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Paid and unpaid labor in nonprofit organizations: Does the substitution effect exist?

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Abstract

In nonprofit organizations (NPOs) volunteers often work alongside paid workers. Such a coproduction setting can lead to tension between the two worker groups. This paper examines for the first time if and how volunteers influence the separation of paid employees, and thus it contributes to the debate over whether volunteers can substitute paid workers. Using Austrian data on an organizational level we find a significant impact of volunteers on the separations of paid workers in NPOs facing increased competition. These findings support the assumption that a partial substitution effect exists between paid workers and volunteers.

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1 Introduction

In comparison to public and for-profit enterprises, nonprofit organizations (NPOs) can rely more intensely on unpaid labor in the form of volunteer work. Given the growing importance of service delivery by NPOs in many countries[1] and the fact that these services are labor intensive, it is astonishing how little is known about the relationship between paid and unpaid labor. In some organizations, such as self-help groups, volunteers are vital for the very existence of the organizations, whereas in other organizations they merely constitute an additional input factor, whereas other NPOs do not have volunteers at all.

This phenomenon of collaboration between paid employees ("professionals") and unpaid employees has been labeled "coproduction" in the literature (see Brudney and England 1983). While coproduction is commonly viewed as collaboration between paid service agents and citizens to deliver services, it can be easily generalized into a nonprofit context (Handy et al. 2008). For NPOs coproduction then implies that they have to decide whether volunteers should be involved in the production process, and if so, which tasks should be performed by paid professionals and which by volunteer workers.

The coproduction setting in NPOs can lead to tension between paid and unpaid labor. While Brudney and Gazley (2002) find no evidence for an adversarial relationship or a replacement of paid personnel by volunteers, Handy et al. (2008) as well as Simmons and Emanuele (2010) address this topic by describing unionized workplaces with provisions in collective agreements that try to protect paid workers against their replacement by unpaid workers, or workplaces preclude volunteer involvement entirely. So the question of a substitution effect on paid employees by volunteers remains thus far unresolved, especially as none of these studies is able to address directly the influence of volunteers on the separations of paid employees.

In light of this, the following paper aims to examine this potentially tense relationship between paid and unpaid workers, and investigates whether the presence of volunteers increases separations for paid employees in NPOs to scrutinize the replacement fears expressed by the above mentioned unions. More specifically, we examine for the first time the direct influence of volunteer presence on separations of paid employees with nonprofit sector-wide data on an organizational - and thus, demand - level. In our analyses we compare organizations that face increased competition and those that operate under unchanged or even reduced competition.

We make this distinction to account for various circumstances in the economic climates in which the NPOs operate and which influence separations of paid staff.

Section 2 discusses existing literature concerning the relation between the two worker groups before positing hypotheses in section 3. Section 4 describes the econometric specification as well as the data used for the analyses. We describe the robustness checks to our results in section 5, present and discuss our findings in section 6 and provide a brief conclusion in section 7.

2 Background and existing literature

Volunteers' roles are diverse and not necessarily distinct from paid workers' roles (Handy et al. 2008; Netting et al. 2005). Volunteers could either serve as complements or substitutes to paid employees. In the first case, paid and unpaid workers assume different tasks within the organization, whereas in the second case, paid employees and volunteers perform similar duties so that volunteers can basically replace paid staff or vice versa.

In practice, volunteer workers are engaged in managerial or organizational core tasks, as well as in auxiliary activities, which suggests that paid work and volunteer work can in fact be interchangeable. However, not all NPOs make use of volunteer labor, while others choose a mix of paid and unpaid labor to deliver their services, which points to incomplete substitution. Otherwise, economic logic would suggest using unpaid work exclusively - provided that access to volunteer work is unlimited. This is a typical assumption made in the study of volunteer labor supply (see Menchik and Weisbrod 1987). Assuming that both types of labor are partial substitutes, NPOs' decisions regarding task assignments and the levels of paid and unpaid labor inputs would in theory account for the marginal productivity of each type of labor. This means that volunteer labor would be used until the change in output resulting from an additional unit of volunteer labor equals the contribution of an additional unit of paid labor (see also Handy et al. 2008).

Furthermore, labor legislation and/or union regulations have to be taken into account when considering the types of jobs where substitution can be affected. It is interesting to note that in May 2006, a collective bargaining agreement regulating labor issues was introduced to health and social service industries. However, at the time of the survey there were no federal or regional statutes concerning the use of volunteers. Moreover, no union regulation would have

prevented a total replacement of paid staff by volunteers. Nonetheless, in principle, statutory rules may set limits to the substitution process between paid and unpaid labor. For example, giving injections requires professional training, can be conducted only by health professionals, and therefore cannot be delegated to volunteers. As a further example, Stine (2008) mentions that Pennsylvanian libraries are required to be headed by a professional librarian, when serving populations of more than 20,000. However, these regulations may be undermined when the professionals also volunteer. This phenomenon has received some attention in the literature. Rotolo and Wilson (2006) show that, for the US, paid workers from the nonprofit sector (compared to private, public, and self-employed workers) "are the most likely to volunteer and with the most hours". What is more, a paper by Baines (2004) documents that for social service workers in three Canadian provinces (Alberta, British Columbia and Nova Scotia) in the course of an adoption of new public management strategies, it became more and more common to expect paid staff to work voluntarily at either the current employer or in the sector. Such a "cannibalization effect" adds to the assumption that the substitution process between volunteers and paid staff can be affected at all task levels in a NPO.

The literature on nonstandard labor is another strand which is of potential interest in the given context. The "blended workforce literature" usually refers to several types of paid labor, such as part-time work, contingent work, contract company employment, or independent contracting (Davis-Blake et al. 2003; Pearce 1993). Even so, volunteer work usually escapes the attention of researchers in this field, and so it can be considered as yet another form of nonstandard labor, adding to the heterogeneity in a firm's employment arrangements.[2] The blended workforce literature focuses on the impact of nonstandard labor on the job design for standard workers and on the behavior of regular workers including psychological drivers of this behavior (such as job satisfaction, commitment, extra-role behaviors, or specific dimensions of a paid worker's psychological contract with his employer). In the given context, contributions to this strand of literature which concern employee separation are of particular interest. As expressed by Davis-Blake et al. (2003; 475), "if the dynamics that affect loyalty and peer relationships also lead to exit or voice, then blending may actually destabilize a work environment."

Connelly and Gallagher (2004) point out that organizations can either integrate standard and nonstandard work (in particular in terms of workers' rights and entitlements or job design)

or decide to separate the various types of work. The extent to which they follow a strategy of "blending" rather than separating, e.g. unpaid and paid work when designing jobs, will determine their substitutional or complementary relationship. The choice of strategy can be expected to depend on an organization's production technology, in particular on the importance of tasks requiring firm-specific knowledge (Lautsch 2002). A strategy of integration is likely to present a greater threat to paid workers and is therefore of specific interest in studying separations.

The psychological contract model (McLean Parks et al. 1998; Rousseau 1995) is one of the key pillars of the blended workforce literature. It posits that each type of work arrangement comes with its "idiosyncratic set of expectations held by an employee regarding their reciprocal obligations and entitlements" (McLean Parks et al. 1998; 698). The model suggests that the (changes in the) psychological contract shape(s) work-related behavior - including decisions to quit a job. According to this model, the presence of nonstandard labor could affect one or several of the underlying dimensions of the psychological contract (e.g., stability or scope). More specifically, proponents of this model hold that an increase in nonstandard labor loosens the ties with a given employer. As a result "although the organization ... may classify certain employees as core or permanent workers they may see themselves as temporary, and it is the employees' perceptions that will drive their expectations, attitudes and behaviors." (McLean Parks et al. 1998; 700)

Connelly and Gallagher (2004; 972) point to empirical research into negative consequences for paid workers associated with an increased organizational reliance on nonstandard work. Contingent work has been found to increase the workload of regular workers, trigger changes in their portfolio of tasks, and weaken the opportunities for promotion for workers with a lower work status. Similarly, in their empirical study, Broschak and Davis-Blake (2006) found that an increase in the proportion of nonstandard work arrangements can worsen intragroup relationships, reduce work-related helping behaviors at work and increase turnover intentions. The latter effect is, however, confined to individuals in the lower job grade, which is in line with the evidence presented by Connelly and Gallagher (2004). In summary, there is support for an association between nonstandard work and separations, which seems to be of particular relevance for workers at the lower end of an organization's hierarchy.

In explaining their findings, Broschak and Davis-Blake (2006) refer to Blalock's (1967) theory of majority-minority group relations, predicting rising levels of perceived economic and social competition between the majority and minority group, the higher the share of the minority. More specifically, regular workers might perceive a threat of status-loss (especially if nonstandard workers perform the same tasks as they do) and a rivalry for attractive tasks. A recent contribution by von Hippel and Kalokerinos (2012) is worth mentioning in this context because it touches on the issue of voluntary nonstandard labor. The authors posit that regular workers' responses to temporary co-workers will be more favorable if those temporary co-workers are voluntary. They argue that voluntary temporary employees have no desire to obtain a regular position, while regular temporary workers do. Therefore, voluntary temporary workers are not considered competitors (nor are treated as such). Analogous to the empirical blended-workforce literature – which so far has focused on paid forms of nonstandard work – several studies on volunteer work have investigated paid employees' attitudes toward volunteers and the optimal mix between the two worker groups (e.g., Netting et al. 2004; Netting et al. 2005; Rogelberg et al. 2010). In particular, Rogelberg et al. (2010) found poor relations between the two groups of workers to be interrelated with augmented employee stress and discontent. Employees that show a positive attitude toward volunteers show more organizational commitment and are less likely to quit.

So far, a few studies have examined the relationship between paid and unpaid personnel. Essentially, the existing literature seeks to answer two questions. First, there is the aforementioned discussion if volunteers (mainly) complement paid employees or if the substitution effect prevails. Second, given that a substitutional relation between the two worker groups does exist, can we observe an increased displacement of volunteer labor over time or the other way round? The evidence from the studies examining these two questions is mixed.

To date, hardly any study has directly examined the changes in firm level demand for paid workers when volunteer labor is used. Stine (2008) applies a translog cost function to estimate cross-elasticities in order to determine whether paid and unpaid workers can be considered substitutes or complements. He finds that volunteers in public libraries act as complements rather than substitutes to paid staff. However, the approach via cost functions seems to be particularly difficult in a nonprofit sector context. As Stine noted, it is already difficult to

determine appropriate output variables to estimate translog cost functions for a homogeneous group like libraries. Accordingly, it seems almost impossible to specify meaningful output variables applying to each and every NPO, given the impossibility of determining a universal "mission" (target function) for all NPOs together, a task that would however be necessary to pursue the cost function approach. (James and Rose-Ackerman (1986) or Steinberg (2006) provide a discussion of different NPO objective functions).

Thus, other approaches are prevalent when the focus is on the entire nonprofit sector. Simmons and Emanuele (2010) investigate the association between the amount of donated volunteer labor and state minimum wage regulations to answer the "substitutability-complementarity" question. Using individual-level data from volunteers they find that a higher minimum wage in a state is associated with a higher supply of volunteer labor and infer that volunteers supplant workers who work on minimum wages. However, the data only reflects volunteer supply and not specifically the organizational demand. Is more volunteer time offered by individuals because the NPOs have a higher demand for it? An alternative interpretation, in our view, is that people who earn more because of higher wages might be able to allocate a larger part of their non-leisure time to volunteer work.

Regarding the second question, whether paid employees crowd out volunteers over time or vice versa, both possibilities have been argued. Some authors observe a tendency towards specialization, professionalization and formalization in organizations which makes the employment of volunteers harder (see Seippel 2002), while others assume that volunteer work will be even more significant in the future because of an expected decline of continuity and importance of traditional paid full-time employment (e.g., Beck 2001) and declining budgets. (For a discussion, see Hustinx, 2007). Handy et al. (2008) report results from two national online surveys of Canadian nonprofits and a case study of two Canadian hospitals. Based on a case study and simple correlation analysis using the data from their online surveys, they find different patterns of volunteer and paid worker employment. On the one hand, NPOs report a tendency towards professionalization and thus towards a replacement of volunteers through paid employees, i.e. a rise in paid staff leads to a decline in the need for volunteers. On the other hand, volunteers also replace paid workers, especially in times of financial stress. This latter result provides the first hints that the organizational development of NPOs is an important factor in how volunteer

work is used. Unfortunately, Handy et al. (2008) do not ground their evidence in a multivariate, econometric framework.

Handy et al. (2008) assert that the replacement process between paid and unpaid work is complex, oscillates, and is not necessarily stable over time. This, however, is exactly what can be read from Emanuele (1996), who finds that organizations remain stable over time in the way they use volunteer input.

In a study of Norwegian sports organizations, Seippel (2002) finds that paid employment rises with both augmenting organization size and increasing sales returns. The importance of volunteer work decreases in relation to paid work but not necessarily the time donated by volunteers.

Additionally, there are two other strands of literature that are worth mentioning for the purpose of this paper, although they do not discuss the aforementioned questions directly. The first is concerned with NPO's demand for voluntary labor in general (Emanuele 1996; Ferris 1988; Handy and Srinivasan 2005). One important finding is that voluntary labor comes at some cost for NPOs, e.g., for supervising volunteers, providing equipment or office space. Using data from four US cities (Chicago, Minneapolis, Pittsburgh, Phoenix) in 1982 and 1984, Emanuele (1996) presents evidence that NPOs have a consistent and downward sloping demand curve for volunteer labor over time. Her results show that organizations do not necessarily accept all volunteer labor offered and that their demand for volunteer labor is stable over time.

Summing up, only a few studies so far have investigated the production-related relationship and interchangeability over time between paid employees and volunteers. Evidence from existing research is mixed. We learn from the studies that substitutional as well as complementary volunteer employment can be found in organizations, depending on the nature of the organization and the specific tasks to be performed. However, from existing research, it is reasonable to believe that especially low-paid workers have reason to feel threatened by volunteer presence, because unpaid workers can substitute them more easily.

Against this backdrop, our own empirical analysis investigates for the first time directly whether the use of volunteers influences separations of paid labor in NPOs. By doing so, we observe changes in employment in NPOs and possible substitution effects. In order to be accurate about the organizational demand for workers, we use data on an organizational

level. Moreover, our study is concerned with the nonprofit sector as a whole, in order to supply information on a more general level. In section 3, we will now lay out our hypotheses concerning the influence of volunteers on paid employees' separations.

3 Hypotheses

We want to analyze in greater detail the question whether volunteers act as substitutes to paid employees, and thus examine the influence of volunteer presence on the separations of paid employees in Austrian NPOs. Firm level separations consist of the sum of quits ("voluntary separations") and layoffs ("involuntary separations"), which are in our data unfortunately not separable. Therefore, we offer some explanations on possible driving forces behind both quits and layoffs.

In our analyses we use competition as an indicator to distinguish the economic conditions under which a certain NPO operates. We differentiate between NPOs facing increased competition and those NPOs facing a stable or favorable economic environment, i.e. observing unchanged or even decreased competition in that period of time. The questionnaire asks if the number of organizations that are perceived as direct competitors has increased, remained stable or decreased in the five years prior to the survey (i.e., in the time period from 2000 to 2005). Alternatively, the organization could also state that there are no direct competitors. Thus, we measure self-declared, subjectively-perceived competition, and by this we follow the approach of several existing studies (e.g., Hay and Kamshad 1994; Robson and Obeng 2008). We hypothesize that volunteers might have a different effect on the employment of paid staff when the competitive environment changes for an organization. We argue that the question whether volunteers act as substitutes or complements might be more pressing in NPOs with increased competition, which means that paid and unpaid labor can be seen as "conditional" substitutes. This "conditional substitution hypothesis" is formulated below in two parts.

The Austrian nonprofit sector can be described as "service-dominant", which means that most nonprofit employees are active in health and social services. NPOs in Austria are often heavily dependent financially on public funding (e.g., Neumayr et al. 2007; Salamon et al. 2003) which presents a serious challenge in times of fiscal austerity. Furthermore, health and social service providers face increasing competition and tight budgets. Governments have sought to

limit spending on social services by way of introducing new public management and opening service markets to competition (e.g., Bonoli et al. 2000; Kautto 1997; Starke 2008). Increased competition between NPOs or with new market players such as for-profit firms will have the effect of lowering possible profits for the NPOs. While NPOs can and do make profits, they operate, however, per definition under a non-distribution constraint (e.g., Anheier and Salamon 2006), which prohibits the distribution of profits to the owners of the firm, but guarantees that such profits are distributed among the stakeholders, e.g. clients, paid staff or volunteers. It is therefore quite plausible to assume that NPOs operating under stable or decreased competition have a higher probability of reinvesting its profits to help sustain the NPO or improve their employees' working conditions, while NPOs under increased competition will lack such possibilities.

Consequently, under increased competition and lowered profits NPOs have to seek alternative ways to finance their activities and to maintain service at a certain level. As many NPOs operate under government contracts with fixed prices and/or because NPOs aim to offer an affordable service to often underprivileged customers, cutting costs is a more feasible strategy to respond to increased competition instead of increasing prices.

As a result, given the fact that labor costs are most often the greatest expense in a NPO's budget, they could resort to using volunteer work more heavily in order to cut labor costs when facing shrinking profits due to increased competition. Hence, an initial reaction of NPOs could be a direct replacement of paid staff by unpaid workers in order to maintain service levels and/or quality while avoiding service disruption.

As an aftereffect, highly productive workers might react by leaving the struggling NPO and seek employment elsewhere. This reaction is supported by the literature as Schwerdt (2011) shows for Austria that the early leavers (before a plant closure) are associated with significantly better post-separation labor market outcomes and suffer significantly less from separating from a closing plant compared to the workers that are ultimately displaced. In the Austrian context, such an effect is enforced by the legal obligation for firms with more than 20 employees to give an advance notice when laying off more than 5 employees. (This is regulated in §45a AMFG and affects 85.3% of the employees in our sample) While this staff loss may occur with and without volunteers in NPOs, this effect might be aggravated when NPOs use volunteers, as

paid employees might anticipate that layoffs are more likely in NPOs with volunteers.

If this second effect takes place, the workforce mix of an NPO is altered and becomes relatively dominated by less productive workers (without outside options) and volunteers. However, as discussed in the literature (Simmons and Emanuele 2010) we know that low wage workers in particular are prone to a replacement by volunteers. This again could aggravate an increase in the separations rate through intensified layoffs by NPOs using volunteers.

Another possible mechanism shows on the other hand that intrinsically motivated workers might also leave NPOs due to increased competition. Such a mechanism can be triggered if paid employees are, in the wake of increased competition, forced to concentrate on their core professional activities, while "soft" work is done by volunteers. For example, in health and social services, this could mean that professionals are reduced to medical work, e.g. giving injections, fulfilling documentation obligations, etc., while volunteers engage in relationship building with patients. While (more) extrinsically motivated workers will not be affected by such a shift, this might well be the case for intrinsically motivated workers. In contrast, such a shift will not take place in NPOs without volunteers, where the redeployment of work might happen between extrinsically and intrinsically motivated workers.[3] This mechanism can also be related to the literature of work intensification (see, e.g. Green 2004). Green mentions as one important explanation for the intensification of work an increased competitive environment and traces the effects of intensification amongst other things back to the increased use of nonstandard workers.

A final consideration for why NPOs using volunteer work might experience an increased separation rate when competition increases is due the possible transitioning of aging workers from paid work to volunteer work. Such a consideration can be found, e.g. in human resource literature (see Schlosser and Zinni 2011). These authors are investigating this topic as a possibility to "stem the loss of organizational learning by developing strong social exchanges that encourage employees to pursue post-retirement volunteering." Converting paid workers into volunteer workers seems to be especially desirable in times of increased competition. This strategy reduces labor costs without reducing service delivery. It implies an increase in separations of paid workers while preserving organization specific knowledge. Therefore, it may foster substitution between paid and unpaid workers especially in times of increased competition.

Therefore, our **first hypothesis (H1)** can be stated as follows:

"In NPOs facing increased competition the presence of volunteers leads to higher separations among paid staff in NPOs using volunteer labor than in those not using volunteer labor. This could be seen as an indicator for a substitution effect between paid employees and volunteers."

Assuming that a stable or decreased competition, i.e. a stabilization or reduction of competitors, will lead to higher profits for the NPO this in turn allows the distribution of these profits under the stakeholders. As a consequence, possible positive effects for the relationship between paid and unpaid workers could emerge, irrespective of whether the volunteers assume complementary or substitutive tasks. Preston (1988; 339) mentions the argument that, in imperfectly competitive markets, volunteer labor can decrease the (labor) costs for a NPO, "allowing nonprofit managers the discretion to funnel more revenue into salaries without increasing the price of service." In such circumstances the presence of unpaid co-workers could be seen as positive. Additionally, Leete (2006; 166) mentions that nonprofit employees working together with volunteers are perhaps more gratified than their for-profit counterparts. As working conditions are an important predictor of labor turnover (see Böckerman and Ilmakunnas 2009 for recent evidence) this can have a positive influence on retention.

Thus, we argue that in NPOs facing no competition or even decreased competition volunteers are perceived more positively by paid employees. Therefore, **our second hypothesis (H2)** can be stated as follows:

"In NPOs facing no competition the presence of volunteers leads to lower separations even if volunteers act as substitutes for paid employees."

4 Data and econometric specification

Research in the nonprofit sector is often hindered by insufficient data concerning paid and unpaid labor due to a lack of compulsory and/or systematic statistical reporting, in contrast to other established sectors of the economy.

Our work is based on a unique data set for Austria. Data were gathered in 2006 by means of a mail survey that was sent to all Austrian NPOs with at least one paid employee. We have information for a myriad of industries that are relevant to the non-profit world, and the questionnaire placed particular emphasis on employment, income, expenditure and organizational activities. In total, 4,590 organizations were contacted, and 798 questionnaires were returned,

yielding a response rate of 17.39%. (See Haider et al. (2008) for a more detailed description of the data). In the following we use a subset of 540 organizations for which we have full information concerning the variables used in the econometric analysis, i.e. we do our regression analysis by listwise deletion. The relatively low response rate raises the issue of a possible nonresponse bias. While a low response rate does not automatically lead to a nonresponse bias (see Groves 2006), it is important to note that in our case the full sample (798 organizations) covers about 38% of paid gross wages in the nonprofit sector. This information is received from Statistik Austria, the national statistical authority, matching the organizational data with the wage withholding tax statistics (see Haider et al. 2008 for a more detailed description of the data). Therefore, we can assume that large organizations (or better paying NPOs) are somewhat oversampled, i.e. small (or lower paying) organizations had a higher nonresponse rate. Drawing from the literature on missing data and sample selection, we know that this is not a problem if we include in our regression analysis all variables that possibly influence the probability of a missing value. However, while we have included the control variables to the best of our judgment to control for the generation of missing values, the fact remains that if our analysis fails to control for all variables influencing missingness, i.e. if the missing values depend on unobserved predictors, the presented estimates will be biased.

As dependent variables we use firm level separations. To adjust for scale effects we build the separations rate (SR), by dividing the absolute number of separations of paid employees through the sum of all paid employees at the end of the year 2005.

The independent variables used are summarized by the vector X. Our main focus lies on the influence of volunteers on separations of paid staff. This is measured with a dummy variable taking the value one if the NPO uses volunteers and zero otherwise. In order to control for the task area of volunteers, four dummy variables are included indicating whether the volunteers are engaged in managerial tasks, the core tasks of the NPO, administrative tasks, or other tasks.

In addition, further control variables are added to the vector X to explain the separations of paid employees. We include the logarithm of total employment of the NPOs to control for size effects in the SR. To cover the employment structure and different employment policies that are important for separations at the company level, we include the ratio of atypical employees, measured as workers with a contract for services plus independent contractors ("freie Dienst-

nehmer") on total employment, as well as the share of employees with an employment duration greater than five years. We define two specific Austrian contract types as atypical employees, so-called "new self-employed" workers and "independent" contractors. Both forms can be interpreted as forms of self-employed persons who are economically dependent on one "employer" (see Eurofound 2010 for an overview of atypical forms of work in Austria). We assume that, on an organizational level, a higher share of atypical employees reduces hirings and the separations of paid staff. We explain this by the fact that the presence of atypical employees allows the NPOs to adjust to demand fluctuations without the need for hiring or separating existing staff, as the workload of atypical employees can be shifted relatively easily.[4] Especially for those NPOs operating in an uncertain funding environment, this can be an important strategy. In the same way, but for different reasons, we expect the share of long term employees (employees with employment duration of 5 or more years on total employees) to reduce separations. Plenty of evidence shows that long term employees exhibit a reduced probability of terminating an employment contract. Accordingly, this variable can be considered as a proxy for the existence of employer- or match-specific capital. (see e.g., Farber 1999)

To control for the dependency on public funding, we add a dummy variable that captures the reliance on public funding. Table 6 in the appendix reveals that 28.3% of all NPOs do not receive public funding. Moreover, Table 1 shows that the percentage of "no public funding" in NPOs facing increased competition is 31.1%, approximately five percentage points higher than the value in NPOs facing no competition (26.3%). A dummy for the existence of work councils is included to control for the exit-voice hypothesis as proposed by Freeman (1980). Work councils offer a possibility to reveal and settle potential problems in the collaboration of paid employees and volunteers. Therefore, we expect the existence of work councils to reduce the separations of paid employees.

To capture the economic development of the NPOs under observation, we additionally control whether the development of revenues and expenditures in the five years prior to the survey have decreased, increased or remained unchanged. Additionally, we include dummy variables to control for industry affiliation on a 2-digit level.

The sample is divided along the variable "competition". We create two subsamples, one consisting of NPOs perceiving increased competition and one of NPOs perceiving a stable sit-

uation or decreased competition. As argued in section 3, we hypothesize that volunteers might have a different effect on the employment of paid staff in different economic circumstances. A detailed overview of the summary statistics for the relevant variables is given in Table 1.

–Table 1 here–

The dependent variable, SR, has a natural lower bound at zero and contains a nontrivial number of zeros (307 observations, i.e. 56.85% of all cases), thus a Tobit regression for corner solution is our starting point.[5] We estimate the Tobit regressions, separately for NPOs facing increased competition and NPOs facing no increased competition:

$$SR_{\mathrm{i}}^{*} = \beta X_{\mathrm{i}} + u_{\mathrm{i}} \text{ with } u_{\mathrm{i}} \mid X_{\mathrm{i}} \sim Normal(0, \sigma) \tag{1}$$

and

$$SR_{\mathrm{i}} = max(0, SR_{\mathrm{i}}^{*}) \tag{2}$$

The Tobit regression in (1) is estimated for a latent variable (SR^{*}), which is difficult to interpret in corner solution applications. The latent variable involves the conception of an underlying "propensity to separate" that can take on negative values. Such a "propensity" is an odd construct for the analysis of observable separation rates. Therefore, of greater interest is the unconditional expected value of the SR, $E[SR_{\mathrm{i}} \mid X_{\mathrm{i}}]$, which consists of the probability of being above the limit and the expected value conditional on being above the limit:

$$E(SR_{\mathrm{i}} \mid X_{\mathrm{i}}) = P(SR_{\mathrm{i}} > 0 \mid X_{\mathrm{i}}) \cdot E(SR_{\mathrm{i}} \mid X_{\mathrm{i}},\ SR_{\mathrm{i}} > 0) \tag{3}$$

As McDonald and Moffit(1980) have shown, a decomposition obtained by a partial derivation of the unconditional expected value, $E[SR_{\mathrm{i}} \mid X_{\mathrm{i}}]$, given in (3) yields the

i) marginal effects on the probability of being above zero,
   $\partial P(SR_{\mathrm{i}} > 0 \mid X_{\mathrm{i}})/\partial X_{\mathrm{i}}$

ii) marginal effects conditional on being above zero,

$\partial E[SR_{\mathrm{i}} \mid X_{\mathrm{i}},\ SR_{\mathrm{i}} > 0]/\partial X_{\mathrm{i}}$

which both have an interesting economic interpretation.

$$\frac{\partial E(SR_{\mathrm{i}} \mid X_{\mathrm{i}})}{\partial X_{\mathrm{i}}} = \frac{\partial P(SR_{\mathrm{i}} > 0 \mid X_{\mathrm{i}})}{\partial X_{\mathrm{i}}} \cdot E(SR_{\mathrm{i}} \mid X_{\mathrm{i}},\ SR_{\mathrm{i}} > 0) + \\ + P(SR_{\mathrm{i}} > 0 \mid X_{\mathrm{i}}) \cdot \frac{\partial E(SR_{\mathrm{i}} \mid X_{\mathrm{i}},\ SR_{\mathrm{i}} > 0)}{\partial X_{\mathrm{i}}} \tag{4}$$

For our purposes, this means that we concentrate firstly on the effect of the change in the probability of separating paid staff when a NPO would change their volunteer policy from not using volunteers to using volunteers, as given by the first product on the right hand side of (4). And secondly, we will respond to the effect of volunteer presence on separations for those NPOs that actually lay off paid staff, as given by the second product on the right hand side of (4).

5 Robustness checks

As Tobit regressions are often criticized for not being very robust to a violation of the underlying assumptions, (e.g., Angrist and Pischke 2009) we conduct several checks concerning the robustness of our results. First of all, Tobit regressions heavily require normality and homoscedasticity of the error term. Thus, we conduct a conditional moment (CM) test to control for the normality of the error term using the *tobcm* command implemented in STATA (Drukker 2002). Additionally, we also apply an LM-test to test the Tobit specification against the alternative of a model with non-linear regressors and a heteroskedastic or non-normally distributed error term. As the results for both tests (see table 2 and table 3) show problems with the assumptions of normality and homoskedasticity of the error term, we furthermore compare the Tobit estimates divided by the standard error of the regression, σ, with the probit estimates of the same regression to obtain "a rough idea of the appropriateness of the Tobit model" (Wooldridge 2010; 687).

To further check the robustness of our results and to circumvent the problems with the strong assumptions that the Tobit model places on the error term, u, we additionally estimate a linear probability model (LPM). The LPM has the advantage that although its error term is heteroskedastic by definition, it can account for the heteroskedasticity by using robust standard errors as obtained by White (1980) so that the LPM model will definitely report unbiased point

estimates. Furthermore, the parameters of the LPM can directly be interpreted as marginal effects.

Finally, to conduct a further check whether our results are robust irrespective of the choice of the functional form and the estimation method used, we will also apply a method particularly suitable for rates or fractions as dependent variables, as this is the case with the SR. One possibility of dealing with rates in the dependent variable is a beta regression framework which builds on the beta distribution. The beta distribution can handle various distributional shapes, assuming that the dependent variable can be regarded as continuous and bounded in an interval with two known endpoints. Therefore, beta regressions are very flexible concerning the problem of nonnormality in the error term or heteroskedasticity, a problem both in Tobit and LPM models. More details on the robustness checks are given in the appendix.

– Table 2 here –

– Table 3 here –

– Table 4 here –

6 Empirical results and discussion

From the regression results in table 2, it becomes apparent that the first hypothesis, H1, regarding NPOs facing increased competition, can be corroborated. Indeed, the presence of volunteers is significantly related to the separations of paid staff. Column (3) of table 2 reveals that the probability of separations for NPOs under increased competition is 24.4% higher if the NPOs can use volunteers in their operations. The LPM gives a similar result for NPOs under increased competition as it states that the probability of separations is 21.0% higher if NPOs have access to volunteers (column (1), table 4). Moreover, NPOs with volunteers are also more likely to have separations at or above the mean of the SR (column (2), table 4). Concerning those NPOs that actually lay off paid employees the Tobit regressions shows that the SR is 5.7% points higher if the NPOs make use of volunteers (column (4), table 2). This is comparable to the

result of the beta regression for NPOs with increasing competition. Column 3 in table 4 states that for a NPO with a SR of 12% (i.e. at the sample mean) the involvement of volunteers is positively correlated with a 5% points higher SR, which is an increase in the SR of more than 40% for NPOs with volunteers compared to NPOs without volunteers. The Tobit regression results for NPOs with increasing competition show that the higher SR related to volunteer involvement is attenuated by the opposite effect of a reduced SR when volunteers are engaged in main tasks. However, as the robustness checks reject the statistical significance of this effect we dismiss the significant influence of this attenuating effect. The logarithmic size is the only other variable that is positively correlated with the SR on a relevant statistical level. Further statistical significant control variables negatively associated with the SR are, as expected, the share of atypical employees, the share of employees with a length of employment of more than five years, and the work council.

The second hypothesis, H2, relating to the separations of paid staff in NPOs facing decreasing or stable competition, cannot be corroborated. Although the coefficient goes in the expected direction the volunteer presence is not statistically significant related to the SR of paid staff in those NPOs (see results table 3). The only exception are NPOs with volunteers engaged in other tasks. In that case, the SR is significantly higher, contrary to our hypothesis, even when a NPO faces a stable or decreasing competition. The LPM again delivers similar results as the Tobit regressions since it also shows no significant effect of the volunteer dummy on the SR. Concerning the further control variables, it becomes apparent that the atypical employees (only in the LPM at μ) as well as the employees with length of service of more than five years again are significantly associated with lower separations in these NPO, for reasons described in section 4. Unlike in the case for NPOs with increased competition, the expenditure variable becomes significant for NPOs facing decreasing or stable competition. Compared to decreased expenditures, increased and unchanged expenditures are negatively correlated with the SR for NPOs facing decreasing or stable competition. As previously explained, the Austrian NPO sector is "service-dominant", which implicates that the services offered are mostly labor intensive. In addition, with the non-distribution constraint of profits for NPOs, we can assume that the NPOs facing stable or declined competition are capitalizing on a friendly economic environment to reinvest money in working conditions, leading to a reduced SR.

In summary, our findings point to the existence of a conditional substitution effect. NPOs facing increased competition have a higher SR when volunteers are involved in the NPO operations. Our empirical results substantially support the hypothesis that volunteers in these NPOs may be used in order to replace paid workers. In NPOs with stable or decreased competition we find no statistically significant effect for the volunteer dummy on separations of paid employees with the exception of an increasing effect in the case of volunteers engaged in other tasks.

7 Conclusion

Volunteer work is a major labor source for NPOs. Nevertheless, comparatively little research exists concerning relations between volunteers and paid staff. In this paper, we analyzed the association of volunteer involvement on separations of paid employees in NPOs. Previous studies have either analyzed only specific sectors and/or public organizations or used individual-level data to investigate the relation between paid work and volunteer work. By contrast, in this paper we studied the volunteer presence with sector-wide data on an organizational – and thus demand – level. We also distinguished between organizations in a different competitive environment. By doing so we emphasized the importance of the economic environment when looking at the relationship between volunteers and paid employees.

The results show that volunteer presence is positively related with higher separations in NPOs facing increased competition, but has no significant relation to separations in NPOs with stable or decreased competition. We interpret our findings as indicative for a conditional substitution effect between volunteers and paid workers that has been discussed previously in the literature. This effect can lead to possible tensions between the two worker groups.

Against the backdrop of public austerity policies, the funding environment of NPOs is expected to become ever more challenging. At the same time, the political rhetoric encourages civic engagement and volunteer work. Thus, indications are that NPOs will continue, and maybe revive, their use of volunteer labor in order to sustain the level and quality of services they provide to society, especially in social care and health care. Policy makers and organizations alike should be aware of possible tensions between volunteers and paid staff when employing both worker groups. Research on the relation between both types of workers is highly relevant and should therefore continue.

However, due to the relatively small sample size, our results for the substitution of paid staff and volunteers must be interpreted with caution and should be understood as a starting point for further research on that topic. More data collection concerning this topic has to be conducted. The availability of panel data would be especially advantageous in dealing with unobserved heterogeneity, an issue that is problematic in our cross-sectional study, and that prevents us from drawing causal inferences. Additionally, with panel data the use of more refined measures of volunteer involvement, such as hours of volunteering would be possible. With cross-sectional data an hourly measure would cause a simultaneity problem between separations of paid staff and volunteering hours. Furthermore, it would be interesting if the findings of this study could be replicated for other countries and other types of welfare states. Further analysis should also try to make a distinction between voluntary and involuntary separations, an issue we could not resolve with our data. Nevertheless, this could give further insight into the effects that are driving the separations of paid employees, a topic which we can only theoretically consider in our study. Moreover, as nonprofit leaders have "to manage a double bottom line of financial results and social impact" (Worth, 2012), organizational leadership also seems to be important for the decision to employ volunteers (or not), the allocation of tasks to volunteers as well as a possible replacement process between paid staff and volunteers. In contrast, our article views the transmission of organizational decisions concerning the (non) employment of volunteers and the optimal mix of paid staff and volunteers as a black box, while it is likely that the attitudes toward these problems are shaped by different kinds of organizational leadership. However, as information concerning organizational leadership is not available to us, this question remains also open for further research.

8 Endnotes

1.) For a sample of 35 countries Salamon et al. (2003) find that the total workforce for the nonprofit sector for the years 1995-1998 is 39.5 million fulltime equivalent workers. As a consequence, the nonprofit sector employs on average 4.4% of the economically active population. In comparative figures for the investigated countries (inter alia, the USA, Japan, and Germany) this means tenfold higher employment than the utilities and textile industries and fivefold more workers than the food manufacturing industry and 20% more workers than the transportation

industry (Salamon et al. 2003; 13f.)

2.) We thank one of our anonymous referees for pointing us to this strand of literature and its relevance for the study of volunteer work.

3.) We thank two referees for their consideration that also the opposite effect might be possible. That is, paid workers might value the presence of volunteers also under increased competition because of their ability to share an even heavier per-worker workload. Unfortunately neither of both assumptions is direct testable with our rough separations measure, however the econometric evidence somewhat favors our assumption. However it could also be the case that the positive effect, mentioned by the referees, is indeed taking place but is overlaid by the other (negative) effects.

4.) See, for example Bentolila and Saint-Paul (1992) for a dynamic model concerning the influence of flexible labor contracts on employment. Boockmann and Hagen (2005) provide empirical evidence for Germany on that phenomenon.

5.) Wooldridge (2010, Ch. 17) clarifies the distinction between corner solution responses and the problem of censored data, which both make use of the Tobit model structure.

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10 Appendix

Table 1: Summary statistics of dependent and independent variables

Variables	**Variable description**	NPOs (increased competition)			NPOs (decreased/stable comp.)		
		Mean(SD)	Min	Max	Mean(SD)	Min	Max
Dependent Variable							
Separation rate (SR)	Separations in 2005 / total employment in 2005	0.120 (0.188)	0	1	0.099 (0.200)	0	1
Independent variables							
Employment related							
Volunteer dummy	Dummy variable indicating whether volunteers work in the NPO, yes=1	0.548 (0.499)	0	1	0.622 (0.486)	0	1
Managerial tasks	Dummy variable indicating whether volunteers are engaged in managerial tasks, yes=1	0.355 (0.480)	0	1	0.494 (0.501)	0	1
Main tasks	Dummy variable indicating whether volunteers are engaged in main tasks, yes=1	0.250 (0.434)	0	1	0.266 (0.443)	0	1
Administrative tasks	Dummy variable indicating whether volunteers are engaged in administrative tasks, yes=1	0.281 (0.450)	0	1	0.365 (0.482)	0	1
Other tasks	Dummy variable indicating whether volunteers are engaged in other tasks, yes=1	0.193 (0.396)	0	1	0.196 (0.397)	0	1
Employer size	Ln of total employment	2.332 (1.390)	0	8.097	1.820 (1.240)	0	7.365
Atypical employees	Ratio: Contract for services workers + independent contractors ("freie Dienstnehmer") / total employment	0.629 (2.354)	0	21.250	0.318 (1.488)	0	17.000
Long term employees	Employees with firm duration of more than 5 years / total employment	0.414 (0.303)	0	1	0.435 (0.331)	0	1
Work council	Dummy variable, yes=1	0.171 (0.377)	0	1	0.112 (0.316)	0	1
Economic environment							
Public funding	Dummy variable indicating whether a NPO obtains public funding, no=1	0.311 (0.464)	0	1	0.263 (0.441)	0	1
Increased revenues	Dummy variable, yes=1 if NPO experienced an increased revenue development over the last 5 years	0.658 (0.475)	0	1	0.577 (0.495)	0	1
Unchanged revenues	Dummy variable, yes=1 if NPO experienced an unchanged revenue development over the last 5 years	0.219 (0.415)	0	1	0.279 (0.449)	0	1
Reduced revenues	Dummy variable, yes=1 if NPO experienced a reduced revenue development over the last 5 years, reference category	0.123 (0.329)	0	1	0.144 (0.352)	0	1
Increased expenditures	Dummy variable, yes=1 if NPO experienced an increased expenditure development over the last 5 years	0.833 (0.373)	0	1	0.776 (0.418)	0	1
Unchanged expenditures	Dummy variable, yes=1 if NPO experienced an unchanged expenditure development over the last 5 years	0.110 (0.313)	0	1	0.176 (0.382)	0	1
Reduced expenditures	Dummy variable, yes=1 if NPO experienced a reduced expenditure development over the last 5 years, reference category	0.057 (0.232)	0	1	0.048 (0.214)	0	1
Industry affiliation							
Nace 80	Education, dummy variable, yes=1	0.382 (0.487)	0	1	0.417 (0.494)	0	1

Table continued on next page

Table 1: Summary statistics of dependent and independent variables

Variables	**Variable description**	NPOs (increased competition)			NPOs (decreased/stable comp.)		
		Mean(SD)	Min	Max	Mean(SD)	Min	Max
Nace 85	Health and social work, dummy variable, yes=1	0.294 (0.457)	0	1	0.202 (0.402)	0	1
Nace 91	Activities of membership organizations, dummy variable, yes=1	0.246 (0.431)	0	1	0.298 (0.458)	0	1
Nace 92	Recreational, cultural and sporting activities, dummy variable, yes=1, reference value	0.057 (0.232)	0	1	0.061 (0.240)	0	1
Dividing variable							
Competition	Dummy variable, yes=1 if NPO experienced an increase in competitors over the last 5 years	1	1	1	0	0	0
N	Sample size	228			312		

Table 2: Tobit regression for NPOs with increasing competition

	(1)	(2)	(3)	(4)
	SR*	$\partial E[SR\|X]/\partial X$	$\partial Pr[SR>0\|X]/\partial X$	$E[SR\|X,SR>0]/\partial X$
Volunteer dummy	0.168**	0.076**	0.244**	0.057**
	(0.067)	(0.031)	(0.099)	(0.023)
Managerial tasks	-0.020	-0.009	-0.030	-0.007
	(0.065)	(0.030)	(0.095)	(0.022)
Main tasks	-0.126**	-0.052*	-0.181**	-0.040**
	(0.059)	(0.027)	(0.087)	(0.020)
Administrative tasks	-0.098	-0.042	-0.143	-0.032
	(0.061)	(0.028)	(0.090)	(0.021)
Other tasks	-0.032	-0.014	-0.047	-0.011
	(0.063)	(0.029)	(0.093)	(0.022)
Employer size	0.093***	0.043***	0.137***	0.032***
	(0.021)	(0.010)	(0.031)	(0.007)
Atypical employees	-0.073***	-0.034***	-0.108***	-0.025***
	(0.022)	(0.010)	(0.032)	(0.007)
Long term employees	-0.334***	-0.154***	-0.493***	-0.114***
	(0.085)	(0.039)	(0.125)	(0.029)
Work council	-0.123*	-0.050*	-0.175*	-0.039*
	(0.064)	(0.029)	(0.094)	(0.022)
Public funding	0.047	0.022	0.069	0.016
	(0.047)	(0.021)	(0.069)	(0.016)
Increased revenues	0.014	0.006	0.020	0.005
	(0.083)	(0.038)	(0.122)	(0.028)
Unchanged revenues	-0.006	-0.003	-0.009	-0.002
	(0.088)	(0.041)	(0.130)	(0.030)
Increased expenditures	0.136	0.054	0.193	0.042
	(0.129)	(0.060)	(0.191)	(0.044)
Unchanged expenditures	0.127	0.068	0.186	0.049
	(0.140)	(0.064)	(0.206)	(0.048)
Sector affiliation	YES	YES	YES	YES
Constant	-0.196			
	(0.135)			
Observations	228	228	228	228
Pseudo R^2	0.396			
BIC	243.279			
CM Test	33.167**			
LM Test	24.812***			
Log likelihood	-70.061			

Marginal effects in columns (2), (3) and (4).

Marginal effects are evaluated at the mean for continuous variables and for discrete change of 0 to 1 for dummy variables.

Following Veall and Zimmermann (1994) we use the pseudo R^2 of McKelvey and Zavoina (1975) for Tobit regressions. Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Tobit regressions for NPOs with decreasing/stable competition

	(1)	(2)	(3)	(4)
	SR*	$\partial E[SR\|X]/\partial X$	$\partial Pr[SR>0\|X]/\partial X$	$E[SR\|X,SR>0]/\partial X$
Volunteer dummy	-0.066	-0.023	-0.065	-0.019
	(0.096)	(0.032)	(0.094)	(0.027)
Managerial tasks	0.111	0.037	0.108	0.031
	(0.083)	(0.028)	(0.081)	(0.023)
Main tasks	0.047	0.016	0.047	0.013
	(0.074)	(0.025)	(0.072)	(0.021)
Administrative tasks	-0.020	-0.007	-0.019	-0.006
	(0.070)	(0.023)	(0.068)	(0.020)
Other tasks	0.168**	0.065***	0.171**	0.051**
	(0.072)	(0.024)	(0.070)	(0.020)
Employer size	0.100***	0.033***	0.098***	0.028***
	(0.026)	(0.009)	(0.025)	(0.007)
Atypical employees	-0.015	-0.005	-0.014	-0.004
	(0.017)	(0.006)	(0.017)	(0.005)
Long term employees	-0.378***	-0.126***	-0.369***	-0.106***
	(0.092)	(0.031)	(0.090)	(0.026)
Work council	0.019	0.006	0.019	0.005
	(0.088)	(0.029)	(0.086)	(0.025)
Public funding	-0.071	-0.023	-0.068	-0.019
	(0.062)	(0.021)	(0.060)	(0.017)
Increased revenues	0.119	0.039	0.115	0.033
	(0.108)	(0.036)	(0.106)	(0.030)
Unchanged revenues	0.007	0.002	0.006	0.002
	(0.119)	(0.040)	(0.116)	(0.033)
Increased expenditures	-0.470***	-0.221***	-0.471***	-0.166***
	(0.150)	(0.050)	(0.146)	(0.042)
Unchanged expenditures	-0.390**	-0.090	-0.305*	-0.091*
	(0.168)	(0.056)	(0.164)	(0.047)
Sector affiliation	YES	YES	YES	YES
Constant	0.215			
	(0.137)			
Observations	312	312	312	312
Pseudo R^2	0.252			
BIC	388.503			
CM Test	22.832**			
LM Test	39.152***			
Log likelihood	-139.693			

Marginal effects in columns (2), (3) and (4).

Marginal effects are evaluated at the mean for continuous variables and for discrete change of 0 to 1 for dummy variables.

Following Veall and Zimmermann (1994) we use the pseudo R^2 of McKelvey and Zavoina (1975) for Tobit regressions. Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Regression results for the robustness checks

	NPOs increasing competition			NPOs decreasing/stable competition		
	(1)	(2)	(3)	(4)	(5)	(6)
	LPM at 0	LPM at μ	Beta Reg.	LPM at 0	LPM at μ	Beta Reg.
Volunteer dummy	0.210**	0.221**	0.050*	-0.023	-0.053	-0.018
	(0.083)	(0.099)	(0.025)	(0.085)	(0.087)	(0.032)
Managerial tasks	-0.040	-0.045	-0.017	0.123	0.064	0.024
	(0.084)	(0.091)	(0.023)	(0.075)	(0.075)	(0.027)
Main tasks	-0.062	-0.055	-0.016	-0.002	0.029	0.005
	(0.077)	(0.083)	(0.021)	(0.067)	(0.069)	(0.024)
Administrative tasks	-0.078	-0.042	-0.024	-0.027	0.021	0.001
	(0.081)	(0.086)	(0.021)	(0.063)	(0.066)	(0.023)
Other tasks	-0.008	-0.046	-0.005	0.124*	0.122*	0.043
	(0.073)	(0.081)	(0.022)	(0.068)	(0.067)	(0.027)
Employer size	0.194***	0.124***	0.033***	0.199***	0.072***	0.023***
	(0.025)	(0.027)	(0.008)	(0.022)	(0.025)	(0.009)
Atypical employees	-0.067***	-0.058***	-0.014***	-0.015	-0.029***	-0.004
	(0.011)	(0.012)	(0.004)	(0.020)	(0.009)	(0.006)
Long term employees	-0.333***	-0.319***	-0.085***	-0.228***	-0.201***	-0.050*
	(0.094)	(0.096)	(0.029)	(0.067)	(0.065)	(0.026)
Work council	-0.068	-0.155	-0.031	0.047	0.093	0.016
	(0.078)	(0.096)	(0.021)	(0.083)	(0.091)	(0.032)
Public funding	0.001	0.060	0.009	-0.017	0.002	-0.010
	(0.059)	(0.066)	(0.017)	(0.053)	(0.054)	(0.018)
Increased revenues	0.032	0.002	0.003	0.026	0.026	0.017
	(0.102)	(0.099)	(0.028)	(0.081)	(0.077)	(0.029)
Unchanged revenues	0.031	-0.041	-0.005	-0.033	0.010	-0.006
	(0.120)	(0.117)	(0.031)	(0.089)	(0.084)	(0.032)
Increased expenditures	0.155	0.101	0.012	-0.275*	-0.375**	-0.109*
	(0.119)	(0.120)	(0.037)	(0.157)	(0.150)	(0.065)
Unchanged expenditures	0.158	0.152	0.012	-0.259	-0.342**	-0.071*
	(0.160)	(0.159)	(0.048)	(0.172)	(0.164)	(0.041)
Sector affiliation	YES	YES	YES	YES	YES	YES
Constant	0.034	0.106	-2.396***	0.338**	0.554***	-1.278
	(0.122)	(0.126)	(0.380)	(0.158)	(0.154)	(0.379)
Observations	228	228	228	312	312	312
BIC			-687.402			-1236.541
Log likelihood			395.280			672.829
R-squared	0.378	0.206		0.305	0.118	

Marginal effects for beta regressions; Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Tobit/σ – probit coefficient comparison

	Increased competition		Decreased competition	
	(1)	(2)	(3)	(4)
	Tobit/σ	Probit	Tobit/σ	Probit
Volunteer dummy	0.625**	0.881**	-0.177	-0.223
Managerial tasks	-0.078	-0.334	0.298	0.520*
Main tasks	-0.468**	-0.082	0.126	0.100
Administrative tasks	-0.364	-0.288	-0.054	-0.113
Other tasks	-0.119	-0.083	0.450**	0.590**
Employer size	0.346***	0.883***	0.268***	0.852***
Atypical employees	-0.271***	-0.349***	-0.040	-0.081
Long term employees	-1.242***	-1.447***	-1.013***	-1.110***
Work council	-0.457*	-0.331	0.051	0.186
Public funding	0.175	0.107	-0.190	-0.140
Increased revenues	0.052	0.026	0.319	0.164
Unchanged revenues	-0.026	0.048	0.019	-0.065
Increased expenditures	0.506	0.748	-1.260***	-1.140**
Unchanged expenditures	0.472	0.785	-1.046**	-1.117**
Industry affiliation	YES	YES	YES	YES
Constant	-0.196	-1.932***	0.215	-0.912
Observations	228	228	312	312

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Summary statistics all NPOs

	Mean	sd	Min	Max
Separations Rate	0.108	0.195	0.000	1.000
Volunteer dummy	0.591	0.492	0.000	1.000
Mangerial tasks	0.435	0.496	0.000	1.000
Main tasks	0.259	0.439	0.000	1.000
Administrative tasks	0.330	0.471	0.000	1.000
Other tasks	0.194	0.396	0.000	1.000
Employer size	2.036	1.329	0.000	8.097
Atypical employees	0.449	1.907	0.000	21.250
Long term employees	0.426	0.319	0.000	1.000
Work council	0.137	0.344	0.000	1.000
Public funding	0.283	0.451	0.000	1.000
Increased revenues	0.611	0.488	0.000	1.000
Unchanged revenues	0.254	0.436	0.000	1.000
Reduced revenues	0.135	0.342	0.000	1.000
Increased expenditures	0.800	0.400	0.000	1.000
Unchanged expenditures	0.148	0.356	0.000	1.000
Reduced expenditures	0.052	0.222	0.000	1.000
Education	0.402	0.491	0.000	1.000
Health and social work	0.241	0.428	0.000	1.000
Activities of membership organizations	0.276	0.447	0.000	1.000
Recreational, cultural and sporting activities	0.059	0.236	0.000	1.000
Observations	540			

Robustness checks

To compare the Tobit estimates divided by the standard error of the regression, σ, with the probit estimates of the same regression, we design a binary dependent variable with the following property:

$$SR_{\mathrm{i}} = \begin{cases} 1 & if\ SR_i > 0 \\ 0 & if\ SR_i = 0 \end{cases} \tag{5}$$

This comparison reveals that the coefficients of both models are relatively similar and that there are no significant sign changes between the Tobit/σ model and the probit model. Therefore, we conclude that the econometric specification is roughly appropriate and thus classify our results as credible even if the CM and LM tests reject the requirements for a properly specified Tobit error term. The results of the comparison can be found below in table 5.

For the LPM we use on the one hand the SR as constructed in (5) and on the other hand convert the SR additionally into a binary variable with the following property:

$$SR_{\mathrm{i}} = \begin{cases} 1 & if\ SR_i \geq \mu(SR) \\ 0 & if\ SR_i < \mu(SR) \end{cases} \tag{6}$$

at which μ is the mean of SR. Hence, we estimate the influence of the volunteer presence of receiving a SR at/above or below the mean value of the SR. This is done again separately for NPOs under increased competition and those with decreasing or stable competition. The results of the Tobit models for NPOs facing increased competition can be found in table 2, the results of the Tobit models for NPOs with decreased or unchanged competition are given in table 3. The results of the LPM for both types of NPOs are given in table 4.

The beta density with the shape parameters p and q is given by:

$$\pi(y; p, q) = \frac{\Gamma(p+q)}{\Gamma(p)\Gamma(q)} y^{p-1}(1-y)^{q-1} \tag{7}$$

with 0<y<1, p, q > 0, and $\Gamma(\cdot)$ denoting the gamma function. As the shape parameters are difficult to interpret with regard to conditional expectations in a regression framework, an alternative parametrization of the beta regression was independently proposed by Paolino

(2001), Ferrari and Cribari-Neto (2004) and Smithson and Verkuilen (2006). To achieve a "regression friendly" version of the beta distribution in (7) these authors reparameterize the shape parameters p and q into location and dispersion (or precision) parameters. For this purpose, they let $p = \mu\phi$ and $q = (1-\mu)\phi$. Then the beta density in (7) can be rewritten as:

$$f(y;\mu,\phi) = \frac{\Gamma(\phi)}{\Gamma(\mu\phi)\Gamma((1-\mu)\phi)} y^{\mu\phi-1}(1-y)^{(1-\mu)\phi-1} \tag{8}$$

with 0<y<1 and $\phi > 0$. The dependent variable y is now $y \sim B(\mu,\phi)$ and $E(y) = \mu$ with $var(y) = \frac{\mu(1-\mu)}{1+\phi}$. If Y is a random variable with $y_i \sim B(\mu_i,\phi)$ and $i = 1,...,n$ the beta regression model is

$$g(\mu_i) = x_i\beta \tag{9}$$

where β is a vector of regression parameters and x_i is the vector of covariates. Using a logit link function for $g(\cdot)$ it is assured that the dependent variable lies in the unit interval and equation (9) becomes, $ln(\frac{\mu}{1-\mu}) = x_i\beta$, which is estimated in our application.[5] To shift the observations at the margins 0 and 1 into the unit interval we use the transformation $y' = [y(N-1)+0.5]/N$ as proposed by Smithson and Verkuilen (2006). Results for the beta regression can be found in table 4 and a discussion of all results follows in section 6. 5.) For a detailed discussion of the beta regression we refer to the cited authors. To conduct the beta regressions in STATA we use the module *betafit* written by Buis et al. (2012).