



What determines volunteer work? On the effects of adverse selection and intrinsic motivation



Nadia Burani^{a,*}, Arsen Palestini^b

^a Department of Economics, University of Bologna, Strada Maggiore 45, 40125 Bologna, Italy

^b MEMOTEF Sapienza University of Rome, Via del Castro Laurenziano 9, 00161 Roma, Italy

HIGHLIGHTS

- We consider the screening problem of a firm willing to hire job applicants.
- Workers are intrinsically motivated and privately informed about their ability.
- When intrinsic motivation is high, low-ability workers earn negative wages.
- With limited liability, low-ability types are volunteers and provide equal effort.

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ABSTRACT

We analyse the screening problem of a firm hiring workers without knowing their ability while observing their intrinsic motivation. We show that volunteerism is the contractual outcome when workers are low-skilled, have high motivation, and are protected by limited liability.

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1. Introduction

Intrinsic motivation is the worker's enjoyment of her personal contribution to the employer's mission or goals. It is particularly relevant in sectors as the non-profit and the public sector where collective goods and services are produced. For example, health professionals are interested in the well-being of their patients, teachers care about the achievements of their students, and "public service motivation" is what pushes dedicated bureaucrats.

The existing literature on workers' intrinsic motivation has fostered the "donative-labour hypothesis", whereby motivated employees donate part of their labour to socially worthwhile organizations by accepting lower wages (Preston, 1989; Delfgaauw and Dur, 2007).¹ But what is the extent of labour donations?

In this paper, we embed labour donations stemming from intrinsic motivation in a model of adverse selection about workers' ability. We consider the screening contracts that a firm offers to its potential applicants, who have heterogeneous and unobservable skills, but have the same observable level of intrinsic motivation. Optimal contracts are fully separating and such that, when the level

* Corresponding author. Tel.: +39 051 209 2642; fax: +39 051 209 2664.

E-mail addresses: nadia.burani@unibo.it (N. Burani), arsen.palestini@uniroma1.it (A. Palestini).

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¹ Accordingly, volunteerism is an important source of labour in these organizations.

of motivation is sufficiently high, workers characterized by low skills earn negative wages. Therefore, it seems natural to provide highly motivated workers with some device that protects them against being ‘exploited’ by their employers.

A limited liability constraint is thus introduced. This is what happens in Makris (2009) and Makris and Siciliani (2013), where an administrative constraint ensures that the monetary costs of production faced by health providers be covered by the budget transferred by purchasers. Yet, our setup is different because our liability constraint is less restrictive, given that it only requires transfers to be non-negative, i.e. the firm cannot offer negative salaries. Our model is also reminiscent of Sappington (1983), which studies limited liability contracts that are agreed upon *ex-ante*, i.e. before the agent knows the actual realization of her type. We rather assume agents to observe their type before accepting the contract, whereby our participation constraint is more stringent.

When liability limitations are binding, our analysis provides an explanation of volunteerism as the contractual outcome for low-ability workers, whose motivation is sufficiently high. Optimal contracts are such that these workers are asked to provide the same level of effort independently of their skills, i.e. pooling emerges. Such uniform effort is the highest possible compatible with full participation, because it ensures a non-negative utility to all workers. Moreover, it is higher than in the absence of limited liability.

These results stand in contrast with Barigozzi and Burani (2016), which shows that liability constraints are irrelevant when both ability and intrinsic motivation are workers’ private information. “Paid volunteers” emerge, namely low-ability, high-motivation workers who are offered positive wages, but who would be ready to work for free. This happens because highly motivated agents, being able to mimic less motivated types, enjoy information rents which drive their salaries up.

2. The model

Consider a principal–agent model with adverse selection. The principal (he) is a firm willing to hire a worker (she) to perform a given task. Both the firm and the agent are risk neutral.

The firm produces output according to a linear technology with labour as the only input. Its production function is $q(e) = e$, where e is the observable and measurable effort that the worker is asked to exert. The firm’s payoff is

$$\pi(e, w) = \alpha(q(e) - w) = \alpha(e - w), \quad (1)$$

where the (exogenous) price of output is set equal to 1, w is the total salary paid to the worker, and $\alpha \in (0, 1]$. If $\alpha = 1$, the firm strictly maximizes profits. If instead $0 < \alpha < 1$, the firm might be: (i) a non-profit organization committed to a non-distribution constraint, whereby the entrepreneur can only capture a fraction of profits in the form of perquisites (Glaeser and Shleifer, 2001); or (ii) a for-profit socially responsible organization sacrificing some profits for the social interest (Bénabou and Tirole, 2010).

Workers differ in productive ability, which lowers the cost of effort provision θ . High realizations of θ represent workers with high cost of effort provision and thus low ability, whereas low realizations of θ correspond to high-skilled workers.² For simplicity, we assume that $\theta \sim U[0, 1]$. Ability cannot be observed by the firm, which only knows its distribution. Workers are also characterized by intrinsic motivation $\gamma \in [0, 1]$. To a certain extent, workers derive utility from exerting effort. Since effort e and output q are equivalent, motivation also stems from

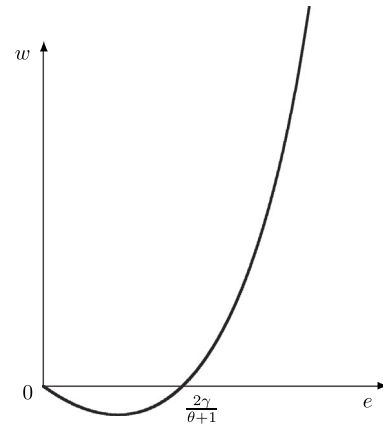


Fig. 1. Level curve $u(e, \theta, w) = 0$ on the (e, w) plane ($\theta = 1/3, \gamma = 2/3$).

the enjoyment of one’s personal contribution to the firm’s goals. Opposite to ability, motivation is perfectly observable to the employer.

For each type θ , the worker’s utility is quasi-linear in income and takes the form

$$u(\theta, e, w) = w - \frac{1}{2}(\theta + 1)e^2 + \gamma e. \quad (2)$$

Fig. 1 represents utility (2) in the (e, w) space. It shows that, when effort is sufficiently low (or when motivation is high and ability is low), i.e. $e < \frac{2\gamma}{\theta+1}$, workers obtain positive utility from effort exertion and might be willing to receive a non-positive reward.³ Utility (2) satisfies the single-crossing condition $\frac{\partial^2 u(\theta, e, w)}{\partial e \partial \theta} = -e < 0$.

Workers’ outside option is type-independent and normalized to zero.

The firm aims at maximizing expected profits. By the Revelation Principle, it chooses effort levels $e(\theta)$ and wages $w(\theta)$ based on the worker’s truthful report of her type θ . Let

$$U(\theta) = w(\theta) - \frac{1}{2}(\theta + 1)e(\theta)^2 + \gamma e(\theta) \quad (3)$$

denote the information rent (or surplus) of a type θ worker accepting contract $[e(\theta), w(\theta)]$. Solving (3) for $w(\theta)$ and substituting it into profits (1), one can write the firm’s problem as

$$\begin{aligned} \max_e \pi &= \max_e \int_0^1 \alpha \\ &\times \left[(1 + \gamma)e(\theta) - U(\theta) - \frac{1}{2}(\theta + 1)e(\theta)^2 \right] d\theta \end{aligned} \quad (P)$$

subject to

$$\frac{\partial e(\theta)}{\partial \theta} \leq 0, \quad (C.1)$$

$$\frac{\partial U(\theta)}{\partial \theta} = -\frac{1}{2}e(\theta)^2, \quad (C.2)$$

$$U(\theta) \geq 0 \quad \text{for all } \theta \in [0, 1]. \quad (C.3)$$

Condition (C.3) represents the participation constraint, whereas monotonicity condition (C.1) and envelope condition (C.2) characterize incentive compatibility (Laffont and Martimort, 2002).

In what follows, we first solve program P without considering liability issues; we then add the requirement that the firm cannot make negative transfers. Both problems are analysed using the Hamiltonian technique (see the online supplementary data).

³ When effort is even lower, i.e. $e < \frac{\gamma}{\theta+1}$, it becomes a ‘good’ because increasing effort provision raises workers’ satisfaction.

² We refer to ‘workers’ or ‘a worker’s types’ interchangeably.

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