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organizations: Do volunteers, donations
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Wage dispersion in non-profit organizations: Do volunteers, donations and public subsidies have an impact?ⁱ

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Summary

Existing research in labor economics has rarely accounted for non-profit status in examining wage dispersion. Contrariwise, in non-profit sector research, little has been said so far about (intra-organizational) wage dispersion. Scattered findings from previous work indicate that wage dispersion is smaller in non-profit organizations (NPOs) as compared to for-profits (FPOs). Fairness perceptions and high moral ideals of workers within this sector are often cited as reasons for this assumption. Empirically, however, the reasons for inter-sectoral differences remain obscure. In our analysis, we concentrate on specific characteristics of NPOs as compared to FPOs. More specifically, this paper is to address the question if volunteer workers, donations and public subsidies influence the within-firm wage dispersion in NPOs. In order to answer this research question we use Austrian matched employer-employee data collected in 2006. We estimate an instrument variable regression and find that NPOs that employ volunteer workers and NPOs with a more even mix between paid and unpaid staff display smaller wage dispersion. Donations and public subsidies augment the wage dispersion.

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1. Introduction

Little is known about wage determination and the wage structure in non-profit organizations (NPOs). As non-profit organizations face growing competition from for-profit firms, research in this area has mainly compared the wage levels in the non-profit sector with pay levels in the for-profit sector (see e.g. Leete 2001; Ruhm and Borkoski 2003; Mocan and Tekin 2003; Noguchi and Shimizutani 2007). By contrast, the aim of this paper is to analyze wage dispersion within NPOs.

In a study done in the United States using 1990 data, Leete found that the wage dispersion within NPOs is more compressed than within for-profit organizations. She argues that NPOs rely heavily on their employees' intrinsic motivation and identification with the organizational mission in order to achieve their goals. Therefore, NPOs try to strengthen intrinsic motivation, adherence to group norms and organizational pride partly through wage equity (Leete 2000, p.428).

Against this backdrop, our study is the first one concerned with the determinants of the wage dispersion *within* an NPO. How do organizations differ within the non-profit sector? In our analysis, we especially concentrate on the idiosyncrasies of NPOs as compared to for-profit organizations. More specifically, when estimating the intra-firm wage dispersion for NPOs we do not only account for factors considered in previous studies for other industries such as the qualification, profession, work experience, tenure, age of workers and sector but also include volunteers, donations and public subsidies as influencing factors. Hence, this paper is to address the question if volunteer workers, donations and public subsidies influence the within-firm wage dispersion in non-profit organizations.

Our empirical analysis is based on Austrian matched employer-employee data collected in 2006 – a unique data set based on a large scale survey of Austrian NPOs with at least one paid employee, on the one hand, and individual data of all paid employees in these NPOs from the tax income statistics, on the other hand. Instrument variable regression technique is used in the analysis.

2. Existing research

The theoretical literature provides two competing hypotheses on wage dispersion and its impact on employees. The fair-wage hypothesis states that employees are more productive and motivated if the wage dispersion is relatively small and employees perceive the wages that are paid in the organization as fair (Akerlof and Yellen 1990; Levine 1991; Frank 1984). A contradictory line of reasoning is the tournament theory which states that a higher wage dispersion leads to more competition among employees and thus more productive employees (Lazear and Rosen 1981).

Machin and Manning (2004) analyzed the wage dispersion of employees in nursing homes without specifying if these organizations are non-profit, public or for-profit nursing homes, and found a low wage dispersion in this sector. They also explain that employees have a preference for equal wages.

Two other studies tested the fair-wage hypothesis and the tournament theory among university faculty (Pfeffer and Langton 1993) and baseball teams (Depken 2000). Both studies found that a more equal wage dispersion leads to higher productivity, better team work and elevated job satisfaction.

Thus far, there has been very little research concerning the wage dispersion in NPOs. Leete (2000) compared the wage dispersion in non-profits and for-profits and, without explicitly stating or testing it, assumes that the fair-wage hypothesis prevails in non-profits. She found lower wage dispersion in the non-profit sector as compared to the for-profit sector. Another strand of literature compares the wage level of managers in the non-profit and the for-profit sectors (Roomkin and Weisbrod 1999; Ballou and Weisbrod 2003; Frumkin and Keating 2001; Hallock 2002; Oster 1998). This research is especially interesting for the analysis of wage dispersion because higher wages for managers influence the within-firm dispersion decisively. The studies point out that managerial pay is generally lower and less often performance-related in the non-profit sector (Ballou and Weisbrod 2003, Frumkin and Keating 2001, Roomkin and Weisbrod 1999).

Thus, the existing research points out that wage dispersion is lower in the non-profit sector than in the for-profit sector. One possible reason for this finding is that for NPOs equal wages are particularly important to sustain employees' intrinsic motivation and hence productivity. In non-profit relevant fields of activity the fair-wage hypothesis, which states that more equal wages lead to a higher productivity among employees, seems to be more applicable than the tournament theory. One specific reason for the lower wage dispersion in the non-profit sector could be lower pay levels for managers in NPOs.

We do not know, however, if this holds true for all non-profits or if there are differentiating characteristics at the organizational level that influence the wage dispersion within and across non-profit organizations. In this article, we test, if donations, public subsidies and volunteers have an influence on the intra-organizational wage dispersion. In the following section we present several arguments why these three characteristics of non-profit organizations could influence their wage dispersion, before testing their impact empirically.

3. Volunteers, donations and public subsidies and their possible influence on the wage dispersion in NPOs

Volunteers are often involved in the production of collective-type goods such as health and education and are particularly important for non-profit suppliers of these goods (Menchik and Weisbrod 1987, p. 159; Steinberg 2003, p. 289). Volunteers frequently work in NPOs alongside paid employees. The relationship between paid staff and volunteers is complex, since volunteers' roles are diverse and not necessarily distinctive from paid workers' roles (Handy, Mook and Quarter 2008, Netting, O'Connor, Thomas and Yancey 2005, p. 192).

From an economic perspective, volunteers can be regarded as either complements or substitutes to paid labor (Emanuele 1996). Where volunteers substitute for paid workers completely, entire wage segments may drop out of the wage distribution. If they perform tasks at the upper end, (e.g. managerial tasks) or at the lower end, the wage dispersion would be smaller compared to organizations without volunteers. Wages could be more or less evenly distributed across the remaining wage segments. We expect that in the case of 'lower end' or 'upper end substitution', volunteers indicate a flat hierarchy in the organization and are more likely to smooth the distribution of wages. However, if the existence of volunteers thins out wage segments in the middle of the wage distribution, a bimodal shape of the distribution could emerge, which tends to increase measured and perceived wage inequality. Thus the actual division of labor between paid and volunteer workers might be more relevant in explaining a difference in wage dispersion than the sheer number of volunteers.

The utilization of volunteers could also be indicative of an organizations' mission. The very existence of volunteers within an organization as well as their number might be an indicator of the high degree of social desirability of the organization's mission and thus of a high intrinsic motivation of the paid employees. If volunteering is 'all in good cause' this necessarily implies that volunteers commit themselves to organizations whose mission they hold to be socially desirable. In this type of organization, employees may display very high levels of intrinsic motivation which in turn means that equal pay is of particular importance for maintaining employees' motivation (Leete 2000).

Donations and public subsidies provide needed financial resources and soften budget constraints¹. They could significantly affect the wage dispersion permitting wage variation within an organization, depending on the extent of rent-sharing² practiced by its management. On the other hand higher dependence on donations and public subsidies may indicate high levels of public scrutiny. An unequal wage distribution might jeopardize the legitimacy of an NPO and adversely affect donations. High wages to managers play a vital role in the public perception of an NPO and might be especially important in the decision making process of donors. Against this backdrop, we would expect a smooth and relatively even distribution of wages in organizations that attract donations. In a similar vein, one could assume that public subsidies usually imply a moderating influence of public authorities on the wage distribution of NPO. As an example, cost reimbursement schemes could tie in with compensation systems in the public sector. In this case, NPOs would not be completely free in their wage setting process and possibly, their wage dispersion would be lower because of public sector influence.

¹. For a discussion of how government subsidies soften budget constraints and to what effect see e.g. Kornai (1986; 1998).

². For an explanation of rent-sharing in a nonprofit specific context see e.g. Borjas et al (1983) and Preston (1988).

Summing up all arguments we assume the wage dispersion to be lower in organizations with volunteers as compared to organizations without volunteers if volunteers substitute for paid managers or for employees at the bottom of the wage distribution. A small countervailing effect may occur when volunteers substituting for paid workers soften budgetary pressures and increase the leeway for wage variation through rent-sharing. If voluntary work is entirely complementary to the work of paid staff, there is less reason why volunteering should affect the wage distribution. Higher income from donations and public subsidies could either lead to higher or lower wage dispersion, depending on the relative effect of (a) relaxing budget constraints in wage setting and (b) public scrutiny and control.

4. Model

In order to test the influence of volunteers, donations and public subsidies on the wage dispersion in non-profit organizations, we propose the following model:

$$disp_j = \alpha + X_j\beta + Y_j\gamma + \varepsilon_j \quad (1)$$

In the equation $disp_j$ represents the intra-firm wage dispersion of a NPO. X_j is a vector of variables that describes the most important worker characteristics of organization j , such as the age dispersion of the paid employees. Y_j is a vector of variables that represent characteristics of the non-profit organization j . This includes information on volunteers within the organization, its funding structure, activity sector or size (see the section on variables below for details). ε_i denotes the error term.

In estimating the wage dispersion we follow the approach of Canal Dominguez and Rodriguez Gutierrez (2004, p. 488) who use the log of the standard deviation of wages and add the average wage level on the right-hand side of the equation. The reason for doing so is that they assume the

coefficient of variation $\frac{\sqrt{V_j}}{\bar{w}_j}$ to be the best statistical dispersion measure, because the dispersion is

independent from the wage level of an organization. However, if you use the logarithm of the

coefficient of variation $\log\left(\frac{\sqrt{V_j}}{\bar{w}_j}\right) = \log\sqrt{V_j} - \log\bar{w}_j$ follows. Consequently, the authors add the

logarithm of the average wage on the right-hand side of the equation (Canal Dominguez and Rodriguez Gutierrez 2004). However, this approach does not equal the coefficient of variation exactly.

Following this approach we rewrite the equation as (Canal Dominguez and Rodriguez Gutierrez 2004):

$$disp_j = \alpha + X_j\beta + Y_j\gamma + \log \overline{w}_j\delta + \varepsilon_j \quad (2)$$

On the one hand, the addition of the average wage level of the organization to the equation can be explained statistically, because, as we just showed, it forms part of the coefficient of variation. On the other hand, Kahn and Curme (1987) argue, that the average wage is a proxy for the human capital in the organization (Kahn and Curme 1987, p. 603). Therefore, adding the log of the average wage also accounts for a possible effect of the wage level on the wage dispersion.

However, the use of the average wage level as a control variable could lead to an endogeneity problem which can be solved by using instrument variable (IV) regression. It remains unclear, if the average wage of an organization influences the wage dispersion or the other way round. We therefore instrument the average wage by the following regression:

$$\log W_{ij} = \alpha + K_{ij}\beta + L_j\gamma + \varepsilon_{ij} \quad (3)$$

$\log W_{ij}$ is the log of the daily wage before tax, K_{ij} is a vector that contains variables on the individual level, L_j is a vector that contains organizational level variables and is the same for all individuals working within one and the same organization.

More specifically, K_{ij} includes age, age squared, sex, a blue-collar/white-collar dummy, and two dummies indicating two specific Austrian contract types as well as a full-time/part-time dummy. L_j comprises a dummy variable whether the organization has volunteers, the number of volunteers per paid full-time equivalent, donations per paid full-time equivalent and subsidies per full-time equivalent as well as 9 region dummies, 32 sector dummies on a 6-digit level, two collective agreement dummies, log full-time equivalents and three variables containing information about the staff composition within an organization such as part-time workers, marginal workers and women per full-time equivalent. Donations, subsidies, the number of employees as well as the variables part-time workers, marginal workers and women are all divided by the number of full-time equivalents in order to take out the size effect in these variables. There are two collective agreement dummies, one that states if an organization does not pay according to a collective agreement, but orientates itself on an existing collective agreement. A second dummy is included if an organization has no collective agreement. Organizations having one or more collective agreements form the reference category. Contrary to the vector Y in equation (2) L_j includes more detailed sector information, as well as region dummies. The donations and subsidies variables are divided by full-time equivalents and not by total income.

We then estimate the following equation:

$$disp_j = \alpha + X_j\beta + Y_j\gamma + \log \overline{\hat{w}_j} \delta^{IV} + \varepsilon_j \quad (4)$$

5. Data and Measures

We use a unique matched employer-employee data set for Austria. Matched employer-employee datasets contain information on employees and employers and have the advantage of allowing us to test factors influencing wages on both the supply and on the demand side. To date, in the non-profit sector matched employer-employee data have been used only for the analysis of wages in certain industries, such as the child care sector (Mocan and Tekin 2003).

We gathered the employer information in a postal survey that was sent out in 2006 to all Austrian non-profit organizations with at least one employee. In total 5,104 organizations³ were contacted, and 947 questionnaires were returned, representing a response rate of 18.55 per cent. We have information for diverse industries that are relevant to the non-profit world, but the postal survey was not sent to schools. The questionnaire, while touching on a variety of issues, placed particular emphasis on employment, income, expenditure and organizational activities.

The employee data used in this analysis are for the year 2005 and are taken from the Austrian tax statistics. More specifically, we use pay slip information on employees working in non-profit organizations. The individual-level data provide information on income, sex, age, length of employment, working hours and whether the person was a blue-collar or white collar worker. The individual data were aggregated on an organizational level, for this we calculated means and standard deviations per organization. We excluded all organizations with only one or two paid employees.

Using the numerical identifier for the employer, organizational-level data were merged with the employee records⁴. The data used for this analysis refer to 317⁵ non-profit organizations that were covered by our organizational study. We excluded all organizations with only one or two paid employees from the analysis.

³ Also including for-profit and public kindergartens as well as elderly care homes which serve as a control group.

⁴ The data in this article are cited as 'Matched NPO-tax data 2006' ('Matched NPO-tax data 2006: NPO postal survey by STATISTIK AUSTRIA & Wirtschaftsuniversität Wien and Statistik der Lohnsteuer (Income tax statistics) by STATISTIK AUSTRIA " 2006)

⁵ The differential to the 947 returned questionnaires results from the omission of the organizations in the control group as well as organizations that not fill out the financial information in the questionnaire and organizations with only one or two paid employees.

Wage dispersion within an organization ($disp_j$) can be measured in various ways. In the existing empirical research many different measures have been used so far, each measure with different pros and cons (Canal Dominguez and Rodriguez Gutierrez 2004: p. 488). Freeman (1980), Dell'Aringa and Lucifora (1994) and Bechtel, Heinbach, Strotmann (2005) use the standard deviation of log wages, Freeman (1982: 9) as well as James and Morlock (1987, p. 971) use the variance of log wages. Pfeffer and Davis-Blake (1990, p. 44) use the coefficient of variation. Interestingly, the authors say little of why they chose the dispersion measure and hardly discuss if or how their results would change if they used a different measure. We therefore apply several measures and present results for estimation using these alternative measures in the appendix.

As an income variable, we use the yearly total labor income before tax divided by the days of employment within the organization (max. 365 days). All full-time workers earning less than €20 per day and all part-time workers with less than €5 daily income were excluded from the data set for plausibility reasons. Unfortunately the data only contain a dummy variable if a person works full-time or part-time and not the exact working hours per week. Consequently, the part-time workers form a very heterogeneous group since an individual in this group could work as little as one hour per week or as much as 34 hours per week.

As previously mentioned, the average wage is included as an exogenous variable by using the logarithm of the mean wage per organization. We expect the coefficient to have a positive sign. One reason is given by Kahn und Curme (1987). They argue that the mean wage can be seen as a proxy for human capital in a firm. Firms with a high average wage employ on average higher qualified personnel. Lazear and Shaw (2007) argue that firms that pay a high mean wage are expected to have a higher wage dispersion for reasons of complementarity. They illustrate their point with the following example: A law firm also needs cleaning personnel, but a cleaning firm does not necessarily need a lawyer. Another argument is of statistical nature: The wage dispersion is right-skewed in most cases meaning that wages are limited at the lower end of the distribution because of minimum wage legislation or collective agreements but have a less strict limitation at the upper end of the distribution. Consequently, firms with a high average wage have more possibilities to vary their wages as opposed to firms with a low average wage.

To describe worker characteristics of an organization we focus on the employees' age dispersion, the distribution of men and women and of blue-collar and white collar workers, as well as of full-time and part-time employees. These variables are also used to control for differences in human capital. Of course, it would be desirable to have further information on the education, the exact jobs and responsibilities or the employment duration. Unfortunately, in the data we use, no such information is available. The information of each individual is used in an aggregated form on the organizational level.

In order to measure the distribution or dispersion of these variables we use the standard deviation per organization which we compute from individual-level data. Other empirical studies use percentages or average values in order to describe the composition of the workforce of an organization (see for example Bechtel, et al. 2005, Canal Dominguez and Rodriguez Gutierrez 2004, Pfeffer and Davis-Blake 1990). By taking percentages and by presuming a linear relation between this variable and the wage dispersion one would assume that wage dispersion is highest if either 100% men or 100% women work in an organization, which we think is not correct. We illustrate our point by a sample data set where we have seven organizations. In organization 1 there are only men working, in organization 7 we have only female employees, in the organizations 2 to 6 we have an increasing female staffing. Next, assume a wage of 10 monetary units for men, and 8 for women.

Table 1: Sample data set

Org. 1	Org. 2	Org. 3	Org. 4	Org. 5	Org. 6	Org. 7
0	1	1	1	1	1	1
0	0	1	1	1	1	1
0	0	0	1	1	1	1
0	0	0	0	1	1	1
0	0	0	0	0	1	1
0	0	0	0	0	0	1
Standard deviation of gender						
0.0000	0.4082	0.5164	0.5477	0.5164	0.4082	0.0000
percentage women						
0.0000	0.1667	0.3333	0.5000	0.6667	0.8333	1.0000
standard deviation of wage						
0.0000	0.8165	1.0328	1.0954	1.0328	0.8165	0.0000
1=woman, 0=man; Source: own example						

Wage dispersion would be highest when the employees are 50 per cent male and 50 per cent female if we assume that men are paid more than women, as is still often the case. Therefore, we use the standard deviation in order to model a linear relationship between wage dispersion and the distribution of men and women.

We assume the same for the remaining variables describing the composition of the work force of the organization. We expect the sign of the coefficients of the standard deviation of age, gender, blue-collar/white-collar and full-time/part-time to be positive. Wage dispersion rises with increasing standard deviation of these variables.

As variables accounting for the specific characteristics of non-profit organizations first and foremost we want to include information about the volunteers and the income structure of an organization.

For measuring volunteer activity within an NPO we have various possibilities. We could include a volunteer dummy, the number of volunteers per paid full-time equivalent or the standard deviation of volunteers and paid full-time equivalents. The first measure would simply differentiate between organizations with or without volunteer participation (model 1). The second one would measure if the relation between volunteers and paid staff mattered and by taking this measure we assume that more volunteers per paid staff lower the dispersion (model 2). The latter measure – the standard deviation - also describes the volunteer/paid staff mix. In contrast to the number of volunteers per full-time equivalent we assume here that dispersion should be lowest when the mix is even (model 3). We estimate three different models with these three measures.

We expect the existence of volunteers to have a negative influence on the wage dispersion for the reasons mentioned previously. By taking two different measures for the number of volunteers we test two different hypotheses. If we expect the number of volunteers per paid full-time equivalent to have a negative influence, we assume that *more* volunteers compared to paid staff lead to a lower wage dispersion. If we use the standard deviation of volunteers and paid staff and postulate a negative influence of this variable on the wage dispersion, we expect that the wage dispersion is lowest in an organization with 50% volunteers and 50% paid employees.

We also include information about the income structure of the organization: the share of donations and income from sponsoring in total income, the share of public subsidies and the share of income from contracts with public authorities in total income. The donations and subsidies variables are divided by full-time equivalents and not by total income. The effect of donations and public subsidies remains ambiguous since we found reasons why they either might positively or negatively influence the wage dispersion. The same is true for the variable 'share of income of contracts with public authorities'.

The activity of the NPO is captured by using dummy variables for the Austrian NACE classification on a two-digit level in order to have enough cases by category. Health and social service serve as our reference group since this is the most important activity category in our dataset. The expected signs of the coefficients of the NACE dummies remain unclear.

In addition, we add two collective agreement dummies, one that states if an organization does not pay according to a collective agreement, but orientates itself on an existing collective agreement. A second dummy indicates whether an organization has no collective agreement. Organizations having one or more collective agreements form the reference category.

We add these two variables because it has often been shown that organizations with collective agreements have a lower wage dispersion (see e.g. Bechtel, et al. 2005; Canal Dominguez and Rodriguez Gutierrez 2004; Dell'Aringa and Lucifora 1994; Gerlach and Stephan 2005; Gerlach and Stephan 2006a; Gosling and Machin 1995; Metcalf, Hansen and Charlwood 2000; Rodriguez Gutierrez 2001).

We also add the log of paid full-time equivalents. This serves as a measure for the size of the organization. We expect bigger organizations to have a higher wage dispersion as has been shown by other authors for the for-profit sector (Lallemand and Rycx 2006; Davis and Haltiwanger 1995; Haltiwanger and Davis 1996).

Table 2 shows frequencies, means, standard deviations as well as minima and maxima for all variables used in the regression. Table 3 summarizes all of the variables used in the regression as well as the expected sign of the coefficients. Before turning to the estimation results, we would like to highlight some descriptive statistics for the non-profits in our study sample: More than half of the organizations – 59% – employ volunteer workers. Public subsidies are the most important of the income variables. On average, 28% of total income is reported to stem from public subsidies, while 23% comes from public contracts, 6% and 2% come from donations. Most frequently, organizations are active in the fields of health, veterinary or social services followed by other public or personal services including advocacy groups and small associations. Other activity categories are ‘accommodation and housing’, ‘research and development’, ‘education’ and ‘culture, sports and entertainment’. Concerning the question if an organization has a collective agreement a good third of the organizations report to have an agreement, while the other two thirds have either no collective agreement or take a wage scheme for orientation.

For the estimation we exclude cases with missing values.

Table 2: Descriptive Statistics of Variables in the Analysis

Variable	Frequ.	Mean	Standard dev.	Min.	Max.
standard dev. daily wage	317	27.38836	14.17316	0	129.31
standard dev. log. daily wage	317	0.5930576	0.2735449	0	1.5049
Composition of work force					
standard deviation age	317	9.225576	3.055856	0.57735	18.932
standard deviation sex	317	0.3530674	0.2069892	0	0.5774
standard deviation full-time/part-time	317	0.3173242	0.2165478	0	0.5774
standard deviation blue-collar/white-collar	317	0.1984962	0.2172647	0	0.5774
Contributions to the NPO					
volunteer dummy	316	0.5917722	0.4922853	0	1
number of volunteers/FTE	305	39.55685	589.4737	0	10286
standard deviation volunteers	281	0.2147071	0.2041267	0	0.5
donations and sponsoring/total income	265	0.0872951	0.2131505	0	1
public subsidies/total income	265	0.2767385	0.3540013	0	1
Other organisational variables					
income from contracts with public authorities/total income	265	0.2300273	0.3345355	0	1
NACE 55	317	0.0252366	0.1570909	0	1
NACE 73	317	0.0347003	0.183309	0	1
NACE 80	317	0.0567823	0.2317921	0	1
NACE 85	317	0.4321767	0.4961618	0	1
NACE 91	317	0.3690852	0.48332	0	1
NACE 92	317	0.0820189	0.2748274	0	1
average wage level	317	3.86886	0.4715189	1.78167	4.8449
average estimated wage level	317	3.709604	0.5058124	1.78141	4.7675
no collective agreement, but orientation	286	0.3286713	0.4705536	0	1
no collective agreement, no orientation	286	0.2867133	0.4530192	0	1
log. FTE	317	2.410739	1.591237	-1.3863	8.7717

Source: Matched NPO-tax data 2006, own calculations

Table 3: Description of independent variables and expected signs of the coefficient

dependent variable: within-firm wage dispersion		exp. sign of the coeff.
standard deviation age	standard deviation of the age of the employees in a NPO	+
standard deviation sex	standard deviation of the sex of the employees in a NPO	+
standard deviation full-time/part-time	standard deviation of full-time and part-time workers in a NPO	+
standard deviation blue-collar/white-collar	standard deviation of blue-collar and white-collar workers in a NPO	+
volunteer dummy	dummy variable, 1 if NPO has volunteers, otherwise 0	-
number of volunteers/FTE	number of volunteers per paid full-time equivalent	-
standard deviation volunteers	standard deviation of volunteers and paid staff in a NPO	-
donations and sponsoring/total income	share of income of donations and sponsoring in total income	+ / -
public subsidies/total income	share of income of public subsidies in total income	+ / -
income from contracts with public authorities/total income	share of income from contracts with public authorities in total income	+ / -
NACE 55	dummy variable, 1 if organisation is active in accommodation, otherwise 0, reference group: health, veterinary and social services	/
NACE 73	dummy variable, 1 if organisation is active in research and development, otherwise 0, reference group: health, veterinary and social services	/
NACE 80	dummy variable, 1 if organisation is active in education, otherwise 0, reference group: health, veterinary and social services	/
NACE 91	dummy variable, 1 if organisation is active in other public and personal services, otherwise 0, reference group: health, veterinary and social services	/
NACE 92	dummy variable, 1 if organisation is active in culture, sports and entertainment, otherwise 0, reference group: health, veterinary and social services	/
average wage level	(estimated) mean log. wage level of the organisation	+
no collective agreement, but orientation	dummy variable, 1 if organisation has no collective agreement, but uses one for orientation in their pay scheme, otherwise 0, reference group: organisation has collective agreement	+
no collective agreement, no orientation	dummy variable, 1 if organisation has no collective agreement, otherwise 0, reference group: organisation has collective agreement	+
log. FTE	log. paid full-time equivalents in an NPO	+

6. Results

Tables 4 and 5 show the results of three different models all estimated in a 'long' and 'short' version. Model 1 includes a voluntary dummy, model 2 the number of volunteers per full-time equivalent and model 3 the standard deviation of volunteers and paid staff. The shorter model includes only the most important organizational control variables and excludes mainly the statistically insignificant variables from the longer models. This was done in order to check how robust the results are. Comparing the results from the 'long' and 'short' models we detect that the results do not differ dramatically. All coefficients show the same algebraic sign, the statistical significance differs for some variables. Looking at the adjusted R^2 values we see that the additional organizational variables have hardly any explanatory value. Model 3 has the highest adjusted R^2 value.

The coefficient for the volunteer dummy is, as expected, negative. Organizations that employ volunteer workers have an approx. 10% lower wage dispersion compared to organizations without volunteers. While the results for the number of volunteers per full-time equivalent are not significant, the standard deviation exhibits a statistically significant negative result. This tells us, that wage dispersion does not decrease as the number of volunteers goes up but rather the mix between paid and unpaid workers is relevant.

A high proportion of donations of the total income raises the wage dispersion. By augmenting the share of donations on the total income by 1 percentage point, the standard deviation of the log daily wage raises between 0.17 (model 2, 'long') and 0.29 (model 3, 'short'). Similarly, higher subsidies cause a higher wage dispersion. If the share of subsidies is increased by 1 percentage point, the wage dispersion raises by 0.11 (model 1, 'long') or 0.19 (model 3, 'short'). Organizations that have a comparatively high part of their income from donations have a higher wage dispersion, the same is true for public subsidies, although the coefficient is much smaller than the one of the donations variable.

Table 4: IV regression results, part 1

Variables	model 1, "long"		model 2, "long"		model 3, "long"	
	coeff.	standard err.	coeff.	standard err.	coeff.	standard err.
	N=246		N=239		N=221	
standard deviation age	0.0060	0.0058	0.0033	0.0061	0.0042	0.0059
standard deviation sex	-0.1171	0.0854	-0.1200	0.0885	-0.0948	0.0885
standard deviation full-time/part-time	0.3989***	0.0817	0.4003***	0.0844	0.3513***	0.0852
standard deviation blue-collar/white-volunteer dummy	0.2611***	0.0901	0.2745***	0.0928	0.3157***	0.0940
number of volunteers/FTE	---	---	---	---	---	---
standard deviation volunteers donations and sponsoring/total income	---	---	---	---	-0.1563*	0.0914
public subsidies/total income	0.2265***	0.0889	0.1658*	0.0921	0.2506***	0.0943
income from contracts with public authorities/total income	0.1116***	0.0546	0.1389**	0.0555	0.1834***	0.0571
NACE 55	-0.0596	0.0588	-0.0382	0.0601	-0.0124	0.0603
NACE 73	-0.0913	0.1136	-0.0853	0.1155	-0.0685	0.1125
NACE 80	0.0258	0.0986	0.0418	0.1000	-0.0092	0.1026
NACE 91	0.0161	0.0703	0.0436	0.0707	0.0465	0.0715
NACE 92	0.0187	0.0422	-0.0103	0.0424	-0.0031	0.0429
average wage level	0.0107	0.0753	0.0243	0.0804	0.0281	0.0783
no collective agreement, but orientation	-0.0569*	0.0335	-0.0451	0.0345	-0.0295	0.0341
no collective agreement, no orientation	-0.0228	0.0423	-0.0112	0.0436	-0.0170	0.0439
log. FTE	-0.0227	0.0470	-0.0037	0.0480	-0.0088	0.0477
constant	-0.0448***	0.0130	-0.0370***	0.0134	-0.0349**	0.0135
	0.7634***	0.1512	0.6507***	0.1525	0.5855***	0.1511
adj. R ²	0.18		0.16		0.24	
dependent var: standard dev. log. wage; *** (**) [*] on the 99%- (95%-) [90%-] level significant						
Source: NPO-Tax-Data 2006, own calculations						

Source: Matched NPO-tax data 2006, own calculations

Table 5: IV regression results, part 2

Variables	model 1, "short"		model 2, "short"		model 3, "short"	
	coeff.	standard err.	coeff.	standard err.	coeff.	standard err.
	N=264		N=256		N=237	
standard deviation age	0.0021	0.0054	0.0010	0.0056	0.0016	0.0054
standard deviation sex	-0.0844	0.0795	-0.0865	0.0816	-0.0704	0.0817
standard deviation full-time/part-time	0.3457***	0.0758	0.3521***	0.0778	0.3083***	0.0782
standard deviation blue-collar/white-collar	0.2145***	0.0792	0.2399***	0.0812	0.2974***	0.0821
volunteer dummy	-0.0787**	0.0338	---	---	---	---
number of volunteers/FTE	---	---	0.0010	0.0007	---	---
standard deviation volunteers	---	---	---	---	-0.1383*	0.0835
donations and sponsoring/total income	0.2585***	0.0814	0.2135**	0.0833	0.2887***	0.0849
public subsidies/total income	0.1290**	0.0524	0.1463***	0.0530	0.1895***	0.0542
income from contracts with public authorities/total income	-0.0941*	0.0554	-0.0741	0.0565	-0.0447	0.0569
NACE 55	---	---	---	---	---	---
NACE 73	---	---	---	---	---	---
NACE 80	---	---	---	---	---	---
NACE 91	---	---	---	---	---	---
NACE 92	---	---	---	---	---	---
average wage level	-0.0539*	0.0320	-0.0420	0.0328	-0.0254	0.0322
no collective agreement, but orientation	---	---	---	---	---	---
no collective agreement, no orientation	---	---	---	---	---	---
log. FTE	---	---	---	---	---	---
constant	0.6740***	0.1373	0.5791***	0.1369	0.5128***	0.1349
adj. R ²	0.18		0.17		0.23	
dependent var: standard dev. log. wage; *** (**) [*] on the 99%- (95%-) [90%-] level significant						
Source: NPO-Tax-Data 2006, own calculations						

Source: Matched NPO-tax data 2006, own calculations

Results for the other control variables show that only few other variables have a significant influence on the wage dispersion. Among them is the standard deviation of the full-time/part-time worker variable, the standard deviation of blue-collar/white-collar workers, the logarithm of full-time equivalents, and, in model 1, the (instrumented) average wage level in the organization.

The first two variables have, as expected, a positive sign. Surprisingly, the latter two have negative signs, meaning that a higher average wage and more paid employees in the organization lead to a smaller wage dispersion.

Results for estimations with the alternative dispersion measures as dependent variables – the log of the standard deviation of daily wages and the 0.9/0.1 quantile ratio – can be found in the appendix. Here, also, the results do not differ dramatically.

7. Discussion

Existing research in labor economics has rarely accounted for non-profit status in examining wage dispersion, the fair-wage hypothesis or tournament theory. Contrariwise, in non-profit sector research, little has been said so far about (intra-organizational) wage dispersion. Scattered findings from previous work indicate that wage dispersion is smaller in non-profit organizations as compared to for-profits. Fairness perceptions and high moral ideals of workers within this sector are often cited as reasons for this assumption. Also, hierarchies are often flat in NPOs, pay is less often performance related and managerial wages are often lower than in the for-profit sector. Empirically, however, the reasons for inter-sectoral differences remain obscure. To unravel empirically what exactly makes the difference in the wage dispersion across sectors, it is necessary to inspect non-profit status more closely.

Among the few wage dispersion studies related to the non-profit sector, our research paper is the first to systematically connect to defining characteristics of non-profit organizations. According to the 'structural-operational definition' of NPO (Salamon and Anheier 1997; UN 2003) non-profits (i) have a distinct organizational structure, (ii) do not distribute any profits to owners, (iii) they are institutionally separate from government, (iv) self-governing and (v) not compulsory. In particular, these organizations involve a significant amount of voluntary participation that is expressed in terms of contributions in time and money from private households. NPOs tend to rely on volunteer work which can be combined with the use of paid staff. In addition NPOs may also receive substantial government support (Salamon and Anheier 1997; UN 2003, p. 17 ff.).

Earlier empirical research has touched on some of these features but has failed to account for volunteer work, presumably for lack of adequate data. It is relatively easy to capture the first four of the defining characteristics, whereas the voluntary component is much harder to substantiate. Based on a unique set of data, our study makes some progress in narrowing this gap in empirical research and explicitly considers volunteers, donations and public subsidies as possible influences on wage dispersion.

Our finding of volunteer involvement leading to lower wage dispersion can perhaps be explained with the high importance of the mission in organizations with volunteers. For mission-based organizations fairness could matter in its own right and for legitimacy reasons. The distribution of wages across different groups of employees is also closely related to concepts and perceptions of fairness. The logic and mechanism behind an organization's wage dispersion can assume particular importance in motivating and retaining employees (e.g. Winter-Ebmer and Zweimüller 1999, Gerlach and Stephan 2006b). Most economic models on job satisfaction and quitting intentions highlight relative wages as a key factor of workplace choices (e.g. Pfeffer and Langton 1993; Rees 1993).

In the specific case of NPOs, workers — while also considering their personal pay and career opportunities — are more likely to respond to an organization's mission and values and the latter are more likely to connect to concepts of solidarity and equality than in a for-profit environment (Leete 2000). As a consequence, employees in NPOs might be particularly perceptive about intra-firm wage dispersion — possibly even unusually 'dispersion averse' as compared to workers in the for-profit world. NPOs rely heavily on their employees' intrinsic motivation and identification with the organization in order to achieve their organizational goals. Therefore, NPOs try to strengthen intrinsic motivation, adherence to group norms and organizational pride partly through wage equity (Leete 2000, p. 428).

Whether these assumptions on the specific 'value frame' of NPO hold, cannot be answered from our data and is left to future research. In any case, our findings suggest, that changing the structure of the workforce will affect wage dispersion and - potentially - perceived wage fairness in a positive or negative manner, depending on whether this change brings about a more or a less balanced mix of paid and unpaid labor. This also means that there is a price tag for excessive professionalization which is already heavily scrutinized in the non-profit literature (e.g. Alexander, Nank and Stivers 1999; Eikenberry and Kluver 2004).

The negative association between volunteer work and intra-organizational wage dispersion in NPO could also be indicative of a substitutional rather than complementary relation between paid and unpaid labor. If voluntary work were entirely complementary to the work of paid staff, there would be less reason why volunteering should affect the wage distribution. If, however, volunteers substitute for paid managers at the top of the organizational hierarchy and/or for employees at the bottom of the wage distribution the wage dispersion narrows – which is what we find in our data.

From a labor market policy perspective, volunteers substituting for paid employees at the bottom tail of the wage distribution could be criticized as being just the most extreme expression of wage dumping. It has to be cautioned, however, that many non-profit organizations start out as a purely voluntary endeavour. Over time, they may want to increase capacity or professionalize parts of their activities by way of hiring paid workers. In this illustration paid workers substitute for volunteer work, not the other way round.

Based on cross-sectional data, it is hence impossible to judge whether the association between volunteer labor and the degree of wage distribution is reflecting wage dumping strategies or not. From the perspective of non-profit organizations, substituting paid labor for volunteers in order to curb costs can also be unavoidable to sustain operations, given that their access to other types of revenue is often difficult (Littich 2007).

Our finding that donations and public subsidies augment the wage dispersion can be explained against the background of earlier work (Haider and Schneider 2010), examining factors determining the wage level in non-profit organizations. Using quantile regressions this study revealed that wages of employees in the upper wage group rise with increasing income of donations and public subsidies. More generally speaking, the pay level of managers in NPOs appears to assume critical importance in explaining the level and pattern of wages in the non-profit sector.

Previous research (Leete 2000) posited that lower pay levels for managers explain lower wage dispersion in the non-profit sector as compared to the for-profit sector. We find that donations and public subsidies increase the wage dispersion and might thus work to reduce the differences between both sectors. Based on our data and looking at NPOs only we therefore suggest that it is the existence of volunteers in NPOs that better explains why wages are less dispersed in the non-profit than in the for-profit sector.

8. Conclusion

This research paper attempts to address the issue of wage dispersion in the specific setting of non-profit organizations. While in market economies, for-profit organizations dominate the picture by definition, non-profits also play a visible role: The share of non-profit paid workers in the total workforce amounts to about 6.3 per cent in the US, 4.8 per cent in the UK and 3.8 per cent in Austria (Salamon, Sokolowski and List 2003, p. 39 and 42). This share is even higher in specific subsectors of the economy as e.g. in the field of social services. The wage dispersion in non-profit organizations therefore is likely to have some bearing on the wage structure in (subsectors) of the economy, with potential repercussions on labor relations and productivity. More importantly, the degree of wage dispersion in non-profit organizations appears to be of crucial importance for their own identity, legitimacy and credibility.

In summary, our paper is among the few to address intra-organizational wage dispersion in non-profit organizations. Our analyses are based on a unique matched employer-employee dataset and offer new insights into wage formation processes in this sector of the economy. In particular, we highlight the moderating effect of volunteer labor on wage dispersion in non-profit organizations. An interesting question to be raised with regard to this result concerns the substitution paid for unpaid labor. However, despite these strengths and innovative features of the paper, there remains room for improvement.

While our work is based on an already extraordinary set of data which matches information from a survey of organizations with individual-level data from official payroll statistics, the data are still cross-sectional in nature and do not provide much detail on organizational values, employee characteristics or the specific tasks performed by paid and unpaid workers. Estimations could also be enhanced by using more detailed information about the employees such as education, employment duration or their exact position within the organization. Future research could also explore the nature of the activities and jobs of both volunteers and paid employees and hence the degree to which both types of labor are substitutes for each other. This could further advance our understanding the association between volunteer activities on wage dispersion.

It is also important to note that at this stage our results refer to Austria only. In Austria, non-profit organizations traditionally have strong relationships with the government. Also, they are very actively involved in delivering (social) services but less engaged in advocacy and community building (Neumayr and Schneider 2008). Both, relationships between the government and non-profit organizations and the specific mix of societal functions fulfilled by this type of organizations could vary across countries and may affect wage formation in the non-profit sector.

In order to better understand the findings from this study and to shed more light into intra-organizational wage distribution in the non-profit world, it would be intriguing to know

- if and how an organizations wage distribution is associated with general beliefs and perceptions of justice and wage fairness among its workers,
- whether and to what extent volunteers substitute for paid work at the top and the bottom of the wage distribution and what drives decisions to substitute one type of labor for the other,
- if and to what extent the wage distribution affects worker motivation, productivity, intentions to quit or fluctuation.

In terms of methodological progress our study offers new insights for those interested in measuring wage inequality or the distribution of other variables of interest. We applied the standard deviation of the log wages of workers as a dispersion measure but also investigated if or how using different measures would change our results. The appendix of the paper presents several measures as well as results for estimation applying these alternative measures. The lesson to be learned from this exercise is the value of exploring and exploiting the features of alternative measures of wage dispersion. This also applies to measures seeking to capture the dispersion of exogenous variables. Instead of using percentage shares we took the standard deviation and also presented its advantage over using percentages. Differences between various dispersion measures and their effects on the results have hardly been discussed in empirical analyses and should be in the focus of interest in future research.

9. Appendix

We present regression results for two alternative dependent variables (tables 6 and 7): the logarithm of the standard deviation of the daily wages and the 90th/10th quantile ratio:

Table 6: Regression results, alternative dependent variable

Variables	model 1, "short"		model 2, "short"		model 3, "short"	
	coeff.	standard err.	coeff.	standard err.	coeff.	standard err.
	N=263		N=255		N=236	
standard deviation age	0.0081	0.0118	0.0074	0.0123	0.0085	0.0122
standard deviation sex	0.1342	0.1772	0.1863	0.1837	0.2303	0.1885
standard deviation full-time/part-time	0.8641***	0.1618	0.9011***	0.1683	0.8424***	0.1733
standard deviation blue-collar/white-collar	0.4110**	0.1718	0.4731***	0.1783	0.5352***	0.1855
volunteer dummy	-0.2326***	0.0726	--	--	--	--
number of volunteers/FTE	--	--	0.0015	0.0015	--	--
standard deviation volunteers	--	--	--	--	-0.4098**	0.1853
donations and sponsoring/total income	0.2349	0.1758	0.1068	0.1832	0.2572	0.1907
public subsidies/total income	0.0789	0.1120	0.1425	0.1150	0.2085*	0.1204
income from contracts with public authorities/total income	-0.1132	0.1199	-0.0633	0.1239	-0.0238	0.1275
average wage level	0.3957***	0.1103	0.4093***	0.1132	0.4506***	0.1146
constant	1.3303***	0.4335	1.0777**	0.4384	0.9413**	0.4505
adj. R ²	0.18		0.15		0.18	
dependent var: log. standard dev. wage; *** (**) [*] on the 99%- (95%-) [90%-] level significant						
Source: NPO-Tax-Data 2006, own calculations						

Source: Matched NPO-tax data 2006, own calculations

Table 7: Regression results, alternative dependent variable

Variables	model 1, "short"		model 2, "short"		model 3, "short"	
	coeff.	standard err.	coeff.	standard err.	coeff.	standard err.
	N=264		N=256		N=237	
standard deviation age	0.0667	0.0894	0.0516	0.0916	0.0506	0.0772
standard deviation sex	-1.8520	1.3062	-1.8399	1.3371	-1.4085	1.1607
standard deviation full-time/part-time	4.3487***	1.2452	4.3866***	1.2745	3.3896***	1.1111
standard deviation blue-collar/white-collar	4.0564***	1.3005	4.4696***	1.3298	5.0175***	1.1660
volunteer dummy	-1.0675*	0.5561				
number of volunteers/FTE			0.0208**	0.0117		
standard deviation volunteers					-1.6277	1.1866
donations and sponsoring/total income	4.2530***	1.3374	3.6157***	1.3653	4.6342***	1.2062
public subsidies/total income	2.2068**	0.8610	2.4973***	0.8690	2.8735***	0.7706
income from contracts with public authorities/total income	-1.2101	0.9097	-0.8826	0.9253	-0.1626	0.8084
average wage level	-0.3405	0.5257	-0.1323	0.5366	0.3038	0.4568
constant	4.5412**	2.2560	3.0119	2.2428	1.3048	1.9168
adj. R ²	0.14		0.15		0.19	
dependent var: Q0.9/Q0.1; *** (**) [*] on the 99%- (95%-) [90%-] level significant						
Source: NPO-Tax-Data 2006, own calculations						

Source: Matched NPO-tax data 2006, own calculations

10. References

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