The Matthew principle in practice? – On the development of wage dispersion in Norway and the relation to changes in the profitability distribution of firms

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April, 2009

PRELIMINARY

Key words: wage and earnings dispersion, variance decomposition, human capital, profitability, GMM

JEL-code: J31, J33, M52

Acknowledgement: This work was financed by the Norwegian Ministry of Work and Inclusion under the project "Lederlønninger og andre topplønninger i det norske arbeidsmarkedet", and by the Norwegian Research Council under grant number 173591/S20 (Harald Dale-Olsen) and under grant number 187928/S20 (Kjersti Misje Nilsen).Corresponding author: Harald Dale-Olsen, Institute for Social Research, P.O. Box 3233 Elisenberg, N-0208 OSLO, NORWAY. E-mail: hdo@socialresearch.no

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Abstract
In this paper we use comprehensive population-wide Norwegian linked employer-employee data to study the development of wage dispersion during the period 1995 to 2006. The dispersion in both for yearly earnings and hourly wages in the Norwegian economy during this period have increased steadily, but less for hourly wages than for yearly earnings. For yearly earnings we identify a movement towards greater dispersion between workplaces and smaller dispersion within workplaces. For hourly wages these changes are less evident. First-differenced GMM-regressions of wage dispersion on profitability reveal that those well-off benefit more from increased firm profitability than the median worker.

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1. Introduction

Changes in the wage and earnings distributions are important for several reasons. Such changes provide evidence on growth in the demand for skills, on changes in wage setting institutions and social norms, and on changes in the distribution of economic welfare and thus on a wide range of health and social issues.[1]

In Anglo-American countries we have observed a strong but possibly diminishing increase in wage and earnings inequality during the last 20 years (Katz and Murphy, 1992; Levy and Murnane, 1992; Acemoglu, 2002). Several studies indicate that the U.S. and UK labour market has been polarising (e.g., Autor et al., 2006; Goldin and Katz, 2007; Goos and Manning, 2007). Goldin and Katz argue for example that the U.S. wage structure has been polarising since the late 1980s. In Europe outside the UK, the evidence is clearly mixed. In many countries one only observes small variation in the overall wage and earnings inequality. In other countries one finds evidence of increased inequality (Freeman and Katz, 1995; Atkinson, 2008; Lazear and Shaw, 2009). In some cases, conflicting evidence is found due to different empirical approach and due to mixed effect over time. For example, while Germany is usually associated with a stable wage structure, Schönberg et al. (2009) conclude that German wage inequality increased at the top of the distribution in the 80s and at the bottom end of the distribution from the 90s. Similarly, the comparative analysis of Atkinson (2008) which focuses on four periods – the 1970s, the 1980s, 1990s and the 2000s – reveal different trends for many countries over the four periods.

The big question is why do we observe these country differences and similarities when it comes to changes in the wage structure? One explanation for the similarity regarding inequality growth is that skill-biased technological change increase demand for all kinds of skills and thus the return to skills (Acemoglu, 2002). Therefore technological change could be the main force

[1] See Katz and Autor (1999) for a survey on wage inequality. For a recent survey of the literature on wage inequality, see Lemieux (2008). For a popularised discussion of inequality in general and the consequences for societies, we recommend the recently published and much debated book of Wilkinson and Pickett (2009).

behind the widening at the top end of the wage distribution (Schönberg et al. (2009). At the same time, Lazear and Shaw (2009) identify large amount of wage variation within firms, which appears when comparing dispersion across countries with very different labour institutions. This may reflect skill-heterogeneity within the firms which are rather similar across countries or similarities regarding firm wage policies across countries.

Explanations for dissimilarities between countries are different changes in the wage setting institutions, for example de-unionisation, decentralisation in the wage setting and/or increased prevalence of performance pay (Fortin and Lemieux, 1997; Lemieux, 2008). Simón (2009) study on the European Structure of Earnings Survey reveals significant differences in inequality between European countries and in the relative influence of factors shaping wage inequality. He argue that cross-country differences in the distribution and in labour market prices attached to workplace and job characteristics are the primary factors contributing to international differences in wage inequality.

It can even be an interaction between technological and institutional change that drives the wage inequality. Lemieux et al. (2009) argue that technological change induce the provision of performance pay contracts, thus causing increased wage inequality.

Finally, one should also be aware of the possibility that changes in social norms contribute to increased wage inequality. This notion is presented by Pikkety and Saez (2006) as one explanation of why top wages are higher in the U.S. today than previously. They also front the possibility that executives have become more successful when bargaining for pay at the cost of owners. On the other hand, Gabaix and Landier (2008) relate the growth of executive pay to the increase in the market value of firms.

In our paper we use Norwegian linked employer-employee data covering the period 1995 to 2006 from both population-wide public administrative registers and comprehensive survey data to shed light on the development in wage and earnings dispersion, with particular emphasis on the relation between inequality, profitability and labour demand. The Norwegian economy is,

as many Central-European countries, characterised by more centralised wage-setting and strong unions compared to that of the Anglo-American countries. OECD (2008) ranks Norway as one of the countries with smallest wage inequality (but actually ranks average when it comes to inequality growth). Our centralised wage determination does not, however, imply that firm profitability does not matter for wages in countries such as Norway. Performance pay is for example provided to over 50 percent of the Norwegian workforce in 2003 (Barth et al., 2008a), and even when pay is fixed, local wage negotiations are based on profitability considerations. This is true for many other European countries as well.

Our study is definitely not the first to use Norwegian linked employer-employee data to address wage dispersion issues. Hunnes et al. (2009) in Lazear and Shaw (2009) analyse the wage dispersion within and between firms during the period 1981 to 1997, primarily restricted to member firms in the largest employer association (NHO) for white-collar workers or member-firms in the Federation of Norwegian Manufacturing Industries (TBL) for blue collar workers. Barth et al. (2008a) analyse the impact of performance pay on the wage dispersion based on data from 1997 and 2003 for a stratified sample of workplaces with more than 10 employees.

Our contribution to the wage and earnings dispersion literature is three-fold. Firstly, using Norwegian data we document similarities and differences in how *both the wage and earnings structure* changes during 1995 to 2006. This allows us to draw inference on the relation between changes in the wage structure and on the relation to effort, work intensity and demand. Secondly, we study over the same 10-year period how sensitive the development in overall wage inequality is to *the inclusion of different wage elements*, such as bonuses, compensation for working extra hours, and additional compensation elements. This also contributes to an understanding of the importance of demand related issues for wage inequality. Finally, by linking our earnings data to firms accounting records comprising the period 1999 to 2005, we are able to study empirically how sensitive the earnings dispersion within and between firms are to *changes in firms' profitability and excess labour demand*. We ask if both low and high paid workers reap the same benefit from

increased firm profitability. Our panel data allow us to exploit local exogenous variation in profitability caused by changed pay-roll tax rate facing a firm to identify a causal impact of profitability on the earnings dispersion. Thus we can study whether the wage dispersion within firms is due to the heterogeneity of skills within firms or due to wage policies of incentive pay.

The structure of the remainder of the paper is as follows. In Section 2 we provide an overview of the current literature on wage and earnings dispersion within and between firms. Our data are described briefly in Section 3. In Section 4 we describe the development in the wage and earnings dispersion in Norway from 1995 to 2006. The importance of differences in educational qualification, between industries and workplaces is analysed in Section 5. In Section 6 we then analyse how sensitive the earning dispersion within and between firms are to changes in profitability and excess labour market demand. A brief conclusion is presented in Section 7.

2. Wage and earnings dispersion within and between firms and workplaces

As seen in the introduction, the empirical literature on wage dispersion comprises different strands, one focusing on explaining similarities motivated by technological change while the other focus on explaining differences motivated by the heterogeneity caused by different labour market institutions.

Our study follows the approach of Lazear and Shaw (2009), which utilises matched employer-employee data sets to look at the structure of wages within firms as well as across firms and individuals. While Lazear and Shaw (2009) analyses data from Denmark, Finland, Norway, Sweden, Belgium, France, Germany, Italy, the Netherlands and the United States, we are limited to data from Norway only.[2] Lazear and Shaw reveal that the "within firm wage variation is about 60 to 80 percent of the overall wage dispersion across all individuals in the economy" (Lazear and Shaw, 2009:6). Furthermore, they point to the observation that in many European countries firm

[2] While Hunnes et al. (2009) in Lazear and Shaw (2009) analysed the period 1981-97, we focus on the period from 1995 to 2006 with population-wide data.

differences in wage appear to be growing over time. This is certainly true for Norway. In the U.S. this appears more stable (Abowd, Haltiwanger and Lane, 2009). In the Norwegian Chapter, Hunnes et al. (2009) show that during the period 1981 to 1989 the between-firm dispersion where rather stable (small ups and downs), but from 1989 the between firm dispersion has increased steadily in Norway. This growth in dispersion, however, completely disappears when Hunnes et al. control for compositional changes. This raises two questions: does the growth in dispersion continue? And if so, will it still be related to compositional change?

If we look to Norway's Scandinavian neighbouring countries, the between-firm wage dispersion in both Sweden and Denmark continues to increase even after taking account of compositional change (Skans et al., 2009; Eriksson and Westergaard-Nielsen, 2009), while Finland differs massively in that the firm dimension was unimportant in the beginning of the 1990s, while most of the wage dispersion in the late 1990s is explained by between firm wage dispersion (Uusitalo and Vartiainen, 2009).

What about changes in the institutional setting and the influence on wage dispersion? As pointed out in the introduction, performance pay is provided to over 50 percent of the Norwegian workforce in 2003, but its prevalence has increased considerably since 1997 (Barth et al., 2008a). How will this influence wage dispersion within and between workplaces? To answer this, Barth et al. (2008b) develop a theoretical model which predicts that, compared to a fixed pay system, individual effort based remuneration schemes increase within-firm wage dispersion, while group-based bonuses have minor effects on the wage inequality. Their model also predicts an interaction between performance-related pay and union bargaining, where union power reduces the impact of performance pay on wage dispersion. Empirically they find, based on Norwegian employer-employee data from 1997 and 2003, that the increasing prevalence of performance pay only has small impact on wage dispersion, particularly in countries with strong unions. However, it is fair to note that 2003 was a recession year for the Norwegian economy. Thus, if wage dispersion follows from the interaction between of an introduction of performance pay and

changes in labour demand following technological change in line with the notion of Lemiuex et al. (2009), then we would expect these effects to become more visible when the Norwegian economy enters an expansionary business cycle phase, i.e., after 2003.

3. Data

The *first* data set, or more precisely, data system, is based on public administrative register data, provided to us by Statistics Norway. It comprises *all* employers (workplaces and firms) and their employees in Norway 1995–2005 (roughly 150000 workplaces and 1800000 employees each year) employed May 15th each year. This linked employer-employee data system provides information on workers (gender, educational qualifications), jobs (for example spell length in days and thus seniority, spell-specific earnings, weekly working hours), firm-and establishment identifying numbers and on establishment-characteristics such as industry (5-digit NACE), sector and municipality.

The job-specific earnings comprise ordinary wages, compensation for working extra hours, and taxable fringe benefits. Among the fringe benefits listed, one finds benefits of lower interest rate from employer provided loans, gains from buying stocks at lower prices than market value, and stock options and housing. The list is thus quite comprehensive.

In most of the analyses we focus on workers being employed by a single employer during the whole years, thus discarding observations of job changes (movers). This restriction is done to avoid or reduce measurement problems related to job spell length. This is important since earnings are measured for the complete job spell. Thus comparison of earnings between workers makes only sense for those having identical job spell length, and thus for simplicity we have focused on those being employed by the same employer 365(366) days a year. An alternative approach would be to construct a daily earnings measure. This is more sensitive to measurement errors of the spell length (information on when the spell stops is more prone to errors), but avoid

selection issues. We present in the appendix (Table A1) analyses based on daily earnings as well, and these reveal qualitatively the same story as our chosen approach.

For research purposes, it is a nice feature of the Norwegian public administrative registers that each individual, each establishment and each firm are identified by unique identifying codes (separate number series). In our data, these original numbers are replaced by encrypted numbers. These numbers make it possible to link our firms to the Accounting register containing accounting information on in principle all reportable Norwegian firms (exemption for certain types of firms). This makes us able to analyse two performance measures; return on sales (profits relative to revenue) and return on capital (profits relative to total capital).

However, since workplaces may change owners during the year and our information on jobs are related to May 15th, we are not able to link accounting information to all firms in our job files. Since our purpose is to estimate regressions of firm-specific earnings dispersion on performance, we enforce a strict firm size limit on the population of firms used in these analyses. Each firm in these analyses has at least three employees. Thus we end up with 120472 observations on 23593 firms.

The *second* data system used in this paper is individual data from the Norwegian Wage statistics (1997-2006) which comprise all jobs in the public sector and a random stratified sample of private sector jobs. The sample in private sector is drawn from Statistics Norway's database of establishments and enterprises. The sample unit is the firm. All establishments in a firm are included and all individuals from a drawn firm will be included in the sample. The sample in private sector is stratified by industry and number of employees, and all large firms are included. The probability for other firms to be drawn is decreasing in number of employees. In the analysis, unless otherwise stated, the data is weighted to make them representative.

The Norwegian Wage Statistics has expanded through two channels; new industries have been included or the population of firms has changed. Two new industries have been included: Hotels and restaurants (from 2001), and fishery (from 2002), and some new major firms (e.g,

Telenor, Post Office Services and Norwegian State Railways) have been included in the Statistics. The sample used in this paper includes all individuals aged 18-67, which usually work at least 4 hours during a week or in the case of public sector workers, are employed in at least 10% positions.

Key variables used in the analysis include different wage measures and contractual weekly working hours (private sector) and percent of normal full-time position (public sector). The wage measures are reported on a monthly basis, and comprise fixed pay, bonuses, extra fixed and variable compensation, and compensation for working extra hours. From the monthly measures we are able to calculated daily wage measures.

4. The development of earnings and wage dispersion in Norway from 1995 to 2006

In this section we document descriptively changes in the Norwegian wage structure during the period 1995 to 2006. Our overview comprises different kinds of inequality measures and we apply these to different kinds of earnings and wage measures. Such an approach clearly increases the robustness of our findings regarding inequality, but it will also allow us to draw tentative inference on issues related to work effort, intensity and demand. Consider for example the difference between 1) total earnings including benefits such as stock options, 2) hourly pay including bonuses, compensations for working extra hours and other kinds of compensation, and 3) fixed hourly pay. These measures are to a diminishing degree sensitive to work effort, intensity and product demand issues.

We start by studying the overall changes in the wage structure for the Norwegian economy. Table 1 depicts the development for different kinds of wage and earnings measures, and for different kinds of inequality measures. Income denotes total income from salaried work across all possible jobs, earnings expresses total earnings within a single specific job. Total hourly wage expresses total hourly pay including bonuses, compensation for working extra hours, and

other fixed and variable compensation. 95-50 and 50-05 denote the relative difference between the 95-pecentile in the earnings(wage)-distribution and the median and the relative difference between the median and the 5-pecentile in the earnings(wage)-distribution, respectively. Gini expresses the Gini-coefficient, while Variance expresses the variance of the log earnings(wage). Since comparisons of earnings between full-time and part-time workers potentially can be regarded as troublesome, we present separate figures for all workers and for full-time workers only.

Table 1 reveals three obvious tendencies. Firstly, with one exception during our period of observation the wage and earnings dispersion in Norway increase, but from a very modest level, and, the dispersion still remains compressed at the end of our observation period. The Gini coefficient for all workers indicates a more stable development.

Secondly, while we observe an increase at the top, the changes at the bottom are modest, particularly if one focuses on full-time workers. The exceptions to this found when we compare the development in yearly earnings, but these are caused by much heterogeneity at the bottom of the earnings distribution, i.e., yearly earnings vary a lot at the bottom due to difficulties in determining what is really a whole-year job.

Thirdly, while the dispersion is less when we compare hourly pay to yearly earnings or yearly income, the changes or development over time are similar, particularly at the top. Thus effort, work intensity and demand create larger dispersion in earnings than in hourly pay, but this relationship does not change over time. An exception to this is possibly found at the low end of the hourly pay distribution, where the median relative to the 5-percentile appears to increase, while the same relative figure for income and earnings are much more stable. This implies a drop in hourly pay, which are offset by effort, work intensity, work hours and demand.

[INSERT TABLE 1 AROUND HERE]

In Table 2 we present the same figures as in Table 1, but in Table 2 we focus on private sector workers. These figures present a similar story as what we found in Table 1. The main difference between Table 2 and Table 1 is, not surprisingly, that the wage and earnings dispersion are greater in private sector than the dispersion over all sectors, but these tables also reveal that the difference is actually rather modest.

[INSERT TABLE 2 AROUND HERE]

Finally in this section we study how the wage dispersion depends on the inclusion of different wage elements. In Table 3 we present figures for the wage dispersion at the top and at the bottom based on four different wage measures: 1) total hourly pay including all elements, 2) hourly pay excluding compensation for working extra hours but including bonuses and other fixed and variable compensation, 3) hourly pay including bonuses but excluding all other extra compensation, and 4) fixed pay only.

[INSERT TABLE 3 AROUND HERE]

Table 3 reveals that the wage dispersion increases modestly regardless of wage measure. The wage dispersion is smallest when we focus on the fixed pay only. Still, even here we observe an increase in dispersion both at the top end of the distribution and at the bottom. By adding bonuses the wage dispersion quite naturally increases. We may possibly see a tendency for larger dispersion growth compared to the growth in fixed pay dispersion. When we add fixed and variable compensation (except compensation for working extra hours) nothing much happens. Finally, when we also add compensation for working extra hours, we find that the dispersion if anything is reduced. This is not strange, since bonuses are much more prevalent at the top end of

firm hierarchies while compensation for working extra hours is often the only way workers low in the firm hierarchies can achieve increased pay.

5. Wage and earnings dispersion and the relation to human capital-, industry- and workplace-differences

In this section we look closer on the importance of education, industry relationship and finally whether these previous wage structure changes can be attributed to changes in the wage dispersion within and between workplaces.

Table 4 comprises three different parts. In the first part – denoted A – we present in column 1, 4 and 6 the variance of log yearly earnings, log total hourly pay and log hourly pay less bonuses and compensation for working extra hours, respectively. Then using our data we conduct simple Mincerian log wage and log earnings regressions, derive from these regressions the residuals, and then calculate the variance of the residuals.

Our two kinds of data allow different sets of controls. On the yearly earnings data we have information on workers' educational qualifications on a very detailed level (4-digit codes), thus we conduct the within-transformation based on educational qualification, and then estimate yearly a log earnings regression controlling for woman, full-time worker, potential experience in years (and squared). The variance of these residuals is presented in Table 4 as "less human capital". When we study the importance of industry, which we know at the 4-digit level, we create 8-digit "occupational codes" by combinations of the 4-digit industry codes and the 4-digit educational code. Then we conduct the within-transformation and thus control for all fixed variation related to industries and educational qualifications (and their combinations), and finally, run the same log earnings regression as described above. The variance of these residuals is presented in Table 4 as "less human capital and industry". For the hourly wage data we cannot control for education on such a detailed level. Here we run simple log hourly wage regressions

controlling for years of education (in excess of compulsory schooling), a dummy for full-time worker, years of potential experience (and squared). The variance of these residuals is also presented in Table 4 as "less human capital".

[INSERT TABLE 4 AROUND HERE]

Table 4, part A, reveals that for yearly earnings the trends in dispersion does not depend on what kinds of control one adds. More controls naturally diminish the dispersion. All three columns reveal significant growth in dispersion, close to 30 percent. For the hourly pay we observe possibly a weak increase when we study total hourly pay, but when we control away human capital differences and exclude compensation for working extra hours, we observe no clear development in dispersion. If anything, human capital differences are related to the occurrence of bonuses. The main difference is really between the development in earnings dispersion and the development in wage dispersion, not between how education- and industry-differences affect this development.

Table 4 comprise two more parts, called B and C, which present the within-workplace variance as a proportion of total variance in percent (B) and the between-workplace variance as a proportion of total variance in percent (C). While the tendencies for yearly earnings are clear, as a proportion of total variance, the within-variance diminishes while the between-variance increases. For the hourly pay we se conflicting tendencies, particularly when we take into account human capital differences. When we do not control for human capital we see no clear trend, thus the within and between-workplace distribution are more or less unchanged.

However, when we control for human capital we find that within-workplace variation in total pay increases (and the between-variance diminishes accordingly), but when we exclude compensation for working extra hours, the within-workplace variance diminishes (while the between-variance increases accordingly). Our interpretation of this is that bonuses increasingly

contribute to the sorting of workers between workplaces, while compensation for working extra hours primarily increases the dispersion within workplaces. Furthermore, bonuses and overtime compensation are provided to workers endowed with different amount of human capital.

Finally, when all aspects of effort, work intensity and hours and demand effects are incorporated, as is expressed by yearly earnings, we observe a clear tendency towards larger dispersion between workplaces and less dispersion within workplaces.

6. Earnings dispersion and firm performance

We start out in this section by descriptively mapping how changes in performance are related to changes in the earnings dispersion of firms. This descriptive approach is very simple. Each year we calculate the relative difference between the 95-percentile and the median in the firm-specific earnings distribution. Each year we also split our firms into three categories depending on profitability: low, medium and high. This defines the profitability group the base year. Then we assign the firms to a profitability group the next year. Thus we create a matrix of nine categories expressing nine different combinations of profitability the base year and the next year. For each category we then calculate the average change in firm-specific 95-50 earnings dispersion. Since profitability can be measured differently, we focus on two measures: return on sales and return on capital. Low, medium and high profitability as measured by the return on sale are: below 1.44%, between 1.44% and 7.61% and above 7.61%, respectively. Low, medium and high profitability as measured by the return on capital are similarly: below 3.58%, between 3.58% and 17.00% and above 17.00%, respectively. The results are presented in Table 5.

[INSERT TABLE 5 AROUND HERE]

Consider the relation between changes in earnings dispersion and changes in the return on sale first. First impressions are that highest growth in dispersion occurs for firms that do not change category, and the largest growth in dispersion is found among high profitability firms. For firms becoming more profitable contingent on being low profitable in the base year we observe diminishing dispersion, while for firms becoming less profitable contingent on being high profitable in the base year, the dispersion grows. This can reflect a "regression towards the mean"-effect, but it can also reflect that increased wage dispersion usually implies increased wage costs and thus reduced profitability. For firms having medium profitability, however, we see that profitability growth implies increased earnings dispersion.

If we then consider the relation between changes in earnings dispersion and changes in the return on capital, we more or less observe the same story. The exception is related to low profitability firms, where it is hard to discern any clear pattern.

Next we are to study the causal impact of performance on the earnings dispersion.[3] We have chosen to measure performance by the return on capital. As motivation for the econometric analyses consider the following two equations:

$$1)\quad \text{Ln } W^{95}_{ft} = \alpha^{95}_{t} + \alpha^{95}_{p}\,(\Pi/K)_{ft} + \alpha^{95}_{1}\ln(V/U)_{mt} + \alpha^{95}_{x}{}'Z_{t} + \theta^{95}_{f} + \nu^{95}_{ft},$$

$$2)\quad \text{Ln } W^{50}_{ft} = \alpha^{50}_{t} + \alpha^{50}_{p}\,(\Pi/K)_{ft} + \alpha^{50}_{1}\ln(V/U)_{mt} + \alpha^{50}_{x}{}'Z_{t} + \theta^{50}_{f} + \nu^{50}_{ft},$$

where ln W expresses log yearly earnings and superscript 50 or 95 denote the 95-percentile and median worker within the firm f's earnings distribution, Π/K denotes the operating profit per capital ratio – the return on capital – , $\ln(V/U)_{mt}$ denotes log local vacancy/unemployment ratio,

[3] A number of studies focus on how wage dispersion affects performance, but the evidence so far is rather mixed. We would argue that the causal impact is yet to be determined. Lallemand et al. (2001) and Heyman (2005) find evidences implyinga positive impact of wage dispersion on performance in Belgium and Sweden, respectively. Winter-Ebmer and Zweimüller (1999) identified an U-shaped relationship in Austria. In Israel Gneezy and Rustichini (2000) found that if one introduced incentives it was important to ensure that these were strong enough, otherwise they worked against their purpose. Finally, Bloom (1999) and Grundt and Westergaard-Nielsen (2008) find on the other hand a negative correlation between wage dispersion and performance and between wage dispersion growth and performance growth.

the Z's express other controls related to competitors' pay (where competitors are defined as other firms within the same 4-digit industry), α_t expresses year dummies, θ_f captures permanent payment differences between firms, and ν_{ft} expresses a standard error term. The inclusion of variables associated with competitors pay are thought to capture the impact of local industry-specific shocks to payment.

Note that α^{50}_p and α^{95}_p denote the piece-rate on performance for the median worker and the 95-percentile worker, respectively. Since the piece-rate is usually increasing as one climbs in a firm's hierarchy[4], we have all reasons to expect that $\alpha^{95}_p - \alpha^{50}_p > 0$. Thus

3) $LnW^{95}_{ft} - LnW^{50}_{ft} = (\alpha^{95}_t - \alpha^{50}_t) + (\alpha^{95}_p - \alpha^{50}_p)(\Pi/K)_{ft} + (\alpha^{95}_1 - \alpha^{50}_1) \ln(V/U)_{mt} + \alpha^x_x{}'Z_t + \theta^x_f + \nu^x_{ft}$,

where notation is as defined previously. From Equation 3) it is clear that if our expectation is correct, then improved performance will increase the earnings dispersion within firms.

In equations 1-3) $(\Pi/K)_{ft}$ is clearly endogenous[5] and thus has to be instrumented by (a) variable(s) thought to affect $(\Pi/K)_{ft}$ but not earnings directly. We argue that the pay-roll tax rate is such a variable. Profits can be decomposed into revenue and costs, i.e., $\Pi = R-(1+t)wL-C$, where w, R, L, and C denote wages (as they are received by the workers), total revenue, employment, and all other costs of production which are not related to labour. The pay-roll tax rate is denoted by t. Thus (1+t)wL expresses total labour costs. We see that if the pay-roll tax rate increases, then labour costs increase, and profits are consequently reduced. The pay-roll tax rate is determined geographically, and varies between five geographical zones during our period of observation (1999-2005). During this period we observe minor changes in the pay-roll tax rate it self (for most of the period the five different pay-roll tax rates are 0, 5.6%, 6.4%, 10%, and 14%) but more importantly, municipalities change pay-roll tax zones. Thus a firm may experience sizeable changes in the labour costs following pay-roll tax rate changes.

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[4] As an extreme case, consider typical CEO remuneration versus the remuneration of an average worker.

[5] Consider for example the case if a firm only employs two workers (called 95 and 50) and production only involve labour and assume for simplicity that we can ignore other controls and fixed effects. Then $\Pi/K = (R-w^{95}-w^{50})/K$, where R denotes total revenue. Then $lnw^{95}{}_t = \alpha^{95}_{ft} + \alpha^{95}_p \Pi/K_{ft} + \nu^{95}_{ft} = \alpha^{95}_t + \alpha^{95}_p (R-w^{95}-w^{50})/K_{ft} + \nu^{95}_{ft}$, where $COV((R-w^{95}-w^{50})/K_{ft}, \nu^{95}_{ft}) \neq 0$ and thus the basic assumptions for running OLS regressions are violated. Since $COV((R-w^{95}-w^{50})/K_{ft}, \nu^{95}_{ft}) < 0$ the OLS-estimates will be biased towards zero and may even become negative.

Using our panel data on firms during the period 1999-2005 we estimate equations 1-3) using GMM-IV on first-differenced observations (in the Appendix Table A2 we present the similar figures estimated using OLS), where we instrument the return on capital by the pay-roll tax rate. Since we estimate first-differenced regressions fixed firm effects are being taken care of, and our instrument need only to be weakly exogenous for us to achieve unbiased estimates (Cameron and Trivedi, 2005:758). Our main results are presented in the first three columns of Table 6.

[INSERT TABLE 6 AROUND HERE]

Note first that our instrument performs quite well. As seen in the table, the pay-roll tax rate affects the return to capital significantly and negatively as expected. Increasing the pay-roll tax rate implies reduced return on capital. Furthermore, the tests of the strength of the pay-roll tax rate as an instrument indicate that our instrument is quite strong.

Next consider the effect of local labour market tightness (as measured by the vacancy/unemployment ratio). As seen in the first column increased local labour market tightness implies higher earnings for the median worker, while the earning of the 95-percentile worker is largely unaffected. The overall effect between the 95-percentile and the median worker is not significantly affected, i.e., the within-firm earning dispersion is not sensitive to changes in the local labour marked tightness.

Finally, consider the impact of the return on capital on earnings and within-firm earnings dispersion. While the return on capital has no significant impact on the earnings of the median worker, it affects the earnings of the 95-percentile worker strongly. If performance is improved then the 95-percentile worker clearly achieves earnings growth. When we consider earnings dispersion, we see that improved performance is manifested in increased earnings dispersion as

well. So these results imply that performance primarily benefits the workers at the top of firms' hierarchies.

However, the previous three regressions do not reveal how performance affects the wage dispersion between firms. Thus we simply calculate the firm average of the variables, and run IV-regressions on these average observations. In these regressions we cannot control away firm fixed effects, but in one of the specifications we add controls for 2-digit SIC industry differences. As instrument for the firm-specific average return on capital we now use average firm-specific change in pay-roll tax. As seen in the next two columns in Table 6 (models 4 and 5) this instrument performs nice. It affects return on capital negatively and significant, and as an instrument it is definitely not weak.

Once again we see strong positive impact of the return on capital on the firms' earnings dispersion. Although we do not present this in the table, we also find a strong positive impact of the return on capital on the earnings of the median worker, but as seen in the table, the impact on the 95-percentile worker is much larger. As seen in the table we also identify a strong impact of the local labour marked tightness on firms' earnings dispersion.

Our regressions in models 4 and 5 yield estimates that are to be interpreted as within+between estimates, i.e., they comprise both the within-firm effect and the between-firm effect. The between estimates then arise as the within+between estimates subtracted the within-estimates. The between-firms estimates are then presented in the last two columns.

Even in this case we find a strong positive impact of the return on capital on the firms' earnings dispersion. Increasing the return on capital by 1 percentage point increases the earnings dispersion by 4 percent. Thus we find that increased performance increases the earnings dispersion within firms and it increases the earnings dispersion between firms. Finally we identify a strong impact of the local labour marked tightness on firms' earnings dispersion. Thus while the local labour market tightness does not affect the wage dispersion within firms, a tighter labour market locally is manifested in more dispersed earnings between firms.

7. Conclusion and discussion

In this paper we have documented that the Norwegian wage and earnings structures have changed, albeit moderately, towards greater inequality. During the period 1995 to 2006 the wage and earnings dispersion in Norway increase. However, the growth in earnings dispersion is larger than the growth in wage dispersion. Our interpretation of this difference is that effort, the amount of work, and other demand considerations provide the additional increase in dispersion when one compares earnings to wages.

We also show that human capital differences are important for the changes in the distribution of hourly wage. The within-workplace variation in total pay increases (and the between-variance diminishes accordingly) when we control for human capital differences, but when we exclude compensation for working extra hours, the within-workplace variance diminishes (while the between-variance increases accordingly). Thus we argue that bonuses increasingly contributes to the sorting of workers between workplaces, while overtime compensation primarily increases the dispersion within workplaces. Bonuses and overtime compensation are provided to workers endowed with different amount of human capital. Still, when all aspects of effort, work intensity and hours and demand effects are incorporated, as is expressed by yearly earnings, we observe a clear tendency towards larger dispersion between workplaces and less dispersion within workplaces.

Finally, we test the notion that improved performance benefits those workers that already are better paid, more than the median worker. In several log earnings regressions of earnings on performance we identify a strong positive causal impact of the return on capital on firms' earnings dispersion. This could be taken as evidence of the Matthew-principle in practice: the 95-percentile worker, already being a highly paid worker, benefits even more than the median worker from improved performance. However, this should not come as a big surprise. It is not unreasonable to expect that the top echelon workers in a firm have their pay set being more sensitive to variation in performance than the average worker. If this is the case and wages are

determined according to the principal-agent framework, then larger inequality follows from improved performance.

Our analyses are unfortunately not without caveats. Particularly our regressions rest on rather simple specifications. The complexity of worker's remuneration schemes varies quite a lot. For example, it is not unreasonable to argue that lagged performance should be important for pay. In our case we only measure a direct effect of performance on pay the same period. However, to achieve identification in a model with more complexity we need additional instruments, and unfortunately our data do not comprise such variables so we let this be a topic for future research. We have also been forced to conduct the regression analyses on a limited period of time (1999-2005) and one could argue that this period do not cover a serious recession. Norway experienced a small recession during 2002-3003, but to find a truly strong recession one has to go back to the late 1980s and early 1990s. Extending the period of observation to incorporate years after the financial crises should clearly be a topic for future research.

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Table 1 The development in earnings and wage dispersion during 1995 to 2006. All sectors.

	Workers employed the whole year by one employer						All	
	Income		Yearly earnings				Total hourly wage	
	95-50	50-05	95-50	50-05	Gini	Variance	95-50	50-05
All workers								
1995	1.96	2.87	1.98	5.61	29.3	53.2		
1996	1.95	2.75	1.98	5.95	28.8	55.3		
1997	1.97	2.80	2.00	5.20	29.1	51.5	1.81	1.40
1998	2.00	2.81	2.03	5.32	29.5	53.3	1.81	1.41
1999	2.00	2.80	2.05	5.43	30.0	54.9	1.83	1.40
2000	2.01	3.50	2.08	5.54	30.8	56.8	1.82	1.42
2001	2.03	2.75	2.10	5.30	30.7	55.5	1.88	1.43
2002	2.04	2.70	2.13	5.51	31.7	58.7	1.87	1.47
2003	2.03	2.73	2.11	5.70	31.5	58.9	1.89	1.45
2004	2.03	2.73	2.07	5.04	29.7	52.8	1.88	1.47
2005	2.05	2.68	2.08	4.93	29.8	52.7	1.90	1.47
2006							1.92	1.48
Fulltime workers								
1995	1.91	1.63	1.92	1.90	20.8	15.1		
1996	1.91	1.61	1.92	1.88	20.9	15.2		
1997	1.93	1.64	1.94	1.89	21.1	15.6	1.83	1.40
1998	1.96	1.66	1.97	1.92	21.6	16.3	1.83	1.39
1999	1.96	1.65	1.98	1.97	22.0	17.0	1.84	1.40
2000	1.98	1.65	2.00	2.06	22.7	18.2	1.85	1.42
2001	1.99	1.93	2.02	2.03	22.7	18.2	1.90	1.44
2002	2.00	1.63	2.04	2.16	23.4	19.5	1.89	1.45
2003	2.00	1.62	2.03	2.26	23.4	20.5	1.90	1.44
2004	1.99	1.67	2.00	1.99	22.5	18.2	1.88	1.46
2005	2.00	1.64	2.01	1.93	22.6	18.3	1.90	1.47
2006							1.92	1.48

Note: Population yearly earnings: Workers registered in public administrative registers (tax and social service registers) employed by at least one employer the whole year and where earnings are known. Population: hourly pay data: Statistics Norway's Wage Statistics survey data. With the exceptions of the columns denoted Gini and Variance, all other columns express relative wage differentials. 95-50 denotes the relative difference between 95-percentile and the median, while 50-05 denotes the differential between the median and the 5-percentile. Gini and Variance express the Gini-coefficient and the variance for log total earnings. From 2004 we observe a break in the time series for yearly earnings and income due to changes in the registration of weekly working hours.

Table 2 The development in earnings and wage dispersion during 1995 to 2006. Private sectors.

	Workers employed the whole year by one employer					All	
	Income		Yearly earnings			Total hourly wage	
	95-50	50-05	95-50	50-05	Variance	95-50	50-05
All workers							
1995	1.99	2.87	2.03	5.18	51.1		
1996	1.97	2.75	2.02	5.44	53.7		
1997	1.98	2.91	2.01	5.66	54.2	1.92	1.47
1998	2.06	3.00	2.11	6.19	59.3	1.90	1.46
1999	2.06	3.03	2.12	6.3	61.3	1.91	1.47
2000	2.04	2.97	2.10	6.16	60.7	1.91	1.48
2001	2.05	3.72	2.11	5.72	58.3	1.98	1.47
2002	2.11	3.01	2.19	6.10	62.5	1.98	1.53
2003	2.12	3.05	2.19	6.09	62.2	2.00	1.50
2004	2.12	3.12	2.18	6.18	62.9	1.99	1.51
2005	2.14	3.09	2.20	6.19	63.8	2.00	1.53
2006						2.03	1.54
Fulltime workers							
1995	1.96	2.87	1.96	1.98	16.5		
1996	1.95	2.75	1.96	1.97	16.6		
1997	1.97	2.80	1.96	1.97	16.6	1.90	1.43
1998	2.00	2.81	2.03	2.04	18.6	1.89	1.43
1999	2.00	2.80	2.04	2.12	19.6	1.89	1.44
2000	2.01	2.82	2.03	2.15	19.5	1.91	1.45
2001	2.04	2.75	2.04	2.13	19.6	1.96	1.46
2002	2.04	2.70	2.11	2.23	21.6	1.96	1.48
2003	2.03	2.73	2.11	2.20	21.4	1.98	1.47
2004	2.03	2.73	2.11	2.22	21.7	1.97	1.49
2005	2.05	2.68	2.12	2.20	22.2	1.99	1.51
2006						2.01	1.52

Note: Population yearly earnings: Workers registered in public administrative registers (tax and social service registers) employed by at least one employer the whole year and where earnings are known. Population: hourly pay data: Statistics Norway's Wage Statistics survey data. With the exception of the column denoted Variance, all other columns express relative wage differentials. 95-50 denotes the relative difference between 95-percentile and the median, while 50-05 denotes the differential between the median and the 5-percentile. Variance expresses the variance for log total earnings. From 2004 we observe a break in the time series for yearly earnings and income due to changes in the registration of weekly working hours.

Table 3 The development in wage dispersion for different wage components during 1995-2005.

	Total hourly pay		Hourly pay including bonuses and other extra pay		Hourly pay including bonuses but not extra pay		Fixed hourly wage	
	95-50	50-05	95-50	50-05	95-50	50-05	95-50	50-05
All								
1997	1.81	1.40	1.78	1.38	1.79	1.35	1.75	1.36
1998	1.81	1.41	1.78	1.39	1.78	1.35	1.77	1.35
1999	1.83	1.40	1.81	1.37	1.80	1.35	1.77	1.35
2000	1.82	1.42	1.81	1.39	1.80	1.37	1.77	1.35
2001	1.88	1.43	1.86	1.39	1.85	1.37	1.81	1.37
2002	1.87	1.47	1.86	1.44	1.86	1.40	1.82	1.40
2003	1.89	1.45	1.88	1.43	1.88	1.41	1.84	1.41
2004	1.88	1.47	1.87	1.44	1.88	1.42	1.84	1.42
2005	1.90	1.47	1.89	1.43	1.90	1.44	1.84	1.41
2006	1.92	1.48	1.92	1.45	1.92	1.45	1.86	1.42
Private sectors								
1997	1.92	1.47	1.92	1.41	1.93	1.40	1.89	1.41
1998	1.90	1.46	1.92	1.42	1.93	1.40	1.90	1.40
1999	1.91	1.47	1.93	1.41	1.94	1.41	1.90	1.40
2000	1.91	1.48	1.93	1.43	1.93	1.41	1.90	1.41
2001	1.98	1.47	1.99	1.42	1.99	1.41	1.94	1.40
2002	1.98	1.53	1.99	1.47	2.00	1.45	1.96	1.45
2003	2.00	1.50	2.00	1.46	2.00	1.46	1.96	1.45
2004	1.99	1.51	2.00	1.47	2.03	1.46	1.96	1.46
2005	2.00	1.53	2.04	1.48	2.04	1.47	1.98	1.45
2006	2.03	1.54	2.06	1.49	2.06	1.49	1.99	1.47

Note: Population: hourly pay data: Statistics Norway's Wage Statistics survey data. All columns express relative wage differentials. 95-50 denotes the relative difference between 95-percentile and the median, while 50-05 denotes the differential between the median and the 5-percentile.

Table 4 Development in wage and earnings dispersion for private sector fulltime employees during the period 1995-2005. The importance of education, industry and the workplace.

	Yearly earnings			Hourly pay			
				Total hourly pay		Hourly pay less bonuses and overtime	
	Total	Less human capital	Less human capital and industry	Total	Less human capital	Total	Less human capital
A. Variance in percent							
1995	16.5	12.5	9.1				
1996	16.6	12.7	9.3				
1997	16.6	12.8	9.3	21.7	14.9	20.4	13.6
1998	18.6	14.2	10.5	23.7	15.7	22.2	14.3
1999	19.6	15.0	11.2	22.7	15.3	21.2	13.7
2000	19.5	15.8	11.6	21.5	14.5	19.9	12.9
2001	19.6	15.6	11.2	23.4	16.0	21.5	14.2
2002	21.6	16.8	12.5	23.4	16.0	21.8	14.4
2003	21.4	16.7	12.3	22.7	15.6	21.2	14.1
2004	21.7	16.8	12.5	22.5	15.2	21.1	13.8
2005	22.2	17.2	12.7	23.5	15.4	21.6	13.9
2006				24.9	16.3	22.5	14.5
B. Within-workplace variance as proportion of total variance (percent)							
1995	53.7	59.1	68.3				
1996	54.3	59.9	69.2				
1997	52.6	57.7	66.8	52.6	56.3	52.6	64.2
1998	52.4	58.4	67.2	55.2	59.6	55.4	67.4
1999	52.4	58.7	67.3	55.8	59.4	55.9	67.4
2000	53.0	58.0	66.9	55.3	58.3	55.8	65.7
2001	52.9	59.1	68.3	53.6	57.7	54.2	65.7
2002	51.9	58.9	67.8	59.1	57.0	59.8	62.6
2003	51.3	58.5	67.3	55.0	56.3	55.9	63.7
2004	49.9	57.4	66.3	52.9	58.7	53.4	65.8
2005	49.4	57.0	66.4	53.9	60.3	55.1	61.2
2006				52.9	61.4	53.9	61.9
C. Between-workplace variance as proportion of total variance (percent)							
1995	46.3	40.9	31.7				
1996	45.7	40.1	30.8				
1997	47.4	42.3	33.2	47.4	43.7	47.4	35.8
1998	47.6	41.6	32.8	44.8	40.4	44.6	32.6
1999	47.6	41.3	32.7	44.2	40.6	44.1	32.6
2000	47.0	42.0	33.1	44.7	41.7	44.2	34.3
2001	47.1	40.9	31.7	46.4	42.3	45.8	34.3
2002	48.1	41.1	32.2	40.9	43.0	40.2	37.4
2003	48.7	41.5	32.7	45.0	43.7	44.1	36.3
2004	50.1	42.6	33.7	47.1	41.3	46.6	34.2
2005	50.4	43.0	33.6	46.1	39.7	44.9	38.8
2006				47.1	38.7	46.1	38.1

Note: Population yearly earnings: Workers registered in public administrative registers (tax and social service registers) employed by at least one employer the whole year and where earnings are known. Population: hourly pay data: Statistics Norway's Wage Statistics survey data. Table elements in A express variance in percent. Columns headed by Less human capital and Less human capital and industry express the variance of the residual from log wage or log earnings regressions. Less human capital implies that we control for gender, potential experience in years (and squared) and education. Education is expressed as years of education in excess of compulsory education in the log wage regressions. In the log earnings regressions we are able to conduct a within educational qualification transformations, thus controlling for a differences related to 4-digit educational qualifications. Less human capital and industry similarly expresses the residual variance, but where we have controlled away all variation related to 4-digit educational qualification and 4-digit industry codes as well as gender and years of experience (and squared). Table elements in B express the within-workplace variance as proportion of the total variance. Table elements in C express the between-workplace variance as proportion of total variance.

Table 5 Changes in 95 – 50-earnings dispersion for different categories of profitability growth. Percent

	Return on sales			Return on capital		
	Low	Middle	High	Low	Middle	High
Profitability base year						
Low	0.07	-0.01	-0.17	-0.01	-0.08	-0.03
Middle	0.41	0.86	0.88	0.37	0.72	0.80
High	1.32	1.01	0.96	1.57	1.15	1.14

Note: Private sector firms with at least 3 fulltime workers employed the whole year and which receive an hourly wage equalling at least 30 1995-Nok. Earnings dispersion is measured by fulltime workers employed the whole year by a single employer and which receive at least an hougly pay equaling 30 1995-Nok. Low, middle and high denote different degrees of profitability (see text for more details).

Table 6 The impact of firms' return on capital on earnings dispersion. GMM-IV. 1999-2005

	Within firm			Within+between firms		Between firms	
Model	1	2	3	4	5	6	7
Left hand side:	Lnw50	Lnw95	wd95-50	wd95-50	wd95-50	wd95-50	wd95-50
Right hand side:							
Return on capital	0.072	0.726**	0.654*	4.249**	4,228**	3,595**	3,574**
	(0.258)	(0.357)	(0.363)	(0.863)	(0,860)	(0,936)	(0,041)
Log local V/U	0.004*	-0.003	-0.006	0.034**	0,035**	0,040**	0,041**
	(0.002)	(0.003)	(0.004)	(0.010)	(0,010)	(0,010)	(0,010)
Comp. lnw50	0.071**	0.105**	0.034**	-0.008	-0,082	-0,042	-0,116**
	(0.008)	(0.012)	(0.012)	(0.034)	(0,040)	(0,036)	(0,042)
Comp. wd95-50	0.003	0.014	0.010	2.197**	2,256**	2,187**	2,246**
	(0.013)	(0.021)	(0.020)	(0.239)	(0,247)	(0,240)	(0,248)
Comp. wd50-05	-0.010	-0.003	0.009	-0.783**	-0,758**	-0,792**	-0,758**
	(0.006)	(0.003)	(0.008)	(0.092)	(0,100)	(0,092)	(0,100)
Additional controls							
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes				
Industry					Yes		Yes
Method							
First-difference	Yes	Yes	Yes				
IV-test 1	F=11.3	F=11.3	F=11.3	F=27.1	F=27.0		
IV-test 2:	F=9.20	F=9.2	F=9.2	F=18.2	F=18.1		
Pay-roll tax rate	-0.003**	-0.003**	-0.003**	-0.014**	-0.014**		
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)		
Unit		firmXyear			firm		
Observations		120742			23593		

Note: Population: Private sector firms with at least 3 fulltime workers employed the whole year and which receive an hourly wage equalling at least 30 1995-Nok. Lnw50, lnw95 and wd95-50 denote firm-specific median log daily earnings, 95-percentile log daily earnings, and the relative earnings differential between the 95-percentile and median log daily earnings (lnw95-lnw50), respectively. Comp denotes competitors, and is defined as the average of other firms within the same 4-digit industry code. In Models 1-3 is the unit in the regressions firmXyear. These models are estimated using GMM-IV on first-differenced observations. Unit in Models 4-5 is the firm. The observations used in Models 4 and 5 express firm averages across the period of observation. In these IV-regressions we weight each observation with the number of years we observe the firm. In the panel-regressions we instrument firm's return on capital with the pay-roll tax rate. In the mean-regressions (Model 4 and 5) we instrument average return on capital with the average change in the pay-roll tax rate during the observation period. IV-test 1 and IV-test 2 denote the F-value to the excluded instrument in the first stage regressions and the Cragg-Donald (N-L)*minEval/L2 F-value, respectively. Both F-tests express the strength of our instrument. The between-firm effect arises as the within+between effect deducted the within-firm effect. ** and * denote 1 and 5 percent level of significance, respectively.

Table A1 The development in earnings dispersion during 1995 to 2006. Daily earnings.

	All				Private sector			
	Full-time and part-time		Full-time		Full-time and part-time		Full-time	
	95-50	50-05	95-50	50-05	95-50	50-05	95-50	50-05
1995	2.03	6.55	1.94	1.88	2.07	6.24	1.99	1.94
1996	2.04	7.25	1.96	1.91	2.08	6.92	2.00	1.98
1997	2.05	6.51	1.97	1.89	2.08	7.07	2.00	1.96
1998	2.08	6.71	1.99	1.92	2.16	7.89	2.06	2.02
1999	2.09	6.89	2.00	1.92	2.18	7.92	2.07	2.08
2000	2.11	6.94	2.03	1.94	2.15	7.94	2.07	2.10
2001	2.14	6.53	2.04	1.97	2.16	7.40	2.07	2.12
2002	2.15	6.30	2.04	2.02	2.24	8.00	2.14	2.27
2003	2.15	6.14	2.04	2.01	2.25	7.98	2.14	2.26
2004	2.12	5.41	2.04	3.49	2.23	6.69	2.13	2.29
2005	2.14	5.25	2.03	3.31	2.24	6.46	2.15	2.28

Note: Unit of observation: job. Population daily earnings: All workers registered in public administrative registers (tax and social service registers) employed by at least one employer and where earnings are known. All columns express relative earnings differentials. 95-50 denotes the relative difference between 95-percentile and the median, while 50-05 denotes the differential between the median and the 5-percentile. From 2004 we observe a break in the time series for daily earnings due to changes in the registration of weekly working hours.

Table A2 The impact of firms' return on capital on earnings dispersion. OLS. 1999-2005

	Within firm			Within+between firms		Between firms	
Model	1	2	3	4	5	6	7
Left hand side:	Lnw50	Lnw95	wd95-50	wd95-50	wd95-50	wd95-50	wd95-50
Right hand side:							
Return on capital	0.022**	0.013**	-0.009**	-0.062**	-0.061**	-0.053**	-0.052**
	(0.003)	(0.003)	(0.003)	(0.009)	(0.009)	(0.009)	(0.010)
Log local V/U	0.004**	0.003**	-0.001**	0.018**	0.017**	0.019**	0.018**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Comp. lnw50	0.070**	0.095**	0.024**	0.004	-0.047**	0.020*	-0.061**
	(0.007)	(0.010)	(0.009)	(0.010)	(0.013)	(0.013)	(0.016)
Comp. wd95-50	0.004	0.016	0.013	1.080**	1.201**	1.067**	1.187**
	(0.013)	(0.018)	(0.017)	(0.031)	(0.046)	(0.035)	(0.049)
Comp. wd50-05	-0.010*	-0.000	0.010	-0.368**	-0.375**	-0.378**	-0.385**
	(0.006)	(0.007)	(0.007)	(0.013)	(0.013)	(0.015)	(0.015)
Additional controls							
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes				
Industry					Yes		Yes
Method							
First-difference	Yes	Yes	Yes				
Unit		firmXyear			firm		
Observations		120742			23593		

Note: Population: Private sector firms with at least 3 fulltime workers employed the whole year and which receive an hourly wage equalling at least 30 1995-Nok. Lnw50, lnw95 and wd95-50 denote firm-specific median log daily earnings, 95-percentile log daily earnings, and the relative earnings differential between the 95-percentile and median log daily earnings (lnw95-lnw50), respectively. Comp denotes competitors, and is defined as the average of other firms within the same 4-digit industry code. In Models 1-3 is the unit in the regressions firmXyear. These models are estimated using OLS on first-differenced observations. Unit in Models 4-5 is the firm. The observations used in Models 4 and 5 express firm averages across the period of observation. In these OLS-regressions we weight each observation with the number of years we observe the firm. The between-firm effect arises as the within+between effect deducted the within-firm effect. ** and * denote 1 and 5 percent level of significance, respectively.