

VOLUNTEER LABOUR SUPPLY: THE ROLE OF WORKERS' MOTIVATIONS[#]

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Abstract

In this paper we investigate the determinants of volunteering. We depart from previous literature that considers only economic incentives and we empirically investigate the role that extrinsic and intrinsic motivations play in the decision to supply voluntary labour. We consider a sample of Italian employees that volunteer in three different sectors, namely social services, political activism and union activism. Motivations seem to affect only the decision to volunteer in the social services sector. However, once measurement error and endogeneity have been properly controlled for, our findings suggest that both types of motivations are important determinants of individuals' behaviour and they should be taken into account when designing incentive contracts, even in the case of volunteering.

J.E.L. Codes: A13, C35, J23, L31

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1. INTRODUCTION

It is often argued that nonprofit organisations attract intrinsically motivated workers more than for-profit or public undertakings do. While this is still debated, it is certainly true that most donations (in terms of both money and time) flow to nonprofits (e.g. Rose-Ackermann, 1996). As Frey (1992, p. 162) puts it, “one is said to be intrinsically motivated when one receives no apparent reward except the activity itself. In this case, behaviour is based on the moral and ethical considerations which forms part of people preferences”. Intrinsic motivation is then defined in opposition to extrinsic motivation: an extrinsically motivated agent (the standard *homo oeconomicus*) requires explicit monetary compensations to modify her behaviour.

There are different ways in which nonprofit organisations could favour interactions with intrinsically motivated individuals. A first method is by explicitly assuming a non-distribution-of-profit constraint. Indeed, this is a necessary condition for an organisation to be called nonprofit and can be interpreted by individuals as a signal that organisation’s members are not (primarily) concerned with extrinsic or monetary rewards (e.g. Glaeser and Shleifer, 2001, suggests that nonprofit status weakens entrepreneurial incentives to maximise profits). Intrinsic motivation could also be supported by increasing members’ participation, for instance by adopting a more democratic decision-making process with respect to for-profit firms. Nonprofit organisations could back intrinsic motivation also by increasing wage equity within the organisation (e.g. Leete, 2000) or by adopting a different wage structure with respect to for-profit undertakings (e.g. Roomkin and Weisbrod, 1999). In any case, intrinsic motivation arguably interact with extrinsic motivation in explaining individuals behaviour, both of employees and volunteers, within these organisations, and motivations can provide a valuable explanations of how agents react to incentives.

In this paper we depart from the traditional literature and empirically investigate the role of motivations in explaining the supply of voluntary labour in Italy. Previous empirical papers concentrates on incentives and estimate the effects of monetary rewards (i.e. extrinsic incentives) on volunteering. On the one hand, studies considering the (market) opportunity cost of giving time provide mixed results: Menchik and Weisbrod (1987) suggests a negative effect of the wage rate, while Freeman (1997) and Banks and Tanner (1998) supports the idea that agents with higher wages volunteer

more. In a similar vein, Brown and Lankford (1992) provide evidence on the negative effect of the tax price of giving on hours volunteered. On the other hand, the only paper looking at direct monetary rewards to volunteers (Frey and Götte, 1999) emphasises a negative effect of economic incentives. In particular, they argue that monetary incentives “crowd-out” intrinsic motivation without providing any further explanation. A better understanding of the role of motivations is surely interesting also for policy makers. For instance, law 64/2001 has recently introduced the Italian National Civil Service. The law provide regulation for a fraction of voluntary work supplied in the country, introducing a direct monetary reward for volunteering. Considering intrinsic motivation, it is not clear, a priori, whether this will increase or decrease the number of hours volunteered.

The paper is linked with three different strands of economic literature. As we look at time donations, our work is clearly related to the literature on money donations. Recent works (e.g. Okten and Weisbrod, 2000, and Khanna and Sandler, 2000) concentrates on the effects of fundraising expenditures and government grants on money giving. Fundraising expenditures theoretically exert two countervailing forces: on the one hand, an increase in fundraising expenditures raises charitable contributions by reducing donors’ information costs; on the other hand, it reduces donations by reducing their effectiveness, as more resources are diverted from output. Empirical findings support the existence of these two effects. However, no clear results on the net effect of fundraising expenditures on money donations are available. The effect of government grants is also theoretically undetermined: on the one hand, an increase in government funding can “crowd-out” private donations, according to the classic result of Warr’s neutrality theorem; on the other hand, it can “crowd-in” private funding, acting as a proxy of charities’ reputation or augmenting trust through government monitoring. Empirical findings suggest that government funding “crowds-in” money donations, as endogeneity of grants is accounted for. Of course, the same kind of arguments can be easily extended to time donations. Unfortunately, due to data limitations, we can not control both for fundraising expenditures and government grants. As we try to understand how individuals’ motivations affect behaviour, our work is also related with the literature about incentives in organisations. Gibbons (1998) and Prendergast (1999) provides excellent surveys on this topic, both on theoretical and

empirical literature. Within this framework, one can argue that multitasking and contract incompleteness leave employees without economic incentives to increase performance. Labour contracts very often specify a fixed wage only, leaving to employee a considerable degree of discretion over effort choice. Purely selfish individuals should then act opportunistically and set effort to the minimum possible level. However, as emphasised e.g. by Rotemberg (1994) and by Fehr and Gächter (1998), *intrinsic motivation* can play a role also in this context and can help explain the absence of explicit performance incentives in labour contracts. Experimental evidence suggests “that reciprocity-based incentives and explicit performance incentives may indeed be in conflict with each other. In particular, explicit incentives may destroy trust- and reciprocity-based incentives and, hence, may lead to welfare losses” (Fehr and Gächter, 1998, pp. 850-851). Similar findings are reported by Rotemberg: experiments conducted at the Western Electric’s Hawthorne plant “suggest that changes in incentive payments together with the creation of an atmosphere conducive to friendship helped productivity more than either change on its own” (Rotemberg, 1994, p. 688). Both examples suggests that intrinsic and extrinsic motivations are interconnected in situations where explicit economic incentives should prevail. In the present paper we look at voluntary work - a situation in which intrinsic motivation should be the driving force - and we study how this interact with extrinsic motivation, e.g. individuals’ career concerns. As we refer to a simple principal-agent framework, our paper is finally connected with the infant literature on empirical contract theory (e.g. Chiappori and Salanié, 1997). As will be clarified below, one can interpret “motivation crowding-out” in terms of individuals’ opportunistic behaviour. Assume that volunteering involves multitasking and that certain activities are more linked with intrinsic motivation than others. The introduction of a direct reward to volunteers could then reduce the time dedicated to more intrinsically rewarding activities and increase the time devoted to alternative tasks, so that the net effect on the *total* amount of voluntary work is undetermined. An empirical test on how a direct reward to volunteers undermine intrinsic motivation could then be interpreted as a test on opportunistic behaviour in volunteering. In this work, we consider unpaid voluntary labour only, so we cannot provide a direct test on “moral hazard”. However, we emphasise how intrinsic and extrinsic motivations interact in shaping individuals’ behaviour, suggesting that both

should be taken into account when analysing context characterised by contract incompleteness.

Our findings, based on a sample of Italian employees, are consistent with the idea that motivations, *both extrinsic and intrinsic*, do matter in explaining individual responses to incentives. We find that estimation of the effect of motivations on volunteering might be blurred by measurement error and endogeneity. After controlling for these biases, motivations display a significant impact on the probability of volunteering. In particular, while extrinsic motivations appear to dominate the choice of volunteering in social services and political associations, trade union volunteers seem to be driven by the intrinsic motive.

The paper is organised as follows. In section 2 we provide a brief survey of the previous empirical literature, while in section 3 we draw extensively on the model by Frey and Götte (1999) to sketch a theoretical framework for the analysis of the data. The data are presented in section 4, while the empirical models and the results are discussed in section 5. Section 6 briefly summarises the paper.

2. VOLUNTARY LABOUR SUPPLY: A BRIEF SURVEY OF THE LITERATURE

Previous empirical papers provide mixed evidence on the role extrinsic monetary incentives play in defining the supply of voluntary work. These contributions usually investigate how volunteering is affected by a change in the wage rate, in the direct reward to volunteering or in the tax price of giving, and they simply infer the presence of intrinsic motivation when empirical findings do not support standard theoretical predictions. Brown and Lankford (1992) survey early empirical studies on volunteering and they suggest how voluntary labour supply is negatively affected by the tax price of money donations. In their own empirical work, the authors confirm these findings: gifts of time (as well as gifts of money) respond negatively to the tax price of giving.

A contribution toward the estimation of a voluntary labour supply function that provide also a theoretical framework is due to Menchik and Weisbrod (1987). The authors point out two different theoretical approach to the analysis of volunteering. A first approach, defined as the *consumption model*, assumes that time donations (like money donations) bear direct utility to individuals. This is consistent with the literature

on “warming glow” (e.g. Andreoni, 1990): individuals receive utility not only from the goods they contribute to provide giving their time, but also from the act of volunteering in itself. This explains why we do not observe any direct money reward to time donations: reward is intrinsic, as the motivation that should guide behaviour. A second approach, the *investment model*, is based on the assumption that volunteering increases individuals’ earning ability by increasing working experience. In this framework, volunteering do not carry direct utility to agents but increase future earnings through work experience. However, authors consider extrinsic motivation only. Hence, an increase in the *opportunity cost* of giving should reduce voluntary labour supply. Indeed, these theoretical predictions are confirmed by their empirical analysis using U.S. data (Menchik and Weisbrod, 1987, p. 175).

Freeman (1997) provides another empirical test for the consumption model proposed by Menchik and Weisbrod. With respect to the *hours* of voluntary work an individual supplies, empirical evidence is mixed: analysis suggests no clear effect on voluntary labour supply due to a change in the opportunity cost of giving time. However, there is a strong empirical evidence that an increase in hourly earnings *increases* the *probability* of an individual to be a volunteer. This last result is clearly inconsistent with the model that considers *extrinsic* motivations only. An interesting finding by Freeman contributes to support this hypothesis: people seem to volunteer *when asked*. In order to explain this conclusion, the author suggests two underlying factors: (a) people value the particular charitable activity a “conscience good”, a kind of public good for which people are willing to contribute time (and money), “even if they would prefer to free ride on the provision of that good”; (b) “the request carries some “social pressure” with it: you are more likely to accede to personal requests than to telephone or written requests; to requests from employers, colleagues, and the like, than to requests from strangers” (Freeman, 1997, p. S164). Factor (b) emphasises the different framework in which voluntary work is provided: differently from market exchanges, characterised by impersonal transactions as in standard Walras-type models, individuals seems to be tied in personal relations. Stark (1993) labels these transaction “nonmarket transfers” and evidences the role of altruistic behaviour in providing an explanation to such transactions.

Banks and Tanner (1998) estimate a two step model of volunteering, using UK data and separating the decision to volunteer from the decision about how many hours to volunteer. They include in their model also a set of variables that are deemed to influence only whether or not an individual decide to volunteer and that are intended to capture the attachment to the local community. One can easily interpret these variables as proxies for intrinsic motivations (in a similar vein Frey and Oberholzer-Gee, 1992). Findings then show that the higher the attachment to the local community, the higher the probability an individual will decide to volunteer. The wage rate enters negatively in the second stage regression, reducing the number of hours volunteered. However, if market and nonmarket labour supply are jointly determined, the two step model will deliver biased estimates. Moreover, the value of volunteered time should be related to the different types of activities that volunteers do (hence, to the contribution made to the output of the charitable good). However, when controlling for these two effects, Banks and Tanner find no relationship between the wage rate and the number of hours volunteered.

Finally, Frey and Götte (1999) estimate the impact of extrinsic monetary compensation on the supply of voluntary work in Switzerland, considering the introduction of direct reward to volunteering. They assume both intrinsically and extrinsically motivated individuals who volunteer in the political sector, namely in local political organisations, public services, interest groups and local political office. In this case, differently from Menchik and Weisbrod (1987), two opposing effects are at work when the direct reward to voluntary labour increases. As we will see below, on the one hand, direct reward reduces the opportunity costs of volunteering; on the other hand, it weakens intrinsic motivation, so that the net effect is theoretically undetermined in sign. Empirical findings are consistent with the “crowding-out effect” proposed by Frey (1992): direct monetary compensation reduces voluntary labour supply by affecting intrinsic motivation. Hence, the indirect effect (that reduces intrinsic motivation) dominates the direct effect of reward. Frey and Götte also argue that the opportunity cost of time has a negative impact on volunteering, by observing that the more hours individuals supply on the market, the less hours they work in the voluntary sector. Of course, the more you work, the higher should be your opportunity cost. However, this could simply reflect a trade-off between the time an individual works and the time an

individual volunteers and it could not necessarily imply the direct effect of wage on the supply of voluntary labour. In any case, one question is left unanswered: why extrinsic motivations are not affected, whereas intrinsic motivations are? In the remaining of the paper we address this issue by empirically investigating how the two types of motivations interact in the decision to supply voluntary labour.

3. A THEORETICAL FRAMEWORK

We build on the theoretical model provided by Frey and Götte (1999). We consider a standard principal-agent framework, in which a nonprofit organisation (the principal) would influence the amount of voluntary work V supplied by an individual (the agent). Assume that the nonprofit organisation can observe only the total amount of services produced but cannot observe agent's effort choice, e.g. because volunteers provide services to third parties that are not able to evaluate the quality of the service.¹ Moreover, assume that an increase in volunteering is desirable for the principal, for it can increase the amount of social services produced more than production costs. In this case, as a standard prescription in agency theory, the nonprofit organisation may offer a direct reward R to the agent in order to affect voluntary labour supply. An example of this incentive scheme is the law 64/2001, that will introduce in Italy this kind of reward for volunteers employed in the National Civil Service.

According to our particular data set and differently from Frey and Götte, we also assume that all potential agents are already employed and receive an hourly wage rate W . In order to account also for extrinsic economic incentives, we assume that the utility of volunteering is $U(V, R, W)$ and the cost of volunteering is $C(V, R, W)$. Hence, agent is both intrinsically and extrinsically motivated. Utility function $U(\cdot)$ and cost function $C(\cdot)$ show standard properties: marginal utility of volunteering is decreasing ($U_V > 0$; $U_{VV} < 0$), whereas marginal disutility of effort is increasing ($C_V > 0$; $C_{VV} > 0$).² Of course, rational utility maximisers agents supply V^* by equating marginal utility of

¹ Think for instance to a nonprofit organisation that provides services to disabled persons. In this case, it is very difficult for the managers of the nonprofit organisation (the principal) to observe the amount of voluntary work offered by the volunteer (the agent). On the contrary, nonprofit managers can easily observe the total number of persons to whom the services have been provided.

² Throughout the paper we use U_i to denote partial derivatives with respect to the i -th variable $\partial U / \partial i$.

volunteering with marginal disutility of effort, i.e. $U_V - C_V = 0$. Suppose now that the nonprofit organisation increase R . By the envelope theorem, we have:

$$(1) \quad U_{VV} + U_{VR} \frac{dV^*}{dR} = C_{VV} + C_{VR} \frac{dV^*}{dR}$$

and rearranging:

$$(2) \quad \frac{dV^*}{dR} = \frac{U_{VR} - C_{VR}}{C_{VV} + U_{VV}}$$

Expression (2) is undetermined in sign. Frey and Götte consider two polar cases. An increase in the direct reward causes a *relative price effect* because it lowers the opportunity cost of volunteering ($C_{VR} < 0$). If the agent does not have an intrinsic motivation (i.e. she is purely selfish) and $U_{VR} = 0$, then $dV^*/dR > 0$: as should be expected, voluntary labour supply increases. However, when the agent does have an intrinsic motivation (i.e. she is purely altruistic), an increase in the direct reward produces also a *“motivation effect”* because it reduces the marginal utility of volunteering ($U_{VR} < 0$). A possible interpretation is that individuals feel their relation with nonprofit organisation is becoming more “market-oriented”. When voluntary work is provided and $R = 0$ individuals recognise a nonmarket transfer; as soon as R becomes positive, the framework changes and individuals refer to a market-type transaction. Frey and Götte observe that “agents switch to a different mode of supply” and that the “motivation effect” is “particularly strong at low levels of rewards, but becomes relatively weak as the rewards increase”. In a similar vein, Kreps (1997) argues that boundedly rational agents “try to fit the relationship to one of a few archetypes. In a kinship or family-like relationship, parties internalize each other’s welfare, curbing their instincts to act opportunistically. In an arms-length, market relationship, caveat emptor is the rule. Relationships within an organization, between employer and employee, or among employees, need not fit any particular archetype. But individuals, to make sense of them, will try to fit them into a standard pattern”. Kolm (1983) suggests that “the same person may be altruistic (in sentiment or in behaviour) toward one, egoistic

toward another, jealous or even malevolent toward a third, and so on. In fact, this is generally the case, and the strength of all these variables may differ depending on, for example, the goods at stake, the people or the situation". Bowles (1998, p. 75) asserts that "markets and other economic institutions do more than allocate goods and services: they also influence the evolution of values, tastes, and personalities". Of course, when $U_{VR} < 0$ and $C_{VR} = 0$, then $dV^*/dR < 0$. This is the "crowding-out effect" highlighted by Frey (1992): an increase in the direct reward R to volunteering "crowd-out" labour supply by reducing intrinsic motivation. The most famous and most quoted empirical example of the "crowding-out effect" is probably Titmuss observation about differences in blood-giving between U.K. and U.S. Total (per capita) supply of blood is significantly greater in the U.K. - where giving blood is voluntary and unpaid - than in the U.S. - where a market for blood does exist.

Motivation crowding theory can be given also alternative and more subtle interpretations, e.g. in terms of opportunistic behaviour. Assume volunteering involves two groups of different activities, with the first group collecting more routinary tasks (e.g. secretarial duties) while the second gathering more intrinsically rewarding actions (e.g. services to disabled). The nonprofit organisation can then offer a pair of different "contracts" to volunteers. The first one (contract A) implies no direct reward ($R=0$) but leave the agent free to choose the amount of time to dedicate to the two activities, whereas the second one (contract B) implies a positive direct reward ($R>0$) but fix the amount of time agent has to dedicate to routinary tasks. Of course, an intrinsically motivated agent will dedicate less time to routinary duties under contract A than under contract B, so that the *total* amount of time donations under contract B could well be less than under contract A. Following the argument presented by Aghion and Tirole (1997), "crowding-out" effect can then be thought as a problem of delegating formal authority to volunteers. With contract A, the principal delegates to the agent authority over the optimal choice of time to dedicate to the two activities. On the contrary, reward R in contract B allows the principal to retain authority, thereby reducing agents initiative and participation.³ Also within this interpretation, motivations provide a noisy

³ A similar argument is recalled by Frey and Götte (1999). Reviewing psychological research, they observe that "people who are paid to perform a task which they did previously for its own sake (i.e. they are intrinsically motivated) reduce their effort. This effect appears when compensation is perceived to be

signal about the type of agent, i.e. whether she is purely altruistic, purely selfish or behaves altruistically or selfishly according to the situation. A key point to observe is that by empirically looking at how R affects volunteering, Frey and Götte can simply *infer* that an intrinsic motivation does exist, but they cannot provide a direct explanation of opportunism or “crowding out”.

To complete the picture, differently from Frey and Götte (1999), by assuming that the agent is employed, we want to consider extrinsic motivation as well. Hence, agent’s utility is also affected by the hourly wage rate W . Suppose that W increases; as before, the optimal supply of voluntary labour V^* change according to:

$$(3) \quad U_{VV} + U_{VW} \frac{dV^*}{dW} = C_{VV} + C_{VW} \frac{dV^*}{dW}$$

Rearranging terms we obtain:

$$(4) \quad \frac{dV^*}{dW} = \frac{U_{VW} - C_{VW}}{C_{VV} + U_{VV}}$$

which again is undetermined in sign. Consider two polar cases. An increase in the wage rate causes a *relative price effect* because it raises the opportunity cost of volunteering ($C_{VW} > 0$). If the agent does not have an intrinsic motivation and $U_{VW} = 0$, then $dV^*/dW < 0$: agent lowers voluntary labour supply. However, an increase in the wage rate produces also a *motivation effect* (the standard income effect that bends the labour supply curve backward) because it increases the marginal utility of volunteering ($U_{VV} > 0$). One possible interpretation is that individuals have their *extrinsic* motivation reduced: therefore, starting from a high level of wage, the agent reduces her supply of paid labour. If $C_{VW} = 0$, then $dV^*/dW > 0$ and agent increases voluntary unpaid labour supply. Findings by Freeman (1997) highlight this last effect: the higher the wage rate, the higher voluntary labour supply. Indeed, “persons with the characteristics associated

controlling, i.e. reducing a volunteer’s feeling of self-determination”. More generally, Hart (2001) affirms that “one would expect to see few formal contracts inside the firm given the concentration of residual control rights in the hands of one party (the board of directors): rather the firm is a place where informal agreements will flourish”.

with higher value of time – the better educated, the employed, those with higher incomes, and so on – are more likely to be asked to volunteer than others. [...] we might expect persons with high valuation of time to reject requests to volunteer, but in fact the opposite is true: those with greater education, family income, and so on, are more likely to accede to requests for volunteer activity” (Freeman, 1997, pp. S162-S163). In the remaining of the paper, we explicitly account for a direct measure of motivations and we study how these affects voluntary labour supply.

4. THE DATA

Data on the determinants of volunteering in Italy are rare. In particular, major labour market surveys as the one from the National Statistical Office (ISTAT) or the Bank of Italy do not report such information. Previous research on volunteering has thus been based on purpose-built surveys (e.g. Borzaga, 2000).

The present paper utilises data from questionnaires administered in 1998 to employees of a major public utility company. The data covers approximately 1,400 workers distributed across regions and sub-sectors within the public utility company and contains information both on workers attitudes and personal characteristics. In particular, workers are asked how often they volunteer in three types of organisations: social services, political associations and trade unions. Based on these questions we form three volunteering dummies, one for each type of organisation, assuming value 1 if the individual volunteers “often” and 0 if the answer is “sometimes” or “never”.

Table 1 reports the means of the three volunteering dummies and other observable characteristics for our sample. Among the three types of volunteering, activities in the social services present the highest occurrence, while, on the other hand only 5% of the sample volunteers for political associations. The relative importance of the three types of volunteering emerging from our data reflects the features of the whole Italian nonprofit sector. According to Barbetta (1997, p. 111), Italian volunteers account for 1.3% of employment in the whole economy; this figure rises to 2.1% when looking at employment in the services sector only (Barbetta, 1997, p. 111). More than one third (35.3%) of these volunteers provide their labour in the social services sector; just a small fraction (respectively 4.5% and 1.7%) supply voluntary work in two broad sectors that include also union activism and political activism.

We can also observe from the Table that the incidence of female employment is rather low, mirroring a feature of the company under investigation. On the other hand, educational attainment is some 10% higher than nation-wide representative statistics (see Banca d'Italia, 2000). As for the rest of observed characteristics, observations appear to be evenly distributed across Italian regions, while the majority of employees is concentrated in the Distribution-Transmission department.⁴

The questionnaire also contains some proxies for individual intrinsic and extrinsic motivations, which, according to the discussion in the previous Section, should play a crucial role in determining the decision to volunteer. In particular, we identify intrinsic motivations from a questions in which individuals are asked to rank a set of “values”, including solidarity, equality, autonomy, democracy and participation. We define a dummy for intrinsic motivations, which equals 1 for individuals who ranked solidarity as the most important value and 0 otherwise. In order to capture extrinsic motivations, we utilise a question in which employees are asked to indicate what would be their most important reason to change job, alternatives being a better salary, better working conditions, better career prospects, better working environment, more job stability, better pensions and company’s values closer to the individual’s. Our dummy for extrinsic motivations equals 1 if salary is the reason to change job and 0 otherwise. Clearly, these dummies are loose proxies for the two sets of motivations, i.e. they might entail some non-ignorable measurement error, an issue which we will tackle in the next section. Sample means for the two motivation dummies are reported at the bottom of Table 1, showing that roughly half of the sample is characterised by intrinsic or extrinsic motivations.

Table 2 provides a description of volunteering patterns by cross-tabulating the volunteering dummies against personal characteristics. We can observe that in each case volunteers are slightly older compared to the sample average. Volunteering in social services appear to be higher than the sample average (i.e. the one of Table 1) for females, employees from Lombardy region and from the South and Islands, those in the production department and respondents characterised by intrinsic motivations.⁵

⁴ The public utility company operates in the energy sector.

⁵ Lombardy is well known for its high incidence of volunteering in the social services. This is the reason why we separate it from the rest of the north when controlling for geographical location.

Volunteering in political associations is a choice characterising employees with high educational attainment, employees from the Centre and employees in the Services department, all groups which present an incidence of volunteering clearly higher than the average. On the other hand, no evident variation seems to emerge from motivation dummies. Finally, volunteering for a trade union is evident for females, southern workers and workers with intrinsic motivations. It can also be observed that the incidence of this last variable is particularly low in the North of the country.

5. ECONOMETRIC ANALYSIS OF MOTIVATIONS AND VOLUNTEERING

In this Section we provide estimates of the role of motivations in explaining the supply of volunteer labour. We first analyse this relationship using probit equations for the three volunteering indicators. Next, we expand our analytical framework and assess endogeneity problems inherent to this kind of analysis.

5.1. The covariates of volunteering

A simple way to assess the relationship between motivations and volunteering is by means of standard probit equations⁶ with which the volunteering dummy is regressed against the set of controls plus the two motivation dummies:

$$(5) \quad \text{prob}(V_i) = \Phi[kv_i (\boldsymbol{\beta}' \mathbf{X}_i + \delta_1 I_i + \delta_2 E_i)]$$

where $i=1..N$ indexes individuals, V_i is the volunteering dummy (either in social services, political associations or trade unions) for individual i , $kv_i=2V_i-1$, the vector \mathbf{X}_i and the associated coefficient vector $\boldsymbol{\beta}$ control for the association between personal attributes and volunteering, I_i and E_i represent the two motivation dummies (intrinsic and extrinsic, respectively) with associated coefficients δ_1 and δ_2 (respectively) and $\Phi(\cdot)$ is the standard normal cumulative density function (c.d.f). The set of controls included in \mathbf{X}_i corresponds to the personal characteristics listed in Table 1; in particular, the

⁶ We also experimented with ordered probit specifications, i.e. utilising the original discretisation of volunteering propensities. While this experiments revealed that ordered probit coefficients typically lie in the 95% confidence interval of their binary probit counterparts, the binary treatment of volunteering indicators simplifies computations in the next Section.

inclusion of wage determinants such as education allows us to cope with the absence of information on wages.⁷

Results from the estimation of equation (5) for each of the three volunteering dummies are reported in Table 3. Estimates from the social services equation show that coefficients on motivation dummies shift volunteering probabilities in the expected direction. Individuals reporting solidarity as the most important value – i.e. those who are intrinsically motivated - present volunteering probabilities larger than otherwise comparable individuals. On the other hand, employees who see a higher salary as the main motivation to change job – i.e. those extrinsically motivated - display a volunteering probability that is lower compared to otherwise similar employees. The table also works out the changes in predicted volunteering probabilities implied by estimated coefficients, holding observed attributes fixed at their sample averages. As can be seen the implied variation in predicted probabilities is bounded below 5%, intrinsic motivations providing the strongest shift. As for the other estimated coefficients, the basic patterns emerged from the descriptive analysis of Table 2 are confirmed, the probability of volunteering in the social services being positively associated with age, high educational attainment, geographical location in Lombardy or the South and Islands and departmental affiliation in Production.

Moving to results from the two other volunteering equations, we can observe that, overall, patterns of covariation are more difficult to detect compared to the social services case. This is particularly evident in the case of political associations, where the overall significance of regression is low and where the only statistically significant influence appears to be that of education. For trade union volunteering the precision of the analysis is higher and reflects some of the patterns emerged from Table 2. In both cases, however intrinsic and extrinsic motivations do not show any statistically significant association with volunteering probabilities. However, it might well be that this outcome reflects biased estimation, an issue which we tackle in the remainder of the paper.

⁷ We also experimented using a quadratic in age and found that this inclusion leads to imprecision in estimating age related coefficients, while leaving remaining coefficients practically unaltered. Our preferred specification thence includes only a linear term in age.

5.2. Accounting for measurement error and endogeneity

There are at least two reasons why regressions in the previous Section may be biased. The first is measurement error. Our motivation dummies are, admittedly, only loose proxies of the degree of intrinsic or extrinsic motivations characterising individuals. We might note that this problem is not specific to our data set, but indeed to the kind of problem under analysis: personal motivations are very difficult to observe in survey – or even experimental – data. The presence of measurement error leaves an unobserved component of motivations in the error term of equations like (5). As long as such unobservable component is correlated with the motivation dummies, standard estimation of (5) will deliver biased results.

The second possible source of biased estimation is, more generally, endogeneity. It might well be that the same unobserved data-generating process in fact determines both volunteering and revealed motivations. For example, individuals who volunteer might be characterised by higher aspirations than otherwise comparable employees and be more prone to report intrinsic motivations. Or the opposite situation might be true, and they could be less inclined in revealing their motivations. While the sign of the bias is undetermined, the possibility that such mechanisms are in place should be taken into account when estimating the effect of motivations on volunteering probabilities.

In this paper we deal with the possibility of biased estimation by explicitly estimating correlation between the unobservables of equations like (5) and the two volunteering dummies. With this aim we augment (5) with two reduced form equations for the determination of motivation dummies:

$$(6) \quad \begin{aligned} \text{prob}(I_i) &= \Phi[k_i \mathbf{I}' \mathbf{Z}_i] \\ \text{prob}(E_i) &= \Phi[k_e \mathbf{E}' \mathbf{Z}_i] \end{aligned}$$

where the vector \mathbf{Z}_i contains a set of variables deemed to influence the reporting of motivations (more on this later on) with associated parameter vectors γ , $k_e = 2E_i - 1$ and $k_i = 2I_i - 1$. We control for the presence of bias by allowing unobservables of (5) and (6) to be jointly distributed:

$$(7) \quad (u_i^V, u_i^I, u_i^E) \sim N_3(\mathbf{0}, \mathbf{\Omega})$$

where the u 's are the unobserved components of the three probit equations, N_3 is the three-variate normal density, and the covariance matrix $\mathbf{\Omega}$ has unit diagonal elements and extra-diagonal element equal to cross-equations correlation coefficients.

The model to be estimated thence becomes:

$$(8) \quad \text{Prob}(V_i, I_i, E_i) = \Phi_3[kv_i(\boldsymbol{\beta}'\mathbf{X}_i + \delta_1 I_i + \delta_2 E_i), ki_i(\boldsymbol{\gamma}_I'\mathbf{Z}_i), ke_i(\boldsymbol{\gamma}_E'\mathbf{Z}_i); kv_i ki_i \rho_{VI}, kv_i ke_i \rho_{VE}, ki_i ke_i \rho_{IE}]$$

where the ρ 's capture correlations of unobservable across equations and $\Phi_3(\cdot)$ is the three-variate normal c.d.f. To compute three-variate normal integral we apply the GHK simulator and estimate the whole model via simulated maximum likelihood.⁸ Note that we allow for correlation between the two motivation dummies, which might also generate a bias in estimation. The null hypothesis of absence of bias can then be tested by testing the joint significance of the ρ 's.

The model in (8) includes a headline equation with two endogenous dummies (which, in this sense, is a structural equation) and two “reduced form” equations for the endogenous dummies. Identification of the latter requires exclusion restrictions in terms of variables entering Z but not X , i.e. variables which affect motivations but which have no additional effect on volunteering after motivations have been controlled for. As “instruments” for motivations we utilise two indicators of workers preferences regarding the use of leisure.⁹ These variables can be interpreted as “types” shifters, thence as determinants of motivations. Thence, the Z vector includes the X vector plus the two instruments. Clearly, our model is not over-identified so that the validity of

⁸ Geweke-Hajivassiliou-Keane. See Hajivassiliou and Ruud (1994) and Gourieroux and Monfort (1996) for illustrations of simulation methods and their application to maximum likelihood estimation of multivariate limited dependent variable models. See Heckman (1978) for a discussion of systems of simultaneous equations for limited dependent variables.

⁹ In particular we include a dummy indicating whether the individual usually watches television (equal to 1 for 28% of the sample) and a dummy indicating whether the individual usually goes to bars or pubs (equal to 1 for 22% of the sample).

exclusion restriction cannot be tested on (8). In order to test the validity of instrument, we then run an unrestricted reduced form model:

$$(9) \quad \text{Prob}(V_i, I_i, E_i) = \Phi_3[kv_i(\gamma_V'Z_i), ki_i(\gamma_I'Z_i), ke_i(\gamma_E'Z_i); kv_i ki_i \lambda_{VI}, kv_i ke_i \lambda_{VE}, ki_i ke_i \rho_{IE}]$$

We test a) the significance of instruments in the volunteering equation and b) the joint significance of instruments in the two motivation equations. While the test under b) is aimed at assessing the explanatory power of the instruments for the variables to be instrumented, the test under a) checks that the instruments have no extra effect on volunteering once the link between motivations and volunteering is held constant, a task accomplished by the two reduced form correlation coefficients λ_{VI} and λ_{VE} .

Results from the estimation of the trivariate probit model are given in Table 4. The bottom lines of the Table report results from testing the various hypotheses underlying the model. The row labelled “Endogeneity test” reports the outcome of the test for the joint significance of the ρ 's. These results indicate that the null of absence of bias can be rejected at usual confidence levels for all the three volunteering equations. This result points towards the necessity of controlling for the determinants of motivations when estimating their impact on volunteering. The next row labelled “Instruments test 1” tests the exclusion of the instruments from the volunteering equation. As we can see, the null hypothesis of insignificance of the two variables can not be rejected at usual confidence levels. Finally, the row labelled “Instruments test 2” tests that the two variables are simultaneously non-significant in the motivation equation, the null hypothesis being overwhelmingly rejected. Outcomes from these tests thence support the validity of leisure variables as instruments for motivations.

Results about the effects of motivations on volunteering again confirm the necessity of allowing for the determinants of motivations. In the case of volunteering in social services coefficients on both types of motivations register a huge increase in absolute value compared to Table 3: while for intrinsic motivations the coefficient approximately doubles, for extrinsic motivation it is now more than 5 times its values of Table 3. But, more impressively, we can observe that both kinds of motivations present

now some detectable effect in the two other volunteering equations. Thence the factors confounding estimation of the effects of motivations on volunteering are controlled for in the three variate model, which consequently delivers unbiased estimates for the coefficient of interest. We can also observe that the bias led to underestimation of the absolute size of the coefficients of interest. As a consequence, the implied shifts in volunteering probabilities are now larger in size. In particular, while for intrinsic motivations the marginal effects ranges between 10 and 20%, for extrinsic motivations the size of the shift is between 5 and 13%. The net marginal effects shows that extrinsic motivations are the driving force for those volunteering in the social services and political associations, while intrinsic motivations dominate the decision to volunteer in trade unions. A possible interpretation relies on the particular sample we use. Volunteering in the political and social services sector do not provide volunteers any valuable working experience; hence, workers both intrinsically and extrinsically motivated (i.e. agents that act selfishly or altruistically according to the situation) are predominantly guided by explicit economic incentives. For the same kind of arguments, intrinsic motivation dominates the decision to volunteer in trade unions for unionised workers.

6. CONCLUDING REMARKS

In this paper we analyse the role of motivations, both extrinsic and intrinsic, in the decision to supply voluntary labour. We depart from previous empirical literature (that considers only explicit economic incentives) by providing a direct analysis of motivations. We propose to interpret motivations as a noisy signal about individuals' types, i.e. whether one is purely selfish, purely altruistic, or act selfishly or altruistically according to the particular choice at stake. Theoretical predictions show that intrinsic motivation should affect positively the choice to supply voluntary work, whereas the contrary is true for extrinsic motivation.

Our empirical analysis has been focused on estimation of the relationship between workers motivations and the probability of volunteering. Using data from a questionnaire administered to employees of a major Italian public utility company, we find that standard regression analysis reveals a weak impact of motivations on volunteering, mostly concentrated in volunteering in the social services sector.

However, by extending our estimation framework beyond the standard set-up and explicitly accounting for the possibility of measurement error as well as endogeneity of motivations, we show that the effect of motivation is indeed stronger. While the effect on volunteering in the social services grows in size, other types of volunteering, such as providing services for political associations and trade unions, also reveal a statistically significant dependence on motivations once endogeneity issues have been properly dealt with. Our results indicate that intrinsically motivated individuals are more likely to volunteer, whereas extrinsic motivated ones are less likely to supply voluntary labour. However, when individuals are both intrinsically and extrinsically motivated, extrinsic motivation dominate the choice of volunteering for social services organisations and political associations; on the other hand, intrinsic motivations are the driving force for those who choose to supply voluntary labour in trade unions. A possible explanation call for the particular sample of unionised workers we used in this paper.

Our findings indicate that motivations are important determinants of individual behaviour and should be taken into account when designing incentive contracts, even in the case of volunteering. In fact, introducing a direct reward for voluntary labour could undermine intrinsic motivation and could lead to a decrease in volunteering. Of course, it would be interesting to jointly analyse the effect of motivations and economic incentives on the decision to supply voluntary work and study how motivations are affected by the wage rate or a direct reward to volunteers. This will bring about a direct empirical analysis of “motivation crowding out” theory and a better understanding of individual reaction to incentives. Further research in this area is certainly needed.

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Table 1: Sample means

Variable	Mean (N=1192)
Social services volunteering	0.13
Political associations volunteering	0.05
Trade union volunteering	0.10
Age	41.51
Female	0.11
Education \geq High school	0.63
Lombardy	0.09
North other than Lombardy	0.26
Centre	0.34
South and Islands	0.31
Production	0.27
Services	0.18
Distribution	0.55
Intrinsic motivation	0.49
Extrinsic motivation	0.48

Table 2: Aggregate volunteering probabilities

Volunteering in	Social services	Political associations	Trade union
Age ^(a)	43.81	44.85	44.45
Female	13.97	2.99	11.94
Male	12.44	5.36	10.23
Education<High school	12.61	4.10	10.18
Education>=High school	12.62	5.68	10.57
Lombardy	15.45	3.74	4.63
Northern other than Lombardy	10.16	3.62	6.25
Centre	11.17	6.27	10.08
South and Islands	15.36	5.42	15.90
Production	18.50	3.79	10.38
Services	12.21	7.11	9.57
Distribution	9.89	5.07	10.72
Intrinsic motivations	15.58	5.18	11.79
Extrinsic motivations	11.09	4.45	9.73

Notes

(a) Sample means

Table 3: Probit estimates of volunteering probabilities

Volunteering in	Social services		Political associations		Trade union	
Covariate						
Age	0.018	(3.40)	0.022	(3.15)	0.019	(3.43)
Female	0.141	(0.96)	-0.277	(1.16)	0.130	(0.83)
Education \geq High school	0.149	(1.38)	0.262	(1.82)	0.111	(0.99)
Lombardy	0.073	(0.43)	-0.161	(0.61)	-0.632	(2.76)
Northern other than Lombardy	-0.238	(1.84)	-0.187	(1.06)	-0.531	(3.78)
Centre	-0.213	(1.78)	0.086	(0.57)	-0.239	(2.01)
Production	0.465	(4.24)	-0.099	(0.62)	0.048	(0.40)
Services	0.094	(0.69)	0.136	(0.83)	-0.034	(0.23)
Intrinsic motivations	0.238	(2.43)	-0.039	(0.30)	0.073	(0.71)
Extrinsic motivations	-0.152	(1.57)	-0.082	(0.64)	-0.055	(0.54)
Constant	-2.111	(7.36)	-2.644	(6.98)	-1.926	(6.55)
Marginal effects of motivations ^(a)						
Intrinsic		0.051		-0.004		0.013
Extrinsic		-0.026		-0.008		-0.009
Both		0.017		-0.011		0.003
Log-likelihood		-428.619		-227.27		-376.44
Model χ^2 (d.f.=10)		44.06 <i>0.0000</i>		19.72 <i>0.0321</i>		36.04 <i>0.0001</i>
Num. of observations		1189		1179		1180

Notes: Asymptotic absolute t-ratios in parentheses, p-values in italic. Reference category for dummy variables: male, education lower than high school, works in South or Islands, distribution department, does not report intrinsic or extrinsic motivations.

(a) Change in predicted volunteering probabilities as motivation dummies change from 0 to 1. Reference probability is that of an individual with a value of 0 for motivation dummies and values of other explanatory variables equal to the sample average.

Table 4: Trivariate probit estimates of volunteering probabilities

Volunteering in	Social services		Political associations		Trade union	
Covariate						
Age	0.012	(1.96)	0.015	(1.98)	0.011	(1.78)
Female	0.091	(0.62)	-0.283	(1.28)	0.114	(0.75)
Education \geq High school	0.104	(0.92)	0.224	(1.58)	0.119	(1.04)
Lombardy	0.122	(0.73)	-0.073	(0.29)	-0.484	(2.14)
Northern other than Lombardy	-0.175	(1.31)	-0.117	(0.69)	-0.403	(2.74)
Centre	-0.127	(1.03)	0.156	(1.09)	-0.135	(1.12)
Production	0.425	(3.69)	-0.106	(0.70)	-0.001	(0.01)
Services	0.036	(0.27)	0.073	(0.48)	-0.080	(0.59)
Intrinsic motivations	0.570	(1.43)	0.507	(1.36)	0.827	(2.38)
Extrinsic motivations	-0.870	(2.28)	-0.776	(1.85)	-0.497	(1.19)
Constant	-1.598	(3.36)	-2.134	(3.94)	-1.695	(3.96)
Marginal effects of motivations ^(a)						
Intrinsic	0.179		0.103		0.211	
Extrinsic	-0.134		-0.064		-0.056	
Both	-0.064		-0.032		0.065	
Endogeneity test: ^(b)	7.96	<i>0.0468</i>	10.65	<i>0.0138</i>	11.59	<i>0.0089</i>
χ^2 (d.f.=3)						
Instruments test 1: ^(c)	0.53	<i>0.7658</i>	3.4	<i>0.1826</i>	1.8	<i>0.4064</i>
χ^2 (d.f.=2)						
Instruments test 2: ^(d)	11.73	<i>0.0195</i>	11	<i>0.0265</i>	11.26	<i>0.0238</i>
χ^2 (d.f.=4)						
Log-likelihood	-2032		-1816.72		-1968.06	
Model χ^2 (d.f.=30)	151.74	<i>0.0000</i>	117.99	<i>0.0000</i>	153.29	<i>0.0000</i>
Num. of observations	1189		1179		1180	

Notes: GHK simulator with 50 random draws. Asymptotic absolute t-ratios in parentheses, p-values in italic. Reference category for dummy variables: male, education lower than high school, works in South or Islands, distribution department, does not report intrinsic or extrinsic motivations.

- (a) Change in predicted volunteering probabilities as motivation dummies change from 0 to 1. Reference probability is that of an individual with a value of 0 for motivation dummies and values of other explanatory variables equal to the sample average.
- (b) Tests the joint significance of cross equation correlations of unobservables.
- (c) Tests significance of instruments in volunteering equation
- (d) Tests significance of instruments in reduced form motivations equations.