Is there rent sharing in the Finnish metal and electrotechnical industry?

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Abstract

In this study we use matched employer-employee panel data to analyse whether white-collar workers' salaries are influenced by the employing firm's profitability in the Finnish metal and electrotechnical industry 1995-2001. A major novelty is the use of several different wage specifications as a dependent variable and combining this with the use of two alternative profitability measures in turn. We start from a simple base salary and move on gradually to cover ever more extensive salary concepts up to the point when even profits related payments and overtime payments are included in the estimated wage concept.

A basic multivariate regression model consisting of a wide set of observable firm and employee characteristics as independent variables produces positive and significant profit-per-employee coefficient estimates consistent with the rent sharing hypothesis of employees' wages being driven by the firm's ability to pay. The robustness of these first hand findings against certain observationally equivalent alternatives to the rent sharing hypothesis is tested using model extensions. After controlling for unobserved time-invariant employee and firm effects the magnitude of rent sharing effects reduces somewhat but they still remain statistically and economically significant. Instead the largest rent sharing estimates are found when using a further extension of one-year lagged profits even being included in the estimated models. Furthermore, these dynamic model specifications show that a prominent part of rent sharing occurs with one year's lag.

According to the study even base salaries seem to vary with the employer firm's profitability. Using the most extensive multivariate model specification covering, in addition to observable firm and employee characteristics, both fixed firm and employee effects as well as current and one year lagged rent sharing effects the long-run elasticity of monthly real base salary with respect to profits is 0.018 when profits are measured by real operating profits per employee and 0.031 when profits are measured by real value added per employee. Using the same model specification the largest elasticity estimates are achieved when the wage concept consists of base salary + benefits in kind + extra compensation for shift and Sunday work + individual/working unit performance-based payments. In this case and when measuring profitability by operating profits, the estimated elasticity is 0.036. When profitability is measured by value added elasticity increases up to a maximum value of 0.063. This means that rent sharing rises average real wages by 3.68 % when using real per capita operating profits and by 6.51 % when measuring profitability with real per capita value added as compared to the wage level without rent sharing in both cases. Since pay-profits estimates based on value added need not suffer from the same kind of calculatory downward bias as operating profits are likely to do the actual size of rent sharing may be closer to the value added based estimates.

Our results show that the significance of shared rents for the magnitude of white collar workers' overall earnings in the Finnish metal and electrotechnical industry is at least of the same size as that indicated by previous Nordic and Western-European estimates. Instead comparison with findings from the US - especially those based on instrumented profits - indicates that rent sharing plays a smaller roll in Finland (as well as elsewhere in Western Europe).

1 Introduction

In this paper we investigate the potential relationship between individual wages and firm-level real profits. The main question is whether employees' real wages respond to the employee firm's profits? The estimation data is collected from amongst the Finnish central industrial employer organisation TT's member enterprises operating in the metal and electrotechnical industry and the observations consist of white-collar employees during the six-year period 1995-2001.[1]

We test whether we can find empirical evidence for a positive relation between salaried workers' earnings and firm profits. One novelty of the current paper is that we use a multitude of different wage specifications starting from a simple base salary and moving on gradually to cover ever more extensive salary concepts until even profits related payments and overtime payments are included in the wage concept to be estimated. Firm profits are measured with two alternative measures. The first measure is real operating profits per employee excluding revenues from sales of tangible capital goods. Operating profits, however, may suffer from an endogeneity problem because the firm's labour costs are a direct component of operating profits and therefore, at the enterprise level, operating profits depend on the same factor, wages, that we, at the employee level, try to explain. Therefore we want to test the robustness of estimated operating profits effects by using some other profitability measure being not as prone to suffer from endogeneity. Our choice for this alternative profitability measure is real value added per employee and it is chosen simply because the concept of value added is actually equivalent to operating profits augmented with wage costs (after having excluded sale revenues of tangible capital goods).

Our empirical analysis starts with a multivariate wage model including only observed effects. After that we move on to test robustness of the first-hand findings. The model specifications will be modified in order to control for unobserved employee- and firm-specific effects. Thus we will test the robustness of the observed correlation (or alternatively, non-correlation) between individual wages and firm profitability by analysing carefully whether our first-hand results remain intact as we add statistical fine controls. In addition to controlling for observed and unobserved firm- and employee-specific effects, we will, in due course, consider also effects of lagged profits on wages and discuss further the problem of endogeneity w.r.t profits. In this way we hope to find out whether a detailed empirical analysis provides reinforcement for the profit sharing hypothesis, or alternatively, whether a more detailed approach undermines the empirical validity of the rent-sharing hypothesis amongst white-collar employees working in the Finnish metal and electrotechnical industry enterprises 1995-2001.

[1] The sample covers in effect *TT*'s all member firms with at least 30 employees. A part of minor member enterprises includes as well. Thus, the size and panel character of the data in hand enables us to take even advantage of advanced panel data methods.

One of the novelties of this paper is a much more detailed treatment of different wage specifications as has been usually the case in corresponding analyses. The approach is to repeat each analysis for various different wage concepts in turn starting from the monthly base wage and, after having gradually added new wage components, ending up with a one containing, in addition to base salary, benefits in kind, supplements for shift and Sunday work, performance-related payments and over-time earnings. Furthermore, we will estimate both short-term as well as long-term pay-profits effects for all various earnings specifications. In this way, we believe, it is possible to analyse in more detail such interesting questions as whether rent sharing is equally important at the base wage level, or alternatively, whether it arises only after different bonus elements and over-time supplements are included. In other words, combining the estimation of simultaneous and lagged pay-profits effects with the use of various different earnings specifications as dependent variable offers us an extensive, and simultaneously, itemised view on complexities of the rent sharing phenomenon. Finally, using two alternative profitability measures (operating profits *vs.* value added) side by side enables us to test the robustness of rent sharing effects estimates.

The structure of the paper is the following. We inspect first previous research on the rent-sharing and profit-sharing hypotheses. After that we discuss how the rent-sharing hypothesis can be rendered a theoretical basis both using the competitive as well as the non-competitive framework. Thus there exists a theoretical foundation for a positive relationship between individual wages and firm-level profits independently on whether the labour market is assumed competitive or non-competitive. The third chapter prepares for empirical analysis as we describe the used data. The fourth chapter consists of the empirical analysis. Finally, a concluding discussion follows.

2 Previous rent-sharing research and theoretical underpinnings

In a competitive labour market individual wages should reflect only a person's marginal productivity. Thus, changing jobs to another more profitable firm should not affect a person' wage if her/his marginal productivity does not change. However, this hypothesis has long been questioned. An early exemplar of questioning the relevance of the competitive labour market model is found in Slichter (1950) who claimed that empirical evidence does not support the competitive approach as apparently homogenous workers are paid differently across industries. Using data on workers in US manufacturing he found that wages were correlated with various measures of the employer's ability to pay. Later, with the emergence of more extensive data sources, a substantial number of empirical evidence has emerged that tends to strengthen Slichter's early findings.

There have also emerged several theoretical models in which a positive relation between a firm's profitability and individual wages appears. In theoretical literature the positive correlation between wages and firm profitability is usually thought to arise from an noncompetitive labour market set-up even though there are rent sharing models where labour market, at least in the long-run, is thought to be perfectly competitive.

Blanchflower et al. (1996) goes through the three possibly most favoured explanations developed for the rent-sharing hypothesis by giving an explicit form for each explanation in turn in a nut-shell but still with mathematical rigour. The first model is a bargaining model in which the firm and its employees bargain over wages and the negotiated wage depends, among others, on the firm's profits. Each counterpart's bargaining power decides its share of the "cake".

The second model represents a mix of short-run non-competitiveness and long-run perfect competitiveness so that the correlation between the firm's profits and wages it pays arises from an short-run upward-sloping labour supply curve. The upward slope of the firm's short-run labour supply curve is thought to stem from rigidities in migration of labour from other less profitable firms. Thus a positive demand shock, while increasing profits, causes simultaneously an outward shift in the demand curve for labour. Therefore, in the short run, the outward shifting labour demand curve takes the firm up the upward sloping labour supply curve with the result that the firm's profits and wages rise together. Eventually, however, migration of workers into the now higher-paying firm levels down the labour supply curve facing the firm and therefore, in this model, there is no long-run relation between wages and profits.

The third model is based on the theory of implicit contracts according to which wages are set to provide efficient "insurance" against random shocks. If both the firm and its workers are risk-aversive they end up in sharing risks by an implicit contract which determines the way wages are adjusted when the firm faces a random demand or technology shock affecting its profitability.

Thus in the case of a negative shock wages may even drop while a positive shock leads to a rise in wages.

Nickell (1999) inspects the robustness of the above mentioned theories linking wages and profits. He points out that under the assumptions of Cobb-Douglas production and the constant labour demand elasticity there follows an outcome in which a positive shift in demand or in productivity leaves profits per *employee* unchanged and hence also wages remain unaffected. Indeed, in order to remain on the safe side and preserve the positive effect of firm profits on wages the elasticity of substitution between capital and labour should stay below unity.

Still, Nickell (1999) concludes that even though the relation between wages and profits *per employee* is far from being unaffected by different assumptions about explicit forms of production functions and labour demand functions *etc.* the rent sharing hypothesis still can be given a plausible theoretical basis with relative ease within the limits of the collective wage bargaining framework. Furthermore, he even discusses some alternative explanations for the rent sharing hypothesis, such as, efficiency wage models, or an explanation based simply on managers' desire to ensure themselves "a quiet life" by passing a part of the firm's profits or rents further on to their subordinates. However, as Nickell observes, the last explanation requires that managers are, to some extent, capable of operating out of range of direct shareholder control.

Finally, the challenge of an upward sloping labour supply curve to the competitive labour market model is elaborated much further in Manning (2003). He argues at length in his book that a very wide range of standard labour market phenomena is easily explained if one accepts the idea of monopsony as a usable tool for analysing labour markets. Manning emphasises, however, that monopsony needs to be dealt with in the sense of the supply of labour to an individual firm not being infinitely elastic instead of thinking in terms of there being only one single buyer of labour. In fact, the focal idea in Manning's book is that once one shifts the focus on the labour supply curve faced by an individual firm, instead of thinking in terms of labour supply to the market as a whole, the idea of an upwards sloping labour supply curve follows quite easily.

For our study it is interesting to note that even though Manning (2003) argues that the standardly observed size-wage effect does not depend on the idea that larger firms would be more profitable and their employees more successful in extracting a share of the rents there still seems to exist a positive correlation between firm profits and employees' wages. He goes even further by stating that profits *per employee* may correlate with individual wages even though the labour supply curve facing the firm would be completely flat and consequently labour supply would be infinitely elastic. According to Manning, however, an upward sloping labour supply curve tends to strengthen the already existing positive relationship between individual wages and the employer firm's per capita profits.

When it comes to empirical studies, the earlier approach to analyse wage-profit effects was based on the use of aggregated industry or firm-level data in which both firm profitability and wages were included as industry- or firm-level averages.[2] A major weakness of studies based on aggregated data is the loss of information on inter-employee variation in individual wages and, in the case of industry data, even on inter-employer variation in firm profits and average wages. It is evident that an ideal data set for research on rent-sharing is formed by combining employee-level information on wages and personal characteristics with firm-level information on profitability and other firm characteristics. Thus the recent development of large employee-firm data sources has enabled research to move on to new paths such as the modelling of observed and unobserved worker characteristics.[3] Our approach in this paper will follow the last mentioned micro-econometric approach which offers the best and most extensive opportunities to study wage-profits effects in detail.

A major controversy over empirical results concerns whether the empirically often observed correlation between a firm's lucrativeness and wages it pays really reflects the fact that firms do pay differently for equally productive workers or does the result only mean that we cannot control for all the important determinants of individuals' wages. Thus, the empirical task is then to test whether the profit-pay effect still exists after having controlled for such alternative explanations as the effects of unobserved and observed

[2]For studies of interfirm wage differentials using firm-level data see, for example, Hildreth et al. (1997) (UK), Nickell et al. (1994) (UK), Estevao & Tevlin (2003) (US) and Haaparanta & Piekkola (1997) (Finland). For studies of interindustry wage differentials using industry-level data see Dickens & Katz (1987*a*), Dickens & Katz (1987*b*), Krueger & Summers (1988) and Blanchflower et al. (1996) (US).

[3]For studies of inter-employee wage differentials using combined employer-employee data see Arai & Heyman (2001) and Arai (2003) (Sweden), Piekkola & Kauhanen (2003) (Finland), Margolis & Salvanes (2001) (Norway and France), Abowd et al. (1999), (France), Fakhfakh & FitzRoy (2004) (France), Blanchflower et al. (1996) (US, though the focus is for the most part on industry-level analysis), Bronars & Famulari (2001) (US) and Martins (2004) (Portugal).

worker, job and firm characteristics.

Finally, before entering the estimation stage, it needs to be complemented that our empirical approach is meant to be neutral *vis-à-vis* different theoretical models presented above. This means that the outspoken aim of our empirical analysis is to find whether individual wages depend -for one or another reason- on the employing firm's lucrativeness after controlling for the effects of other wage determining factors. In fact, not restricting our empirical analysis to fit merely one of several alternative explanations put forth above may only add to robustness of the empirical results.

3 The Data

Before going in to the empirical estimations we present the research data in brief. We concentrate on the Finnish metal and electrotechnical industry firms' white collar workers working on fulltime. We have specified "the metal and electrotechnical industry" to cover the monthly paid employees under the Finnish metal and electrotechnical industry's collective contract for monthly paid employees (the employer organisation *TT*'s code '40'). [4] All the firms in our data are organised and belong to the Finnish central industrial employer organisation *TT*.[5] This means that all unorganised (predominantly minor) metal and electrotechnical industry firms are excluded from our analyses. A further restriction concerning the firm sample is that the subgroup of organised metal and electrotechnical industry firms having less than 30 employees is under-represented in our data since the data collecting instant *TT* does not require obligatory response from these minor member enterprises. For the part of larger enterprises, however, the data set covers all the organised metal industry firms.

The analysed data set has been formed by linking three different data

[4] This corresponds closely to the 2-digit Divisions 27 to 35 of NACE Rev. 1 classification (the statistical Nomenclature of economic activities in the European Community) even though a minority of covered employees works in multi-branch firms with main activity within some other division (2-digit level of NACE Rev. 1.) than 27 to 35. However, all holding companies (main activity determined by the 4-digit level code '7415' in NACE Rev.1) have been excluded.

[5] *TT* and its service sector counterpart *PT* have recently merged into a one unified central employer organisation. However, during the time range of the study (1995-2001) there still were two separate central employer organisations and therefore we will follow the terminology of that time period and use the respective abbreviations *TT* and *PT*.

sources from the years 1995 to 2001. The two first data sources consist of two employee-level wage statistics: the Finnish Structure of Earnings Statistics of Statistics Finland and the white collar industrial employees' wage statistics collected by *TT*. These two data sources contain information *a)* on wages, working hours and other employee-level items and *b)* on the employer firm's items; such as information on firms' employee numbers, industry *etc.* The third data source is the financial statement data collected by Statistics Finland containing enterprise-specific information, among others, metal and electrotechnical industry firms' profitability. For each year 1995-2001 these three extensive and on yearly basis collected data sources have first been linked together by using employees' and enterprises' identity codes and finally a longitudinal data set has been formed by combining the combined annual data sets together. All in all, this means that the data set forms a matched employer-employee data set including information on both firms and workers.

4 Empirical analysis

4.1 Multivariate models without controls for unobserved employee and firm effects

One new feature in the current study compared to previous research is to use different wage specifications in turn as a dependent variable in the estimated wage models. That is, we will run repeated estimations for each model specification using the same set of independent variables but altering the definition of the dependent wage variable. Thus, in successive estimations of each particular model the wage specification ranges from a simple base wage to the one comprising - in addition to basic wage - performance-related payments, benefits in kind, supplements for shift and Sunday work and earnings for overtime hours (and for the years 1998-2001, profit-based cash rewards). In this way we hope to see whether there are statistically significant wage-profitability effects, and if the answer is affirmative, whether these effects are exclusively confined to the most extensive wage specification or is it rather the case that even base wages are affected by firms' ability to pay?

This is an interesting issue as in public discussion in Finland it is often argued that wages are too rigid; they do not react to changes in firms' economic lucrativeness and/or cannot be varied in order to enhance workers' productivity. Thus actually -the argument goes on- the only factor through which a firm can adjust its labour costs is the amount of its labour input. Then the argument concludes that in order to offer firms an alternative to adjustment of the amount of labour input a larger share of paid wages should consist of profits-based portions or be adaptable to changing economic circumstances in some other way. Our aim is to test whether wages in the Finnish metal and electrotechnical industry really are as rigid as argued and do not react to changes in profitability. In other words, we will consider whether the claim of individual wages being rigid w.r.t. profitability stands a closer empirical examination.

As the starting point for our study we run first a static multivariate model containing only controls for *observable* effects:

$$\ln w_{it} = \delta + \pi_{j(i,t)}\rho_0 + \mathbf{x'}_{it}\boldsymbol{\beta} + \mathbf{u'}_i\boldsymbol{\eta} + \mathbf{v'}_{j(i,t)}\boldsymbol{\rho}_1 + \mathbf{q'}_{j(i,t)t}\boldsymbol{\rho}_2 + \mathbf{p'}_t\boldsymbol{\tau} + \epsilon_{it}. \quad (1)$$

where w_{it} is person i's wage in period t and $\pi_{j(i,t)}$ measures *per capita* profitability of firm j in which person i works during the period t. Note that wage is defined as a logarithmic transformation. Since profits are in levels our empirical model specification is of semi-logarithmic form. Further the term $\mathbf{x'}_{it}$ is a transposed vector of observed *time-varying* individual characteristics (*e.g.* person's age) and $\boldsymbol{\beta}$ is the corresponding coefficients vector. $\mathbf{u'}_i$ is a transpose vector of *time-invariant* individual characteristics (*e.g.* person's sex). $\boldsymbol{\eta}$ is the vector of effects associated with the *time-invariant* individual characteristics. $\mathbf{v'}_{j(i,t)}$ is a transpose vector of *time-invariant* firm characteristics[6] (*e.g.* industry) and $\boldsymbol{\rho}_1$ is the corresponding coefficients vector. $\mathbf{q'}_{j(i,t)t}$ is a transpose vector of *time-varying* firm characteristics (*e.g.* capital intensity[7]) and $\boldsymbol{\rho}_2$ is the corresponding coefficients vector. $\mathbf{p'}_t$ is a transpose vector containing *time-specific* effects (*e.g.* indicators of business cycles and sectoral shocks, indices measuring collective wage increases or simply year dummies [8]) and $\boldsymbol{\tau}$ contains the corresponding coefficients. Finally, errors are specified with ϵ_{it}.

[6]Not represented in our estimation specifications.

[7]This vector should actually include per capita profits $\pi_{j(i,t)t}$ but as this forms our main object of interest the profits term is presented separately.

[8]Our decision to include year dummies was determined by the fact that an essential part of wage increases in Finland regularly takes place through collectively negotiated wage increases. Apart from year dummies we experimented also with an index by Statistics

But before going into regression models we look at descriptive statistics of salaries and profitability variables in table 1. After matching the monthly paid employees under the Finnish metal and electrotechnical industry's collective contract for monthly paid employees (the employer organisation TT's code '40') with annual firm-level profit information the number of employees having the information of the employer firm's profits (operating profits/value added) and thereby being estimable within the framework of model 1 amounted to 296625 (1995-2001) and 183920 (1998-2001). Since profits related payments are available only from 1998 onwards we will present - even at the risk of added confusion - two different sets of key figures for the salary concepts 1, 2, 3 and 4. The first set refers to the full time range 1995-2001 (296625 observations) and the second set is calculated from the limited period of 1998-2001 (183920 observations).

Concerning mean salaries it can now be seen that performance-based payments make the major difference. When compared to the salary concept 2 (basic salary+benefits in kind+compensation for exceptional working time) the inclusion of performance-based payments (concept 3) increases mean salary by well over three to almost four percent depending on whether calculated from the overall period 1995-2001 or from the limited period 1998-2001. Instead the addition of profits related cash payments[9] on top of that (salary concept 5) leads to hardly any net increase in mean salary.[10] The net effect of over time payments is about one and half percentage points. However, as over time payments are paid as compensation for increased labour input they need not be linked to rent sharing even if they were correlated with profitability. Of course, any of the observations above says nothing about whether and into which degree even base salaries are affected by firm profits.

Another interesting finding is that - independently how measured - profits are much more volatile than wages. While the coefficient of variation (standard deviation divided by mean) varies between 0.33-0.34 for salaries the same measure is 0.80 for real per-employee value added and rises up to 1.32 when profitability is measured with real annual per capita operating

Finland measuring collective wage increases and the regression results turned out to be similar to the ones based on year dummies. These results are available from the author on request.

[9]The profits related payments being paid to personnel funds are not included in these.

[10]Since profits related payments are available only from 1998 onwards the comparison here refers to the mean salaries calculated from the limited period 1998-2001.

profits. The significant volatility of per capita profits means that rent sharing effects may in fact affect employees' labour earnings much stronger than what regression model estimates might hint at first glance. We will consider this issue in more detail later on in this study.

In table 2 we see results of regressing monthly wages on annual per-employee profits (defined in terms of real operating profits, or alternatively, real value added) plus on an extensive set of employee and employer characteristics[11]. In models 1a-6a the profitability variable refers to real per employee operating profits [12]while in models 1b-6b firm's profitability is measured by real per employee value added.

The role or *raison d'etre* of value added as an alternative profitability measure deserves a short explanation. As already discussed, operational profits may suffer from not being completely exogenous with respect to wages. The reason for this is simply that operational profits are, by definition, revenues minus production costs, in the latter of which even costs for labour are included. Thus the very same thing that we are trying to explain at employee level, *i.e.* the individual's wage, affects the explanatory factor, operating profits, through labour costs at firm level. Value added, however, is defined as revenues minus production costs *except for* personal costs being included in these and therefore it is unaffected by changes in personal costs.

In regard to the dependent variable, models 1a and 1b represent a regression with base wage as dependent variable, in models 2a and 2b the base wage variable is augmented with benefits in kind and extra compensation for shift and Sunday work. In models 3a and 3b the wage variable is further augmented with performance-based payments. The wage specification in models 4a and 4b is that of the models 3a and 3b augmented with monthly overtime payments. Excluding over-time earnings but including instead per-month profits related cash payments leads us to the wage specifications in models 5a and 5b. Finally, by adding over-time payments back to the pay concepts of

[11]Along with profitability all the models contain the following independent variables: employer firm's real capital assets per employee; regular monthly working hours; age and its square; seniority within the current company and its square and cube; educational level (five categories); occupation (74 categories in accordance with *TT*'s own classification); and six year dummies for years 1996-2001. When the wage specification contains even over time earnings (models 4a, 4b, 6a and 6b) monthly over time hours are included amongst the explanatory variables.

[12]Income due to sales of tangible capital goods is excluded from our definition of operating profits. Therefore this measure of 'net' operating profits plus personal costs equals value added.

models 5a and 5b we obtain our most extensive wage specification in models 6a and 6b.

In all models the dependent variable is in natural logarithms while the independent profit variable is in levels enabling us to include even negative values in the analysis. All wage specifications are defined in real terms (1995 €) and as per month. Per capita profits are also in real terms (1995 1000 €) but, in contrast to monthly wages, profits are counted on yearly basis.

Firms' profitability appears to have a significant positive effect on white-collar employees' monthly salaries. The estimated wage elasticities with respect to per-head operating profits (models 1a-6a) range from 0.023 to 0.036.[13] And the estimated wage elasticities with respect to per-head value added (models 1b-6b) range between 0.039 and 0.062. Estimated elasticities for base wage models 1a and 1b are 0.023 and 0.039 respectively.

Thus even base wages seem to vary with firms' profitability. Inclusion of benefits in kind and working time supplements adds nothing to the estimated magnitude of shared rents. Instead individual or working unit performance based payments turn out to be of primary importance leading the elasticity to rise up to its practically highest estimated values, *i.e.* 0.036 and 0.060 for model 3a and 3b, respectively. The inclusion of over-time payments or even profits related cash payments leads to no further change.

The divergent roles of performance related payments *vs.* profits related cash payments are especially interesting for the emergence and magnitude of shared rents. A clear-cut conclusion would be to think that only the individual employee's (or his/her working unit's) own good performance affects his/her salary while the employer firm's overall collective economic performance does not add much extra at that. But the valid interpretation is not necessarily quite so unambiguous.

Firstly, and as mentioned earlier, information on firm-level profits related payments is available only from 1998 onwards. The reason for this is that the data collector, Finnish central industrial employer organisation *TT*, did not require that information from its member enterprises earlier. However, it is possible that firms may have even earlier reported profits related payments together with performance related payments without making a clear distinction between the two concepts.[14] In any case, from table 1 it appears

[13] For a semi-logarithmic model the elasticity is calculated by multiplying the estimated coefficient of profitability effect by the average of per employee profits.

[14] This optional reservation has also come up in our discussions with TT's wage statistics experts.

that during the years 1998-2001 profits related payments raised the average salary per month by only 2.13 euros (2503.89 *vs.* 2506.02 euros) while the impact of performance related payments during the same period was of a totally different magnitude raising the average salary by 94.30 euros per month (2409.59 *vs.* 2503.89 euros).

Another potential reason for the minor impact of profits related cash payments on individual salaries is the delay in the payment of these kinds of profits related items. Typically, firms measure profits on a yearly basis and the actual decisions concerning the corresponding cash payments are made only after the accounting period has ended. This means that cash payments based explicitly on profitability are generally paid during the following year after they are actually earned. This means that even lagged profits should be included in estimations. Evidently, the omission of lagged profits leads to the omitted variable problem resulting in biased estimates even for the part of non-lagged rent sharing effects. Therefore the impact of profits related cash payments will be fully assessed only after having added lagged profits as independent variables to the estimated model. We will analyse the potential impact of lagged pay-profits effects in more detail later on in this study.

It is also noteworthy to observe that rent sharing *effects* seems to be larger in the case of value added than in the case of operational profits. This is exactly what can be expected if operational profits suffer from endogeneity. In this case the use of operational profits as a profitability measure leads to downward biased estimates of rent sharing *coefficients*.[15] One way to try to detect potential endogeneity bias is to use value added as a parallel profitability measure.

Finally, in order to test the impact of estimation periods we ran auxiliary model estimations restricted to years 1998-2001 only using the wage concepts 3 and 4 as dependent variables.[16] The estimated pay-profits effects from the latter period turned out to be similar to the ones estimated from the overall period 1995-2001. Thus it seems that the relation between wages and

[15]Even though the sizes of rent sharing coefficient estimates remain fairly close to each other independently of the applied profitability measure the fact that real per capita added is much larger than real per capita operational profits on average means that the use of value added produces absolutely much larger rent sharing effects. In other words, there is a sort of scaling issue here so that operational profits *not* having larger estimated rent sharing coefficients compared to those of value added suggests that operational profits produce downward biased rent sharing coefficient estimates.

[16]The estimates are accessible on request from the author.

profitability remained unchanged during the period 1998-2001 compared to the years 1995-1997 even though a significant increase in real per capita profits took place during the latter period (*cf.* table 3).

The results of table 2 bear well comparison with the magnitude of international rents effects estimates based on corresponding multivariate models. Looking first at Nordic labour markets Arai & Heyman (2001) and Arai (2003) using corresponding model specifications presented elasticities in the range of 0.009 to 0.015 for Swedish nonagricultural private sector employees in 1991 and 1995 when profits were measured as four to five years averages of current and lagged profits per employee. However, Arai & Heyman (2004) using data of Swedish private sector employees combined with simultaneous annual per employee profits for 2000 arrives at the elasticity value of 0.002 only. Using a corresponding model specification and data on the manufacturing sectors Margolis & Salvanes (2001) report an elasticity of 0.01 for Norway.

Looking at continental labour markets (often regarded as an intermediate form between the Nordic and the Anglo-American labour market models) Margolis & Salvanes (2001) report an elasticity of 0.002 for a French manufacturing sectors data using a multivariate model specification. Correspondingly, using matched employee-firm data of French manufacturing Fakhfakh & FitzRoy (2002) report elasticities from 0.014 up to 0.019 for basic hourly wage and between 0.03 and 0.04 for total hourly earnings when profits are measured with the average of preceding three year's positive per-employee *operating profits*. When profitability is measured with the average of preceding three year's positive per-employee *value added* the elasticities rise up to 0.07 and 0.12 for basic hourly wages and total hourly earnings, respectively.

Martins (2004) uses Portuguese matched employee-employer panel data for manufacturing sector 1993-95 and shows hourly wage elasticities w.r.t. profits per worker between -0.002 and 0.013 for multivariate models. However, after having added the wage bill per worker to "net profits per worker" elasticities rise up to the range between 0.08. and 0.22. Martins concludes that small and even negative elasticities of the "net profits per worker" measure may testify of the fact that profitability measures from which even labour costs are subtracted suffer from endogeneity resulting in downward biased rent sharing estimates (higher wages, *ceteris paribus*, translate into lower profits).

Finally, as an example of the more disaggregated Anglo-American labour market system Blanchflower et al. (1996) estimate short-time elasticities ranging between 0.037 and 0.040 (weekly respectively hourly earnings) for full-year full-time worker data of U.S. manufacturing industry 1964-1986.

Regarding the estimated rent sharing effects from other countries above and comparing these with our own estimates a few remarks need to be made. Firstly, the foreign studies show that magnitudes of rent sharing effects vary significantly from one study to another. Substantial variation in estimated results underlines even more the significance of defining the estimated model specifications as well as the included profitability and earnings variables in detail.

Secondly, the sample of employees and industrial sectors is crucial when thinking how representative the results are with respect to the whole private sector workforce. Therefore, of course, when comparing our estimates with estimates from international studies based usually on a more or less representative sample of the entire private sector (or at least manufacturing sector) employees one needs to keep in mind that our estimation sample consists solely of metal and electrotechnical industry white-collar employees and therefore it is not representative for the whole Finnish private sector nor even for the manufacturing sector alone. Furthermore, as the sample of white-collar workers represents the more educated part of the private sector workforce and simultaneously covers such modern high-tech industries as the electronics industry it can be assumed that the estimated rent sharing effects are not representative in terms of their magnitude either. In fact, they are likely to be more significant than elsewhere in the Finnish private sector (*cf.* Piekkola (1999)).

Thirdly, a mere fact of finding statistically significant wage-profits effects and, moreover, these being more or less of the same dimension as the estimated effects from previous studies does not, *per se*, imply that rent-sharing needs to have any major effect on the size of individual wages. In absolute terms, the size of the estimated wage-profit effects means simply that at the average level of per capita operational profits of 52591.37 euros an increase by *1000 euros* in *annual* per capita operational profits leads to an increase in *monthly* wage by 1.00 to 1.68 euros depending on the wage definition.[17] Correspondingly, a one *percent* rise in annual per capita value added starting from its average level of 89702.23 € leads to an increase in monthly salary by 1.01 to 1.75 euros.[18] Of course, by themselves, these hardly form any

[17]This is calculated as $\hat{\rho}_0 \times \bar{w}$ where $\hat{\rho}_0$ is the estimated rent sharing parameter and $\bar{w}$ is the mean monthly wage.

[18]Corresponding values can be derived for France and Norway using the results of Mar-

exhaustive indicators for the potential significance of rent sharing *vis-à-vis* the size of monthly wages. Instead in order to clarify this issue we need to take a closer look on the average magnitude and volatility of profits.

One way to assess the importance of shared rents in this respect is to follow Margolis & Salvanes (2001) who compared the average contribution of pay-profits effects with the average wages net of this contribution. The idea of using this measure is that it shows directly how much higher wages are due to shared profits as compared to the case of no rent sharing taking place. After combining the estimated ρ_0-coefficient (*cf.* model 1) of table 2 with the per-capita profits of table 1 and adapting the measure by Margolis & Salvanes (2001) (hereafter referred as "the Margolis-Salvanes measure") to the semi-logarithmic model it can be seen in table 2 that when operating profits are used as profitability measure rent sharing raises wages by 2.32-3.68 % as compared to the average wages with no rent sharing effects present.[19] If profitability is measured by value added the corresponding Margolis-Salvanes measures range between 4.03 and 6.37 %. Thus rent-sharing has clearly a non-ignorable effect on white-collar employees' wages in the Finnish metal and electrotechnical industry.[20]

The comparison above, however, pays no attention to the year-to-year volatility or inter-firm dispersion of profits which both are focal factors when evaluating the impact of rent sharing on wages. A closer look at annual profitability figures (see table 3) reveals that over the observed time span 1995-2001 the yearly average of real per employee operating profits more than tripled in the Finnish metal and electrotechnical industry and the yearly coefficients of variation (the ratio of the standard deviation of the real per employee operating profits to the mean of the same measure) varied between 84.1% (1997) and 150.9% (1999). These figures show that profitability changes substantially over time and there is significant inter-firm dispersion

golis & Salvanes (2001).

[19]In difference to Margolis & Salvanes (2001) we adapt their measure to semi-logarithmic models. The measure can now be defined as $(\exp(\hat{\rho_0} \times \bar{\pi}) - 1)$ where $\hat{\rho_0}$ is the estimate of profit-pay coefficient and $\bar{\pi}$ is the (arithmetic) mean per-employee profit. Note that the percentage refers now to the geometric average instead of the arithmetic one.

[20]Margolis & Salvanes (2001), using a multivariate model, reported corresponding estimates of 0.21 % and 1.00 % for France and Norway, respectively. On the other hand, Oswald (1996) using estimation results of Abowd & Lemieux (1993) for Canada with instrumented profits ended up with a 28% wage premium created by rents as calculated from the mean wage after deducting the premium. Oswald (1996) admits, however, that there is likely to be measurement error in quasi-rents.

too.

In this respect, a more interesting approach to assess the importance of shared rents as a component of total salary is to use a measure by Richard Lester (1952). Lester's "range of pay" compares the spread of wages due to the dispersion of profits[21] with the mean wage.[22] The estimates of Lester's measure in table 2 indicate that the four standard deviations' dispersion ("range") in per-employee operating profits led to a 12.1-19.1 percent spread in wages in proportion to the monthly paid employees' mean wage in the Finnish metal and electrotechnical industry 1995-2001. And similar calculations based on real per-head value added instead led to a spread between 12.7 and 19.8. [23] These estimates are significant even in international perspective. Calculating Lester's range of pay values using cross-section multivariate estimations by Arai & Heyman (2001) for the Swedish private sector implies that the wage inequality due to the spread of profits ranged between 5.4-7.3 % and between 3.0-4.3 % of mean wages in 1991 and 1995 respectively. According to Blanchflower et al. (1996) the same measure applied to workers and firms in the U.S. manufacturing industry matched employee-firm sample gave the result that 12.2 % of the distribution of weekly earnings and 11.3 % of that of hourly wages is being originated in rent sharing. However, when using firm-level data and a dynamic model specification Blanchflower et al. (1996) ends up with a long-run Lester's range estimate of 24 per cent.

Another measure designed to assess the magnitude of shared rents for total wages is presented by Oswald (1996). The idea is to analyse how large a share of the *dispersion* of wages is to be accounted for the *dispersion* in shared profits.[24] When using operating profit as profitability measure it appears from table 2 that, depending on the wage concept, 8.8 to 13.6 percent of the standard deviation of salaries could be attributable for shared profits. When measuring profitability with value added Oswald's measure goes

[21] Using four standard deviations of profits as the width of the distribution of profits.

[22] Lester's range of pay is calculated using the formula $\varepsilon_{w,\pi} \times \frac{4 \times \sigma_\pi}{\bar{\pi}}$ where $\varepsilon_{w,\pi}$ is the elasticity of wages (w) with respect to profits (π), σ_π is the standard deviation of profits and $\bar{\pi}$ is the mean profit.

[23] Due to the adapted semi-logarithmic model specification the larger wage-profit elasticities linked to value added than to operational profits are now counterbalanced by the larger averages of per capita value added.

[24] For a log-linear model Oswald's measure can be defined as $\rho_0 \frac{\sigma_\pi \times \overline{w}}{\sigma_w}$ where ρ_0 is the coefficient of the profit-pay effect as estimated using a semi-logarithmic model like the equation 1 (wages defined as natural logarithms and profits as levels), σ_π is the standard deviation of profits and σ_w the standard deviation of wages.

from 9.2 percent up to 14.3 percent depending on the wage concept. In international comparison these values do not fall behind either. Using linear models Margolis & Salvanes (2001) presented Oswald's measure estimates of 2.56 % for France and 9.88 % for Norway. Oswald (1996), however, mentions that previous research has produced shares ranging from 24% to 70% for the United States and from 4% to 25% for United Kingdom.

As a conclusion of the estimation results using the basic multivariate static regression model 1 as our benchmark case it seems that profits and firms' ability to pay do play an undisputable role in monthly paid employees' wage determination in the Finnish metal and electrotechnical industry. However, the analysis so far forms only a starting point for a more detailed analysis. The rest of the paper will deal with a couple of analytical extensions. We will first consider the potential omitted variable bias due to the absence of controls for *unobserved time-invariant* firm and employee effects. After that we will consider the question whether firm profitability affects wages exclusively during the same year or whether there are lagged effects too. In the latter case we will also compare the magnitude of lagged effects with the immediate ones.

4.2 Multivariate models with controls for observed and unobserved personal and firm characteristics

Our static multivariate benchmark model estimations showed that profitability affects positively Finnish metal and electrotechnical industry salaries. Profits seem to affect even base wages and therefore the correlation of individual wages with the employer firm's profitability cannot be attributed merely to changing labour inputs (*e.g.* overtime working hours) or straight performance- or profits related wage components. On the other hand, the inclusion of performance-related components magnifies substantially the observed pay-profits effects.

But the multivariate static model estimations offer only a first scratch for a rent sharing analysis. Thus, the next issue is to analyse how robust the preliminary findings are when we adopt more detailed specifications. We still continue with a static model but extend the analysis by model specifications enabling us to control even *unobserved* time-invariant personal and firm effects.

The following model specification 2 contains now both observed and unobserved employee and firm effects:

$$\begin{aligned}\ln w_{it} =&\delta + \pi_{j(i,t)}\rho_0 + \mathbf{x}'_{it}\boldsymbol{\beta} + \alpha_i + \mathbf{u}'_i\boldsymbol{\eta} + \phi_{j(i,t)} + \mathbf{v}'_{j(i,t)}\boldsymbol{\rho}_1 + \mathbf{q}'_{j(i,t)t}\boldsymbol{\rho}_2 + \\ &\mathbf{p}'_t\boldsymbol{\tau} + \epsilon_{it}.\end{aligned} \tag{2}$$

In the equation 2 above α_i stands for the unobservable personal heterogeneity while $\phi_{j(i,t)}$ captures the unobserved firm heterogeneity associated with person i's employer firm j in period t. The rest of the parameter and variable symbols is defined as in model 1.

A detailed model such as model 2 entails, however, serious practical difficulties when trying to estimate it. Using unrestricted OLS leads to huge design matrices which need to be inverted in order to reach least squares estimates for all the parameters of the model. Abowd et al. (1999) present statistical methods they call 'conditional' methods which offer approximative solutions to the computationally infeasible full least squares estimation of all the parameters of the model 2. Margolis & Salvanes (2001) and in Finland Piekkola & Kauhanen (2003) have followed that approach but since the key interest in our study is the profits-pay effect we will follow another route suggested by Abowd et al. (1999).

The solution is simply to estimate a first-differenced (*cf.* Abowd et al. (1999)) or, alternatively, as deviations from individual means specified version of model 2 restricting the calculation of first-differences or mean deviations to each separate firm-individual cell (each cell consisting of the observations of the same person (i) as long as she/he stays in the same firm (j) between the two subsequent years (*i.e.* j(i,t)=j(i,t-1)). We will follow the latter approach. Using deviations from individual means wipes out the individual effects while restricting the calculation of each individual mean to contain only observations in the service of the same employer wipes out firm-specific time-constant effects. Thus our approach offers a way to bypass the computational difficulties linked with the full least squares solution. On the other hand, however, this is achieved at the expense of being unable to estimate and identify explicitly time-invariant individual and firm effects (*i.e.* α_i and $\phi_{j(i,t)}$). Neither can we estimate any other time-invariant effects. But, despite these shortcomings we still achieve our three most important objectives both with the first-differenced or within-individual mean differenced versions of model 2 as long as each separate differencing or calculation of means is accomplished using only observations of the same worker staying in the same firm. First, we can implicitly control for all observed and unobserved time-constant individual and firm-specific effects. Second, observable time-variant effects will be explicitly included and therefore also separately estimated in the model. And finally, we obtain a robust and consistent OLS estimate for the wage-profits effect.

Model specification 3 represents the mean-differenced version of the full model 2 and the deviations from means are calculated within each employee-employing firm (i-j) combination.[25] Note especially, that even the persons changing employer will remain in the estimation sample as long as the new employer firm is an estimation sample firm too. The individual-firm mean-differenced version is chosen instead of the first-differenced version because the deviations from means transformation preserves and makes use of a larger number of observations in the estimations (*e.g.* fitting the model in first differences ignores all the 1995 year's observations). As noted before, the use of differences eliminates all time-constant effects from the model. Still, any time-constant effect is controlled for in the model specification 3 which means that the estimation bias of estimated parameters due to omission of time-invariant effects from the basic model 1 is now eliminated. Yet, of course, only the explicit inclusion of any other previously omitted time-variant effect can eliminate the corresponding bias.

$$\begin{aligned} \ln w_{it} - (\overline{\ln w_i} - \overline{\ln w}) = &\delta + \{\pi_{j(i,t)t} - (\bar{\pi}_{j(i,t)} - \bar{\pi})\}\rho_0 + \\ &\{\mathbf{x}_{it} - (\bar{\mathbf{x}}_i - \bar{\mathbf{x}})\}'\boldsymbol{\beta} + \\ &\{\mathbf{q}_{j(i,t)t} - (\overline{\mathbf{q}}_{j(i,t)} - \overline{\mathbf{q}})\}'\boldsymbol{\rho}_2 + \\ &\{\mathbf{p}_t - (\overline{\mathbf{p}}_i - \overline{\mathbf{p}})\}'\boldsymbol{\tau} + \\ &\{\epsilon_{it} - (\bar{\epsilon}_i - \bar{\epsilon})\} \end{aligned} \tag{3}$$

[25] In the specification 3, actually, total sample means ($\overline{\ln w}$, $\bar{\pi}$, $\bar{\mathbf{x}}$, $\overline{\mathbf{q}}$ and $\bar{\epsilon}$) are first subtracted from the corresponding firm-employee combinations means ($\overline{\ln w_i}$, $\bar{\pi}_{j(i,t)}$, $\bar{\mathbf{x}}_\mathbf{i}$, $\overline{\mathbf{q}}_{\mathbf{j(i,t)}}$ and $\bar{\epsilon}_i$) and these differences then are subtracted from employee-level values. In this way even the constant term will be preserved in estimations. Note, however, that the estimated intercept coefficient encompasses now, in addition to the actual constant term, the total sample means of individual and firm-specific unobserved effects plus the effects of the total sample means of all time-constant observed firm and worker characteristics. Note furthermore that the specification 3 covers even unbalanced panels. For the case of time dummies belonging to the set of cross section-constant but time-variant variables $\overline{\mathbf{p}}'$ this implicates that their individual-specific means vary across individuals explaining the subindex of $\overline{\mathbf{p_i}}'$. The transformation, however, has no effect on the estimated $\boldsymbol{\tau}$ parameters.

In table 4 we see results of estimating multivariate mean-differenced regression models of type 3 above for the same six different wage specifications and the two per head profitability measures as before (see table 2). Again, each wage concept generates statistically significant estimates of rent sharing coefficients. But when it comes to the consequences of controlling for unobserved time-invariant employee and firm characteristics the comparison between tables 2 and 4 shows that the controls lead to a significant decrease in all the different indicators measuring the economic significance of rent sharing except in those of the wage concept 5.

Looking at any of the four indicators (the wage-profits elasticity, Margolis-Salvanes measure, Lester's range and Oswald's measure) it can be seen that the most prominent decreases fall on the two most elementary wage concepts (models 1a, 1b, 2a and 2b) which show decreases by one quarter as compared to the corresponding indicators in table 2. This means that a significant part of the observed (partial) correlation between basic wages and profits disappears if we also control for all the time-constant unobserved firm- and employee-specific effects. One possible explanation for this could be that higher basic wages are paid in more profitable firms simply because these employ more skilled and thus more productive workers.

While the aforementioned explanation leans closely on the idea of unobserved *employee-specific* effects there is another option inclined rather towards efficiency wage theories and unobserved *firm-specific* effects. Namely, if a firm chooses to pay more than the prevailing wage level in order to enhance its employees' productivity this is likely to produce unobserved firm-specific effects potentially correlated both with profits and wages. Thus unless being controlled, these effects might produce upward bias in pay-profits effects which would explain the observed decrease in rent sharing coefficients. Of course, both these explanations may apply simultaneously the only prerequisite being that the unobserved effects are time-invariant.

A similar, though quantitatively smaller, pattern of decreasing profit coefficients is repeated even for the broader wage concepts 3 (containing performance related payments) and 4 (even over-time earnings being included) after controlling for unobserved fixed effects. The wage concept 5 seems to be the most robust of all the wage definitions in this respect. It appears that even after controlling all unobserved time-invariant firm and employee effects on top of a wide set of time-variant effects the elasticity and the other estimates remain roughly intact. This shows up to the extent that once unobserved fixed effects are taken into account the wage concept 5 adduces now the largest response *vis-à-vis* both the profitability measures. This is no surprise, rather the contrary, but the outcome emerges only after having controlled both the employee- and firm-specific unobserved effects. The result emphasises, once more, the importance of detailed micro-econometric model specification.

Finally, when overtime earnings are added back (*i.e.* the wage concept 6) all the indicators drop even below those of the wage concepts 3 and 4. This might suggest that overtime earnings per an overtime hour are relatively unresponsive to fluctuations in profits (*cf.* table 1) which, combined with the semi-logarithmic model specification and the fact that the wage concepts 6a and 6b possess the largest averages of all the wage concepts, would then explain the decrease of wage-profit elasticities.

Again, Margolis-Salvanes measures show net effects of rent sharing on monthly salary as a percentual proportion of the average monthly salary without rent sharing. Now when operating profits are used as a profitability measure rent sharing raises wages by 1.72-3.43 % (*cf.* 2.32-3.68 % of table 2). If profitability is measured by value added the corresponding Margolis-Salvanes measures range between 3.01 and 5.89 % (4.03-6.37 % in table 2).[26]

As said, irrespective of a used profitability measure the largest wage-profit responses are now connected to the wage concept 5 which contains even the pay components based directly on the firm's profitability. Still it needs to be emphasised that, in absolute terms, the profits related components do not add much extra into the overall picture of rent sharing: for example, the Margolis-Salvanes measure estimates of salary concepts 3 and 4 are not significantly smaller. For the magnitude of shared rents the individual or working unit performance based payments are still by far the most important (*cf.* the difference between wage concepts 2 and 3 using any of the indicators).

Thus it seems that there are *unobserved* worker and firm characteristics contributing positively to individual wages and therefore unless being controlled for producing upwards biased rent sharing estimates. An apparent

[26]On the whole, these last-estimated margolis-Salvanes measures correspond fairly closely with estimates from international studies. Margolis & Salvanes (2001), using a multivariate model with instrumented per-employee profits and regressors consisting of a large set of observable firm and worker characteristics plus fixed worker and firm effects, reported estimates of 1.10 % and 0.61 % for France and Norway, respectively. A similar specification by Martins (2004) produced estimates of 0.66 % for instrumented real gross per-employee profits (*i.e.* operating profits) and 4.01 % for instrumented real net per-employee profits (*i.e.* value added).

reason for the rent sharing indicators of wage specification 5 to change least of all is that profits related payments are not paid because of some unobserved individual-specific characteristics but instead because they relate explicitly to the employer firm's profitability.

When it comes to the comparison of explanatory powers (goodness of fit) of various model specifications the comparison of the mean differenced model specifications with the basic multivariate specifications encompasses severe ambiguities and difficulties. The major ambiguity concerns the question of between which (or rather if any) R-squares the comparison ought to be made? In the case of the basic models of table 2 there is only one "squared R" but for the part of the mean differenced models, instead, there are three different R-squares. Each of these three R^2s is based on the same set of regression coefficient estimates being estimated using deviations from the individual-firm specific means (*i.e.* table 4 estimations). Thus for mean differenced models "R^2 within" is now an ordinary R^2. "R^2 overall" is a correlation squared between the observed untransformed values of the corresponding log-wage specification and the "predicted" values achieved by combining the coefficient estimates of table 4 estimations with the untransformed explanatory variable values of table 2. Finally, "R^2 between" is a correlation squared between the firm-worker means of the corresponding log-wage specification and the "predicted" values achieved by combining the coefficient estimates of table 4 with the firm-worker means of the explanatory variable values.[27] The quotes around the word "predicted" refer to the fact that the vector of coefficient estimates $\hat{\boldsymbol{\beta}}$ comes from the firm-worker mean-deviated model.

Thus, at first sight, it could be thought that the R^2s of the basic model estimations (table 2) could be compared with the "within" R^2s of the firm-worker mean-deviated models (table 4). But this is not a viable option either since in the case of the basic models the dependent variable is defined in logarithmic levels while in the case firm-worker mean-differenced model specifications the dependent variable is defined as deviations from the differences between the firm-worker specific and the total sample means. In other words, the model specifications differ not only in terms of the set of controlled effects but also in the way the dependent variable is specified. This means that

[27] More formally, if the estimated mean differenced model were simply $(y_{it} - \overline{y}_i) = (\mathbf{x}'_{it} - \overline{\mathbf{x}}'_i)\boldsymbol{\beta} + (\epsilon_{it} - \overline{\epsilon}_i)$ then R^2 within would refer to the prediction equation $(\hat{y}_{it} - \hat{\overline{y}}_i) = (\mathbf{x}'_{it} - \overline{\mathbf{x}}'_i)\hat{\boldsymbol{\beta}}$; R^2 between to the "prediction" equation $\hat{\overline{y}}_i = \hat{\boldsymbol{\delta}} + \overline{\mathbf{x}}'_i\hat{\boldsymbol{\beta}}$; and R^2 overall to the "prediction" equation $\hat{y}_{it} = \hat{\boldsymbol{\delta}} + \mathbf{x}'_{it}\hat{\boldsymbol{\beta}}$.

both the sums of squared errors (SSE) and the sums of squared totals (SST) differ between our basic models (table 2) and the mean-deviated models (table 4). In summary, one cannot straightforwardly compare the basic model R-squares with any of the three different R-squares of the mean-deviated models.

Instead the intra-group comparison is possible within the set of different "within" R^2s. Maybe the most interesting observation now concerns the sharp drop in the within R-squares when the directly on profits based payments are added in to salaries (concepts 5 and 6). The reason might be connected with the fact that all lagged wage-profits effects have been excluded from our estimated models so far. Especially, as the decrease in R-squares happens to coincide with the inclusion of firm-level profitability related payments the final pecuniary amount of which cannot be determined by the firm before it knows its annual profit. Therefore, as an accounting period continues often past the end of the year, the observed decline in the wage-profits effects may simply be due to the fact that payments based on the firm's overall profitability will not be paid during the same year they are actually earned but instead in the course of the following year. Thus in order to capture these effects lagged per-capita-profits need to be included in the estimation models. We will return to this issue in the latter part of the study.

Finally, the use of value added as an alternative profitability measure generated again without exception larger estimated rent sharing effects than those based on operational profits. This observation weakens the potential endogeneity problem as value added is likely to be more immune to potential downward endogeneity bias in rent sharing estimates than operational profits.

As a conclusion, the most interesting results can be summed up. Firstly, even after taking into account the unobserved time-constant individual and firm heterogeneity the evidence of rent sharing remains feasible. Secondly, the role of individual or working unit performance based payments comes out still as the most important factor for the magnitude of share rents. Thirdly, the firm-level profitability related payments are now proportionally more responsive than before to changes in a firm's profitability compared to basic wages. Fourthly, for the part of more basic wage concepts of models 1a-2a and 1b-2b it seems that a large part of the initially observed rent sharing effects arising from the basic models estimations was actually due to higher basic wage employees being in possession of more well paid individual characteristics or simply working in higher paying firms or occupations. Finally, the use of value added as an alternative profitability measure lends again further credence to the observed results as being more robust to endogeneity bias.

Up to now we have concentrated entirely on simultaneous pay-profits effects. Still, it is quite easy to think various mechanisms through which rent sharing may have delayed effects so that changes in pay need not necessarily take place instantly during the same year the firm's profitability changes. Therefore potential lagged profitability effects on wages are the issue of the following chapter.

4.3 Adding lagged profits and modelling long-run wage-profits effects

We continue by the question of whether the wages depend solely on current profits or are there effects that are due to previous years' profitability? Next step is to add a one period lagged per employee profits term ($\pi_{j(i,t)t-1}$) into the mean-differenced estimation model 3. The model specification is consequently now:

$$\begin{aligned}\ln w_{it} - (\overline{\ln w}_i - \overline{\ln w}) =& \delta + \{\pi_{j(i,t)t} - (\bar{\pi}_{j(i,t)} - \bar{\pi})\}\rho_0 + \\ & \{\pi_{j(i,t)t-1} - (\bar{\pi}_{j(i,t)} - \bar{\pi})\}\rho_1 + \\ & \{\mathbf{x}_{it} - (\bar{\mathbf{x}}_i - \bar{\mathbf{x}})\}'\boldsymbol{\beta} + \\ & \{\mathbf{q}_{j(i,t)t} - (\overline{\mathbf{q}}_{j(i,t)} - \overline{\mathbf{q}})\}'\boldsymbol{\rho}_2 + \\ & \{\epsilon_{it} - (\bar{\epsilon}_i - \bar{\epsilon})\}\end{aligned} \tag{4}$$

The model specification 4 represents a familiar distributed lag model: firm j's per capita profits have now also lagged effect(s) on person i's wage but there is no lagged dependent variable on the right side of the estimation equation. Otherwise the notation is identical to that of equation 3. Note that we are now primarily interested of *long-run* relations and the combined long-run effect of current and one year lagged profits can be modelled as $\rho = \rho_0 + \rho_1$.

In table 5 we see OLS estimation results of mean-differenced distributed lag wage models containing controls for observed and unobserved employee and individual effects as well as for current and one period lagged pay-profit effects. Except for one-year lagged profitability effects, in all other respects the specifications are identical to static multivariate models of table 4 above.

All estimated current period ($\hat{\rho}_0$) and one-year lagged ($\hat{\rho}_1$) pay-profit effects are statistically significant at 0.1% significance level in each of our twelve models. When comparing the long run effect estimates ($= \hat{\rho}_0 + \hat{\rho}_1$) of table 5 with the sole current period effect estimates ($\hat{\rho}_0$) of table 4 these do not differ much from each other for the part of basic wage specifications (1a, 1b, 2a and 2b). Instead in the case of models 3a, 3b, 4a, 4b, 5a and 5b the distributed lags models produced 3.1 to 13.5 per cent larger (long term) pay-profit estimates compared to the sole current period estimates. The biggest change by 13.5 % concerns wage concept 3.

In table 5 even the monthly base salary (models 1a and 1b) depends on the firm's lucrativeness. The addition of benefits in kind or supplements for shift and Sunday work does not alter the estimated effects. Instead, and in line with the previous static multivariate models findings, the inclusion of individual or working unit performance based payments into a wage specification leads to the doubling of *long-run* pay-profits effects. Instead augmenting wage specification 3 with monthly over-time earnings or explicit firm-level profits related payments does not affect the size of *long-run* pay-profits effects. An interesting outcome is also that wage specification 5 (containing even payments based directly on profits) generates now the strongest estimated one-year lagged effects of all. This supports the view mentioned before that the firm's overall profitability based payments may not always be paid during the same year as they are actually earned.

Even though the inclusion of lagged profits proved to be fully warranted it does not alter the "big picture" of previous findings; salaries seem still to vary in line with a firm's profitability independently of whether this is measured with operating profits or with value added. Thus the findings derived from the static models previously achieve further support from the distributed lag pay-profit models estimations. These dynamic models estimations offer, however, a more detailed view of rent sharing and the process through which profits may affect overall wages as well as their separate components.

The conclusions remain fairly similar when looking at pay-profit elasticities. Again, models 3a, 3b, 4a, and 4b produce elasticities that are proportionally from 8-9 up to 13-14 percent larger than the ones based on the static mean-deviated models. The rest of the models produce elasticities closer to those of table 4. The same observation holds for the other rent sharing indicators (Margolis-Salvanes measure, Lester's range of pay, the Oswald's measure). A distributed lags model's explanatory power is never higher than that of the corresponding multivariate model with no lagged profits. This may relate to the fact that the use of distributed lag multivariate models is restricted to a much smaller estimation sample than the one used in the static multivariate models estimations.

When assessing the importance of shared rents for the magnitude of average wages we may consider again estimated Margolis-Salvanes measures. Now the per-capita profits of table 1 are combined with the sum of the current and one-period lagged pay-profits coefficients ($= \hat{\rho}_0 + \hat{\rho}_1$). When operating profits are used as profitability measure the Margolis-Salvanes measures shows that after two years the total net effect of rent sharing raises wages by 1.77-3.68 % as compared to the average wages without rent sharing. If profitability is measured by value added the corresponding Margolis-Salvanes measures rise up to the range of 3.10-6.51 %. Thus even after controlling unobserved employee and firm effects rent sharing preserves clear and non-ignorable *long-run* effect on the white-collar employees' salaries, whereas the inclusion of lagged profits, for its part, emphasises especially responsiveness of wage concept 3 and individual-/working unit-specific performance related payments to profitability changes.

The significance of rent sharing is emphasised even more when recalling our preceding assumption about operating profits being likely to suffer from downward bias due to endogeneity while value added not being as susceptible to endogeneity may offer potentially more reliable profit sharing estimates.

As before, explanatory power comparisons are restricted to the intra-group comparison of different "within" R^2s. And there is again a sharp drop in the within R-squares when the directly on profits based payments are added into salaries (concepts 5 and 6). This same result repeating itself even after the inclusion of lagged profits indicates that it is not connected with profits related payments being paid during the following year after they are actually earned. An alternative explanation for the declining explanatory powers might be inter-firm heterogeneity as regards Finnish metal and electrotechnical enterprises' prevailing practises and grounds for paying profits related cash payments.

All in all, the parallel findings from the static and dynamic distributed lag multivariate models suggest that the existence of rent sharing cannot be disproved simply by explaining it to be due to misspecified estimation models or omitted observed and unobserved firm and employee effects. Besides, the observation that the measurement of profitability with per head value added generates regularly substantially stronger rent sharing effects than per capita operating profits is interesting in two respects. Firstly, the findings supporting the rent sharing hypothesis irrespective of which of the two alternative profitability measures is used offers a direct proof of the robustness of the estimated rent sharing effects. Secondly, in contrast to operating profits, per-head value added is not likely to suffer from the same kind of calculatory endogeneity bias because it does not depend upon wages. And therefore estimation results supporting the existence of shared rents when using value added as profitability measure offer further reliability for our results. Furthermore, value added not suffering from endogeneity related downward bias indicates that the actual magnitude of rent sharing may be closer to the estimates based on value added than those based on operating profits.

5 Conclusions

We have analysed the question of whether monthly paid employees' salaries depend on the employer firm's profitability in the Finnish metal and electrotechnical industry. This was done using annual matched employer-employee panel data for years 1995-2001 consisting of three extensive data sets: two sets of private sector wage statistics and one including firm-specific information on their profitability and other analogous issues.

Our findings show that there seem to be significant rent sharing effects in terms of monthly paid employees' wages being driven by the employer firm's ability to pay. The first-hand multivariate model's findings are strengthened when unobserved firm and employee effects are controlled. It also turns out that rent sharing is not an entirely immediate process so that it takes more than a year before a change in firm's profitability is passed on into individual salary changes in its entirety. Especially, this seems to concern firm-level profits related cash payments. Furthermore, the strongest rent sharing effects are found when even lagged rent sharing effects are included in estimations.

We have considered a wide set of different wage specifications in this study. A major novelty of the current study was to combine six different individual-level monthly wage concepts with two alternative profitability measures. In almost all model specifications the elasticity of monthly wages with respect to real per capita profits achieved its largest estimate value when using wage concept 3 consisting of basic wage, benefits in kind, supplements for shift and Sunday work and performance related payments. Such items as profits related cash payments or over-time payments did not add anything particular in terms of the magnitude of shared rents. When the profitability was measured by operating profits the estimated pay-profit elasticities of wage specification 3 ranged from 0.032 to 0.036 depending on the model specification. When profitability was measured by value added the elasticities were significantly higher ranging between 0.056 (static mean-differenced model) and 0.063 (dynamic mean-differenced distributed lag model). The additional inclusion of monthly over-time earnings or profits related payments did not rise the estimated pay-profits effects noteworthily.

The net wage rising effect as compared to the wage level without rent sharing achieved its highest values when wage concept 3 and the dynamic mean-differenced distributed lag model were combined. In this case the net wage rising effects varied between 1.77 and 3.68 per cent when measuring profits with operating profits and between 3.10 and 6.51 per cent when using value added as a profitability measure. Since pay-profits estimates based on value added need not suffer from a similar calculatory downward bias as operating profits are likely to do the actual size of rent sharing may be closer to the value added based estimates.

Our estimates of shared rents and their magnitude vis-à-vis total profits were also compared to estimates from previous international studies. The main conclusions obtained from various applied measures were the following. First, all the adapted measures produced size estimates for the significance of shared rents at least of the same magnitude as previous Nordic and Western-European findings. Second, comparing findings from the US and especially from papers using instrumented profits our estimates indicated that shared rents play a much smaller roll in the Finnish earnings determination; at least for the part of the metal industry's white collar workers.

As said, amongst the novelties of this paper was the use of various different wage specifications ranging from the monthly base wage to the one including benefits in kind, supplements for shift and Sunday work, performance-related payments, over-time earnings and direct profits related payments. Another new feature was to incorporate the use of various earnings specifications with two alternative profitability measures, namely, real per operating profits and real per head value added. The inclusion of the latter measure enabled also to consider possible endogeneity bias linked with operating profits. Still another extension was to incorporate the use of various earnings specifications with both short-term as well as long-term pay-profits estimates.

In this way we were not restricted to consider only the first hand question of whether there is rent sharing in the Finnish earnings determination but we could also extend the analysis to further interesting questions, such as, whether rent sharing is an equally important factor already at the base wage level, or alternatively, whether it arises only if different bonus elements and over-time supplements are included in wage specifications. All in, the study highlights the importance of specifying both wages and profitability variables in detail as well as careful microeconometric modelling. These all put strict requirements on the quality of used data: detailed information on wages and other individual-specific characteristics need to be combined with detailed firm-specific accounting information plus other firm characteristics. In addition to these cross-sectional aspects the applied data need to have a time-series dimension also enabling both the analysis over time as well as the controlling of unobserved fixed firm and worker effects.

A natural extension for future research is to analyse whether the observed pay-profits effects are symmetric wrt firm profitability. In other words, is it the case that only increasing profits affect individual wages? Or is it the case that even falling profitability affects wages maybe leading even to wage cuts? This is a central issue when thinking the discussion about "wage rigidities". If wages follow lucrativeness only upwards then there is a case for a familiar wage drift phenomenon. But if wages react even to decreasing profits it means that firms are both willing and able to use wage cuts as an alternative to decreases in labour input or even staff reductions. A specifying auxiliary question is then again whether potential wage cuts are restricted only to certain wage elements (for example to performance and profitability related payments) or could they concern even basic salaries?

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Table 1: Finnish metal and electrotechnical industry firms' profitability and their monthly paid employees' salaries 1995-2001.

Variable	Obs.	Mean	Std. dev.	Coeff. of variation
(1) Real monthly base salary (1995 €)	296625	2294.59	761.03	0.33
	183920	2369.87	779.50	0.33
(2) Real monthly salary (1995 €):				
consisting of real monthly base salary (1) +				
benefits in kind + extra compensation	296625	2331.74	803.65	0.34
for shift and Sunday work	183920	2409.59	824.69	0.34
(3) Real monthly salary (1995 €):				
consisting of real monthly salary (2) +	296625	2409.51	850.31	0.35
performance-based payments	183920	2503.89	876.17	0.35
(4)Real monthly salary with				
overtime earnings (1995 €):				
consisting of real monthly wage (3) +	296625	2447.95	859.17	0.35
overtime earnings per month	183920	2542.61	881.44	0.35
(5) Real monthly salary (1995 €):				
consisting of real monthly salary (3) +				
profits related cash payments	183920	2506.02	877.23	0.35
(6) Real monthly salary with				
overtime earnings (1995 €):				
consisting of real monthly salary (5) +				
overtime earnings per month	183920	2544.74	882.34	0.35
(7) Real annual operating profit	296625	52.5914	69.3938	1.32
per employee (1995 1000€)	183920	66.2108	82.2661	1.24
(8) Real annual value added	296625	89.7022	71.9876	0.80
per employee (1995 1000€)	183920	104.7188	83.9061	0.80

Notes:

[1] All the wages and their components calculated on monthly basis.

[2] Profit-based cash rewards available only from the year 1998 onwards.

[3] Profitability variables are calculated on yearly basis and divided by the annual average number of hourly and monthly paid employees of the corresponding firm. The proceeds of sales of tangible capital goods are excluded.

[4] The means and standard deviations of all the wage specifications are calculated directly from the employee sample while the means and standard deviations of the profitability variables are calculated from firm-level figures using firm-specific proportions of monthly paid employees as weights.

[5] Coefficient of variation measures standard deviation in proportion to mean.

[6] The number of observations tells the corresponding estimation period (1995-2001 vs. 1998-2001).

Table 2: Multivariate static wage equations without controls for unobserved effects in the Finnish metal and electrotechnical industry 1995-2001, monthly paid employees.

Model	1a	1b	2a	2b	3a	3b
Operating profit	0.0004366*		0.0004388*		0.0006789*	
per employee	(1.02E-05)		(0.0000105)		(0.0000112)	
Value added		0.0004402*		0.0004402*		0.0006739*
per employee		(0.0000119)		(0.0000126)		(0.0000156)
$\varepsilon_{w,\pi}$	0.023	0.039	0.028	0.039	0.036	0.060
Margolis-Salvanes						
measure (%)	2.32	4.03	2.33	4.03	3.63	6.23
Lester's range (%)	12.12	12.67	12.18	12.68	18.84	19.40
Oswald's measure (%)	9.14	9.55	8.83	9.20	13.35	13.75
R^2	0.6501	0.6505	0.6372	0.6376	0.6398	0.6403
N	277755	277755	277755	277755	277755	277755

Notes:

[1]In models 1a and 1b dependent variable is monthly base wage. In models 2a and 2b dependent variable consists of the model 1a/b base wage+benefits in kind+supplements for shift and Sunday work (all per month). In models 3a and 3b the wage specification is further augmented with performance-related payments. In all models the dependent variable is defined in natural logarithms while the profitability variable is in levels. All pecuniary factors are defined in real terms (wages in 1995 € and profits/value added in 1995 1000€).

[2] Profitability is measured by the employer firm's real annual operating profits per employee (excluding sales of tangible capital goods) or, alternatively, by the firm's real annual value added per employee.

[3] Along with profitability all the models contain the following independent variables: employer firm's real capital assets per employee; regular monthly working hours; age and its square; seniority within the current company and its square and cube; educational level (five categories); occupation (74 categories in accordance with *TT*'s own classification); and six year dummies for years 1996-2001. When the wage specification contains even over time earnings (models 4a, 4b, 5b and 6b) monthly over time hours are included amongst the other explanatory variables.

Table 2: (continues)

Model	4a	4b	5a	5b	6a	6b
Operating profit	0.0006875*		0.0006542*		0.0006615*	
per employee	(0.0000112)		(0.0000115)		(0.0000115)	
Value added		0.0006829*		0.0006805*		0.0006889*
per employee		(0.0000157)		(0.0000114)		(0.0000114)
$\varepsilon_{w,\pi}$	0.036	0.061	0.034	0.061	0.035	0.062
Margolis-Salvanes						
measure (%)	3.68	6.32	3.50	6.29	3.54	6.37
Lester's range (%)	19.08	19.66	18.16	19.60	18.36	19.84
Oswald's measure (%)	13.59	14.01	12.92	14.00	13.24	14.30
R^2	0.6442	0.6447	0.6201	0.6220	0.6219	0.6238
N	277755	277755	165120	165120	165120	165120

Notes:

[4] The wage specification in models 4a and 4b is that of the models 3a and 3b above augmented with monthly over-time earnings. The replacement of monthly over-time payments by per-month profits related cash payments leads to the wage specification in models 5a and 5b. Finally, when over-time payments are added back to the wage concept of models 5a and 5b there follows the earnings concept of models 6a and 6b. The information on profits related cash payments covers only the years 1998-2001 explaining the smaller number of observations.

[5] In models 1a-6a the profit variable is real operating profits (without sales of tangible capital goods) per employee (1995 1000€) and in models 1b-6b the profit variable is real value added per employee (1995 1000€). The term "employee" refers to the firm's total labour force (both hourly and monthly paid workers).

[6] $\varepsilon_{w,\pi}$ is the elasticity of wages with respect to profits per employee.

[7] The "Margolis-Salvanes measure" tells how many percent higher the mean wage rises due to rent sharing as compared to the average wage without rent sharing.

[8] "Lester's range of pay" tells the percentage change in wages due to the change of profits by four standard deviations starting from the mean profits.

[9] "Oswald's measure" tells how large a share of the total standard deviation of wages is due to profits and rent sharing.

[10] To ensure comparability between the adapted model specifications all elasticities and other indicators measuring the economic significance of rent sharing are calculated using the full 1995-2001 sample values of table 1.

[11] Standard errors are shown in parentheses and are adjusted for within cluster (*i.e.* within firm-person) dependence.

[12] + indicates significance at 1 %-level and * at 0.1 % -level.

Table 3: Finnish metal and electrotechnical industry firms' profitability 1995-2001.

	Real operating profits per employee			Real value added per employee		
Year	Mean	Std. dev.	Coeff. of variation	Mean	Std. dev.	Coeff. of variation
1995	25.01719	29.15382	1.165	59.24043	28.72545	0.485
	(11.01484)	(28.96395)	(2.63)	(42.48277)	(28.15707)	(0.663)
1996	28.22115	24.95325	0.884	63.71453	41.83735	0.657
	(16.0309)	(44.92884)	(2.803)	(53.06562)	(124.5063)	(2.346)
1997	36.65177	30.81109	0.841	71.3357	29.33754	0.411
	(17.19962)	(23.46843)	(1.364)	(49.30028)	(25.83306)	(0.524)
1998	46.29441	49.67852	1.073	83.01507	50.48548	0.608
	(14.6857)	(20.58834)	(1.402)	(46.85685)	(22.73786)	(0.485)
1999	57.343	86.55072	1.509	94.75123	86.87	0.917
	(13.15199)	(25.49656)	(1.939)	(46.23616)	(35.73843)	(0.773)
2000	78.01971	99.93356	1.281	116.524	100.2998	0.861
	(16.19257)	(31.36941)	(1.937)	(49.37974)	(32.78369)	(0.664)
2001	79.81173	77.83999	0.975	120.8329	81.98708	0.679
	(14.48875)	(20.22252)	(1.396)	(48.41062)	(23.09389)	(0.477)
All	52.56428	69.37903	1.320	89.67198	71.97341	0.803
	(14.77483)	(30.53025)	(2.066)	(48.11952)	(55.98794)	(1.32)

Notes:

[1]The means and standard deviations of both profitability variables have been calculated by using firm-specific proportions of monthly paid employees as weights.

[2]The alternative means and standard deviations have been calculated by using constant firm-specific unit-weights for each firm-year combination in the data. These statistics as well as the corresponding coefficients of variations are presented in the parentheses.

[3]All the means and standard deviations denoted in thousands of 1995 euros.

Table 4: Multivariate fixed effects wage equations for the Finnish metal and electrotechnical industry 1995-2001, monthly paid employees.

Model	1a	1b	2a	2b	3a	3b
Operating profit	0.0003247*		0.0003303*		0.0006059*	
per employee	(9.31E-06)		(9.78E-06)		(1.11E-05)	
Value added		0.0003308*		0.0003374*		0.0006198*
per employee		(9.14E-06)		(9.61E-06)		(1.10E-05)
$\varepsilon_{w,\pi}$	0.017	0.030	0.017	0.030	0.032	0.056
Margolis-Salvanes						
measure (%)	1.72	3.01	1.75	3.07	3.24	5.72
Lester's range (%)	9.01	9.53	9.17	9.71	16.82	17.85
Oswald's measure (%)	6.79	7.18	6.65	7.05	11.91	12.64
R^2: within	0.6491	0.6498	0.6310	0.6317	0.6475	0.6494
R^2: between	0.1955	0.1966	0.1952	0.1962	0.1986	0.2005
R^2: overall	0.1697	0.1711	0.1709	0.1722	0.1768	0.1793
N	277755	277755	277755	277755	277755	277755

Notes:

[1] In models 1a and 1b dependent variable is monthly base wage. In models 2a and 2b dependent variable consists of the model 1a/b base wage+benefits in kind+supplements for shift and Sunday work (all per month). In models 3a and 3b the wage specification is further augmented with performance-related payments. In all models the dependent variable is defined in natural logarithms while the profitability variable is in levels. All pecuniary factors are defined in real terms.

[2] Profitability is measured by the employer firm's real annual operating profits per employee (excluding sales of tangible capital goods) or, alternatively, by the firm's real annual value added per employee.

[3] Along with profitability all the models contain the following independent variables: employer firm's real per employee capital assets; regular monthly working hours; age and its square; seniority within the current company and its square and cube; educational level (five categories); occupation (74 categories in accordance with *TT*'s own classification) and six year dummies for years 1996-2001. When the wage specification contains even over time earnings (models 4a, 4b, 5b and 6b) monthly over time hours are included amongst the other explanatory variables.

Table 4: (continues)

Model	4a	4b	5a	5b	6a	6b
Operating profit	0.0005892*		0.0006416*		0.0005356*	
per employee	(1.13E-05)		(1.91E-05)		(2.00E-05)	
Value added		0.0006039*		0.0006376*		0.0005376*
per employee		(1.11E-05)		(1.86E-05)		(1.46E-05)
$\varepsilon_{w,\pi}$	0.031	0.054	0.034	0.057	0.029	0.049
Margolis-Salvanes						
measure (%)	3.15	5.57	3.43	5.89	2.86	4.94
Lester's range (%)	16.35	17.39	17.81	18.36	14.87	15.48
Oswald's measure (%)	11.65	12.39	12.72	13.11	10.72	11.16
R^2: within	0.6795	0.6812	0.5092	0.5096	0.5445	0.5450
R^2: between	0.2026	0.2045	0.1626	0.1647	0.1665	0.1685
R^2: overall	0.1850	0.1876	0.1337	0.1358	0.1375	0.1396
N	277755	277755	165120	165120	165120	165120

Notes:

4 The wage specification in models 4a and 4b is that of the models 3a and 3b above augmented with monthly over-time earnings. The replacement of monthly over-time payments by per-month profits related cash payments leads to the wage specification in models 5a and 5b. Finally, when over-time payments are added back to the wage concept of models 5a and 5b there follows the earnings concept of models 6a and 6b. The information on profits related payments covers only the years 1998-2001 which explains the smaller number of observations.

5 In models 4a-6a the profit variable is defined as in models 1a-3a and in models 4b-6b the profit variable is the same as in that of models 1b-3b.

6 In models 5a and 5b the independent variables are the same as in models 1a-3a and 1b-3b. Since monthly overtime earnings are included in the wage specifications of models 4a, 4b, 6a and 6b the corresponding numbers of over-time hours have been included as explanatory variables in these models.

7 $\varepsilon_{w,\pi}$ is the elasticity of wages with respect to profits per employee.

8 The "Margolis-Salvanes measure" tells how many percent higher the mean wage rises due to rent sharing as compared to the wage level without rent sharing.

9 'Lester's range of pay' tells the percentage change in wages due to the change of profits by four standard deviations ('Lester's range') divided by mean profits.

10 'Oswald's measure' tells how large a share of the total standard deviation of wages is due to rent sharing.

11 Standard errors are shown in parentheses and they are adjusted for clustering in firm-employee combinations.

12 + indicates significance at 1 %-level and * at 0.1 % -level.

Table 5: Multivariate mean-differenced distributed lag wage equations for the Finnish metal industry 1995-2001, monthly paid employees.

Model	1a	1b	2a	2b	3a	3b
Operating profit	0.0001695*		0.0001674*		0.0002995*	
per employee	(8.85E-06)		(9.30E-06)		(1.11E-05)	
Operating profit per	0.0001649*		0.0001722*		0.0003878*	
employee (one year lag)	(8.66E-06)		(9.19E-06)		(1.13E-05)	
Value added		0.0001787*		0.0001773*		0.0003346*
per employee		(8.49E-06)		(8.95E-06)		(1.06E-05)
Value added per		0.0001616*		0.0001699*		0.0003689*
employee (one year lag)		(8.25E-06)		(8.79E-06)		(1.07E-05)
$\varepsilon_{w,\pi}^{LR}$	0.018	0.031	0.018	0.031	0.036	0.063
Margolis-Salvanes						
(long-term) measure (%)	1.77	3.10	1.80	3.16	3.68	6.51
Lester's (long-term)						
range (%)	9.28	9.80	9.43	10.00	19.08	20.26
Oswald's (long-term)						
measure (%)	7.00	7.39	6.84	7.25	13.52	14.35
R^2: within	0.6180	0.6187	0.5959	0.5966	0.6046	0.6069
R^2: between	0.1207	0.1217	0.1212	0.1222	0.1179	0.1201
R^2: overall	0.1084	0.1095	0.1096	0.1107	0.1095	0.1119
N	185360	185360	185360	185360	185360	185360

Notes:

[1] $\varepsilon_{w,\pi}^{LR}$ is the long-run elasticity of wages with respect to profits per employee. For other details see table 4.

Table 5: (continues)

Model	4a	4b	5a	5b	6a	6b
Operating profit	0.0003043*		0.0002489*		0.000166*	
per employee	(1.13E-05)		(0.0000142)		(0.000015)	
Operating profit per	0.0003364*		0.0004129*		0.0003632*	
employee (one year lag)	(0.0000116)		(0.0000129)		(0.0000133)	
Value added		0.0003382*		0.0002663*		0.0001932*
per employee		(1.08E-05)		(0.0000136)		(0.0000145)
Value added per		0.0003204*		0.0004164*		0.0003594*
employee (one year lag)		(1.00E-05)		(0.0000124)		(0.0000128)
$\varepsilon_{w,\pi}^{LR}$	0.034	0.059	0.035	0.061	0.028	0.050
Margolis-Salvanes						
(long-term) measure (%)	3.43	6.09	3.54	6.32	2.82	5.08
Lester's (long-term)						
range (%)	17.79	18.97	18.37	19.66	14.69	15.91
Oswald's (long-term)						
measure (%)	12.67	13.51	13.12	14.04	10.59	11.47
R^2: within	0.6286	0.6306	0.4732	0.4748	0.4917	0.4929
R^2: between	0.1172	0.1193	0.0900	0.0919	0.0882	0.0899
R^2: overall	0.1120	0.1144	0.0738	0.0758	0.0726	0.0744
N	185360	185360	125428	125428	125428	125428

Notes:

[2] $\varepsilon_{w,\pi}^{LR}$ is the long-run elasticity of wages with respect to profits per employee. For other details see table 4.