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Profit sharing the firm-size wage premium

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Abstract

This study analyzes the relationships among wages, firm size, and profit sharing schemes. We develop a simple theoretical model and explore the relationship empirically using high-quality panel data. The theoretical model shows that the firm-size wage premium decreases in the presence of profit sharing. The empirical results based on rich matched employee-employer data for private sector wage earners in Finland show that the firm-size wage premium is modest, and it becomes negligible when we account for profit sharing and covariates describing assortative matching and monopsony behavior. The analysis suggests that profit sharing schemes embody effects of firm-specific unobservables that raise productivity, support rent sharing and boost wages.

JEL classification: J31; J51

Keywords: Wages; firm size; profit sharing; wage bargaining; assortative matching; monopsony behavior; unbalanced panel

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1. Introduction

Empirical research indicates that wage differentials between small and large firms are substantial and pervasive and that the firm-size wage premium arises from either the labor market or the product market. The most frequently cited reasons for the firm-size wage premium relate to differences in labor quality and working conditions across firms. Large firms hire greater numbers of qualified workers because of their greater capital intensity and capital-skill complementarity, and the wage premium reflects a compensation differential; see, e.g., Brown and Medoff (1989), Kruse (1992). Wage efficiency, labor turnover, and dynamic monopsony explanations fall into the same category. Larger firms face higher monitoring and recruiting costs, and to discourage shirking and increase job stability, they provide higher wages. In essence, these explanations reflect labor market frictions and sorting, with heterogeneous labor being sorted into heterogeneous firms; see, e.g., Barth and Dale-Olsen (2011) for a review of recent empirical research.

The second set of explanations is rooted in the profit sharing literature. The firm-size wage premium may reflect large firms' greater market power in the product market and, thus, greater earnings per worker. Some firms might be large because their superior technology makes them efficient and allows them to capture market shares from other, less efficient firms and may benefit from lower prices of non-labor inputs and, thus, higher earnings per worker; see, e.g., Foster et al. (2008), Bagger et al. (2010). The excess profits can be shared *ex post* between the firm and workers represented by a strong union, a group of workers, or by individual workers.

The earlier literature shows large firms are more likely to use profit sharing than the smaller ones; see, e.g., Kruse et al. (2010), Andrews et al. (2010). The literature also lists several reasons for this behavior. Larger firms may be more eager to substitute fixed pay components by variable pay if they face more financial volatility than smaller firms; see, e.g., Kruse (1992, 1996). These firms may have a greater need to attract and retain trained labor, as well as enhance employees' efforts and motivation to fulfill diversified organizational goals; see, e.g., Strauss (1990). In short, larger firms may enjoy greater market power in the product market, which allows them to pay higher wages; at the same time, they may have incentives to do so.

This study contributes to the literature on the firm-size wage premium in two ways. First, we sketch a theoretical model that focuses on the relationship between profit sharing and the firm-size wage premium. The model follows the literature beginning with Weitzman (1984, 1987) and assumes that total pay is made up of two components, a base wage and a profit share, which may both contribute to the wage differential. Considering varying degrees of profit sharing, the model shows that the firm-size wage premium decreases as the profit sharing component increases. This implies that the effect of profit sharing may be attributed to the firm-size wage premium if it is not controlled for in the estimation.

Second, we use large panel data from Finland, a country with strong trade unions and a long history of wage bargaining, to explore the relationship empirically. In particular, we apply a novel approach that identifies firms that use profit sharing schemes and workers who participate in such schemes. As such, the study contributes to the recent literature focusing on wages and profit sharing, including Arai and Heyman (2009), Andrews et al. (2010), Long and Fang (2012), Rusinek and Rycx (2013) and Card et al. (2014), and from a more general perspective, it extends the multi-country analyses of Lallemand et al. (2007) and Albeck et al. (1998), who examine firm-size wage premiums in five European countries (Belgium, Denmark, Ireland, Italy, and Spain) and four Nordic countries (Denmark, Finland, Norway, and Sweden), respectively.

Our empirical analysis is based on rich matched employee-employer data for private sector wage earners containing longitudinal information on 283,757 individuals working in 18,570 different firms. The data span the 2003-2012 period and provide 1,162,325 wage observations and several useful covariates for regression analysis. In particular, we control for dynamic monopsony behavior and labor market frictions; see, e.g., Manning et al. (2003, 2011). We also control for assortative matching; see, e.g., Abowd et al. (1999). For example, heterogeneity across workers and firms can be accounted for by education (9-category ISCED classification), occupation (25-category ISCO classification), form of employment (full- or part-time), firm capital-labor intensity and firm export status. The approach is in line with Melitz's (2003) theoretical arguments on quality differences between exporting (large firms) and non-exporting firms (small firms), as well as with the subsequent empirical findings of Yeaple (2005) and Wagner (2012). Labor market frictions are accounted for in the spirit of the dynamic monopsony behavior. We follow Barth and Dale-Olsen (2011), who show that the unexplained firm-size wage effect reflects labor market frictions and difficulties in the job-to-job search process stemming from variations in skill group size between firms of different sizes.

The empirical analysis treats the adoption of profit sharing scheme as exogenous. This constitutes a potential source of estimation bias if both base wages and profit sharing scheme adoption are both driven by common unobserved factors. Although it is quite likely that wages and profit shares are driven jointly, e.g., by demand-side shocks, the existence of a profit sharing scheme in a firm is less likely to be driven or determined by such temporary shocks (including demand-side shocks) that affect wages. However, we aim to alleviate possible endogeneity problems by using a rich set of firm and worker characteristics and fixed effects. Furthermore, in the spell specification, where the profit sharing indicator becomes a part of the firm fixed effect, we measure the impact of profit sharing on wages using a worker-level indicator, controlling for several worker and firm observables simultaneously. Implicitly, we assume that the adoption of a profit sharing scheme is associated with overall firm quality and that the effects can be captured by observable covariates, such as firm export status (Melitz 2003) and capital-labor ratio (Foster et al. 2008), conditional on the firm's industry (Kruse, 1996).

The empirical section of the study begins by reporting a modest but statistically significant effect of firm size on base wages after accounting for several sources of individual and firm heterogeneity and worker and firm fixed effects. The results from the subsequent analysis of profit sharing indicate that there is no firm-size wage

premium. The results also imply that employees in firms with profit sharing schemes earn higher base wages. In sum, the findings accord with the notion that larger firms are more likely to use profit sharing schemes, to employ more proficient labor and thus to pay higher wages.

2. The firm-size wage premium – a simple model of profit sharing

This section studies how profit sharing affects the firm-size wage premium from a theoretical point of view. We utilize a standard wage-setting/price-setting framework with incomplete competition on the goods and labor markets. We assume firm heterogeneity to be rooted in the product market, where small firms are not able to charge the same prices as large firms. Recent empirical evidence that product prices increase with firm size motivates this assumption; see Kugler and Verhoogen (2012), Johnson (2012) and Manova and Zhang (2012).¹ In other words, large firms are assumed to have more price-setting power compared to small firms.²

Moreover, we assume that firms commit themselves to profit sharing before union wage-setting. This timing structure is common in the literature; see, e.g., Holmlund (1990) and Koskela and Stenbacka (2012), and it may result in certain policy benefits for firms, such as tax exemptions; see Cahuc and Dormont (1997) and Pendleton et al. (2001). In essence, the structure implies that after wage bargaining, the total pay of the worker is composed of a (negotiated) base wage and a profit share, where the base wage is set with the expectation of profit sharing.

We assume that there are two types of firms. Large firms face lower product market competition (κ_b), whereas small firms face tougher market competition (κ_s), with subscripts b and s denoting large and small firms, respectively.³ The price-setting power $0 < \kappa < 1$ is defined as $\kappa \equiv (\eta - 1)/\eta$, with $\eta > 1$ being the good's demand elasticity from a Blanchard-Kiyotaki demand function.

Following the structure of the Finnish labor market,⁴ where union density is over 70 % and bargaining coverage is over 80 %, we assume that bargaining over base wages is the basic mechanism through which unions enable the transfer of rents to workers. In both large and small firms, wages are negotiated separately with a rent-maximizing

¹ A large part of the literature also focuses on differences in product quality, where large firms tend to produce qualitatively superior products. It is also common in the competition and antitrust literature to expect that larger firms realize higher margins; see Davis and Garcés (2010).

² It can be argued that firms also differ in respects other than price-setting power. If we assume that firm productivity is a second source of heterogeneity, our results remain qualitatively unchanged.

³ In an open economy where large firms tend to export, this assumption would need further adjustment, such as higher price-setting power for larger firms to be limited to their home markets, for instance. Although this is an interesting avenue, we are not able to pursue it in this paper.

⁴ See www.findikaattori.fi (2015) and <http://www.uva-aias.net/208> (2015).

union. In the case of bargaining with a large firm, the union's utility function is given by eq. (1).

$$U_{ib} = N_{ib}\Omega_{ib} \quad (1)$$

The union's utility is the number of workers in firm $i \in [0,1]$, N_{ib} , multiplied by the rent of each worker when that worker is employed in that firm Ω_{ib} . Assuming risk-neutral workers, the rent is given by

$$\Omega_{ib} = w_{ib} - \bar{w} + \mu \frac{\Pi_{ib}}{N_{ib}} \quad (2)$$

w_{ib} denotes the wage in the large firm, \bar{w} denotes the outside option, and $\mu \Pi_{ib}/N_{ib}$ denotes the share of profits that the firm is committed to paying each worker.⁵ Following Bhaskar (1990) and Holden and Driscoll (2003), the union is concerned about the relative pay of w_{ib} over the wage of outside workers \bar{w} and relies on the firm's commitment to profit sharing.

Bargaining takes place via Nash bargaining between the single firm and the union.

$$\max_{w_{ib}} U_{ib}^{1-\gamma} [(1-\mu)\Pi_{ib}]^\gamma \quad (3)$$

γ denotes the bargaining power of the firm. We assume zero rent and zero profits as status quo payments.⁶ Replacing subscript b with s in equations (1) to (3) provides the same setup for a union facing a small firm.

Firm behavior is similar in both types of firms. They face a production function with diminishing marginal returns to labor and a productivity parameter: $Y_i = AN_i^\alpha$, with $0 < \alpha < 1$. They maximize profits by setting prices as a markup on labor costs. Aggregation is achieved by setting relative prices to unity and acknowledging the continuum of firms $i \in [0,1]$ in the economy: $w_{ib} = w_b$, $w_{is} = w_s$, $N_{ib} = Jn_b$, and $N_{is} = Jn_s$. J indicates the number of different firm types in the economy; in this case, two. Overall production is given by $Y = A(n_b + n_s)^\alpha$, and the outside option takes the form $\bar{w} = n_b r_b + n_s r_s + (1-n)b$ where the total pay of the worker is given by $r_j = w_j + \mu \Pi_j/N_j$ with $j = b, s$. Workers have the opportunity to find a job at a large

⁵Profit sharing is a pay variable and a group incentive related to firm performance. As such, the size of μ is likely to be determined by tradeoffs among potential tax exemptions, productivity effects, costs and agency problems (e.g., shirking). The rules of profit sharing are set and known in advance; see Estrin et al. (1997). In the basic version of the model, discussed in this section, we assume μ to be exogenously given and set by the firm unilaterally. The results are qualitatively the same when the profit share is bargained over; see Appendix A.1 for details.

⁶Instead of a rent-maximizing union, it is possible to assume a utilitarian union with $U_{ib} = N_{ib}(w_{ib} + \mu \Pi_{ib}/N_{ib}) + (L - N_{ib})\bar{w}$, where L denotes the total labor force and the following status quo payments: $U_{ib}^0 = L\bar{w}$ and $\Pi_{ib}^0 = 0$ as above. However, we prefer the specification with the rent-maximizing union because the utilitarian one is inconsistent when dealing with firm-level labor unions in the general equilibrium.

firm or a small firm or to receive unemployment benefits. The employment rates denote the respective probabilities.

The general equilibrium is given by equations (4) to (7). The labor demand of the share of the large and small firm, respectively, is written as

$$w_j = \alpha \kappa_j A (2n_j)^{\alpha \kappa_j - 1} n^{\alpha(1-\kappa_j)} \text{ with } j = b, s \quad (4)$$

and the labor demand condition (5) ensures that the share of employment in small firms plus the share of employment in large firms gives total employment.

$$n_s + n_b = n \quad (5)$$

Assuming all bargaining power to be on side of the union ($\gamma = 0$) yields the simplest solution for the base wage and total pay in both firms:⁷

$$w_b = -\mu \frac{\Pi_b}{n_b} + \frac{n_s r_s + (1-n)b}{\alpha \kappa_b - n_b} \text{ and } w_s = -\mu \frac{\Pi_s}{n_s} + \frac{n_b r_b + (1-n)b}{\alpha \kappa_s - n_s} \quad (6)$$

$$r_b = \frac{n_s r_s + (1-n)b}{\alpha \kappa_b - n_b} \text{ and } r_s = \frac{n_b r_b + (1-n)b}{\alpha \kappa_s - n_s} \quad (7)$$

In contrast to a model with firm homogeneity, base wages and total pay are set as a markup not only on unemployment benefits but also on the pay of the other firm type. The model thus captures the idea from the outside option, which comprises the likelihood of finding a job not only in another firm of the same type but also in another type of firm. A positive profit share μ decreases base wages in eq. (9) because unions anticipate the share to be paid when bargaining over wages. To ensure positive base wages and total pay, there is an upper limit on employment, which is given by $n_j < \alpha \kappa_j$ for $j = b, s$.

Total pay, as denoted in eq. (7), is composed of a base wage component, as given in eq. (6), and a profit share component, $\mu \Pi/n$. The relative premium of total pay between different types of firms is given by

$$p \equiv \frac{r_b - r_s}{r_s} = \frac{\kappa_s - \kappa_b}{\kappa_s} \quad (8)$$

Obviously, the size of the premium rests only upon the different degrees of price-setting power. Because total pay is made up of two pay components, the base wage and profit share, both contribute to the total premium. In order to distinguish between the components, we divide eq. (8) into a base wage premium that stems from firm-size effects and a profit sharing premium. The firm-size wage premium (base wage premium) is given by

$$f \equiv \frac{w_b - w_s}{w_s} = \frac{(1-\mu)\alpha(\kappa_s - \kappa_b)}{\alpha \kappa_b + \mu(1 - \alpha \kappa_b)} \quad (9)$$

⁷ Assuming $0 < \gamma < 1$ yields qualitatively similar results and is therefore not discussed separately.

The profit sharing premium is given by

$$s = \frac{\mu(\kappa_s - \kappa_b)}{\kappa_b(\alpha\kappa_b + \mu(1 - \alpha\kappa_b))} \quad (10)$$

Considering eq. (9) first, the base wage premium can be interpreted as firm-size wage effect because large firms face lower product market competition, which unions are able to transform into higher base wages. In the case of $\mu = 0$, meaning without any profit sharing, the base wage premium is identical to the premium in total pay. Only firm size accounts for the pay premium.

Eq. (10) shows that firms committing to profit sharing leads to another wage differential between large and small firms. As the price-setting power of the firm increases, the profit and, therefore, the profit share transferred to the workers increase. In the case of $\mu = 1$, when all profits of the firm are redistributed to the workers, the profit sharing premium is identical to the premium on total pay. Only profit sharing accounts for the pay premium. With $0 < \mu < 1$, the premium in total pay consists of two components: a firm-size (base) wage premium and a profit sharing premium. As such, the intuition of the model is that an increasing size-earnings profile may stem from a flat base wage and an increasing profit share or from an increasing base wage without a profit share.⁸

Calibrating the model using $\alpha = 0.7$, $\kappa_b = 0.9$, $\kappa_s = 0.9135$, $b = 0.5$, $A = 5.0$ yields a total pay premium of 1.5 %, which is consistent with our estimates reported in section 3 (Table 5). With $\alpha = 0.7$, we fit the labor share of several European countries, and the values for unemployment benefits and the productivity parameter ultimately lead to an employment rate of 60 %. We follow the theoretical literature in setting $\kappa_b = 0.9$. This implies product demand elasticity for large firms of minus 10 %. The estimate is compatible with the data from the Swedish Establishment Survey (1991) wherein over one-half of firms expect the decrease in demand to be stronger than the price increase.⁹ We also fit the empirical finding that the share of workers employed by large firms is smaller than the share employed by small firms.

Table 1 shows the decomposition of the premium of total pay under different degrees of profit sharing. The first column presents the pay premium in the absence of profit sharing. As shown in eqs. (8)–(10), the pay premium stems entirely from the firm-size wage effect. Columns two to five show that an increase in profit sharing simultaneously increases profit sharing premium and decreases the firm-size wage premium. If one-quarter of profits are shared, 34.67 % of the total pay premium is

⁸ A similar result could be obtained if the firm-size premium arose from the labor market. Considering a typical dynamic monopsony model, wages rise with firm size because the monopsonist faces an upward sloping supply curve. The greater the monopsony power, the stronger the firm-size relationship and the higher the profits (Green et al., 1996). Introducing profit sharing into such a setting may produce the same results as in our model. The firm-size wage effect might stem from monopsony (base) wage setting or from total remuneration through profit sharing, where larger firms share more of their profits. We are grateful to an anonymous referee for highlighting this similarity.

⁹ We are grateful to Michael Tåhlin for providing the data.

explained by profit sharing. As more profits are shared, the firm-size wage effect becomes less relevant to the point at which it does not have any impact on the wage premium, that is, when all profits are redistributed to the employees.¹⁰

Table 1 about here

3. Data, methods and preliminary findings of the firm-size wage premium

3.1 The employee-employer panel, 2003–2010

This study exploits matched employee-employer data from the registers of Statistics Finland, using a 20 % unbalanced sample of private sector wage earners containing longitudinal information on 283,757 individuals working in 18,570 different firms.¹¹ The total number of unique combinations of workers and firms (job spells) in the data is 384,041, and the total number of observations is 1,162,325.

Table 2 tabulates summary (ratio) statistics for a selection of variables. Firms are divided into four size groups, measured by the numbers of employees, following the classification of Statistics Finland: micro (1-9 employees), small (10-29 employees), medium-sized (30-249 employees), and large (over 250 employees). Firm size is measured as a continuous variable, and worker wages contain all fixed pay components. The data record employees' age, gender, place of residence, level and field of education, occupation, and job tenure. Recorded employer characteristics include industry, region, form of ownership, export status, and capital input, as well as an indicator of the existence of a profit sharing scheme; see the appendix A2 for definitions.

The first observation is that differences between large and micro firms are substantial and broadly consistent with observations from other countries; see the estimates in column 1. The wage ratio in the largest and smallest size categories varies from 1.20 (hourly wages) to 1.29 (monthly wages). The firm-size wage ratio is 1.18 for males and 1.13 for females. In addition, the size-wage profile is steeper for males than for females, and males are clearly overrepresented in larger firms (1.43). Similarly, jobs last longer (1.59) and workers have more formal education (1.05) in larger firms than in smaller firms. These numbers are consistent with observations that large firms have fewer part-time workers (0.40) than small firms. Although the average age of workers does not significantly differ between small and large firms (1.02), longer tenures in

¹⁰ With $0 < \gamma < 1$, this pattern is exactly identical as long as the profit share is smaller than the union's bargaining power. If $\mu > \gamma$, the firm-size wage effect becomes negative, but it is compensated by an even larger profit sharing premium.

¹¹ Studies that use panel methods and register-based employer-employee data typically rely on samples of 1-2 % of all wage earners or less; see Bart and Dale-Olsen (2011) and Scoppa (2014). Survey-based data involve smaller samples. Arai's (2003) analysis of Sweden is based on 1,000 matched worker-firm observations. In Winter-Ebmer and Zweimuller (1999), the sample consists of 2,600 job changers, whereas Ferrer and Lluís (2008) use panels with a sample of approximate 21,000 yearly observations.

larger firms indicate that large firms may be older than small firms.¹² Differences in firm size are reflected in differences in the capital-labor ratio (2.34), profits per worker (1.25), and the use of profit sharing schemes (7.67).

The second observation is that the discrepancy profile flattens swiftly when moving from micro firms to small and medium-sized firms. The wage ratio between large and small (medium-sized) firms is now 1.18 (1.02) for both hourly and monthly wages; the firm-size wage ratio decreases to 1.13 (1.05) for males and 1.09 (0.99) for females. In sum, these numbers are consistent with the perception that firm-size wage profiles are flatter in countries with stronger trade unions; see Oi and Idson (1999) and references therein. Males are still overrepresented in larger firms compared to small firms (1.26) but are not overrepresented in larger firms compared to medium-sized firms (1.01). Jobs still last longer in larger firms in both cases (1.48 and 1.25), but the ratio in the share of university-educated workers drops from 1.05 to 0.94 for medium-sized firms. The relative use of part-time workers varies across firms of different sizes, with the relation being u-shaped; micro and small firms use more part-time workers in relation to large firms (0.40 and 0.84), whereas large firms use more part-time workers in relation to medium-sized firms (1.41). ~~There are no differences in the use of national wage agreements across different sizes of firms.~~

Table 3 illustrates the data further by reporting averages of the main variables in the first (2003) and the last years (2010) of the investigation period. The table divides firms into those that use profit sharing and to those that do not. In 2003, firms with a profit sharing scheme accounted for 33.6 % of all firms. In 2010, the corresponding estimate was 32.1 %. The samples are consistent in indicating that firms that use profit sharing are different in many observable characteristics. In essence, they are considerably larger (medians of 14.4 employees versus 47.25 employees in 2010), provide higher base wages (medians of 13.86 euros versus 15.48 euros in 2010), possess more operating capital (medians of 13.2 thousand versus 21.6 thousand in 2010), are more profitable (medians of 5.3 thousand euros per employee versus 7.0 thousand in 2010) and are more likely to be engaged in foreign trade (averages of 20.9 % versus 49.9 % in 2010). In addition, employees differ across firms. ~~Workers receiving bonuses are more educated (have a third-level education: 28.1 % versus 38.3 % in 2010), are older (41.2 years versus 40.2 years), Workers receiving bonuses are more unlikely be female (41.3 % versus 43.0 %) and are less likely to be part-time workers (15.0 % versus 16.9 %). In addition, they have longer tenures (10.7 years versus 7.3 years) and work longer weeks (35.3 hours versus 34.6 hours).~~

Tables 2 and 3 around here

3.2. Preliminary findings: the roles of observables and fixed effects

We tackle unobserved heterogeneities by adopting a commonly used variant of the linear three-way error-component model; see, e.g., Abowd et al. (2008) and Andrews

¹² The possible effect of plant age on wages is then captured by tenure; see Brown and Medoff (1989) and Idson and Oi (1999) for a discussion on plant age and wages.

et al. (2006, 2008). We write the standard Mincerian wage equation as follows, omitting time dummies:

$$(1) \quad w_{it} = \mathbf{x}_{it}\boldsymbol{\beta} + \mathbf{w}_{j(i,t)t}\boldsymbol{\gamma} + \theta_i + \psi_{j(i,t)} + \epsilon_{it}$$

where workers ($i = 1, \dots, N$) are observed once per period ($t = 1, \dots, T$) in a firm ($j = 1, \dots, J$). Because workers can move from one firm to another over time, the function $j(i, t)$ maps worker i to firm j at time t . w_{it} denotes the dependent variable (log base wages), and ϵ_{it} denotes a stochastic error term. \mathbf{x}_{it} and $\mathbf{w}_{j(i,t)t}$ are vectors of time-variant observables for workers and firms, whereas θ_i and ψ_j capture the corresponding time-invariant unobservables.

The analysis begins by treating observations as one cross-section and by assuming that each component of the implied error term for the OLS estimator ($\theta_i + \psi_{j(i,t)} + \epsilon_{it}$) is contemporaneously uncorrelated with the observed covariates. Column (1) in Table 4 provides the benchmark. The estimate without observable controls indicates that the firm-size wage premium is quantitatively relevant and statistically significant: doubling the firm size relates to an increase in wages of 1.9 %. This estimate is of the same magnitude as estimates with observable controls of human capital; see, e.g., Brown and Medoff (1989) for the U.S. and Manning (2003) for the U.K.

Table 4 corroborates this basic finding by tabulating results for specifications with covariates for observable worker and firm characteristics (columns 2 and 3), fixed effects for workers (column 4), for firms (column 5) and for both (column 6). The within- i transformation eliminates the unobserved worker component and assumes that the remaining unobserved firm component (ψ_j) is uncorrelated with the observed covariates. The model identifies the firm-size wage effect from job stayers with a changing firm size and job movers between firms of different sizes. The within- j transformation, in turn, eliminates the unobserved firm component and assumes that the remaining unobserved worker component (θ_i) is uncorrelated with the observed covariates. The firm-size effect is identified by workers who switch firms. In our data, the number of such cases is 79,984. Following Andrews et al. (2006), we use the spell specification where unobserved worker and firm heterogeneity is eliminated by differencing within each unique worker-firm spell. In our data, the number of such spells is 384,041.¹³

Controls for worker characteristics reduce the baseline estimate from 1.9 % to 1.4 % (column 2), and those for observable firm characteristics reduce it further to 0.7 % (column 3). Both factors are important: worker heterogeneity accounts for 41 % and firm heterogeneity accounts for approximately 59 % of the decline in the firm-size wage premium. Unobserved worker heterogeneity captured by fixed effects reduces the estimate from 0.7 % to 0.3 %, suggesting that there might be sorting of more productive workers into larger firms (column 4). The specification that accounts for firm-specific unobservables, presenting, for example, differences in technologies that provide higher rents and require compensating differentials, yield a similar result: there is a slight decline in the estimate from 0.7 % to 0.5 % (column 5), albeit the

¹³ We follow Andrews et al. (2006) and assume that two periods of employment with employer H separated by a period with employer S consists of two unique job spells.

point estimate is now insignificant.¹⁴ The result may also reflect the possibility that larger firms provide more insurance to workers, thus flattening the wage firm-size profile; see Guiso et al. (2005).¹⁵ The results of the spell specification (column 6) that incorporates firm and worker effects and thus accounts for the systematic sorting of workers across firms, do not differ from those in column (3): the estimate (0.8 %) suggests that the sum of the unobserved worker and firm components is not correlated with firm size.

The findings that the firm-size wage effect is modest and that it can be controlled for by using a rich set of observable worker- and firm-specific controls are consistent with the view that the firm-size wage effect is lower in countries with coordinated wage setting than in countries with non-coordinated wage setting. At the general level, the findings support those of, among others, Teulings and Hartog (1998), who report that overall wage dispersion is inversely related to corporatism. Regarding more recent cross-country evidence, our findings are consistent with those of Lallemand et al. (2007), who report considerable lower firm-size estimates for more corporatist countries (Denmark and Belgium) in relation to non-corporatist countries (the U.S. and France). Our results, in turn, differ from those of Albæk et al. (1998), who report considerable firm-size wage effects for all four Nordic countries, with the firm-size wage elasticity for Finland ranging between 2 % and 3 %. However, their analysis focuses on only one year using a relatively small sample (1985 and 23,500 full-time workers). In sum, our estimates suggest that although the effect of firm size on wages appears negligible, it exists. Furthermore, the estimates of the firm-size wage premium may be biased due to omitted variables, and the firm-size premium estimates may be biased upward or downward.

Table 4 about here

4. Profit sharing and the firm-size wage premium

As noted at the outset, larger firms have the ability to pay more if they have market power in the product market, and thus, they can generate more earnings per worker; see, e.g., Foster et al. (2008), Bagger et al. (2010). Rent sharing may take different modes (through higher fixed pay or through higher variable pay) and different manners (between the firm and a labor union, a group of workers, or by an individual worker). The literature indicates that larger firms may have more incentives to use profit sharing schemes, as well as other modes of variable pay, than smaller firms; see Kruse (1992), Strauss (1990), and Guiso et al. (2005). The earlier literature has also shown that large firms are more likely than smaller firms to use financial participation schemes and that the use of such schemes may have a bearing on the base wage and on total employee compensation; see Weitzman (1984), Kruse et al. (2010), and

¹⁴ Clustering by workers provides statistically significant estimate.

¹⁵ Consistently with this conjecture, Ilmakunnas and Maliranta (2005) find that plant size has a negative relationship with the worker outflow rate when a host of other factors are controlled for, including plant age, labor productivity, wage level, industry, average tenure of the employees, wage dispersion within plant, and net employment growth in the previous period.

Andrews et al. (2010). This, in turn, may lead to the non-random matching of workers and firms; see, e.g., Abowd et al. (1999, 2008) and Prendergast (1999).

Tables 5 and 6 summarize our findings on the associations among firms' profit sharing schemes, firm size and workers' base wages. Three distinct features of our approach are worth noting. First, we apply an indicator variable that divides firms into those that have adopted and operate profit sharing schemes and those that do not.¹⁶ Second, we examine the roles of assortative matching and dynamic monopsony behavior in explaining the firm-size premium. To do so, we report the results of specifications that include/exclude observables that control for worker and firm quality. Covariates that describe assortative matching consist of measures for labor and firm quality (e.g., worker education, capital intensity of firm) and job characteristics (e.g., urgent work, workplace conditions). Third, we employ two model specifications: spell fixed effects and worker fixed effects with alternative identification strategies. We first report the analysis based on spell fixed effects.

4.1 Results of the job spell specification

Our preliminary results (Table 4) show that unobserved fixed effects shape the wage-size relationship, albeit marginally. The inclusion of worker fixed effects reduces the firm-size estimate from 0.7 % to 0.3 %; the inclusion of firm fixed effects, to 0.5 %. The model that incorporated both effects (spell effects) raises the estimate to 0.8 %.¹⁷ We continue the analysis using spell fixed effects because it is important to control for both types of unobservables. Theories of assortative matching, in particular, emphasize the approach: there may be selection of high-wage workers to high-wage firms, or vice versa, or both; see Abowd et al. (1999).

Unfortunately, there is little variation in firm-level profit sharing policy over job spells; typically, firms tend to ratify their remuneration policies for several years. Thus, the firm-level profit dummy becomes a part of the firm fixed effect. Consequently, we use a profit indicator that varies over job spells: a dummy variable that indicates whether a worker has received a profit share in a given year. This approach has shortcomings of its own because the proxy combines two possible effects. First, it captures the impact of firm-level profit sharing on wages that is not eliminated by the spell transformation. Second, it reflects the individual heterogeneity of the recipient if a firm's profit sharing scheme is not inclusive, i.e., it does not cover all of a firm's workers.

Table 5 reports the estimated firm-size wage premium when the base wage is conditioned by a dummy that indicates whether a worker has received a profit share. To address the role of alternative theoretical explanations, we divide the covariates

¹⁶ We do not explore whether there is causality running from profit sharing schemes to wages. For such attempts, see Hildreth and Oswald (1997), Guertzgen (2009), Arai and Heyman (2009), and Long and Fang (2012).

¹⁷ Andrews et al. (2006) report a similar pattern for the wage-size relationship in the IEB data, although their estimates on firm-size wage premiums are much higher. Their estimates for plant employment are, using sample means, 2.7 % (OLS), 1.7 % (worker fixed), 0 % (firm fixed), and 2.2 (for worker and firm effects).

into three groups: i) basic controls that are included in all specifications, ii) covariates that describe assortative matching, and iii) covariates that describe monopsony behavior. We control directly for labor quality using worker education and the attractiveness of a job (job characteristics) is captured by dummies that measure the form of employment, irregular working hours, urgent work, and workplace conditions. Firm quality is proxied by capital intensity and export status; see Melitz (2003) and Foster et al. (2008).¹⁸ The dynamic monopsony view of wage formation follows Barth and Dale-Olsen (2011), i.e., we assume that increased demand for one particular worker category implies higher wages for that group but not necessarily for other worker categories in the firm. This approach is further conditioned on a measure of local labor market tightness based on workers' travel-to-work area classification; see Maliranta and Nurmi (2007). These controls assess the robustness of the impact of profit sharing on wages, as the observed effects may be due to group size or local shortages that either increase or decrease base wages.

The results are in line with the preliminary findings reported in Table 4. The inclusion of the profit sharing indicators (the individual-level profit share and its interaction with firm size) yields three interesting findings (column 2). First, the estimate on the firm-size premium is unaffected at 0.9 % for doubling of the firm size. Second, the interaction dummy produces a statistically significant estimate (-0.1 %). This implies that an increase in firm size increases base wages less for workers who belong to profit sharing schemes, which is in accordance with our theoretical model. Third, the base wages of workers who receive a profit share are, on average, 0.7 % higher compared to non-receivers. The inclusion of the matching/monopsony covariates (columns 2-4) changes the overall picture of the analysis neither qualitatively nor quantitatively: the firm-size wage premium is modest but statistically significant. Furthermore, as in column 1, the specifications indicate that base wages are higher in firms with profit sharing schemes. However, the specifications suggest that the covariates that describe monopsony behavior are positively correlated with the firm-size premium, the estimate decreasing from 0.9 to 0.7 (see column 4). The covariates describing assortative matching, in turn, are correlated with the interaction variable, decreasing the estimate to close to zero (see column 3).

The point estimates for the covariates (not reported here) provide interesting comparisons with recent findings. First, they lend support to the view that base wages are affected by the size of different skill groups within a firm. The estimated coefficient (0.7 %) implies that an increase in the number of workers of the same educational type increases wages at the same rate as the general increase in the number of workers in the firm. The magnitude of the estimate is comparable with Barth and Dale-Olsen (2011), who report estimates for Norway. Second, pressures in the local labor market are associated with wages. The estimated coefficient (-0.021 %) is in line with previous findings on the wage-unemployment curve; see Nijkamp and Poot (2005) for a survey.¹⁹

¹⁸ Capital intensity may also signal higher product market rents stemming from high barriers to entry attributable to high fixed costs and, in the presence of unions, may lead to rent extraction and thus higher wages; see Arai (2003).

¹⁹ Following Guertzgen (2009) and Rusinek and Rycx (2013), we attempted to examine whether the association between profit sharing and wages varies across the level of bargaining, i.e., centralized versus decentralized (industry-level) bargaining. We find some evidence,

Table 5 about here

5.2 Results of the worker fixed effects specification

The results in Table 5 suggest that the spell specification yields robust estimates of the relationship between base wages and firm size. There are still matters that cause concern. First, the spell fixed effect specification employs an individual-level profit sharing indicator because there is little variation in profit sharing policies within firms over job spells. Second, the identification of the firm-size effect on base wages relies on changes in firm size over a job spell. Thus, the premium estimates may reflect short-term fluctuations related to, e.g., firm size or personnel policies; see, e.g., Card et al. (2014) for a similar discussion on the within-job correlation between wages and profitability.

Table 6 reports the results of specifications wherein we have omitted the unobserved firm component and split the data into workers who stay and workers who switch firms. The approach has two advantages. First, it allows us to identify the effect of firm-level profit sharing schemes on base wages together with the individual effect of profit sharing (column 4). Second, it provides information on possible selection bias related to heterogeneity between job movers and stayers. Columns (1)–(2) report estimates of the firm-size wage effect from the model wherein identification is based on workers who stay at the same firm or switch across firms. Columns (3)–(4), in turn, exploit data on workers who have switched firms.²⁰ For brevity, we do not report the results by various sets of covariates.

As before, the inclusion of the profit variables leaves (column 1) the firm-size estimate intact (0.4 % for a doubling of firm size), the interaction dummy yields a statistically significant estimate (-0.1 %), and the base wages of workers in firms with profit sharing schemes are higher compared to those in firms without profit sharing (1 %). The inclusion of the matching and monopsony covariates (column 2) decreases the premium estimate to nearly zero in firms without profit sharing schemes, and according to the F-test, there is no firm-size wage premium in firms with profit sharing schemes ($p=0.173$). The results are robust across identification strategies, i.e., regardless of whether the estimates are derived from data on job movers alone (see columns 3 and 4). Furthermore, column (4) suggests yet another interesting finding: the base wages of workers in firms that use profit sharing and who do receive a profit share earn an additional premium in their base wages of approximately 0.4 %. In sum, because the model omits firm fixed effects but includes worker-specific unobservables together with various observables on worker and firm characteristics, profit sharing schemes are likely to capture firm-specific unobservables that raise productivity and endorse rent sharing.

based on a rough division of the data into periods of centralized and decentralized bargaining, that centralized wage agreements suppress the impact of profits on wages.

²⁰ The proportion of moves that could be considered exogenous due to firm disclosures in the data is limited (2,211 out of 78,111 moves in total). Our analysis using this sample provides qualitatively similar but statistically insignificant estimates.

Table 6 about here

5. Conclusions

This study analyzes the impact of firm size, profit sharing and their interaction on wages. As such, it not only links two different and well-established strands of the literature but also provides insights into how the wage effects of firm size and profit sharing are related to each other. To do so, we first analyze a theoretical model with firm size rooted in differences in price-setting power in the product market and, second, explore high-quality panel data on wage earners from the Finnish private sector to empirically study the relationships among firm size, profit sharing and base wages.

The study contributes to the literature in two ways. First, considering varying degrees of profit sharing, our model shows that the firm-size premium and profit sharing premium are traded off one to one against each other. If a large firm introduces a profit sharing scheme, the differential in total pay compared to small firms remains unchanged, but in this case, profit sharing – not firm size – accounts for the differential. Second, we use firm- and individual-level information on profit sharing programs to examine the relationship empirically. As such, the study contributes to research on the wage-profit relationship that has recently focused on profitability and wages by bargaining structures (Guertzgen 2009; Rusinek and Rycx 2013), the effects of the adoption of profit sharing schemes on wages (Long and Fang 2012), asymmetry in the relationship between profits and wages over firm business cycles (Arai and Heyman, 2009), and the role of sunk capital in rent-sharing (Card et al. 2014).

The findings of the empirical analysis are in line with our theoretical profit sharing model. Furthermore, the study shows the importance of labor market frictions (dynamic monopsony behavior) and assortative matching (worker and firm quality), in determining the firm-size wage premium. The main findings can be summarized as follows. First, the study detects a modest but statistically significant effect of firm size on base wages after accounting for individual and firm heterogeneity, including worker and firm fixed effects. Second, the study shows that there is no firm-size wage premium when we control for profit sharing and several covariates that describe assortative matching and monopsony behavior. The results also imply that employees in firms with a profit sharing scheme have higher base wages per se. This finding accords with, e.g., Andrews et al. (2010) and Lang and Fong (2012), who show that workers in establishments using financial participation schemes earn more than their counterparts. In sum, our results provide support for the view that large firms are more likely to use profit sharing schemes, employ more proficient labor and pay higher wages. The empirical results are thus consistent with the view that larger firms that enjoy price-setting power in the product market may transfer some of these extra rents to employees in the form of profit sharing.

Table 1. Firm-size wage premium under different degrees of profit sharing between firms and workers

	(1)	(2)	(3)	(4)	(5)
<i>Workers' share of profits (μ)</i>	<i>0.00</i>	<i>0.25</i>	<i>0.50</i>	<i>0.75</i>	<i>1.00</i>
Firm-size premium	1.50	0.98	0.58	0.26	0.00
Profit sharing premium	0.00	0.52	0.92	1.24	1.50
Total pay premium	1.50	1.50	1.50	1.50	1.50
Premium explained by (percent)					
*Firm size	100.00	65.33	38.67	17.33	0.00
*Profit sharing	0.00	34.67	61.33	82.67	100.00

Note: The model is calibrated with $\alpha = 0.7$, $\kappa_b = 0.9$, $\kappa_s = 0.9135$, $b = 0.5$, $A = 5.0$.

Table 2. Illustration of the data; selected variable ratios by firm size

<i>Variables</i>	<i>Large/Micro</i>	<i>Large/Small</i>	<i>Large/Medium</i>
Monthly wages	1.29	1.18	1.02
Hourly wages	1.20	1.14	1.03
Male wages	1.18	1.13	1.05
Female wages	1.13	1.09	0.99
Average age	1.02	1.01	1.00
Male share	1.43	1.26	1.01
Tenure	1.59	1.48	1.25
Part time	0.40	0.84	1.41
Paid by monthly/hour	1.93	1.56	1.04
Education*	1.05	1.05	0.94
Profits/worker	1.25	1.56	1.53
Capital/worker	2.34	1.46	1.12
Bonus scheme	7.67	3.36	1.60
National coverage	1.01	1.02	1.02

Note: * Education = the share of tertiary education of the workforce.

Table 3. Illustration of the data; breakdown of main variables by firm in 2003 and 2010

<i>Variables</i>	<i>Firms with no profit sharing</i>		<i>Firms with profit sharing</i>	
	<i>2003</i>	<i>2010</i>	<i>2003</i>	<i>2010</i>
Monthly wage, euros (year 2003)	1,971.40 (5.27)	2,337.42 (5.70)	2,388.41 (3.37)	2,707.28 (4.102)
Hourly wages, euros (year 2003)	12.92 (0.029)	15.74 (0.034)	15.04 (0.019)	17.32 (0.023)
Female, percent	0.523 (0.003)	0.536 (0.002)	0.423 (0.002)	0.426 (0.002)
Tertiary education, percent	0.310 (0.003)	0.409 (0.002)	0.349 (0.001)	0.400 (0.001)
Worker age, years	40.35 (0.063)	41.45 (0.059)	40.87 (0.034)	41.39 (0.036)
Tenure, years	7.46 (0.049)	7.28 (0.042)	11.05 (0.034)	10.67 (0.032)
Working week, hours	34.96 (0.048)	34.23 (0.043)	36.12 (0.023)	35.24 (0.025)
Part-time, percent	0.162 (0.002)	0.170 (0.002)	0.115 (0.001)	0.151 (0.001)
Profits per employee, euros	11,075.94 (631.75)	9,923.34 (648.76)	12,021.74 (10,511.5 1)	22,470.19 (2,222.17)
Firm size, no. of employees	37,49 (2.81)	37,19 (1.94)	202,77 (14.08)	203,06 (13.50)
Capital per employee	68,810.55 (8,716.81)	70,281.63 (8838.40)	319,064.0 (38,277.6 3)	400,286.10 (44,477.48)
Export/import (domestic=0)	0.20 (0.01)	0.21 (0.01)	0.49 (0.01)	0.50 (0.01)
Capital region, percent	0.332 (0.003)	0.347 (0.002)	0.382 (0.001)	0.406 (0.001)
No. of workers	33,692	43,096	107,145	107,702
No. of firms	5.385	6.007	2.727	2.828

Table 4. Hourly wages and firm size in linked worker-firm panel 2003–2010: the roles of unobservables and fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)
Log firm size	0.019*** (0.0002)	0.014*** (0.0001)	0.007*** (0.0001)	0.003*** (0.0004)	0.005 (0.004)	0.008*** (0.0001)
Observables:						
*Workers	-	yes	yes	yes	yes	yes
*Firms	-	-	yes	yes	yes	yes
Fixed effects:						
*Workers	-	-	-	yes	-	-
*Firms	-	-	-	-	yes	-
*Spells	-	-	-	-	-	yes
Identification	Movers & Stayers	Movers & Stayers	Movers & Stayers	Movers & Stayers	Movers	Stayers
Clustered	No	No	No	Workers	Firms	Workers
R ²	0.01	0.57	0.60	0.91	0.70	0.93
No. of Firms	18,570	18,570	18,570	18,570	18,570	18,570
No. of Workers	283,757	283,757	283,757	283,757	283,757	283,757
No. of Spells	-	-	-	-	-	384,041
No. of Obs.	1,162,325	1,162,325	1,162,325	1,162,325	1,162,325	1,162,325

Note: All specifications include time dummies. Worker controls include age, age squared, gender, occupation, tenure, tenure squared, level and field of education, and form of employment. Firm controls include industry, region, and export status. *** denotes statistical significance at the 0.01 level.

Table 5. Hourly wages and firm size: the roles of profit sharing, matching and monopsony controls based on the spell specification

	(1)	(2)	(3)	(4)	(5)
Log firm size	0.009*** (0.001)	0.009*** (0.001)	0.009*** (0.001)	0.007*** (0.001)	0.007*** (0.001)
Profit sharing: *Worker indicator	-	0.007*** (0.002)	0.006*** (0.002)	0.007*** (0.002)	0.005*** (0.002)
Size-profit interaction	-	-0.001*** (0.000)	-0.000 (0.000)	-0.001** (0.000)	-0.000 (0.000)
<i>Matching controls:</i>					
Education & level	-	-	yes	-	yes
Employment form	-	-	yes	-	yes
Job characteristics	-	-	yes	-	yes
Capital intensity	-	-	yes	-	yes
Export status	-	-	yes	-	yes
<i>Monopsony controls:</i>					
Skill group size	-	-	-	yes	yes
Local unemployment	-	-	-	yes	yes
<i>Basic controls</i>	yes	yes	yes	yes	yes
<i>F-test for equality</i> (p-value)+	-	188.67 (0.000)	161.82 (0.000)	122.90 (0.000)	95.63 (0.000)
R ²	0.93	0.93	0.93	0.93	0.93
Obs.	1,162,325	1,162,325	1,011,875	1,162,325	1,011,875

Note: Basic controls include worker age, age squared, gender, occupation, tenure, tenure squared, industry, and region.

*** (***) denotes statistical significance at the 0.01 (0.05) level. Standards errors are clustered by workers.

+F-test that the estimates on the firm size variables are jointly zero.

Table 6. Hourly wages and firm size: the roles of profit sharing, matching and monopsony controls based on worker fixed effects specification

	(1)	(2)	(3)	(4)	(5)
Log firm size	0.004*** (0.000)	0.004*** (0.000)	.001* (0.001)	0.001* (0.001)	0.001 (0.001)
Profit sharing: * Firm indicator	-	0.010*** (0.002)	0.004* (0.002)	0.011*** (0.003)	0.009*** (0.001)
Size-profit interaction	-	-0.001*** (0.0003)	-0.000 (0.000)	-0.001** (0.001)	-0.001** (0.001)
Profit sharing: *worker indicator	-	-	-	-	0.004*** (0.001)
<i>Matching & monopsony controls</i>	-	-	yes	yes	yes
<i>Basic controls</i>	yes	yes	yes	yes	yes
F-test for equality (p-value)+	(0.000)	69.16 (0.000)	1.85 (0.174)	0.01 (0.931)	0.00 (0.978)
R ²	0.91	0.91	0.91	0.90	0.90
Obs.	1,162,325	1,162,325	1,011,875	377,488	377,488

Note: Controls (basic, monopsony and matching) are listed in Tables 4 and 5.

*** (**, *) denotes statistical significance at the 0.01 (0.05, 0.10) level. Standards errors are clustered by workers.

+F-test that the estimates on the firm size variables are jointly zero.

Appendix A.1 Firm-size wage premium under endogenous profit sharing

Allowing the endogenous determination of the profit share, where unions and firms bargain over the share, leads to qualitatively similar results as the basic model presented in section 2. Similar to the basic model with an exogenous profit share, we assume that the profit share is set independent from wages due to potential policy benefits for firms. Following a similar timing structure, we thus assume that unions and firms first bargain over the profit share and, thereafter, bargain independently over wages. Nash bargaining over the profit share is given by the following maximization problem:

$$\max_{\mu_j} U_{ij}^{1-\gamma} [(1-\mu)\Pi_{ij}]^\gamma \text{ subject to } 0 \leq \mu_j \leq 1 \quad (11)$$

This leads to a profit share that depends on firm and union characteristics:

$$\mu_j = 1 - \gamma - \gamma \frac{N_{ij}}{\Pi_{ij}} (w_{ij} - \bar{w}) \quad (12)$$

As firms and unions are committed to the profit share, they take it as given when bargaining over wages. We are therefore back to equation (3). Solving this equation with regard to wages leads to:

$$w_{ij} = -\mu_j \frac{\Pi_{ij}}{N_{ij}} + \frac{1 - \gamma(1 - \alpha\kappa_j)}{\alpha\kappa_j} \bar{w} \quad (13)$$

Combining equations (12) and (13), replacing firm profits and employment and rearranging leads to:

$$\mu_j(\gamma) = 1 - \gamma \quad (14)$$

Ultimately the profit share depends solely on the bargaining power of the union. The intuition for this result lies in the fact that bargaining over profit shares and wages takes place independently. Although perfect independence might not prevail in actual bargaining situations, it is very likely that decisions on profit shares and wages are quite disconnected for the following reasons: First, as noted above, in order to obtain potential policy benefits, the firm has an interest in separating the two bargaining situations, for example, by the timing structure. Second and more importantly, wage negotiations most often take place on a very centralized level with a high degree of coordination, especially in the Finnish labor market context. Profit sharing decisions are, however, firm specific and – if negotiated – handled by parties other than central employer organizations or unions. As such, it is difficult, if not impossible, to anticipate and internalize profit sharing or wage decisions.

Replacing $\mu_j(\gamma)$ in the respective equations in section 2 thus yields the general equilibrium under endogenous profit sharing. The relative total pay premium given in eq. (8) remains unchanged, while the base wage premium from eq. (9) reduces to a constant and equals zero. Note that for simplicity, it was assumed in section 2 that all the bargaining power is on side of the union, which also implies that the profit share equals unity. The result of a base wage premium of zero remains unchanged when $0 < \gamma < 1$. Therefore, the total premium is explained only by profit sharing. This

outcome directly corresponds to the results from column 5 in Table 1. As such, the basic model with exogenous profit sharing nests the augmented model with endogenous profit sharing as a special case where the bargaining power of the union coincides with the size of the profit share.

Appendix A.2

Data: Main variable definitions

Base wage (BW): Total hourly wages include supplements based on location and workplace conditions; performance-based pay components for salaried employees (based on employer's subjective evaluations); performance-based earnings for wage earners (based on piece rates); taxation values for fringe benefits; earnings for extra and overtime work; eventual compensation for on-call or urgent work; other irregularly paid supplements; and pay for working hours not worked. Hourly earnings do not include one-off items, such as holiday pay.

Firm size (FS): number of employees.

Profit sharing scheme in firm (PSF): dummy (yes = 1, otherwise 0).

Worker receives a profit share (PSW): dummy (yes=1, otherwise 0).

Skill group size in firm (SGS): 81 groups (9 education levels and 9 education fields).

Local labor market tightness (LMT): the unemployment rate of each municipality (445) within the travel-to-work area (82 areas) weighted by the employment share of the municipality in the travel-to-work area.

Capital-labor ratio (CLR): physical capital (in euros) per worker (number of employees) in the firm.

Job characteristics (JC): dummy (yes=1, otherwise 0) for overtime pay, compensation based on location and workplace conditions, on-call compensation; piece rates.

Age and age squared (A, A2): years.

Tenure and tenure squared (TE, TE2): years of employment in firm.

Occupation (OCC): 25 categories, ISCO 2-digit classification.

Education (EDU): 9 categories, ISCED 1997 classification.

Field of education (FEDU): 9 categories (General Education; Teacher Education and Educational Science; Humanities and Arts; Social Sciences and Business; Natural Sciences; Technology; Agriculture and Forestry; Health and Welfare; Services; Other or Unknown Field).

Form of employment (FE): dummy (full time = 1, part time = 0).

Pay mode (PM): dummy (monthly = 1, hourly = 0).

Regions (RE): 18 regions, NUTS2 classification, excluding Ahvenanmaa.

Industry (IN): 12 categories, NACE 1-digit classification.

Firm's export status (EX): dummy (exports = 1).

Firm's legal status (LE): dummy (limited company = 1).

Firm's ownership (FO): dummy (public majority = 1).

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