based on the fact that there are many real-world examples of social enterprises in both the developed and developing worlds (see Porter and Kramer, 2011). The management literature presents many interesting case studies. For example, Lendstreet Financial pursues the social mission of helping indebted people reduce their debts by delivering financial literacy programmes and incentives that encourage responsible repayment. Yet prior to delivering these services to a new client, Lendstreet purchases the client's debt from institutional investors. When the client increases their repayment, Lendstreet earns revenue which enables it to sustain

its operations.³ The commercial microfinance sector is another good example where the social mission of relaxing borrowing constraints of the poor has come head to head with profiting at the expense of the poor, raising the spectre of "mission drift" (see Yunus, 2011). *Ben and Jerry's*, is an ice-cream brand which was established to pursue strong ethical norms alongside more commercial ends. For example, the ice-cream is manufactured in Vermont using hormone-free milk sourced from local farms. However, it was eventually sold to Unilever at the behest of shareholders, raising questions about how far it would continue to be run as a social enterprise.⁴ In this case, the citizen-manager is the Unilever-appointed CEO, Justin Solheim, who promised when he was appointed to uphold "the history and the authenticity of the culture and values" of the firm.

The failure of profit maximization to align with the public interest is a classic problem of mispricing of inputs or outputs. We view social enterprises as trying to lean against this by employing decision makers who sometimes consciously ignore price signals. This ties the paper to the growing literature on motivation and incentives (see e.g. Akerlof and Kranton, 2005, Benabou and Tirole, 2006, Besley and Ghatak, 2005, Delfgaauw and Dur, 2010, Francois, 2000, and Kosfeld and von Siemens, 2011). Our paper is particularly close in spirit to Prendergast (2007, 2008) who shows that for certain types of agency problems, there is a role for hiring motivated but biased bureaucrats. The general thrust of the literature is that intrinsic motivation reduces the need to give explicit incentives (e.g., Besley and Ghatak, 2005) but in the current paper, greater motivation mitigates the mission integrity problem and this allows using higher powered financial incentives to stimulate effort.

Our paper is also related to the literature on non-profits (Hansmann, 1980, Weisbrod, 1988, and Glaeser and Shleifer, 2001). A key theme of this literature is that the "non-distribution constraint" used by non-profits may be a constrained optimal choice in the presence of agency problems which are often in the nature of multi-tasking problems (Holmstrom and Milgrom, 1991) where high powered incentives can distort allocation of effort away from tasks whose outputs are hard to measure. This leads to a cost-quality trade off; for-profits lowers costs at the expenses of low unverifiable quality whereas non-profits reduce the incentive to shade quality in order to cut costs. The choice of organizational forms depends upon how much the principal values quality (or any other non-pecuniary aspects of production) as opposed to profits. Even though, as we noted above, the potential role of non-profits to attract motivated managers is recognized (see, for example, Weisbrod, 1988) the formal literature has not explicitly considered the role of intrinsically motivated managers, and how their presence and selection interacts with the underlying agency problems.

The paper is also related to the emerging literature among economists on Corporate Social Responsibility (CSR). Here, we will have a trade-off between mission and profits. In contrast, that literature is largely interested in the possibility that the pursuit of pro-social ends could enhance profitability. For example, in Bagnoli and

³See Lee and Battilana (2013).

⁴See the discussion in Page and Katz (2012).

Watts (2003), Besley and Ghatak (2007), and Kotchen (2006), socially responsible consumers drive this possibility.

Our paper is also related to the literature on delegation and incentives (e.g., Aghion and Tirole, 1997). In our model of social enterprise the manager has the authority to control the mission whereas in a for-profit or a non-profit the mission is not under the manager's control - in the former case, it is to always maximize financial returns and in the latter case, it is to prioritize the social mission over any financial considerations.

Our lab experiment that is close in spirit to those conducted by Fehrler and Kosfeld (2012) and Tonin and Vlassopoulos (2012) who investigate how pro-social mission choice influences effort. These ideas have also been explored in a field experiment in Zambia by Ashraf et al (2013). The particular effort task that we employ comes from Gill and Prowse (2012) who use it to investigate incentives when there is disappointment aversion.

3 Theoretical Framework

We set out a stylized model to capture the key trade-offs which characterize our approach to social enterprise and its potential role in the economy. The three key features of our model are managers are motivated ("citizen managers"), the benefits are not purely private - they have a non-rival component, and there are no constraints on (financial) residual claimancy (e.g., risk-aversion or limited liability).

The Firm The enterprise produces a good which it sells to customers and on which it can earn a profit (possibly zero). The good is valued by the consumer but also has a benefit that is external to the firm. It can be valued by the founder (the social entrepreneur), by workers involved in its production and citizens at large. We will keep the details of the interaction between the customer and firm in the background. We have three broad classes of firm-level decision making in mind.

First, there are some goods where the goal is to widen access; education, health care and legal services are important examples. Tobin (1970) referred to this as "specific egalitarianism". Firms must decide whether it should value access to certain goods in its pricing strategy. So it could hold down prices and ration access to deserving individuals. For example, a university might care that students from disadvantaged backgrounds are admitted or a hospital that values medical care being available to poor patients. Access to the good in question is the social component in these examples.

A second case is where there is externality associated with the good's production. For example, environmental externalities may arise requiring firms to trade off cost efficiency against social costs. The social component here is the willingness of a firm to reduce its pollution even if profits are lower.

A third case is where firms take decisions in markets where consumers face behavioral or informational issues. Although this has been popularized recently by behavioral economics, the idea is much older and is related to Musgrave (1959)’s concept of merit goods. In this case, the firm must weigh up the ethics of exploiting its information or the frailties of consumers against making a profit.

Our model is not specific to any one of these cases. What the examples have in common is the fact that the firm’s decision making matters to the balance of social and private goals being pursued. And these are attached to production which has both profit flows and social costs and benefits as outcomes. Moreover, there is a public component to the payoff which is non-rival. This contrasts with the standard agency framework where rewards are pecuniary, and therefore, rivalrous. Also, this public component is realized only when the manager himself participates in the production, i.e., her contribution results in payoffs that are “warm glow” as opposed to pure public goods in nature.

Actions The manager takes two actions which we shall call effort $e \in [\underline{e}, 1]$, and mission $x \in \{0, 1\}$ where $\underline{e} \geq 0$.

Effort is modelled as a continuous choice with greater effort creating a first-order stochastic dominating shift in payoffs. Let $c(e)$ be the cost of effort. It is assumed to have the standard properties: it is strictly increasing and strictly convex. We also assume that $c'''(e) > 0$.⁵ This ensures that the marginal cost of *eliciting* effort is increasing.

The parameter λ captures a manager’s ability to supply effort. We normalize $c(\underline{e}) = 0$. Define $\hat{e}(z)$ as:

$$\hat{e}(z\lambda) = \arg \max_{e \in [\underline{e}, 1]} \{ze - c(e)/\lambda\}. \quad (1)$$

The parameter z is the reward from high effort. It is a combination of some level of intrinsic motivation (A) and rewards from contributing to society or financial rewards. Therefore, $z \geq A$.⁶

Let the manager’s indirect utility function be denoted as:

$$\phi(z, \lambda) = z\hat{e}(\lambda z) - c(\hat{e}(\lambda z))/\lambda = \frac{\lambda z\hat{e}(\lambda z) - c(\hat{e}(\lambda z))}{\lambda}. \quad (2)$$

Mission choice is a discrete (binary) decision that affects how far social payoffs are prioritized. The action has no utility cost. The choice $x = 1$ is the pro-social action, where profits are sacrificed for the social objective, and $x = 0$ is the commercial profit-maximizing action.

⁵This stronger condition is needed for only Propositions 3 and 4 below and is satisfied for the constant elasticity case used in the empirical analysis given our estimate of the elasticity of effort with respect to rewards.

⁶Alternatively we could have assumed that it is costly for the agent to supply effort both above and below some minimum standard level, e.g., $c(e) = (e - \underline{e})^2$.

Timeline, States, and Payoffs After the manager is recruited, she chooses e and this stochastically determines which of two states $r \in \{L, H\}$ occurs where $r = H$ occurs with probability e and $r = L$ occurs with probability $(1 - e)$. The state r refers to the overall (pecuniary and non-pecuniary) surplus that the firm is able to generate. After the realization of r there is a further state $s \in \{h, l\}$ which is realized with $q \in (0, 1)$ being the probability of state h . This state affects the relative desirability of $x = 0$ and $x = 1$ in a way that we make precise below. The realization of state s is independent of the actions of the agent. When s is realized, the manager chooses x unless it is contractually specified to be either always 0 or always 1. After this payoffs are stochastically realized.

The payoffs depend on the realized and the mission choice. These payoffs are the sum of two components. The first is financial profit, which takes two values, π and 0. The second component is a social payoff θ which takes three values, θ_h, θ_l , and 0 with $\theta_h > \theta_l > 0$. The following table summarizes the payoffs for all (x, s, r) combinations:

- With probability e , $r = H$ and then the decision of the agent is given by the following matrix:

	$x = 1$	$x = 0$
$s = h$	θ_h	π
$s = \ell$	θ_ℓ	π

- With probability $1 - e$, $r = L$, upon which the decision of the agent is given by the following matrix:

	$x = 1$	$x = 0$
$s = h$	0	0
$s = \ell$	0	0

This says that if $r = H$ then it is feasible to generate a profit but this depends on the choice of x . In particular, if $x = 0$ then profits are positive but there are no social payoffs. But if $x = 1$ then profits are zero, but depending on s , social payoffs can be high or low. In particular, if $s = h$, which occurs with probability q , choosing $x = 1$ yields θ_h while if $s = l$, which occurs with probability $1 - q$, choosing $x = 1$ yields θ_l . If $r = L$, then only the low profit results independent of the action choice, and there is no scope for generating a positive social payoff. Let

$$\bar{\theta} = q\theta_h + (1 - q)\theta_\ell$$

denote the expected social payoff.

Informational and Contracting Assumptions We assume that the states r and s , the manager’s effort e , and the non-pecuniary social payoff θ_s ($s = h, l$) are non-verifiable. Everything else (including x) is contractible.

The two main agency problems in this framework are: (a) upon observing $x = 1$, knowing whether the manager succeeded in making the firm profitable ($r = H$) but chose to pursue the social mission, or whether the manager failed ($r = L$), because in both cases observed financial profits are zero; (b) conditional on succeeding in making the firm profitable ($r = H$), is the manager choosing the right mission in the right state of the world ($s = h, l$).

Hence the use of contractual means to enforce a flexible trade-off between mission and profit is limited even though the mission choice (x) and profits (π or 0) are verifiable.⁷ We restrict attention to organizational forms where either the manager is a full residual claimant or has a flat payoff.⁸ Organizations will also differ in terms of whether the manager has the authority to choose x or whether it is fixed by the founder.

We focus on three possible organizational forms: (i) (FP) a for-profit with a rigid mission of profit-maximization ($x = 0$) but managers are full (financial) residual claimants; (ii) (NP) a non-profit with a rigid pro-social mission ($x = 1$) and managers are paid a flat wage;⁹ and (iii) (SE) a social enterprise where the citizen-manager has control rights over the mission so may choose whether to earn a profit or pursue a social purpose and are full (financial) residual claimants.¹⁰ Thus, the social enterprise is a hybrid where there is scope for a flexible trade-off between the pro-social mission and profit.

In each case, managers receive a fixed payment from (make a payment to) the organization’s founder to run the firm which we denote by T . The sign of T is not known a priori. In a for-profit firm, we would typically expect the founder to license the product to a manager in exchange for a royalty payment so that $T < 0$. In a non-profit firm, it would be necessary for the manager to be paid to run the firm

⁷The model could easily be modified to have a partially informative public signal of the mission-related payoff which could then be used in the contract offered to the manager. But selection of citizen-managers would still be relevant as long as this is imperfect.

⁸In principle, we could allow for more continuous forms of contracts that make the manager a *partial* residual-claimant. This expands the range of parameter values for which social enterprise strictly dominates non-profits or for-profits but otherwise does not change the main conclusions qualitatively. Our focus on three discrete organizational forms is driven by our experiment design.

⁹Our model of non-profit organization follows the literature in emphasising how a non-distribution constraint ensures that the non-profit mission is not compromised for private gain (e.g., Hansmann, 1980, and Glaeser and Shleifer, 2001). Here, it ensures that the enterprise is never tempted to choose a highly profitable at the expense of the mission.

¹⁰Logically we could allow a fourth possibility, namely, a non-profit where the manager has control rights over mission. But his mission choice in this case will be driven by non-pecuniary considerations only (by definition), and so that means the choice will be $x = 1$. This is assuming that the manager puts some value weight on the social payoff, however small. If he derives no value whatsoever, then he is indifferent between choosing $x = 0$ and $x = 1$ and in such cases, we assume he will choose the mission that the founder prefers.

where $T > 0$ is a grant or the returns to an endowment which makes the firm viable. However, managers may also be willing to work below their “market” price if they are committed to the cause being pursued by the firm. In the limit, they could either work for free or donate to the organization. In all cases, the level of T will be determined endogenously by the need to attract managers to the run the firm in a competitive market setting.

Citizen-Managers We use the term citizen-manager to capture the idea of a manager who is a motivated agent in the sense of Besley and Ghatak (2005), i.e. may care directly about the social payoff.¹¹ This will play a key role in achieving mission integrity in a social enterprise. We assume that everyone is risk neutral and that there are no transferability constraints. There is a pool of potential managers who differ in two dimensions. A typical manager i places a weight γ_i^M on the social payoff where $\gamma_i^M \in [0, \bar{G}]$ where $\bar{G} > 0$. Manager i 's competence level is denoted by $\lambda_i \in (0, \Lambda]$. Each manager has an outside option, u_i , which is determined endogenously in a competitive recruitment process. We will drop the subscript i when referring to an individual manager for the remainder of this section to simplify notation.

For the rest of the analysis we will focus on the following parameter range: $\theta_h > \pi > \theta_\ell$. This implies that a manager with motivation $\gamma^M = 1$ will make a state-contingent action choice, along with those for whom $\gamma^M \in [\underline{\gamma}, \bar{\gamma}]$ where $\underline{\gamma} \equiv \frac{\pi}{\theta_h} < 1$ and $\bar{\gamma} \equiv \frac{\pi}{\theta_\ell} > 1$. For such managers, social payoffs are more important than profits when $r = H$ and $s = h$ and profits are more important than social payoffs when $r = H$ and $s = l$. Managers with γ^M outside this interval will make a non state-contingent mission-choice. With $\gamma^M \geq \bar{\gamma}$, they always choose $x = 1$ and with $\gamma^M \leq \underline{\gamma}$ they choose $x = 0$. This normalization allows us to define managers with $\gamma < \underline{\gamma}$ as “unmotivated” and those with $\gamma > \bar{\gamma}$ as “super-motivated” and those in the middle as “motivated”.

In general, the payoff of the manager is $U^M = \phi(z, \lambda) + T$ and the choice of effort is given by $\hat{e}(z\lambda)$. Our first proposition states a useful result that we use repeatedly below. The proof of this and subsequent results are in the Appendix.

Proposition 1 *The larger is the payoff of the manager conditional on success (z), the greater is her effort and the higher is her expected payoff.*

The proof follows directly from the properties of $\phi(z, \lambda)$ and $\hat{e}(z\lambda)$. It embodies the standard logic of residual claimancy in promoting effort incentives. That said, it is important to bear in mind that z could reflect a non-pecuniary payoff from pursuing a pro-social mission.

¹¹See also Francois (2000) and Delfgauw and Dur (2010) for models which make use of selection arguments with motivated agents.

Founders (Social Entrepreneurs) Organizations are established by founders who are motivated by a combination of profits and social payoffs. We think of founders as entrepreneurs who endow the firm with a constitution (an organizational form) which could specify a rigid mission and recruit managers to run the firm on their behalf. Even if he delegates running the organization, the founder retains rights over the idea or the brand that is created which allows her to choose the organizational form even if he has no direct control over the management of the organization.

The founder's expected payoff is

$$U^F = \gamma^F \hat{e}(\lambda z) [qx_h \theta_h + (1 - q) x_\ell \theta_\ell] - T$$

where x_s ($s \in \{\ell, h\}$) is the action taken by the manager in state s . As we noted above, the fixed payment T can be positive or negative.

The parameter $\gamma^F \geq 0$, denotes how much the founder cares about the social payoff relative to money. A founder who cares only about money has $\gamma^F = 0$ and, as γ^F increases, the manager cares increasingly about the social cause. Below, we will consider a world where there are many founders who differ in γ^F and compete to hire managers from the pool in matching market. In section 5, we discuss the more standard agency case where $\gamma^F < 0$.

4 Organizational Forms

This section elaborates the three organizational forms that we study throughout the paper. For the remainder of this theoretical section, we will consider only variation in motivation γ^M assuming that all potential managers are equally productive, i.e. have the same λ .

For-Profit Enterprise (FP) A for-profit enterprise always sets $x = 0$, a commercial mission. In this case, γ^M is irrelevant since all rewards to managers are in the form of private consumption. We assume that the manager is made a residual claimant on profit. Hence, she will put in effort $\hat{e}(\lambda [A + \pi])$ and her expected payoff will be $\phi(A + \pi, \lambda) + T$.

Non-profit Enterprise (NP) In this case, we assume that the firm always pursues the social mission, i.e. $x = 1$. Managers will be motivated to put in effort only in so far as they value the social payoffs. Hence effort will be $\hat{e}(\lambda [A + \gamma^M \bar{\theta}])$, i.e. effort now depends on how far the manager values the mission. Her expected payoff will be $\phi(A + \gamma^M \bar{\theta}, \lambda) + T$.

Social Enterprise (SE) The mission of the organization is now delegated to the citizen-manager who has to weigh up the social payoff against private payoffs. In

effect, she is in a multi-tasking environment, making both a productive effort and a mission decision. Unlike a non-profit, the firm can choose to return a profit rather than pursuing a social goal and the manager is rewarded for that decision. And unlike a for-profit, she is able to forgo profit and do what is good for society should she chooses to do so.

The mission choice in social enterprise will be:

$$\begin{aligned}\hat{x}(\gamma^M; s) &= \arg \max_{x \in \{0,1\}} \{ \gamma^M \theta_s x + [1-x] \pi \} \text{ for } s \in \{h, l\} \\ &= \begin{cases} 1 & \text{if } \gamma^M \geq \frac{\pi}{\theta_s} \\ 0 & \text{otherwise.} \end{cases}\end{aligned}$$

Let $v(\gamma^M) \equiv \sum_{s \in \{h, l\}} q_s [\hat{x}(\gamma^M; s) \gamma^M \theta_s + (1 - \hat{x}(\gamma^M; s)) \pi]$ where $q_h = q$ and $q_l = 1 - q$. It is the expected payoff (social and financial) when the state is $r = H$. Then effort will be $\hat{e}(\lambda [A + v(\gamma^M)])$. The expected payoff of the manger is $\phi(A + v(\gamma^M), \lambda) + T$.

Comparison of Organizations from the Manager's Point of View Upon inspection, $v(\gamma^M) \geq \max\{\pi, \gamma^M \bar{\theta}\}$ with strict inequality holding for $\gamma^M \in (\underline{\gamma}, \bar{\gamma})$. From Proposition 1, we know that the higher the marginal payoff of the manager conditional upon success (z), the higher is her effort and her expected payoff. As a benchmark, we first consider an environment where T is exogenously given and equal for all organizational forms. This can be viewed as autarchy ($T = 0$) where the manager is acting independently of the founder. In the next section, we consider competition for managers. Then, we have:

Proposition 2 *Suppose T is exogenously given. For $\gamma^M \leq \underline{\gamma}$ the manager is indifferent between a social enterprise and a for profit, but strictly prefers each of them to a non-profit. For $\gamma^M \geq \bar{\gamma}$ the manager will be indifferent between a non-profit and a social enterprise but will strictly prefer these to a for-profit. For $\gamma^M \in (\underline{\gamma}, \bar{\gamma})$, the manager strictly prefers a social enterprise to a for-profit or a non-profit.*

This proposition shows that if manager's self-select into organizations without any compensating adjustments in the fixed transfers, then social enterprise dominates both for-profits and non-profits for all levels of manager motivation, and strictly so for intermediate levels of manager motivation. The intuition is simple: in a social enterprise, conditional on success ($r = H$) the manager's expected payoff is higher than that of non-profits or for-profits, and due to this complementarity, she puts in more effort. For very low and very high levels of manager motivation, managers are indifferent between social enterprise and a for-profit or a non-profit. This suggests that the scope for social enterprise is most promising for citizen-managers who wish to tailor the mission to the realization of state s . We have the following:

Corollary *The effort level in a social enterprise is (weakly) higher than in a for-profit or a non-profit, and strictly so for $\gamma^M \in (\underline{\gamma}, \bar{\gamma})$.*

Notice that if the choice was restricted between NP and FP only, then the critical value of γ^M such that a manager is indifferent is $\gamma^M = \frac{\pi}{\bar{\theta}} \equiv \hat{\gamma}$ which lies between $\underline{\gamma}$ and $\bar{\gamma}$, and FP preferred for $\gamma^M < \hat{\gamma}$ and NP preferred for $\gamma^M > \hat{\gamma}$. That is, we have:

Observation *There exists $\hat{\gamma}$ such that effort is higher (lower) in a for-profit than a non-profit for $\gamma^M < \hat{\gamma}$ ($\gamma^M > \hat{\gamma}$).*

This would be relevant to decide whether the manager is better off working in a for-profit, and if she wishes, donate her earnings to charity that on average would yield a value of $\gamma^M \bar{\theta}$ rather than working in a non-profit. However, social enterprise strictly dominates both FP and NP in the interval $(\underline{\gamma}, \bar{\gamma})$.

So far we have looked only at the manager's payoffs but not the payoff of the founder. Next, we characterize how the choice of organizational form depends on the preferences of the founder. We also look at the competitive recruitment process for managers.

Optimal Choice of Organizational Form We now consider which organizational form is optimal once we take the founder's valuation into account. The joint surplus of each organizational form factoring in both the founder's valuation of the social payoff and the citizen-manager's payoff is given by:

$$\begin{aligned} S^{FP}(\gamma^F, \gamma^M) &= \phi(A + \pi, \lambda) \\ S^{NP}(\gamma^F, \gamma^M) &= \gamma^F \bar{\theta} \hat{e}(\lambda [A + \gamma^M \bar{\theta}]) + \phi(A + \gamma^M \bar{\theta}, \lambda) \\ S^{SE}(\gamma^F, \gamma^M) &= \gamma^F \left(\sum_{s \in \{h, l\}} q_s \hat{x}(\gamma^M; s) \theta_s \right) \hat{e}(\lambda [A + v(\gamma^M)]) + \phi(A + v(\gamma^M), \lambda). \end{aligned}$$

For now, we take the matching of founders and managers as given, relaxing this in the next section.

To maximize joint surplus, in the first-best, the mission in state s should be governed by whether $(\gamma^M + \gamma^F) \theta_s \geq \pi$. However, in the second-best, the choice is governed solely by manager's preferences (in a social enterprise) or can be rigidly stipulated (in a for-profit or a non-profit). The selection of a manager with a specific γ^M along with an organizational form are the two instruments at the disposal of the founder to influence mission choice as well as effort.

These payoffs can be used to define two critical levels of founder motivation which affect which organizational form is optimal. We define the parameter space relative to a non-profit being optimal. Thus, for $\gamma^M \leq \underline{\gamma}$, let us define $\Gamma_{FP}(\gamma^M)$ such that $S^{FP}(\Gamma, \gamma^M) = S^{NP}(\Gamma, \gamma^M)$, i.e. as the switch point above which a non-profit yields greater total surplus when the manager would always prefer to pursue a for-profit mission. And for $\gamma^M \in (\underline{\gamma}, \bar{\gamma})$, define $\Gamma_{SE}(\gamma^M)$ from $S^{SE}(\Gamma, \gamma^M) = S^{NP}(\Gamma, \gamma^M)$, as the switch point above which a non-profit yields higher total surplus when a manager in a social enterprise will choose a state-contingent mission.

Using these definitions, we have the following key result:

Proposition 3

1. For low levels of manager motivation ($\gamma^M \in [0, \underline{\gamma}]$) there is a level of founder motivation $\Gamma_{FP}(\gamma^M) > 0$ above which a non-profit dominates a for-profit which yields the same surplus as a social enterprise. Moreover, the function $\Gamma_{FP}(\gamma^M)$ is strictly decreasing, with $\Gamma_{FP}(0) > \frac{\pi}{\theta}$ and $\Gamma_{FP}(\underline{\gamma}) > \pi - \pi \frac{\theta}{\theta_h}$.
2. For middle levels of manager motivation ($\gamma^M \in (\underline{\gamma}, \bar{\gamma})$) there is a level of founder motivation $\Gamma_{SE}(\gamma^M) > 0$ above which a non-profit dominates a social enterprise which dominates a for-profit. Moreover, $\Gamma_{SE}(\gamma^M)$ is strictly decreasing, with $\Gamma_{SE}(\underline{\gamma}) > 0 = \Gamma_{SE}(\bar{\gamma})$.
3. For high levels of manager motivation ($\gamma^M \geq \bar{\gamma}$) a non-profit yields the same surplus as a social enterprise, and both of these organizational forms dominate a for-profit for all $\gamma^F \geq 0$.

This partitions the parameter space depending on the level of founder and manager motivation matter. Manager motivation matters in a social enterprise because it affects which mission will be chosen while founder motivation matters because it affects how far she cares about the social cause. When manager motivation is low, then either a non-profit or for-profit is optimal with the former yielding the highest payoff when the founder is sufficiently motivated. This has been the focus of existing theories of non-profits. However, for moderate levels of manager motivation, a social enterprise can be optimal as long as the manager will choose the correct mission as effort will be higher than both for-profits and non-profits. Therefore, even if the founder does not care much about the social cause, a social enterprise will be preferred to a for-profit. Of course, if the founder cares a lot about the social cause, then a non-profit will be chosen. There is a complementarity between founder and manager motivation since a more motivated manager puts in greater effort which lessens the efficiency loss in a non-profit. When managers are highly motivated, then motivated founders always choose a non-profit form.¹²

Competition and Matching Now we turn to matching of founders and managers. T can adjust to ensure that, for an given founder-manager pair, the most efficient organizational form is chosen. Specifically, we study a market equilibrium where managers match with firms set up by founders who choose an organization form. We assume types of founders and managers to be observable and also, that preferences not to be affected by the type of the matched partner (e.g., M does not care about F's type). We focus on the implications of stable matching, defined as allocations of founders and managers which are immune to a deviation in which *any* founder and

¹²Note the switch points between different forms of enterprise are not aligned with the point that mission preferences of founders and citizen-managers align since manager motivation also affects productive effort levels.

manager can negotiate a choice of organizational form and a payment which makes both of them better off. Were this not the case then we would expect re-matching to occur. This approach can be thought of as the outcome of a competitive labor market.

For simplicity, we focus on the case of three types of founders and managers, ranked in terms of how much weight they put on the social mission. Let $\mathcal{A}_F = \{f_0, f_1, f_2\}$ denote the set of types of founders and $\mathcal{A}_M = \{m_0, m_1, m_2\}$ be the set of types of managers. Following Roth and Sotomayor (1989), the matching process can be summarized by a one-to-one matching function $\mu : \mathcal{A}_F \cup \mathcal{A}_M \rightarrow \mathcal{A}_F \cup \mathcal{A}_M$ such that (i) $\mu(f_i) \in \mathcal{A}_M \cup \{f_i\}$ for all $f_i \in \mathcal{A}_F$ (ii) $\mu(m_j) \in \mathcal{A}_F \cup \{m_j\}$ for all $m_j \in \mathcal{A}_M$ and (iii) $\mu(f_i) = m_j$ if and only if $\mu(m_j) = f_i$ for all $(f_i, m_j) \in \mathcal{A}_F \times \mathcal{A}_M$. A founder (manager) is unmatched if $\mu(f_i) = f_i$ ($\mu(m_j) = m_j$). What this function does is to assign each founder (manager) to at most one manager (founder) and allows for the possibility that a founder (manager) remains unmatched, in which case he (she) is described as “matched to himself (herself)”.

The founder and the manager types determine how much the cause is valued and are denoted by $\gamma^F(f)$ and $\gamma^M(m)$ respectively. We assume that $\gamma^F(f_0) = \gamma^M(m_0) = 0$; $\gamma^M(m_2) > \bar{\gamma} > \gamma^M(m_1) > \underline{\gamma}$, and $\gamma^F(f_2) > \gamma^F(f_1) > 0$. This means that type m_2 agents are strongly motivated and will always choose the pro-social mission, while type m_1 agents would achieve mission integrity only if they worked in a social enterprise. Type m_0 agents are completely neutral. The founders of type f_2 and f_1 are motivated, the former more than the latter, but type f_0 founders are neutral. We will abuse notation slightly and refer to $\gamma^F(f_\tau) = \gamma_\tau^F$ and $\gamma^M(m_\kappa) = \gamma_\kappa^M$ where $\tau, \kappa \in \{0, 1, 2\}$, i.e. subscripts now refer to the type.

The number of founders and managers of each type is denoted by $N(f_\tau)$ and $n(m_\kappa)$ respectively. We study a population where $N(f_2) = n(m_2)$ and $N(f_1) = n(m_1)$, but $N(f_0) > n(m_0)$. This puts social enterprises and non-profits under maximum competitive pressure from for-profit firms who will be seeking to recruit managers and will be willing to bid up manager’s wages to the point where expected profit is zero.

Associated with each possible match $(f_\tau, m_\kappa) \in \mathcal{A}_F \times \mathcal{A}_M$ is a choice of organization form $J(f_\tau, m_\kappa) \in \{FP, NP, SE\}$ and a transfer $T(f_\tau, m_\kappa)$ when a founder of type f_τ matches with a manager of type m_κ .

As we saw in Proposition 3, for matched pairs (γ_1^F, γ_0^M) and (γ_2^F, γ_0^M) either a for-profit or a non-profit may be the best organizational form, depending on the value of $\Gamma(\gamma_0^M)$ relative to γ_1^F and γ_2^F . Similarly, for the pairs (γ_1^F, γ_1^M) and (γ_2^F, γ_1^M) either a social enterprise or a non-profit may be the optimal depending on the value of $\Gamma_{SE}(\gamma_1^M)$ relative to γ_1^F and γ_2^F .

However, the fact that there are some managers who would do what founders would like in a social enterprise is not sufficient to guarantee that social enterprises would survive as part of a stable matching model of market competition. Once firms have been founded, they need to be able to recruit managers against competition from other enterprises. We now give a condition under which there is a stable

assortative matching where selfish managers and founders match together in for-profit firms, highly motivated founders and managers set up non-profit firms and those with middle levels of motivation set up social enterprises.

Stable matching will require one further condition which guarantees that a non-profit organization values a more motivated manager more than does a social enterprise. For this, we need to ensure that effort does not increase too much with manager motivation in the range $\gamma^M \in [\underline{\gamma}, \bar{\gamma}]$ because social enterprises have a strict advantage in terms of manager effort in this range. A sufficient condition for this is given as part of the following result:

Proposition 4 *Suppose that the elasticity of effort at $A + \underline{\gamma}\bar{\theta}$ is less than $\frac{(A+\underline{\gamma}\bar{\theta})\theta_l}{\pi q(\theta_h - \theta_l)}$, then the unique stable matching equilibrium displays assortative matching, with (i) $J(f_0, m_0) = FP$; (ii) $J(f_1, m_1) = SE$ if $\gamma_1^F < \Gamma_{SE}(\gamma_1^F)$ and NP otherwise; and, (iii) $J(f_2, m_2) = NP$.*

This result articulates the case where we would expect social enterprises to emerge in matching market against competition from other organizational forms.¹³ This will happen precisely when the flexible mission is valuable to both the founder and the manager. Within the specified range, having a more motivated manager is good for the prospect of having a social enterprise since the effort committed by the manager will be higher.¹⁴

¹³Our assumption that $c'''(e) > 0$ implies that the marginal cost eliciting effort is increasing, which in turn implies that $\hat{e}(z)$ is increasing but concave in z (setting $\lambda = 1$), as shown in the proof of Proposition 3. Therefore, the elasticity of effort with respect to reward, namely, $\hat{e}(z) \equiv \frac{z\hat{e}'(z)}{\hat{e}(z)}$, is strictly less than 1. For Proposition 4, we require that

$$\frac{\hat{e}'(A + \underline{\gamma}\bar{\theta})}{\hat{e}(A + \underline{\gamma}\bar{\theta})} < \frac{\theta_l}{\Delta q(\theta_h - \theta_l)},$$

which is equivalent to

$$\hat{e}(A + \underline{\gamma}\bar{\theta}) < \frac{(A + \underline{\gamma}\bar{\theta})\theta_l}{\Delta q(\theta_h - \theta_l)}.$$

A sufficient condition for this assumption to hold is $\frac{(A+\underline{\gamma}\bar{\theta})\theta_l}{\Delta q(\theta_h - \theta_l)} > 1$ which is easy to verify in applications including in the empirical application below.

¹⁴Our assumptions about the distribution of types of founders and managers implies that all the surplus will accrue to managers. Therefore, type m_0 agents receive $T_0 = S^{FP}(\gamma_0^F, \gamma_0^M) = \phi(A + \pi, \lambda)$, type m_1 agents receive $T_1 = \max\{S^{NP}(\gamma_1^F, \gamma_1^M), S^{SE}(\gamma_1^F, \gamma_1^M)\}$, and type m_2 agents receive $T_2 = S^{NP}(\gamma_2^F, \gamma_2^M)$. However, they do not automatically ensure that self-selection constraints are satisfied for managers in an assortative matching equilibrium if there is asymmetric information about managers' types. To see this, suppose we start with an assortative matching equilibrium, and then pull out the managers from two different organizational forms, say a NP with the pair (γ_2^F, γ_2^M) and a SE with the pair (γ_1^F, γ_1^M) . If their identities are concealed, would they have an incentive to self-select back into their existing positions? For this to happen both the

Summary We have developed a model where social enterprises can play a role. They can recruit managers who are willing to pursue a trade-off between profits and social purpose. The level of productive effort also matters with more motivated managers also putting in greater effort. Depending on the levels of motivation and the matching process, it may be better for a motivated founder to set up a non-profit or a social enterprise.

5 Quantitative Analysis

The theoretical model highlights the role that motivated agents can play in running social enterprises. We now breathe life into the approach in two steps. First, we present results from a laboratory experiment which is designed to test some of the core trade-offs in the theory, showing that there are indeed motivated agents in this setting and to provide a basis for calibrating the theoretical model. We then use the calibrated model to explore the parameter ranges in which a social enterprise staffed by a citizen-manager can survive in competition with non-profits and for-profits.

5.1 The Experiment

The experiment is designed to replicate all of the key features of the theoretical model and to allow heterogeneity in preferences and ability in the population of participants to be explored. By randomly assigning organizational choices to participants, we can test for the way that the two main decisions, effort and mission choice, vary with organizational form.

The Experiment and Data The experiment was carried out in the LSE Behavioral Lab in May 2013 and drew in participants based on the Lab’s mailing list. While students dominate the list, participation was not restricted to this group. The experiment was designed to capture the theoretical setting as closely as possible. Details of the experiment are in Appendix C. Here, we focus only on the main elements that are needed to understand the results.

The participants attended in groups of up to 20 and the experiment took approximately one hour. Before starting, participants were read instructions describing the experiment which were also available on screen. They were aware that the experiment would allow them to earn money for themselves as well as making donations to a good cause, the latter being the lab version of a social payoff. The tasks were

following conditions need to hold:

$$\begin{aligned} S^{SE}(\gamma_1^F, \gamma_1^M) &\geq S^{NP}(\gamma_2^F, \gamma_1^M) \\ S^{NP}(\gamma_2^F, \gamma_2^M) &\geq S^{SE}(\gamma_1^F, \gamma_2^M) \end{aligned}$$

whereas assortative matching only implies that $S^{SE}(\gamma_1^F, \gamma_1^M) + S^{NP}(\gamma_2^F, \gamma_2^M) \geq S^{NP}(\gamma_2^F, \gamma_1^M) + S^{SE}(\gamma_1^F, \gamma_2^M)$.

programmed in z-Tree – see Fischbacher (2007).¹⁵ During the experiment, but prior to undertaking any of the specified tasks, participants were asked to select their preferred good cause from a list of nine possibilities.¹⁶

The effort task follows Gill and Prowse (2012). Each participant is asked to locate an on screen slider in the middle of a line. We used this task since we were persuaded that, in contrast to other tasks proposed in a range of experiments to capture the effect of incentives on effort, it provides a clean measure of effort.¹⁷ In line with previous experiments, we find persistent heterogeneity in an individual’s ability to perform the task.

As in the model above, effort led to a discrete outcome denoted by success (state H) or failure (state L). The baseline probability of a successful outcome was 52%. The participant was asked to position 48 sliders in the middle of a line during a two minute period with each correctly positioned slider increasing the probability of success by 1%. After each two minute round, success or failure was determined probabilistically in accordance with the probability determined by their effort.

As in the theoretical model, in state L (i.e. in the event of failure) there were no earnings or donations to charity. In the lab version of a non-profit or a social enterprise, we captured the two states in the model conditional on state H being realized by offering an opportunity to give to a good cause, a process which was governed by the realization of an equiprobable stochastic variable $\beta \in \{\beta_h, \beta_\ell\}$ with $\beta_h > 1 > \beta_\ell > 0$ with

$$\theta_h = \beta_h \pi \text{ and } \theta_\ell = \beta_\ell \pi.$$

Hence the outcomes $\{h, \ell\}$ correspond to the states in the theory above. In the experiment, we set $\beta_h = 2$, $\beta_\ell = 0.2$ and $q = 1/2$ so that $\bar{\beta} = \frac{\beta_h + \beta_\ell}{2} = 1.1$.

In a non-profit, proceeds were automatically given to the pre-selected good cause while in the case of a social enterprise, this was chosen by the participant to mimic the decision $x \in \{0, 1\}$. In state $s = h$, the participant in the experiment could forego private income to give twice his or her earnings to a good cause, while in state $s = \ell$, he or she could donate only one fifth of what should could earn to a good cause. Following the convention of the theoretical section, we will refer to participants as female even though in the experiment players of both genders participated. The observable decision is whether she chose to donate or to keep what she had earned, i.e., $x = 1$ and $x = 0$ respectively.

The experiment ran with 11 two minute effort rounds. We label the practice round as 0 and analyze the data from rounds 1 through 9.¹⁸ In advance of each

¹⁵We are grateful for Sam Marden for his excellent programming work.

¹⁶The list was: Oxfam, Cancer Research UK, British Heart Foundation, Amnesty International, LSE Student Hardship Fund, Centrepont (a London-based charity which helps young homeless), Mind (support for those with mental health problems), National Society for the Prevention of Cruelty to Children (NSPCC), Royal Society for the Protection of Cruelty to Animals (RSPCA), and World Wildlife Fund.

¹⁷See Gill and Prowse (2012) for discussion of the prior literature.

¹⁸Here, we do not use the data from round 11 where we allowed self-selection into tasks.

effort round, the participants were also told whether they were playing for $\pi = 2000$ or $\pi = 250$. These were point tallies for success or failure which would later be converted into money.¹⁹

Following the practice round, participants faced one of two possible tasks with the order in which they were faced determined randomly. One was described to participants as an “earnings” task which was intended to capture essence of a for-profit enterprise in which individuals got to keep the points that they earned. If assigned that task, each participant completed the earnings task three times consecutively. The second possibility was described to participants as a “giving” task and was intended to capture a non-profit. And it was also repeated three times with success in the effort task leading to $\beta_h = 2$ or $\beta_\ell = 0.2$ with equal probability.

The seventh through ninth round, was described to participants as a “hybrid” task. This captured the structure of the social enterprise model in theory above. Here, the participants performed an effort task after which, if successful, they were presented with either $\beta_h = 2$ or $\beta_\ell = 0.2$ but with a choice between giving their earnings to charity or keeping it for themselves.

We expect variation in behavior according to the motivation of each participant. Specifically, we can think of each participant placing a weight γ_i on donations versus private rewards. For $\gamma_i^M = 1$, given that $\bar{\beta} = 1.1$, it is not more efficient to keep one’s total earnings irrespective of β donate all of it to charity later. For $\gamma_i > 5$, it will be privately optimal to donate in a social enterprise even if $\beta_s = 0.2$ while if $\gamma_i^M < 0.5$, it will never be privately optimal to donate. In terms of our notation from the theory section, $\underline{\gamma} = 0.5$ and $\bar{\gamma} = 5$. In the interval $\gamma_i^M \in [0.5, 5]$, individuals will choose to donate to their preferred good cause only if $s = h$. By observing their behavior when they face the incentives of a social enterprise, we will therefore be able to put bounds on their individual preference parameter γ_i^M .²⁰

In addition to the experimental evidence, we also asked each participant to complete a short survey.²¹ We collected data on age, occupation, religion, and nationality. Given the nature of the experiment and the context that interests us, we were also interested in trying to assess participants’ degree of pro-social motivation. We asked them whether they had volunteered in the past year, whether they had voted, given to charity, or were a member of a political party. We also followed Dal Bo, Finan and Rossi (2013) in asking two hypothetical questions regarding a hypothetical dictator game and receiver game experiment. The details are provided

¹⁹Even though in the theoretical section we had a single value for positive profits (π), here we use two different levels of reward to give us a basis for estimating the elasticity of effort with respect to rewards.

²⁰In the eleventh round participants were allowed to choose a task. They were randomly assigned to making one of three binary choices between any of the three tasks: earnings, giving or hybrid. They then undertook the effort task associated with that choice. Note however that this does *not* replicate the matching outcome of the theory where wages are set endogenously. Hence, we do not use these data in this paper.

²¹Further details are in the data appendix.

in Appendix C.

Finally, we used the questionnaire proposed in Perry (1996) to measure public service motivation. It asks a series of questions using six categories which contribute towards having an outlook on life which is indicative of greater public service orientation: attraction to policy making; commitment to the public interest; social justice; civic duty; compassion; and self-sacrifice. All of the individual questions which go into creating these judgements is based on a five point “Liker” scale measured from 1 = *strongly disagree* to 5 = *strongly agree*. From these six underlying categories, we also created an “aggregate” z-score for each participant.

At the end of the experiment, the participants for one of the earnings, giving and hybrid task rounds.²² Which of these rounds they were rewarded for was determined randomly, by a roll of the dice in the presence of the payment clerk.

Descriptive Evidence We begin by describing some basic features of the data and experimental findings. In Table 1, we look at how effort (as measured by the number of correctly positioned sliders) varies across the tasks. Looking at the raw data, effort is highest in the hybrid round (social enterprise) and lowest in the giving round (non-profit).

Table 2 looks at how effort varies by round (excluding the practice round). There is a pronounced "learning by doing" effect which seems to last around three rounds. Thereafter, effort seems roughly flat over rounds four through six. However, it picks up again in the final three (hybrid rounds). Since rounds four through six are roughly flat, it seems reasonable to attribute this to the impact of the organizational type on choice rather than being due to continued learning. This view is further underlined by looking at the cumulative distribution of effort as shown in Figure 1.

Table 3 looks at the decision of whether to choose the pro-social action (donate to a good cause) or the selfish action (keep as earnings) in rounds six through nine of the experiment. We break this down by whether β_s is high (2) or low (0.2). Of the 468 cases where a mission choice decision was faced 236 were cases where β_s is low. There are a number of cases where individuals choose to keep the money as earnings whatever the value of β_s . However, there is evidence that individuals are more willing to take a pro-social action when the rewards of doing so are high. There are also individuals who pursue the pro-social action even when the charitable donation that they can make is lower than the private reward that they could earn. This provides evidence that there is indeed heterogeneity in motivation among the participants in the experiment in line with the theory.

Effort Choice and Incentives In the theory, we focused on heterogeneity in motivation rather than ability. However, it is be straightforward to allow λ to vary and this turns out to be empirically relevant. Imagine therefore that each participant is characterized by a pair $\{\lambda_i, \gamma_i^M\}$ reflecting their ability and motivation towards

²²They were also rewarded for the final (self-selection) round.

their preferred good cause. Since we observe multiple effort observations for each participant, we can obtain an estimate of λ_i . Moreover, we can put bounds on the value of γ_i^M by observing their donation choice in the hybrid task which replicates incentives in the social enterprise. We could also, in principle, allow for A to vary as it would be likely to in the population but trying to estimate this amount of parameter heterogeneity in our data is not very credible. Hence, below we calibrate the model to a core case where A is a common parameter across all participants.

The output from the experiment is 9 observations on effort per participant in the three organizational forms that were assigned, with three observations for each form. Formally, for each of the k observations for individual i , let e_{ikJ} be an effort observation where $J \in \{NP, FP, SE\}$ is the organizational form.

Suppose that

$$c(e) = \frac{1}{1 + 1/\mu} e^{(1 + \frac{1}{\mu})}$$

i.e. a constant elasticity function. Then privately optimal effort is:

$$e_{ikJ} = (\lambda_i)^\mu (A + M_{ikJ})^\mu$$

where $M_{ij\theta}$ is a payoff associated with each organizational form. Hence:

$$\begin{aligned} M_{ikFP} &= \pi_k \\ M_{ikNP} &= \gamma_i^M \bar{\beta} \pi_k \\ M_{ikSE} &= \sum_{s \in \{\ell, h\}} \frac{[\gamma_i^M \beta_s \hat{x}(\gamma_i^M; J) + [1 - \gamma_i \beta_s] \mathcal{I}(\gamma_i^M \beta_s - 1)]}{2} \pi_k \end{aligned}$$

where $\mathcal{I}(\gamma_i^M \beta_s - 1)$ is the indicator function. Recall that there are two possible values of rewards when the state is H with $\pi_k \in \{250, 2000\}$.

Taking logs, we therefore have

$$\log(e_{ikFP}) = \mu \log(\lambda_i) + \mu \log(A + \pi_k). \quad (3)$$

for effort under a for-profit. With a non-profit effort is:

$$\log(e_{ikNP}) = \mu \log(\lambda_i) + \mu \log(A + \gamma_i^M \bar{\beta} \pi_k). \quad (4)$$

The term $\mu \log(\lambda_i)$ will be picked up empirically by including a participant fixed effect in all the specifications that we estimate.

Combining (3) and (4), we can run the following regression

$$\log(e_{ikJ}) = \alpha_i + \eta_k + \delta_J + \phi D_k + \varepsilon_{ikJ}.$$

where $J = \{NP, FP\}$ and δ_J is a dummy variable that is equal to one if $J = NP$ and zero otherwise, D_k is a dummy variable which is equal to one if $\pi_k = 2000$ and zero otherwise. Individual and round fixed effects (α_i and η_k) are included to allow for the possibility of learning by doing.

We begin by focusing on the first six rounds where round and organizational form are both randomly assigned and hence can be fully separated from each other by including a full set of round dummy variables. The result in column (1) of Table 4 shows that effort is approximately 4% lower in the non-profit case (compared to the for-profit case), i.e. where all returns to effort are donated to the participant's selected good cause. This suggests that on average γ_i^M in our sample of participants was not high enough (recall that if $\gamma_i^M \geq 1$ for all players then effort should be higher under a NP than a FP).

In column (2) we add a dummy for whether the participant is playing for $\pi_k = 2000$ or $\pi_k = 250$ with a dummy variable equal to one in first case. Participant effort is 4% higher when the stakes are higher. This makes sense if there are a number of individuals who do not care about the cause, i.e. $\gamma_i^M = 0$ in the theory. In column (3), we test whether the effect of having a high value of π is different in a non-profit situation where rewards are donated to a good cause. However, there is no significant difference between the two organizational forms in the data.

The pattern of round effects for the first six rounds suggest that learning by doing is exhausted by round 3 with the baseline effort being similar for each participant thereafter. An F test of the hypothesis that all dummies are the same after round 3 cannot be rejected with a p-value of 0.55. When we control for learning by doing in this way as reported in column (4), then we find that the results are virtually identical to those in column (2) confirming that this more restrictive way of capturing learning by doing is not affecting the impact of organizational form and higher rewards on effort. This finding is important since we only have observations in a social enterprise for round seven onwards due to the design of the experiment.

According to the theory, effort in a social enterprise is given by:

$$\log(e_{ikSE}) = \mu \log(\lambda_i) + \mu \log \left(A + \left(\sum_{s \in \{\ell, h\}} \frac{[\gamma_i^M \beta_s + [1 - \gamma_i^M \beta_s] \mathcal{I}(\gamma_i^M \beta_s - 1)]}{2} \right) \pi_k \right). \quad (5)$$

This is predicted to be higher in a social enterprise since there is now a flexible disposition of the resources, in line with our theoretical result.

In column (5) of Table 4, we maintain the hypothesis that all learning by doing is exhausted beyond the third round of the effort task to estimate the effect of a social enterprise in which the participant chooses the mission of the organization on effort choice. Here, we find a positive and significant effect of the social enterprise on effort with effort being around 5% higher.²³ This is in line with what we expect from the theory (recall the Corollary to Proposition 2) where the individuals can autonomously choose how resources are spent.

²³When we run the regressions separately for each organizational form, then we only find a significant effect of high rewards in the for-profit case.

Mission Choice We now consider the decision over whether to give earnings to pursue a good cause in a social enterprise by looking at decisions to donate if the state is H . The theory suggests that this decision follows the following decision rule depending on γ_i^M :

$$\hat{x}(\gamma_i^M; \beta) = \begin{cases} \text{donate} & \text{if } \gamma_i^M \geq \frac{1}{\beta} \\ \text{keep} & \text{otherwise.} \end{cases} \quad (6)$$

Thus, the decision maker is more likely to donate if she is more motivated towards the good cause that she has chosen. We model this decision empirically using a linear probability model where

$$x_{ik} = \rho w_i + \lambda \beta_{ik} + \eta_{ik}$$

where w_i are characteristics of the participant which may capture their pro-sociality, i.e., are proxies for γ_i^M , β_{ik} is determined randomly in the experiment for participant i after effort has been chosen, and η_{ik} is the error term.

Table 5 reports the results. At most a participant could face three rounds in which they were confronted with this choice but this happened in only 468 out of a maximum possible 621 cases. In fact only 202 of the 207 participants successfully reached the stage in the game where a ‘‘mission choice’’ was made.

The raw data can be used to calibrate the different ranges of γ_i^M in our data. In terms of raw percentages, we find that around 8% of the population choose to donate their earnings even only if $\beta = \beta_\ell$. In terms of the model such individuals have $\gamma_i^M \geq 5$ and are strongly motivated types. Around 18% choose to donate their earnings if $\beta = \beta_h$. They have $\gamma_i^M \in [0.5, 5]$ and are moderately pro-social. The remaining 74% of the population have $\gamma_i^M < 0.5$ since they always choose to keep the money as earnings. Thus, the results suggest that there are motivated agents among those who took are experiment and that, in line with the core idea of the paper, there is heterogeneity in motivation across the population.

In column (1) of Table 5, we show that if $\beta_s = 2$, then there is a 10 percentage point increase in the chance that the participant chose to give the money as a charitable donation (chose the pro-social mission in the language of our theoretical model) compared to when $\beta_s = 0.2$.

Column (2) adds as a control whether not an individual has been a volunteer in the past year as a proxy for γ_i^M . If the answer is ‘‘yes’’, then he/she is 9.4 percentage points more likely to make the pro-social choice. In column (3), we add their answer to the dictator game question. Here, we find that a £1 increase in their willingness to give in the answer to that hypothetical dictator game is associated with a 1.7 percentage point increase in the probability of donating their earnings to a good cause. The results on the effect of the high donation possibility are broadly unchanged with the introduction of controls.

Also as a proxy for γ_i^M , column (4) adds their answer to the hypothetical receiver game. However, in this case the answer has no predictive power. Column (5) adds the six different dimensions based on the Perry (1996) scores on different dimensions

of motivation. Among these, only the score which measures attraction to policy making and commitment to the public interest appear to predict a greater likelihood of giving to charity. However, when we aggregate the measures to form a Perry z-score as we report in column (6) this is significantly and positively correlated with donating to the good cause. A one standard deviation increase in the z-score (4.6) is associated with a 6 percentage point increase in the probability of giving to charity rather than taking the money as earnings. Finally, column (7) looks at the relationship with β when we include individual fixed effects, i.e. identify the effect only by exploiting information on participants who faced the decision to donate in multiple rounds.

In all of the specifications in columns (1) through (7), the coefficient on realizing $s = h$, the social state in our theoretical framework, is around 0.1 (10 percentage points). Thus changing the importance of social rewards versus private rewards does, in line with theory, have an impact on the behavior of some of our participants.

Our model assumes that income is linear in money so that the size of π does not affect whether or not to donate earnings to charity. However, if there were curvature in the utility function with respect to private consumption as well as donation, then this will not necessarily be the case. Suppose $u(\pi)$ is a strictly concave utility function of private consumption, and $w(\beta\pi)$ is a strictly concave utility of donating to a charitable cause. Now the decision to donate would depend on income. Specifically:

$$\hat{x}(\gamma_i^M; \beta) = \begin{cases} \text{donate} & \text{if } \gamma_i^M \geq \frac{u(\pi)}{v(\beta\pi)} \\ \text{keep} & \text{otherwise.} \end{cases} \quad (7)$$

In column (8) of Table 5, we test this linearity assumption by including the size of the π draw on the decision to donate. The result reported shows that having a high π makes it around 10 percentage point less likely that a participant in the experiment chooses to give their earnings to charity. This suggests that marginal utility from donation falls very fast relative to marginal utility from private consumption or, the underlying payoff functions have some non-standard properties.

Summary Taken together, these results show that the core elements of the theory seem to appear in a lab setting. Effort responds to organizational choice and incentives. Moreover, mission choice varies flexibly with the importance of the good cause in the organizational setting which we use to capture our notion of a social enterprise. Our results also show that people are heterogeneous in the main ways that the model envisages: their ability and their pro-social motivation. This is important for validating the basic ideas in the theory which were based on the idea of heterogeneous motivations among citizen-managers.

Our next step is to use the empirical findings to calibrate the model and to use this to compute the hypothetical market equilibrium in the model. We can then explore how the motivation of the founder of an organization leads to the possibility

that social enterprises staffed by motivated agents emerge in a market equilibrium where firms compete to hire managers on the basis of their ability and motivation.

5.2 Calibration of a Matching Model

Although the experiment does not replicate the matching model or throw any light on the consequences of the motivation of founders, we can use the calibrated parameters of the model construct this by imagining that the participants in our experiment constitute a population of potential citizen-managers who can be hired by founders with different degrees of motivation. We can then see which levels of founder motivation would lead to social enterprises emerging as the outcome of the matching process characterized by Proposition 4.

Core Parameter Values To calculate the total surplus functions, we need to plug in values for the parameter vector $\{\lambda_i, \gamma_i^M, \mu, A, \beta_\ell, \beta_h, \pi, \underline{e}\}$. Even with $A + z = 0$, $\hat{e} = \underline{e}$. We set $\underline{e} = 0.52$ as the lower bound on effort. The values of $\{\beta_\ell, \beta_h\}$ come directly from the experiment and we will calibrate the model for $\pi = 2000$. Estimates of λ_i are straightforward from the estimates of the participant fixed effects in the effort equation from Table 4. We use the estimates in the column (1) to obtain our estimate of participant ability.

To estimate γ_i^M we look at the mission choices as studied in Table 5. We will assign $\gamma_i^M = 5$ for individuals who always donate, $\gamma_i^M = 0$ for those who never donate and $\gamma_i^M = 1$ who only donate when $\beta = \beta_h$. Thus, we have three levels of pro-social motivation which we refer to as ‘low’, ‘medium’ and ‘high’. Out of the 207 subjects in our experiment, we have 157 for whom we assign $\gamma_i^M = 0$, 33 for whom $\gamma_i^M = 1$ and 17 for whom we calibrate $\gamma_i^M = 5$.

The final two parameters that we need are intrinsic motivation A and the effort elasticity μ which we assume to be common across agents for the purposes of our calibration. There is a large number of studies that suggest that a reasonable number for μ is 0.2.²⁴ We can then estimate the level of intrinsic motivation from

$$0.043 = 0.2[\log(A + 2000) - \log(A + 250)]$$

where 0.043 was the estimated coefficient in column 2 of Table 4. This gives an estimate of $A \approx 7000$. We will look at the sensitivity of the results to this below.

Consider a founder with preference γ^F who matches with a manager of type $\{\lambda_i, \gamma_i^M\}$. The set of potential managers are the 207 individuals who participated in our experiment. We can compute the total surplus that any match would generate.²⁵ We will use these to solve for the values of γ^F which make any particular match

²⁴This elasticity is similar to those found in other settings such as the field experiment of Bandiera et al (2007). As noted in Prendergast (2013) it is also consistent with the findings in the literature on taxation and labor supply.

²⁵The exact formulae for these are given in Appendix B.

a stable outcome. The results in Propositions 3 and 4, show that we need to characterize is $\Gamma_{SE}(\gamma_i^M)$ and $\Gamma_{FP}(\gamma_i^M)$. These functions are straightforward to compute and Appendix B gives the precise formulae that we use.

Social Enterprise versus Non-Profits The theoretical analysis informs us that, for a social enterprise to emerge as an outcome, it suffices to focus on the participants in our experiment for whom we have calibrated that $\gamma_i^M = 1$. They have the right degree of motivation to achieve mission integrity in a social enterprise. This was a total of 33 out of the 207 participants in the experiment. For each of these potential citizen-managers, we also have an estimate of their ability λ_i .

The estimates of $\Gamma_{SE}(\gamma_i^M)$ are in Figure 2. They suggest that there is a role for social enterprise when $\gamma^F < 4.1$ but for values above this, a non-profit will be able to compete for workers from a social enterprise because it cares more about having motivated workers. We find an upward-sloping locus with the switch point towards social enterprise being higher for more productive workers.

Thus social enterprise does indeed occupy a niche between standard non-profit and for-profit organizations but works when there is suitable matching between the managers and founders. Note that the founder of the social enterprise is considerably more motivated than the managers that they employ. But if the founder were more highly motivated still, then he would prefer a non-profit.

This quantitative analysis also allows us to see what the percentage increase in total surplus possible by allowing social entrepreneurs to establish social enterprises rather than non-profits, assuming that they are matched with managers who have similar preferences. For this, we take the case where $\gamma^F = 1$ and $\gamma_i^M = 1$. Then the gain is measured as

$$\pi = \frac{S^{SE}(1, 1) - S^{NP}(1, 1)}{S^{NP}(1, 1)}.$$

Using our core calibration, we measure this benefit as between 8% and 12% over the range of ability that we have estimated for the 33 participants in the experiment for whom $\gamma_i^M = 1$. Thus, for this range of motivation, there do appear to be reasonable gains.²⁶

The calibration that we have used is based on specific parameter values from the experimental data. We can assess straightforwardly the robustness of the results to varying some of the key parameters.

We begin by looking at the elasticity of effort with respect to rewards where the core results set $\mu = 0.2$. We now consider what happens when we halve this to $\mu = 0.1$ and double it to $\mu = 0.4$. Since we calibrate the level of intrinsic motivation based on this, we also have to adjust this to be consistent with the coefficient in

²⁶We also computed the gains for a social enterprise over a for-profit enterprise. These are much large with an average gain in total surplus of 70%, ranging from around 60% to 100% across the 33 participants.

column (2) of Table 4. Hence the values that we set are:

$$\begin{aligned} \mu = 0.1 & \quad A = 3000 \\ \mu = 0.2 & \quad A = 7000 \\ \mu = 0.4 & \quad A = 15000. \end{aligned}$$

Figure 3 looks at the margin between a non-profit and social enterprise when $\gamma^M = 1$. Now we find that the differences are quite modest, but increasing the effort elasticity to $\mu = 0.4$ does expand the range under which a social enterprise is optimal quite a bit.

We now look at what happens when we vary β_ℓ . We consider lowering β_ℓ to 0.1 and increasing it to 0.4. Figure 4 shows the choice between a non-profit and social enterprise. The critical value of γ^F now seems quite sensitive to having a higher value of β_ℓ with a lower value of β_ℓ significantly increasing the range over which a social enterprise is better than a non-profit.

Finally, we look at variations in the value of γ^M . We pick $\gamma^M = 0.5$ (with the correct mission choice still chosen when the manager is indifferent) and $\gamma^M = 1.5$. The results of doing this are displayed in Figure 5. The effect of this on the choice of a social enterprise versus a non-profit are quite modest.

These results illustrate, following Proposition 4, that there is indeed a range of founder motivation consistent with social enterprises which hire motivated agents as managers emerging as part of a competitive labour market process. Such firms do not behave like either for-profit or non-profit firms since they use their flexibility coupled with manager selection to balance profits with purposes. Since they respond to an *ex ante* surplus-maximizing good cause (since $\bar{\beta} > 1$), they dominate for-profit production. Also, they achieve efficiency gains, due to both higher effort and better mission choice compared to non-profit firms. However, some alignment between founder incentives and manager motivation is needed for them to emerge endogenously from a competitive matching process.

For-Profit versus Non-Profit Previous discussions of the merits of for-profit and non-profit enterprise such as Glaeser and Shleifer (2001) have focused on the case where managers are not motivated, i.e. $\gamma^M = 0$. As we have already stressed, there is no role for social enterprise in our setting since there is no way of achieving the flexible mission which is the hallmark of balancing profits with purpose. Following the prior literature, our model justifies an exclusive focus on the choice between for-profit and non-profit enterprise. Moreover, we can use our calibration exercise to explore this quantitatively.

For this case, we compute the function $\Gamma_{FP}(0)$, which we defined above as the critical value of γ^F such that a non-profit is preferred to a for-profit for all γ^F above this threshold. We get the upward sloping locus in Figure 6 characterizing the critical γ^F values above which a non-profit will be chosen. The value of γ^F is below one, so even a modest interest in the good cause will be sufficient to establish a

non-profit in the setting that we studied in the lab. This makes sense since we have assumed that $\bar{\beta} > 1$ so only differences in effort incentives can make a for-profit desirable.

Figure 7 considers sensitivity to choosing $\mu = 0.1$ or $\mu = 0.4$, re-calibrating the level of intrinsic motivation as above. Observe now that the high elasticity case now requires a negative value of γ^F to make having a for-profit optimal. This is because, we need to assume quite a high level of intrinsic motivation to be consistent with the results in Table 4. Note that the effect of having a lower effort elasticity is not particularly large.

6 The Case for For-Profit Enterprise

The focus of the analysis so far has been on cases where forgoing profit can generate unambiguous social gains since the mission is a non-rival good, i.e. $\gamma^F \geq 0$ and $\bar{\beta} > 1$. But, if these conditions did not hold, then the case for for-profit enterprise (as a rigid mission) is stronger.

Suppose first that $\gamma^F < 0$. Then there is a conflict of interest between the founder and motivated managers which is similar to standard agency models of the firm where managerial discretion leads to private rent-seeking.²⁷ Founding a for-profit firm now makes sense as a means of restricting this by creating a rigid mission to pursue profit maximization. Thus we have:

Proposition 5 *For any $\gamma^M > 0$ a for-profit will dominate a non-profit or a social enterprise if $\gamma^F < 0$ and is sufficiently large.*

This result highlights a key difference between the framework of this paper and standard models of organization. The study of social enterprises and non-profits makes sense in cases where there is a non-rival cause that founders and managers wish to pursue.

Making use of the observation in Proposition 5, it should be clear that if $\gamma^F = -5$ in our core calibration, then there is never a case for either a non-profit or social enterprise. This is because even with managers who are strongly committed towards choosing $x = 1$, produce a corresponding “loss” in utility for the founder. However, with $\gamma^F = -1$, there could be a case for a non-profit or social enterprise if they employ a manager for whom $\gamma^M = 5$. This is because the benefits to the manager of the good cause exceeds the loss to the founder, and there is always an effort advantage of hiring highly motivated managers, even if one does not agree with the social mission.

Having $\bar{\beta} < 1$, is similar to having $\gamma^F < 0$ since the value of the cause favored by motivated managers is less on average than forgone profits. Founding a non-profit again restricts the manager’s discretion to pursue a private surplus-reducing agenda.

²⁷See, for example, Tirole (2006).

A more subtle possibility arises by considering what happens if the social cause can also be pursued through government action, as in the standard public economics literature. This also bears on Milton Friedman’s well-known critique of corporate social responsibility (see Friedman (1970)). He argues that government should take responsibility for regulating public goods and bads, leaving firms to focus on profit maximization. If the government were choosing its preferred level of public goods, then it would optimally reduce its contribution to good causes in response to private contributions. The result would be complete crowding out, making private contributions irrelevant. To all intents and purposes, this is like having $\beta_s = 0$ for all s . In this case, in line with Friedman, only for-profit enterprise would be chosen. Hence the case for a non-profit or social enterprise as developed here is (implicitly) premised on government intervention being either rigid or absent in the enterprise’s sphere of operation.

7 Concluding Comments

This paper has explored the potential for recruiting motivated agents as a means of creating social enterprises which balance profit with a social purpose in a flexible way. We have calibrated the model to experimental data and identified the range of founder and manager motivation for which a social enterprise is a surplus maximizing organizational form which arises in a competitive setting. The quantitative analysis suggests that there is a gain of around 10% in total surplus from founding a social enterprise rather than a non-profit.

The paper has blended a mix of theory and experimental evidence. The latter has allowed us to calibrate our model and to explore the trade-off between effort and mission integrity empirically. The core elements of the model are found to have empirical counterparts in the lab setting. We do find that there are motivated agents that are needed to make a social enterprise work but they are relatively scarce. This is helpful in taking lessons of the analysis beyond theoretical possibilities and into real world debates. However, the usual issue of external validity of experimental findings remains. In future work, it would be interesting to study the interplay of mission integrity and effort incentives in field settings and using observational data.

There are other areas where the ideas in this paper are applicable given the importance of motivated agents. Although not normally classified as “social enterprises”, the ideas in this paper can be used to think about the ownership and management of sports franchises and media outlets. These are both cases where there is a wider constituency, fans in the case of sports and citizens/politicians in the case of the media, who care about how the enterprise is run. In both cases, owners own such enterprises because they too care about success in non-profit terms. In sports, club like structures were traditionally a means of attenuating the profit motive and in media some kind of trust based ownership is not uncommon. It would be interesting to use the ideas here to explore in more detail how ownership and control structures

affect performance.

In a wider sense, the paper contributes to debates about the right organizational structures for a market economy and how this is limited by human motivation.²⁸ Protest movements around the world have used the recent financial crisis to galvanize discontent about some aspects of market-driven societies. Such sentiments have been seized upon to denounce economic reasoning, particular in spheres where social goals matter. On this score, our analysis fuels both promise and pessimism. It is promising since social enterprise can be used to allow those with certain kinds of pro-social preferences to express and act upon these as managers of private enterprises. But it is pessimistic when human nature rather than organizational rules provide a limit on what can be achieved. Our experiment, perhaps predictably, showed that those with standard selfish preferences were in the majority. Whether these values are hard-wired or pliable then becomes a key determinant of what can feasibly be achieved in a market setting.

²⁸See Besley (2013) for discussion in the context of the critique of markets by Sandel (2012).

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Appendix

A Proofs

Proof of Proposition 1: Using earlier notation, if z is the manager's expected payoff (pecuniary and non-pecuniary) conditional on success, then the choice of effort by the manager is given by $\hat{e}(\lambda z)$ and the expected payoff of the manager by $\phi(z, \lambda) - T = \frac{\lambda z \hat{e}(\lambda z) - c(\hat{e}(\lambda z))}{\lambda} - T$. For higher values of z , the value of $\hat{e}(\lambda z)$ is higher from the first-order condition, and by the envelope theorem, the change in $\phi(z, \lambda)$ is given by $\hat{e}(\lambda z)$. ■

Proof of Proposition 2: There are three ranges of γ^M to consider. For $\gamma^M \leq \underline{\gamma}$, the manager will always choose $x = 0$ under a social enterprise, and therefore, be indifferent between a social enterprise and a for profit. But a non-profit is strictly dominated. For $\gamma^M \geq \bar{\gamma}$, the manager will always choose $x = 1$ in a social enterprise. Therefore he will be indifferent between a non-profit and a social enterprise but a for-profit will be strictly dominated. Finally, for $\gamma^M \in (\underline{\gamma}, \bar{\gamma})$, the manager will choose $x = 1$ when $s = h$ and $x = 0$ when $s = l$ in a social enterprise. In this case, $v(\gamma^M) = q\gamma^M\theta_h + (1-q)\pi > \max\{\pi, \gamma^M\bar{\theta}\}$. Therefore, the social enterprise is preferable to the manager to a for-profit or a non-profit. ■

Proof of Proposition 3: $S^{FP}(\Gamma, \gamma^M) = S^{NP}(\Gamma, \gamma^M)$ is equivalent to the value of $\gamma^F = \Gamma_{FP}$ that solves $\phi(A + \pi, \lambda) = \gamma^F \bar{\theta} \hat{e}(\lambda [A + \gamma^M \bar{\theta}]) + \phi(A + \gamma^M \bar{\theta}, \lambda)$. This is equivalent to

$$\begin{aligned} & \lambda(A + \pi) \hat{e}((A + \pi)\lambda) - c(\hat{e}((A + \pi)\lambda)) \\ &= \lambda(\gamma^F \bar{\theta} + A + \gamma^M \bar{\theta}) \hat{e}(\lambda(A + \gamma^M \bar{\theta})) - c(\hat{e}((A + \gamma^M \bar{\theta})\lambda)). \end{aligned}$$

To minimize notation we set $\lambda = 1$ in the subsequent analysis so that we have:

$$(A + \pi) \hat{e}(A + \pi) - c(\hat{e}(A + \pi)) = (A + \gamma^F \bar{\theta} + \gamma^M \bar{\theta}) \hat{e}(A + \gamma^M \bar{\theta}) - c(\hat{e}(A + \gamma^M \bar{\theta})). \quad (8)$$

It is straightforward to verify that $\Gamma'(\gamma^M) < 0$: totally differentiating (8), we get

$$\frac{d\gamma^F}{d\gamma^M} = -1 - \bar{\theta} \gamma^F \frac{\hat{e}'(A + \gamma^M \bar{\theta})}{\hat{e}(A + \gamma^M \bar{\theta})} < 0.$$

For $\gamma^M = 0$, the right-hand side of (8) is lower than the left-hand side at $\gamma^F \bar{\theta} = \pi$, and therefore, $\Gamma(0) > \frac{\pi}{\bar{\theta}}$, which lies between $\underline{\gamma}$ and $\bar{\gamma}$. At $\gamma^M = \underline{\gamma}$, $\gamma^M \bar{\theta} = \pi \frac{\bar{\theta}}{\theta_h} < \pi$ and therefore, at $\gamma^F \bar{\theta} + \gamma^M \bar{\theta} = \pi$, the left hand side is larger. Therefore, the two sides can be equal only if γ^F exceeds some minimum threshold, given by $\Gamma(\underline{\gamma}) > \left(\pi - \pi \frac{\bar{\theta}}{\theta_h}\right) \frac{1}{\bar{\theta}}$.

Also, as $\Gamma'(\gamma^M) < 0$, and $\Gamma(0) > \Gamma(\underline{\gamma}) > 0$, $\Gamma(\gamma^M) > 0$ for all $\gamma^M \in [0, \underline{\gamma}]$. Therefore, we find that in the parameter range $\gamma^M \leq \underline{\gamma}$, both FP and NP can

dominate depending on parameter values. In particular, for any given level of manager motivation γ^M , there is a level of founder motivation $\Gamma(\gamma^M)$ such that for $\gamma^F \geq \Gamma(\gamma^M)$ NP dominates FP. $\Gamma(\gamma^M)$ is strictly negatively sloped, with $\Gamma(0) > \frac{\pi}{\bar{\theta}}$ and $\Gamma(\underline{\gamma}) > \left(1 - \frac{\bar{\theta}}{\theta_h}\right) \frac{\pi}{\bar{\theta}}$. Notice that $\frac{\pi}{\bar{\theta}} > \left(1 - \frac{\bar{\theta}}{\theta_h}\right) \frac{\pi}{\bar{\theta}}$.

Now we turn to the parameter range $\gamma^M \in (\underline{\gamma}, \bar{\gamma})$. For this parameter range,

$$v(\gamma^M) = q\gamma^M\theta_h + (1-q)\pi.$$

Also, $v(\gamma^M) > \max\{\gamma^M\bar{\theta}, \pi\}$ for $(\underline{\gamma}, \bar{\gamma})$. At $\gamma^M = \underline{\gamma}$, $v(\gamma^M) = \pi > \gamma^M\bar{\theta}$ and at $\gamma^M = \bar{\gamma}$, $v(\gamma^M) = \gamma^M\bar{\theta} > \pi$. Once again setting $\lambda = 1$, $S^{SE}(\Gamma, \gamma^M) = S^{NP}(\Gamma, \gamma^M)$ is equivalent to $\gamma^F = \Gamma_{SE}$ solving:

$$\gamma^F q\theta_h \hat{e}(A + v(\gamma^M)) + \phi(A + v(\gamma^M)) = \gamma^F \bar{\theta} \hat{e}(A + \gamma^M \bar{\theta}) + \phi(A + \gamma^M \bar{\theta})$$

or,

$$\begin{aligned} & (A + v(\gamma^M) + \gamma^F q\theta_h) \hat{e}(A + v(\gamma^M)) - c(\hat{e}(A + v(\gamma^M))) \\ &= (A + \gamma^F \bar{\theta} + \gamma^M \bar{\theta}) \hat{e}(A + \gamma^M \bar{\theta}) - c(\hat{e}(A + \gamma^M \bar{\theta})). \end{aligned} \quad (9)$$

Observe that $\gamma^F q\theta_h < \gamma^F \bar{\theta}$, i.e., the non-pecuniary payoff received by the founder is always lower under a SE than a NP, since the SE chooses a commercial action when $s = l$. However, the effort under a SE is higher than that of a NP, as $v(\gamma^M) \geq \gamma^M \bar{\theta}$ with the strict equality holding only for $\gamma^M = \bar{\gamma}$. This is the key trade off between a SE and a NP.

For $\gamma^M = \underline{\gamma}$, $v(\gamma^M) = \pi > \gamma^M \bar{\theta}$. Therefore, a SE strictly dominates a FP. Therefore, the critical level of γ^F such that a NP dominates a SE, has to be higher than the one for a FP, namely, $\Gamma(\underline{\gamma})$. In particular, consider the threshold

$$(\gamma^F + \underline{\gamma})\theta_l = \pi$$

(which is consistent with $\underline{\gamma}\theta_l < \pi$). For this value, $\gamma^F \bar{\theta} + \underline{\gamma}\bar{\theta} = (\gamma^F + \underline{\gamma})q\theta_h + (1-q)\pi$ and the total payoff conditional on success is the same under a NP and a SE, but the effort level is higher under a SE. Therefore, $\Gamma_{SE}(\underline{\gamma}) > \bar{\gamma} - \underline{\gamma} > \left(\pi - \pi \frac{\bar{\theta}}{\theta_h}\right) \frac{1}{\bar{\theta}} > 0$. For $\gamma^M = \bar{\gamma}$, $v(\gamma^M) = \gamma^M \bar{\theta}$. Therefore, the effort level is the same under a SE and a NP, and therefore, for any $\gamma^F > 0$, a NP must dominate. At $\gamma^F = 0$ they yield the same surplus.

Observe that

$$\Gamma'_{SE}(\gamma^M) = -1 \cdot \frac{\phi(A + v(\gamma^M)) - \phi(A + \gamma^M \bar{\theta})}{[\bar{\theta} \hat{e}(A + \gamma^M \bar{\theta}) - q\theta_h \hat{e}(A + v(\gamma^M))]^2} \cdot \frac{\partial [\bar{\theta} \hat{e}(A + \gamma^M \bar{\theta}) - q\theta_h \hat{e}(A + v(\gamma^M))]}{\partial \gamma^M}$$

using the envelope theorem. As $v(\gamma^M) > \gamma^M \bar{\theta}$ for $\gamma^M \in [\underline{\gamma}, \bar{\gamma}]$, by Proposition 1, $\phi(A + v(\gamma^M)) > \phi(A + \gamma^M \bar{\theta})$. Also,

$$\frac{\partial [\bar{\theta} \hat{e}(A + \gamma^M \bar{\theta}) - q\theta_h \hat{e}(A + v(\gamma^M))]}{\partial \gamma^M} = (\bar{\theta})^2 \hat{e}'(A + \gamma^M \bar{\theta}) - (q\theta_h)^2 \hat{e}'(A + v(\gamma^M)).$$

So $\Gamma'_{SE}(\gamma^M) < 0$ for $\gamma^M \in [\underline{\gamma}, \bar{\gamma}]$ if $\hat{e}'(z) > \hat{e}'(z^*)$ whenever $z^* > z$, that is, $\hat{e}(z)$ is concave. To see when this is true, observe that

$$\hat{e}'(z) = \frac{1}{c''(\hat{e}(z))}.$$

Hence it will hold whenever $c'''(e) > 0$. Therefore, $\Gamma'_{SE}(\gamma^M) < 0$. As $\Gamma_{SE}(\underline{\gamma}) > 0 = \Gamma_{SE}(\bar{\gamma})$ this shows that $\Gamma_{SE}(\gamma^M) > 0$ for all $\gamma^M \in [\underline{\gamma}, \bar{\gamma}]$. ■

Proof of Proposition 4: Our assumptions on the fraction of each type implies that all the surplus will accrue to managers. Both $S^{NP}(\gamma^F, \gamma^M)$ and $S^{SE}(\gamma^F, \gamma^M)$ have a positive cross-partial derivative with respect to γ^M and γ^F . Also, $S^{FP}(\gamma^F, \gamma^M)$ is independent of γ^F and γ^M and therefore, is weakly supermodular. However, the maximum of these supermodular functions is not necessarily supermodular. We proceed to prove positive assortative matching using the following steps:

Step 1: Consider a function $f(\gamma^F, \gamma^M)$ that is increasing in both arguments. Suppose it is strictly supermodular, i.e.,

$$f(\gamma_a^F, \gamma_a^M) + f(\gamma_b^F, \gamma_b^M) > f(\gamma_a^F, \gamma_b^M) + f(\gamma_b^F, \gamma_a^M)$$

whenever $\gamma_a^F > \gamma_b^F$ and $\gamma_a^M > \gamma_b^M$. Define a function $g(\gamma^F, \gamma^M) = \max\{f(\gamma^F, \gamma^M), C\}$ where C is a constant. We show that $g(\gamma^F, \gamma^M)$ is weakly supermodular and strictly so for $C < \max\{f(\gamma_a^F, \gamma_b^M), f(\gamma_b^F, \gamma_a^M)\}$. As $f(\gamma^F, \gamma^M)$ is increasing in both arguments, the result is trivially true if $C > f(\gamma_a^F, \gamma_a^M)$ or $C < f(\gamma_b^F, \gamma_b^M)$. Therefore, consider the case where

$$C \in [f(\gamma_b^F, \gamma_b^M), f(\gamma_a^F, \gamma_a^M)].$$

Then

$$g(\gamma_a^F, \gamma_a^M) + g(\gamma_b^F, \gamma_b^M) = f(\gamma_a^F, \gamma_a^M) + C.$$

As

$$f(\gamma_a^F, \gamma_a^M) \geq \max\{f(\gamma_a^F, \gamma_b^M), f(\gamma_b^F, \gamma_a^M), C\}$$

and

$$f(\gamma_a^F, \gamma_a^M) + C \geq f(\gamma_a^F, \gamma_a^M) + f(\gamma_b^F, \gamma_b^M) > f(\gamma_a^F, \gamma_b^M) + f(\gamma_b^F, \gamma_a^M)$$

the result follows. Suppose $C < \max\{f(\gamma_a^F, \gamma_b^M), f(\gamma_b^F, \gamma_a^M)\}$. Then we show that $g(\gamma^F, \gamma^M)$ is strictly supermodular. There are three cases to consider: (i) $f(\gamma_a^F, \gamma_b^M) > C > f(\gamma_b^F, \gamma_a^M)$. Then $g(\gamma_a^F, \gamma_b^M) + g(\gamma_b^F, \gamma_a^M) = f(\gamma_a^F, \gamma_b^M) + C < f(\gamma_a^F, \gamma_a^M) + C = g(\gamma_a^F, \gamma_a^M) + g(\gamma_b^F, \gamma_b^M)$; (ii) $f(\gamma_b^F, \gamma_a^M) > C > f(\gamma_a^F, \gamma_b^M)$ for which the proof is

similar to (i); (iii) $\min \{f(\gamma_b^F, \gamma_a^M), f(\gamma_a^F, \gamma_b^M)\} > C$ then $g(\gamma_a^F, \gamma_b^M) + g(\gamma_b^F, \gamma_a^M) = f(\gamma_a^F, \gamma_b^M) + f(\gamma_b^F, \gamma_a^M) < f(\gamma_a^F, \gamma_a^M) + f(\gamma_b^F, \gamma_b^M) < g(\gamma_a^F, \gamma_a^M) + C = g(\gamma_a^F, \gamma_a^M) + g(\gamma_b^F, \gamma_b^M)$. A direct corollary of Step 1 is, that $\max\{S^{SE}, S^{FP}\}$ and $\max\{S^{NP}, S^{FP}\}$ are weakly supermodular, and strictly so for particular cases (which arise later in the proof).

Step 2: Consider the pair (γ_a^F, γ_a^M) and (γ_b^F, γ_b^M) . Suppose $\gamma_a^F > \gamma_b^F$ and $\gamma_a^M > \gamma_b^M$. Then $S^{NP}(\gamma_a^F, \gamma_a^M) - S^{NP}(\gamma_a^F, \gamma_b^M) > S^{SE}(\gamma_a^F, \gamma_a^M) - S^{SE}(\gamma_a^F, \gamma_b^M)$ where $\gamma_a^M, \gamma_b^M \in (\underline{\gamma}, \bar{\gamma})$. From the proof of Proposition 3, $\frac{\partial^2(S^{NP}-S^{SE})}{\partial\gamma^F\partial\gamma^M} > 0$. Therefore, $\frac{\partial(S^{NP}-S^{SE})}{\partial\gamma^M} > \frac{\partial(S^{NP}-S^{SE})}{\partial\gamma^M} \Big|_{\gamma^F=0} = \bar{\theta}\hat{e}(A + \gamma^M\bar{\theta}) - q\theta_h\hat{e}(A + v(\gamma^M)) = (1-q)\theta_l\hat{e}(A + \gamma^M\bar{\theta}) - q\theta_h[\hat{e}(A + v(\gamma^M)) - \hat{e}(A + \gamma^M\bar{\theta})]$. We want to show this is positive. From the proof of Proposition 3, $\hat{e}(z)$ is increasing and concave. Therefore $\hat{e}(A + v(\gamma^M)) - \hat{e}(A + \gamma^M\bar{\theta}) < [v(\gamma^M) - \gamma^M\bar{\theta}]\hat{e}'(A + \gamma^M\bar{\theta}) = (1-q)(\pi - \theta_l\gamma^M)\hat{e}'(A + \gamma^M\bar{\theta})$. For our proof, it is sufficient to show that $q\theta_h(\pi - \theta_l\gamma^M)\hat{e}'(A + \gamma^M\bar{\theta}) < \theta_l\hat{e}(A + \gamma^M\bar{\theta})$ for all $\gamma^M \in (\underline{\gamma}, \bar{\gamma})$. The left-hand side is decreasing in γ^M while the right-hand side is increasing and so it is sufficient to show that $q\theta_h(\pi - \theta_l\underline{\gamma})\hat{e}'(A + \underline{\gamma}\bar{\theta}) < \theta_l\hat{e}(A + \underline{\gamma}\bar{\theta})$ which follows from assumption in the statement of the proposition (namely, $\hat{e}(A + \underline{\gamma}\bar{\theta}) < \frac{(A+\underline{\gamma}\bar{\theta})\theta_l}{\pi q(\theta_h - \theta_l)}$) given that that $\underline{\gamma} = \frac{\pi}{\theta_h}$. A similar proof holds to establish the inequality $S^{NP}(\gamma_a^F, \gamma_a^M) - S^{NP}(\gamma_b^F, \gamma_a^M) > S^{SE}(\gamma_a^F, \gamma_a^M) - S^{SE}(\gamma_b^F, \gamma_a^M)$. So far in the proof of Step 2 we considered only $\gamma^M \in (\underline{\gamma}, \bar{\gamma})$. We can extend this argument to the case where $\gamma_b^M < \underline{\gamma}$ while $\gamma_a^M \in (\underline{\gamma}, \bar{\gamma})$ and this would be needed in the proof of case 1 below. This is done by noting that $S^{SE}(\gamma_a^F, \gamma_b^M) = S^{SE}(\gamma_a^F, \underline{\gamma})$ while $S^{NP}(\gamma_a^F, \gamma_b^M) < S^{NP}(\gamma_a^F, \underline{\gamma})$. Therefore, $S^{NP}(\gamma_a^F, \gamma_a^M) - S^{NP}(\gamma_a^F, \gamma_b^M) > S^{NP}(\gamma_a^F, \gamma_a^M) - S^{NP}(\gamma_a^F, \underline{\gamma}) > S^{SE}(\gamma_a^F, \gamma_a^M) - S^{SE}(\gamma_a^F, \underline{\gamma}) = S^{SE}(\gamma_a^F, \gamma_a^M) - S^{SE}(\gamma_a^F, \gamma_b^M)$.

We now proceed to prove that the unique matching equilibrium involves positive assortative matching, i.e., a type f_τ founder ($\tau = 0, 1, 2$) matches with a type m_κ ($\kappa = 0, 1, 2$) manager where $\tau = \kappa$ and some type f_0 founders remain unmatched. Suppose not, and if possible let there be at least one non-assortative match. Since type m_0 managers are scarce relative to type f_0 founders, therefore, we cannot have a non-assortative match such that a type m_0 manager is unmatched. There can be three possible types of non-assortative matches:

Case 1: A type m_0 manager can be matched to a type f_2 (or f_1) founder, and a type m_2 (or m_1) manager to a type f_0 principal. If there is a non-assortative match (f_0, m_2) would be a NP and (f_2, m_0) would be a NP or FP. As $\max\{S^{NP}, S^{FP}\}$ is strictly supermodular, the non-assortative match is not stable. If they are re-matched assortatively, i.e, (f_0, m_0) and (f_2, m_2) , these would be a FP and a NP respectively. Next consider a possible non-assortative match (f_0, m_1) and (f_1, m_0) . We know (f_0, m_1) would be a SE, but (f_1, m_0) could be a FP or a NP and (f_1, m_1) could be a NP or a SE. These generates four possible cases, of which (f_1, m_0) being a FP and (f_1, m_1) being a SE is easy to deal with by the supermodularity of $\max\{S^{SE}, S^{FP}\}$

(by Step 1). Let us consider the case where (f_1, m_0) and (f_1, m_1) are both NPs. Then we want to show:

$$S^{NP}(\gamma_1^F, \gamma_1^M) - S^{NP}(\gamma_1^F, \gamma_0^M) > S^{SE}(\gamma_0^F, \gamma_1^M) - S^{FP}(\gamma_0^F, \gamma_0^M).$$

Notice that $S^{FP}(\gamma_0^F, \gamma_0^M) = S^{SE}(\gamma_0^F, \gamma_0^M)$. The result follows as

$$S^{NP}(\gamma_1^F, \gamma_1^M) - S^{NP}(\gamma_1^F, \gamma_0^M) > S^{SE}(\gamma_1^F, \gamma_1^M) - S^{SE}(\gamma_1^F, \gamma_0^M)$$

by Step 2 above, and

$$S^{SE}(\gamma_1^F, \gamma_1^M) - S^{SE}(\gamma_1^F, \gamma_0^M) > S^{SE}(\gamma_0^F, \gamma_1^M) - S^{SE}(\gamma_0^F, \gamma_0^M)$$

by the supermodularity of S^{SE} . Next consider the case where (f_1, m_0) is a NP and (f_1, m_1) is a SE. Then we want to show

$$S^{SE}(\gamma_1^F, \gamma_1^M) - S^{NP}(\gamma_1^F, \gamma_0^M) > S^{SE}(\gamma_0^F, \gamma_1^M) - S^{FP}(\gamma_0^F, \gamma_0^M).$$

This is true as

$$S^{NP}(\gamma_1^F, \gamma_1^M) - S^{NP}(\gamma_1^F, \gamma_0^M) > S^{SE}(\gamma_0^F, \gamma_1^M) - S^{SE}(\gamma_0^F, \gamma_0^M)$$

by the argument above, and

$$S^{SE}(\gamma_1^F, \gamma_1^M) - S^{NP}(\gamma_1^F, \gamma_0^M) > S^{NP}(\gamma_1^F, \gamma_1^M) - S^{NP}(\gamma_1^F, \gamma_0^M)$$

in this instance. The final sub-case is where (f_1, m_0) is a FP and (f_1, m_1) is a NP. Then we want to show

$$S^{NP}(\gamma_1^F, \gamma_1^M) - S^{FP}(\gamma_1^F, \gamma_0^M) > S^{SE}(\gamma_0^F, \gamma_1^M) - S^{FP}(\gamma_0^F, \gamma_0^M).$$

This follows from $S^{NP}(\gamma_1^F, \gamma_1^M) > S^{SE}(\gamma_1^F, \gamma_1^M)$ and given that $S^{SE}(\gamma_0^F, \gamma_1^M) > S^{NP}(\gamma_0^F, \gamma_1^M)$, the supermodularity of $\max\{S^{SE}, S^{FP}\}$.

Case 2: A type m_1 manager can be matched to a type f_2 founder, and a type m_2 manager to a type f_1 founder. We know that (f_2, m_2) and (f_1, m_2) would be a NP, but (f_2, m_1) could be a NP or a SE and (f_1, m_1) could be a NP or a SE. Obviously, if (f_1, m_1) is a NP then (f_2, m_1) would be a NP as well. Obviously, if all four organizational forms are NP, then assortative matching follows from the supermodularity of S^{NP} . Therefore, let us consider the two interesting cases, where we want to show, respectively:

$$S^{NP}(\gamma_2^F, \gamma_2^M) - S^{NP}(\gamma_1^F, \gamma_2^M) > S^{SE}(\gamma_2^F, \gamma_1^M) - S^{SE}(\gamma_1^F, \gamma_1^M)$$

and

$$S^{NP}(\gamma_2^F, \gamma_2^M) - S^{NP}(\gamma_2^F, \gamma_1^M) > S^{NP}(\gamma_1^F, \gamma_2^M) - S^{SE}(\gamma_1^F, \gamma_1^M).$$

The first one follows from the fact that S^{NP} is supermodular, i.e.,

$$S^{NP}(\gamma_2^F, \gamma_2^M) - S^{NP}(\gamma_1^F, \gamma_2^M) > S^{NP}(\gamma_2^F, \gamma_1^M) - S^{NP}(\gamma_1^F, \gamma_1^M)$$

and Step 2:

$$S^{NP}(\gamma_2^F, \gamma_1^M) - S^{NP}(\gamma_1^F, \gamma_1^M) > S^{SE}(\gamma_2^F, \gamma_1^M) - S^{SE}(\gamma_1^F, \gamma_1^M).$$

The second inequality follows from the fact that S^{NP} is supermodular, i.e.,

$$S^{NP}(\gamma_2^F, \gamma_2^M) - S^{NP}(\gamma_2^F, \gamma_1^M) > S^{NP}(\gamma_1^F, \gamma_2^M) - S^{NP}(\gamma_1^F, \gamma_1^M)$$

and $S^{NP}(\gamma_1^F, \gamma_1^M) < S^{SE}(\gamma_1^F, \gamma_1^M)$.

Case 3: A type m_0 manager is matched with a founder of type f_1 (or f_2), a type m_1 (or m_2) manager is matched to a type f_2 (or f_1) founder, and a type m_2 (or m_1) manager is matched to a type f_0 founder. We can repeat the types of arguments used above to show that a non-assortative match of the above kind is not stable. ■

Proof of Proposition 5: Suppose $\gamma^M \bar{\theta} = \pi$ so that the effort level under a non-profit is the same as in a for-profit. Clearly, overall surplus in a NP is lower, since the marginal social payoff from success is lower as $\gamma^F < 0$. In contrast, if $\gamma^F = 0$, then a non-profit and a for-profit will yield the same total surplus. Extending the argument, for any value of $\gamma^M > 0$, there exists a $\gamma^F < 0$ such that a for-profit dominates a non-profit. Similarly, for $\gamma^M = \underline{\gamma}$, $v(\gamma^M) = \pi$ and so for $\gamma^F = 0$, a for-profit and a social enterprise yield the same surplus, which is higher than that of a non-profit. But if $\gamma^F < 0$, a FP will dominate both. Therefore, for any $\gamma^M \in [\underline{\gamma}, \bar{\gamma}]$ such that a social enterprise dominates a non-profit and a for-profit for $\gamma^F \geq 0$, there exists a $\gamma^F < 0$ such that a for-profit will yield the highest surplus. ■

B Calibration Formulae

The formulae for total surplus in the constant elasticity case are:

$$\begin{aligned} S^{FP}(\gamma_i^M, \lambda) &= \underline{e}\pi + \frac{1}{1+\mu} [(\lambda_i)^\mu (A + \pi)^{1+\mu}], \\ S^{NP}(\gamma^F, \gamma_i^M, \lambda) &= \underline{e} [\gamma_i^M + \gamma^F] \bar{\beta}\pi + \frac{1}{1+\mu} [(\lambda_i)^\mu (A + \gamma_i^M \bar{\beta}\pi)^{1+\mu}] \\ &\quad + \gamma^F \bar{\beta} (\lambda_i)^\mu (A + \gamma_i^M \bar{\beta}\pi)^\mu \pi, \\ &\text{and} \\ S^{SE}(\gamma^F, \gamma_i^M, \lambda) &= \underline{e} [\sigma(\gamma_i^M) + \Sigma(\gamma_i^M, \gamma^F)] + \frac{1}{1+\mu} [(\lambda_i)^\mu (A + \sigma(\gamma_i^M))^{1+\mu}] \\ &\quad + \Sigma(\gamma_i^M, \gamma^F) (\lambda_i)^\mu (A + \sigma(\gamma_i^M))^\mu \end{aligned}$$

where:

$$\begin{aligned}\sigma(\gamma^M) &= \sum_{s \in \{\ell, h\}} \frac{\hat{x}(\gamma^M; s) \gamma^M \beta_s + [1 - \hat{x}(\gamma^M; s)]}{2} \pi \\ &\text{and} \\ \Sigma(\gamma^M, \gamma^F) &= \sum_{s \in \{\ell, h\}} \frac{\hat{x}(\gamma^M; s) \gamma^F \beta_s}{2} \pi.\end{aligned}$$

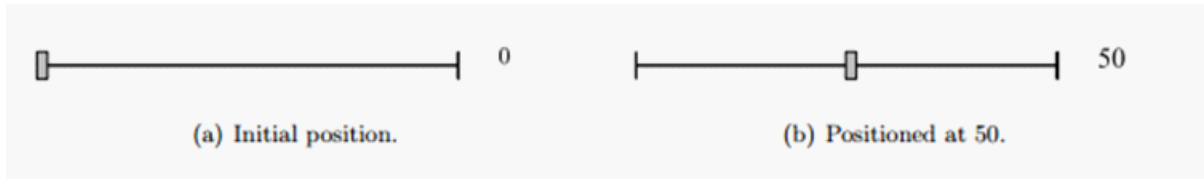
Then we can compute $\Gamma_{FP}(\gamma^M)$ as follows:

$$\Gamma_{FP}(\gamma_i^M) = \frac{\underline{e} [1 - \gamma_i^M \bar{\beta} \pi] + \frac{1}{1+\mu} [(\lambda_i)^\mu [-(A + \pi)^{1+\mu} - (A + \gamma_i^M \bar{\beta} \pi)^{1+\mu}]]}{[\underline{e} + (\lambda_i)^\mu \bar{\beta} (A + \gamma_i^M \bar{\beta} \pi)^\mu] \bar{\beta} \pi}$$

and $\Gamma_{SE}(\gamma^M)$ as follows:

$$\Gamma_{SE}(\gamma_i^M) = \frac{\underline{e} [\gamma_i^M \bar{\beta} \pi - \sigma(\gamma_i^M)] + \frac{1}{1+\mu} [(\lambda_i)^\mu [(A + \gamma_i^M \bar{\beta} \pi)^{1+\mu} - (A + \sigma(\gamma_i^M))^{1+\mu}]]}{\underline{e} \left[\frac{\hat{x}(\gamma^M; s) \beta_s}{2} - \bar{\beta} \right] + (\lambda_i)^\mu \left[\frac{\hat{x}(\gamma^M; s) \beta_s}{2} (A + \sigma(\gamma_i^M))^\mu - \bar{\beta} (A + \gamma_i^M \bar{\beta} \pi)^\mu \right] \pi}$$

which can be computed straightforwardly given values of the parameters as specified.



C Experiment Details

Stage 1 Stage 1 is several iterations of the ‘real effort’ task from Gill and Prowse (2012). In this task participants are faced with a computer screen of 48 ‘sliders’ (see diagram below) and have two minutes in order to change the position of as many as possible from initial position (a) into the correct central position (b).

The number of sliders correctly positioned is the effort outcome. Higher effort will result in a higher probability of ‘success’ and hence higher payoffs. Before each iteration of the task, we gave the payments associated with success and failure. If successful, the participants are told how much they have earned. Round 0 allowed the participant to practice positioning the sliders without any payoffs attached. During subsequent rounds, they were confronted with three possibilities:

1. (non-profit) success triggers a donation to charity which could be either high or low (greater than or less what they have earned) with equal probability. We described this as the "giving task".
2. (for-profit) their success gives them an amount that will be banked until the end of the game. We described this as the "earnings task".
3. (social enterprise) participants will choose between banking the money for themselves or making a charitable contribution (we will randomly make that contribution high or low with equal probability attached to each outcome). We described this as the "hybrid task".

In rounds 1-6, they were confronted with either 1 or 2, each for three rounds with the order being randomly assigned. In rounds 7-9, only option 3 was offered.

The round order for the tasks is as follows:

1. Participants were told the number of points available if successful.
 - (a) In the earnings task this is a number of points for the participant.
 - (b) In the giving task this is two possible donations to charity, both are equally likely but they only learn which one they are playing for after they have been successful.
 - (c) In the hybrid task this is the opportunity to choose between a number of points for themselves and one of two possible donations to charity. Both are equally likely, but they only learn which one they are playing for after they have been successful.

2. Participants play the slider game.
3. Based on the number of correctly-positioned sliders, whether participant has been successful is determined.
4. If successful, a reward is earned:
 - (a) In the earning task this is the number of points as stipulated in (1a).
 - (b) In the giving task this is a donation to charity depending on one of the two numbers of points as stipulated in (1b)
 - (c) In the hybrid task there is a choice between the number of points or the two possible donations specified in (1c).
5. Unsuccessful participants earned nothing and could make no donation to charity.

(In round 10, participants were asked to complete an additional iteration of the effort task from stage 1, with one modification: they will now be allowed to choose one of the organizations from Stage 1 to play again. However, we do not use that data in the in the paper as it does not correspond to the theoretical model of self-selection with endogenous wages.)

Stage 2 Questionnaire:

1. Personal Characteristics
 - (a) Age : 1="18-21"; 2="22-24"; 3="25-29"; 4="30-39"; 5="40+";
 - (b) gender : 0= "Male" 1= "Female"
 - (c) occupation : 0="Undergraduate Student"; 1="Postgraduate Student"; 2="Other Student"; 3="University Employee"; 4="Otherwise Employed"; 5="Unemployed, Retired or Otherwise Neither Working or Studying"
 - (d) nationality 0="British"; 1="other European"; 2="Middle Eastern"; 3="other African"; 4="Central Asian"; 5="South Asian"; 6="East Asian"; 7="Pacific"; 8="North American"; 9="South or Central American"; 10="Other";
 - (e) religion 0="Atheist/Agnostic"; 1="Christian"; 2="Muslim"; 3="Hindu"; 4="Jewish"; 5="Buddhist"; 6="Sikh"; 7="Other";
2. Volunteering
 - (a) "Have you done any volunteer or charity work in the last year?" 1="Yes"; 0="No"
 - (b) "Have you donated to charity in the last month?" 1="Yes"; 0="No"

- (c) "Do you belong to a political party?" 1="Yes"; 0="No"
- (d) "Did you vote in the last election you were eligible to vote in?" 1="Yes"; 0="No";

3. Hypothetical Games

- (a) Dictator Game: "Suppose you were given £10 pounds to split between yourself and an anonymous other person. How much would you give the other person? (They would never know who you were)." Choice set was values between 0=£0 to 10=£10 in £1 increments.
- (b) Receiver Game: "Suppose an anonymous partner had been given £10 to split between you and them. They chose to give you £1. You can reject their offer, in which case you both get nothing, or accept their offer, in which case you get to keep the £1 (and they keep £9). What would you do?" The possible answers were, 0="reject"; 1="accept";

4. Public Service Motivation: Answer to following questions on the Perry (1996) scale, measured from, 1="Strongly Disagree"; 5="Strongly Agree" (Reversed means that scale is reversed);

- (a) Attraction to Policy Making (5 items)
 - i. PSM 11 Politics is a dirty word. (Reversed)
 - ii. PSM 15 I respect public officials who can turn a good idea into law.
 - iii. PSM 22 Ethical behavior of public officials is as important as competence.
 - iv. PSM 27 The give and take of public policy making doesn't appeal to me. (Reversed)
 - v. PSM 31 I don't care much for politicians. (Reversed)
- (b) Commitment to the Public Interest (7 items)
 - i. PSM 7 People may talk about the public interest, but they are really concerned only about their self-interest.(Reversed)
 - ii. PSM 16 It is hard for me to get intensely interested in what is going on in my community. (Reversed)
 - iii. PSM 23 I unselfishly contribute to my community.
 - iv. PSM 30 Meaningful public service is very important to me.
 - v. PSM 34 I would prefer seeing public officials do what is best for the whole community even if it harmed my interests.
 - vi. PSM 37 An official's obligation to the public should always come before loyalty to superiors.
 - vii. PSM 39 I consider public service my civic duty.

(c) Social Justice (5 items)

- i. PSM 18 I believe that there are many public causes worth championing.
- ii. PSM 20 I do not believe that government can do much to make society fairer. (Reversed)
- iii. PSM 32 If any group does not share in the prosperity of our society, then we are all worse off.
- iv. PSM 33 I am willing to use every ounce of my energy to make the world a more just place.
- v. PSM 38 I am not afraid to go to bat for the rights of others even if it means I will be ridiculed.

(d) Civic Duty (7 items)

- i. PSM 14 When public officials take an oath of office, I believe they accept obligations not expected of other citizens.
- ii. PSM 21 I am willing to go great lengths to fulfil my obligations to my country.
- iii. PSM 25 Public service is one of the highest forms of citizenship.
- iv. PSM 28 I believe everyone has a moral commitment to civic affairs no matter how busy they are.
- v. PSM 29 I have an obligation to look after those less well off.
- vi. PSM 35 To me, the phrase "duty, honor, and country" stirs deeply felt emotions.
- vii. PSM 36 It is my responsibility to help solve problems arising from interdependencies among people.

(e) Compassion (8 items)

- i. PSM 2 I am rarely moved by the plight of the underprivileged. (Reversed)
- ii. PSM 3 Most social programs are too vital to do without.
- iii. PSM 4 It is difficult for me to contain my feelings when I see people in distress.
- iv. PSM 8 To me, patriotism includes seeing to the welfare of others.
- v. PSM 10 I seldom think about the welfare of people whom I don't know personally. (Reversed)
- vi. PSM 13 I am often reminded by daily events about how dependent we are on one another.
- vii. PSM 24 I have little compassion for people in need who are unwilling to take the first step to help themselves. (Reversed)
- viii. PSM 40 There are few public programs that I wholeheartedly support. (Reversed)

(f) Self-Sacrifice (8 items)

- i. PSM 1 Making a difference in society means more to me than personal achievements.
- ii. PSM 5 I believe in putting duty before self.
- iii. PSM 6 Doing well financially is definitely more important to me than doing good deeds. (Reversed)
- iv. PSM 9 Much of what I do is for a cause bigger than myself.
- v. PSM 12 Serving citizens would give me a good feeling even if no one paid me for it.
- vi. PSM 17 I feel people should give back to society more than they get from it.
- vii. PSM 19 I am one of those rare people who would risk personal loss to help someone else.
- viii. PSM 26 I am prepared to make enormous sacrifices for the good of society.

Stage 3 The participants were paid any money that they have banked at stage 1 or 2. A dice was rolled by the participant to determine which round they would be rewarded for. (Before receiving the payment, each participant was asked whether they wished to receive their banked earnings in round 10 as a cash payment or to donate it to charity.) To avoid stigma effects, the participants were assured that nobody among the participants would know what choice they made. All participants received an identical brown envelope containing either money or a thank you note and confirming the size of their total charitable donation.

Table 1: Effort Levels by Task

Round Type	Rounds 1-9
For Profit	21.58 (7.74)
Non-Profit	20.96 (7.74)
Social Enterprise	24.58 (7.80)
Total	22.37 (7.92)

Notes: The table gives the number of correctly positioned sliders in each two minute task for each kind of task. (Standard deviation in parentheses.)

Table 2: Effort, Choices and Payoffs by Round

Round Number	Effort	Keep as Earnings (percentage)	Average Payoff (π)
Round 1	18.60 (7.43)	-	1103.87 (877.03)
Round 2	19.48 (7.41)	-	1112.32 (877.03)
Round 3	21.62 (7.25)	-	1086.96 (876.29)
Round 4	22.78 (7.86)	-	1171.50 (875.88)
Round 5	22.37 (7.56)	-	1086.96 (876.29)
Round 6	22.77 (7.93)	-	1036.23 (872.60)
Round 7	23.86 (7.72)	87.20 (33.54)	1154.59 (876.62)
Round 8	24.40 (7.77)	85.28 (35.54)	1095.41 (876.62)
Round 9	25.48 (7.88)	86.58 (34.21)	1247.59 (868.47)

Notes: There are 207 observations per round. (Standard Deviation in parentheses.)

Table 3: Mission Choice

	Low β round ($\beta = 0.2$)	High β round ($\beta = 2$)
Keep as Earnings	212	192
Donate to Good Cause	20	44
Total	232	236

Notes: Data are from rounds six through nine where the participants could choose either to donate or keep their earnings. There were 207 participants but only 202 were successful with a total of 468 facing the mission choice decision out a maximum of 621 such cases.

Table 4: Effort

Variable	(1)	(2)	(3)	(4)	(5)
Non-Profit Round	-0.039*** (0.014)	-0.039*** (0.014)	-0.033 (0.021)	-0.039*** (0.014)	-0.038*** (0.015)
High π	-	0.043*** (0.017)	0.052** (0.021)	0.046*** (0.017)	0.017 (0.014)
High π x Non-profit Round	-	-	-0.011 (0.031)	-	-
Social Enterprise Round	-	-	-	-	0.057*** (0.016)
High π x Social Enterprise Round	-	-	-	-	-
ID Fixed Effects	Yes	Yes	Yes	Yes	Yes
Full Set of Round Fixed Effects	Yes	Yes	Yes	No	No
Restricted Round Effects	No	No	No	Yes	Yes
Rounds	Giving and Earning (Rounds 1-6)	Giving and Earning (Rounds 1-6)	Giving and Earning (Rounds 1-6)	Giving and Earning (Rounds 1-6)	Giving, Earning and Hybrid (Rounds 1-9)
R ²	0.99	0.99	0.99	0.99	0.99
Observations	1242	1242	1242	1242	1863

Notes: The data are for 207 participants over six effort rounds in columns (1) through (4) and nine effort rounds in columns (5) and (6). The dependent variable is the log of effort. Robust standard errors in parentheses: *** significant at 1%, ** significant at 5%. The restricted round effects include four dummy variables: for the first round, second round, third round and all subsequent rounds.

Table 5: Choosing to Donate in a Social Enterprise

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High β round ($\beta = 2$)	0.100*** (0.035)	0.090** (0.035)	0.094*** (0.035)	0.10*** (0.035)	0.089*** (0.034)	0.092*** (0.035)	0.129** (0.574)	0.121** (0.06)
Volunteer	-	0.086** (0.034)	-	-	-	-	-	-
Dictator	-	-	0.018** (0.007)	-	-	-	-	-
Receiver	-	-	-	-0.015 (0.056)	-	-	-	-
Attraction to Policy Making	-	-	-	-	0.054* (0.028)	-	-	-
Commitment to the Public Interest	-	-	-	-	0.089** (0.040)	-	-	-
Social Justice	-	-	-	-	-0.028 (0.038)	-	-	-
Civic Duty	-	-	-	-	-0.019 (0.036)	-	-	-
Compassion	-	-	-	-	0.040 (0.035)	-	-	-
Self-Sacrifice	-	-	-	-	-0.015 (0.040)	-	-	-
Perry Z-Score	-	-	-	-	-	0.012*** (0.004)	-	-
High π	-	-	-	-	-	-	-	-0.137*** (0.045)
ID Fixed Effects	No	No	No	No	No	No	Yes	Yes
R ²	0.02	0.04	0.04	0.02	0.06	0.05	0.53	0.55

Notes: The dependent variable is choosing to give the proceeds to charity in a social enterprise. Standard Errors (clustered on id) in parentheses: *** significant at 1%, ** significant at 5%, * significant at 10%. The number of observations in each regression is 468 with 202 distinct participants.

Figure 1: Cumulative Distribution of Effort by Round
(first six rounds)

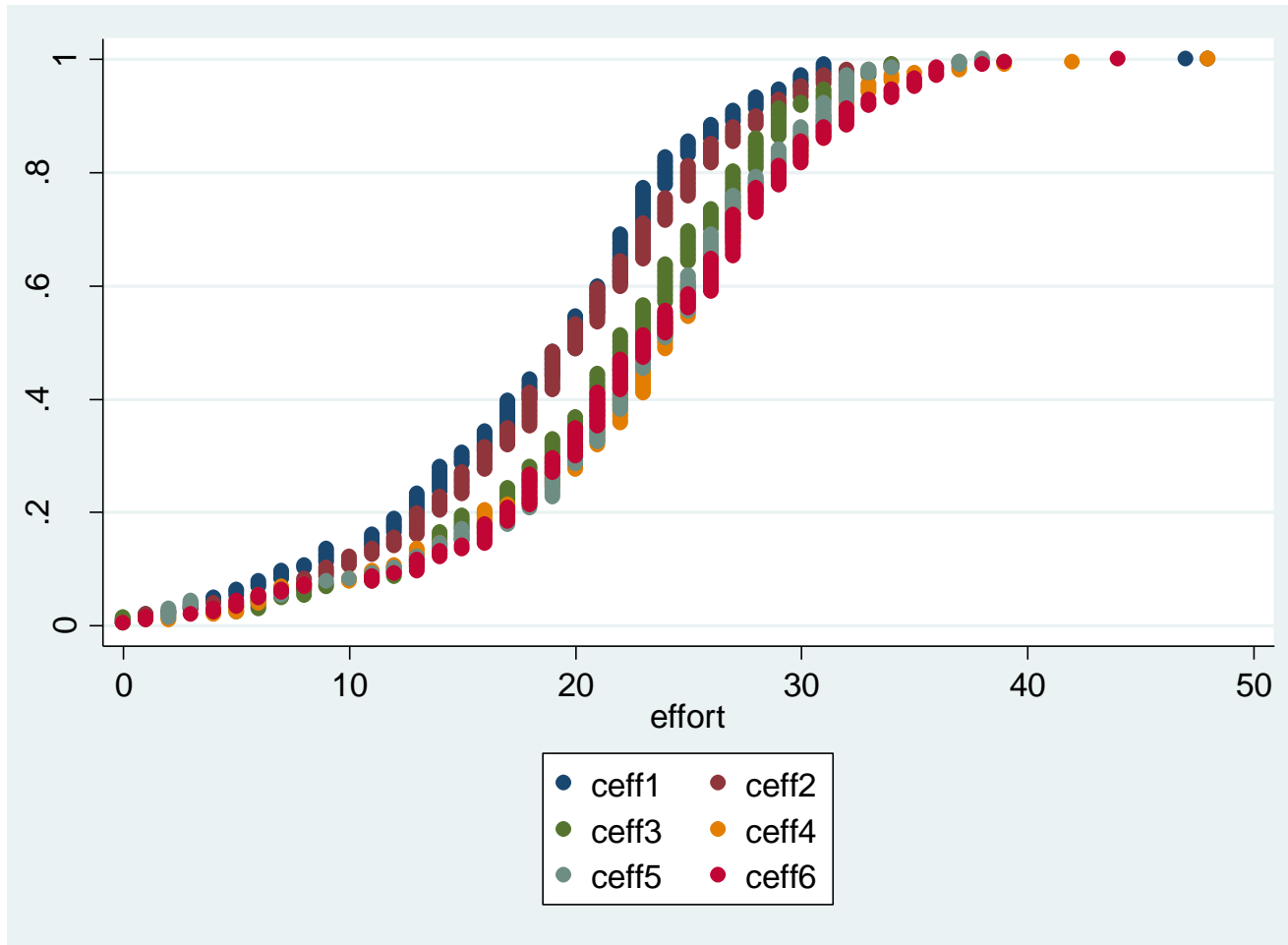


Figure 2: Non-profit versus Social Enterprise ($\gamma=1$)

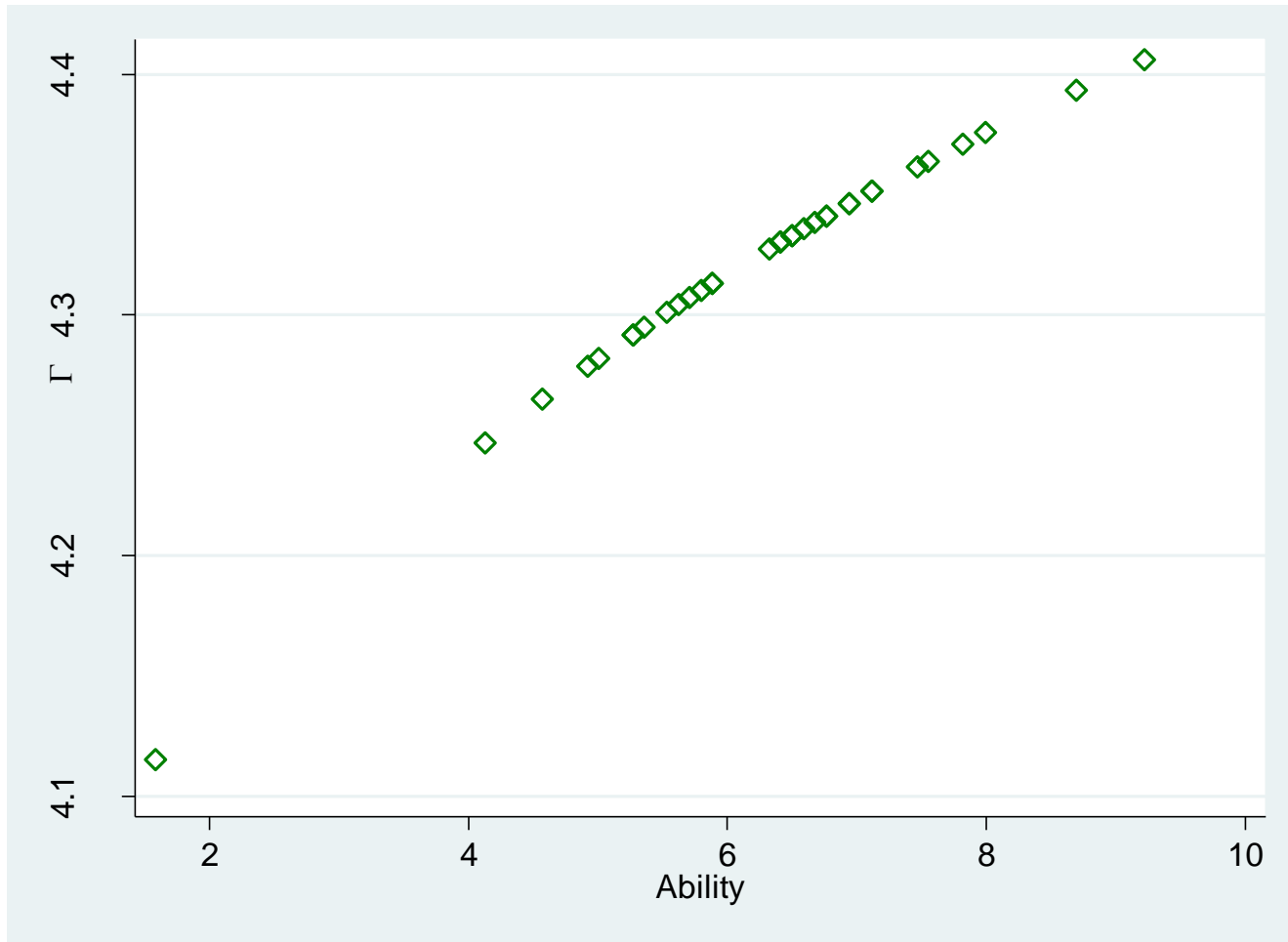


Figure 3: For-profit versus Non-Profit: Varying μ

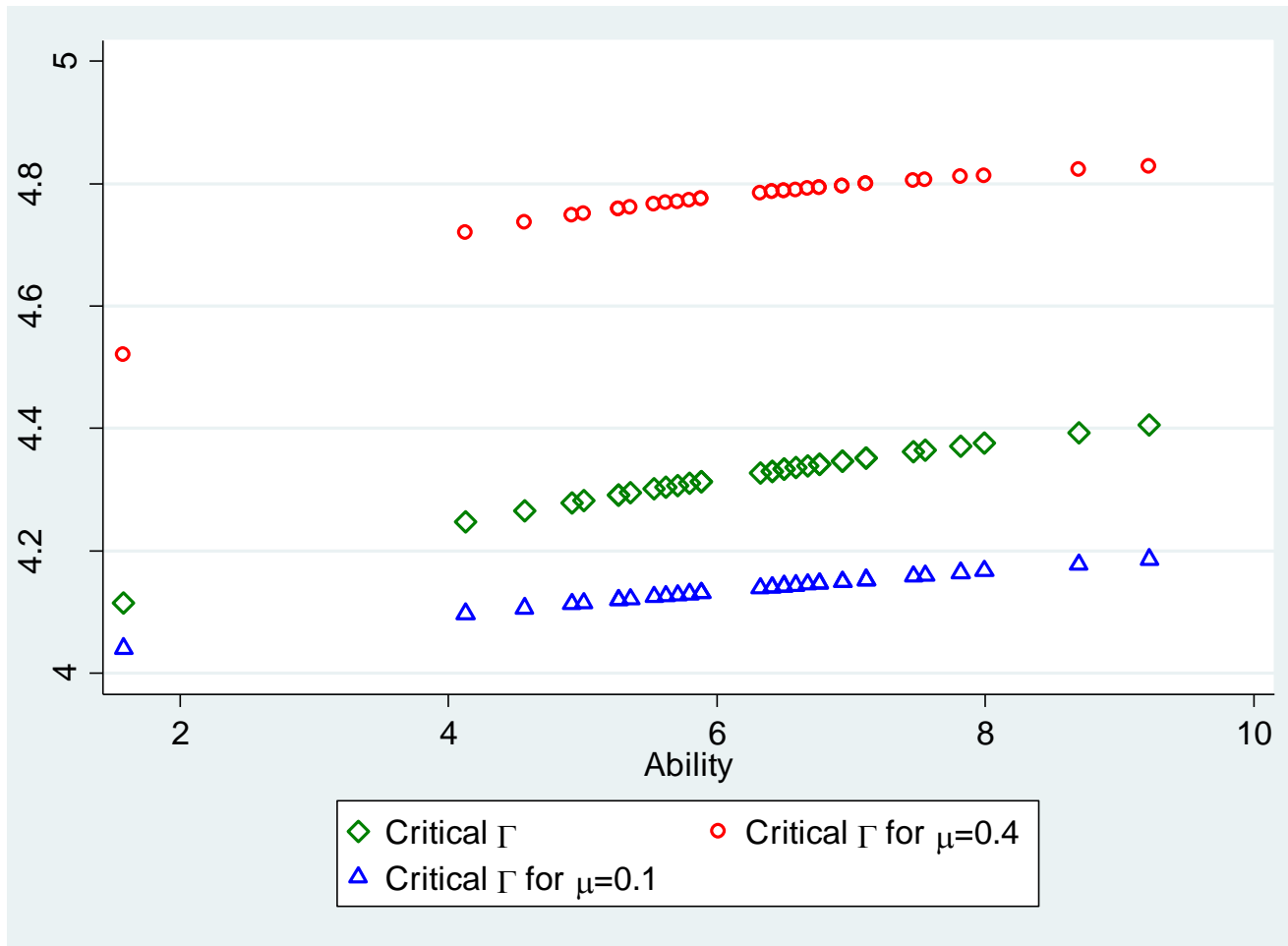


Figure 4: Non-profit versus Social Enterprise: Varying β_L

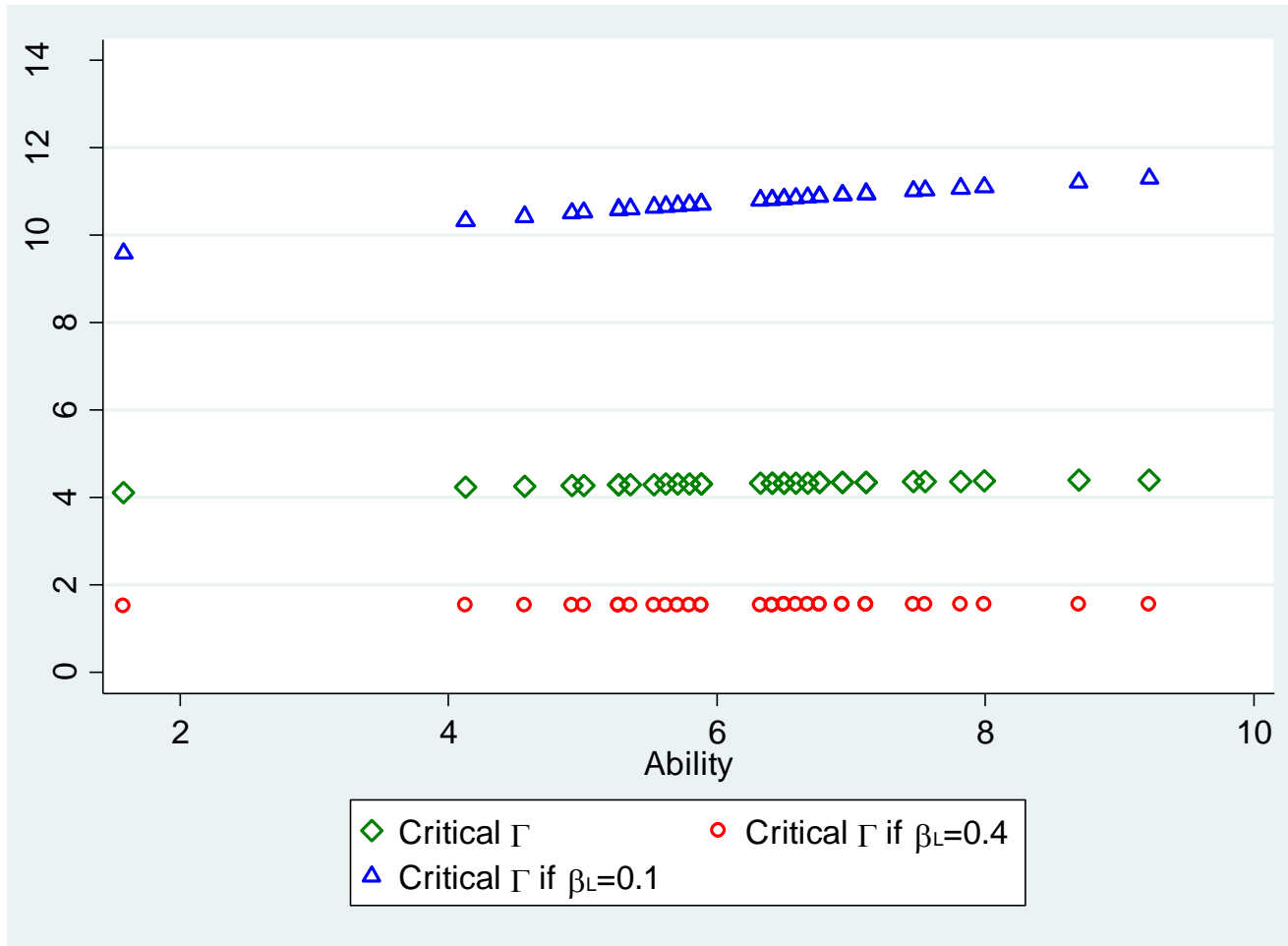


Figure 5: Non-profit versus Social Enterprise: Varying γ

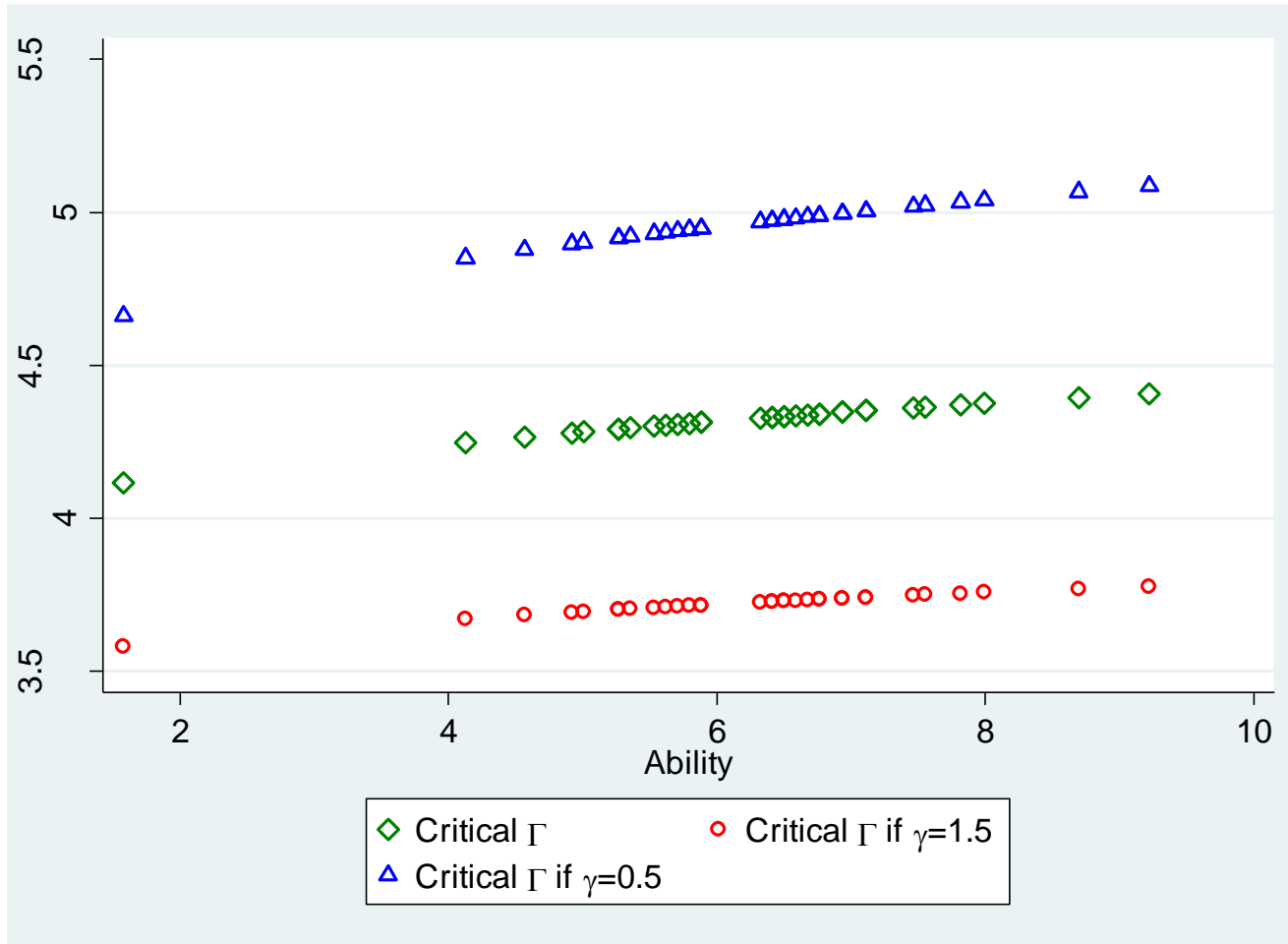


Figure 6: For-profit versus Non-Profit ($\gamma=0$)

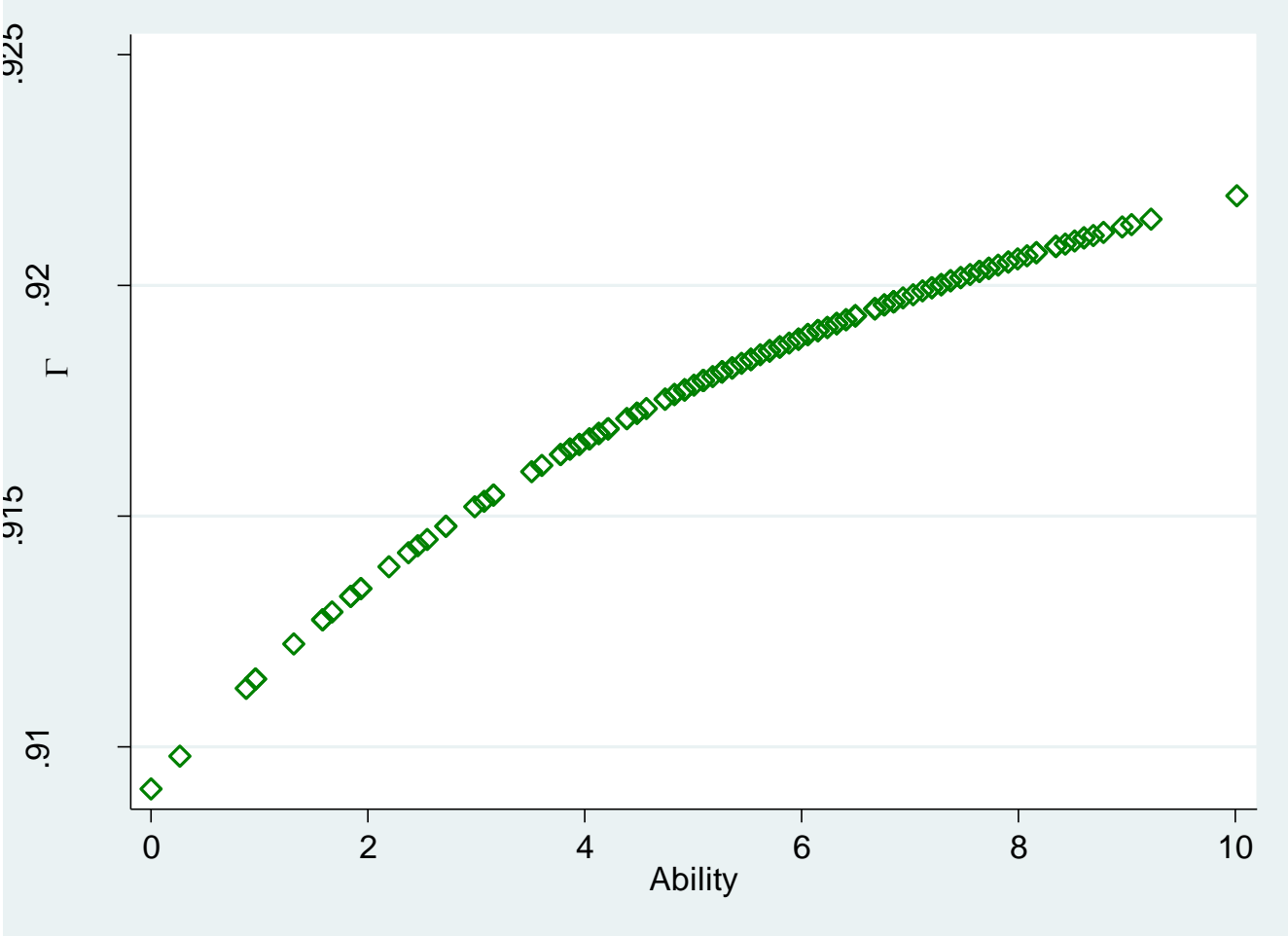


Figure 7: Non-profit versus Non-Profit: Varying μ

