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Discussion Papers in Economics and Econometrics

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No. 0707

This paper is available on our website
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ISSN 0966-4246

Volunteer Hiring, Organizational Form and the Provision of Mission-Oriented Goods*

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September 2007

Abstract

Mission-oriented organizations, such as nonprofit organizations and NGOs, rely critically on volunteer recruitment to achieve their organizational goals. Besides serving as an outlet of altruistic motives, volunteering often acts as a stepping-stone for a paid position in the nonprofit sector. This paper provides an explanation for the fact that nonprofit employers are uniquely able to attract such 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. This equilibrium outcome has some desirable welfare properties.

JEL Classification: D21, H41, J41, L31
Keywords: volunteers, nonprofit institutions, privately provided public goods

*I am most grateful to Patrick Francois for his valuable advice, continuous support and patience. I am also indebted to Mukesh Eswaran, Steeve Mongrain, Hugh Neary, Horatiu Rus and Ralph Winter for helpful comments and suggestions. I have also benefited from comments by seminar participants at UBC, Wilfrid Laurier University, CRAI, Southern Methodist University, University of Southampton, University of St.Andrews, IMT Lucca and ESNIE 07. All errors are my own.

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1 Introduction

Volunteering constitutes a considerably large and increasing share of the nonprofit sector's contribution to economic activity, in most advanced economies.[1] 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 source of professional development by providing work experience and a chance to develop skills that strengthen employability. This is especially true for those pursuing employment in the nonprofit sector where volunteering experience appears to be a prerequisite for any type of career. This paper takes the altruistic motivations and the career concerns of volunteers as a point of departure[2] and provides an explanation for the following salient patterns (1) nonprofit organizations attract the overwhelming share of volunteers[3] 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[4] – 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.[5] These contrast with most other activities, typically 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 dif-

[1] 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. 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.

[2] This is motivated by previous research that studied factors that determine the decision to supply volunteer time, which found evidence suggesting that besides purely altruistic motives people may engage in volunteering activities to improve their employment opportunities: Menchik and Weisbrod (1987), Day and Devlin (1998), Segal and Weisbrod (2002), Gunderson and Gomez (2003). For instance, Day and Devlin (1998) report evidence of a 6-7 percent return of volunteering in annual earnings for Canadian workers. Surveys also support these findings. 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. See Hall et al. (2001), figure 2.2, pg 35.

[3] 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.

[4] Even though these goods do not necessarily feaure 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.

[5] See Rose-Ackerman (1996) for cross-country documentation of the composition of the nonprofit sector.

ferent 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 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 (non-profit or for-profit) in which they do it;[6] (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 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;[7] 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.[8] This type of compensation, namely a wage set above the market clearing rate (efficiency wage), is known to induce important labor market inefficiencies – 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.[9]

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

[6] 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.

[7] 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).

[8] In the context of the provision of public services, this avenue has been pursued in Francois (2003).

[9] 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).

– *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 regularly 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, 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.[10] 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

[10] 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.

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 it does not have a particular advantage over for-profit firms (true in the non-mission sector). This is because while for a nonprofit firm 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 behavior. Therefore, in this case a nonprofit manager's promise of honest behavior 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 strucuture.

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 on 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 firm-type 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 subsection briefly discusses strands of the literature that are relevant for this paper. Section 2 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 3 turns to market equilibrium, characterizing a steady-state 'sorting' equilibrium in the two sectors and presents a welfare analysis of the equilibrium. Section 4 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 5 concludes.

Related Literature

This paper is related to the literature that has identified circumstances where nonprofit status may be a valuable commitment against opportunistic behavior 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 non-contractible 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 worker's 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 profit-maximization, 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 (2006), Delfgaauw and Dur (2006)). Our paper builds on the contributions by Besley and Ghatak (2005, 2006a), who study incentive design issues in an environment with mission-motivated 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.

2 The Model

2.1 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.[11] 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.[12] 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

[11] For clarity, we shall refer to managers using feminine pronouns and to workers using masculine.

[12] For convenience, we subsume the discounting factor of agents in β.

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 β 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.[13] 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 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 $\widehat{g}_m > g_m^h$.[14] To be concrete, we imagine that 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, $\widehat{g}_m$, that the organization can

[13] 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.

[14] In reality, the difference between g_m^H and $\widehat{g}_m$ 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.

achieve with better matching.[15]

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:

$$U_{ij}^W(y, \theta_{ij}, e) = \begin{cases} y - e & \text{if } i = u \text{ and } j = u \\ y + \theta^l - e & \text{if } i \in \{m_1, m_2\},\ j \in \{m_1, m_2\},\ i \neq j \\ y + \theta^h - e & \text{if } i \in \{m_1, m_2\},\ j \in \{m_1, m_2\},\ i = j \end{cases} \quad \text{where } \theta^h > \theta^l > 0 \quad (1)$$

The parameter θ_{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).[16] 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.[17] 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 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 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-

[15] 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.

[16] 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).

[17] Alternatively, $\bar{w}$ may be thought of as the value of home production.

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 (π) 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.[18] 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.[19] This way of modelling the objectives of nonprofit managers makes operational the notion that these organizations can be instituted to have weaker incentives to pursue profits.[20] 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.[21] Thus, we take the view that, as a 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 $k = f$ denotes a for-profit organization and $k = n$ indicates a nonprofit organization, given by:

$$v_j^k(\pi, g_s) = \phi_j^k \pi + \delta_{js} b(g_s) \tag{2}$$

where π 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

[18] It is important to note that such a constraint does not preclude the possibility that a nonprofit organization may be actually earning positive profits.

[19] 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.

[20] 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.

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

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 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 π accrue to her.[22] 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 (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 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).[23] 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.[24] We proceed to characterize first, the nature of the in-

[22] 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.

[23] This insight is emphasized in the multi-tasking literature, see for example Holmstrom and Milgrom (1991).

[24] In particular, MacLeod and Malcomson (1998) have shown that efficiency wages are likely to arise in markets

ternship and volunteering relational contract between an exogenously given single manager-worker pair, and, subsequently, the market equilibrium in section 3.

2.2 The Employment Relational Contracts

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 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 equilibirum, abstracting momentarily from 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 $\bar{w}$ every period. At the end of each period there is an endogenous probability ρ 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.[25] 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.

where there is excess supply of workers, while performance-related bonus payments in markets with excess demand for workers.

[25] 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 behavior in the next section.

2.2.1 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:[26]

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.[27] 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.[28]

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 conributions 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.

[26] For a similar treatment of the information structure in a dynamic game between workers and firms, see MacLeod and Malcomson (1989).

[27] For example, a letter of confirmation/recommendation from the employer outlining a volunteer's experience may be provided at the end of the assignment.

[28] When an organization cheets 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 workers or not is public information, which is verifiable information since wage payments are verifiabel.

- The worker observes manager's hiring decision.
- Both parties decide whether to continue the employment relationship or not.
- The period ends and both players continues to the next period with probability β.

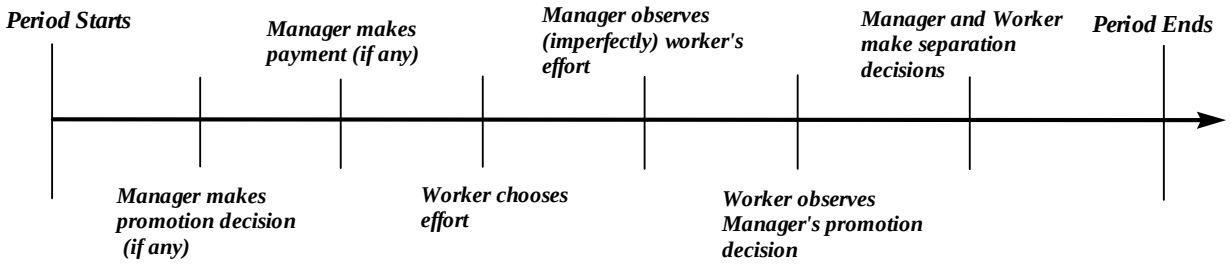


Figure 1: Timing of Events

2.2.2 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 being constant. Letting V^I_{ijt} 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:

$$V^I_{ij} = -e^h + \beta \left[(1-\beta) V^p_{ij} + \beta V^I_{ij} \right] \tag{3}$$

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^p_{ij} 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^p_{ij} is defined below:

$$V^p_{ij} = w^I + \theta_{ij} - e^h + \beta \max(V^p_{ij}, V^s_{ij}) \tag{4}$$

where V^s_{ij} 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 θ_{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 θ_{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.[29] We write the value function of a shirker as:

$$V_{ij}^s = w^I + \theta_{ij} + \beta \left[\mu V^g + (1-\mu) \max(V_{ij}^p, V_{ij}^s) \right] \tag{5}$$

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

$$V^g = \bar{w} + \beta \left[\rho V_{ij}^I + (1-\rho) V^g \right] \tag{6}$$

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

Let us now consider the incentives that employers face in designing the relational contract. 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:

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

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), (6) and (4) it can be shown that:

$$w^{PC} = \frac{1+\beta}{\beta}(e^h + \bar{w}) - \theta^r \tag{7}$$

where θ^r is the expected intrinsic payoff when workers and firms are randomly matched. ($\theta^l < \theta^r <$

[29] 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.

θ^h). Also, to deter shirking by the worker, the wage offered to the worker must satisfy the following incentive compatibility (no-shirking) constraint:

$$V_{ij}^p \geq V_{ij}^s \tag{8}$$

this condition implies:

Lemma 1 *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:*

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

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 (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.[30] 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 ($V_{ij}^I \geq V^g$). 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

[30] 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).

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 all the 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.

2.2.3 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 plays the role of facilitating matching between mission-motivated workers and organizations.[31] 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 2 *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,

[31] In equilibrium, volunteering only occurs in the mission sector, this will be proved later, but for now we take it as given.

employed and unpaid (volunteer) and unemployed are identical to the ones in (3), (6), (4) and (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:

$$V_{ij}^{p} \geq V_{ij}^{s} \tag{9}$$

and

$$w_{ii}^{V} + \theta^{h} \geq w_{ij}^{V} + \theta^{r} \tag{10}$$

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

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

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:

Proposition 1 *Conditional on a common job acquisition rate* (ρ)*, 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 multiplayer game.

2.3 Selection of Relational Contract and Organizational Form

2.3.1 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 $\pi^V = p_m \widehat{g}_m - w^V$, 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 $\widehat{g}_m > g_m^h$, 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.[32] 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 writes as:

$$\frac{1}{1-\beta} v_j^k(\pi^V, \widehat{g}_m) \geq v_j^k(\pi^{Vd}, g_m^h) + \frac{\beta}{1-\beta} v_j^k(\pi^I, g_m^h) \tag{11}$$
$$\text{for each } j \in \{m_1, m_2\}, \text{ and } k \in \{f, n\}$$

where $\pi^{Vd} > \pi^V > \pi^I$ and the last inequality follows from the fact that $w^I \geq w^V$. The left-hand side of (11) is a manager's discounted payoff from not cheating. The first term on the right-hand side of (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.[33] 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

[32] 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.

[33] Note that for cheating to be worthwhile it has to be that $\phi^k \left(\pi^{Vd} - \pi^V\right) \geq b(\widehat{g}_m) - b(g_m^h)$. 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.

compatibility is easier to satisfy. Substituting from (2) into (11) yields:

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

which upon rearrangement and simplification implies that:

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

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

Proposition 2 *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 ϕ^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 behavior 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 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 2 has the following important implication.

Corollary 1 *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 for-profit 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 activites 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 volunteer-hiring 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 (11) fails – it leads to the unravelling of the volunteering structure. The implication of *Proposition 2* is that organizing the production of collective goods by nonprofit organizations is a less costly way to overcome this kind of free-riding problem.

2.3.2 Non-mission Sector

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

Lemma 4 *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 behavior 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 behavior 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). Equilibirum strategies supporting the internship hiring structure are defined in Appendix A.

The incentive compatibility condition of the manager writes as follows:

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

or equivalently

$$\frac{1}{1-\beta}\pi^I \geq \pi^{Id} + \frac{\beta}{1-\beta}\pi^e \tag{12}$$

where π^I, π^{Id} and π^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 (12) as:

$$\pi^I \geq (1-\beta)\,\pi^{Id} + \beta\pi^e \equiv K \tag{13}$$

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 (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-mision sector as well because of the absence of the non-pecuniary component in managers' payoff.

3 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 mission-oriented 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.

3.1 A 'Sorting' Equilibrium

To close the model, since we did not explicitly include in workers' preferences (1) the utility benefits derived from consumption of the services (g_m, g_b) produced, we assume that the demand side of the market[34] is described by a downward sloping demand schedule for the total services produced in the mission sector and the non-mission sector respectively:

$$G_m = D_m(p_m) \text{ and } G_b = D_b(p_b)$$

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.[35] 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 1 *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 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

[34] In the case of mission goods, both the government and individual agents may be purchasers.

[35] E encompasses both paid workers (P) and unpaid workers (volunteers or interns) (U), i.e. $E = P + U$.

following characteristics: the mission sector attracts mission-motivated managers who establish nonprofit organizations that compete with each other and hire mission-motivated 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 behavior 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 writes as:

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

while the one for unmotivated workers is:

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

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

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

and the one for unmotivated managers:

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

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 (ρ^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 (ρ^b) is given respectively by:

$$\rho^m(E_m) = \frac{(1-\beta)\, E_m}{L_m - E_m} \quad \text{and} \quad \rho^b(E_b) = \frac{(1-\beta)\, E_b}{L_b - E_b} \tag{14}$$

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

Assumption 2. $\left\{p_b(G_b(E_b))g_b^h - K\right\}$ takes at least one value in the interval $\left(w^I(0), w^I(L_b)\right)$.

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 3 *If the conditions for self-selection of workers (B-4) and managers (B-5) hold, there exists a steady-state 'Sorting' equilibrium* ($\widetilde{w}^V$, $\widetilde{p}_m$, $G_m(\widetilde{E}_m)$, $\widetilde{w}^I$, $\widetilde{p}_b$, $G_b(\widetilde{E}_b)$) *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 $\frac{\widetilde{E}_m}{2}$ workers of each type: $\frac{\widetilde{E}_m}{4}$ volunteers and $\frac{\widetilde{E}_m}{4}$ wage workers and $\frac{\widetilde{E}_m}{8}$ organizations of each type (m_1 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 $\frac{\widetilde{E}_b}{2}$ workers of each type: $\frac{\widetilde{E}_b}{4}$ interns and $\frac{\widetilde{E}_b}{4}$ wage workers and $\frac{\widetilde{E}_b}{4}$ organizations.

Proof. Proof is in Appendix B. ■

Conditions (B-4) and (B-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 self-selection of workers (B-4) is not transparent and does not yield a straightforward economic interpretation.[36] Nevertheless, what this condition suggests is that the higher θ^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 (B-5) suggests that motivated managers will find entry into the mission sector preferable provided that they can extract sufficient economic rents (high ϕ^n) from the operation of the nonprofit organization and/or they derive sufficiently strong intrinsic benefits (high $b(\widehat{g}_m)$) 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

[36] Ideally we would like to recast condition (B-4) in terms of only the exogenous parameters of the model, namely, β, θ, e, $\overline{w}$, μ, 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 (B-7) and (B-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 (B-4) and demonstrate existence with a worked example in Appendix C.

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 ρ is increasing in E. Equilibrium occurs at the intersection of the two conditions.

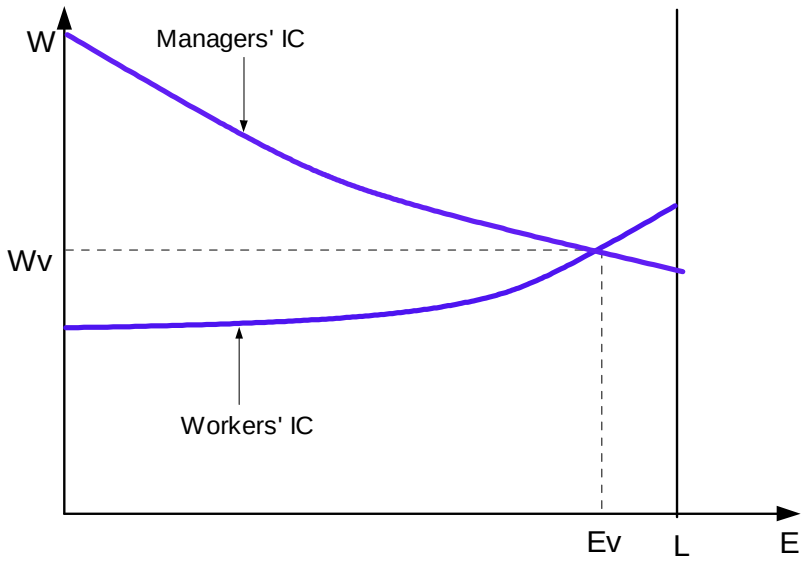


Figure 2: Volunteering Equilibrium in Mission Sector

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

Corollary 2 *A rise in the probability of detection (μ) or in the intensity of workers' intrinsic motivation (θ^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 4 *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.[37] Both effects result in the employment level at the sorting equilibrium to be higher than the benchmark case. This is illustrated in figure 3, where the intersection of the blue lines corresponds to the equilibrium with volunteer hiring (point V), while the intersection of the red lines indicates 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

[37] The condition in the proposition ensures that this is true.

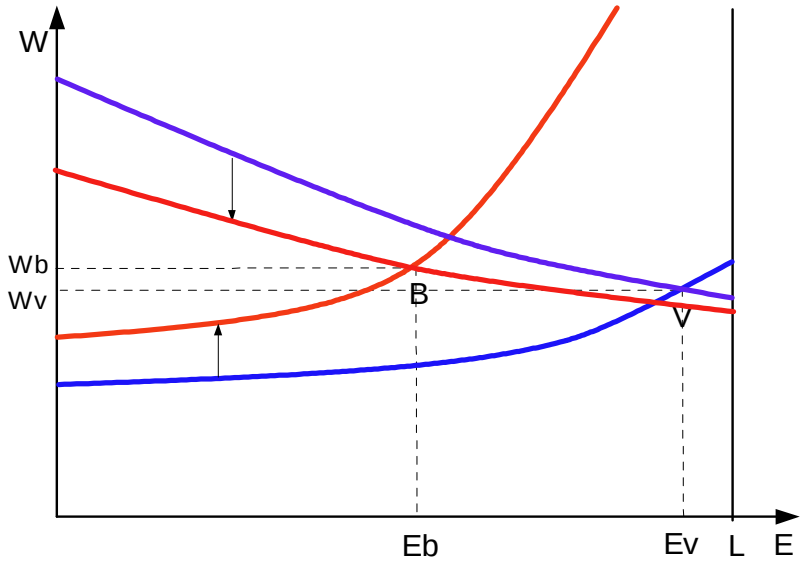


Figure 3: Volunteering Equilibrium (point V) vs Efficiency Wage Equilibrium (point B)

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.

3.2 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 (16) and the feasibility constraint (17) assuming away the commitment problem of firms:

$$\max_{w,E} (w + \theta^h - e^h)\frac{E}{2} + (-e^h)\frac{E}{2} + \bar{w}(L_m - E) \tag{15}$$

subject to:

$$w \geq \frac{\left(1-\beta^2\right)\left(1+\beta\frac{(1-\beta)E}{L_m-E}-\beta\left(1-\mu\right)\right)}{\beta\mu\left(1+\beta\frac{(1-\beta)E}{L_m-E}-\beta^2\right)}e^h + \frac{\left(1-\beta^2\right)}{\left(1+\beta\frac{(1-\beta)E}{L_m-E}-\beta^2\right)}\bar{w} - \theta^h \tag{16}$$

and

$$w \leq p_m(G_m)\widehat{g}_m \tag{17}$$

The solution to this problem would be given by the intersection of the workers' incentive compatibility condition (16) and the binding feasibility condition (17), point P in figure (4).

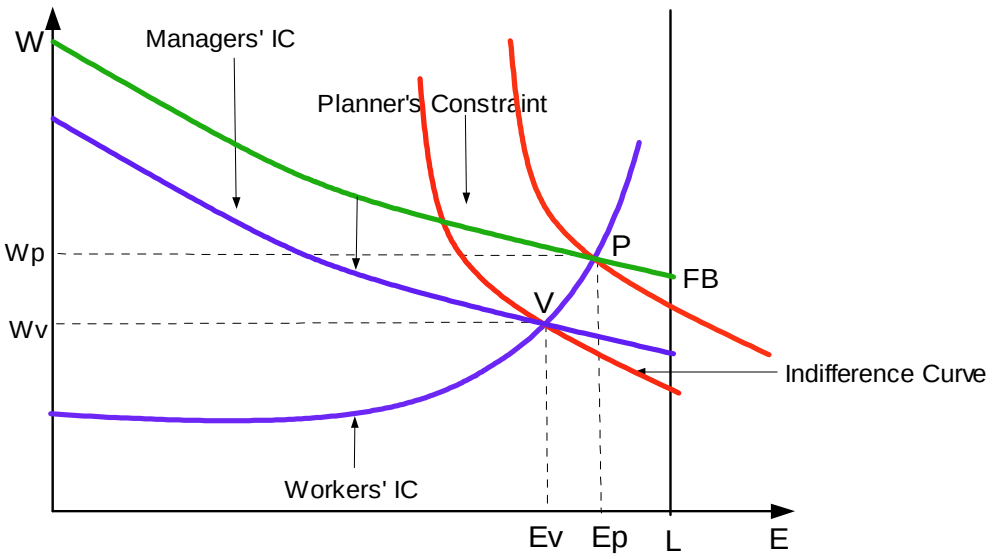


Figure 4:

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:

$$\pi^V(p_m(G_m), E_m) = p_m(G_m)\widehat{g}_m - w \equiv \Theta(\phi^n) \tag{18}$$

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 (16) and (18). The fact that (16) is upward sloping and (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 5 *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.[38]

Proposition 6 *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 behavior of workers. Consequently, in this situation more matches can be supported and therefore employment

[38] 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.

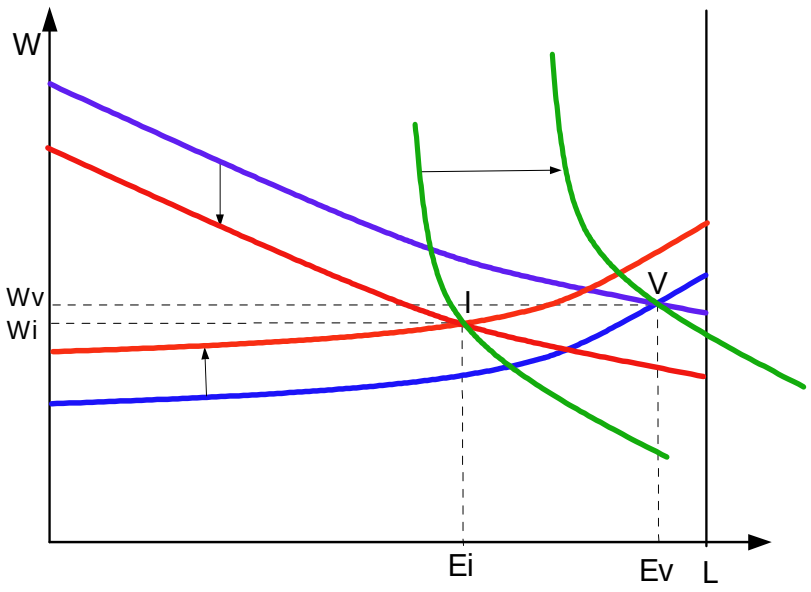


Figure 5: Volunteering Equilibrium (point V) vs Equilibrium with Internships (point I)

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

4 Discussion

There is ample anecdotal evidence in the literature of the selection and sorting of managers and workers across nonprofit organizations and proprietary firms modelled 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 sub-

sequently enter the nonprofit sector vary substantially in terms of personality traits, values and behavior 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.

5 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 implements the internship structure and is occupied by profit taking firms. In addition, our analysis suggests that

this arrangement improves the provision of public goods and services and therefore highlights an important productive component of volunteer activity.

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 less widespread use of volunteers by for-profit organizations.

A Appendix A: Equilibrium Strategies supporting the Relational Contracts.

A.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 μ) 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 $H(t) = \{w_0, w_1, ...w_{t-1}\}$ 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 $\underset{j \in \mathcal{M}_i}{\cup} f_{ij}(t-1)$, 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 $\underset{i \in \mathcal{W}_j}{\cup} q_{ij}(t-1)$, where $\mathcal{W}_j$ is the set of workers that manager j has employed.

A.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.

A.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 (11), 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 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 (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 $w \geq w^V$, make him an up-front wage offer of w^V satisfying (ICV).

2. If the manager's incentive compatibility constraint (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 (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 (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 (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 (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.

A.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 (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 (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 (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 (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 (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 (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 (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.

B Appendix B: Proofs

Proof of Lemma 1: It is

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

and

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

while

$$V_{ij}^p = w^I + \theta_{ij} - e^h + \beta V_{ij}^p$$
$$\Rightarrow V_{ij}^p = \frac{w^I + \theta_{ij} - e^h}{1-\beta} \tag{B-3}$$

and

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

So, incentive compatibility implies:

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

$$V_{ij}^p \geq \frac{w^I + \theta_{ij}}{1-\beta(1-\mu)} + \frac{\beta\mu\bar{w}}{(1-\beta(1-\mu))(1-\beta(1-\rho))} + \frac{\beta^2\mu\rho}{(1-\beta(1-\mu))(1-\beta(1-\rho))}\left(\frac{-e^h + \beta(1-\beta)V_{ij}^p}{1-\beta^2}\right)$$

Substituting from (B-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 2: 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 ($g_m = \widehat{g}_m > g_m^h$). 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 3: Similar to that of Lemma 1, so omitted.

Proof of Lemma 4: 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 (B-4) and (B-5): We derive the sorting conditions of workers by computing directly $\widetilde{V}_u^g(m)$, $\widetilde{V}_u^g(b)$ and $\widetilde{V}_i^g(m), \widetilde{V}_i^g(b)$ for $i \in \{m_1, m_2\}$. Substituting recursively (B-3) into (B-2) and then into (B-1) gives:

$$\widetilde{V}_U^g(m) = \frac{\bar{w}}{1-\beta+\beta\rho^m(\widetilde{E}_m)} - \frac{\beta\rho^m(\widetilde{E}_m)e^h}{(1-\beta^2)(1-\beta+\beta\rho^m(\widetilde{E}_m))} + \frac{\beta^2\rho^m(\widetilde{E}_m)}{(1-\beta^2)(1-\beta+\beta\rho^m(\widetilde{E}_m))}(\widetilde{w}^V - e^h)$$

$$\widetilde{V}_i^g(b) = \frac{\bar{w}}{1-\beta+\beta\rho^b(\widetilde{E}_b)} - \frac{\beta\rho^b(\widetilde{E}_b)e^h}{(1-\beta^2)(1-\beta+\beta\rho^b(\widetilde{E}_b))} + \frac{\beta^2\rho^b(\widetilde{E}_b)}{(1-\beta^2)(1-\beta+\beta\rho^b(\widetilde{E}_b))}(\widetilde{w}^I - e^h) \text{ for } i \in \{u, m_1, m_2\}$$

$$\widetilde{V}_i^g(m) = \frac{\bar{w}}{1-\beta+\beta\rho^m(\widetilde{E}_m)} - \frac{\beta\rho^m(\widetilde{E}_m)e^h}{(1-\beta^2)(1-\beta+\beta\rho^m(\widetilde{E}_m))} + \frac{\beta^2\rho^m(\widetilde{E}_m)}{(1-\beta^2)(1-\beta+\beta\rho^m(\widetilde{E}_m))}(\widetilde{w}^V + \theta^h - e^h) \text{ for } i \in \{m_1, m_2\}$$

where $\widetilde{E}_m$ and $\widetilde{E}_b$ are implicitly defined below by (B-7) and (B-9) respectively. Substituting these

expressions into $(SW1)$ and $(SW2)$ and rearranging yields:

$$\frac{\rho^b(\widetilde{E}_b)(1-\beta)\left[\beta w^I(\widetilde{E}_b)-(1+\beta)(\bar{w}+e^h)\right]}{\beta\left(1-\beta+\beta\rho^b(\widetilde{E}_b)\right)\left(w^V(\widetilde{E}_b)+\theta^h\right)-(1-\beta^2)(\bar{w}+e^h)-\beta^2\rho^b(\widetilde{E}_b)w^I(\widetilde{E}_b)}<$$
$$\rho^m(\widetilde{E}_m)<\frac{\rho^b(\widetilde{E}_b)(1-\beta)\left[\beta w^I(\widetilde{E}_b)-(1+\beta)(\bar{w}+e^h)\right]}{\beta\left(1-\beta+\beta\rho^b(\widetilde{E}_b)\right)\left(w^V(\widetilde{E}_m)\right)-(1-\beta^2)(\bar{w}+e^h)-\beta^2\rho^b(\widetilde{E}_b)w^I(\widetilde{E}_b)} \tag{B-4}$$

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

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

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

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

so combining these two, one obtains

$$\frac{p_b(G_b(\widetilde{E}_b))g^h_b-w^I(\widetilde{E}_b)-b(\widehat{g}_m)}{p_m(G_m(\widetilde{E}_m))\widehat{g}_m-w^V(\widetilde{E}_m)}<\phi^n<\frac{p_b(G_b(\widetilde{E}_b))g^h_b-w^I(\widetilde{E}_b)}{p_m(G_m(\widetilde{E}_m))\widehat{g}_m-w^V(\widetilde{E}_m)} \tag{B-5}$$

Proof of Proposition 3: Part (a). The choice of nonprofit organizational form follows from Corollary 1. 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:

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

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

$$\frac{\left(1-\beta^2\right)\left(1+\beta\frac{(1-\beta)\widetilde{E}_m}{L_m-\widetilde{E}_m}-\beta\left(1-\mu\right)\right)}{\beta\mu\left(1+\beta\frac{(1-\beta)\widetilde{E}_m}{L_m-\widetilde{E}_m}-\beta^2\right)}e^h+\frac{\left(1-\beta^2\right)}{\left(1+\beta\frac{(1-\beta)\widetilde{E}_m}{L_m-\widetilde{E}_m}-\beta^2\right)}\bar{w}-\theta^h \tag{B-7}$$
$$-p_m(G_m(\widetilde{E}_m))\widehat{g}_m+\Theta(\phi^n)=0$$

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

Part (b). The choice of for-profit status follows from lemma 4. The equilibrium strategies supporting the internship structure are described in Appendix A. On the managers' side, free-entry implies that incentive compatibility (13) binds:

$$\pi^I(p_b(G_b), E_b) = p_b(G_b)g_b^h - w = K \tag{B-8}$$

On the workers' side, incentive compatibility requires that condition (ICI) is satisfied. Note that (B-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:

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

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

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

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

Proof of Corollary 2: Follows from observing that increasing (μ) or (θ) 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 4: 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

$$\begin{aligned} U^p &= w^{BM} + \theta_{ij} - e^h + \beta U^p \\ \Rightarrow U^p &= \frac{w^{BM} + \theta_{ij} - e^h}{1-\beta} \end{aligned} \tag{B-10}$$

while

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

and

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

Incentive compatibility requires that:

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

Substituting from (B-10) and rearranging implies:

$$w^{BM} \geq \frac{1+\beta\rho-\beta(1-\mu)}{\beta\mu}e^h - \theta^r + \bar{w} \tag{B-11}$$

where $\theta_{ij} = \theta^r$ because of random matching. Therefore, (B-11) is workers' incentive compatibility constraint in the benchmark case. Recall that $w^V = \frac{(1-\beta^2)(1+\beta\rho-\beta(1-\mu))}{\beta\mu(1+\beta\rho-\beta^2)}e^h + \frac{(1-\beta^2)}{(1+\beta\rho-\beta^2)}\bar{w} - \theta^h$ is workers' incentive compatibility constraint 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 ρ 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 $w = p_m(G_m)\widehat{g}_m - \Theta(\phi^n)$. 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 6: 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 writes 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 (15) gives rise to indifference curves that are steeper than the managers' incentive compatibility constraint (*i.e.* $\frac{w+\theta^h-\bar{w}-2e^h}{E} > \frac{dp_m(G_m)g_m^h}{dE}$), then the volunteering equilibrium (point V) will be welfare improving for workers relative to the internship equilibrium (point I).

C Appendix C: A Parametric Example of a 'Sorting' Equilibrium

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

C.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

Table 1: Parameters values

Parameter	Value
$\widehat{g}_m$	4
g_b^h	2
$\Theta(\phi^n)$	2.5
K	2
β	0.7
L_m	1
L_b	3
θ^h	2
e^h	2
$\overline{w}$	0.5
μ	0.2
ϕ^n	0.5

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, $\frac{(1-\beta)e^h}{\overline{w}+e^h} = \frac{0.3*2}{2.5} = 0.24 > 0.2$

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 ($x = 1.125$)

C.2 Computing equilibrium in the Mission Sector

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

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

$$w^V(E_m) = \frac{\left(1-\beta^2\right)\left(1+\beta\frac{(1-\beta)E_m}{L_m-E_m}-\beta\left(1-\mu\right)\right)}{\beta\mu\left(1+\beta\frac{(1-\beta)E_m}{L_m-E_m}-\beta^2\right)}e^h + \frac{\left(1-\beta^2\right)}{\left(1+\beta\frac{(1-\beta)E_m}{L_m-E_m}-\beta^2\right)}\bar{w} - \theta^h \tag{C-2}$$

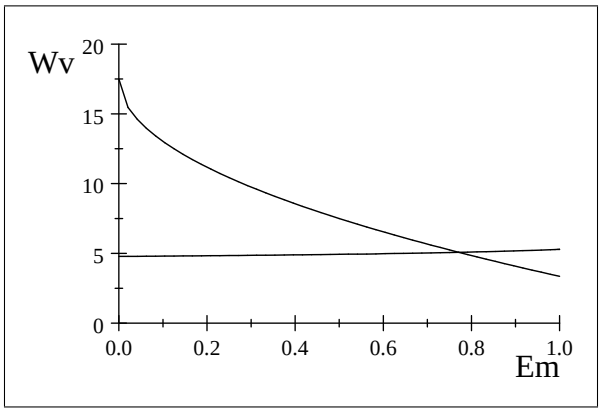
Substituting yields

$$\frac{\left(1-\beta^2\right)\left(1+\beta\frac{(1-\beta)E_m}{L_m-E_m}-\beta\left(1-\mu\right)\right)}{\beta\mu\left(1+\beta\frac{(1-\beta)E_m}{L_m-E_m}-\beta^2\right)}e^h + \frac{\left(1-\beta^2\right)}{\left(1+\beta\frac{(1-\beta)E_m}{L_m-E_m}-\beta^2\right)}\bar{w} - \theta^h + \Theta(\phi^n) - p_m(G_m)\widehat{g}_m = 0 \tag{C-3}$$

Then (C-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 $\left(\widetilde{E}_m = 0.771\right)$.



which implies that:

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

C.3 Computing equilibrium in the Profit Sector

Recall that the equations that determine the equilibrium are:

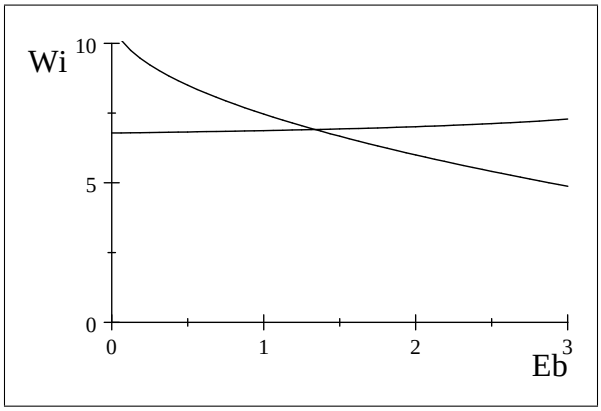
$$p_b(G_b)g_b^h - w^I = K$$

$$w^I(E_b) = \frac{\left(1-\beta^2\right)\left(1+\beta\frac{(1-\beta)E_b}{L_b-E_b}-\beta\left(1-\mu\right)\right)}{\beta\mu\left(1+\beta\frac{(1-\beta)E_b}{L_b-E_b}-\beta^2\right)}e^h + \frac{\left(1-\beta^2\right)}{\left(1+\beta\frac{(1-\beta)E_b}{L_b-E_b}-\beta^2\right)}\bar{w}$$

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: $\left\{\widetilde{E}_b = 1.338\right\}$



which implies that

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

C.4 Checking the sorting constraint for Workers

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

$$\widetilde{V}_u^g(m) = \frac{0.5}{1-0.7+0.7*1.014} - \frac{0.7*1.014*2}{(1-0.7^2)(1-0.7+0.7*1.014)} + \frac{0.7^2*1.014}{(1-0.7^2)(1-0.7+0.7*1.014)}(5.076-2) = 0.706$$

$$\widetilde{V}_i^g(b) = \frac{0.5}{1-0.7+0.7*0.241} - \frac{0.7*0.241*2}{(1-0.7^2)(1-0.7+0.7*0.241)} + \frac{0.7^2*0.241}{(1-0.7^2)(1-0.7+0.7*0.241)}(6.910-2) = 2.081 \text{ for } \ i \in \{u, m_1, m_2\}$$

$$\widetilde{V}_i^g(m) = \frac{0.5}{1-0.7+0.7*1.014} - \frac{0.7*1.014*2}{(1-0.7^2)(1-0.7+0.7*1.014)} + \frac{0.7^2*1.014}{(1-0.7^2)(1-0.7+0.7*1.014)}(5.076+2-2) = 2.636 \text{ for } \ i \in \{m_1, m_2\}$$

Therefore,

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

and

$$\widetilde{V}_u^g(b) > \widetilde{V}_u^g(m)$$

which implies that workers' sorting constraints are satisfied.

C.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

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

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

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