Firm-Size Wage Differentials in Switzerland: Evidence from Job-Changers

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Economists have long been interested in the influence of employer size on the structure of wages. Yet there is little consensus in the literature about the particular reason why the size of a firm should be a determinant of a worker's wage rate. The seminal work of Charles Brown and James Medoff (1989) provides only weak evidence for the traditional explanation, which relies on size differences in the quality of labor or size differences in working conditions. Recently, however, John Abowd et al. (1999) found that individual heterogeneity rather than firm heterogeneity accounts for almost all the wage variation between detailed size categories. They used a large matched firm–worker sample from France and isolated fixed individual effects and fixed firm effects from workers moving between employers.[1] The well-known problem with the fixed-effects estimate (which applies also to the latter study) is the implicit assumption that job changes are exogenous. A large part of worker mobility is voluntary, however, and this self-selection causes the fixed-effect estimate in general to be inconsistent (see Gary Solon, 1988; Robert Gibbons and Lawrence H. Katz, 1992).

We try to add to this literature not only by studying wage changes of workers who move between firms of different size classes, but also by explicitly analyzing the underlying mobility decisions. Our analysis is based on a recent data set for Switzerland. Studying the Swiss labor market is interesting because it is rather non-European as far as labor-market institutions are concerned. In particular, unions are weak, membership and coverage are low, and employment protection measures are not far-reaching. Nevertheless, the Swiss labor market resembles a typical continental European country in terms of low and rather stable wage inequality and in terms of a distribution of employment that is skewed toward small and medium-sized firms. According to the Swiss Labor Force Survey (SLFS) roughly 30 percent of all employees are working in firms with more than 100 employees. Moreover, there is only detailed information on firm size for enterprises with less than 100 employees. The focus of this paper will therefore be on employer-size wage differences in small and medium-sized enterprises.[2] We find no evidence for the hypothesis that larger employers provide worse working conditions. We do however find some support for the labor-quality explanation.

I. The Employer-Size Wage Gap in Switzerland

The SLFS is a yearly survey covering a representative sample of Swiss households over

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[1] Similarly, Jonathan S. Leonard and Marc Van Audenrode (1995) stress the importance of unobserved general human capital hidden in firm fixed effects, without explicitly considering firm size.

[2] See Karsten Albæk et al. (1998) for a recent investigation of firm-size wage differentials in the Nordic countries.

the years 1991–1996. The survey is constructed as a five-year rotating panel providing information not only on year-to-year job mobility, but also on on-the-job search activities of workers. This can be taken as an indicator of individual job satisfaction.

In a first step, we ran a standard ordinary least-squares (OLS) wage regression using dummies for four firm-size categories with a roughly equal employment share. The results are displayed in equation (1) (employer-size less than five employees serves as the reference; standard errors are in parentheses below the coefficients):[3]

$$\ln w_i = \cdots + \underset{(0.008)}{0.046}(\text{size } 5\text{–}9) + \underset{(0.007)}{0.095}(\text{size } 1\text{–}99) + \underset{(0.007)}{0.129}(\text{size } 100+) \quad (1)$$

where w_i is the gross hourly wage rate. The OLS size premium between two consecutive size classes is roughly 4 percentage points. Running the same regression but using the fixed-effects estimator leads to a strong reduction of the firm-size premia:

$$\ln w_i = \cdots - \underset{(0.010)}{0.010}(\text{size } 5\text{–}9) + \underset{(0.010)}{0.025}(\text{size } 11\text{–}99) + \underset{(0.011)}{0.030}(\text{size } 100+). \quad (2)$$

[3] Controls include squared terms in age and tenure, years of schooling, and dummies for on- and off-the-job training, gender, nationality, family and supervisor status, and part-time and temporary job; there are also two regional as well as five yearly dummies and nine broad industry dummies.

Equation (2) shows that the firm-size effect shrinks to less than a third of the OLS estimate, once we control for fixed individual effects. Consequently, and in line with Abowd et al. (1999), one is led to conclude that by far the largest part of the OLS firm-size effect is due to individual heterogeneity.

One potentially important problem with fixed-effects estimates is measurement error, which would worsen the signal-to-noise ratio and attenuate estimated coefficients. In our case, the low number of size categories should minimize this error. On the other hand, the fixed-effect estimate identifies the size effect both from job-stayers with a changing firm size and from movers between firms of different size classes. We consider the measurement error to be more severe for size-class-changing workers who stayed with the same firm than for job-changers, as the former may result from mere legal changes, mergers, plant/establishment measurement problems, and so forth. Also Brown and Medoff (1989 p. 1038) found no impact of firm size on wages in the fixed-effect estimate for job-stayers, but a significant size differential among movers. In what follows, we will therefore concentrate our analysis on job changers. In particular, we consider the OLS size premium as a distinct determinant of individual wages and ask how this wage component affects the dynamics of individual wages and the mobility and search behavior of workers.

II. Wage Growth of Job-Movers Between Size Classes

Table 1 presents evidence on wage growth for job-changers. If the OLS estimate in equation (1) measures a true size effect, a worker changing, say, from size-class 100+ to size-class 11–99 would suffer a wage reduction of $12.9 - 9.5 = 3.4$ percent. Denote by α_k the OLS coefficient for size class k, and by $\Delta\alpha_{kj}$ the expected wage change of a worker changing from class k to j, where $\Delta\alpha_{kj} = \alpha_j - \alpha_k$. These variables are included as regressors in Table 1. The estimated coefficient of $\Delta\alpha_{kj}$ has a simple and meaningful interpretation in the wage-growth equation. It indicates what fraction of the cross-sectional "size" wage com-

TABLE 1—WAGE GROWTH AMONG JOB-CHANGERS

A. *Without Control for Sample Selectivity*

Independent variable	Regression (i)	(ii)	(iii)	(iv)
Change in size premium, $\Delta\alpha_{kj}$	0.515 (0.168)	0.426 (0.169)	—	—
Positive change ($\Delta\alpha_{kj} > 0$)	—	—	0.395 (0.281)	—
Negative change ($\Delta\alpha_{kj} < 0$)	—	—	0.454 (0.260)	—
Size premium, current firm, α_j	—	—	—	0.474 (0.200)
Size premium, old firm, α_k	—	—	—	−0.379 (0.200)
Controls:	no	yes	yes	yes
$\bar{R}^2$:	0.003	0.017	0.017	0.017
P (inequality of coefficients):	—	—	0.89	0.66
N:	2,779	2,738	2,738	2,738

B. *With Control for Sample Selectivity*

Independent variable	Regression (v)	(vi)	(vii)	(viii)
Change in size premium, $\Delta\alpha_{kj}$	0.469 (0.172)	0.381 (0.176)	—	—
Positive change ($\Delta\alpha_{kj} > 0$)	—	—	0.249 (0.306)	—
Negative change ($\Delta\alpha_{kj} < 0$)	—	—	0.481 (0.259)	—
Size premium, current firm, α_j	—	—	—	0.502 (0.203)
Size premium, old firm, α_k	—	—	—	−0.240 (0.212)
Controls:	no	yes	yes	yes
$\bar{R}^2$:	0.004	0.023	0.023	0.023
P (inequality of coefficients):	—	—	0.60	0.24
N:	2,655	2,640	2,640	2,640

Notes: The dependent variable is $\ln w_{it} - \ln w_{it-1}$, control variables include tenure in the old job, age-squared, and dummies for changes in on- and off-the-job training, temporary contract, working time, and supervisory status, as well as dummies for nine broad industry categories. The sample selection equation is identified by the use of level variables instead of changes as in the wage-growth equation. Numbers in parentheses are standard errors.

ponent a worker takes with her when moving between class categories. For instance, a coefficient of 1 means that a worker moving between class 11–99 and 100+ experiences a wage growth of 3.4 percent as suggested by the OLS regression.

The results indicate that actual wage growth for job-changers is a significant fraction of the wage growth suggested by the OLS estimate. If individual characteristics are not controlled for [column (i)], this fraction is about 52 percent. If controls are included, the corresponding fraction is roughly 43 percent. This is considerably larger than the fixed-effect estimates in equation (2).

As mentioned above, when the endogeneity of mobility is not accounted for, the estimated firm-size coefficients are in general inconsistent. In order to study how mobility choices could affect our results we first looked at a possible asymmetry in wage changes between those individuals who moved to a larger firm and those who moved to a smaller firm [column (iii)]. Individuals moving to larger firms experience an increase in the wage of roughly 40 percent of the cross-sectional size gap, whereas the decline in wages of those moving to a smaller firm is about 45 percent of the estimate predicted by OLS. The difference is not statistically significant. Such high wage losses are remarkable given the supposedly high downward wage rigidity in Europe. They are also difficult to reconcile with voluntary job moves.

A similar result arises, once we distinguish between leavers and joiners of a size class [column (iv)]. It turns out that leavers have to give up about 38 percent the cross-section firm-size wage component, and joiners gain about 47 percent. Again, no significant difference between joiners and leavers can be detected.

The results in column (iii) and (iv) of Table 1A give some informal tests about the potential importance of self-selection into different size classes. In Table 1B, we redo the analysis but formally account for possible selectivity effects by applying James Heckman's two-stage selectivity correction. The selection equation is solidly identified, as we use levels of the covariates in the selection equation but changes in the wage-growth equation. The coefficients in Table 1 only change marginally while the general picture remains. Individual heterogeneity seems to be of some importance for the employer-size wage gap. However, almost half of the OLS size-related wage premium is still captured by workers who change firm-size categories.[4]

[4] It has to be noted that the variable "firm-size wage premium" is based on regression coefficients which may

III. Job Search and Mobility by Firm Size

Further insights into the causes of measured firm-size wage differentials can be gained by looking at revealed behavior of workers. By her decision to look for a new job or to change the job, the worker reveals information about her job satisfaction.

The upper panel of Table 2 presents results on the impact of firm size as such and firm-size wage premiums α_k on job-search activities of workers. If observed wage differences by firm size are due to differences in working conditions (more rules, a less autonomous and more impersonal work atmosphere, etc.) then observed wage differentials should be utility-equalizing, and no systematic differences in search behavior across firm-size classes should be observed. Moreover, conditional on the individual wage, lower job satisfaction in larger firms should induce higher on-the-job-search activities in larger firms than in smaller ones.

The results show a clear picture: irrespective of conditioning on the current wage, workers employed in larger firms are significantly less likely to look for another job. Controlling for the wage [column (iii) in Table 2A] leads to a somewhat smaller effect, without changing the general picture. Note that the individual's wage also has a negative, but considerably smaller, impact on on-the-job search behavior than firm size as measured by the cross-sectional firm-size premium. As the own wage might pick up job rents as well as returns to unobserved human capital, which should not lead to higher quit rates, a smaller effect is to be expected. Columns (iv) and (v) in Table 2A serve as robustness checks for the influence of current wage rates and the size premium.

The lower panel of Table 2 provides evidence on actual job mobility of workers.[5] Here we find qualitatively the same results. The quantitative impact, however, is somewhat lower in the job-change analysis. The difference between the firm-size impact on search and its impact on actual worker mobility lies primarily in the fact that the former variable is the outcome of a voluntary choice of the worker, whereas the latter could be the result either of a (voluntary) quit or an (involuntary) layoff. Based on our analysis of workers' search and mobility behavior, we are led to conclude that, if anything, larger firms offer *better* working conditions than

TABLE 2—ON-THE-JOB SEARCH AND MOBILITY OF WORKERS

	A. Dependent variable = on-the-job search (0, 1)				
Independent variable	(i)	(ii)	(iii)	(iv)	(v)
Size premium in current firm, α_k	−0.131 (0.028)	—	−0.106 (0.029)	—	—
Wage in current firm	—	—	−0.023 (0.003)	−0.025 (0.003)	−0.025 (0.003)
Current firm size 5–10 (0, 1)	—	−0.001 (0.004)	—	0.001 (0.001)	—
Current firm size 11–99 (0, 1)	—	−0.007 (0.004)	—	−0.005 (0.002)	—
Current firm size 100+ (0, 1)	—	−0.014 (0.004)	—	−0.011 (0.004)	—
Observations:	37,265	37,265	37,265	37,265	37,265
Pseudo-R^2:	0.075	0.073	0.078	0.076	0.077
Mean of dependent variable:	0.079	0.079	0.079	0.079	0.079
	B. Dependent variable = worker changed job within one year (0, 1)				
Independent variable	(i)	(ii)	(iii)	(iv)	(v)
Size premium in old firm, α_k	−0.086 (0.020)	—	−0.081 (0.020)	—	—
Wage in old firm	—	—	−0.006 (0.002)	−0.006 (0.002)	−0.005 (0.002)
Old firm size 5–10 (0, 1)	—	−0.001 (0.003)	—	0.002 (0.003)	—
Old firm size 11–99 (0, 1)	—	−0.003 (0.002)	—	−0.004 (0.002)	—
Old firm size 100+ (0, 1)	—	−0.007 (0.003)	—	−0.009 (0.003)	—
Observations:	37,318	37,318	37,318	37,318	37,318
Pseudo-R^2:	0.159	0.156	0.157	0.159	0.156
Mean of dependent variable:	0.080	0.080	0.080	0.080	0.080

Notes: Results are from pooled probit regressions (random-effects probits gave very similar results); coefficients are marginal effects evaluated at means of all independent variables. Further controls include squared terms in age and tenure, years of schooling, and dummies for on- and off-the-job training, gender, nationality, family and supervisor status, and part-time and temporary job, as well as two regional and five yearly dummies and nine broad industry dummies. Numbers in parentheses are standard errors.

lead to an errors-in-variables problem. This possible bias of the estimated coefficients toward zero only reinforces the point that heterogeneity of workers cannot be the sole explanation for size-related wage differentials.

[5] See Winter-Ebmer (1996) for a related analysis for Austria.

smaller firms. Todd Idson (1996) mentions the importance of better promotion expectations, fringe benefits, and more job security (due to a lower risk of bankruptcy of larger firms), as well as the importance of intrafirm job mobility as possible explanations for such a result.

IV. Conclusions

Using information on job changes and search behavior of workers, and controlling for endogenous mobility, we conclude that firm-size wage differentials in Switzerland cannot be explained by job heterogeneity. About half of the differential (the size of which is comparable to the differential in the United States) is accounted for by worker heterogeneity. This fraction is lower than in recent matched employer–employee data studies using fixed effects (Leonard and Van Audenrode, 1995; Abowd et al., 1999). This may result from the assumption of exogenous job changes in those studies but could also result from relatively poor information on worker characteristics like schooling. Such a procedure may place too much emphasis on individual heterogeneity as compared to firm heterogeneity in the determination of wages (Daniel S. Hamermesh, 1999).

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