#### Organizational Form, Prosocial Motivation and Provision of

**Public Services** 

by

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#### Abstract

This thesis is a collection of three essays that are concerned with the role of organizational form and intrinsic motivation in the delivery of public services.

The first essay revisits one of the most influential among the economic theories of nonprofit organizations, the "contractual failures" theory, which argues that consumers perceive nonprofit status – because of the constraint in the distribution of surpluses – as a commitment device, which ensures them against opportunistic behaviour in markets that are characterized by contractual incompleteness in the producer/consumer relationship. This paper questions the robustness of this theory by taking into account the role of reputation. The main result is that when reputations can be sustained, then for-profit status is the preferred organizational form and high quality services are ensured.

The second essay provides an explanation for the fact that nonprofit employers are uniquely able to attract volunteers with social concerns and career aspirations and for the related observation that nonprofits figure prominently in mission-related activities. Our theory is predicated on that nonprofit incorporation relaxes the incentive constraint that employers face when implicitly contracting with volunteers. The not-for-profit commitment is shown to be effective only in activities where producers, who can choose to be for-profit or nonprofit, care about the level or quality of the service being provided. Thus, in the equilibrium of the model developed here nonprofit entry in sectors where missions play a defining role and the hiring of volunteers arise endogenously due to economic forces. This equilibrium outcome has some desirable welfare properties.

The third essay, co-authored with Patrick Francois, provides a selective overview highlighting some major themes of the recent literature on the role of intrinsic motivation in the context of the provision of social services. We focus on how the presence of intrinsic motivation affects the design of optimal incentives, the selection of motivated agents, and how prosociality interacts with monetary rewards and organizational form. We also discuss some of the recent literature that addresses issues of organizational design for the provision of public services.

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## **Co-Authorship Statement**

Chapter 4 (Prosocial Motivation and the Provision of Social Services) was co-written with Professor Patrick Francois (UBC). My contribution to the production of this piece of research is outlined below.

- Identification of research program Shared responsibility with co-author.
- Design of research program Shared responsibility with co-author.
- Performing the research Shared responsibility with co-author.
- Manuscript preparation Shared responsibility with co-author.

### Chapter 1

## Introduction

The starting point and overarching motivation of this thesis emanates from an interest to understand the relative merits of alternative institutional arrangements – government agencies, nonprofit organizations, for-profit firms – in the delivery of public goods and services. Within this broader research agenda, this thesis attempts to contribute to our understanding of what determines the scope of nonprofit organizations and the allocation of economic activity between the for-profit and nonprofit sector. The motivation for an investigation into the economic forces that account for the existence of nonprofit organizations stems, partly, from the realization that these organizations are a large and growing part of most modern economies and yet they remain relatively under-researched.<sup>1</sup> As the relative size of the private nonprofit sector increases and its contribution to GDP and total employment rises, it seems increasingly appropriate to seek to understand the factors that shape the distribution of activity between the two sectors across countries and across time, the differences between the quality of services provided in commercial firms versus nonprofit organizations, and the social benefits and losses involved in favouring one institutional form over the other.

Even a casual observation of the sectoral concentration of nonprofit organizations in most developed countries suggests a salient pattern according to which this type of organizations tend to engage predominantly in the provision of healthcare, education, social and other mission-oriented services. Traditionally, in many countries, the government has been the key player in these sectors while the boundary line between the nonprofit and the public sector in some cases can be hard to draw, as some nonprofit institutions are strongly influenced by governments. Nevertheless, since the dominant pattern is for the government involvement as a direct service provider to wane, interest lies in developing a theoretical framework

<sup>&</sup>lt;sup>1</sup>For example, in Canada the GDP of the nonprofit sector was estimated at \$61.8 billion in 1999, accounting for 6.8% of the total economy. If the contribution of volunteers is also taken into account then the nonprofit sector's share of GDP increases to 8.5%. Equally impressive is the nonprofit sector's role as an employer, representing 13% of the country's nonagricultural employment.

that helps us appraise how should the responsibility for the ebbing government activity be replaced and divided among private alternatives (for-profit and nonprofit).

Though it may be comparatively easy to explain why some activities are associated with one and only one type of provider, the coexistence of organizations that appear to engage in similar activities yet operate under different ownership form is much harder to explain. For example, in the United States, the ownership of hospitals, schools, day care centres, nursing homes, museums and theatrical companies is shared between the nonprofit and for-profit sector. The persistent mix of ownership types across many industries poses a serious challenge to some of the existing theories of the neoclassical profit-maximizing firm. In particular, a valuable insight, emphasized by the property rights theory of the firm, is the importance of the residual claimant in monitoring inputs and organizing production efficiently.<sup>2</sup> The most distinctive feature of nonprofit organizations, is that they operate under a strict nondistribution constraint.<sup>3</sup> which stipulates that though the organization may earn surpluses no person has legal rights over them, instead any residuals have to be used for the advancement of the organization's mission or kept as endowment. While nonprofits do not have owners with residual rights, they do have boards of trustees or directors, which exercise control rights. Additionally, nonprofits face a set of state imposed legal and reporting constraints that maintain oversight over the nondistribution constraint – ensure that its managers and employees are not paid excessively.<sup>4</sup>

Nonprofit firms are often considered to be wasteful because presumably they face no pressure to maximize profits – in view of the lack of an owner with residual claim on profits. They are expected to exhibit higher costs and grant managerial perks. The presence of the nondistribution constraint is remarkable, given the importance attributed to the residual claimant in the literature on the property rights theory of the firm, and prompts the following questions for economic theory: Are there circumstances where the commitment to not having a residual claimant conveys a comparative institutional advantage for nonprofit provision of certain goods and services? Why would an entrepreneur contemplating entry in one of the mixed sectors, where for-profits can break even, found a nonprofit if the for-profit status were more cost efficient?

There have been some attempts to address such questions, in the economics literature, which have largely focused on justifying the existence of the nonprofit sector by reference to instances of failures of markets and governments.<sup>5</sup> One of the most influential among the economic theories of nonprofit organizations, the "contractual failures" theory, argues

 $<sup>^{2}</sup>$ See Alchian and Demsetz (1972) and Holmstrom and Milgrom (1994) for early and more recent statements respectively of this theory.

<sup>&</sup>lt;sup>3</sup>The first paper to emphasize this aspect of nonprofits is Hansmann (1980).

<sup>&</sup>lt;sup>4</sup>The effectiveness of oversight mechanisms in nonprofits varies. See Glaeser (2003), for a discussion of governance problems in nonprofits and a model of nonprofit capture by its elite workers.

<sup>&</sup>lt;sup>5</sup>Hansmann(1987) and Weisbrod (1988) survey early economic theories of nonprofit organizations while the articles in Anheier and Ben-Ner (2003) revisit older theories and introduce some more recent ones.

that consumers perceive nonprofit status – because of the constraint in the appropriation of surpluses – as a commitment device, which ensures them against opportunistic behaviour in markets that are characterized by contractual incompleteness in the producer/consumer relationship. In these markets, profit-taking firms have an incentive to skimp on quality in order to reduce costs and improve profitability. By removing or attenuating the profit incentive, nonprofit status is a signal that a firm will provide the non-contractible quality it promises, and thus in such circumstances consumers perceive them as more trustworthy.

The second chapter of this thesis titled "Quality, Reputation and the Choice of Organizational Form", revisits this theory, to question its robustness by taking into account the role of reputation. If for-profit firms can establish a reputation of not exploiting consumers – as they do in many service sectors where quality is unverifiable – then it is not clear whether nonprofit status is the most efficient protection mechanism against consumer exploitation. To investigate this possibility, the paper analyzes an entrepreneur's optimal choice of organizational form and service quality, when quality is noncontractible, in a repeated interaction framework. Four possible combinations of firm status (for-profit, nonprofit) and service quality (one-shot, reputation) can arise in equilibrium. The main result is that when reputations can be sustained, then for-profit status is the preferred organizational form and high quality services are ensured. This finding challenges the adequacy of the contractual failure hypothesis as an explanation of nonprofit organizations that generate most of their revenue from the sale of goods and services.

The next chapter of this thesis titled "Volunteer Hiring, Organizational Form and the Provision of Mission-Oriented Goods", is motivated by the observation that volunteering constitutes a considerably large and increasing share of the nonprofit sector's contribution to economic activity, in most advanced economies. For example, in 1997 the value of volunteer work amounted to roughly one-quarter of the total value of labour services provided to the nonprofit sector in Canada, while in the U.S. it reached one-third of total earnings in the sector.<sup>6</sup> Besides volunteering for altruistic reasons – a desire to help others or contribute to an important cause – there is a widespread belief that volunteering can be a stage in professional development by\ providing work experience and a chance to develop skills that strengthen employability. Volunteering offers some of the government: opportunities to receive valuable on-the-job training, discover hidden talents and interests, learn about possible career tracks, expand networks of contacts, and enrich one's resume. In many cases the potential is high for the transition to a paid position, especially in the nonprofit sector where volunteering experience appears to be a prerequisite for any type of career.

For those individuals whose motivation for volunteering includes the desire to acquire

<sup>&</sup>lt;sup>6</sup>The estimate for Canada is taken from the Satellite Account of Nonprofit Institutions and Volunteering of Statistics Canada, which is available at http://www.statcan.ca/english/freepub/13-015-XIE/13-015-XIE2004000.htm. For the U.S., see the New Nonprofit Almanac and Desk Reference, Table 1.7, pg 22-23.

professional skills that improve future earning capacity, it is not clear why they do not associate more often with for-profit employers. This chapter provides an explanation for the fact that nonprofit employers are uniquely able to attract volunteers with social concerns and career aspirations and for the related observation that nonprofits figure prominently in mission-related activities. Our theory is predicated on that – by committing to not distributing profits – nonprofit incorporation relaxes the incentive constraint that employers face when implicitly contracting with volunteers, without relying on ex ante differences in workers' preferences over the employer's identity or inherent asymmetries between nonprofit and for-profit providers. The not-for-profit commitment is shown to be effective only in activities where producers, who can choose to be for-profit or nonprofit, care about the level or quality of the service being provided. Thus, in the equilibrium of the model developed here nonprofit entry in sectors where missions play a defining role and the hiring of volunteers arise endogenously due to economic forces. The welfare analysis of the equilibrium suggests that it has some desirable properties.

The fourth chapter titled "Prosocial Motivation and the Delivery of Social Services", co-authored with Patrick Francois, provides a synthetic overview that highlights the major themes of the recent literature on the role of intrinsic motivation in the context of the provision of social services. We focus on the insights obtained from the two alternative ways of modelling pro-social motivation, action-oriented and output-oriented altruism, concerning the design of optimal incentives, the selection of motivated agents, and its interaction with monetary rewards and organizational form. We also discuss the implications for government provision of social services from the perspective of the literature that emphasizes the noncontractible nature of output and contrast it with the implications derived from the literature that emphasizes the role of intrinsic motivation. In addition to taking stock of what has been learnt so far we suggest a few directions for future work.

Chapter 5 provides a brief summary and offers some concluding remarks.

4

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### Chapter 2

# Quality, Reputation and the Choice of Organizational Form<sup>\*</sup>

#### 2.1 Introduction

The importance of the provision of high quality public services such as health, education, child care and care for the aged cannot be overstated.<sup>1</sup> Clearly, voters and consequently their elected representatives place a high value on these and improvements in these areas are given high priority in the social agenda of any modern society. However, several potential pathologies associated with the provision of such services have been recognized in the economics literature. In particular, one kind of market failure that has received considerable attention is the one induced by the high degree of information asymmetries between providers and consumers over the quality of these services. The problem arises when consummers are not as well informed about the quality of the service or when the quality of the service is difficult to measure and verify by third parties. In such circumstances, it is argued, service providers have an incentive to act opportunistically and take advantage of the ill-informed consumer. These informational problems are exacerbated by the fact that often the person that is consuming these services is not the person that is choosing them. An example from education would be that of the parent who chooses and pays for her child's schooling but is not the recipient of the services; moreover, the quality of the provided service may be hard to assess immediately because the potential deficiencies may only manifest themselves as the child grows up.<sup>2</sup>

<sup>\*</sup>A version of this chapter has been submitted for publication.

<sup>&</sup>lt;sup>1</sup>These services are often more accurately characterized as quasi-public goods, in that they yield both public and private benefits. Besides, the mere fact that the private sector is partly involved in the provision of these services, indicates that they fail to satisfy (or do not satisfy fully) one or both of the principal properties associated with pure public goods: non-rivalry and non-excludability.

<sup>&</sup>lt;sup>2</sup>This type of goods which are evaluated by experience, are commonly referred to as experience goods (see Nelson 1970).

In response to these informational problems, which following the literature we will refer to as "contractual failures", it has been suggested by some authors, starting with Hansmann (1980),<sup>3</sup> that nonprofit organizations are an effective solution because the low-powered incentives that permeate the structure of these organizations provide insurance to the consumer that she is not going to be exploited. In other words, what this theory argues is that nonprofit organizations act as a commitment mechanism for the provision of quality services in circumstances where quality is too costly to monitor.

Interestingly, Hart, Shleifer and Vishny (1997) use a similar rationale in an influential paper that analyzed the choice between in-house government provision of services and contracting out to private suppliers, when the quality of service the government requires cannot be fully specified. The conclusion that emerges from their analysis is that private provision is generally more cost efficient but may result in lower quality service because private suppliers have a stronger incentive to undertake cost reduction that adversely affects quality. In a recent formalization of the "contractual failure" idea, Glaeser and Shleifer (2001) apply the incomplete contracts framework of Hart et al. (1997) to study the choice of an entrepreneur between setting up a for-profit firm and a nonprofit organization. The prediction of their model is that when the benefit of commitment is high, that is, when consumers value quality highly and are willing to pay higher prices anticipating better quality, then nonprofit status is preferable, despite the fact that the entrepreneur is not the full claimant of profits, because it ensures softer incentives to skimp on quality.

This paper is motivated by the fact that in spite of its intuitive appeal, the contractual failure approach seems to have overlooked a potentially important issue, namely, that the relationship between purchaser and supplier is, in many cases, an on-going one. The on-going aspect of the relationship should allow reputation to emerge as another mechanism for maintaining high unverifiable quality.<sup>4</sup> Therefore, a potential limitation of the contractual failure argument is that it fails to take into account the interaction between reputations and the choice of organizational form or treats the two as orthogonal.

However, markets that involve unverifiable quality are exactly the ones that we would expect long-term relationships to predominate and reputation effects to matter. Specifically, the repeated feature of the interaction between producer and consumer seems particularly relevant in the case of public services, where the arrangement of services is of a continuing nature and it rarely entails a one-time exchange. A related shortcoming of this theory arises when one considers a salient pattern in the sectoral concentration of nonprofits. In particular, contractual failures cannot be reconciled with the observation that nonprofit

<sup>&</sup>lt;sup>3</sup>Other early studies of nonprofit organizations that emphasize the role of asymmetric information between producers and consumers are Easly and O'Hara (1983) and Weisbrod (1988).

<sup>&</sup>lt;sup>4</sup>Word of mouth is also a means of learning about the quality of the services of various providers. Therefore, reputation is not only valuable because of the multiple purchases by the same person, but also through the impact of this person's experience on his friends and family.

organizations tend to engage predominantly in the provision of health, education, social and other mission-oriented services and not other services where quality is equally unobservable and informational problems are acute – for example business, professional, legal services etc. – yet, only for-profit firms appear to have established themselves as quality providers of services in the latter. Thus, two related questions can be raised: (a) Is it possible for reputation mechanisms to work equally well in the provision of public services and ensure the supply of quality services by for-profit firms? (b)What factors determine when reputation is a sufficient consumer protection mechanism and when not, in which case nonprofit status is necessary to resolve failures associated with informational imperfections?

The purpose of this paper is to explicitly address these questions by studying the optimal choice of organizational status allowing reputation to act as an alternative commitment mechanism to nonprofit status for the provision of high quality services.<sup>5</sup> Our analysis builds on the Glaeser and Shleifer (2001) model because it captures the essence of the theory in a concise and formal way. A repeated game is the natural environment to study reputation effects. Therefore, we extend the one-shot framework to a setting of repeated interaction between the consumer and the provider of the service and establish conditions under which reputation is a sufficient mechanism for the provision of quality services by for-profit firms. The intuition is that the loss of reputation associated with delivering bad quality service implies a substantial loss of future profits for the for-profit firm and therefore when the entrepreneur is sufficiently forward-looking then the fear of foregoing future profits disciplines him to deliver high quality services. The idea that repeated purchases are a means of disciplining the producer to deliver high quality has been previously explored in the Industrial Organization literature.<sup>6</sup> The difference in our approach is that, besides quality, the choice of organizational form is endogenous and the interest is on what combination of type of firm and quality level will be optimally chosen in a dynamic set-up.

The main finding of this paper is that when reputations can be established, then forprofit status is the optimal choice of organization form and firms have an incentive to supply high quality services. Therefore, we believe that without dismissing the contractual failure hypothesis, the repeated-interaction version of the model restricts its explanatory power. Furthermore, we argue in section five that the model can be useful in explaining some empirical evidence from the U.S. and Canada on the quality differences between commercial and nonprofit child care centres. Finally, we believe the paper has some normative implications, in particular, on the debate over the soundness of policies that favour nonprofit organizations on the grounds that commercial firms cannot be trusted to deliver high quality service

<sup>&</sup>lt;sup>5</sup>Licensing is an alternative means of controlling the quality of the service which is arguably imperfect, because it sets only a minimum standard on the inputs used to provide the service and does not directly affect quality. For details on the impact of occupational licensing and certification on consumer welfare, see Shapiro (1986).

<sup>&</sup>lt;sup>6</sup>See for example Klein and Leffler (1981), Shapiro (1983), Tirole (1988) and more recently Horner (2002).

because of their interest to earn profits. There may be a number of good reasons<sup>7</sup> why governments should subsidize nonprofits but our analysis suggests that, in many sectors, overcoming contractual failures is not one of them.

The rest of the paper is organized as follows. The next section sets-up the basic oneperiod model of Glaeser and Shleifer and section three extends it to a multi-period setting. The fourth section analyzes the optimal choice of firm status in the repeated game. Section five discusses the predictions of the model and attempts to relate them to empirical evidence on the quality of child care centres across commercial and nonprofit providers in the U.S. and Canada. Finally, section six offers some concluding remarks.

#### 2.2 The One-Shot Game

In order to set a benchmark as well as establish some notation we introduce here the basic setup of the one-period Glaeser-Shleifer model. The model analyzes the optimal choice of organization from the perspective of a rational entrepreneur who contemplates entering an industry and decides on firm type in order to maximize utility.

The timing of events is as follows: First, the entrepreneur sells one unit of the good to a competitive market of consumers at price P, which is paid upfront. Consumers are willing to pay  $P_e = z - m(\hat{q} - q_e)$  for one unit of the good of expected unverifiable quality  $q_e$ , where  $(q_e = q_f)$  if the firm is for-profit and  $q_e = q_n$  if nonprofit), m is a parameter capturing the consumer's taste for unverifiable quality, and z,  $\hat{q}$  are constants. Then, the entrepreneur chooses what level of unverifiable quality q to produce and delivers it. The total cost of producing one unit of quality q is c(q), where c(.) satisfies the standard regularity conditions: it is twice differentiable with c'(q) > 0, c''(q) > 0, c(0) = 0, c'(0) = 0,  $c'(\infty) = \infty$ . The key assumption is that while q may be observable by the consumer, the final quality of the good cannot be verified by a third party and therefore the transaction is subject to contractual incompleteness.

Before any transactions take place, the entrepreneur decides whether to organize the firm as for-profit or nonprofit, denoted by f and n respectively, in order to maximize utility. Specifically, entrepreneurs maximize a quasilinear utility function:  $U_i = I - b(\hat{q} - q_i), i \in \{f, n\}$  where I is income, and b is a parameter measuring entrepreneurs' altruistic preferences or intrinsic care for quality, which is independent of the firm's legal status. When the entrepreneur is for-profit then income is equal to the profits the firm makes, while when he is nonprofit then he is subject to a nondistribution constraint, which implies that he cannot

<sup>&</sup>lt;sup>7</sup>Among the social benefits of nonprofit provision of public services one can single out the positive externalities associated with the acquisition of services such as education and childcare. Another important reason that a government may want to subsidize nonprofits is that they offer supplemental services to the ones that are publicly provided, which are tailored to the needs of consumers who are not satisfied with the quality of service that the government offers.

directly draw on the firm's profits. However, a fraction  $\delta$ ,  $\delta < 1$ , of the profits can accrue to the entrepreneur in the form of benefits such as less work hours, better working conditions etc.<sup>8</sup>

Entrepreneurs maximize utility by choosing quality  $(q_i)$ , while the price  $P_i$  is predetermined by consumer's expectation of quality. Thus, if they choose for-profit status their objective is:

$$\max_{q_f} U_f = P_f - c(q_f) - b(\hat{q} - q_f)$$
(2.1)

while if they choose nonprofit status:

$$\max_{q_n} U_n = \delta \left( P_n - c(q_n) \right) - b(\widehat{q} - q_n) \tag{2.2}$$

with  $\delta < 1$ . The optimal quality level of a for-profit entrepreneur is given by  $c'(q_f^s) = b$ , while a nonprofit entrepreneur chooses  $c'(q_n^s) = \frac{b}{\delta}$ . As an immediate consequence of the convexity of c(.) it follows that  $q_n^s > q_f^s$ , a nonprofit entrepreneur commits to higher quality, and consumers correctly anticipating this are willing to pay the associated higher price  $(P_n > P_f)$ .

Hence, the entrepreneur chooses nonprofit status if  $U_n > U_f$ , or:

$$\delta(z - m(\hat{q} - q_n^s) - c(q_n^s)) - b(\hat{q} - q_n^s) > z - m(\hat{q} - q_f^s) - c(q_f^s) - b(\hat{q} - q_f^s)$$
(2.3)

This inequality implies that there exists a cut-off level of consumer taste for non-contractible quality  $m^*$ , with

$$m^* = \frac{(1-\delta)z - (c(q_f^s) - \delta c(q_n^s)) - b(q_n^s - q_f^s)}{(1-\delta)\widehat{q} - q_f^s + \delta q_n^s}$$
(2.4)

below which all entrepreneurs choose for-profit status and above which they all choose nonprofit status.<sup>9</sup>

Thus, the one-shot analysis of the game predicts that markets for services where unverifiable quality is not valued by consumers will be dominated by for-profit firms, while nonprofit firms will provide services whose unverifiable quality is important for consumers. In what follows we extend the static model to a multi-period setting where consumers and entrepreneurs interact repeatedly.

<sup>&</sup>lt;sup>8</sup>One can think of the nondistribution constraint as a discount on the cash value of the entrepreneur's profits. That is, from the entrepreneur's perspective the restriction that residual earnings can only be consumed in kind, makes those earnings less valuable under not-for-profit status than they would have been under for-profit status. Moreover, this discount may vary with the constraints that the state imposes on the kind of perks nonprofits can grant to their managers.

<sup>&</sup>lt;sup>9</sup>Note that for  $m > \overline{m} = \frac{\delta(z-c(q_n^s)-b(\widehat{q}-q_n^s))}{\delta(\widehat{q}-q_n^s)}$ , it is  $U_n = 0$  so the range of m over which nonprofit status

is preferable is bounded by  $\bar{m}$ . To rule out the degenerate case where nonprofit status is never optimal, we assume throughout that  $m^* < \bar{m}$ .

#### 2.3 The Repeated Game

Now suppose that there is infinitely repeated interaction between the consumer and the entrepreneur.<sup>10</sup> In the dynamic game, the consumer bases her purchasing decision on the firm's past behaviour, that is, based on the firm's "reputation". If the firm has built a reputation for producing high quality then the consumer will be willing to pay the associated price as long as the entrepreneur's past actions live up to his reputation. Thus, the entrepreneur can choose quality to maximize one-period utility internalizing the adverse effect that his choice of quality has on the price that the consumer is willing to pay, namely, he can choose first-best quality. However, the entrepreneur's promise of high quality is credible provided it is incentive compatible for him to commit to providing better quality. That is, the entrepreneur will choose to build and maintain a reputation for high quality if this strategy generates a discounted stream of payoffs that exceed the one-shot gains of cheating and being punished in future transactions. As might be expected, if entrepreneurs are sufficiently patient then the first-best outcome can be achieved under any ownership. In what follows we focus on (a) establishing and comparing the level of incentive compatible per-period payoffs, that can be supported using punishment strategies that entail reversion to the outcome of the one-shot game, under the two alternative organizational forms, and (b) on examining the possible configurations of firm status (for-profit, nonprofit) and quality (one-shot, reputation) that can occur in the infinite repetition of the stage game, for the different values of the discount factor  $\beta$  and the consumer taste for quality parameter m.

#### 2.3.1 For Profit Status

In each period the structure of the interaction is as follows. The entrepreneur chooses organizational form and the consumer pays upfront for the service. Then the entrepreneur makes his quality choice and delivers the service. The consumer observes the quality chosen by the entrepreneur and forms her beliefs about future quality. If the producer deviates from delivering promised quality he is punished in future interactions by the consumer agreeing to pay upfront only for one-shot quality.

As a first step we must now determine the first-best level of quality and the resulting utility that can be sustained in the repeated game. Formally, each period the for-profit entrepreneur maximizes the following objective:

$$\max_{q_f} U_f(q_f) = z - m(\hat{q} - q_f) - c(q_f) - b(\hat{q} - q_f)$$
(2.5)

<sup>&</sup>lt;sup>10</sup>The assumption that the firm is infinitely lived is important here. Behaviour that would be compatible with  $(IC_F)$  cannot arise if there is a final period to the firm's life because the unique subgame Nash equilibrium of that game would be for the firm to cheat. So, backward induction rules out behaviour that satisfies  $(IC_F)$  in a finitely repeated version of the game. In other words,  $(IC_F)$  can only be satisfied if at any period t, there is a positive probability that the game will continue into period t + 1.

Therefore, the utility maximizing choice of quality  $q_f^*(m)$ , satisfies:

$$c'(q_f^*(m)) = b + m \Rightarrow q_f^*(m) = c'^{-1}(b + m)^{11}$$
(2.6)

and  $\frac{dq_f^*(m)}{dm} = \frac{1}{c''(q_f^*(m))} > 0$ . Moreover, per-period utility in this case is given by:

$$U_f(q_f^*(m)) = z - m(\widehat{q} - q_f^*(m)) - c(q_f^*(m)) - b(\widehat{q} - q_f^*(m))$$
(2.7)

Note that the convexity of c(.) implies that  $q_f^*(m) > q_f^s$ , that is, the entrepreneur has an incentive to increase the quality of the good relative to what he offers in the one-shot game – indeed,  $q_f^*(m)$  maximizes total surplus – since he can extract all the surplus that is generated.

However, the first-best choice of quality  $(q_f^*(m))$  will be supported in equilibrium if and only if the discounted stream utility from adhering to honest behaviour exceeds the payoff stream from the deviating path. That is, incentive compatibility for the for-profit entrepreneur may be written as:

$$\begin{cases} \frac{1}{1-\beta}U_f(q_f^*(m)) \ge U_f^c(m) + \frac{\beta}{1-\beta} & U_f^s(m) & \text{if } 0 < m \le m^* \\ \frac{1}{1-\beta}U_f(q_f^*(m)) \ge U_f^c(m) + \frac{\beta}{1-\beta} & U_n^s(m) & \text{if } m^* < m \le \overline{m} \end{cases}$$
(*IC<sub>F</sub>*) (2.8)

where  $\beta \in (0, 1)$  is the discount factor and  $U_f^c(m) = z - m(\widehat{q} - q_f^*(m)) - c(q_f^s) - b(\widehat{q} - q_f^s)$ , is the utility the entrepreneur can attain if he deviates from offering the anticipated first-best level of quality and instead chooses the most profitable deviation which is to produce the one-shot utility maximizing choice of quality  $q_f^s$  (i.e.  $q_f^s$  satisfies  $c'(q_f^s) = b$ ). Moreover, when the entrepreneur deviates he loses reputation, so in subsequent periods the consumer punishes him by reverting to the Nash equilibrium of the stage game. Given the strategy adopted by consumers, the entrepreneur's best-response after a deviation in which he cheated by providing one-shot level of quality is to continue providing low quality from then on. In particular, for m higher than the cut-off level  $m^*$ , the entrepreneur chooses to come back as a nonprofit firm and make one-shot level of utility:  $U_n^s(m) = \delta \left(z - m(\widehat{q} - q_n^s) - c(q_n^s)\right) - b(\widehat{q} - q_n^s)$ , every period thereafter. If, instead, m is less than  $m^*$ , then it is more profitable for the entrepreneur to maintain her for-profit legal status but is punished for having skimped on quality and therefore his utility is reduced to the one-shot level of profit:  $U_f^s(m) = z - m(\widehat{q} - q_n^s) - c(q_f^s) - b(\widehat{q} - q_f^s)$ , every period after the deviation.

 $<sup>{}^{11}</sup>c'{}^{-1}(.)$  is continuous and strictly increasing as a consequence of the continuity of c'(.) and that it is strictly increasing.

#### 2.3.2 Nonprofit Status

If the entrepreneur is nonprofit, then his problem is to choose  $q_n$  to maximize one-period utility  $U_n(q_n)$ :

$$\max_{q_n} U_n(q_n) = \delta \left( z - m(\widehat{q} - q_n) - c(q_n) \right) - b(\widehat{q} - q_n)$$
(2.9)

The utility maximizing choice of quality  $q_n^*(m)$  satisfies:

$$\delta c'(q_n^*(m)) = b + \delta m \Rightarrow q_n^*(m) = c'^{-1} \left(\frac{b + \delta m}{\delta}\right)$$
(2.10)

with  $\frac{dq_n^*(m)}{dm} = \frac{1}{c''(q_n^*)} > 0$ , and  $q_n^*(m) > q_n^s$ . Utility is given by

$$U_n(q_n^*(m)) = \delta\left(z - m(\widehat{q} - q_n^*(m)) - c(q_n^*(m))\right) - b(\widehat{q} - q_n^*(m))$$
(2.11)

Notice that (2.6) and (2.10) imply that  $q_n^*(m) > q_f^*(m)$ , first-best quality under nonprofit status is greater than under for-profit status.

**Lemma 1** There exists  $\underline{m} \in (0, m^*)$ , such that  $U_n(q_n^*(m))$  is  $\gtrless U_f^s(m)$  for  $m \gtrless \underline{m}$ .

**Proof.** In the Appendix.

Lemma 1 suggests that for low  $m, m \in (0, \overline{m})$ , nonprofit status is not desirable even if a reputation for quality can be established. The intuition is that when m is small, the price premium that the consumer is willing to pay a nonprofit firm for higher quality is not enough to compensate the entrepreneur for the loss of income due to the limited access to profits.

As in the case of a for-profit entrepreneur, the first-best choice of quality  $(q_n^*(m))$  will be supported in equilibrium if and only if the discounted stream of utility from adhering to honest behaviour exceeds the payoff stream from the deviating path. That is, incentive compatibility for a nonprofit entrepreneur may be written as:

$$\begin{cases} \frac{1}{1-\beta}U_n(q_n^*(m^*)) \ge U_n^c(m) + \frac{\beta}{1-\beta} \quad U_f^s(m) & \text{if } \underline{m} < m < m^* \\ \frac{1}{1-\beta}U_n(q_n^*(m^*)) \ge U_n^c(m) + \frac{\beta}{1-\beta} \quad U_n^s(m) & \text{if } m^* \le m \le \overline{m} \end{cases}$$
(1C<sub>N</sub>) (2.12)

where  $U_n^c(m) = \delta (z - m(\hat{q} - q_n^*(m)) - c(q_n^s)) - b(\hat{q} - q_n^s)$  is the utility the entrepreneur can attain if he deviates from offering the anticipated first-best level of quality and instead produces the one-shot utility maximizing choice of quality  $q_n^s$ , i.e.  $q_n^s$  satisfies  $\delta c'(q_n^s) = b$ . The arguments regarding the choice of legal status and the corresponding payoff after the deviation are analogous to the ones we made above for the for-profit case. The difference here is that, as Lemma 1 suggests, for  $m < \underline{m}$ , it is  $U_f^s(m) > U_n(q_n^*(m^*))$ , so  $(IC_N)$  cannot be satisfied, which implies that a nonprofit entrepreneur cannot commit to providing firstbest quality  $(q_n^*(m))$  to the low *m* segment of the market.

#### 2.4 Optimal Choice of Organizational Form

#### 2.4.1 Overview

In the multi-period formulation, the entrepreneur has two distinct decisions to make: what organizational type to choose and whether to establish reputation for quality or not. Consequently, four possible combinations of firm-status (for-profit, nonprofit) and quality (first-best, one-shot) may arise. The optimal choice of firm status and quality can be analyzed with reference to the two critical exogenous parameters: the firm's discount factor  $\beta$  and consumer's sensitivity to unverifiable quality m. To this end, it is useful to rearrange  $(IC_F)$  and  $(IC_N)$  as follows:

$$\begin{cases} \beta \ge \frac{U_{f}^{c}(m) - U_{f}(q_{f}^{*}(m))}{U_{f}^{c}(m) - U_{f}^{*}(m)} & \text{if } 0 < m \le m^{*} \\ \beta \ge \frac{U_{f}^{c}(m) - U_{f}(q_{f}^{*}(m))}{U_{f}^{c}(m) - U_{n}^{*}(m)} & \text{if } m^{*} < m \le \overline{m} \end{cases}$$
(2.13)

$$\begin{cases} \beta \geq \frac{U_n^c(m) - U_n(q_n^*(m))}{U_n^c(m) - U_1^s(m)} & \text{if } \underline{m} < m < m^* \\ \beta \geq \frac{U_n^c(m) - U_n(q_n^*(m))}{U_n^c(m) - U_n^s(m)} & \text{if } m^* \leq m \leq \overline{m} \end{cases}$$

$$(2.14)$$

The right-hand-side of (2.13) and (2.14) define critical values for the discount factor  $\beta$ , which we shall denote  $\beta_f(m)$  and  $\beta_n(m)$ , respectively, above which delivery of first-best quality can be sustained. That is, for m such that  $\beta > \beta_f(m)$ ,  $(IC_F)$  is satisfied and the for-profit entrepreneur delivers first-best quality  $q_f^*(m)$ . Likewise, for m such that  $\beta > \beta_n(m)$ ,  $(IC_N)$ is satisfied and the nonprofit entrepreneur chooses the first-best level quality  $q_n^*(m)$ . Our aim is to establish, first, which organizational form is preferable when reputations can be established, and second, which organizational form can support first best quality for the widest range of discount factors, namely, we shall be interested in comparing  $\beta_f(m)$  to  $\beta_n(m)$ .

To compare utility across organizational forms, note that the relative benefit of being for-profit when  $(IC_F)$  and  $(IC_N)$  are slack is given by:

$$G(m) = \left[ (m+b)q_f^*(m) - c(q_f^*(m)) \right] - \left[ (\delta m + b)q_n^*(m) - \delta c(q_f^*(m)) \right] + (1-\delta)(z - m\hat{q})$$
(2.15)

The following lemma applies:

**Lemma 2** When the entrepreneur can commit to the first-best level of quality  $q_f^*(m)$  and  $q_n^*(m)$ , then for-profit status is more attractive at any level of m, i.e.  $G(m) > 0 \forall m \in$ 

 $(0, \overline{m}).^{12}$ 

#### **Proof.** In the Appendix.

This result suggests that reputation forces favour for-profit status. The intuition for this is that as m increases the for-profit firm can now anticipate the price reduction that will occur if it does not offer better quality, and adjusts the optimal quality offered  $q_f^*(m)$ upwards, thus remaining more attractive than the nonprofit firm for any m. This is the power of the reputation mechanism, it allows for-profit firms to credibly commit to delivering the high quality service because it is more valuable to them to do so.

Next, in order to compare  $\beta_f(m)$  to  $\beta_n(m)$ , notice that, after substitution and the appropriate simplifications, (2.13) and (2.14) imply that:

$$\beta_{f}(m) = \begin{cases} \frac{\left(bq_{f}^{s} - c(q_{f}^{s})\right) - \left(bq_{f}^{*}(m) - c(q_{f}^{*}(m))\right)}{m(q_{f}^{*}(m) - q_{f}^{*})} & \text{if } 0 < m \le m^{*} \\ \frac{\left(bq_{f}^{s} - c(q_{f}^{s})\right) - \left(bq_{f}^{*}(m) - c(q_{f}^{*}(m))\right)}{(1 - \delta)(z - mq) + mq_{f}^{*}(m) - c(q_{f}^{*}) + bq_{f}^{*} - \delta mq_{n}^{*} + \delta c(q_{n}^{*}) - bq_{n}^{*}} & \text{if } m^{*} < m \le \overline{m} \end{cases}$$
(2.16)

 $\operatorname{and}$ 

$$\beta_{n}(m) = \begin{cases} \frac{(bq_{n}^{s} - \delta c(q_{n}^{s})) - (bq_{n}^{*}(m) - c(q_{n}^{*}(m)))}{-(1 - \delta)(z - m\hat{q}) + \delta mq_{n}^{*}(m) - \delta c(q_{n}^{s}) + bq_{n}^{s} - mq_{f}^{s} + c(q_{f}^{s}) - bq_{f}^{s}} & \text{if } \underline{m} < m < m^{*} \\ \frac{(bq_{n}^{s} - \delta c(q_{n}^{s})) - (bq_{n}^{*}(m) - c(q_{n}^{*}(m)))}{\delta m(q_{n}^{*}(m) - q_{n}^{s})} & \text{if } m^{*} \le m \le \overline{m} \end{cases}$$
(2.17)

Analyzing the monotonicity and the relative position of  $\beta_f(m)$  and  $\beta_n(m)$  is very subtle. To gain some intuition for this, notice that  $\beta_f(m)$  and  $\beta_n(m)$  can be rewritten as follows:

$$\beta_i(m) = \frac{B_i(m)}{B_i(m) + L_i(m)} \text{ for each } i \in \{f, n\}$$

$$(2.18)$$

where  $B_i(m) = U_i^c(m) - U_i(q_i^*(m))$  denotes the one-time benefit from cheating, and  $L_i(m) = U_i(q_i^*(m)) - U_i^s(m)$  denotes the absolute value of the future loss induced by the punishment. From (2.18), it follows that:

$$\beta_f(m) \stackrel{\geq}{\equiv} \beta_n(m) \Leftrightarrow \frac{B_f(m)}{L_f(m)} \stackrel{\geq}{\equiv} \frac{B_n(m)}{L_n(m)}$$
(2.19)

This last condition suggests that comparing  $\beta_f(m)$  to  $\beta_n(m)$  amounts to comparing the ratio of benefits and losses associated with a deviation, across organizational forms and for different values of m. Intuitively, one might think that under nonprofit status the manager's incentive to cheat is attenuated, because he can only partially enjoy the extra profits generated due to cheating, so we might expect  $B_n(m)$  to be smaller than  $B_f(m)$ .

<sup>&</sup>lt;sup>12</sup>It follows, a fortiori, that for profit status is more attractive when the entrepreneur can choose first-best quality  $q_f^*(m)$  when for-profit, but  $(IC_N)$  is not satisfied. That is,  $U_f(q_f^*(m)) > U_n(q_n^*(m))$  implies that  $U_f(q_f^*(m)) > U_n(m) \forall m \in (0, \overline{m})$ .

On the other hand, though, the value of the punishment inflicted in the event of cheating is also smaller – the expression in the denominator, so it is not immediately clear how  $\beta_f(m)$ compares to  $\beta_n(m)$ .

In particular, closer inspection of (2.16) and (2.17) suggests that the value and the monotonicity of these expressions depend on relative changes of terms involving c(.), which renders the problem intractable. Therefore, in order to proceed to a full characterization of the properties of  $\beta_f(m)$  and  $\beta_n(m)$  and therefore of the optimal choice of firm, we need to place some structure on the cost function c(q). After performing the analysis positing a specific cost function, we return to discuss what part of the results obtained we think would hold under more general conditions.

#### **Assumption 1** $c(q) = \frac{1}{2}q^2$ .<sup>13</sup>

The following lemma describes the properties of  $\beta_f(m)$  and  $\beta_n(m)$ .

**Lemma 3** (i)  $\beta_f(m) = \frac{1}{2}$  for  $m \in (0, m^*]$ , and  $\beta_n(m) = \frac{1}{2}$  for  $m \in [m^*, \overline{m})$ . (ii)  $\beta_n(m) > \beta_f(m)$  for  $m \in (0, m^*)$ , and  $\beta_f(m) > \beta_n(m)$  for  $m \in (m^*, \overline{m})$ . (iii)  $\beta_n(m)$  is decreasing, for  $m \in (0, m^*)$ . (iv)  $\beta_f(m)$  reaches a maximum at  $m = 2m^*$ .

#### **Proof.** In the Appendix.

The analysis is significantly aided by reference to Figure 2.1, which Lemma 3 helps us construct, and which illustrates  $\beta_f(m)$  and  $\beta_n(m)$  in  $(m,\beta)$  space. Note that for msuch that the punishment path after cheating does not include conversion of legal status,  $\beta_f(m)$  and  $\beta_n(m)$  remain flat and equal. This, however, is not true in the subintervals of  $(\underline{m}, \overline{m})$  where the punishment phase entails change of the firm's legal status prescribed by entrepreneur's optimal behaviour in the one-shot game. In this case, there are two opposite effects governing the monotonicity of  $\beta_f(m)$  and  $\beta_n(m)$ . On one hand, the first period benefit of cheating increases with m, which implies that incentive compatibility becomes stricter. On the other hand, the benefit of committing to high quality, relative to being a one-shot firm, increases with m for periods two onwards as the reputation firm adjusts optimal quality upwards while the one-shot firm adheres to the stage game quality. For  $m \in (0, m^*]$ , the second effect dominates the first effect we described above so the overall tendency is for  $(IC_N)$  to become increasingly easier to satisfy and hence  $\beta_n(m)$  is decreasing. For  $m \in (m^*, \overline{m}), \beta_f(m)$  is nonmonotonic because initially the first effect dominates while for higher m the second effect takes over.

We can now determine the entrepreneur's choice of firm status for  $\beta$  lying in three different subintervals of (0, 1) by referring to figure 1.

<sup>&</sup>lt;sup>13</sup>Note that this specification satisfies the regularity conditions imposed on c(.).



Figure 2.1:  $\beta_f(m)$  (solid) and  $\beta_n(m)$  (dash)

#### **2.4.2** Optimal Choice when $\beta \in [\beta_f(2m^*), 1)$

The following proposition applies:

**Proposition 1** If the entrepreneur is sufficiently patient (i.e.  $\beta \geq \beta_f(2m^*)$ ), then the  $(IC_F)$  never binds and for-profit status is the preferred choice of organization, for any level of m. Furthermore, the first-best level of quality  $(q_f^*(m))$  can be sustained.

**Proof.** Follows directly from Lemma 2 and the fact that  $\beta_f(2m^*)$  is the maximum value that  $\beta_f(m)$  takes in  $(0, \overline{m})$ . Therefore, for  $\beta \geq \beta_f(2m^*)$ ,  $(IC_F)$  is always satisfied, so it follows from Lemma 2 that for-profit status is the optimal choice of legal status and that first best quality  $(q_f^*(m))$  is provided.

### **2.4.3** Optimal Choice when $\beta \in (\frac{1}{2}, \beta_f(2m^*))$

To analyze the optimal choice of organizational form when  $\beta$  lies in the interval  $(\frac{1}{2}, \beta_f(2m^*))$ , it is useful to divide the relevant  $(\beta, m)$  space into the following two mutually exclusive and exhaustive regions, also illustrated in Figure 2.2:

**Definition 1** a) Region A consists of  $\beta \in [\beta_f(m), \beta_f(2m^*))$  and  $m \in (0, \overline{m})$  such that  $\beta > \beta_f(m)$ .

b) Region B consists of  $\beta \in (\frac{1}{2}, \beta_f(m))$  and  $m \in (m^*, \overline{m})$  such that  $\beta_n(m) < \beta_f(m)$ .

The following proposition summarizes the optimal choice of organizational form and quality for  $\beta \in (\frac{1}{2}, \beta_f(2m^*))$ :

**Proposition 2** a) In Region A the entrepreneur chooses for-profit status and delivers firstbest quality  $q_f^*(m)$ .

b) In Region B the entrepreneur chooses nonprofit status and delivers first-best quality  $q_n^*(m)$ .

**Proof.** a) Note that in region A it is  $\beta > \beta_f(m)$  so  $(IC_F)$  is satisfied, thus it follows from Lemma 2 that for-profit status is the optimal choice of legal status and that first best quality  $(q_f^*(m))$  is provided.

b) In region B it is  $\beta_n(m) < \beta < \beta_f(m)$ , implying that only  $(IC_N)$  is satisfied which means that nonprofit status offering first best quality  $(q_n^*(m))$  will be chosen.

Moreover, whether  $(IC_F)$  is satisfied or not, for  $m \in (m^*, \overline{m})$  depends on parameters such as the consumer's willingness to pay for the service (z) and the entrepreneur's altruistic taste b.

**Remark 1** Differentiation of  $\beta_f(m)$  for  $m \in (m^*, \overline{m})$  yields:

a) 
$$\frac{\partial \beta_f(m)}{\partial z} < 0$$
  
b)  $\frac{\partial \beta_f(m)}{\partial b} > 0$ 

Thus, the higher the profitability of the industry or the firm the larger area A becomes, which implies that the greater is the likelihood that  $(IC_F)$  will be satisfied and entrepreneurs are going to choose for-profit status as the preferred form of organization. On the other hand, the more an entrepreneur is intrinsically concerned about quality, the larger area B becomes, which means that it is harder to maintain first-best quality under for-profit status.

#### **2.4.4** Optimal Choice when $\beta \in (0, \frac{1}{2})$

The following proposition applies:

**Proposition 3** If  $\beta < \frac{1}{2}$ , then  $(IC_F)$  and  $(IC_N)$  are never satisfied for any level of m and reputations cannot be sustained regardless of what legal status the entrepreneur chooses. The optimal choice of organizational type is the one described in the one-shot game.

**Proof.** It is immediately clear from Lemma 3 and figure 2.1 that for  $\beta < \frac{1}{2}$ ,  $\beta < \beta_f(m)$  and  $\beta < \beta_n(m)$ , so both  $(IC_F)$  and  $(IC_N)$  fail.

For reference, the various possible outcomes of the repeated game are also illustrated in Figure 2.2 and summarized in Table 2.1.



Figure 2.2: Summary of Optimal Choice of Organizational Form

Summary of Optimal Choice of Firm Status and Quality by Region					
Region	Firm Status	Quality			
$(0,\overline{m})\times[\beta_f(2m^*),1)$	FP	$q_f^*$			
$A:(0,\overline{m})\times(\beta_f(m),\beta_f(2m^*))$	FP	$q_f^*$			
$B:(m^*,\overline{m})\times (\tfrac{1}{2},\beta_f(m))$	NFP	$q_n^*$			
$(0,\overline{m}) \times (0,\frac{1}{2})$	One-She	ot Analysis			

Table 1.1Summary of Optimal Choice of Firm Status and Quality by Region

The foregoing analysis suggests that if we imagine that there is a distribution of  $\beta's$  in the population of entrepreneurs, then those that have sufficiently high  $\beta$  will choose for-profit status and will deliver high quality service. There is an intermediate range of  $\beta's$  where the choice of firm status varies with m. Finally, for very low  $\beta$ , reputations are not going to be established and the one-shot analysis of Glaeser and Shleifer will apply.<sup>14</sup> The value of  $\beta$  need not be interpreted literally as a discount factor. There are plenty of reasons that one would expect variation in managerial outlook of future profitability that are not directly related to one's personal rate of time preference. For example, some markets

<sup>&</sup>lt;sup>14</sup>There may also be ideological or religious motivations that make nonprofit status attractive for some people and therefore affect the supply of nonprofit activity. Much like most of the literature that relies on contractual failures, we have abstracted from these considerations here.

may have higher demand growth than others which means that the potential future losses from shirking on quality and losing reputation in these markets are higher. This kind of differences in market-specific or sector-specific conditions can be regarded as determinants of the effective discount factors that have to be applied by potential entrants when deciding which firm status to choose and what level of quality to offer.

It is noteworthy that if we were to adopt the view that the optimal organizational form is the one that minimizes the discount factor that is necessary to sustain first-best quality, then the outcome of the repeated game matches with that of the static game. That is, there exists a threshold value for consumer preference for quality  $m^*$ , above which nonprofit status is optimal and below which for-profit status dominates. This way of ranking organizations may be relevant if, for instance, we believe that free-entry competition among firms will ensure that the incentive compatible constraints  $(IC_F)$  and  $(IC_N)$  bind. Then, we should expect the organizational form with the lower critical value for the discount factor to drive the other one out of the market.

#### 2.4.5 Discussion

The analysis of the optimal choice of firm status was considerably simplified by introducing an explicit functional form for the cost function, since a general characterization is not possible. Here we point out where the difficulties in obtaining general results lie and elaborate on what parts of the analysis are likely to generalize under more general conditions.

First, we examine whether the result that for profit status is optimal for  $m \in (\underline{m}, m^*]$ , i.e.  $\beta_f(m) < \beta_n(m)$ , is general. Using (2.19) and simplifying one can obtain the following necessary and sufficient condition for this to be true:

$$U_{f}(q_{f}^{*}(m))\left(U_{n}^{c}(m)-U_{f}^{s}(m)\right)-U_{f}^{s}(m)\left(U_{n}^{c}(m)-U_{n}(q_{n}^{*}(m))\right)>U_{f}^{c}(m)\left(U_{n}(q_{n}^{*}(m))-U_{f}^{s}(m)\right)$$
(2.20)

where the left-hand-side is positive because  $U_f(q_f^*(m)) > U_f^s(m)$  and  $U_n(q_n^*(m)) > U_f^s(m)$ . In addition, recall that Lemma 1 suggests that the term on the right-hand-side is zero, for m in the vicinity of  $\underline{m}$ , and increasing in m. This suggests that inequality (2.20) holds for  $m = \underline{m}$ ; whether it becomes easier or harder to satisfy as m increases depends on the relative changes of the terms on the left and right-hand-side of the inequality, which cannot be assessed generally.

Next, we examine whether the prediction that nonprofit status is optimal for  $m > m^*$ , i.e.  $\beta_f(m) > \beta_n(m)$ . We use (2.19) again to derive the following necessary and sufficient condition for this to be generally true:

$$U_{f}^{c}(m)\left(U_{n}(q_{n}^{*}(m))-U_{n}^{s}(m)\right)+U_{n}^{s}(m)\left(U_{n}^{c}(m)+U_{f}(q_{f}^{*}(m))-U_{n}(q_{n}^{*}(m))\right)>U_{f}(q_{f}^{*}(m))U_{n}^{c}(m)$$
(2.21)

where all of the above terms are positive. Thus, whether inequality (2.21) holds or not depends on the relative magnitude of these terms, which cannot be ascertained unless some structure is imposed on the cost function. The particular formulation we used is convenient for deriving simple analytical results but numerical examples using higher-order power functions suggest that the insights obtained are robust to alternative specifications of the cost function.

### 2.5 Relating the Model to Empirical Evidence and Policy Implications

We believe that the predictions obtained from the dynamic framework can help us understand some facts concerning quality differentials in mixed sectors which the one-shot model falls short of explaining. For instance, consider the market for child care, which features a considerable nonprofit presence, making it appropriate for drawing comparisons between the quality offered by for-profit and nonprofit providers.<sup>15</sup> Furthermore, the quality dimension in child care is arguably hard to measure and verify, which makes it amenable to the incomplete contracts framework we have laid out above. Our reading of the empirical evidence on the between-sector differences in quality from the U.S. and Canada.<sup>16</sup> is that although most studies find that nonprofit centres as a group obtain higher scores on observational measures of overall quality developed by child development experts,<sup>17</sup> this finding cannot be interpreted as a direct confirmation of the contractual failure theory. First, the differences on average quality between the two groups are not overwhelming, and there is variation in quality within each category of auspice. That is, there are commercial centres that offer high quality and nonprofit centres that offer low quality. This possibility though is in contradiction with the strong form of the contractual failure view of the world which predicts that only nonprofits will occupy the upper part of the quality distribution. Second, it seems very likely that the greater access to government funding and subsidies nonprofits enjoy in certain jurisdictions, could at least partly account for the reported difference in average quality between the nonprofit and commercial child care sectors. Finally, it is possible that the variation in quality may simply reflect choice of market niche and be unrelated to informational asymmetries of any sort. For example, for-profit child care centres may choose to substitute lower quality care, for more convenient arrangements offered to the parents (convenient location, longer hours etc.).

<sup>&</sup>lt;sup>15</sup>Studies that examine the relative performance of nonprofits are too many to list here, see Rose-Ackerman (1996) for a comprehensive review of the literature. Ortmann and Schlesinger (2003) review the empirical work on ownership-related differences in quality from various mixed industries.

<sup>&</sup>lt;sup>16</sup>For evidence from the U.S. child care sector, see the survey by Blau and Currie (2005) and the references therein. For evidence from Canada, see Krashinsky (1998) and Doherty et al (2002).

<sup>&</sup>lt;sup>17</sup>It is important that these instruments of child care quality refer to non-contractible quality, and is distinct from structural measures of quality, such as the child-teacher ratio, which are contractible.

Yet another explanation of the apparent between-sector quality differential, and indeed one that the analysis of the repeated version of the model points to, is that because for-profit status dominates the lower part of the quality distribution  $(m < m^*)$ , even though there are some high quality for-profit centres (in area A and for  $\beta \in [\beta_f(2m^*), 1)$ , on average the quality provided by the commercial sector is lower than the nonprofit which has a higher quality threshold.<sup>18</sup> Furthermore, in markets where nonprofits have lower costs (c(q)), because of access to free space and utilities, the model suggests that more entrepreneurs will choose nonprofit status, which would increase the average quality care in the nonprofit sector and lower that one in the commercial sector.

In light of this interpretation of the quality differential, it is interesting to revisit the ongoing debate over the effectiveness of subsidy policies that discriminate against for-profit child care centres, on the basis that they are untrustworthy to provide high quality care. We argued above that the existing empirical evidence on the impact of centre ownership on care quality is scant and does not allow for sweeping conclusions, while the model considered here demonstrates that reputations can provide enough incentives for profit-maximizing entrepreneurs to offer high quality services when the playing field is levelled. Perhaps future empirical work may be able to settle the debate by identifying the extent to which quality differences between sectors echo contractual failures or unequal funding opportunities.

#### 2.6 Conclusion

The idea that nonprofit organizations can solve market imperfections attributable to asymmetric information between consumers and producers, regarding hard to verify quality of certain services, has been a particularly influential explanation of the emergence and expansion of the nonprofit sector. Our task in this paper has been to perform a robustness check of this theory by allowing reputations to serve as a competing mechanism that can ensure quality. The analysis of the model of repeated interaction between consumers and firms yields some interesting new outcomes while it encompasses the one-shot case originally examined by Glaeser and Shleifer. In this sense, it may be argued that the predictions of the contractual failure hypothesis apply in the special case where the long-run reputation mechanism cannot be sustained because interaction is not repeated or because of frictions in the flow of information. In more general circumstances, nonprofit status does not appear to be a necessary mechanism to overcome opportunistic behaviour that arises because quality is unverifiable. Also, the multi-period version considered in this paper provides an explanation for the differences and variability in non-contractible quality across organizational types that have been identified in empirical studies of the child care sector.

The goal of this paper has not been to utterly dismiss the contractual failure hypothesis,

<sup>&</sup>lt;sup>18</sup>Recall that nonprofit status is chosen only for  $m > m^*$ .

only to challenge its scope as an explanation for the widespread presence of nonprofit organizations. The key implication of our analysis is that, in many sectors, the existence of a large number of nonprofit firms cannot be explained with reference to their unique ability to mitigate problems of asymmetric information. In particular, we shouldn't expect it to be an important factor in industries where income from sales of services constitutes the largest source of revenue and where there is repeated interaction between consumers and providers – such as the child care sector discussed in the previous section and other social services. This does not preclude the theory to play an important role in charitable services where donations are a significant source of revenues. Also, our analysis does not rule out the expropriation problem having significant implications on the relationship between the organization and various other economic actors such as its employees, volunteers, donors and the different government agencies. Further research in these areas may prove fruitful in advancing our understanding of the role, advantages and evolution of the nonprofit sector.

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### Chapter 3

# Volunteer Hiring, Organizational Form and the Provision of Mission-Oriented Goods<sup>\*</sup>

#### **3.1** Introduction

Volunteering constitutes a considerably large and increasing share of the nonprofit sector's contribution to economic activity, in most advanced economies. So much so, that in fact it is not uncommon for nonprofit organizations to be referred to as "voluntary organizations" to emphasize their reliance on voluntary employment. For example, in 1997 the value of volunteer work amounted to roughly one-quarter of the total value of labour services provided to the nonprofit sector in Canada, while in the U.S. it reached one-third of total earnings in the sector.<sup>1</sup> Besides volunteering for altruistic reasons – a desire to help others or contribute to an important cause – there is a widespread belief that volunteering can be a stage in professional development by providing work experience and a chance to develop skills that strengthen employability. Volunteering offers some of the benefits that are often also associated with unpaid internships in for-profit firms or the government: opportunities to receive valuable on-the-job training, discover hidden talents and interests, learn about possible career tracks, expand networks of contacts, and enrich one's resume. In many cases the potential is high for the transition to a paid position, especially in the nonprofit sector where volunteering experience appears to be a prerequisite for any type of career.

Previous research which studied factors that determine the decision to supply volunteer time, such as Menchik and Weisbrod (1987), Day and Devlin (1998), Segal and Weisbrod

<sup>\*</sup>A version of this chapter will be submitted for publication.

<sup>&</sup>lt;sup>1</sup>The estimate for Canada is taken from the Satellite Account of Nonprofit Institutions and Volunteering of Statistics Canada, which is available at http://www.statcan.ca/english/freepub/13-015-XIE/13-015-XIE2004000.htm. For the U.S., see the New Nonprofit Almanac and Desk Reference, Table 1.7, pg 22-23.

(2002), Gunderson and Gomez (2003) has found evidence suggesting that besides purely altruistic motives people may engage in volunteering activities to improve their employment opportunities. For instance, Day and Devlin (1998) report evidence of a 6-7% return of volunteering in annual earnings for Canadian workers. Surveys also support this. For example, the National Survey of Giving, Volunteering, and Participating (2000), which provides a snapshot of the state of voluntary and civic action in Canada, reveals that almost a quarter (23%) of volunteers agreed that improving job opportunities was a reason for volunteering, with younger volunteers more likely (55%) to indicate this as a reason. Furthermore, 14% of volunteers reported that volunteering had at some point helped them to obtain employment, with again a greater proportion of younger volunteers (24%) claiming likewise.<sup>2</sup> These findings confirm the common wisdom that volunteering for some individuals is viewed as a means to help others while at the same time increase the chances of success in the labour market, and in particular in the nonprofit sector.

This paper takes the altruistic motivations and the career concerns of volunteers as a point of departure and provides an explanation for the following salient patterns (1) nonprofit organizations attract the overwhelming share of volunteers<sup>3</sup> that meet this profile and (2) volunteer-hiring nonprofits are concentrated in mission-oriented sectors, where the goods and services produced can be conceived as having a public (or collective) good component<sup>4</sup> – commonly thought to lead to the market underproviding them – and which generate nonpecuniary benefits to those involved in their delivery. Education, healthcare, childcare, international aid, the arts, religious and philanthropic foundations, and the vast social services are examples of mission-oriented fields.<sup>5</sup> These contrast with most other activities, regularly provided by profit taking firms, where non-pecuniary motivations are less of a consideration.

The challenge we pose in this paper is to explain the above set of observations as an equilibrium outcome without positing that workers motivated by concerns for social outcomes have an exogenous disposition for working at nonprofit establishments or assuming that nonprofit and for-profit producers have respective ex ante advantages in the delivery of goods and services of different character. We expound our theory by developing a model with two sectors (a mission sector and a non-mission sector), where heterogeneous (some mission motivated and some not) managers (principals) and workers (agents) are matched, choosing organizational form (for-profit, nonprofit), employment contract and sector. To

<sup>&</sup>lt;sup>2</sup>See Hall et al. (2001), figure 2.2, pg 35.

<sup>&</sup>lt;sup>3</sup>In 1998, the distribution of full-time volunteers by sector in the U.S. was 68.5 percent nonprofit, 26 percent government and 5.5 percent for-profit sector. See the New Nonprofit Almanac and Desk Reference, Figure 1.7, pg 24.

<sup>&</sup>lt;sup>4</sup>Even though these goods do not necessarily feature both properties shared by public goods – nonrivalry and nonexcludability – they are associated with external benefits. For example, a person may benefit from high quality healthcare coverage of others, not only because it reduces the chances that she may be infected by a contagious disease, but also because of ethical concerns for the standards of human well-being in society.

<sup>&</sup>lt;sup>5</sup>See Rose-Ackerman (1996) for cross-country documentation of the composition of the nonprofit sector.
address the previously mentioned challenge we start from a position of ex-ante symmetry: (a) the intrinsic benefit that caring managers and workers derive in the mission sector is attached to the job that they do, not the identity of the organization (nonprofit or forprofit) in which they do it;<sup>6</sup> (b) workers are equally productive working for either type of employer; and (c) managers have access to a common production technology regardless of the organizational form they select. Therefore, besides the restriction in the appropriation of profits there are no ex ante structural differences between for-profit and nonprofit status. We then proceed to demonstrate how the observed configuration (nonprofit firms hiring volunteers in the mission sector) arises endogenously in the equilibrium of the model, among the host of ex ante possible (firm-type/employment structure/sector) combinations, and that this particular equilibrium has some desirable welfare properties.

An example from healthcare illustrates the reasons why. Consider the case of a hospital or a long-term care facility, which recruits volunteers to support direct patient care. The given hospital can benefit by refusing to recognize the volunteering experience of individuals at other firms while at the same time taking advantage of the fact that its volunteers will be acknowledged elsewhere. Such a deviating firm will like to perpetually fill positions with unpaid volunteers who are denied promotion to paid positions and are replaced by new volunteers, when they turnover to seek employment at another employer. Such behaviour will eventually be detected and punished by future workers who will pass up volunteer opportunities at a hospital which had previously cheated on its volunteers. For nonprofit organizations, the incentive to exploit volunteers is weaker, because of the weaker incentives to pursue profits and the greater concern about the social mission, which allows them to maintain an incentive compatible scheme. Their commitment to not distributing profits conveys a comparative advantage in mission-oriented sectors by giving them exclusive access to the volunteer pool.

An important feature of the analysis is that workers' effort and output are unverifiable by third parties and as a result performance-contingent remuneration is infeasible;<sup>7</sup> this element is present in both sectors and for all types of firm. One standard solution to this incentive problem is the use of implicit contracts that are self-enforcing and that take advantage of the long-term aspect of the employment relationship: a worker receives a fixed payment that exceeds opportunity costs as long as performance has been satisfactory and is dismissed otherwise.<sup>8</sup> This type of compensation, namely a wage set above the market clearing rate (efficiency wage), is known to induce important labour market inefficiencies

<sup>&</sup>lt;sup>6</sup>This is not to deny that individuals might receive direct benefits from founding or working for a nonprofit firm. Here we wish to explore whether we can explain the observed patterns of nonprofit activity without assuming such direct rewards.

<sup>&</sup>lt;sup>7</sup>The notion that workers' performance is observed by the firm but cannot be verified in court is borrowed from the incomplete contracts literature and has been widely applied to agency models of employment, see Malcomson (1999).

<sup>&</sup>lt;sup>8</sup>In the context of the provision of public services, this avenue has been pursued in Francois (2003).

- sub-optimal employment levels. Here, motivated by the observation that some workers (interns and volunteers) are induced to undertake unpaid or very low pay work by the possibility of rewards in the form of future employment by the same or some other employer, we recognize that this two-tier employment structure provides a more efficient solution to the problem of incomplete employment contracts: it allows firms to extract some of the rents that workers have to be offered later on as paid workers in order to supply effort, thus dampening the distorting effect arising from providing incentives with payments above opportunity cost.<sup>9</sup>

We consider two alternative incentive structures, which in the interest of facilitating exposition we refer to as:

- Volunteering: A worker is hired as an unpaid volunteer and is subsequently transferred to a paid position not necessarily at the firm where he has volunteered (incentives are sector-wide).
- *Internship*: A worker is hired as an unpaid intern and is subsequently promoted within the firm he has interned, when a vacancy is created (incentives are firm-specific).

The key difference between volunteering and internship is that time spent volunteering elsewhere is treated "as if" it were volunteered at the firm – much like actual volunteering occurs in reality – whereas interns are promoted at the firm where they intern. In both structures a worker is willing to work for a period with no pay if he anticipates that he will be subsequently promoted to a wage position, yielding an expected lifetime utility no less than his outside option. But notice that the hiring of volunteers (or interns) introduces a two-sided moral hazard problem, as firms have incentive to recruit unpaid workers, promising them promotion to paid positions, and then renege on the promise. It is well known from the theory of repeated games that repeated interaction can help overcome these problems (reputation mechanism), if the discounted stream of payoffs associated with hiring volunteers exceeds the payoffs from cheating and then being punished by having to resort to hiring only paid workers. The dynamic interaction between multiple firms and workers is formally studied as a repeated game and a characterization of the equilibrium strategies supporting 'volunteering' and the 'internship' structure is provided.

An additional component of the present setting is that managers and workers can be intrinsically motivated and derive nonpecuniary benefits from contributing to the production of mission goods (e.g. nurses, teachers, aid workers). Motivated agents are typically heterogeneous in terms of mission preferences – what activity to pursue and how to pursue it – and usually some hands-on experience is required before an individual can learn enough about the different causes to be able to identify a preferred mission. For example,

<sup>&</sup>lt;sup>9</sup>The possibility that employers use deferred payments as a means of providing incentives has been studied, in a different context, by Lazear (1981) and by Akerlof and Katz (1989).

the manager of an international aid agency or an aid worker may prefer working for an organization with a particular religious outlook, or they may develop through experience a preference over the targeted group of beneficiaries (which group is more needy). Because the main parties involved may have different views about how the project should be carried out, preference alignment is an important determinant of the quality of the mission good.<sup>10</sup> Volunteering facilitates the matching of like-minded organizations and workers, which improves the quality/impact of the mission activity as well-matched pairs are more productive: a volunteer works for a period of 'exploration', then as his mission preferences become known he can transfer to a matching firm, when a vacancy is created. By contrast, internships match workers and organizations randomly, as when an intern joins the firm his mission preferences have not been determined. Therefore, from employers' perspective volunteer hiring is the preferred hiring practice in the mission sector because it can generate more efficient matching.

The workings of the matching process we envisage between mission-motivated principals and agents resemble that of the entry-level medical labour market. There it was recognized that mismatches occurred because competition led hospitals to sign up interns early on, years ahead of graduation, before their skills and interests were developed. The problem was that when a hospital and an intern reached an early deal they did not take into account the externality imposed on other hospitals and interns (Roth 1984). Some rules were eventually designed to move the dates of appointment later into the senior year of medical school when more information about students' abilities and preferences was available and as a result more efficient matches between interns and hospitals were identified. We believe that the process of volunteer hiring we described above alleviates a similar problem – albeit in a less structured fashion than the labour market for medical residents – that would arise if mission-oriented organizations hired workers too soon (as would be the case with internships), before their mission preferences have been revealed.

Nothing in the structure of the model we have sketched suggests that a rational manager would choose nonprofit over for-profit status, since the only effect of this choice is that the manager's pecuniary payoff from operating the firm is reduced. A possible reason would be that nonprofits are at an advantage in terms of being able to sustain volunteer hiring. But does the nonprofit incorporation relax the incentive compatibility constraint that makes commitment to hiring volunteers credible? Our analysis suggests that the answer to this hinges on the type of activity (mission-oriented or not) that is undertaken. In particular, if volunteering only raises profits then a nonprofit firm does not have a particular advantage

<sup>&</sup>lt;sup>10</sup>The role of matching in principal-agent pairs with heterogeneous preferences is explored in Besley and Ghatak (2005), who show that better matching leads to higher effort and productivity. Here we take as given the proposition that better matched pairs are more productive in order to focus on how the interaction between the choice of organizational form (for profit or nonprofit) and incentive structure (volunteering or internship) can lead to more efficient matching.

over for-profit firms (true in the non-mission sector). This is because while for a nonprofit manager the benefit from cheating is weaker – under nonprofit status profits are less valuable for managers because they can only be enjoyed as perks – so is the reward for honest behaviour. Therefore, in this case a nonprofit manager's promise of honest behaviour is not more credible than the one of a for-profit manager. On the other hand, if volunteering also enhances the quality of the service provided – because of better matching – and managers care about quality, then nonprofit status is helpful in solving employers' moral hazard problem (true in the mission sector). The intuition is that a nonprofit manager will discount more heavily the fact that if she cheats on volunteers quality will suffer and hence a smaller profit (reputational rent) is needed to maintain incentive compatibility. With free-entry the incentive compatibility constraint for nonprofit firms binds, which means that the one for for-profit firms fails, so they cannot use the volunteer hiring structure.

Thus, the model accounts for the observed patterns of entry by sector: nonprofits engage in the provision of goods and services where better matching on mission preferences improves quality, while in sectors where missions play no role, nonprofit incorporation is not essential and for-profit status will be preferred. In addition, our analysis explains why otherwise similar nonprofit and for-profit organizations will select different incentive structures to motivate their workers. In equilibrium, nonprofit organizations select the volunteering organizational structure while for-profit organizations utilize the internship. These features are in tune with the patterns of employment structure, work force characteristics and firmtype entry across sectors that we observe in many modern economies. Finally, we show that this equilibrium has some desirable welfare properties as it generates more employment and output than a benchmark equilibrium where only paid workers are employed, or one where firms hire interns.

The rest of the paper is organized as follows. The next section briefly discusses strands of the literature that are relevant to this paper. Section 3 introduces the environment of the model, characterizes the two types of relational employment contract for an exogenously matched organization-worker pair, and analyzes the choice of organizational form and employment relational contract in each sector. Section 4 turns to market equilibrium, characterizing a steady-state 'sorting' equilibrium in the two sectors and presents a welfare analysis of the equilibrium. Section 5 contains a brief discussion of some anecdotal accounts and case studies that lend support to some of the arguments made in this paper and Section 6 concludes.

# 3.2 Related Literature

This paper is related to the literature that has identified circumstances where nonprofit status may be a valuable commitment against opportunistic behaviour that arises because of various forms of contractual incompleteness. For instance, Glaeser and Shleifer (2001) argue that nonprofit incorporation is a valuable mechanism for an entrepreneur because, by weakening incentives to maximize profits, it credibly commits to customers that noncontractible quality will be higher, while in Rowat and Seabright (2006), nonprofit status is a valuable signal for aid agencies because it reassures donors that their funds will be indeed directed to unverifiable development projects and not be skimmed off. Francois (2001) establishes conditions under which a nonprofit entrepreneur, by relinquishing residual claims to profits, faces weaker incentives to adjust production after a worker has shirked. When workers care about the level of the public good produced this commitment is shown to be valuable in that it reduces the wage that has to be offered to induce workers' non-contractible effort.

This paper is also related to a literature (Weisbrod (1988), Tirole (1994), Rose-Ackerman (1996), Francois (2000, 2001, 2003), Dixit (2002)) which emphasizes the notion that organizations producing public goods and services pursue missions that depart from strict profitmaximization, and underlines the significance of the fact that workers in these sectors are intrinsically motivated by the action of participating in the provision of these collective goods. Several recent papers study the provision of incentives and the screening of intrinsically motivated workers, among others Handy and Katz (1998), Murdock (2002), Francois (2007), Delfgaauw and Dur (2007). Our paper builds on the contributions by Besley and Ghatak (2005, 2006a), who study incentive design issues in an environment with missionmotivated principals and agents. Their emphasis is on the role of matching of principals and agents on mission preferences and the effects of competition on productivity and the power of incentives, but they abstract from issues concerning organizational form which are central in our model. Specifically, the contribution of the present paper is that it presents a plausible avenue (volunteer hiring and sorting) which interacting with the endogenously chosen organizational status allows mission-driven entrepreneurs to match with like-minded workers and therefore play the efficiency enhancing role emphasized by Besley and Ghatak (2005). Also, one of our aims (and indeed the one that might be relevant for policy-makers) is to compare welfare outcomes between an equilibrium where the volunteering structure is sustained, and hence the matching is facilitated, to one where it fails.

# 3.3 The Model

# 3.3.1 Primitives

We consider an economy with discrete time and infinite time horizon consisting of two sectors: a mission-oriented and a non-mission-oriented sector which serves as a benchmark, denoted by m and b respectively. Two groups of agents exist in the economy: managers/entrepreneurs and workers.<sup>11</sup> Agents remain alive for another period with probability  $\beta \in (0, 1)$ , while with the complementary probability,  $(1 - \beta)$ , they die and are replaced by identical agents.<sup>12</sup> There is heterogeneity in mission preferences in both groups. Specifically, we consider three types of workers, indexed by *i*, and managers, indexed by *j*, with  $i, j \in \{u, m_1, m_2\}$ . Type *u* managers and workers are motivated exclusively by monetary rewards. We refer to type *u* agents as *unmotivated*. Types  $m_1$  and  $m_2$  are referred to as *mission-motivated* in light of the fact that, besides the usual pecuniary motivations, they are driven by a concern about the missions pursued by the organizations they join. We allow for a distinction between  $m_1$  and  $m_2$  which has one of two possible interpretations. It can either reflect the differences in focus among the variety of subfields of public good activity (e.g. advocacy/activist versus direct care provider), or it can reflect differences in some attribute (e.g. religious affiliation versus secular) within some specific subfield (e.g. education) of the mission sector.

We assume that the supply of managers is infinitely elastic. A measure  $L_u$  of unmotivated workers and a measure  $L_m$  of mission-motivated workers are alive every period, half of which are of type  $m_1$  and half of type  $m_2$ , that is  $(L_{m_1} = L_{m_2} = \frac{L_m}{2})$ . The fraction  $\beta$  of workers that dies every period is immediately replaced by identical workers, who enter the labour market as unemployed, so that the size and the composition of the workforce remain intact and stationary.

There are three goods in the model: two produced goods  $g_m$  and  $g_b$ , corresponding to the mission and the non-mission sector respectively, and a non-produced numeraire good y. Production of  $g_m$  and  $g_b$  is undertaken by organizations – established as either for-profit or nonprofit – which consist of a manager (founder) employing two workers. Details about the differences between the two types of institutions are provided further on. Workers do not care directly about the type of organization they work for and are equally productive working for either type of provider. All organizations in each sector, have access to a common sector-specific production technology,  $g_s(e_1, e_2)$ , where  $s \in \{m, b\}$  and  $e_i \in \{e^l, e^h\}$ , which describes how the combined effort choices of the two workers and the entrepreneurial input of the manager translate into the production of the organization's service,  $g_m$  or  $g_b$ .<sup>13</sup> We assume that each worker can choose between two effort levels: high effort ( $e = e^h$ ) with corresponding output  $g_s(e_1^h, e_2^h) = g_s^h$ , and low effort ( $e = e^l = 0$ ) which yields a normalized output  $g_s(e_1^l, e_2^l) = 0$ . When only one of the workers shirks production level falls but not all the way to zero:  $g_s(e_1^h, e_2^l) = g_s(e_1^l, e_2^h) = \gamma$ , where  $0 < \gamma < g_s^h$ . Workers' effort, e, need not admit a one-dimensional interpretation; one can imagine that workers' effort is applied

<sup>&</sup>lt;sup>11</sup>For clarity, we shall refer to managers using feminine pronouns and to workers using masculine.

 $<sup>^{12}</sup>$  For convenience, we subsume the discounting factor of agents in  $\beta.$ 

<sup>&</sup>lt;sup>13</sup>For simplicity, we abstract from non-labour inputs. One possible interpretation of the difference between a manager and a worker is that performing the entrepreneurial and supervisory duties of a manager requires an investment in human capital. Thus, a wealthy fraction of workers who have incurred the fixed cost of acquiring the human capital have become managers. We do not model this investment decision here.

along a vector of qualitative and/or quantitative dimensions of output that managers care about.

In the mission sector, if, in addition to high effort, workers' type matches the type of the organization we assume that preference congruence has a beneficial impact on productivity. When workers' are called to carry out a mission with which they identify, they are more motivated, and hence provision of  $g_m$  is increased to  $\hat{g}_m > g_m^{h,14}$ . To be concrete, we imagine that there are two sets of actions that workers can take: one set is costly to them to provide, and shirking on this dimension will eventually be detected by the manager of the organization. These actions, denoted by (e) in the model, are responsible for the organization delivering  $g_m^h$  when effort is high. In addition, there is another *unobservable* set of actions, not explicitly modeled, that workers will only undertake if they buy into the mission of the organization. It is this set of actions that we view as accounting for the higher level of mission good provision,  $\hat{g}_m$ , that the organization can achieve with better matching.<sup>15</sup>

In order to focus on incentive issues we assume that workers are risk neutral and have a within period utility function, separable in income (y) and effort (e). We summarize the per-period utility,  $U_{ij}^W(y, \theta_{ij}, e)$ , attained by worker of type *i* when working for employer of type *j* as follows:

$$U_{ij}^{W}(y,\theta_{ij},e) = \begin{cases} y-e & \text{if } i = u \text{ and } j = u \\ y+\theta^{l}-e & \text{if } i \in \{m_{1},m_{2}\}, \ j \in \{m_{1},m_{2}\}, \ i \neq j \text{ where } \theta^{h} > \theta^{l} > 0 \\ y+\theta^{h}-e & \text{if } i \in \{m_{1},m_{2}\}, \ j \in \{m_{1},m_{2}\}, \ i = j \end{cases}$$
(3.1)

The parameter  $\theta_{ij}$  represents the intrinsic payoff of a mission-motivated worker, which accrues to the worker independently of the legal status of the organization (for-profit or nonprofit).<sup>16</sup> If employed by one of the organizations, a worker receives an endogenous wage w, while if not employed workers are able to find work elsewhere at an exogenously given reservation wage  $\bar{w}$ , which does not require high effort.<sup>17</sup> To rule out trivial outcomes, we assume that  $p_s g_s(e_1^h, e_2^h) - 2e^h > 2\bar{w}$ , where  $p_s$  is the market price for good  $g_s$ , so it is

<sup>&</sup>lt;sup>14</sup>In reality, the difference between  $g_m^H$  and  $\hat{g}_m$  would most likely correspond to differences in the quality of the service being produced. Our model is consistent with this view, if we interpret output as being weighted by quality.

<sup>&</sup>lt;sup>15</sup>Our logic is similar to that in Akerlof and Kranton (2005), who emphasize the notion of workers' identity and argue that when workers identify with the goals of the organizations they are employed they might be willing to put in high effort with little wage variation. Here we take the view that workers' sense of identity stems from the particular mission the organization is committed to.

<sup>&</sup>lt;sup>16</sup>The way we specified preferences implies that workers receive a "warm glow" effect; that is, the benefit they receive is action-determined not output-determined, as in Besley and Ghatak (2005). If instead we allowed workers to be motivated by the effects of their actions on the quantity of output, then the benefit generated would entail a public good component and hence a standard free-riding problem would ensue. The implications of this type of preferences on organizational incentives are pursued in Francois (2003, 2006).

<sup>&</sup>lt;sup>17</sup>Alternatively,  $\bar{w}$  may be thought of as the value of home production.

productively efficient for workers to be employed by a firm and to choose high effort.

Unmotivated managers, type u, care only about personal consumption of the numeraire good y. On the other hand, mission-motivated managers have preferences given by  $u_j^M(y, g_m)$ , for  $j \in \{m_1, m_2\}$ . That is, we allow mission-motivated managers, as we did above with mission-motivated workers, to derive personal nonpecuniary benefits from being involved in the delivery of collective goods. Note, however, that managers' altruistic motivations are outcome-oriented as they care about the scale of the mission good  $(g_m)$  produced by the organization they set up and not merely about their participation in the production of the collective good. As in the case of workers, intrinsic motivations are present whether the manager sets up a nonprofit or a for-profit organization. We identify the mission of the organization with the manager's type. Furthermore, we assume that the manager's type and the organization's form are common knowledge and so is the worker's type – whether he is mission-motivated or not; however, if he is, his precise mission type  $(m_1 \text{ or } m_2)$  is revealed to him and becomes public information only after working for one period.

Before entering a sector, a manager can choose whether to establish the organization as for-profit or nonprofit. Thus, a brief description of the differences between the two organizational forms is in order. The objective of the manager (residual claimant) of a private enterprise is primarily to maximize profits  $(\pi)$  for the organization. This assumption is standard in neoclassical economic analysis and does not warrant further justification. On the other hand, when an organization is nonprofit, it is not obvious what the objective of its manager is. Nevertheless, a defining characteristic of nonprofits is that they are subject to a *nondistribution constraint*, which stipulates that the manager of a nonprofit is banned from appropriating any net earnings from the organization's operations.<sup>18</sup> We follow Glaeser and Shleifer (2001) in assuming that the effect of this is that a fraction of the firm's profits can indirectly accrue to her in the form of perquisites such as less work hours, better working conditions etc.<sup>19</sup> This way of modeling the objectives of nonprofit managers makes operational the notion that these organizations can be instituted to have weaker incentives to pursue profits.<sup>20</sup> Though it is true that for-profit firms may also be motivated to serve other goals, we maintain that they must be consistent with their primary responsibility which is to generate sufficient rewards to shareholders.<sup>21</sup> Thus, we take the view that, as a

<sup>&</sup>lt;sup>18</sup>It is important to note that such a constraint does not preclude the possibility that a nonprofit organization may be actually earning positive profits.

<sup>&</sup>lt;sup>19</sup>In addition to the nondistribution constraint, nonprofit organizations do not have access to the equity capital market and may be also subject to regulations requiring that they engage in specific charitable, religious, educational or scientific activities in order to receive preferential tax treatment. We abstract from these issues here.

<sup>&</sup>lt;sup>20</sup>It is beyond the scope of this paper to model explicitly the objectives and constraints of nonprofit managers. The approach taken here serves the purpose of focusing attention on whether volunteer hiring can be consistent with a firm objective that departs from strict profit-maximization.

<sup>&</sup>lt;sup>21</sup>In a recent paper, Besley and Ghatak (2006b) show that the pursuit of socially responsible practices by profit-maximizing firms is possible in a competitive environment. They develop a model in which some firms commit to producing a public good along with a private good and are able to finance its production

first approximation, for-profit managers will face more high-powered incentives to maximize total firm value than their nonprofit counterparts.

In keeping with this discussion, we assume that the decision making process within nonprofit organizations – represented by the actions of the manager (founder) in our analysis – balances the goals of maximizing profits and furthering the mission of the organization. We posit that the outcome of this can be represented by an *induced* per-period quasi-linear utility function for a manager of type j who chooses organizational form k, where k = fdenotes a for-profit organization and k = n indicates a nonprofit organization, given by:

$$v_j^k(\pi, g_s) = \phi_j^k \pi + \delta_{js} b(g_s) \tag{3.2}$$

where  $\pi$  stands for profits and b(.) is a strictly increasing and concave function. The binary variable  $\delta_{js} \in \{0, 1\}$  captures managers' "care intensity" or altruism, which is only present for mission-motivated managers when producing a mission-oriented good (*i.e.*  $\delta_{jm} = 1$  for  $j \in \{m_1, m_2\}$ , while  $\delta_{jb} = 0$  for  $j \in \{u, m_1, m_2\}$ ). The parameter  $\phi_j^k \in [0, 1]$  reflects the extent to which the organization's profits can be enjoyed as income by the manager – so the nondistribution constraint implies that  $\phi_j^f > \phi_j^n$ . We assume that differences in mission preferences  $(m_1 \text{ or } m_2)$  are orthogonal to the degree to which the nondistribution constraint is enforced, and that a for-profit manager is the sole residual claimant, thus all profits  $\pi$ accrue to her.<sup>22</sup> From now on we let  $\phi_{m_1}^n = \phi_{m_2}^n \equiv \phi^n$ ; and  $\phi_{m_1}^f = \phi_{m_2}^f = \phi_u^f \equiv 1$ .

Note that when production is of the good without the mission component  $g_b$ , then  $\delta_{jb} = 0$ , so setting up a nonprofit firm in the non-mission sector only corresponds with reducing the utility a manager obtains from profit. Equation (3.2) captures, in a reduced-form, the fundamental trade-off that the manager faces in making the incorporating decision, highlighted by Glaeser and Shleifer (2001): commitment to nonprofit status signals greater care for the 'quality' of the public good, which, however, comes at the cost of restricted access to pecuniary rewards.

An important feature of the environment in which production is undertaken is that though the individual performance of the worker can be potentially assessed by the manager or supervisor, it is unverifiable by third parties, and as a result, no standard contractual instruments can be used to induce workers' effort. For example, an aid worker's job description typically involves a variety of complex tasks: from direct care provision to drafting reports, fund-raising and lobbying. Performance related compensation in this context is rare because (a) The monitoring and measurement of a worker's contribution to these tasks is very costly (and certainly difficult to verify by a third party, such as the courts) or (b) it

by charging caring consumers a premium for the private good. These firms can be viewed as exercising corporate socially responsibility (CSR).

<sup>&</sup>lt;sup>22</sup>For simplicity, we make no distinction between the owner and the manager of the firm, so that agency problems between ownership and control are assumed away.

may be difficult to ascertain an individual worker's contribution (due to the team character of production) or (c) it may induce effort distortions (due to multi-tasking considerations).<sup>23</sup> We abstract from the underlying details regarding the incentive provision problem and simply assume that workers' input and the intrinsic reward they receive, though potentially observable by the firm and the agent, are *noncontractible*. At the heart of the problem is not asymmetric information between principal and agent but third party nonverifiability of the individual worker's effort and output.

When an employer and a worker are engaged in a repeated, on-going relationship, they may be able to sustain informal long-term relational contracts as a means to overcome the noncontractibility of worker's performance. Specifically, MacLeod and Malcomson (1989) (under symmetric information) and Levin (2003) (under adverse selection and moral hazard) have shown, in a repeated game framework, the existence of an equilibrium outcome where firms can use implicit self-enforcing contracts to motivate workers, provided there is sufficient rent for both parties from the continuation of employment. Optimal self-enforcing contracts can take the form of efficiency wages or performance bonuses depending on market conditions.<sup>24</sup> We proceed to characterize first, the nature of the internship and volunteering relational contract between an exogenously given single manager-worker pair, and, subsequently, the market equilibrium in section 3.

# 3.3.2 The Employment Relational Contracts

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The two alternative relational contracts that we consider here are (a) The internship contract, which entails the vertical promotion of interns *within* an organization. Under this incentive structure, workers and managers are randomly matched. (b) The volunteering contract, which involves the horizontal *sorting* of workers to managers with similar mission preferences, after the unpaid stage. In the mission sector, this incentive structure will be shown to generate assortative matching of organization-worker pairs. Both sorts of self-enforcing contracts give rise to actions that could not be supported in a one-shot interaction, but which can be sustained when agents have a sufficiently high valuation of the future.

In the present model, a worker faces the following career choices: what sector to seek employment (m or b), what type of employer  $(u, m_1, m_2)$  to be matched with and how much effort to exert  $(e^h \text{ or } e^l)$ . To fix ideas, we describe briefly the successive stages in the career path of a typical worker who will enter into an implicit contract with a manager in a certain sector, assuming that such contracts exist in equilibrium, abstracting momentarily from

 $<sup>^{23}</sup>$ This insight is emphasized in the multi-tasking literature, see for example Holmstrom and Milgrom (1991).

<sup>&</sup>lt;sup>24</sup>In particular, MacLeod and Malcomson (1998) have shown that efficiency wages are likely to arise in markets where there is excess supply of workers, while performance-related bonus payments in markets with excess demand for workers.

issues of sector selection and matching which are considered subsequently. The given worker moves sequentially through three states: the general pool of workers, unpaid employment and paid employment (i.e. deferred wage position). In particular, the worker is born into the general pool where he receives an exogenous compensation  $\overline{w}$  every period. At the end of each period there is an endogenous probability  $\rho$  that the worker will exit the general pool and will find an unpaid employment position. Suppose that this occurs in period t-1; then the worker works for no pay during period t and at the end of the period he transitions to a wage position with probability  $(1 - \beta)$ ; otherwise, he remains an unpaid worker for another period.<sup>25</sup> If the worker is hired into a paid position he continues to work there until he dies.

We model the self-enforcing contracts as equilibrium strategies of a dynamic game between managers and workers. The first step of the analysis is to specify precisely the incomplete contract environment in which the repeated game is conducted.

#### Information Structure and Within Period Timing

Our specification of the information structure of the repeated game between workers and organizations, at any time t, can be summarized as follows:<sup>26</sup>

**Public Information.** The identity of all previous employment pairs and the wage payment histories are common knowledge since they are verifiable pieces of information. In particular, all workers and managers know whether a separation has occurred but do not know whether the worker quit or was fired, since this information is unverifiable. A separation that has taken place because of a death of one of the parties is distinguishable from separations due to the other causes involving one of the parties violating a promise. Also, if a separation occurs because a volunteer transfers to a paid position with a different employer this is also distinguishable from a separation due to malfeasance.<sup>27</sup> Note that a manager's public history includes the event of mistreatment of volunteers. By this we refer to the event where an organization which has been hiring volunteers into unpaid positions refuses to reciprocate by promoting workers from the volunteering pool into its own paid work vacancies. We assume that such practice becomes public information.<sup>28</sup>

<sup>&</sup>lt;sup>25</sup>At this point the employer must decide whether to honour the promise to promote the worker or cheat by hiring another intern to fill the vacancy. We examine the conditions that ensure employers' incentive compatible behaviour in the next section.

 $<sup>^{26}</sup>$ For a similar treatment of the information structure in a dynamic game between workers and firms, see MacLeod and Malcomson (1989).

<sup>&</sup>lt;sup>27</sup>For example, a letter of confirmation/recommendation from the employer outlining a volunteer's experience may be provided at the end of the assignment.

<sup>&</sup>lt;sup>28</sup>When an organization cheats on the promise to promote a volunteer into its paid position, it hires instead an unpaid intern directly from the general pool and therefore ceases to employ a paid worker. We assume that this practice can be detected by labour market participants by observing the composition of the organization's workforce. Essentially what we assume is that whether the organization is employing paid

Worker's Private Information. A worker knows his own performance and whether the organization where he was employed in previous periods honoured any promises made to him.

Manager's Private Information. A manager knows the history of effort contributions of all her workers up to time t and whether she has delivered on promises made to her workers.

The sequencing of decisions *within* a period in the contracting game between a matched manager and worker is:

- The manager makes the hiring decision (if there is a vacancy).
- The manager decides whether to make a payment or not.
- The worker makes the effort decision.
- The manager observes imperfectly worker's effort contribution.
- The worker observes manager's hiring decision.
- Both parties decide whether to continue the employment relationship or not.
- The period ends and both players continue to the next period with probability  $\beta$ .



Figure 3.1: Timing of Events

## The 'Internship' Incentive Compatible Wage

We now focus on the determination of the incentive compatible wage that induces an intern's effort. We consider a stationary environment, with employers offering the same wage  $w^{I}$  every period and the expected utility a worker gains from remaining in the general pool

workers or not is public information, which is verifiable information since wage payments are verifiable.

being constant. Letting  $V_{ijt}^{I}$  represent the expected lifetime utility of a worker of type i who accepts an unpaid position (internship) at an organization of type j at time t, and suppressing the time subscripts we write:

$$V_{ij}^{I} = -e^{h} + \beta \left[ (1 - \beta) V_{ij}^{p} + \beta V_{ij}^{I} \right]$$
(3.3)

In this expression,  $(1-\beta)$  denotes the probability that there will be a paid position vacancy and thus that the intern will be hired into a paid job.  $V_{ij}^p$  designates the expected lifetime utility of a paid worker who decides to deliver high effort. An intern receives no compensation and provides high effort in the current period but expects to be hired into a paid job with probability  $(1 - \beta)$ . Thus,  $(1 - \beta)$  acts as a quasi-discount factor on the value of becoming a paid worker.

Similarly,  $V_{ij}^p$  is defined below:

$$V_{ij}^{p} = w^{I} + \theta_{ij} - e^{h} + \beta \max(V_{ij}^{p}, V_{ij}^{s})$$
(3.4)

where  $V_{ij}^s$  represents the expected utility of a worker who decides to shirk. If a worker supplies high effort then he attains utility  $w^I + \theta_{ij} - e^h$  during the course of the current period, where  $w^I$  is the wage associated with the position in an organization of type j and  $\theta_{ij}$ is the intrinsic reward for individual of type i associated with a position in an organization of type j. If the job is continued, then the worker decides whether to furnish high effort next period or not, if doing so yields greater utility to him than shirking.

When a worker shirks, he receives the wage  $w^{I}$  and the nonpecuniary benefit  $\theta_{ij}$  but does not undergo the disutility of supplying effort. A shirking worker is detected with a constant exogenous probability  $\mu \in (0, 1)$ , in which case he loses the job at the end of the period, and goes undetected with probability  $(1 - \mu)$  in which case he makes the effort decision again next period.<sup>29</sup> We write the value function of a shirker as:

$$V_{ij}^{s} = w^{I} + \theta_{ij} + \beta \left[ \mu V^{g} + (1 - \mu) \max(V_{ij}^{p}, V_{ij}^{s}) \right]$$
(3.5)

Finally, the value function of being in the outside general pool is:

$$V^g = \overline{w} + \beta \left[ \rho V^I_{ij} + (1 - \rho) V^g \right]$$
(3.6)

where  $\overline{w}$  is the general pool compensation and  $\rho$  is the endogenous, in equilibrium, job acquisition rate.

Let us now consider the incentives that employers face in designing the relational con-

<sup>&</sup>lt;sup>29</sup>The assumption of a less than perfect monitoring technology can be justified by the costs associated with supervision. In addition, we assume that inference of effort via observing output is impossible because of noise and the difficulties of identifying individual contributions due to the team character of production.

tract. Their strategy is to minimize labour costs subject to being able to attract interns and induce them to provide high effort. Consequently, they will choose  $w^{I}$  such that the prospective worker is no worse-off from becoming an intern and not remaining in the general pool, i.e. the following participation constraint must be satisfied:

$$V_{ij}^I \ge V^g \tag{PC}$$

If  $V_{ij}^{I} > V^{g}$ , then it is in the firm's best interest to adjust the features of the package and transfer the surplus from the worker to itself such that internships are no more attractive than the outside option. The only means of adjusting the package, since the probability of transitioning from unpaid to paid work  $(1-\beta)$  is exogenous, is to reduce the wage associated with a paid position. Let the wage solving (PC) with equality be  $w^{PC}$ . Substituting from (3.3), (3.6) and (3.4) it can be shown that:

$$w^{PC} = \frac{1+\beta}{\beta} (e^h + \bar{w}) - \theta^r \tag{3.7}$$

where  $\theta^r$  is the expected intrinsic payoff when workers and firms are randomly matched.  $(\theta^l < \theta^r < \theta^h)$ . Also, to deter shirking by the worker, the wage offered to the worker must satisfy the following incentive compatibility (no-shirking) constraint:

$$V_{ij}^p \ge V_{ij}^s \tag{3.8}$$

this condition implies:

**Lemma 4** If the probability of detection of a shirking worker is sufficiently low,  $\mu < \frac{(1-\beta)e^h}{\bar{w}+e^h}$ , then the relational contract  $(w^I, e^h)$  between an intern/worker and a firm consists of a wage satisfying:

$$w^{I}(\rho) = \frac{\left(1-\beta^{2}\right)\left(1+\beta\rho-\beta\left(1-\mu\right)\right)}{\beta\mu\left(1+\beta\rho-\beta^{2}\right)}e^{h} + \frac{\left(1-\beta^{2}\right)}{\left(1+\beta\rho-\beta^{2}\right)}\bar{w} - \theta^{r}$$
(ICI)

with  $\frac{\partial w^{I}(\rho)}{\partial \rho} > 0.$ 

**Proof.** Proof is in Appendix B.

Note that the assumption on the primitives  $\left(\mu < \frac{(1-\beta)e^h}{\bar{w}+e^h}\right)$  is needed to ensure that the wage in (ICI) is at least as high as the wage in (3.7), which is necessary to induce participation by workers in the general pool. The incentive compatible wage in (ICI)admits a standard efficiency wage type of interpretation. That is, to induce effort the organization has to pay the worker a premium over his market alternative. Intuitively, the relational contract defined above allows the organization to elicit effort from the worker while limiting the rent offered to him. This is accomplished because while the worker gets a wage premium while occupying an efficiency wage position, the rent is partially taxed back by making the worker pay an "entrance fee" in the form of the uncompensated effort he has to supply as an intern.<sup>30</sup> This arrangement encourages interns to stay with the firm and supply high effort throughout their career in order to benefit from the higher wages that come with seniority.

For the relational contract in (ICI) to be supported in equilibrium, a sufficient rent has to be generated from employment. The rent is the difference between the returns to the current arrangement and those that the two parties could achieve in their outside options. In this model, the surplus is divided between employers and workers. To see this note that an intern prefers his current status than staying in the outside pool  $(V_{ij}^I \ge V^g)$ . For employers, profits from hiring interns are trivially greater than profits from hiring straight from the outside pool, which would be the alternative way of filling a vacancy, because an intern generates as much lifetime expected profits as an outside worker when in a paid position, but also makes an uncompensated contribution to the firm's profits as an intern.

Note that we have ruled out the possibility that workers can post a performance bond (in the form of a negative hiring wage) during the internship stage of employment. If this were possible, then firms could use this instrument to bind the participation constraint of workers  $(V_{ij}^I = V^g)$ , thereby extracting the entire surplus from the employment relationship and clearing the labour market. In reality, however, performance bonds are rarely observed. One possible explanation for this absence is credit market imperfections that make it impossible for workers to raise the money for the bond. More generally, the possibility of posting performance bonds raises a host of issues, as it induces employers to cheat workers in various ways, so we proceed by assuming that firms leave some rents to workers.

### The 'Volunteering' Incentive Compatible Wage

The volunteering employment structure resembles the internship structure except that volunteering is an implicit contract offered jointly by all participating organizations and not by one specific employer. In particular, the volunteer is initially randomly matched with an organization and supplies high effort for that employer with no compensation; subsequently, the volunteer learns his type and when a paid position in an organization of the same type is vacated he transitions to that position even if this means transferring to a different organization. We examine managers' incentives to sustain this structure in the next subsection.

In addition to providing incentives, since volunteering is recognized by other firms, it

<sup>&</sup>lt;sup>30</sup>Essentially, our version of the shirking model allows an entrance fee to emerge which reduces the rent that the employer needs to concede in order to motivate the worker. The suppression of this mechanism in the original Shapiro and Stiglitz (1984) formulation-by assuming that the principal pays the same wage at every period-was considered a theoretical weakness of the efficiency wage theory (see Carmichael 1989).

plays the role of facilitating matching between mission-motivated workers and organizations.<sup>31</sup> We posit a frictionless matching process: the matching is instantaneous and costless. We look for allocations of workers to organizations that are voluntary and stable, in the sense that there is no pair that could negotiate an agreement that would make both parties better off than they are in their current matches. The following lemma characterizes the nature of stable matching in the mission sector.

**Lemma 5** Any stable matching equilibrium must have organizations and workers assortatively matched.

#### **Proof.** Proof is in Appendix B.

We now turn to the determination of the incentive compatible wage for an organization hiring volunteers. The value functions of being in any of the three possible states, employed and paid, employed and unpaid (volunteer) and unemployed are identical to the ones in (3.3), (3.6), (3.4) and (3.5). Therefore, maintaining the notation we established in the previous section, incentive compatible wages that support assortative matching have to satisfy the following two conditions:

$$V_{ij}^p \ge V_{ij}^s \tag{3.9}$$

and

$$w_{ii}^V + \theta^h \ge w_{ij}^V + \theta^r \tag{3.10}$$

The first condition is standard and ensures that the worker supplies high effort. The second condition ensures that the payoff to a worker when working for an organization of the same type is at least as high as when working for an organization of a different type.

**Lemma 6** The relational contract  $(w^V, e^h)$  between a volunteer/worker and a firm consists of a wage satisfying:

$$w^{V}(\rho) = \frac{\left(1-\beta^{2}\right)\left(1+\beta\rho-\beta\left(1-\mu\right)\right)}{\beta\mu\left(1+\beta\rho-\beta^{2}\right)}e^{h} + \frac{\left(1-\beta^{2}\right)}{\left(1+\beta\rho-\beta^{2}\right)}\bar{w} - \theta^{h}$$
(ICV)

with  $\frac{\partial w^V(\rho)}{\partial \rho} > 0.$ 

**Proof.** Proof is in Appendix B.

The interpretation of the incentive compatibility wage for volunteering is analogous to that offered above for internship: a worker receives a premium for . The analysis of the two alternative self-enforcing mechanisms can be summarized in the following proposition:

 $<sup>^{31}</sup>$ In equilibrium, volunteering only occurs in the mission sector, this will be proved later, but for now we take it as given.

**Proposition 4** Conditional on a common job acquisition rate  $(\rho)$ , binding incentive compatible wages in the mission sector are higher under an 'Internship' relational contract than a 'Volunteering' relational contract  $(w^{I}(\rho) > w^{V}(\rho))$ .

**Proof.** Follows directly from (ICI), (ICV) and noting that  $\theta^h > \theta^r$ .

The role that mission heterogeneity plays in the model now becomes clear. As in Besley and Ghatak (2005), selecting workers with congruent preferences can be cost saving for organizations, as this allows them to induce high effort at a lower wage. In addition, there are productivity gains to be made since volunteering ensures the better matching which raises workers' output. Consequently, those firms that can attract volunteers will be at an advantage. This feature is absent in the non-care sectors of the economy, so for employers a volunteering contract in those sectors is not preferred to the internship contract we discussed above. It now remains to establish that the wages and employment patterns which have been computed for a single worker can constitute an equilibrium of the multi-player game.

# 3.3.3 Selection of Relational Contract and Organizational Form

#### Mission Sector

The purpose of this sub-section is to explore the role of the interaction between the choice of organizational form and the presence of mission preferences for the type of implicit contract that managers will use, in equilibrium, to overcome the non-contractibility problem of workers' effort. In what follows, we analyze whether it is incentive compatible for managers to implement volunteer hiring. In particular, we shall show that under the stated assumptions on the preferences of the managers who control the organizations, a deviation from a volunteer structure is more valuable for for-profit firms, which in equilibrium is going to lead to volunteering being only available to nonprofit organizations.

For an organization that implements a volunteer hiring structure the composition of its workforce, at any time t, is one wage worker plus one volunteer who awaits promotion to a paid position next period and is going to be replaced by a new volunteer. Profits equal  $\pi^V = p_m \hat{g}_m - w^V$ , where  $p_m$  is the price of the final product which the firm takes as given. Similarly, for an organization which uses an internship structure, its workforce consists of one wage worker plus one intern who will be promoted if a wage position is vacated next period and will be replaced by a new intern. Profits equal  $\pi^I = p_m g_m^h - w^I$ , where  $\hat{g}_m > g_m^h$ , reflecting the fact that interns are randomly matched with organizations.

Note that the volunteer relational contract described above creates moral hazard on the part of the employer. Organizations have an incentive not to promote current volunteers to wage positions and to replace them with new volunteers from the general pool, thus appropriating the unpaid labour contribution made by volunteers. Workers anticipating that they will not receive the high future payments have no incentive to work and thus incentives are destroyed. Thus, for volunteer hiring to be sustainable it has to satisfy the manager's incentive compatibility condition.

Consider what constitutes a deviation from the volunteering structure. Suppose that a paid position vacancy is created. The organization deviates by reneging on the promise to hire an individual from the volunteering pool to fill its vacancy and instead hires an unpaid intern straight from the general pool to fill this position. By doing this, the manager makes a one-period gain from not having to pay the wage she would otherwise have to, if she continued to hire volunteers to paid positions, but has to resort to an internship structure to get around workers' moral hazard in future periods since workers will refuse to volunteer for her anymore. That is, organizations that cheat lose their reputations and are punished in future labour market dealings by the workers' equilibrium strategies. Punishment here consists of future workers refusing to volunteer for organizations who have previously chosen not to promote volunteers into paid positions and to instead only accept internship contracts from such organizations.<sup>32</sup> This kind of grim trigger strategy requires that labour market participants can observe whether an organization is employing a paid worker or not. In particular, when a manager breaches the implicit agreement to promote a volunteer into a paid position and hires another unpaid worker then during the deviation she employs only unpaid workers; other potential workers can detect this – because wage payments are verifiable information – and so they rationally avoid volunteering for the organization in the future. Equilibrium strategies supporting the volunteer-hiring relational contract are explicitly defined in Appendix A.

Specifically, in the first period of deviation the manager hires two interns to fill both the vacant paid position and the unpaid position. Profits are  $\pi^{Vd} = p_m g_m^h$ . The opportunistic manager then loses the goodwill of being an honest employer so in future periods workers only accept internship positions that are more costly for the firm because  $w^I > w^V$  – that is, the wage paid to interns is greater than the wage paid to volunteers. Also the mismatch induced because interns are randomly matched with organizations will also have an impact on the ability of the organization to successfully fulfill its mission. That is, following a deviation, the organization's mission good production is compromised  $(g_m^h)$ .

Hence, volunteering is self-enforcing if the present value of honouring is greater than the present value of reneging. The manager's incentive compatibility condition may be written as:

$$\frac{1}{1-\beta} v_j^k(\pi^V, \widehat{g}_m) \ge v_j^k(\pi^{Vd}, g_m^h) + \frac{\beta}{1-\beta} v_j^k(\pi^I, g_m^h)$$
(3.11)  
for each  $j \in \{m_1, m_2\}$ , and  $k \in \{f, n\}$ 

<sup>&</sup>lt;sup>32</sup>Given this strategy of workers, the best response for managers who have reneged in the past is to continue cheating on the promise to promote volunteers, so that workers' strategies are a best response.

where  $\pi^{Vd} > \pi^V > \pi^I$  and the last inequality follows from the fact that  $w^I \ge w^V$ . The left-hand side of (3.11) is a manager's discounted payoff from not cheating. The first term on the right-hand side of (3.11) represents the utility the manager can attain if she cheats. Note that this would raise profits but hurt the quality of the mission good.<sup>33</sup> The second term captures the expected present value payoff from hiring interns, which is the hiring practice the manager implements along the punishment path. Our goal now is to determine for which organizational form incentive compatibility is easier to satisfy. Substituting from (3.2) into (3.11) yields:

$$\frac{1}{1-\beta} \left[ \phi^k \pi^V + b(\widehat{g}_m) \right] \ge \left[ \phi^k \pi^{Vd} + b(g_m^h) \right] + \frac{\beta}{1-\beta} \left[ \phi^k \pi^I + b(g_m^h) \right]$$

which upon rearrangement and simplification implies that:

$$\pi^{V} \ge (1-\beta)\pi^{Vd} + \beta\pi^{I} - \frac{1}{\phi^{k}} \left[ b(\widehat{g}_{m}) - b(g_{m}^{h}) \right]$$
(ICM)

Define the right-hand side of (ICM) as  $\Theta(\phi^k)$ . The following result holds:

**Proposition 5** In the mission sector, equilibrium level profits required to satisfy incentive compatibility of managers under a for-profit status is higher than that under a nonprofit status.

**Proof.** Because  $\Theta(\phi^k)$  is increasing in  $\phi^k$ , and  $\phi^f > \phi^n$  it follows that  $\Theta(\phi^f) > \Theta(\phi^n)$ .

To gain some intuition for this result notice that the way in which the reputation mechanism informally enforces managers' incentive compatible behaviour is by offering to the potential cheater a "premium": a stream of payoffs that exceed the potential gain from cheating. This premium is given in both monetary (i.e. higher profits) and intrinsic (i.e. better quality) terms. Under nonprofit status profits are less valuable for a manager – because they can only be enjoyed as perks – so a nonprofit manager places relatively more weight on the fact that if she cheats on volunteers quality will suffer, and hence a smaller monetary premium is needed to maintain incentive compatibility. This is further illuminated by inspecting (ICM): the term that is subtracted from the right-hand side captures how heavily the loss of quality – due to cheating – is discounted. Thus, if cheating did not affect quality then this term would be zero so the right-hand side of the inequality would be the same across firm types, and no organizational form would find it easier to attract volunteers. But to the extent that volunteering does affect the quality of the service provided, the term is positive, so nonprofit incorporation relaxes the incentive compatibility condition

<sup>&</sup>lt;sup>33</sup>Note that for cheating to be worthwhile it has to be that  $\phi^k \left(\pi^{Vd} - \pi^V\right) \ge b(\hat{g}_m) - b(g_m^h)$ . That is, the monetary benefit from cheating (due to higher profits) has to be greater than the intrinsic loss a manager suffers (due to quality degradation). In what follows we assume that this is always true.

that makes commitment to hiring volunteers credible. This suggests that volunteer hiring by nonprofits should occur only in fields where matching on mission heterogeneity has a noticeable effect on quality.

Proposition 5 has the following important implication.

**Corollary 2** For-profit firms will not be able to participate in a volunteer hiring structure that is just incentive compatible for nonprofit firms.

Free entry in the mission sector will ensure that the incentive compatibility condition of the nonprofit firm (ICM) binds. However, when this is the case, incentive compatibility for for-profit firms will be violated which means that they cannot credibly commit to hiring volunteers. Furthermore, if a mission-motivated manager were to enter the mission sector establishing a for-profit firm and implement an internship structure she would be outcompeted by existing not-for-profit firms recruiting volunteers because of their lower labour costs. Thus, incorporation as nonprofit is valuable for managers because it serves as a commitment device that signals potential volunteers that they will be fairly treated. The very factor that is usually thought of as accounting for the efficiency supremacy of forprofit governance – high-powered incentives – can rule out participation in the volunteering incentive structure in mission-oriented sectors.

The model's prediction that only nonprofit firms will participate in a volunteering structure and that this will occur in mission-related activities is consistent with even a casual observation of the pattern of sectoral distribution of volunteer activity, according to which nonprofit agencies are the overwhelming recipients of volunteering services. This is even true in mixed ownership industries (childcare, nursing homes etc) where for-profit coexist and compete against nonprofits in both the service and labour markets.

For a different perspective on the difficulties associated with sustaining the volunteerhiring structure notice that, because incentives are sector-wide and not employer-specific, their provision has the character of a public good and is susceptible to a form of free-riding. That is, each individual employer would like to obtain labour donations from volunteers but refrain from reciprocating by subsequently hiring them into paid positions, thereby free-riding on other organizations' hiring of volunteers. When the free riding is severe – i.e. when condition (3.11) fails – it leads to the unraveling of the volunteering structure. The implication of *Proposition 5* is that organizing the production of collective goods by nonprofit organizations is a less costly way to overcome this kind of free-riding problem.

#### **Non-mission Sector**

In the non-mission sector mission matching plays no role. The following result holds:

Lemma 7 In the non-mission sector managers choose for-profit status.

### **Proof.** Proof is in Appendix B

This prediction of the model is also consistent with the observation that nonprofit firms are absent from sectors of the economy which do not involve mission-oriented production.

Furthermore, since there is no issue of matching managers and workers in this sector internships is the preferable hiring policy. However, when an internship structure is implemented there is still scope for opportunistic behaviour on the part of managers. In particular, when a paid position vacancy is created in an organization which has been hiring interns then its manager has an incentive not to honour the promise to hire the existing intern into the paid position, but to fill the position with an unpaid worker from the general pool. Such behaviour once detected by labour market participants results in loss of reputation and is punished in future labour market interactions by the workers' equilibrium strategies. That is, in future periods workers will not be willing to be recruited as unpaid interns and the manager would have to resort to paying both of its workers an up-front wage  $w^I$  satisfying (*ICI*). Equilibrium strategies supporting the internship hiring structure are defined in Appendix A.

The incentive compatibility condition of the manager may be written as follows:

$$\frac{1}{1-\beta}v^f(\pi^I) \ge v^f(\pi^{Id}) + \frac{\beta}{1-\beta}v^f(\pi^e)$$

or equivalently

$$\frac{1}{1-\beta}\pi^I \ge \pi^{Id} + \frac{\beta}{1-\beta}\pi^e \tag{3.12}$$

where  $\pi^{I}$ ,  $\pi^{Id}$  and  $\pi^{e}$  denote per-period profits under an internship structure, the deviation, and in the periods after the deviation respectively, and  $\pi^{d} > \pi^{Id} > \pi^{e}$ . For future reference, it is useful to rewrite (3.12) as:

$$\pi^{I} \ge (1-\beta)\,\pi^{Id} + \beta\pi^{e} \equiv K \tag{3.13}$$

This incentive constraint must be satisfied for the internship structure to be a credible recruitment strategy. With free entry into the non-mission sector, the level of profits that a manager can enjoy in equilibrium will satisfy (3.13) as equality. Notice that adding heterogeneity among unmotivated agents would not lead to the implication that there is a nonprofit advantage in the non-mission sector as well because of the absence of the non-pecuniary component in managers' payoff.

# 3.4 Market Equilibrium

Up to this point we have discussed the design of incentive schemes between a given exogenously formed manager/worker pair. We now turn attention to the steady-state analysis of a market equilibrium where multiple managers and workers interact, and consider the choice of organizational form (by managers) as well as the type of incentive relational contract that will be implemented by organizations in the two sectors.

We characterize an equilibrium with sorting of agents into sectors by type. In particular, mission-motivated managers and workers seek entrepreneurial and employment opportunities only in the mission sector and the same is true for their unmotivated counterparts in the non-mission sector. In addition, it will be shown that production in the missionoriented sector will only be undertaken by nonprofit organizations, and the employment structure will take the form of the volunteering contracts derived above. Conversely, in the non-mission-oriented sector, organizations will only be for-profit, and employment contracts will take the form of internships.

# 3.4.1 A 'Sorting' Equilibrium

To close the model, since we did not explicitly include in workers' preferences (3.1) the utility benefits derived from consumption of the services  $(g_m, g_b)$  produced, we assume that the demand side of the market<sup>34</sup> is described by a downward sloping demand schedule for the total services produced in the mission sector and the non-mission sector respectively:

$$G_m = D_m(p_m)$$
 and  $G_b = D_b(p_b)$ 

where  $\frac{dD_m(p_m)}{dp_m} < 0$  and  $\frac{dD_b(p_b)}{dp_b} < 0$ , and aggregate service provision is given by simply adding up the individual output of all producing organizations:  $G_m = \sum g_m$  and  $G_b = \sum g_b$ .

In the steady-state equilibrium, the same endogenous total number of jobs  $E_m$  and  $E_b$ , in the mission and the non-mission sector respectively, are created in every period.<sup>35</sup> We assume that at full employment  $(E_m + E_b = L_u + L_m)$  the revenue product of labour covers the opportunity cost of labour, that is, full employment is efficient. At the beginning of each period, workers in the general pool are randomly assigned to the unfilled vacancies created as some existing matches are dissolved with exogenous probability  $1 - \beta$ . Workers must be willing to accept positions and supply high effort at the going wage, and managers must be willing to create enough jobs to replace the workers who turnover because they die and must have an incentive not to renege on the promise to promote unpaid workers into paid positions. Formally, a steady-state equilibrium is defined as follows:

**Definition 2** Given the aggregate demand functions  $D_m(p_m)$  and  $D_b(p_b)$ , a steady-state equilibrium consists of a set of wages, prices and allocations of final services  $(w_m^*, p_m^*, G_m^*, w_b^*, p_b^*, G_b^*)$  along with a stationary allocation of workers across sectors (mission, non-mission) and states (paid employment, unpaid employment, general pool), such that

 $<sup>^{34}</sup>$ In the case of mission goods, both the government and individual agents may be purchasers.

<sup>&</sup>lt;sup>35</sup> E encompasses both paid workers (P) and unpaid workers (volunteers or interns) (U), i.e. E = P + U.

incentive compatibility is satisfied for both managers and workers. In addition, no new entry, under any choice of organizational form, must be attractive.

We now focus on identifying the conditions under which a steady-state 'Sorting' equilibrium, that is consistent with the above definition, exists. The equilibrium we are interested in has the following characteristics: the mission sector attracts mission-motivated managers who establish nonprofit organizations that compete with each other and hire missionmotivated workers offering them the volunteering relational contract derived above. In the non-mission sector, unmotivated managers establish for-profit organizations that compete with each other and offer unmotivated workers the internship relational contract.

To establish conditions under which this type of 'Sorting' equilibrium we hypothesize exists, we check whether the prescribed self-selecting behaviour is incentive compatible once we take into account that workers are freely mobile between the two sectors, and that managers are free to enter either sector. That is, for the sorting equilibrium to exist we need to confirm that in equilibrium the entry of mission-motivated workers into the mission sector and of unmotivated workers into the non-mission sector is optimal. Letting  $V_i^g(s)$ denote the discounted lifetime utility of a worker in the general pool of type *i* who wishes to enter sector *s*, the sorting constraint for mission-motivated workers may be written as:

$$\widetilde{V}_i^g(m) \ge \widetilde{V}_i^g(b) \text{ for } i \in \{m_1, m_2\}$$
(SW1)

while the one for unmotivated workers is:

$$\widetilde{V}_u^g(b) \ge \widetilde{V}_u^g(m) \tag{SW2}$$

Similarly, the sorting constraint for mission-motivated managers is:

$$v_j^n(\widetilde{\pi}_m^V, \widehat{g}_m) \ge v_j^f(\widetilde{\pi}_b^I) \text{ for } j \in \{m_1, m_2\}$$
(SM1)

and the one for unmotivated managers:

$$v_u^f(\tilde{\pi}_b^I) \ge v_u^n(\tilde{\pi}_m^V) \tag{SM2}$$

where  $(\sim)$  denotes that the objects in question are evaluated in the sorting equilibrium.

Also, note that in the equilibrium we are interested in, the probability of finding a volunteering position in the mission sector  $(\rho^m)$  for a mission-motivated worker in the general pool and for an unmotivated worker in the general pool the probability of finding an internship position in the non-mission sector  $(\rho^b)$  is given respectively by:

$$\rho^m(E_m) = \frac{(1-\beta) E_m}{L_m - E_m} \text{ and } \rho^b(E_b) = \frac{(1-\beta) E_b}{L_b - E_b}$$
(3.14)

where  $\rho^m(E_m)$  and  $\rho^b(E_b)$  are increasing functions.

We make the following assumptions on the parameters of the inverse demand functions:

Assumption 2.  $\{p_m(G_m(E_m))\widehat{g}_m - \Theta(\phi^n)\}$  takes at least one value in the interval  $(w^V(0), w^V(L_m))$ .

Assumption 3.  $\{p_b(G_b(E_b))g_b^h - K\}$  takes at least one value in the interval  $(w^I(0), w^I(L_b))$ .

Because  $w^{V}(E_{m})$  and  $w^{I}(E_{b})$  are continuous and increasing in  $E_{m}$  and  $E_{b}$  respectively, the above restrictions on the parameters of  $p_{m}(G_{m})$  and  $p_{b}(G_{b})$  ensure that the managers' downward sloping incentive compatibility conditions cross the workers' upward sloping incentive compatibility conditions in the relevant region, that is, for  $E_{m} \in (0, L_{m})$  and  $E_{b} \in (0, L_{b})$ . We have:

**Proposition 6** If the conditions for self-selection of workers (C.4) and managers (C.5) hold, there exists a steady-state 'Sorting' equilibrium  $(\tilde{w}^V, \tilde{p}_m, G_m(\tilde{E}_m), \tilde{w}^I, \tilde{p}_b, G_b(\tilde{E}_b))$  with the following properties:

a) The mission sector features a 'Volunteering' equilibrium: type  $m_1$  and  $m_2$  managers sort into the mission sector and establish nonprofit organizations hiring type  $m_1$  and  $m_2$ workers, respectively. The employment structure takes the form of volunteering. There are  $\frac{\tilde{E}_m}{2}$  workers of each type:  $\frac{\tilde{E}_m}{4}$  volunteers and  $\frac{\tilde{E}_m}{4}$  wage workers and  $\frac{\tilde{E}_m}{8}$  organizations of each type  $(m_1 \text{ and } m_2)$ .

b) The non-mission sector features an 'Internship' equilibrium: type u managers sort into the non-mission sector and establish for-profit firms hiring type u workers. The employment structure takes the form of internships. There are  $\frac{\tilde{E}_b}{2}$  workers of each type:  $\frac{\tilde{E}_b}{4}$ interns and  $\frac{\tilde{E}_b}{4}$  wage workers and  $\frac{\tilde{E}_b}{4}$  organizations.

# **Proof.** Proof is in Appendix B.

Conditions (C.4) and (C.5) in the proposition, which are derived in Appendix B, ensure that in the 'Sorting' equilibrium no mission-motivated worker or manager has an incentive to deviate from sorting into their designated sector. In particular, the condition for selfselection of workers (C.4) is not transparent and does not yield a straightforward economic interpretation.<sup>36</sup> Nevertheless, what this condition suggests is that the higher  $\theta^h$  the more attractive employment in the mission sector becomes for motivated workers, which makes the self-selection condition easier to satisfy. The sorting condition for managers (C.5) suggests that motivated managers will find entry into the mission sector preferable provided that they can extract sufficient economic rents (high  $\phi^n$ ) from the operation of the nonprofit

<sup>&</sup>lt;sup>36</sup>Ideally we would like to recast condition (C.4) in terms of only the exogenous parameters of the model, namely,  $\beta$ ,  $\theta$ , e,  $\overline{w}$ ,  $\mu$ ,  $L_m$ ,  $L_f$  etc. This is possible if we postulate specific functional forms for the inverse demand functions  $p^m(G_m(E_m))$  and  $p^f(G_f(E_f))$ , in order to explicitly solve (C.7) and (C.9) for  $\widetilde{E}_m$  and  $\widetilde{E}_f$ . Because this does not yield any additional economic insight we chose to leave  $\widetilde{E}_m$  implicitly defined in condition (C.4) and demonstrate existence with a worked example in Appendix C.

organization and/or they derive sufficiently strong intrinsic benefits (high  $b(\hat{g}_m)$ ) from contributing to the production of mission goods. In Appendix C we numerically compute a simple parametric example which illustrates that the sorting constraints for workers and managers in the 'Sorting' equilibrium can hold in non-trivial environments.

On the managers' side, free-entry ensures that incentive compatibility (ICM) binds. On the workers' side, incentive compatibility requires that condition (ICV) is satisfied. The two constraints are illustrated in figure 2. Note that (ICM) is downward sloping because the inverse demand function  $p_m(G_m)$  is decreasing in the level of employment  $E_m$ . Workers' incentive compatibility implies that equilibrium must lie on the upward sloping curve defined by (ICV), which is increasing because  $\frac{\partial w^V(\rho)}{\partial \rho} > 0$  and  $\rho$  is increasing in E. Equilibrium occurs at the intersection of the two conditions.



Figure 3.2: Volunteering Equilibrium in Mission Sector

The comparative statics of the 'Sorting' equilibrium are as follows:

**Corollary 3** A rise in the probability of detection  $(\mu)$  or in the intensity of workers' intrinsic motivation  $(\theta^h)$  reduces the equilibrium wage and increases the employment level. The opposite is true when the benefits of being in the general pool  $(\bar{w})$  rise. On the other hand, positive demand shocks for the service produced  $G_m$ ,  $G_b$  lead to more entry of organizations and higher equilibrium wage and employment level.

**Proof.** Proof is in Appendix B.

It is noteworthy, that in both sectors, workers in the general pool would be willing to work for less than the wage received by an identical paid worker, yet, organizations are not willing to hire them knowing that if hired these workers would have incentive to shirk. In this sense, unemployment in the 'Sorting' equilibrium can be characterized as involuntary – the kind commonly associated with efficiency wage models, for example Shapiro and Stiglitz (1984). However, compared to a benchmark equilibrium where all workers are hired directly into efficiency wage positions we have the following result:

**Proposition 7** If  $p_m(G_m) > \frac{\Theta(\phi^n)}{\widehat{g}_m - \frac{g_m^h}{2}}$ , for  $E_m \in (0, L_m)$ , then in any 'Sorting' equilibrium, employment and output in both sectors are higher than those that would occur if organizations employed only paid workers and paid them efficiency wages.

#### **Proof.** Proof is in Appendix B.

The restriction on the parameters of the inverse demand function  $p_m(G_m)$  is a sufficient but not necessary condition for this to be true. The intuition for the result in the proposition is simple. The model predicts that workers' incentive compatible wages, when volunteer hiring is implemented, are less sensitive to employment rates than those when workers are hired directly into paid positions. Having to go through an unpaid stage before hired into a paid position, if they are caught shirking, induces a harsher punishment so it reduces the wage premium needed to motivate volunteers or interns, from that in the benchmark case where workers in the general pool are directly hired into paid positions. Also, organizations' demand for labour is lower when at any point in time both workers need to be compensated, so managers' incentive compatibility constraint is shifted down and tilted.<sup>37</sup> Both effects result in the employment level at the sorting equilibrium to be higher than the benchmark case. This is illustrated in figure 3, which depicts the equilibrium with volunteer hiring (point V) and the equilibrium with only paid workers (point B).

To summarize the key points made so far, starting from the premise that some individuals view volunteer experience as a stepping stone for a professional career, the 'Sorting' equilibrium described provides a plausible explanation for why voluntary effort is almost exclusively elicited by not-for-profit organizations and why competing for-profit corporations cannot duplicate the incentives needed to support a sector-wide volunteer-hiring structure. Furthermore, by relaxing the incentive compatibility constraint of workers, employment and service provision in the 'Sorting' equilibrium move closer to the full employment levels.

A limitation of the 'Sorting' equilibrium is the counterfactual prediction that all hiring by nonprofit organizations in the mission sector is done from the volunteer pool. However, we believe that this shortcoming arises because of our stylized assumption of a homogeneous (in ability) workforce. In other words, what the model predicts is that if two otherwise identical workers apply for a paid position, then the organization will always choose the worker who has some volunteering experience over a person who has none, which seems to be a plausible description of the way nonprofit employers screen applicants.

<sup>&</sup>lt;sup>37</sup>The condition in the proposition ensures that this is true.



Figure 3.3: Volunteering Equilibrium (point V) vs Efficiency Wage Equilibrium (point B)

# 3.4.2 Welfare Analysis

Our task in this sub-section is to assess some welfare properties of the two-sector 'sorting' equilibrium. In particular, we are interested in gauging its performance against the efficient benchmark set by a social planner. It will be demonstrated that the 'Sorting' equilibrium is constrained Pareto efficient, as a planner, maximizing a representative worker's expected utility subject to the same informational constraints faced by agents, would not be able to improve worker's welfare. In addition, we will show that the 'Sorting' equilibrium has some desirable welfare properties as it generates more employment and output than a benchmark equilibrium where only paid workers are employed, or one where firms hire interns.

To begin notice that although both the volunteering and the internship structures partly overcome workers' moral hazard, they introduce another source of inefficiency because producing organizations must earn a rent in order to be deterred from behaving opportunistically. As a result, a wedge between marginal production cost and price is created, and the socially optimal amount of service is not produced. To illustrate the welfare losses induced by these two frictions, we decompose the departure from the first best allocation into two parts: one due to workers' moral hazard and one due to firms' moral hazard. The analysis is significantly aided by reference to figure (4). First, note that in the absence of any informational constraints the first best allocation would correspond to full employment, point FB in figure (4). Let us now introduce the two frictions successively: first, we seek the point that maximizes a representative worker's expected utility subject to worker's incentive compatibility constraint (3.16) and the feasibility constraint (3.17) assuming away the commitment problem of firms:

$$\max_{w,E} (w + \theta^h - e^h) \frac{E}{2} + (-e^h) \frac{E}{2} + \bar{w}(L_m - E)$$
(3.15)

subject to:

$$w \ge \frac{\left(1 - \beta^{2}\right) \left(1 + \beta \frac{(1 - \beta)E}{L_{m} - E} - \beta \left(1 - \mu\right)\right)}{\beta \mu \left(1 + \beta \frac{(1 - \beta)E}{L_{m} - E} - \beta^{2}\right)} e^{h} + \frac{\left(1 - \beta^{2}\right)}{\left(1 + \beta \frac{(1 - \beta)E}{L_{m} - E} - \beta^{2}\right)} \bar{w} - \theta^{h}$$
(3.16)

and

$$w \le p_m(G_m)\widehat{g}_m \tag{3.17}$$

The solution to this problem would be given by the intersection of the workers' incentive compatibility condition (3.16) and the binding feasibility condition (3.17), point P in figure (4).



Figure 3.4: Welfare Analysis

The planner would increase wages until there are zero profits. Note the first departure from first best: point P implies lower employment level and therefore service provision than

the first best, point FB. Next we add firms' binding incentive compatibility constraint:

$$\pi^{V}(p_m(G_m), E_m) = p_m(G_m)\widehat{g}_m - w \equiv \Theta(\phi^n)$$
(3.18)

and let the planner choose the allocation that would maximize a representative worker's welfare. The planner would now choose point V, the volunteering equilibrium, which occurs at the intersection of (3.16) and (3.18). The fact that (3.16) is upward sloping and (3.18) is a parallel inward shift of the planner's feasibility condition by the vertical distance  $\Theta(\phi^n)$ implies that point V in figure (4) will occur at an even lower employment level introducing a second departure from first best. Therefore, the volunteering equilibrium is constrained Pareto efficient, since a social planner subject to the two informational constraints could not increase the welfare of workers, but does not produce the first best amount of service  $g_m$ . The same logic applies to the internship equilibrium in the non-mission sector so we do not repeat it here.

The above argumentation is summarized in the following proposition:

**Proposition 8** a) In the mission sector, the 'Volunteering' equilibrium is constrained Pareto efficient but fails to produce the optimal amount of  $g_m$ .

b) In the non-mission sector, the 'Internship' equilibrium is constrained Pareto efficient but fails to produce the optimal amount of  $g_b$ .

We next compare worker's welfare in the mission sector when the two alternative employment practices are implemented, that is, we compare the volunteering equilibrium to the equilibrium that would occur in the same market if organizations instead of horizontally sorting workers were using the next best alternative hiring practice, the internal promotion of interns.<sup>38</sup>

**Proposition 9** In the mission sector, if  $p_m(G_m) > \frac{\Theta(\phi^n) - K}{\widehat{g}_m - g_m^h}$ , for  $E_m \in (0, L_m)$ , then an equilibrium with a volunteer-hiring structure always generates more employment and service provision than an equilibrium with interns. Moreover, workers' welfare is enhanced.

**Proof.** Proof is in Appendix B

In the Volunteering equilibrium, higher intrinsic motivation partly substitutes the monetary compensation needed at each level of employment to sustain incentive compatible behaviour of workers. Consequently, in this situation more matches can be supported and therefore employment and production in the mission sector is enhanced. The two types of equilibria are depicted in figure 5. Though the model presented here is too stylized to be taken as a literal account of the functioning of the labour market for volunteers, we believe

<sup>&</sup>lt;sup>38</sup>This thought experiment would make no sense in the profit sector as in that sector workers and organizations are homogeneous so the two hiring practices would yield identical equilibrium outcomes.



Figure 3.5: Volunteering Equilibrium (point V) vs Equilibrium with Internships (point I)

it is suggestive of the welfare benefits that the interaction between volunteering activity and nonprofit organizations can achieve.

# 3.5 Discussion

There is ample anecdotal evidence in the literature of the selection and sorting of managers and workers across nonprofit organizations and proprietary firms modeled in this paper. Hansmann (1980) mentions the possibility that the nondistribution constraint may act as a screening device that selects the type of entrepreneurs (managers) and workers who are more concerned about the quality of the service being provided and less interested in monetary rewards than other individuals. Weisbrod (1988) suggests that this process is indeed taking place:

'Managers, will, therefore, sort themselves, each gravitating to the types of organizations that he or she finds least restrictive-most compatible with his or her preferences. As a result, nonprofit and proprietary organizations, having different legal regulations, will attract managers with systematically different goals.' (pg 32)

He also reports case studies which find that business school and law school students who subsequently enter the nonprofit sector vary substantially in terms of personality traits, values and behaviour from their colleagues preferring to pursue a career in the for-profit sector.

Moreover, our model suggests that those individuals who gravitate toward the mission sector are better-off than if they sought employment in the non-mission sector – even if they may have to suffer a wage penalty – because they derive intrinsic satisfaction from their work. In contrast, individuals with strong monetary motivations are deterred from seeking employment in the mission sector and opt for positions in the non-mission sector. This may explain the general perception that nonprofit workers, despite being relatively poorly compensated, enjoy high levels of job satisfaction. Mirvis and Hackett (1983), analyzing the Quality of Employment Survey report that nonprofit workers may receive lower wages and benefits than their for-profit counterparts, but are more likely to find the orientation of their work more important than the money they earn and to receive intrinsic rewards from doing their jobs. In a similar vein, Frank (1996) using a dataset of Cornell graduates finds sizeable salary differentials between graduates employed in the profit sector and the nonprofit sector, after controlling for a rich set of job and individual characteristics. Though these differences admit other interpretations, they can be attributed to the self-selection of intrinsically motivated individuals – who are willing to accept a lower wage (compensating differential) for the possibility to contribute to a goal in which they find intrinsic value – into the nonprofit sector.

# 3.6 Conclusion

This paper helps us understand a number of related observations regarding volunteer activity and the sectoral concentration of nonprofit firms. By committing not to distribute surpluses, the nonprofit status ensures that the social mission takes precedence over the financial remuneration of any interested parties. We have shown how this commitment allows nonprofit firms alone to sustain a sector-wide incentive structure – volunteer hiring – which is capable of initially extracting labour donations from volunteers and subsequently compensates them with higher wages as they transition to paid positions. In addition, we argued that volunteering facilitates the matching of workers and organizations with similar mission preferences. The tighter congruence of organizations' and workers' goals in nonprofit organizations offers them a competitive advantage in mission-oriented sectors. In the non-mission oriented sector of the economy there is no scope for nonprofit organizations to be founded since the for-profit structure is preferable in that it allows the manager\owner to fully appropriate profits, whereas the nonprofit status rules out this possibility. Consequently, the simple framework developed here explains endogenously the observed dichotomy that the mission-oriented sector is associated with nonprofit organizations, which hire volunteers and sort them into paid positions based on their intrinsic preferences, whereas the non-mission sector is occupied by profit taking firms which hire interns. In addition, our analysis suggests that this arrangement improves the provision of public goods and services and therefore highlights a welfare-enhancing implication of the interaction between volunteer activity and the nonprofit institutional form.

Finally, we should add that both the view that volunteering acts simply as a screening device and/or as a form of investment in human capital, and the incentive provision (rent extraction) and matching theory we propose here lead to similar predictions regarding the process of volunteer engagement, which makes them empirically indistinguishable. There is, however, a crucial piece of evidence which the volunteering as screening and human capital investment views cannot be reconciled with. That is, these alternative candidate explanations would suggest that volunteer hiring should be a widespread hiring practice in mixed sectors, whereas in reality volunteering activity is restricted to nonprofit organizations while for-profit organizations seem to have very limited ability to recruit volunteers. We believe that the theory presented here, while consistent with the alternative views of volunteer motivation, provides a possible rationale for the fact that nonprofit organizations can exclusively tap into the pool of volunteer workers.

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# Chapter 4

# Prosocial Motivation and the Delivery of Social Services (with Patrick Francois)<sup>\*</sup>

# 4.1 Introduction

While the presence of nonpecuniary motivations is considered to be an important component of human behaviour in other social sciences, the use of models in which agents display some type of other-regarding preferences is only recently becoming common in the economics literature. This development is, at least in part, spurred by the mounting experimental evidence attesting to the usefulness of this approach in rationalizing many social and economic interactions such as donations of time and money, private provision of public goods, voting, intergenerational bequests and so on. To be sure, in their recent and comprehensive survey of the experimental evidence, Fehr and Schmidt (2006) conclude that:

'Given this evidence the real question is no longer whether many people have other-regarding preferences, but under which conditions these preferences have important economic and social effects and what the best way to describe and model these preferences is'.

Here we will argue that one area they do have important economic effects is in the provision of social services, such as health care, education and research, child care, care for the elderly, community development, and international aid. Many of these have been seen as part of the traditional role of government, but this view has been increasingly challenged. Governments in many countries have moved from provider to purchaser, and have sought out greater involvement in direct provision from the private sector. The arguments underlying

<sup>\*</sup>A version of this chapter will be submitted for publication.
this involvement are generally sound. The power of incentives created by residual claimancy in private firms creates a better environment for timely, efficient and innovative service provision. However, it will be argued here that when prosocial motivation is taken into account, the recent literature looking at its effect on private provision will suggest that governments (or more generally institutions without residual claimants, like nonprofit firms) continue to have an important role in providing such services. In such environments, these may be the unique form of institution capable of eliciting donations of effort that are engendered by prosocial motivations.

To provide a bit of background on the motivations behind prosocial behaviour we draw on Benabou and Tirole (2006). They argue that prosocial behaviour reflects the mix of three underlying motivations: *extrinsic, intrinsic* and *reputational*. Extrinsic motivation stems from the standard pecuniary or other material rewards that an individual may receive from outside. Broadly speaking intrinsic motivation refers to the case where an individual pursues actions not because of external rewards but because the activity is valuable in its own right.<sup>1</sup> Different conceptualizations of intrinsic motivation are possible. In particular, a distinction can be made between (a) Impure or Action-Oriented Altruism: the individual receives a 'warm glow' from the actual act of contributing to a public good and (b) Pure or Output-Oriented Altruism: the individual cares about the overall value of the public good to which he contributes. In reality, it is likely that a combination of these two sources of intrinsic motivation is at play. Finally, intrinsic motivation should be differentiated from an instrumental altruism that arises because of the concern about developing a valuable reputation in repeated interaction settings.

We focus on the manifestation of prosocial behaviour in workplace contexts that involve the provision of social services, like those above. Given the nature of these services, workers engaged in providing them often derive direct nonpecuniary benefits because they have a genuine concern, or care, about the recipients of the service – for example the welfare of the sick, the poor, or underprivileged children – and/or by virtue of the social recognition they might receive for contributing to an important mission.<sup>2</sup> Since such intrinsic motivations seem relevant in organizations that provide social services, it is important to understand their interaction with monetary incentives and what the implications are for the provision of incentives and optimal organizational design.

The classic agency-theoretic approach to addressing questions in public sector contracting and procurement is primarily concerned with adverse selection and moral hazard problems that arise when the government wants to procure a public good or service from a

<sup>&</sup>lt;sup>1</sup>According to Deci (1971), cited by Frey (1997), "one is said to be intrinsically motivated to perform an activity when one receives no apparent reward except the activity itself".

<sup>&</sup>lt;sup>2</sup>Note that besides this kind of prosocial behaviour a worker may exhibit a whole class of other-regarding behaviour, such as altruistic feelings towards his employers or co-workers. For an excellent survey of the literature concerned with such motivations, see Rotemberg (2006).

private firm, or regulate a private firm that directly supplies a public service to consumers on behalf of the government (see for example Laffont and Tirole 1993). The basic problem is that the firm may have private information regarding the costs of production and\or its cost reducing efforts, and so the government in its attempt to elicit truthful revelation of private information is faced with a trade-off between provision of incentives and rent extraction.

From the perspective of traditional agency theory, providing incentives for a public agency or a privately regulated firm to deliver a service presents the government with generally similar challenges. More recently, attention has shifted from the distortions associated with asymmetric information towards the effects of alternative ownership and organizational structures. The core problem inhibiting private provision here is the non-contractibility of the output, in this case the service provided by the public provider. In an environment where the quality of the service provided cannot be contracted upon, Hart et al. (1997) have offered insights into the specific trade-offs between government ownership and privatization. Our focus in the second part of this paper is on the lessons derived from this second wave of the literature on the institutional structure of public services delivery.

We will argue, in our very selective review of this literature, that this work suggests prosociality of employees has important implications for the delivery of public services. Prosociality amounts to a statement of what enters into agents' utility functions, and it will be seen that the implications for public service delivery hinge on a subtle difference in the way prosociality is modelled. Importantly, these implications will contrast markedly with those derived from the literature that has examined the effects of ownership in environments where the contractibility of output is the core problem.

The rest of this paper is organized as follows. The next section introduces and discusses the two alternative ways of modelling prosocial motivation: action-oriented and outputoriented altruism. Section 3 is concerned with the implications for government provision of social services from the perspective of the literature that emphasizes the noncontractible nature of output and contrasts it with the implications derived from the literature that emphasizes the role of intrinsic motivation. The last section offers some concluding remarks.

### 4.2 Modelling prosociality

At least implicitly, recent models emphasizing agent prosociality start from a production function which converts inputs of either time, effort, or other resources into the production of a good, service or activity about which some agents care. Something of the form:

$$g = k \left( e_i \dots e_{-i}, c \right)$$

where k is an increasing function of efforts,  $e_i$  is the effort of agent *i*, and also a function of *c* a vector of other potential inputs into this process. There are small differences in how this production process may work that have been the focus of some papers. Output may be multi-dimensional, i.e. depend on quality which can be adversely affected by poor input choice,  $k_c < 0$ , or multi-task  $e_i (e_i^1, e_i^2)$  where  $e_i^2$ , for example, does not affect *g*. But these will not be the focus of this survey.

The following quasi-linear utility function for an agent i embeds, what we will argue, are the main contrasting ways in which prosociality has been modelled to affect service provision in the literature. Agent i's utility,  $U_i$ , is increasing in his own consumption  $c(y_i)$ and decreasing in the amount of effort he expends at work,  $e_i$ . Some variant of this is common to all papers in this literature. Authors, however, differ in their inclusion of a possible third and fourth term in this expression below. Papers that have emphasized impurely altruistic, or action-oriented, motivation include a term like the third one:

$$U_{i} = c(y_{i}) - \phi(e_{i}) + h_{i}(e_{i}) + \gamma_{i}(g)$$
(4.1)

If the firm is producing a good or service that the agent considers meritorious, then it is possible for the agent to obtain a benefit from effort expended at the task. This is represented by the term  $h(e_i)$  with h' > 0, over some or all of the range. In effect, workers contributing effort at such firms may actually enjoy contributing some of that effort, or dislike it less than if the same efforts were expended elsewhere. A recent example of such an approach is Besley and Ghatak (2005), where the agent's identification with a firm or principal's "mission", lowers the cost of agent effort.

Alternative approaches have started from the assumption that a term like the fourth one in (4.1) plays a role. According to these papers, a recent example of which is Francois (2007), agents derive a benefit directly when what they consider a socially worthwhile good or service, g, is provided. Their utility is thus increasing in the level of that good,  $\gamma'_i > 0$ . Note that this benefit is independent of whether agent i has a hand in producing the good or service or not; something which does not occur with action oriented motivations.

Some of the implications of the two alternative conceptual views of intrinsic motivation are not hard to see. Firstly, free-riding. When altruism is impure, no free-riding problem ensues as the individual worker's intrinsic reward hinges exclusively on his own contribution to a project that has a social impact. This can be conveniently used as a shortcut to study the structure of optimal incentive contracts. On the other hand, when a worker is purely altruistic she derives an intrinsic benefit from the project being successful regardless of whether she has been actively involved in delivering it, and therefore the setting has an endemic free-riding problem.

Secondly, an additional moral-hazard problem may arise in purely altruistic settings. When workers care about the level of service provided, they will want to ensure that their efforts are contributing to that service. The provider of the service, their principal, boss, owner, manager, or employer will thus be able to elicit this effort that is based on care, only when they can ensure that such efforts will contribute to the service of concern. Moral hazard problems can arise when the agent is unsure about how much extra effort contributed goes towards provision of their socially desired good. No such problem arises in the case of impure altruism. The worker knows the effort she provides, and is directly, intrinsically, rewarded for it.

#### 4.2.1 Impure or Action-Oriented Altruism

We first consider impure altruism. In this case, the agent derives direct benefit from performing what he or she considers to be the meritorious task. Though it is presumably the effects of such actions that the agent ultimately cares about, in this type of modelling, this is assumed to affect the agent directly by lowering the cost of performing the task. The agent does not deliberate regarding the impact of his actions, nor does he wonder what would happen if he were to act differently. According to this approach, the utility function is of the following form:

$$U_{i} = c(y_{i}) - \phi(e_{i}) + h_{i}(e_{i})$$

Besley and Ghatak (2005) are concerned with the implications of impure altruism on the optimal incentive contract in a moral hazard setting. This paper studies the provision of optimal incentives in a principal-agent model when some agents are driven by intrinsic motivations while others have conventional pecuniary motivations. In particular, the two key implications of this framework are that (1) An altruistic worker will provide more effort and (2) An altruistic worker requires less monetary compensation. Thus, intrinsic motivation in this case is akin to a compensating differential. This framework also emphasizes the role of endogenous matching of principals and agents with similar altruistic preferences as this can raise productivity and affect the structure of compensation.

Another paper in this strand is the one by Dixit (2005). This paper features a multipletask environment in which production entails two outcomes – a primary and a by-product – both of which generate nonpecuniary rewards to the worker. The principal can only reward the agent for the primary output since the secondary product might even be undesirable to her (for instance, the by-product might be promotion of a particular faith). The paper provides the properties of the optimal incentive scheme. In addition to finding that the agent's intrinsic motivation substitutes for pecuniary compensation that would have to be offered in order to induce participation, it is shown that when the principal exhibits aversion to the by-product she offers weaker marginal incentives. That is, while worker's intrinsic motivation may relax his participation decision it does not affect the power of incentives.

Corneo and Rob (2003) consider a setting where workers engage in two tasks: an indi-

vidual task and a cooperative task which furnishes personal benefits but which is difficult for the principal to reward because of the collective nature of the output workers contribute to. This formulation is used to compare optimal incentives in a public firm that maximizes social welfare (including workers' utility) and a profit-maximizing private firm. The analysis suggests that incentives in the private firms are stronger, but workers in the public firm provide more cooperative effort.

Canton (2005) presents a two-task two-output principal agent model in which one output is observable while the other is not. Some agents are intrinsically motivated and some are not and the type is not observable by the principal, so the model features an element of adverse selection. In common with the two other papers above, intrinsic motivation reduces the fixed cost of meeting the agent's participation constraint. In addition, this paper finds that in order for the intrinsically motivated workers to be induced to provide effort along the unobserved dimension, the power of incentives has to be moderate, a result which he interprets as high-powered incentives crowding-out intrinsic motivation.

A related paper that focuses on issues of worker selection and screening is Delfgaauw and Dur (2007). This paper addresses the question of how should a firm facing a pool of workers that are heterogeneous in terms of their intrinsic motivation optimally set its compensation policy. In common with the papers mentioned above, in their formulation intrinsic motivation is also of the impurely altruistic form as the way it enters is by affecting the cost of a worker's effort. This allows them to abstract from the free-riding problem that would arise if workers were purely altruistic. When the level of intrinsic motivation is private information of the worker, then the employer faces the following trade-off in designing the optimal wage scheme: by increasing the wage she raises the probability of filling the position but attracts workers with lower intrinsic motivation. This trade-off appears to be similar to the one in Francois (2007) but in the latter there is also moral hazard in production and this serves as an additional inducement for motivated types to apply for the job in order to deter a shirker from filling the position. In Francois (2007) a marginal increase in the wage induces more applications from both shirkers and non-shirkers and whether output increases or declines depends on the relative density of the two types of workers.<sup>3</sup>

Murdock (2002) studies the role of the agent's intrinsic motivation for the investment decisions made by the firm. In this paper, the agent's effort contributes to a project that generates a financial return valuable to the firm, and a nonpecuniary return valuable to the agent. Starting from a position where the expected intrinsic return that the agent receives is zero, the author shows that the intrinsic motivation affects incentive contracts only by inducing firms to undertake investment projects with higher intrinsic payoffs. In particular, the firm may implicitly agree to implement projects that have negative financial return but generate positive intrinsic value to the worker, and in exchange the worker provides higher

<sup>&</sup>lt;sup>3</sup>This paper is covered in the next section.

ex-ante effort, thus increasing the firm's expected profits. Moreover, the firm's gains from implementing such an implicit contract are increasing in the intensity of the agent's intrinsic motivation.

The common implication of all of these treatments of impure altruism is to lower the need for "power" in incentives. This is akin to a compensating differential, and though it does suggest that such services may be cheaper to deliver when people have prosocial motivations, this has relatively little impact for the delivery of social services.

#### **Crowding Out**

The other implication that arises occurs when service delivery happens in multitask environments. The usual modelling here treats one good as socially meritorious, and another not, with the socially meritorious one more difficult to contract over. The main insight of these is that paying too much for the good that can be directly rewarded may crowd out efforts devoted to the socially meritorious good.

This crowding out of altruism can also occur when the use of external incentives reduces or eliminates the effects of intrinsic motivations. There is a large recent experimental literature documenting this phenomenon in different contexts. This literature is thoroughly surveyed by Frey (1997), and Frey and Jegen (2001). Since these surveys there has been some interesting work by Benabou and Tirole on providing an information-based framework to formally think about the interplay between extrinsic and intrinsic motivations and the mechanism behind the notions of 'crowding out' and 'crowding in'.<sup>4</sup>

In Benabou and Tirole (2003) they consider an informed principal setting where the principal has private information over the characteristics of a task and/or the agent's abil-

<sup>&</sup>lt;sup>4</sup>Makris (2006) analyzes a principal-agent set-up that departs from the canonical adverse selection model in that the agent, besides the monetary payoff, derives direct utility from higher output and he is subject to an administrative constraint which gives rise to a limited liability condition. He finds that the agent's intrinsic motivation reduces the power of incentives, and that under certain conditions the principal may decide to distort the output of both the high and low-cost types, unlike the canonical model where only the high-cost's output is reduced from the efficient level.

Huck et al. (2006) is concerned with the interaction between economic incentives and social norms and show that the choice of incentive structure can affect the impact that social norms have on team production. In this framework, social norms may be beneficial or detrimental to output depending on whether the type of compensation implemented induces positive externalities among workers (team-based incentives) or negative externalities (relative performance-based compensation), and it is possible that higher monetary incentives may reduce workers' effort.

Vyrastekova et al. (2006) investigate the effect of power of incentives experimentally. In their experimental design, subjects repeatedly perform two tasks: one which improves their own output and another which increases the output of a teammate. Subjects are compensated based on both individual and team performance, and the power of incentives reflects the weight that the payment scheme puts on individual output. Subjects choose to join either a 'private' firm, which has a payment scheme with high weight on individual performance, or a 'public' firm which has a more low-powered incentive scheme. The experimental findings suggest that increasing the power of incentives has a negative effect on effort if the interdependency between workers is high.

ity to perform it, whereas the agent cares about the outcome of the task but has imperfect self-knowledge. The principal strategically chooses actions, rewards and punishments, in order to incentivize the agent and to enhance his self-confidence. The agent on his part, tries to extract information from the principal's actions about himself and about the task. They show that in situations where the asymmetry of information is important, and under certain conditions.<sup>5</sup> extrinsic rewards may be detrimental to the agent's intrinsic motivation, in that they convey bad news to the agent about the attractiveness of the task or about his own type. In a companion paper, Benabou and Tirole (2006) describe a different mechanism through which crowding out may occur. They argue that the presence of extrinsic incentives crowds out reputational motivation by creating doubt about the extent to which a person is undertaking an action for the monetary rewards rather than for themselves. An argument in the same vein can be found in Seabright (2005); he develops a two-period model where agents undertake an altruistic action in the first period and are in a second period assortatively matched in a matching market. It is shown that the signalling aspect that ensures an individual a more desirable match may induce a higher proportion of individuals participating when rewards are zero than when rewards are positive but small.

In workplace settings, the informed principal mechanism of intrinsic motivation crowding out may be the most relevant. That framework has a natural manager-worker interpretation: the manager may be in a better position to judge the worker's ability to perform well in a certain task, or may be a better informed about how difficult a certain task will turn out to be. The reputational crowding out, seems to apply to activities such as donating blood and volunteering where the social aspect is more pronounced, but may be also suitable here, since it is plausible that workers may undertake activities in the workplace to gain social approval. In reality of course both considerations may be relevant.

One of the defining characteristics of agencies producing public services is the multiplicity of both the tasks agents have to perform and the principals to which agents have to answer to (Burgess and Ratto 2003, Dixit 2002, Wilson 1989). An interesting, if challenging, extension would be to see whether the information-related crowding-out mechanisms work in multiple-task and multiple-principle settings.

The insights offered by the literature on crowding out of intrinsic motivation have important implications for the on-going debate regarding public service reform, as they indicate that the uncritical introduction of high-powered incentives, which have been proven to be effective in the private sector, may backfire when workers are altruistic.

<sup>&</sup>lt;sup>5</sup>The key condition is a 'sorting condition', which suggests that a principal must be more willing to offer an agent rewards when he is less able or the task is more costly.

#### Motivated Bureaucracies and the Delivery of Social Services

A recent paper by Prendergast (2007) argues that the fact of members of bureaucracies and government agencies being public-spirited has to be taken into account when considering the various agency problems that arise in such organizations. That paper takes the view that bureaucrats act as intermediaries between their principals and their clients. The issue that then arises is how to select bureaucrats such that an efficient outcome is generated. In particular, when the objectives of the principal and the client are aligned, as is the case for example in healthcare, then efficiency requires that an altruistic bureaucrat is chosen, that is, one who cares about the welfare of the client. On the other hand, in bureaucratic settings where the principal's interests are in conflict with the client's, for instance in tax authorities, then the optimal policy is to hire a bureaucrat who is biased against the client. This explains why workers with different attitudes are attracted to hospitals (client-friendly) than tax agencies (client-hostile). The next question that is addressed is whether, when a bureaucrat's intrinsic motivation is not observable, self-selection will lead to the efficient outcome. The analysis then suggests that this is not necessarily true, as both the most preferred and the least preferred types self-select, the latter attracted by the possibility to undermine the principal's goals. Finally, another interesting implication in this model is a crowding out effect that emerges due to selection: higher wages induce more workers with no intrinsic motivation to apply, which adversely affects efficiency.

Leaver (2004) is also concerned with bureaucratic motivation and behaviour. The paper draws attention to the fact that strong reputational concerns in the presence of informed interest groups may distort bureaucratic behaviour. Another paper that is concerned with the issue of worker selection in the public sector is Delfgaauw and Dur (2006). This paper assumes that the presence of workers instilled with a public service motivation gives monopsony power to public sector employers. When workers' effort is unverifiable the paper shows that unmotivated workers may be attracted and crowd-out the dedicated ones.<sup>6</sup>

This type of treatment of prosocial motivation has profound implications for the design of optimal contracts, but says relatively little about what sort of organization should be providing the social service – a feature that will be the focus of the next type of altruism that we consider.

<sup>&</sup>lt;sup>6</sup>Another paper on public organizations is Dewatripont et al. (1999). Motivated by a number of observations regarding government agencies made in Wilson (1989), they introduce multiple tasks in a standard career concerns model. This extension generates a set of interesting implications that are consistent with the motivating facts in Wilson: increasing the number of tasks reduces effort because it hinders the market's ability to draw inferences about the agent's ability, while effort is also reduced when the market is uncertain about the nature of tasks undertaken. These results suggest that hiring specialists, and setting a well defined mission enhance the productivity of the organization.

### 4.2.2 Output-Oriented Altruism

Output oriented (or pure) altruism has profound implications for organizational design. Papers that take a purely altruistic starting point are set up something like:

$$U_{i}=c\left(y_{i}
ight)-\phi\left(e_{i}
ight)+\gamma_{i}\left(g
ight)$$

$$g = k (e_i \dots e_{-i}, c)$$
 (4.2)

The implications for organization design were analyzed by Francois (2000). Suppose that a worker is motivated by a desire to advance a cause about which he is concerned, g, the function  $\gamma_i$  capturing the impact of that. However, individual is not the only contributor to production of the good. The key element here is that the firm manager also controls other inputs that contribute to production of the social good, as per equation (4.2). These could be the hiring of other workers, the  $e_{-i}$ , or some other inputs like equipment or facilities. The manager observes the worker's effort before having to decide on the final level of these other inputs.

That paper compares the behaviour of managers who are residual claimants in the neo-classical firm à la Alchian and Demsetz (1972), and those managers working for a government. In the private firm, the manager owns any accumulated surplus (negative or positive) from production. In the government, the manager has to respect a zero budget condition in planning his inputs, but has no claims on accumulated surpluses. The question it asks is which type of organization has an advantage in eliciting the worker's altruistically motivated contributions to the organization's output.

The answer is that there exist conditions under which the worker is motivated to contribute effort because of its effect on the social good only when working for the government. That is, the worker paid as a government employee can be paid less than would have been required to compensate him for the disutility of effort. Or, in other words, the worker contributes more effort than he would contribute if he did not care about the good at all, i.e., if  $\gamma_i(\cdot) = 0$ . The reason is that he knows that by contributing this effort he is advancing the cause which he cares about, raising g, and he takes account of this when deciding on his effort level. Why does this not happen when the same worker works for a private firm?

Purely altruistic people care about the output of the good they produce. They are not interested in contributing effort to such tasks only to see that their efforts imply that someone else who should, or could, be contributing takes the opportunity to do less. This is the essence of the moral hazard problem that arises when the firm is run by a residual claimant. The residual claimant may care as strongly about the output of the organization as does the worker, but he also gains financially if resources can be saved. Consequently, if he knows he has a worker working for him who is willing to contribute extra effort out of a direct concern for the organization's mission, he can reduce the level of some other inputs that he controls. His incentive to do this will be greater the higher the degree of substitutability between the inputs he controls and the efforts of the worker. In terms of the production function above, facing a higher level of  $e_i$  reflecting the donation of a motivated worker, the marginal contribution of the inputs that he controls, for example the c, will be lower and the residual claimant will optimally choose to lower these and pocket the savings provided that  $k_{e_ic} < 0$ . Knowing this, the intrinsically motivated and purely altruistic worker will rationally choose not to contribute extra effort in pursuit of the organization's mission. He knows that doing this merely crowds out the principal's contribution and therefore does not affect (or affects only weakly) the organization's output.

The manager in a government bureaucracy, in contrast, has much weaker incentive to reduce his inputs when faced with extra contributions from a motivated worker. He does not claim any of the outstanding residual from the department's operations. Consequently, when faced with the labour donation of a motivated worker, even though the marginal contribution of the inputs he controls is reduced, he still has incentive to use these in production of the good about which he cares. Importantly, his level of direct concern for the firm's output need be no different than that of a for-profit owner. It is simply that, due to the nature of government provision through bureaucracies, he is directly divorced from a claim on the operating profits of the production unit. He thus can credibly commit to having much weaker incentives to reduce his own inputs ex post.

So, the upshot of this story is that a government bureaucracy, which, in contrast to the high powered incentives built in by residual claimancy in a private firm, has lower powered incentives for operating managers, can obtain labour donations due to the service motivation of their employees in some situations where a private firm could not.

However, as always, this simple story becomes more complicated when we consider its details more deeply. Specifically, we have assumed in the discussion above that only the relationship between the agent (worker in the organization) and his boss, who is either the manager in a government bureaucracy, or the residual claimant in a private firm, is what matters. It has been implicitly assumed that the organization is rewarded for changes in output by some sort of price for the service. But overseeing this whole process is a government, who chooses whether to contract this process of service provision out to the private firm, or to produce it in house with a bureaucracy. It is not clear whether a government purchasing the service could alter the price schedule faced by the private firm so as to help it overcome the credibility problem that it faces with its employees. Francois (2000) shows that even allowing for the government to use any sort of unrestricted non-linear pricing schedule it wants, it will not generally be able to undo the problem of credibility faced by the residual claimant in the private firm. The optimal pricing schedule for the service will always allow greater potential for labour donations by the motivated bureaucratic worker

than it does by the worker in a private for-profit enterprise providing the same service.

Another potential way for private firms to overcome this problem is for them to develop a reputation for allowing their own workers' extra contributions to have an impact. If the problem that private firm owners face is that they have an incentive to distort downwards their input contributions in light of extra effort from their motivated workers, then a firm would have a financial incentive to develop a reputation for not doing this. This is explored in Francois (2001). Such a reputation would work as follows. The firm is known to not reduce inputs when workers contribute extra to the firm's tasks. Consequently, workers know that when doing so, they will not be expropriated ex post by the firm reducing other inputs and thus keeping the service unadjusted. If the firm were to deviate from doing this, its reputation would be tarnished, and future workers would not donate effort to its service. Consequently, the quality of its output would fall, and it would suffer a loss in value. With such a reputation of non-interference in place, the private firm would be able to elicit labour donations from workers, as the workers would not fear being expropriated ex post. This should imply that any worker who was willing to contribute extra effort to the government bureaucracy should also be able to do the same to the private firm.

Though the reasoning here is sound, this means of solving the credibility problem requires some operating profit to accrue to the private firm. In a repeated game context, it is the operating profit that provides the private firm with the incentive to not deviate and expropriate the workers' labour donations ex post. These profits must be positive for it to remain worthwhile for the firm to maintain their reputation of non-expropriation. In contrast, the government bureaucracy can obtain labour donations even when its operating surplus is zero. Operating surpluses play no role in disciplining the government bureaucrat. Consequently, in this repeated game setting where reputations can be developed to mitigate moral hazard problems, though both a government bureaucracy and a private firm can operate in a way that allows both to equally obtain labour donations due to purely motivated workers, the private firm has to also obtain positive profit from per period operations. The bureaucracy does not require this, and consequently, should be able to produce at a cost which is lower than the private firm. Again, the bureaucracy, or equivalently a nonprofit entity will perform better than an organization with a residual claimant, i.e., the private firm.

Finally, there is a free-riding problem implicit in this discussion that has been skirted so far. If workers are concerned about the actual output of an organization – irrespective of their own efforts – then the labour donation game resembles a standard private provision of public good problem, with free-riding a key characteristic.<sup>7</sup> The worker benefits by donating labour to a task about which she cares, however she would benefit still more if someone else

<sup>&</sup>lt;sup>7</sup>Labour donations in this context refer to the circumstance where the worker contributes effort that is not fully compensated by the wage payments he receives.

were to undertake the donation for her.

A first possibility of solving this problem, identified by Francois (2000, 2003), is when rents accrue to workers so that participation constraints are not binding. Such a situation occurs in the standard agency problem with private information. It also occurs when firms use relational contracts to solve moral hazard problems. In that case, the firm implements an efficiency wage type of incentive structure that is able to both overcome moral hazard in production as well as elicit labour donations. By offering the worker a payment above opportunity costs in order to induce incentive compatible effort provision, workers' participation is ensured and hence the free-riding problem does not arise. This way of overcoming the free-riding problem applies whenever informational rents imply non-binding participation constraints; as often arise in more standard agency problems with heterogeneous types.

A second way to overcome the free-riding problem in the labour donations game is explored in Francois (2007). This paper is concerned with the participation decision – not the incentive problem – and so heterogeneity in workers' evaluation of the public good is introduced. In particular, it is demonstrated that when firms do not use performance-contingent compensation, and the possibility of workers' shirking looms, those workers with high valuation of the public good may be motivated to donate labour effort to obviate the outcome where a low valuation type takes the job and shirks thereby adversely affecting output. Moreover, the elasticity of output with respect to wages may be negative. This result may be given a crowding out of intrinsic motivation interpretation: the use of monetary rewards contingent on performance accompanied by the use of direct supervision at the workplace may lead to crowding out of labour donations.

The logic of this argument is similar to the one made in Engers and Gans (1998), who also examine a purely altruistic setting where there are incentives to provide effort when care for output is a central consideration. The outcome of interest in their context is the quality of academic journals and their paper provides an explanation for why not paying referees may be editors' optimal response. When deciding whether to agree to review a paper a referee compares the private cost that he would incur if he decided to referee the paper to the expected delay imposed on the journal if he refused. While adding a monetary payoff would increase a referee's private gain from refereeing a paper it also reduces the cost of refusing because the monetary payoff would increase the acceptance rate. Note, however, that in this setting the free-riding problem is partly overcome by the editor sequentially soliciting referees' services whereas in the context of labour markets workers usually apply for positions voluntarily, so there is an additional layer to the free-riding problem. In other words, in labour markets the pool of applicants is endogenous, whereas in the context of the refereeing process the pool of referees is fixed and the editor chooses sequentially among them.

Many other papers have considered purely altruistic agents in this context. Grout and

Schnedler (2006) extend the analysis in Francois (2000) by introducing a third party – besides the worker and the manager – who has an interest in the service being produced and who is willing to contribute something (money or some other input) toward its provision. They show that the worker's labour donation is sensitive to the other contributor's negotiating power and that this effect may be discontinuous - a slight increase in power may crowd-out donated labour dramatically. This suggests that if the purchaser of the final service is for example a monopsonist, this may adversely affect the workers' willingness to donate labour as they recognize that were they to donate labour the monopsonist would adjust downward its own contribution, in a similar way as a for-profit employer adjusts in Francois (2000).

Other papers that are concerned with the role of firm commitment in inducing donations are Bilodeau and Slivinski (1998) and Glazer (1998) – monetary donations in the first case and labour donations in the second. The first paper presents a multistage game in which an entrepreneur first decides whether to set up a for-profit or nonprofit firm in order to produce a public good and subsequently solicits voluntary contributions by others. It is shown that by committing not to appropriate the funds donated by the community, the nonprofit entrepreneur attracts more contributions, and so the value of the public good is enhanced. Glazer (2004) analyzes a setting in which a good is produced using a technology that combines capital provided by an employer and a worker's labour effort. Importantly, the good being produced is of intrinsic value for the worker. It is shown that if the employer can commit to a level of capital and not adjust after observing worker's effort she can induce the worker to increase effort. This result is given the interpretation that government provision of certain goods may be socially preferable because the public sector is slower to react than the private sector.

The paper by Rowat and Seabright (2006) is concerned with aid agencies and addresses the question of whether intrinsically motivated workers, willing to take wage discounts in order to contribute to a cause they care about, act as a signal to donors that their funds will be devoted to the cause and not be appropriated. In particular, the employment of altruistic workers is viewed as a commitment device against opportunistic behaviour by the managers of development agencies, because a motivated aid worker would only accept a wage cut if the organization were indeed undertaking the promised aid projects.

Vlassopoulos (2006b) provides an explanation for the observation that nonprofit employers are uniquely able to attract volunteer workers who are both intrinsically motivated and have career aspirations, and also accounts for the fact that nonprofits are concentrated in mission-oriented sectors. That paper shows that the choice of organizational form (for-profit or nonprofit) and sector (mission sector or non-mission sector) jointly impinge on the credibility of the promises that managers make when implicitly contracting with workers/volunteers. To gain some intuition for this, consider the form that the relational contract between employers and volunteers takes: a volunteer agrees to donate labour in return for a promise of future compensation that comes in the form of paid employment - not necessarily at the employer where volunteering took place. So a firm that wants to participate in the volunteer-hiring structure has to credibly commit to having both paid work and unpaid work positions and to fill paid work vacancies drawing from the pool of workers with volunteer experience – much like actual volunteering occurs in the real world. Notice, that this structure induces a moral hazard problem on the part of employers, as they have an incentive to recruit unpaid workers, promising them promotion to paid positions, and then renege on the promise. The analysis suggests that whether nonprofit employers are at an advantage in terms of being able to sustain volunteer hiring hinges on the type of activity (mission-oriented or not) that is undertaken. In particular, if volunteering enhances the quality of the service provided and managers care about quality – which can only be true in care-related activities, then nonprofit status is helpful in solving employers' moral hazard problem. The intuition is that a nonprofit manager will put relatively more weight on the fact that if she cheats on volunteers quality will suffer and hence a smaller profit (reputational rent) is needed to maintain incentive compatibility. This is true even though the nonpecuniary payoff a manager receives is the same regardless of firm type.

Delfgaauw (2007) is a fascinating exploration of the implications of pure altruism on the delivery of medical services. He starts from the assumption that some physicians care to deliver medical quality provision to patients. They can choose between working in the public health providing service, or private practice. In private practice quality can be contracted over and paid for. Patients differ in their demand for quality, with the rich, having higher demand for quality, but due to quasi-concavity of preferences, lower valuation of marginal increases in quality. In public health provision, there is a lower level of quality which must be provided, and for which physicians will be paid. Any extra provision of quality above that is unpaid. There are two sorts of physicians - the pure altruists, who care about patient quality of service as well as their own income and effort, and purely selfish doctors who only care about income and effort. Since purely altruistic, the physicians care not just about delivering services, but about what their efforts do to raise the level of provision above what a patient would otherwise obtain. In general they would voluntarily provide more than the non-altruistic physicians. He assumes that the number of places available in the public service exceeds the number of altruistic physicians. Consequently, in equilibrium, altruistic physicians correctly conjecture that if they turn away a public patient, or if they work in the private sector, then one less patient will receive the extra treatment that an altruist provides. Consequently, the altruist's actions have impact, and this leads them to want to work in the public sector. This ends up leading to selection of the altruistic physicians into the public sector as well as the poor patients there. The richer ones select into the private sector and are treated by the doctors who only care about money. Interestingly the mixed equilibrium with some public and private provision Pareto dominates either a fully privatized or fully public provision.

### 4.3 Implications for Government Provision

Many papers have explored implications for the optimal institutional arrangement for the provision of public goods and services, without any reference to intrinsic motivation. We briefly survey that work highlighting its main conclusions, and then contrast it with the implications derived from the recent work emphasizing prosocial motivation. Much of this recent work covers topics such as in-house government provision versus privatization or outsourcing, public versus private ownership of public goods, and comparative institutional analysis (for-profit vs. nonprofit, public-private partnerships, corporate social responsibility).

### 4.3.1 Insights from Standard Agency Models

A natural point to start an overview of this growing literature on these issues is the seminal paper by Hart, Shleifer and Vishny (1997) (henceforth, HSV), which has spawned a lot of the recent research into this area. This paper analyzes the relative merits of providing a public service in-house versus contracting out to the private sector, adopting an incomplete contracts approach, following the earlier work by Grossman and Hart (1986) and Hart and Moore (1990) on the property rights theory of the firm. The incomplete contracts framework seems appropriate in the context of public goods and services that the government either produces or procures, since not all aspects of such services that a benevolent government may care about seem to be codifiable into a contract. In such an environment, the residual rights of control are crucial in determining agents' investment incentives, in particular, their decisions to improve quality and reduce costs. The upshot of the analysis of the model is that private ownership leads to excessive investment in cost reduction and insufficient investment in quality improvement, whereas, government provision leads to less than efficient cost reduction and quality improvement. The intuition for this is that a private manager with residuals rights has stronger incentives to reduce costs and improve quality, while a government employee faces weaker incentives as he benefits less from these improvements.

Thus, private provision is preferable the more important cost reduction is and the less important are the adverse effects on quality. On the other hand, public provision dominates when quality is a more important aspect than cost considerations. This insight is then used to guide a discussion of the wisdom of the privatization of various activities such as prisons, garbage collection, education and health. In some cases, the authors are unequivocal about the superiority of the private sector (garbage collection, weapons procurement), or the government (foreign policy), whereas for a whole range of other activities (education, healthcare) things are less clear-cut so they admit that a more detailed cost-benefit analysis is required.

Hart (2003) uses the HSV framework to understand the benefits and costs of publicprivate partnerships (PPPs), that have been widely used for public service provision. The key characteristic of PPPs that this paper focuses on is the bundling of the building and the running of the facility, as opposed to conventional procurement where the builder and the party who operates the facility are two separate entities. Two kinds of investment can be undertaken both of which reduce operating costs but only one of which generates social benefits. The trade-off between unbundling and bundling is the following: under unbundling, the builder does not undertake either type of investment, since he does not benefit from improvements that take effect at the operation stage. In contrast, under bundling or PPP, the builder does some of the productive investment, although still less than the efficient level, but also more of the unproductive investment. The implication of this is that bundling of building and management is preferable when investment in the productive component is a serious issue, or in different terms, when it is easier to write contracts on service provision than on building provision. The same question is also addressed by Bennett and Iossa (2006) who extend the analysis in Hart (2003) assuming that there is renegotiation after investment decisions are sunk, so that ownership matters because it affects the disagreement payoffs of the parties and hence their shares of the surplus and investment incentives, and that there may be externalities, positive or negative, between the cost reducing activities undertaken at the building stage and those at the administration stage. Naturally, when there is a positive externality bundling of the two activities is preferred since it allows for the internalization of the externality. With respect to ownership, Bennett and Iossa (2006) find that private ownership by a consortium may or may not be optimal, for reasons similar to those identified in HSV. In a related paper, Bennett and Iossa (2005) study the desirability of for-profit versus nonprofit firms as contractors of public services both under PPPs and standard procurement.

Besley and Ghatak (2001) extend HSV into a setting where the service being produced has the features of a public good. Their analysis applies to the question of who should be the owner of joint public projects that require investment contributions from both the government and private organizations, such as NGOs. They show that ownership should reside with the party that cares the most about the public good, which is in contrast with the result in HSV where the optimal ownership is driven by technological factors.

Glaeser and Shleifer (2001) apply the HSV framework to understand the entrepreneurial choice between setting up a proprietary firm or a nonprofit organization. The approach is motivated by the contractual failures theory of Hansmann (1980), who had earlier suggested that nonprofit organizations emerge as a remedy to informational problems that pervade markets where quality is hard to measure, so that consumers are subject to producers' morally hazardous behaviour, as the commitment not to pursue profits signals greater concern over quality. In Glaeser and Shleifer's formalization of this idea, an entrepreneur chooses organizational form (for-profit or nonprofit) to deliver a unit of a good whose quality is not contractible. By choosing to incorporate as a nonprofit the entrepreneur's incentives are blunted – because the nondistribution constraint permits only in-kind consumption of residual earnings, making those earnings less valuable to the entrepreneur than they would be under for-profit status – and hence he commands a higher price in the marketplace. Thus, the trade-off associated with the choice of organizational form is that choosing to organize as nonprofit implies that the entrepreneur can charge a higher price but on the other hand it gives him only restricted access to the firm's profits. The model thus predicts that nonprofits will dominate markets where the costs of monitoring quality are high, which seems consistent, as nonprofits and governments are heavily involved in the provision of services – and services are difficult to contract over. These models also predict government and nonprofit provision where consumers' taste for noncontractible quality is high, so that the first effect will dominate.

Thus, along the "Contractibility" dimension the predictions of contracting-based explanations do quite well as the figure below illustrates.

Location of Non-profits And Govt. Provision According to Contractual Failure Hypothesis

#### Contractability

High

Low e.g. Services



But having a firm without residual claimant is not the only way to solve such problems. Reputation is an alternative mechanism that can deter opportunistic behaviour that arises because quality is not-contractible. Vlassopoulos (2006a) asks the question of whether the predictions of the contractual failures hypothesis are robust in a setting where firms and consumers interact repeatedly, in order to study the effect of reputational concerns. The analysis suggests that when the manager can establish a credible reputation for high quality then for-profit status is preferable for all levels of consumer sensitivity to quality, which may explain why so many fields that are subject to contractual difficulties (e.g. business consulting, insurance, professional services etc.) are dominated by for-profit firms which have created and maintained valuable reputations for high quality services. Thus, this paper points to a potential shortcoming of a rationalization of nonprofit organizations based on contractual failures in the output market – it does not take into account the interaction between organizational form and reputations.

Of independent interest is the paper by Acemoglu et al. (2006), which provides a different, incentive-based perspective on the optimal allocation of economic activity between markets, firms and governments. They present a multitask career concerns model where a worker can choose two types of effort: one which is socially productive and one which is not. Thus, in this setting high-powered incentives have both benefits and costs, and the relative importance of the two types of effort determines what is the optimal power of incentives and whether markets, firms or the government are the best way to organize the production of a given activity. In particular, the analysis suggests that activities where productive effort is important should be left for market environments which breed high-powered incentives, whereas as the negative impact of the unproductive action becomes more severe, the activity should gradually shift toward firms, and the government, which entail progressively dull the power of incentives provided to workers.

Finally, Besley and Ghatak (2006) study the feasibility of corporate social responsibility (CSR) as a mechanism to deliver public goods that are bundled with production of private goods – for example, fairtrade, i.e. goods that meet certain environmental or ethical standards. The economy consists of two sets of consumers: those who care about the public good and those who do not. In the equilibrium characterized, consumers sort according to their preferences: the caring ones choose to patronage firms that promise to deliver a certain level of public good alongside the private good – and pay a price premium, while the non-caring ones purchase the private good from firms producing at marginal cost. In this framework, firms serving the caring consumers are interpreted as exercising CSR. The analysis then suggests that CSR can sustain a level of public good provision that is equivalent to the private contributions game. Moreover, comparing public good provision delivered through this mechanism with that provided by nonprofit organizations reveals that CSR may be superior in activities where the public good is technologically bundled with the production

of a private good, but not more generally.

### 4.3.2 Contrasting Implications from Prosocial Motivation Approaches

The contractibility of output, which, we argued above, plays a key role in the more standard agency based approaches to the issue of government provision, is not of direct importance in the literature that has emphasized prosocial motivations. To be sure, non-contractibility does play some role, but it is not over output as much as it is over agents' actions. Specifically, if it is the case that a worker will only contribute effort to a service when they are sure that their efforts directly impact that service, then the worker effectively wants a guarantee that some other actions which the principle controls will not be adjusted downwards in the light of her extra contributions. This sort of guarantee will be impossible for the principle to provide whenever it is not possible to contract over inputs directly.

But difficulty in contracting over inputs is likely to be ubiquitous in most production processes, and so does not suggest where nonprofit or government provision should dominate. In understanding the distinction between explanations based on prosocial motivation and those based on traditional agency theory, it is useful to consider the differences suggested by the theories.

As explained above, traditional agency theory suggests that nonprofits and governments should have an advantage in areas where output is difficult to contract over. It is the case that these organizations typically provide services, which are difficult to contract over. However, there are many services where provision is entirely by private firms: for example, management consultancy, cleaning, accounting, marketing. Private firms and markets are somehow able to adequately provide these. And, as Vlassopoulos (2006a) has argued, there is no reason that standard reputation based solutions cannot allow for-profit firms to dominate these sectors. So, standard agency based explanations based on the noncontractibility of output have trouble explaining why non-contractibility can be overcome for some services but not for those provided by governments and nonprofits.

Secondly, when one considers the types of services that nonprofits do provide, a definite pattern emerges. Nonprofit firms are heavily over-represented in sectors where third parties are likely to have some interest or concern over the quality of service provided. Childcare, for example, is typically a transaction between childcare provider and parent, but even disinterested third parties who do not have direct acquaintance with the child, may have a civic minded interest in seeing that the care is properly provided. It is unlikely that third parties will take a similar interest in the provision of services that are typically transacted between firms and private providers – like, for example, management consultancy.

This reasoning suggests that there is another important dimension along which there seems to be a marked separation between for-profit firms on one hand and government and nonprofit providers on the other: the "care" dimension, that is, the degree to which the provision of the service is associated with external benefits to non-purchasers (workers, managers, donors, community). At the low-care end we find services such as business consultancy, which do not generate external rewards to non-recipients of the service. At the high-care end we find social and personal services such as child care, which do. With respect to the "care" dimension then, the contractual failure approach does less well. Nonprofit firms and the government seem to be concentrated at the high-care end while for-profit firms dominate the low-care end, a fact which this theory cannot explain.



Figure 4.2: Adding "Care" Dimension

On the contrary, the predictions of prosocial motivation approaches seem to do better along this dimension, since they emphasize the care of a not directly concerned participant, i.e., the provider, who will most generally be a nonprofit or government employee, and therefore predict that governments and nonprofits should be over-represented in care-based sectors, as the figure below illustrates.

### 4.3.3 Empirical Evidence

There is a relatively large body of literature on Public Service Motivation – its prevalence and effect – in the public sector. The first study emphasizing this seems to be Perry and Wise (1990), and a number of authors have tested the implications of such a motivation for performance in the public sector, see for example Alonso and Lewis (2001) and the references therein. Murnighan and Kim (1993) for a specific focus on non-economic factors motivating



Figure 4.3: Predictions of Prosocial Motivation Approaches

people to volunteer, and Menchik and Weisbrod (1987) for an early economic analysis of voluntarism. Segal and Weisbrod (2002) provide a recent investigation of volunteer contributions and their variation with observable individual characteristics.

Some suggestive evidence of the higher civic-mindness of nonprofit employees can be found in Rotolo and Wilson (2004). Using data from the Current Population Survey, they report significant differences in workers' propensity to undertake volunteer work across sectors, with workers in the private sector being less likely to volunteer, and those who do volunteer contribute less hours than workers in the nonprofit sector and the government. Mirvis and Hackett (1983), analyzing the US Quality of Employment Survey find that nonprofit workers report higher levels of intrinsic motivation, feelings of accomplishment, and importance of work relative to money in their occupations. Also, a Brookings Institution Survey of over 1200 childcare, child welfare, youth services, juvenile justice, and employment and training workers found that the surveyed workers report that they took the work because they are driven by the desire to help the people in need and serve the community, though they are not satisfied with the monetary rewards.<sup>8</sup>

There is also some empirical evidence in support of the idea that workers in nonprofit firms should be willing to donate effort while their for-profit counterparts should not. Mocan and Tekin (2000) provide a direct test of the labour donations hypothesis. Using an

<sup>&</sup>lt;sup>8</sup>See Table 4, pg 17 in Light (2003).

unusually detailed worker/firm matched data set for the US childcare sector and controlling for the endogenous selection into sectors, found a significant nonprofit wage premium. Workers were asked what the main reason to choose employment in child care was. One of the options was "this is an important job that someone needs to do", which is an indicator of the intrinsic value the worker derives from working in the sector. To be consistent with labour donations workers who chose this option should receive lower wages. The authors report that this variable had a significant downward effect on wages if working for a nonprofit firm. In contrast, workers in for-profit firms who chose this option had either no, or a positive wage premium, suggesting no labour donations.

There is also some evidence that incentives in nonprofit organizations and the government are weak relative to those in the private sector and that in sectors where for-profit and nonprofit establishments co-exist the former tend to use more performance related compensation. Burgess and Metcalfe (1999) using British cross-sectional establishment data from 1990 find that establishments in the public sector are less likely to operate an incentive scheme than comparable ones in the private sector, and that this difference arises only amongst non-manual workers (workers more likely to be involved in discretionary practices). Roomkin and Weisbrod (1999) find greater use of performance related compensation in for-profit than nonprofit hospitals amongst top managerial positions.

Finally, DeVaro and Brookshire (2007) using a US cross-sectional employer telephone survey (1992-1995) find evidence that, relative to for-profit employers, nonprofit employers are less likely to use promotion as incentive device, that promotions are less likely to be based on merit and job performance, and that nonprofits are less likely to use incentive contracting - output contingent payment or bonuses. These differences are most pronounced amongst the high skilled workers who are most likely to have significant effects on firms' missions.

### 4.4 Conclusions

This survey has argued that prosocial motivation has effects on the delivery of public services. A slight difference in the way the motivation is modelled, whether as impurely, or purely altruistic, has large implications for service delivery. Most of the literature has modelled a type of impure altruism which is action, not output, oriented. When this is present, workers will work for less than otherwise, and when workers have multiple tasks, the presence of such motivations can make it better for firms to use low powered incentives. There are no implications for the type of organization that should be delivering the service.

When workers are motivated by pure altruism, or direct output considerations, things are very different. The main implication is that it may be better to have the actual service delivery undertaken by an organization that does not have a residual claimant. A government bureaucracy, or a nonprofit firm, can have a distinct advantage in delivering the service. Such an organization may be uniquely placed to obtain donations of labour effort from output oriented employees because these employees will not fear that their effort donations are expropriated by a residual claimant.

This literature would seem particularly important in informing governments as to presently poorly understood benefits of service provision by governments in-house. In many countries, governments have moved away from their traditionally direct role of providers of public and socially meritorious services, to purchasing them. Some have suggested handing over, en masse, bureaucratic service provision to contractors from the private sector in a wide variety of sectors. This is for the well known incentive reasons that such contractors have as residual claimants. The present survey argues that the government as a provider may still have an important role. This will be especially the case where the choice is between government bureaucratic provision and for-profit firms, i.e., where nonprofit firms are not able to play a part.

But we are far from a good understanding of the empirical significance of these considerations. As this survey has argued, subtle differences in the way that prosocial motivation arises can have profound implications for who should be providing social services. Data are needed to directly test this.

At a theoretical level, the difference between government and nonprofits as providers of services is not well understood. The present survey has treated them much the same, as both do not have residual claimants but there are clearly other differences which need to be better understood. One difference has to do with preference heterogeneity. Government bureaucrats answer to elected politicians so they might take actions that appeal to voters, whereas the managers of nonprofit firms are appointed by the community so they might have more flexibility in choosing the "mission" and providing services tailored to the needs of the local community. If workers are also horizontally heterogeneous in terms of their prosocial motivation then there may also be productivity gains from better matching in nonprofits (à la Besley and Ghatak 2005) rather than through a monolithic public service. There may also be differences that are due to political economy and accountability. For instance, nonprofit managers may have more opportunity to evade the nondistribution constraint than do government bureaucrats. These and other questions await further analysis.

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### Chapter 5

# **Concluding Remarks**

The question of how to design effective provision of public services, because of their significant impact on the quality of life, is a key issue in economic policy. This thesis takes a few steps towards a better understanding of what institutional arrangements have a comparative advantage in the provision of these services. Our starting point is the realization that recent years have witnessed an expansion in the involvement of the private nonprofit sector in the delivery of public services, in both advanced and developing countries. In particular, nonprofit organizations are playing an important role in delivering public services – often in partnership with the government – in developed countries, whereas in the developing world the recent trend is for the state to delegate a large responsibility of carrying out social and development projects to non-governmental organizations (NGOs). Despite these developments, the economics literature has not devoted enough attention in identifying the relevant tradeoffs associated with delegating responsibility for the delivery of public services to alternative private providers (for-profit, nonprofit), and this thesis attempts to make a contribution towards this end.

The approach in the first two substantive chapters is primarily positive: we are concerned with the fundamental question of what are the economic mechanisms that lead to the emergence of nonprofit firms and the aim is to identify conditions under which this organizational form is more likely to prevail. These chapters share a common perspective: the choice of organizational form is made by rational entrepreneurs who take into account the benefits and costs associated with this choice. Chapter 2, investigates whether entrepreneurs choose nonprofit status as a commitment device in those markets that are characterized by contractual failures in the producer\consumer relationship, a hypothesis which has been rather influential in the economics literature. The answer that emerges from the analysis in that chapter is that when a reputation for honest behaviour can be sustained then nonprofit status is not necessary nor optimal, which suggests that explanations based on contractual failures in the product market have less explanatory power than previously thought.

In chapter 3, the nonprofit commitment was shown to be valuable in terms of giving those entrepreneurs who choose this form unique access to the pool of volunteer labour. Importantly, this commitment was shown to be effective only in sectors producing goods and services that entrepreneurs consider meritorious. Thus, this chapter provides a theory that is able to simultaneously explain two key features of the nonprofit sector: the reliance on volunteers, and the focus in the delivery of care-related activities. Also, this chapter highlighted the welfare gains that are achieved when nonprofit organizations use a hiring structure which allows them to hire volunteers and subsequently sort them into paid positions across firms in the sector, based on their mission preferences.

Though the models developed in these two chapters are too simple and abstract to provide detailed policy recommendations, they could cast some light on the ongoing policy debate as to whether the government should subsidize only nonprofit providers in mixed sectors, such as child care. In light of chapter 2, the effectiveness of subsidy policies that discriminate against for-profit providers, on the basis that they are untrustworthy to provide high quality care, seems questionable. The model considered there demonstrates that reputations can provide enough incentives for profit-maximizing entrepreneurs to offer high quality services when the playing field is leveled. There may be a number of good reasons why governments should subsidize nonprofits but our analysis suggests that, in many sectors, overcoming contractual failures is not one of them. On the other hand, chapter 3 points to the desirability of subsidizing volunteer hiring nonprofits, as a mechanism to enhance employment and service provision. In future work, the framework developed in this chapter could be used to investigate in greater detail what tax-subsidy policy would improve employment and welfare.

Another theme of this thesis is that understanding the workings of public goods producing organizations requires the recognition that the broader group of stakeholders involved – donors, workers, volunteers, managers – are not strictly self-interested, but may have other-regarding preferences. Recognizing this possibility, opens the door to a whole range of interesting issues regarding the selection of intrinsically motivated managers and workers and of the provision of incentives in organizations employing altruistic agents that are surveyed in chapter 4 of this thesis. In particular, the main message of this chapter is that prosociality of employees has important implications for the delivery of public services, as it not only affects the structure of optimal incentives but it also provides an efficiency rationale for why public service delivery should be undertaken by organizations that do not have a residual claimant – a government bureaucracy or a non-profit firm – by virtue of their unique ability to harness workers' intrinsically motivated efforts. Crucially, this last implication is shown to hinge on a subtle distinction in the source of prosocial motivation – whether it is action or output-oriented. The more systematic collection of micro-based data on organizations delivering public services will be very valuable in deriving further insights as to the relative roles of the alternative views of prosocial motivation.

Much more remains to be done in developing theoretical and empirical implications of alternative institutional arrangements for the provision of public goods and services. For instance, this thesis has drawn a strict line between for-profits and nonprofits, whereas in reality this dichotomy is becoming less stark as hybrid organizations that combine resources from the two sectors are engaging in mission-related activities. The potential merits and pitfalls of these partnerships have not been scrutinized yet. Also, there are various issues of political economy and accountability that this thesis has not touched, which are important in understanding the nature of the interaction between the government and nonprofit organizations. Finally, it remains to be seen whether and how additional behavioural elements, such as concerns with fairness and identity, which are being integrated into economic analysis, will interact with the issue of organizational form, which has been the focus of this thesis. We regard all of these areas as important ones for future research.

### Appendix A

## **Omitted Proofs: Chapter 2**

**Proof of Lemma 1:** First we establish that  $U_f^s(0) > U_n(q_n^*(0))$ . To see this, note that  $U_n(q_n^*(0)) = \delta\left(z - c(q_n^*(0))\right) - b(\widehat{q} - q_n^*(0))$ , while  $U_f^s(0) = z - c(q_f^s) - b(\widehat{q} - q_f^s)$ , so  $U_f^s(0) > U_n(q_n^*(0))$  iff  $z - c(q_f^s) - b(\widehat{q} - q_f^s) > \delta\left(z - c(q_n^*(0))\right) - b(\widehat{q} - q_n^*(0)) \iff bq_f^s - c(q_f^s) + (1 - \delta)z > bq_n^*(0) - c(q_n^*(0))$ . The last inequality is true because  $bq_f^s - c(q_f^s) > bq_n^*(0) - c(q_n^*(0))$  since:  $\left\{q_f^s = \arg\max_q [bq - c(q)]\right\}$ . Also,  $U_n(q_n^*(m^*)) > U_f^s(m^*)$ . To see this, recall that  $U_f^s(m^*) = U_n^s(m^*)$ , and that  $U_n(q_n^*(m)) > U_n^s(m) \ \forall \ m \in [0, \overline{m}]$ . Note that

$$\frac{dU_n(q_n^*(m^*))}{dm} = -\delta(\widehat{q} - q_n^*(m))$$

which implies that

$$\frac{dU_n(q_n^*(m^*))}{dm} \gtrless 0 \Leftrightarrow q_n^*(m) \gtrless \widehat{q}$$

and that

$$\frac{d^2 U_n(q_n^*(m^*))}{dm^2} = \delta \frac{dq_n^*(m)}{dm} > 0$$

that is,  $U_n(q_n^*(m))$  is continuous, and U-shaped (it is decreasing, for m such that  $q_n^*(m) < \hat{q}$ , and increasing for m such that  $q_n^*(m) > \hat{q}$ ) and  $U_f^s(m)$  is continuous, strictly decreasing and linear for  $m \in [0, \overline{m}]$ , there exists a *unique*  $\underline{m} \in (0, m^*)$  such that  $U_n(q_n^*(\underline{m})) = U_f^s(\underline{m})$ , and therefore  $U_n(q_n^*(m))$  is  $\gtrless U_f^s(m)$  for  $m \gtrless \underline{m}$ .

**Proof of Lemma 2:** We want to show that  $U_f(q_f^*(m)) > U_n(q_n^*(m))$ , or equivalently that

$$z - m(\widehat{q} - q_f^*(m)) - c(q_f^*(m)) - b(\widehat{q} - q_f^*(m)) > \delta\left(z - m(\widehat{q} - q_n^*(m)) - c(q_n^*(m))\right) - b(\widehat{q} - q_n^*(m))$$
(A.1)

To show that (A.1) holds note that

$$z - m(\widehat{q} - q_f^*(m)) - c(q_f^*(m)) - b(\widehat{q} - q_f^*(m)) > z - m(\widehat{q} - q_n^*(m)) - c(q_n^*(m)) - b(\widehat{q} - q_n^*(m))$$

since

$$q_f^*(m) = \arg\max_q [(b+m)q - c(q)]$$

which implies that

$$z - m(\widehat{q} - q_f^*(m)) - c(q_f^*(m)) - b(\widehat{q} - q_f^*(m)) > \delta\left(z - m(\widehat{q} - q_n^*(m)) - c(q_n^*(m))\right) - b(\widehat{q} - q_n^*(m)) = \delta\left(z - m(\widehat{q} - q_n^*(m)) - c(q_n^*(m))\right) - b(\widehat{q} - q_n^*(m)) = \delta\left(z - m(\widehat{q} - q_n^*(m)) - c(q_n^*(m))\right) - b(\widehat{q} - q_n^*(m)) = \delta\left(z - m(\widehat{q} - q_n^*(m)) - c(q_n^*(m))\right) - b(\widehat{q} - q_n^*(m)) = \delta\left(z - m(\widehat{q} - q_n^*(m)) - c(q_n^*(m))\right) - b(\widehat{q} - q_n^*(m)) = \delta\left(z - m(\widehat{q} - q_n^*(m)) - c(q_n^*(m))\right) - b(\widehat{q} - q_n^*(m)) = \delta\left(z - m(\widehat{q} - q_n^*(m)) - c(q_n^*(m))\right) - b(\widehat{q} - q_n^*(m))$$

for  $\delta \in (0, 1)$ , which establishes (A.1).

**Proof of Lemma 3:** First note that when  $c(q) = \frac{1}{2}q^2$ , the marginal cost is c'(q) = q, which implies that  $q_f^s = b$  and  $q_n^s = \frac{1}{\delta}b$ , while  $c(q_f^s) = \frac{1}{2}b^2$  and  $c(q_n^s) = \frac{1}{2}(\frac{1}{\delta}b)^2$ . Also, substitution into (2.6) and (2.10) implies that  $q_f^*(m) = b + m$  and  $q_n^*(m) = \frac{1}{\delta}(b + \delta m)$ , so  $c(q_f^*(m)) = \frac{1}{2}(b + m)^2$  and  $c(q_n^*(m)) = \frac{1}{2}(\frac{1}{\delta}(b + \delta m))^2$ .

We show part (i) by inserting the values for  $q_f^s, q_n^s, c(q_f^s), c(q_n^s), q_f^*(m), q_n^*(m), c(q_f^*(m))$ and  $c(q_n^*(m))$  into (2.16) and (2.17), and simplifying to obtain:

$$\beta_f(m) = \begin{cases} \frac{1}{2} & \text{if } 0 < m \le m^* \\ \frac{m^2/2}{(1-\delta)\left(z - \frac{b^2}{2\delta} - \hat{q}m\right) + m^2} & \text{if } m^* < m \le \overline{m} \end{cases}$$
(A.2)

and

$$\beta_n(m) = \begin{cases} \frac{\delta m^2/2}{-(1-\delta)\left(z - \frac{b^2}{2\delta} - \hat{q}m\right) + \delta m^2} & \text{if } \underline{m} < m < m^* \\ \frac{1}{2} & \text{if } m^* \le m \le \overline{m} \end{cases}$$
(A.3)

which establishes part (i) of the lemma.

For part (ii), it is useful to first compute  $m^*$ . From (2.4), we have

$$m^{*} = \frac{(1-\delta)z - (c(q_{f}^{s}) - \delta c(q_{n}^{s})) - b(q_{n}^{s} - q_{f}^{s})}{(1-\delta)\widehat{q} - q_{f}^{s} + \delta q_{n}^{s}} = \frac{(1-\delta)z - (\frac{1}{2}b^{2} - \delta\frac{1}{2}(\frac{1}{\delta}b)^{2}) - b(\frac{1}{\delta}b - b)}{(1-\delta)\widehat{q} - b + \delta\frac{1}{\delta}b} = \frac{z - \frac{b^{2}}{2\delta}}{\widehat{q}}$$

We need to show that first, for  $m \in (0, m^*)$ ,  $\beta_n(m) > \beta_f(m)$ , or equivalently that

$$\frac{\delta m^2/2}{-(1-\delta)\left(z-\frac{b^2}{2\delta}-\widehat{q}m\right)+\delta m^2} > \frac{1}{2} \Leftrightarrow m < \frac{z-\frac{b^2}{2\delta}}{\widehat{q}} = m^*$$
(A.4)

so the inequality holds. Second, we want to show that for  $m \in (m^*, \overline{m})$ ,  $\beta_f(m) > \beta_n(m)$ , or equivalently that

$$\frac{1}{2} < \frac{m^2/2}{\left(1-\delta\right)\left(z-\frac{b^2}{2\delta}-\widehat{q}m\right)+m^2} \Leftrightarrow m > \frac{z-\frac{b^2}{2\delta}}{\widehat{q}} = m^* \tag{A.5}$$

so the second inequality is also established.

For part (iii), differentiating  $\beta_n(m)$  with respect to m yields:

$$\frac{\partial \beta_n(m)}{\partial m} = \frac{\delta m \left[ -(1-\delta) \left( z - \frac{b^2}{2\delta} - \widehat{q}m \right) + \delta m^2 \right] - \frac{1}{2} \delta m^2 \left( 2\delta m + \widehat{q}(1-\delta) \right)}{\left[ -(1-\delta) \left( z - \frac{b^2}{2\delta} - \widehat{q}m \right) + \delta m^2 \right]^2}$$

implying that

$$\frac{\partial \beta_n(m)}{\partial m} \stackrel{\leq}{=} 0 \Leftrightarrow \delta m \left[ -(1-\delta) \left( z - \frac{b^2}{2\delta} - \hat{q}m \right) + \delta m^2 \right] - \frac{1}{2} \delta m^2 \left( 2\delta m + \hat{q}(1-\delta) \right) \stackrel{\leq}{=} 0$$
$$\Leftrightarrow m \stackrel{\leq}{=} 2 \frac{z - \frac{b^2}{2\delta}}{\hat{q}} = 2m^*$$

So for  $m \in (0, m^*)$ ,  $\frac{\partial \beta_n(m)}{\partial m} < 0$ , that is,  $\beta_n(m)$  is decreasing. For part (iv), differentiating  $\beta_f(m)$  with respect to m:

$$\frac{\partial \beta_f(m)}{\partial m} = \frac{m \left[ \left(1-\delta\right) \left(z-\frac{b^2}{2\delta}-\widehat{q}m\right)+m^2\right] - \frac{1}{2}m^2 \left(2m-\widehat{q}(1-\delta)\right)}{\left[ \left(1-\delta\right) \left(z-\frac{b^2}{2\delta}-\widehat{q}m\right)+m^2\right]^2}$$

implying that

$$\begin{aligned} \frac{\partial \beta_f(m)}{\partial m} & \stackrel{\leq}{=} & 0 \Leftrightarrow m \left[ (1-\delta) \left( z - \frac{b^2}{2\delta} - \widehat{q}m \right) + m^2 \right] - \frac{1}{2} m^2 \left( 2\delta m + \widehat{q}(1-\delta) \right) \stackrel{\leq}{=} 0 \\ & \Leftrightarrow & m \stackrel{\leq}{=} 2 \left( \frac{z - \frac{b^2}{2\delta}}{\widehat{q}} \right) = 2m^* \end{aligned}$$

so  $\beta_f(m)$  is flat in  $(0, m^*)$  increasing in  $(m^*, 2m^*)$ , and decreasing in  $(2m^*, \overline{m})$ , which implies that it reaches a maximum at  $2m^*$ .

### Appendix B

# Equilibrium Strategies Supporting the Relational Contracts in Chapter 3

### **B.1** Information Sets

We let  $h_i^w(t)$  denote worker *i's* public history up to time *t*, with  $h_i^w(t) = 1$  if the worker has not been involved in a separation due to cheating, and  $h_i^w(t) = 0$ , otherwise. Similarly, a manager *j's* public history is denoted  $h_j^m(t)$ , with  $h_j^m(t) = 1$  if the manager has not been involved in a separation due to cheating, and  $h_j^m(t) = 0$ , otherwise. We let  $q_i(t)$ denote worker *i's* effort contribution up to time *t*, with  $q_i(t) = 1$  if the worker has delivered promised effort and  $q_i(t) = 0$ , otherwise. Also, we let  $f_j(t)$  denote whether manager *j* has honoured all previous promises made to workers, with  $f_j(t) = 1$  if she has and  $f_j(t) = 0$ otherwise.

Furthermore, if worker *i* has provided promised effort when working for *j* or has shirked but has not been caught (an event which occurs with probability  $1-\mu$ ) then we let  $q_{ij}(t) = 1$ , whereas if the worker has been caught shirking (an event which occurs with probability  $\mu$ ) it is  $q_{ij}(t) = 0$ . Similarly, let  $f_{ij}(t)$  denote whether manager *j* has honoured all previous promises made to worker *i*, with  $f_{ij}(t) = 1$  if all promises were honoured and  $f_{ij}(t) = 0$ , otherwise.

Agents know all previous wage payments made since this is verifiable information. We let  $H(t) = \{w_0, w_1, \dots, w_{t-1}\}$  denote the history of wage payments made up to time t.

Let  $\mathcal{W}$  denote the set of all workers and  $\mathcal{M}$  the set of all managers, then worker *i's* information set in period t, is given by the collection of the public histories of all workers and managers up to time t - 1,  $h^{\mathcal{W}}(t - 1) \cup h^{\mathcal{M}}(t - 1) \cup H(t - 1)$ , as well as the private information he has from his own employment history  $q_i(t - 1)$  and his interactions with

employers  $\bigcup_{j \in \mathcal{M}_i} f_{ij}(t-1)$ , where  $\mathcal{M}_i$  is the set of managers for whom worker *i* has worked. Similarly, manager *j*'s information set in period *t* comprises the collection of the public histories of all workers and managers up to time t-1,  $h^{\mathcal{W}}(t-1) \cup h^{\mathcal{M}}(t-1) \cup H(t-1)$ , as well as the private information she has from her own history as employer  $f_j(t-1)$  and her interactions with her workers  $\bigcup_{i \in \mathcal{W}_j} q_{ij}(t-1)$ , where  $\mathcal{W}_j$  is the set of workers that manager *j* has employed.

### **B.2** Strategy Space

Strategies consist of rules that specify a worker's and a manager's set of actions at each information set and time t.

- Worker: A strategy  $\sigma^w(t)$  for the worker specifies two sorts of actions. First, it specifies whether to accept an employment offer (volunteering or internship) from every manager. An offer consists of an unpaid position along with a promise of promotion to a wage position (within the organization in the case of an internship, in an organization of matching type in the case of volunteering), when a vacancy is created, as well as a wage offer (w). In the second stage, for a worker who has accepted the offer from a given employer, and is either in the unpaid or the paid position, the strategy specifies whether to provide high effort  $(q_i = 1)$  or not  $(q_i = 0)$  and whether to continue in the employment relationship or quit.
- Manager: A strategy  $\sigma^m(t)$  for a manager specifies the following set of actions. Firstly, it specifies what type of employment offer to make to workers: volunteering or internship, and the accompanying wages. Secondly, if a volunteering structure is implemented, it specifies whether to honour the promise to promote a worker from the pool of volunteers when a paid position opening has occurred ( $f_j = 1$ ) or to renege on the promise ( $f_j = 0$ ) by filling the vacancy with an intern hired from the general pool. Finally, it specifies whether to continue an employment relationship or not.

### B.3 Equilibrium Strategies Supporting the Volunteering Structure

In what follows we describe the actions that the equilibrium strategies  $\left(\sigma_i^{*w}(t), \sigma_j^{*m}(t)\right)$  supporting the volunteering structure prescribe in every possible information set.

### Worker's strategy $\sigma_i^{*w}(t)$ :

1. If manager j's incentive compatibility constraint, as defined in (3.11), is satisfied, and  $h_i^m(t-1) = 1$  and  $h_i^w(t-1) = 1$ , and  $q_i(t-1)f_{ij}(t-1) = 1$ , then accept a volunteering
position promising promotion to a wage position of  $w^V$ , satisfying (ICV), and set  $q_{ij} = 1$ . Otherwise, do not accept a volunteering position. If the worker is already in a paid position then accept any wage offer. If  $h_j^m(t-1) = 1$  and  $h_i^w(t-1) = 1$ , and  $q_i(t-1)f_{ij}(t-1) = 1$ , and the up-front wage  $w^V$  satisfies (ICV), then set  $q_{ij} = 1$ , otherwise set  $q_{ij} = 0$ .

- 2. If  $h_i^w(t-1) = 1$ , and  $q_i(t-1)f_{ij}(t-1) = 1$ , then accept an internship position in organization j promising a wage of  $w^I$ , satisfying (*ICI*), and set  $q_{ij} = 1$ . Otherwise, do not accept an internship position. If the worker is already in a paid position then accept any wage offer. If  $h_i^w(t-1) = 1$ , and  $q_i(t-1)f_{ij}(t-1) = 1$ , and the up-front wage offer  $w^I$  satisfies (*ICI*), then set  $q_{ij} = 1$ , otherwise set  $q_{ij} = 0$ .
- 3. Terminate a relationship with a manager if promised promotion or promised wage offer have not been met.

### Manager's strategy $\sigma_j^{*m}(t)$ :

- 1. If the manager's incentive compatibility constraint (3.11) is satisfied, and  $h_j^m(t-1) = 1$ and  $h_i^w(t-1) = 1$ , and  $q_{ij}(t-1)f_j(t-1) = 1$ , then: a) Offer worker *i* a volunteering position. b) Honour the promise to promote a worker *i* from the volunteer pool into a paid position  $(f_j = 1)$  whether *i* has volunteered for *j* or not, when there is a paid work vacancy. c) If a worker *i* is an existing paid worker with  $h_j^m(t-1) = 1$  and  $h_i^w(t-1) = 1$ , and  $q_i(t-1)f_{ij}(t-1) = 1$ , who has received previous payment of  $w \ge w^V$ , make him an up-front wage offer of  $w^V$  satisfying (*ICV*).
- 2. If the manager's incentive compatibility constraint (3.11) is satisfied, and  $h_j^m(t-1) = 0$ and  $h_i^w(t-1) = 1$ , and  $q_{ij}(t-1)f_j(t-1) = 1$ , then: a) Offer worker *i* an internship position. b) Honour the promise to promote a worker *i* who has interned for you into a paid position  $(f_j = 1)$ , when there is a paid work vacancy. c) If a worker *i* is an existing paid worker with an internship history with you and  $h_j^m(t-1) = 1$  and  $h_i^w(t-1) = 1$ , and  $q_{ij}(t-1)f_j(t-1) = 1$ , then make him an up-front wage offer of  $w^I$ .
- 3. If (3.11) is satisfied, and  $h_j^m(t-1) = 1$ ,  $h_i^w(t-1) = 1$  and  $q_{ij}(t-1)f_j(t-1) = 0$ , then make no offer to worker *i*.
- 4. If (3.11) is satisfied, and  $h_j^m(t-1) = 1$  and  $h_i^w(t-1) = 0$ , then make no offer to worker *i*.
- 5. If (3.11) is violated, and  $h_j^m(t-1) = 0$ ,  $h_i^w(t-1) = 1$  and  $q_{ij}(t-1)f_j(t-1) = 1$ , then: a) Offer worker *i* an internship position b) Honour the promise to promote

worker *i* into a paid position  $(f_j = 1)$ , when there is a paid work vacancy. c) If worker *i* is an existing paid worker with an internship history and  $h_i^w(t-1) = 1$ , and  $q_{ij}(t-1)f_j(t-1) = 1$ , then make worker *i* a wage offer of  $w^I$ .

6. If (3.11) is violated, and either  $h_j^m(t-1) = 0$ , or  $h_i^w(t-1) = 1$ , or  $q_{ij}(t-1)f_j(t-1) = 1$  does not hold, then make no offer to worker *i*.

The above strategies induce a perfect equilibrium of the repeated game, in which managers choose to set up a volunteering structure. Workers accept volunteering positions with a promise of promotion to a paid position paying  $w^V$  and choose not to shirk, while managers honour their promises to promote only workers with volunteering experience and rehire workers who have provided the promised effort. Note that the above strategies describe behavior both on and off the equilibrium path, for instance, after one of the parties reneges on a promise. To see this, note that under the equilibrium strategy  $\sigma_i^{*m}(t)$  a manager who has cheated on a promise to promote volunteers and has therefore lost reputation, will continue to exploit future volunteers, and this would be a best response to workers' equilibrium strategy  $\sigma_i^{*w}(t)$  of not accepting volunteer positions in organizations with stained reputations. In turn, a worker's best response facing a manager who has lost reputation is to only accept internship positions paying  $w^I > w^V$ , which is what the equilibrium strategy  $\sigma_i^{*w}(t)$ prescribes. Also, this is the best the manager can do since under  $\sigma_i^{*w}(t)$  workers offered a lower up-front wage will shirk. Or suppose that a worker shirks. Then the equilibrium strategy of the manager states that the worker should not be hired again. This is optimal given that the worker's equilibrium strategy says that a shirking worker will shirk again even if the wage offer is  $w^V$ . Furthermore, this is the optimal thing for the worker to do, since the equilibrium strategy of the manager calls for a shirking worker not to be hired again.

### B.4 Equilibrium Strategies Supporting the Internship Structure

### Worker's strategy $\widetilde{\sigma}_i^w(t)$ :

1. If manager j's incentive compatibility constraint, as defined in (3.12) below, is satisfied, and  $h_j^m(t-1) = 1$  and  $h_i^w(t-1) = 1$ , and  $q_i(t-1)f_{ij}(t-1) = 1$ , then accept an internship position promising promotion to a wage position of  $w^I$ , satisfying (*ICI*), and set  $q_{ij} = 1$ . Otherwise, do not accept an internship position. If the worker is already in a paid position then accept any wage offer. If  $h_j^m(t-1) = 1$  and  $h_i^w(t-1) = 1$ , and  $q_i(t-1)f_{ij}(t-1) = 1$ , and the up-front wage  $w^I$  satisfies (*ICI*), then set  $q_{ij} = 1$ , otherwise set  $q_{ij} = 0$ .

- 2. Accept any non-negative up-front wage offer. If  $h_i^w(t-1) = 1$ , and  $q_i(t-1)f_{ij}(t-1) = 1$ , and the up-front wage offer satisfies  $w^I$  satisfies (ICI), then set  $q_{ij} = 1$ , otherwise set  $q_{ij} = 0$ .
- 3. Terminate a relationship with an organization if promised promotion or promised wage offer have not been met.

### Manager's strategy $\widetilde{\sigma}_{j}^{m}(t)$ :

- 1. If the manager's incentive compatibility constraint (3.12) is satisfied, and  $h_j^m(t-1) = 1$ and  $h_i^w(t-1) = 1$ , and  $q_{ij}(t-1)f_j(t-1) = 1$ , then: a) Offer worker *i* an internship position. b) Honour the promise to promote a worker *i* who has interned for you into a paid position  $(f_j = 1)$ , when there is a paid work vacancy. c) If a worker *i* is an existing paid worker with an internship history with you and  $h_j^m(t-1) = 1$  and  $h_i^w(t-1) = 1$ , and  $q_{ij}(t-1)f_j(t-1) = 1$ , then make him an up-front wage offer of  $w^I$ .
- 2. If the manager's incentive compatibility constraint (3.12) is satisfied, and  $h_j^m(t-1) = 0$ and  $h_i^w(t-1) = 1$ , and  $q_{ij}(t-1)f_j(t-1) = 1$ , then offer an up-front wage offer  $w^I$ satisfying (*ICI*).
- 3. If (3.12) is satisfied, and  $h_j^m(t-1) = 1$ ,  $h_i^w(t-1) = 1$  and  $q_{ij}(t-1)f_j(t-1) = 0$ , then make no offer to worker *i*.
- 4. If (3.12) is satisfied, and  $h_j^m(t-1) = 1$  and  $h_i^w(t-1) = 0$ , then make no offer to worker *i*.
- 5. If (3.12) is violated, and  $h_j^m(t-1) = 0$ ,  $h_i^w(t-1) = 1$  and  $q_{ij}(t-1)f_j(t-1) = 1$ , then make worker i a wage offer of  $w^I$ .
- 6. If (3.12) is violated, and either  $h_j^m(t-1) = 0$ , or  $h_i^w(t-1) = 1$ , or  $q_{ij}(t-1)f_j(t-1) = 1$  does not hold, then make no offer to worker *i*.

The above strategies give rise to a perfect equilibrium of the repeated game, in which workers accept internship positions with a promise of promotion to a paid position paying  $w^{I}$  and choose not to shirk, while managers honour their promises to promote interns into paid positions and rehire workers who have provided the promised effort.

# Appendix C Omitted Proofs: Chapter 3

Proof of Lemma 4: It is

$$V_i^g = \bar{w} + \beta [\rho V_{ij}^I + (1 - \rho) V_i^g]$$
  
$$\Rightarrow V_i^g = \frac{\bar{w} + \beta \rho V_{ij}^I}{1 - \beta (1 - \rho)}$$
(C.1)

and

$$V_{ij}^{I} = -e^{h} + \beta \left[ (1 - \beta) V_{ij}^{p} + \beta V_{ij}^{I} \right]$$
  
$$\Rightarrow V_{ij}^{I} = \frac{-e^{h} + \beta (1 - \beta) V_{ij}^{p}}{1 - \beta^{2}}$$
(C.2)

while

$$V_{ij}^{p} = w^{I} + \theta_{ij} - e^{h} + \beta V_{ij}^{p}$$
  

$$\Rightarrow V_{ij}^{p} = \frac{w^{I} + \theta_{ij} - e^{h}}{1 - \beta}$$
(C.3)

and

$$\begin{split} V_{ij}^s &= w^I + \theta_{ij} + \beta \left[ \mu V^g + (1-\mu) V_{ij}^s \right] \\ \Rightarrow V_{ij}^s &= \frac{w^I + \theta_{ij} + \beta \mu V^g}{1 - \beta (1-\mu)} \end{split}$$

So, incentive compatibility implies:

$$\begin{split} V_{ij}^{p} &\geq V_{ij}^{s} = \frac{w^{I} + \theta_{ij} + \beta\mu V^{g}}{1 - \beta(1 - \mu)} = \frac{w^{I} + \theta_{ij}}{1 - \beta(1 - \mu)} + \frac{\beta\mu}{1 - \beta(1 - \mu)} \left(\frac{\bar{w} + \beta\rho V_{ij}^{I}}{1 - \beta(1 - \rho)}\right) \Rightarrow \\ V_{ij}^{p} &\geq \frac{w^{I} + \theta_{ij}}{1 - \beta(1 - \mu)} + \frac{\beta\mu\bar{w}}{(1 - \beta(1 - \mu))(1 - \beta(1 - \rho))} \\ &+ \frac{\beta^{2}\mu\rho}{(1 - \beta(1 - \mu))(1 - \beta(1 - \rho))} \left(\frac{-e^{h} + \beta(1 - \beta)V_{ij}^{p}}{1 - \beta^{2}}\right) \end{split}$$

Substituting from (C.3) and rearranging yields the incentive compatible wage in (ICI).

Also note that straightforward computation yields:  $\frac{\partial w^{I}(\rho)}{\partial \rho} = (1 - \beta) e^{h} - \mu \left( \bar{w} + e^{h} \right)$ , which is positive under the condition stated in the lemma.

**Proof of Lemma 5:** An assortatively matched pair generates strictly more surplus than one where types differ. When workers' type matches the type of the organization, provision of the mission good  $(g_m)$  is enhanced  $(g_m = \hat{g}_m > g_m^h)$ . Consider a matching-equilibrium without assortatively matched pairs. An organization employing a worker of a different type would have an incentive to attract a worker of the same type by offering him some share of the higher surplus. This would also be preferred by the worker thus undoing the stability of the equilibrium.

Proof of Lemma 6: Similar to that of Lemma 4, so omitted.

**Proof of Lemma 7:** Follows from the fact that in the non-mission sector there is no commitment benefit to being nonprofit. Thus, managers will find it optimal to set up for-profit firms since the for-profit status makes them full residual claimants of the organization's net earnings.

**Derivation of the Sorting conditions** (C.4) and (C.5): We derive the sorting conditions of workers by computing directly  $\tilde{V}_{u}^{g}(m)$ ,  $\tilde{V}_{u}^{g}(b)$  and  $\tilde{V}_{i}^{g}(m)$ ,  $\tilde{V}_{i}^{g}(b)$  for  $i \in \{m_{1}, m_{2}\}$ . Substituting recursively (C.3) into (C.2) and then into (C.1) gives:

$$\widetilde{V}_{u}^{g}(m) = \frac{\overline{w}}{1 - \beta + \beta \rho^{m}(\widetilde{E}_{m})} - \frac{\beta \rho^{m}(\widetilde{E}_{m})e^{h}}{(1 - \beta^{2})(1 - \beta + \beta \rho^{m}(\widetilde{E}_{m}))} + \frac{\beta^{2} \rho^{m}(\widetilde{E}_{m})}{(1 - \beta^{2})(1 - \beta + \beta \rho^{m}(\widetilde{E}_{m}))} (\widetilde{w}^{V} - e^{h})$$

$$\widetilde{V}_{i}^{g}(b) = \frac{\overline{w}}{1 - \beta + \beta \rho^{b}(\widetilde{E}_{b})} - \frac{\beta \rho^{b}(\widetilde{E}_{b})e^{h}}{(1 - \beta^{2})(1 - \beta + \beta \rho^{b}(\widetilde{E}_{b}))} + \frac{\beta^{2} \rho^{b}(\widetilde{E}_{b})}{(1 - \beta^{2})(1 - \beta + \beta \rho^{b}(\widetilde{E}_{b}))} (\widetilde{w}^{I} - e^{h}) \text{ for } i \in \{u, m_{1}, m_{2}\}$$

$$\widetilde{V}_{i}^{g}(m) = \frac{\overline{w}}{1-\beta+\beta\rho^{m}(\widetilde{E}_{m})} - \frac{\beta\rho^{m}(\widetilde{E}_{m})e^{h}}{(1-\beta^{2})(1-\beta+\beta\rho^{m}(\widetilde{E}_{m}))} + \frac{\beta^{2}\rho^{m}(\widetilde{E}_{m})}{(1-\beta^{2})(1-\beta+\beta\rho^{m}(\widetilde{E}_{m}))}(\widetilde{w}^{V}+\theta^{h}-e^{h}) \text{ for } i \in \{m_{1},m_{2}\}$$

where  $\tilde{E}_m$  and  $\tilde{E}_b$  are implicitly defined below by (C.7) and (C.9) respectively. Substituting these expressions into (SW1) and (SW2) and rearranging yields:

$$\frac{\rho^{b}(\widetilde{E}_{b})(1-\beta)\left[\beta w^{I}(\widetilde{E}_{b})-(1+\beta)(\overline{w}+e^{h})\right]}{\beta\left(1-\beta+\beta\rho^{b}(\widetilde{E}_{b})\right)\left(w^{V}(\widetilde{E}_{b})+\theta^{h}\right)-(1-\beta^{2})(\overline{w}+e^{h})-\beta^{2}\rho^{b}(\widetilde{E}_{b})w^{I}(\widetilde{E}_{b})} < \rho^{m}(\widetilde{E}_{m}) < \frac{\rho^{b}(\widetilde{E}_{b})(1-\beta)\left[\beta w^{I}(\widetilde{E}_{b})-(1+\beta)(\overline{w}+e^{h})\right]}{\beta\left(1-\beta+\beta\rho^{b}(\widetilde{E}_{b})\right)\left(w^{V}(\widetilde{E}_{m})\right)-(1-\beta^{2})(\overline{w}+e^{h})-\beta^{2}\rho^{b}(\widetilde{E}_{b})w^{I}(\widetilde{E}_{b})}$$
(C.4)

For mission-motivated managers the sorting constraint (SM1) implies that:

$$\phi^n \widetilde{\pi}^V + b(\widehat{g}_m) > \widetilde{\pi}_b^I \Rightarrow \phi^n > \frac{p_b(G_b(\widetilde{E}_b))g_b^h - w^I(\widetilde{E}_b) - b(\widehat{g}_m)}{p_m(G_m(\widetilde{E}_m))\widehat{g}_m - w^V(\widetilde{E}_m)}$$

and the one for unmotivated managers (SM2) implies that:

$$\widetilde{\pi}_b^I > \phi^n \widetilde{\pi}^V \Rightarrow \phi^n < \frac{p_b(G_b(\widetilde{E}_b))g_b^h - w^I(\widetilde{E}_b)}{p_m(G_m(\widetilde{E}_m))\widehat{g}_m - w^V(\widetilde{E}_m)}$$

so combining these two, one obtains

$$\frac{p_b(G_b(\widetilde{E}_b))g_b^h - w^I(\widetilde{E}_b) - b(\widehat{g}_m)}{p_m(G_m(\widetilde{E}_m))\widehat{g}_m - w^V(\widetilde{E}_m)} < \phi^n < \frac{p_b(G_b(\widetilde{E}_b))g_b^h - w^I(\widetilde{E}_b)}{p_m(G_m(\widetilde{E}_m))\widehat{g}_m - w^V(\widetilde{E}_m)}$$
(C.5)

**Proof of Proposition 6:** Part (a). The choice of nonprofit organizational form follows from Corollary 2. The equilibrium strategies supporting the volunteer structure are described in Appendix A. To prove the rest of the proposition we analyze the interaction of incentive compatibility conditions for workers and managers. On the managers' side,

free-entry ensures that incentive compatibility (ICM) binds:

$$\pi^V(p_m(G_m), E_m) = p_m(G_m)\widehat{g}_m - w = \Theta(\phi^n)$$
(C.6)

On the workers' side, incentive compatibility requires that condition (ICV) is satisfied. Combining (C.6) and (ICV) yields:

$$\frac{\left(1-\beta^{2}\right)\left(1+\beta\frac{(1-\beta)\tilde{E}_{m}}{L_{m}-\tilde{E}_{m}}-\beta\left(1-\mu\right)\right)}{\beta\mu\left(1+\beta\frac{(1-\beta)\tilde{E}_{m}}{L_{m}-\tilde{E}_{m}}-\beta^{2}\right)}e^{h}+\frac{\left(1-\beta^{2}\right)}{\left(1+\beta\frac{(1-\beta)\tilde{E}_{m}}{L_{m}-\tilde{E}_{m}}-\beta^{2}\right)}\bar{w}-\theta^{h} \qquad (C.7)$$
$$-p_{m}(G_{m}(\tilde{E}_{m}))\hat{g}_{m}+\Theta(\phi^{n})=0$$

Assumption 1 ensures that the two conditions cross in the relevant region, that is, (C.7) has a solution in the interval  $(0, L_m)$ .

Part (b). The choice of for-profit status follows from lemma 7. The equilibrium strategies supporting the internship structure are described in Appendix A. On the managers' side, free-entry implies that incentive compatibility (3.13) binds:

$$\pi^{I}(p_{b}(G_{b}), E_{b}) = p_{b}(G_{b})g_{b}^{h} - w = K$$
(C.8)

On the workers' side, incentive compatibility requires that condition (ICI) is satisfied. Note that (C.8) is downward sloping because the inverse demand function  $p_b(G_b)$  is decreasing in the level of employment  $E_b$ . The free-entry-condition requires that equilibrium must lie on the downward sloping curve defined by:  $w^I = p_b(G_b)g_b^h - K$ , while the workers' incentive compatibility implies that equilibrium must lie on the upward sloping curve defined by:

$$w^{I}(E_{b}) = \frac{\left(1 - \beta^{2}\right)\left(1 + \beta\frac{(1 - \beta)E_{b}}{L_{b} - E_{b}} - \beta\left(1 - \mu\right)\right)}{\beta\mu\left(1 + \beta\frac{(1 - \beta)E_{b}}{L_{b} - E_{b}} - \beta^{2}\right)}e^{h} + \frac{\left(1 - \beta^{2}\right)}{\left(1 + \beta\frac{(1 - \beta)E_{b}}{L_{b} - E_{b}} - \beta^{2}\right)}\overline{w} - \theta^{r}$$

Equilibrium occurs at the intersection of these two. Assumption 2 ensures that the two conditions cross in the relevant region, that is,

$$\frac{\left(1-\beta^2\right)\left(1+\beta\frac{(1-\beta)\widetilde{E}_b}{L_b-\widetilde{E}_b}-\beta\left(1-\mu\right)\right)}{\beta\mu\left(1+\beta\frac{(1-\beta)\widetilde{E}_b}{L_b-\widetilde{E}_b}-\beta^2\right)}e^h + \frac{\left(1-\beta^2\right)}{\left(1+\beta\frac{(1-\beta)\widetilde{E}_b}{L_b-\widetilde{E}_b}-\beta^2\right)}\overline{w}-\theta^r - p_b(G_b(\widetilde{E}_b))g_b^h + K = 0$$
(C.9)

has a solution in the interval  $(0, L_b)$ .

**Proof of Corollary 3:** Follows from observing that increasing  $(\mu)$  or  $(\theta)$  shifts workers' incentive compatibility condition downwards so the equilibrium point moves along the downward sloping managers' incentive compatibility constraint. Similarly, increasing  $p_m(G_m)$ ,

 $p_b(G_b)$ , shifts up managers' incentive compatibility constraint, which causes the equilibrium to occur at a higher point along workers' upward sloping incentive compatibility constraint.

**Proof of Proposition 7:** First, let us define workers' value functions associated with the benchmark scheme of hiring workers directly into paid positions. We denote the expected lifetime value of being in a paid position and not-shirking  $(U^p)$ , being in a paid position and shirking  $(U^s)$  and being in the general pool  $(U^g)$ . It is

$$U^{p} = w^{BM} + \theta_{ij} - e^{h} + \beta U^{p}$$
  
$$\Rightarrow U^{p} = \frac{w^{BM} + \theta_{ij} - e^{h}}{1 - \beta}$$
(C.10)

while

$$U^{g} = \bar{w} + \beta [\rho U^{p} + (1 - \rho) U^{p}]$$
$$\Rightarrow U^{g} = \frac{\bar{w} + \beta \rho U^{p}}{1 - \beta (1 - \rho)}$$

and

$$U^{s} = w^{BM} + \theta_{ij} + \beta \left[ \mu U^{g} + (1 - \mu) U^{s} \right]$$
$$\Rightarrow U^{s} = \frac{w^{BM} + \theta_{ij} + \beta \mu U^{g}}{1 - \beta + \beta \mu}$$

Incentive compatibility requires that:

$$U^p \ge U^s = \frac{w^{BM} + \theta_{ij} + \beta\mu U^g}{1 - \beta + \beta\mu} = \frac{w^{BM} + \theta_{ij}}{1 - \beta + \beta\mu} + \frac{\beta\mu}{1 - \beta + \beta\mu} \left(\frac{\bar{w} + \beta\rho U^p}{1 - \beta(1 - \rho)}\right)$$

Substituting from (C.10) and rearranging implies:

$$w^{BM} \ge \frac{1 + \beta \rho - \beta (1 - \mu)}{\beta \mu} e^h - \theta^r + \bar{w}$$
(C.11)

where  $\theta_{ij} = \theta^r$  because of random matching. Therefore, (C.11) is workers' incentive compatible wage in the benchmark case. Recall that  $w^V = \frac{(1-\beta^2)(1+\beta\rho-\beta(1-\mu))}{\beta\mu(1+\beta\rho-\beta^2)}e^h + \frac{(1-\beta^2)}{(1+\beta\rho-\beta^2)}\overline{w} - \theta^h$  is the incentive compatible wage under the volunteering structure. Because  $\theta^r < \theta^h$  and  $\frac{(1-\beta^2)}{(1+\beta\rho-\beta^2)} < 1$ ,  $w^{BM}$  will have a higher intercept and increase more steeply in  $\rho$  than  $w^V$ . Also, note that the free-entry condition in the benchmark case becomes:

$$p_m(G_m)g_m^h - 2w = 0 \Rightarrow w = \frac{p_m(G_m)g_m^h}{2}$$

Recall that the free-entry condition for the volunteering structure is  $w = p_m(G_m)\hat{g}_m - \Theta(\phi^n)$ . Therefore, the benchmark free-entry condition is shifted inwards. For this to be true, it has to be that:

$$p_m(G_m)\widehat{g}_m - \Theta(\phi^n) > \frac{p_m(G_m)g_m^h}{2} \Rightarrow p_m(G_m) \left[2\widehat{g}_m - g_m^h\right] > 2\Theta(\phi^n)$$

which is the condition in the proposition. Consequently, equilibrium in the benchmark case will occur at a lower employment level as figure 3 illustrates.

**Proof of Proposition 9:** First note that workers' incentive compatibility constraint with internships (ICI) is shifted up by the difference  $(\theta^h - \theta^r)$  relative to workers' incentive compatibility constraint with volunteers (ICV). In addition, managers' incentive compatibility constraint is shifted down. To see this, note that the managers' binding incentive compatibility constraint for internships is written as:  $p_m(G_m)g_m^h - w = K' \Rightarrow w = p_m(G_m)g_m^h - K$ , where K is the level of profits that would make the incentive compatibility constraint for managers bind. Therefore, the free-entry condition for internships is shifted inwards if

$$p_m(G_m)\widehat{g}_m - \Theta(\phi^n) > p_m(G_m)g_m^h - K \Rightarrow p_m(G_m)\left[\widehat{g}_m - g_m^h\right] > \Theta(\phi^n) - K$$

which is the condition in the proposition.

Both of these effects imply that the two constraints that define equilibrium will always cross at a point with more employment  $(E_V > E_I)$  in the case where volunteer hiring is supported, as illustrated in figure 5. Note also that, as long as (3.15) gives rise to indifference curves that are steeper than the managers' incentive compatibility constraint  $(i.e. \frac{w+\theta^h - \overline{w} - 2e^h}{E} > \frac{dp_m(G_m)g_m^h}{dE})$ , then the volunteering equilibrium (point V) will be welfare improving for workers relative to the internship equilibrium (point I).

## Appendix D

# A Parametric Example of a 'Sorting' Equilibrium in Chapter 3

In this Appendix we provide a parametric example which demonstrates the existence of the Sorting equilibrium, by checking that it satisfies the existence conditions (C.7), (C.9), (C.4) and (C.5).

### D.1 Parameter Values

We make the following assumptions on the functional forms of the inverse demand functions  $p_m(G_m)$  and  $p_b(G_b)$  and on the parameters of the model. Let

$$p_m(G_m(E_m)) = 5 - 5(E_m/2)^{1/2}$$
$$p_b(G_b(E_b)) = 6.5 - 2.5(E_b/2)^{1/2}$$

and

Parameter	Value
$\widehat{g}_m$	4
$g^h_b$	2
$\Theta(\phi^n)$	2.5
K .	2
eta	0.7
$L_m$	1
$L_b$	3
$ heta^h$	2
$e^h$	2
$\overline{w}$	0.5
$\mu$	0.2
$\phi^n$	0.5

Table D.1: Parameter values

Note that the values of the parameters are chosen such that the condition  $\mu < \frac{(1-\beta)e^h}{\bar{w}+e^h}$  is satisfied, that is,  $\frac{(1-\beta)e^h}{\bar{w}+e^h} = \frac{0.3*2}{2.5} = 0.24 > 0.2$ 

Also, note that the condition in Proposition 4 is satisfied, since  $p_m(G_m(E_m))(\widehat{g}_m - g_b^h) = [5 - 5(x/2)^{1/2}] * 2 > 2.5 = \Theta(\phi^n)$  for  $x \in (0, 1)$ . To see this, note that the solution to

$$[5 - 5(x/2)^{1/2}] * 2 - 2.5 = 0$$

is (x = 1.125)

### D.2 Computing Equilibrium in the Mission Sector

Recall that equilibrium in the mission sector is defined by the following two conditions:

$$w^{V} = p_m(G_m)\widehat{g}_m - \Theta(\phi^n) \tag{D.1}$$

$$w^{V}(E_{m}) = \frac{\left(1 - \beta^{2}\right) \left(1 + \beta \frac{(1 - \beta)E_{m}}{L_{m} - E_{m}} - \beta \left(1 - \mu\right)\right)}{\beta \mu \left(1 + \beta \frac{(1 - \beta)E_{m}}{L_{m} - E_{m}} - \beta^{2}\right)} e^{h} + \frac{\left(1 - \beta^{2}\right)}{\left(1 + \beta \frac{(1 - \beta)E_{m}}{L_{m} - E_{m}} - \beta^{2}\right)} \bar{w} - \theta^{h} \quad (D.2)$$

Substituting yields

$$\frac{\left(1-\beta^{2}\right)\left(1+\beta\frac{(1-\beta)E_{m}}{L_{m}-E_{m}}-\beta\left(1-\mu\right)\right)}{\beta\mu\left(1+\beta\frac{(1-\beta)E_{m}}{L_{m}-E_{m}}-\beta^{2}\right)}e^{h}+\frac{\left(1-\beta^{2}\right)}{\left(1+\beta\frac{(1-\beta)E_{m}}{L_{m}-E_{m}}-\beta^{2}\right)}\bar{w}-\theta^{h}+\Theta(\phi^{n})-p_{m}(G_{m})\widehat{g}_{m}=0$$
(D.3)

Then (D.3) implies that

$$\frac{(1-0.7^2)(1+0.7\frac{0.3E_m}{1-E_m}-0.7*(1-0.2))}{0.7*0.2(1+0.7\frac{0.3E_m}{1-E_m}-0.7^2)}2 + \frac{(1-0.7^2)}{(1+0.7\frac{0.3E_m}{1-E_m}-0.7^2)}0.5 - 2 - (17.5 - 20(E_m/2)^{1/2}) = 0$$

This equation has two solutions, we pick the one in the relevant region, that is, for  $E_m \in (0,1)$ . The solution is  $(\tilde{E}_m = 0.771)$ , which implies that:

$$\rho^m(\widetilde{E}_m) = 1.014$$
 while  $\widetilde{w}^V = 5.076$ 

### D.3 Computing Equilibrium in the Profit Sector

Recall that the equations that determine the equilibrium are:

$$p_b(G_b)g_b^h - w^I = K$$

$$w^{I}(E_{b}) = \frac{\left(1-\beta^{2}\right)\left(1+\beta\frac{(1-\beta)E_{b}}{L_{b}-E_{b}}-\beta\left(1-\mu\right)\right)}{\beta\mu\left(1+\beta\frac{(1-\beta)E_{b}}{L_{b}-E_{b}}-\beta^{2}\right)}e^{h} + \frac{\left(1-\beta^{2}\right)}{\left(1+\beta\frac{(1-\beta)E_{b}}{L_{b}-E_{b}}-\beta^{2}\right)}\overline{w}$$

Equilibrium point is solution to

$$\frac{(1-0.7^2)(1+0.7\frac{0.3E_b}{3-E_b}-0.7*(1-0.2))}{0.7*0.2(1+0.7\frac{0.3E_b}{3-E_b}-0.7^2)}2 + \frac{(1-0.7^2)}{(1+0.7\frac{0.3E_b}{3-E_b}-0.7^2)}0.5 - (11-5(E_b/2)^{1/2}) = 0$$

This equation has two solutions. We pick the one in the relevant region, for  $E_b \in (0,3)$ . The solution is:  $\{\tilde{E}_b = 1.338\}$ , which implies that

$$\rho^b(\widetilde{E}_b) = 0.241$$
 and  $\widetilde{w}^I = 6.910$ 

### D.4 Checking the Sorting Constraint for Workers

We verify that the sorting conditions of workers hold by computing directly  $\tilde{V}_{u}^{g}(m), \tilde{V}_{i}^{g}(b)$ and  $\tilde{V}_{i}^{g}(m)$ . Using the parametric values from the table and the equilibrium values we obtained above it is

$$\begin{split} \widetilde{V}_{u}^{g}(m) &= \frac{0.5}{1 - 0.7 + 0.7 * 1.014} - \frac{0.7 * 1.014 * 2}{(1 - 0.7^2)(1 - 0.7 + 0.7 * 1.014)} \\ &\quad + \frac{0.7^2 * 1.014}{(1 - 0.7^2)(1 - 0.7 + 0.7 * 1.014)}(5.076 - 2) = 0.706 \end{split}$$

$$\widetilde{V}_{i}^{g}(b) = \frac{0.5}{1 - 0.7 + 0.7 * 0.241} - \frac{0.7 * 0.241 * 2}{(1 - 0.7^{2})(1 - 0.7 + 0.7 * 0.241)} + \frac{0.7^{2} * 0.241}{(1 - 0.7^{2})(1 - 0.7 + 0.7 * 0.241)} (6.910 - 2) = 2.081 \text{ for } i \in \{u, m_{1}, m_{2}\}$$

$$\widetilde{V}_{i}^{g}(m) = \frac{0.5}{1 - 0.7 + 0.7 * 1.014} - \frac{0.7 * 1.014 * 2}{(1 - 0.7^{2})(1 - 0.7 + 0.7 * 1.014)} + \frac{0.7^{2} * 1.014}{(1 - 0.7^{2})(1 - 0.7 + 0.7 * 1.014)} (5.076 + 2 - 2) = 2.636 \text{ for } i \in \{m_{1}, m_{2}\}$$

Therefore,

$$\widetilde{V}_{i}^{g}(m) = 2.636 > \widetilde{V}_{i}^{g}(b) = 2.081 \text{ for } i \in \{m_{1}, m_{2}\}$$

and

$$\widetilde{V}_{u}^{g}(b) = 2.081 > \widetilde{V}_{u}^{g}(m) = 0.706$$

which implies that workers' sorting constraints are satisfied.

### D.5 Checking the Sorting Constraint for Managers

Recall that the sorting condition for managers is

$$\frac{p_b(G_b(\widetilde{E}_b))g_b^h - w^I(\widetilde{E}_b) - b(\widehat{g}_m)}{p_m(G_m(\widetilde{E}_m))\widehat{g}_m - w^V(\widetilde{E}_m)} < \phi^n < \frac{p_b(G_b(\widetilde{E}_b))g_b^h - w^I(\widetilde{E}_b)}{p_m(G_m(\widetilde{E}_m))\widehat{g}_m - w^V(\widetilde{E}_m)}$$

But

$$\frac{p_b(G_b(\widetilde{E}_b))g_b^h - w^I(\widetilde{E}_b) - b(\widehat{g}_m)}{p_m(G_m(\widetilde{E}_m))\widehat{g}_m - w^V(\widetilde{E}_m)} = \frac{13 - 5(1.338/2)^{1/2} - 6.91 - 1}{20 - 20(0.771/2)^{1/2} - 5.076} = 0.4$$

and

$$\frac{p_b(G_b(E_b))g_b^h - w^I(E_b)}{p_m(G_m(\tilde{E}_m))\hat{g}_m - w^V(\tilde{E}_m)} = \frac{13 - 5(1.338/2)^{1/2} - 6.910}{15 - 15(0.446/2)^{1/2} - 4.910} = 0.66$$

so for  $\phi^n \in (0.4, 0.66)$  managers' sorting conditions are met.