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IZA DP No. 13867

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ABSTRACT

Heterogeneous Impacts of the Decentralization of Collective Bargaining*

This paper analyses the heterogeneous effects of the decentralization of collective bargaining on the incidence of wage increases and wage dispersion in Finland. We use linked employer-employee panel data for the 2005-2013 period, which includes major changes in bargaining systems and economic conditions. Our regression results from models with high-dimensional individual and firm fixed effects show that decentralized bargaining leads to very different outcomes for blue- and white-collar employees. Decentralized bargaining decreases wage dispersion among blue-collar employees and slightly increases it among white-collar employees. Decentralization also affects the incidence of wage increases differently for blue- and white-collar employees. We argue that these differences reflect the different preferences of the employee groups. We also show that the fallback option in local negotiations affects the decentralization outcomes.

JEL Classification: J31, J51, J52

Keywords: decentralization, collective agreements, wage bargaining, wage increase, wage dispersion

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1. Introduction

There has been a strong tendency towards decentralization of collective bargaining in European countries (Visser, 2016). This means that wage negotiations have moved closer to the individual enterprise. Centralized collective bargaining systems have traditionally been seen to reduce wage inequality (e.g., OECD, 2004, Blau and Kahn, 1999, Rowthorn, 1992), which has attracted the attention of scholars to the effects of decentralization on both wages and wage dispersion. Decentralization means that collectively bargained wages may better reflect firm- and individual-specific characteristics, which may increase wage dispersion. Decentralization may also lead to smaller wage increases for occupations for which demand is declining, such as routine occupations. However, it has been argued that the impact of decentralization on wage dispersion is likely to depend on the preferences and bargaining power of the parties involved (Dell'Aringa and Pagani, 2007, p. 31).

Although the decentralization of wage bargaining has been associated with higher earnings in many empirical studies[1], the evidence regarding wage dispersion is more mixed. Some studies find that decentralization is related to increased wage dispersion (Card and de la Rica, 2006, Dahl et al., 2013, Addison et al., 2017), some find mixed evidence (Dell'Aringa and Pagani, 2007, Plasman et al., 2007, Cirillo et al., 2019), and others find a negative relationship (Canal Domínguez and Gutiérrez, 2004). Sometimes the results vary even within a single country, depending on the measurement of wage dispersion used, the definition of decentralization used, or the methods applied in the analyses (e.g. Card and de la Rica, 2006, Dell'Aringa and Pagani, 2007, Plasman et al., 2007).

There are several reasons for these differences in the results. First, the literature on decentralized bargaining has no consensus on the measurement of decentralization or of

[1] See, e.g., Canal Domínguez and Gutiérrez (2004), Card and de la Rica (2006) and Plasman et al. (2007) for evidence for Spain; Dahl et al. (2013) and Plasman et al. (2007) for Denmark; Rycx (2003) and Plasman et al. (2007) for Belgium; and Cardoso and Portugal (2005) for Portuguese evidence.

wage dispersion. Decentralization can take on many forms, and there is little evidence on how the details of decentralization, such as what happens if local negotiations are not successful, affect wages and wage dispersion. Second, the effects of decentralization may differ because the preferences and bargaining power of the parties differ in different settings. For example, white-collar unions in Finland have more positive views of decentralization, and they are ready to accept higher levels of wage than blue-collar unions (Pekkarinen and Alho, 2005). Third, the literature is mostly based on cross-sectional estimates, which suffer from severe endogeneity issues. The few studies that can account for firm and employee selection into different collective agreements find reduced estimates on the impact of decentralization on wages (Dahl et al., 2013, Gürtzgen, 2016). These results show that controlling for firm and employee selection is important for credible estimates.

We use Finnish data to study how decentralization has affected the incidence of wage increases and wage dispersion. The key to our analysis is Finnish administrative register data matched with collective bargaining data spanning the years 2005-2013, which allows us to follow employees over time and link them to their employers and contracts and to condition on a rich set of background characteristics. Our empirical approach follows state-of-the-art methods in the literature on decentralization (Dahl et al., 2013). To credibly estimate the effects of decentralization, we exploit time variation in the wage-setting system for the individual employee.[2]

During the period we study, there was a move from a very centralized collective bargaining system towards a more decentralized system. The decentralization took place within the collective bargaining system, meaning that the Finnish case is an example of organized decentralization (Traxler, 1995). Traditionally, the key outcome of centralized

[2] Identification of the impact of wage setting systems comes from employees who change wage-setting systems while staying with the same firm, which happens for two main reasons: the wage setting system might change as a part of the decentralization process, or the employee may change jobs with the same employer. We are thus able to improve on much of the literature that has used cross-sectional data.

collective bargaining has been general wage increases, which stipulate the extent to which wages should be increased in a given sector. The key characteristics of decentralization is that in addition to the general increase, there is a local wage increase allowance, which can be allocated locally. In the following, we will use the term "local pot" for this wage increase component.

Our contribution to the existing literature is twofold. First, we are the first to show that decentralization can lead to very different outcomes for different employee groups. Dell'Aringa and Pagani (2007) also study wage dispersion under different bargaining regimes for manual and nonmanual workers, but do not study whether decentralization has a different *impact* on the wage dispersion of manual and nonmanual workers. Our results show, for example, that local pots decrease the dispersion in wage increases for blue-collar employees and increase the dispersion for white-collar employees. We argue that these different outcomes reflect the differences in the preferences of the two employee groups. There are also differences in the impact of decentralization on the incidence of wage increases between blue- and white-collar employees. For example, for white-collar workers, the local pots are more targeted towards younger employees, whereas for blue-collar employees, they are more evenly distributed. Thus, we empirically verify the theoretical argument of Dell'Aringa and Pagani (2007, p. 31) that decentralization likely has heterogeneous impacts.

Second, we are the first to show that the details of decentralization affect the incidence of wage increases and wage dispersion. We show that different fallback options affect the outcomes of decentralization. The fallback option affects the incentives to conduct local negotiations and may thus have an impact on the outcomes of decentralization. Our results show that a fallback option that provides incentives for employee unions to conduct local negotiations, even though they would otherwise be reluctant to do so, leads to smaller wage

increases and a smaller dispersion in wage increases for blue-collar employees but to higher wage increases and a higher wage dispersion for white-collar employees.

Taken together, these results show that the impacts of decentralization are likely heterogeneous and context dependent. The impacts depend on the preferences of the negotiation parties and the details of decentralization. Thus, to obtain a full picture of the impacts of decentralization, more finely grained analyses are needed. These results also suggest that the external validity of results concerning a particular country or employee group is likely to be low.

The rest of this paper is organized as follows. Section 2 discusses the relevant literature, and section 3 presents the institutional background on the Finnish labour market. Section 4 describes the Finnish register data sets, and section 5 presents aggregate-level evidence based on the Harmonized Structure of Earnings Survey (HSES) data matched with private sector collective bargaining data for the period of 2005-2013. Section 6 explains our empirical approach, and section 7 provides the estimation results. The final section concludes the paper by placing our findings into a larger context.

2. Related Literature

The standard view suggests that centralized collective bargaining systems reduce wage dispersion. This argument has been confirmed in a number of studies (e.g. Blau and Kahn, 1999, Rowthorn, 1992), as well as in OECD cross-country analyses (e.g. OECD, 2004).[3] As several advanced countries have experienced a process towards more decentralized wage bargaining, the examination of the impacts of such decentralization on pay determination has attracted increased attention. Our key contribution to the existing literature is a careful

[3] See also Card et al. (2004), for their review of the empirical evidence on unions and wage inequality.

analysis of the effects of decentralization on different employee groups. This area is not well covered by previous literature. Hence, we focus below on a selected set of studies that are particularly relevant for the setting of the current study.

Collective bargaining may have an impact on both the overall wage level and on wage inequality. Table A1 in the Appendix provides a concise overview of the estimates of the relationship between different measures of decentralization and wage structures that have been presented in the recent literature. Card and de la Rica (2006) use matched employer-employee data from the 1995 Spanish Wage Structure Survey and compare firm-level contracting with sector-level contracting. They find that employees under a firm-level contract (decentralization) earn a wage premium of 5-10 percent. Interestingly, this wage premium increases along the earnings distribution, thus suggesting increased wage inequality. Canal Domínguez and Gutiérrez (2004) and Plasman et al. (2007) similarly use 1995 data from Spain and confirm that more decentralized agreements are associated with higher earnings (4-10 percent) but they find that decentralization leads to a lower level of wage dispersion. These differences in the results regarding wage dispersion are likely explained by differences in the chosen measures and econometric methods. For example, while Card and de la Rica (2006) use quantile regression method to evaluate the effect of firm-level contracting along the earnings distribution, Canal Domínguez and Gutiérrez (2004) and Plasman et al. (2007) use the standard deviation of hourly wages as a measure for wage dispersion and the Blinder-Oaxaca decomposition method.[4] Thus, the results regarding wage dispersion seem to be sensitive to the chosen measures and methods, which is supported by Dell'Aringa and Pagani (2007), who also report mixed evidence on the effect of a decentralized bargaining system on wage dispersion in Spain.

[4] Plasman et al. (2007) also used inter-decile wage gaps as an alternative measure of wage dispersion.

Studies from Germany include Fitzenberger et al. (2013), Gürtzgen (2016) and Addison et al. (2017). Of these papers, both Gürtzgen (2016) and Addison et al. (2017) use panel data to evaluate the causal effect of bargaining status within plants using difference-in-differences and fixed-effects panel estimation methods. Gürtzgen (2016) finds that leaving industry-level contracts is associated with 2-4 percent lower earnings, but firm-level contracting is associated with 3 percent higher earnings compared to no contracting. Addison et al. (2017) find that plants that move from sectoral collective agreements to no agreements at all show only a modest increase in intra-plant wage dispersion. These results are somewhat in line with Fitzenberger et al. (2013), who use cross-sectional data from Germany from the year 2001. They find that higher coverage at the firm or industry level is associated with higher wages but do not find a clear-cut effect on wage dispersion.

The analysis of the decentralization of wage bargaining in the Danish labour market by Dahl et al. (2013) is the most comparable study to the current one. The authors use panel data for the 1992-2001 period and find a wage premium of approximately 4-6 percent associated with firm-level bargaining. The quantile regression estimates show that wages are also more dispersed under the more decentralized wage-setting system. Another study using Danish data likewise shows a similar decentralization wage premium (3 percent) and a widening wage dispersion (Plasman et al. (2007).

Studies regarding wage bargaining in Belgium all use the same Structure of Earnings Survey for the year 1995 (Plasman et al., 2007, Rycx, 2003, Dell'Aringa and Pagani, 2007). The results show that employees working under a more decentralized wage-setting system earn approximately 5 percent more than those working under a centralized system (Plasman et al., 2007, Rycx, 2003) but that the effect on wage dispersion is more mixed. Plasman et al. (2007) show that single-employer agreements are associated with slightly higher levels of wage dispersion, whereas Dell'Aringa and Pagani (2007) show the opposite. The

difference between these results may be driven by the fact that the analysis of Plasman et al. (2007) was restricted to employees in the manufacturing sector for both male and female employees. Rycx (2003) shows that the dispersion in the inter-industry wage differential is estimated to be either higher or lower under company-level agreements, depending on the estimation method used.

One interesting study is Cardoso and Portugal (2005), who use linked employee-employer data from Portugal for the years 1998-1999. As a measure for the wage-setting system, they use (Herfindahl) indexes for the concentration of bargaining within occupations, firms and regions. As an outcome variable, they use actual wages, which are also decomposed into bargained wages and a wage cushion, i.e., "wage drift". The authors find that lower union power is associated with higher actual wages, but this effect is mediated solely through higher wage drifts.

Finally, an analysis of the decentralization of wage bargaining in the European context includes Dell'Aringa and Pagani (2007) for Italy and McGuinnes et al. (2010) for Ireland. They both look at the effect of decentralization on wage dispersion using cross-sectional data. The results for Italy provide (inconclusive) evidence on the negative effect of single-employer bargaining on wage dispersion, while the decentralization of collective agreements increases within-firm wage inequality in Ireland.[5]

Taken together, the previous literature suggests that decentralization is often associated with 0-10 percent higher wages in a selection of European countries.[6] Studies that are able to account for employee and firm selection into different collective agreements typically show smaller estimates on the effects of decentralization on wages (Dahl et al., 2013, Gürtzgen, 2016). Finally, the findings regarding the effects of decentralization on

[5] McGuinnes et al. (2010) also find that labour costs are 6-8 percent higher in firms implementing either individual- or business-level agreements.
[6] See also Rycx (2003, Table VII, p. 360) for an earlier review of the impacts of bargaining regimes on wage levels.

wage dispersion are more mixed. However, these studies differ in the details of the decentralization, the measurement of wage dispersion and the methods used. In addition, if decentralization affects different occupations differently, the differences in the occupational structures could partly explain the differences in the effects of decentralization on wage dispersion in various countries.

3. Institutions and background

This section provides the necessary institutional background needed for understanding the nature of decentralization in Finland and the modelling choices. It explains the role of local pots in Finnish collective agreements and how the contracts of blue-collar and white-collar employees differ. It also provides evidence on the preferences of blue-collar and white-collar employees for local bargaining and wage dispersion. Some of the institutional details are used in the identification strategy.

3.1. Collective bargaining in Finland

Finland is characterized by highly controlled collective agreements (e.g., Jonker-Hoffrén, 2019). Collective agreements play a large role in the labour market due to the high coverage of collective bargaining (approximately 90 percent of workers are covered), the widespread extension of collective agreements, and the wide scope of the agreements. The union density rate is also quite high in Finland at approximately 70 percent, even though it has been declining.

Bargaining takes place at the sectoral level, and the actors are employers' federations and trade unions. In each sector, blue-collar, white-collar, and sometimes upper-white collar employees have separate contracts. Blue-collar employees are paid hourly, and their remuneration is based on time pay, piece rates and reward rates. Wage supplements such as shift allowances may also be important for blue-collar employees. White-collar employees

are paid monthly. Both groups may also receive performance-related pay, which is not governed by collective agreements. Performance-related pay is typically only a small portion of earnings. If employees are paid bonuses, they are on average approximately 5 percent of regular earnings for the blue-collar employees and 8 percent for the white-collar employees (Kauhanen and Napari, 2012). The different contracts and different modes of pay suggest conducting separate estimations for blue- and white-collar employees.

The contract applied to each employee is determined by their employer's federation or its industry if they do not belong to an employer's federation. Employers have a very limited possibility to choose their contract. In some cases, they may be able to choose the employer association to which they belong, but that is very rare. This fact becomes important later on when we discuss the identification strategy.

Collective agreements cover, e.g., wage formation, working time, holidays, social provisions and parental leave (e.g., Jonker-Hoffrén, 2019). The general increase is typically the most important element in the collective agreement. It stipulates how much each employee's individual wage is increased. Often, this is the only wage increase component, which means that everyone's wages are increased in the same way.

For our purposes, the most interesting element is the local pot. These are wage increases that are negotiated and implemented locally according to the rules set in the collective agreement. Local pots used to be rare, but their prevalence increased notably at the beginning of the 21st century, especially in the years 2007-2008. Local pots are the primary way in which the Finnish collective bargaining system has become decentralized.

Local pots often include a fallback clause, which means that if the local negotiations are not successful, the wage increase will be implemented as a general wage increase. For our purposes, it is important that sometimes the fallback wage increase is of the same size as the locally negotiated increase and sometimes it is smaller. When the fallback (general)

wage increase is smaller than the locally negotiated wage increase, there are incentives for the employee side to conduct local negotiations.

Private sector employers can always pay more and increase wages more than is stipulated in the contract. In practice, wages do often increase more than what the contracts stipulate. This is called wage drift.[7] Next, we describe in more detail the development of the bargaining structure in Finland and describe the collective bargaining rounds that occurred during our period of observation.

3.2. Development of the bargaining structure

There is a strong history of centralized bargaining in Finland (e.g. Andersen et al., 2015). From 1986 to 2006, the Finnish system of industrial relations was characterized by a tripartite centralized collective agreement (the so-called incomes policy or TUPO). This meant that central organizations negotiated an agreement first and sectoral organizations then either followed this agreement or did not. The government often made its tax and social policy conditional on the coverage of the agreements. The centralized bargaining rounds meant that sectors had very similar wage increases. From time to time there were purely sectoral bargaining rounds. This happened when some sectors did not accept the centralized collective agreement but wanted to negotiate for themselves. The typical contract duration is approximately two years.

From 2005 to 2013 the Finnish collective bargaining system experienced some degree of organized decentralization, although towards the end of the period there was some movement back towards the old system.

In 2007, the confederation of the Finnish Industry and Employers, EK, decided that it would no longer be a part of centralized bargaining (Andersen et al., 2015, p. 144), leading

[7] Holden (1998) analyses wage drift in the Nordic setting both empirically and theoretically. Cardoso and Portugal (2005) study wage drift (or wage cushions in their terminology) in Portugal.

towards a more decentralized bargaining system. The employers saw that a more decentralized wage setting would be beneficial for them. This led to two rounds of industry bargaining. Employers wanted more local bargaining, but labour unions resisted this, especially blue-collar unions (Heikkilä and Piekkola, 2005). The readiness to accept more local bargaining was highest among upper-white collar employees, followed by white-collar employees, and blue-collar employees had the most negative view of local bargaining (Pekkarinen and Alho, 2005, Fig. 10).

The 2007-2008 bargaining round led to large wage increases due to favourable economic conditions. The increases were approximately 4-5 percent in the private sector. Actual wage increases were close to the contract increases, meaning that wage drift had a limited role. In this round, many contracts included local pots. Thus, at this point, there was organized decentralization in the Finnish collective bargaining system. Due to the onset of the financial crises, the wage increases in the 2009-2010 bargaining round were lower, by approximately 1 percent. Actual wage increases were much larger, approximately 3-4 percent. Thus, there was more wage drift than in 2007-2008. The role of local wage-increase pots decreased, especially in the blue-collar contracts.

The following bargaining round took place in 2011 and resembled the old, centralized agreements. In this so-called "framework agreement", the national centralized agreement provided guidelines for industry-level bargaining. Despite the centralized nature of the bargaining round, many contracts still included local pots, although they were less common than in the 2007-2008 bargaining round. Next, we describe in more detail the views of blue- and white-collar employees on local bargaining and wage dispersion. These results are important for the interpretation of our empirical results.

3.3. Different views on local bargaining and wage dispersion

Figure 1 shows the difference in the preferences of white-collar and blue-collar employees with respect to decentralization and wage dispersion. This figure draws on a survey carried out in 2002 and shows that blue- and white-collar workers differ markedly in their preferences. The figure shows that white-collar workers prefer wage increase negotiations to be held at the firm level more than blue-collar workers do. Over 40 percent of the white-collar workers chose firm-level as the best or second-best option for the level of wage negotiations, while this was the case for less than 20 percent of the blue-collar workers.

Moreover, views on how firm-level wage increases/local pots should be implemented differ. A large portion of the blue-collar workers (45 percent) prefer local pots to be targeted towards the lowest earnings brackets or to have the same absolute increases for all workers (32 percent), while white-collar workers prefer them to be implemented to increase wage incentives (40 percent) or to have similar percentage increases for all workers (24 percent). These results mean that blue-collar employees believe that locally bargained wage increases should be used to decrease wage dispersion, whereas white-collar employees believe that they could be allocated in a way that increases wage dispersion. Given these drastic differences in preferences, it is likely that the effects of decentralization differ by worker group.

[Figure 1 in here]

4. Data

4.1. Harmonized structure of earnings survey

The analysis in this study is based on rich, linked data that combine two data sources. The key data for our analysis are the Harmonized Structure of Earnings Survey (HSES) data from

Statistics Finland, which includes individual and firm identifiers.[8] In the data, all wage measures and variable classifications, such as occupation and industry, are consistent across years and sectors, which makes the data suitable for panel analysis. The harmonization of the data is particularly important for our analysis, as it takes into account the differences and changes in collective agreements, wage concepts and compensation components.

The earnings structure statistics are based on firm and individual-level payroll records data from member firms in employer federations. An augmenting survey for non-member firms and sectors that are not covered by the Confederation of Finnish Industries (EK) is also conducted by Statistics Finland. The HSES data are available for private sector firms annually from 1995 onwards. In our analysis, we use the time period 2005-2013, which includes both post- and pre-financial crisis years. The coverage of the data is 55-75 percent of employees, depending on the year and industry. Firms with fewer than 5 employees are not included in the survey. Accordingly, there is limited coverage of employees in unorganized, mostly small, firms; top management, owners and their family members; and employees whose job contracts began or ended during the months of data collection. The data also exclude the agriculture, forestry and fisheries industries, household employers and international organization employees.

The HSES data include detailed information on earnings from either the fourth quarter or October, depending on the industry and employee group. The data include two alternative earnings measures. Regular hourly earnings include all pay components that are paid regularly divided by standard contractual hours. This measure excludes overtime pay but includes pay supplements that are paid regularly. Total hourly earnings is the widest earnings measure available. It also includes overtime pay and annual bonuses. The earnings are divided by total hours worked (regular hours + overtime).

[8] A description of the data can be found at https://taika.stat.fi/en/aineistokuvaus.html#!?dataid=YA246a_19952013_jua_harmonpalrakyks_003.xml

In the main analyses, we focus on total hourly earnings because we want to capture all ways that decentralization can impact on wage increases. Decentralization may affect, e.g., the variable pay elements that the employer can decide on unilaterally. Incentive pay systems are not regulated by collective agreements, except for piece-rate and reward-rate systems for blue-collar employees (Kauhanen and Napari, 2012, p. 654). Accordingly, decentralization may affect total earnings via wage drift rather than via bargained wages (Cardoso and Portugal, 2005). We use regular hourly earnings in the robustness analyses. To study whether the effects differ by preferences, we examine the effects separately for white-collar and blue-collar workers. The definitions of and classifications for the two groups and other variables are presented in Table A2 in the Appendix.

4.2. Collective agreement data

To these earnings data, we match data collected by Kotilainen (2018) from private sector collective agreements and supporting documents.[9] The collective agreement data contain information on the magnitudes and timing of wage increases stipulated by the contracts. The data include a total of 776 manually collected contracts, of which approximately 80 percent are generally binding. For our purposes, the most important information concerns whether there was a local pot and whether the fallback option was smaller than the general increase. HSES data do not contain information on collective agreements at the individual level. It is, however, possible to match the collective bargaining data with the HSES data. Kotilainen (2018) created a mapping of the collective agreements data to the structure of earnings data based on detailed information on industry and occupation. Approximately 17 percent of employees in the HSES data could be mapped into more than one collective agreement. In these cases, the individuals were mapped into the generally binding agreement. If all

[9] For more details, see Kotilainen (2018, p. 66-69)

agreements are generally binding or non-binding, then the contract with the largest number of employees was chosen.[10]

We use two indicator variables to characterize the collective agreements. "Local pot with full fallback" is an indicator variable that equals one if the collective agreement has a local pot in a given year and *the fallback option is of the same size as the local pot*. "Local pot with reduced fallback" is an indicator variable that equals one if the collective agreement has a local pot in a given year and *the fallback option is smaller than the pot*. The comparison category in the analyses is thus collective agreements without local pots. Most often the contracts in the comparison category involve only a general increase.[11]

5. Descriptive statistics

Figure 2 shows the prevalence of local pots for white-collar workers and blue-collar workers.[12] The figure shows that there is variation over time in the share of employees in contracts with local pots. There was a spike in 2008, and afterwards, the prevalence declined. On average, the prevalence of local pots is quite similar among blue-collar and white-collar workers. The figure also shows that the prevalence of local pots with reduced fallback differs from year to year. In 2007-2008, it was the dominant form of local pot, but in other years, the distribution was more balanced.

[Figure 2 in here]

[10] The number of employees covered by the agreement is available in the documents of the body that decides on the extension of collective agreements.
[11] A few sectors have the option of locally negotiating wages, but in practice, local negotiations are very rare because the contracts always have the general increase as a fallback. We control for local negotiations in the analyses.
[12] The summary statistics for all employees and separately for blue-collar and white-collar employees is given in Table A3 in the Appendix.

Table 1 shows the variation in the local pot variables at the job-spell level (i.e., cells defined by individual and firm indicators). This is the variation that is used in the empirical analysis to identify the impacts of local pots. The table shows that there are transitions both into and out of local pots. For example, approximately 12 percent of the observations that did not have local pots with reduced fallback in year *t* do have them in year *t+1*. Additionally, approximately 65 percent of the observations that had local pots with reduced fallback in year *t* do not have them in year *t+1*.

Figure 3 shows the development of changes in the total hourly wage and the size of the local pots in 2006-2013. For white-collar workers, the change in total hourly earnings was highest in 2008, and afterwards, it stabilized to approximately 4 percent. The local pot has always been small relative to the change in total hourly earnings, but it was at its highest level in 2008. Figure 3 shows that for blue-collar workers, the change in total hourly wages has been declining throughout the period of observation. The magnitude of the local pots varied over time, being at its highest levels in 2008 and 2011.

[Table 1 and Figure 3 in here]

6. Empirical methods

To study the impact of the wage-setting system on wage increases and wage dispersion, we employ two different empirical methods. First, we study how local pots affect wage increases and how the increases depend on, for example, educational attainment conditional on both observed and unobserved heterogeneity. We concentrate on wage increases instead of wage levels (as, e.g., Dahl et al., 2013, Gürtzgen, 2016) as the collective agreements in Finland concern wage increases and not wage levels. Second, we use quantile regressions to study how decentralization affects the wage distribution. We estimate the models separately for blue-collar and white-collar employees because their contracts and their views on local bargaining differ.

6.1. Wage increase regressions

We first estimate how the wage increase $\Delta y_{it} = y_{it} - y_{it-1}$ for individual *i* in year *t* (t ϵ [2006,…,2013]) depends on the type of collective agreement

$$\Delta y_{it} = \gamma ct_{1it} + \eta ct_{2it} + \sum_{l=1}^{n} \phi_l w_l ct_{1it} + \sum_{l=1}^{n} \lambda_l w_l ct_{2it} + \sum_{k=1}^{n} \beta_k x_k + \theta_t + \vartheta_{ht} + \alpha_i + \delta_j + \varepsilon_{it} \quad (1)$$

We use two indicator variables to depict the collective agreements: local pot with full fallback (ct_1) and local pot with reduced fallback (ct_2). We condition on several individual and firm characteristics, x_k, such as age, tenure, level and field of education, occupation, routine-occupation indicator, part-time indicator, and firm size.[13]

To study how the effects of contract types on wage increases depend on individual characteristics, we interact ct_1 and ct_2, with individual level characteristics, w_l, gender, age, tenure, level of education, routine-occupation indicator, and sector (services or manufacturing). We do not include the main effects of gender and sector in the model because these are perfectly collinear with the individual and firm fixed effects.

The parameter θ_t captures the time effects. We follow Dahl et al. (2013) and include individual α_i and firm δ_j fixed effects as well as the interaction of industry and year in the regressions (ϑ_{ht}). Adding employee and firm fixed effects is equivalent to adding job-spell fixed effects.

The identification of γ and η comes from time variation in the individual's wage-setting system during a spell with a given employer. The changes take place because the wage-setting system in the collective agreement changes (due to decentralization or in some cases due to reverting back to centralization).

[13] Table A2 in the appendix presents the definitions of and classifications for different variables.

One potential threat to our identification is the possible endogeneity of wage-setting system changes due to the decentralization process. It is impossible to completely rule out the possibility that decentralization in a wage-setting system is a consequence of changes in, for example, work practices, technology, or similar unobserved qualifications of the employees that also affect wages. As argued by Dahl et al. (2013), such time varying shocks are more likely to be correlated with decentralization if they are industry wide or they hit firms across entire bargaining segments. Hence, to capture these shocks, we include a full set of industry dummies interacted with a full set of year dummies following Dahl et al. (2013).

Firm-level selection into contracts is another potential threat to identification. It is, however, unlikely in our setting. This follows from the limited possibility that firms have to choose their collective agreement. Moreover, the contracts are negotiated at the industry level, so that individual firms have very limited opportunities to affect the contracts. Thus, our setting differs from, e.g., Gürtzgen (2016), who shows that firms that choose to abandon collective agreements appear to have experienced negative shocks.

The final potential threat is that employees have selected themselves into wage-setting systemsm and wage increases after decentralization might only reflect their observed and unobserved attributes. Having panel data on individuals solves the problem only partly as we eliminate only unobserved characteristics that do not vary over time. There might be changes in unobserved ability that drive the changes in wage-setting systems and in wages, which will lead to biased estimates. Our setting, however, is more robust than the setting in the previous literature using cross-sectional data (except for Dahl et al., 2013). Moreover, given that collective agreements are typically generally binding, employees' ability to choose their collective agreements are also limited. In practice, employees would have to change industries to be covered by a different agreement.

6.2. Quantile regressions

To study how the type of collective agreements affect the distribution of wage increases we use unconditional quantile regressions (Firpo et al., 2009). These models let us study how collective agreements affect the unconditional distribution of wage increases. This contrasts with a traditional quantile regression, where the quantiles are defined conditional on some explanatory variables. Firpo et al. (2009) build on the theory of influence functions and show that unconditional quantile regressions can be estimated in the usual regression framework when the dependent variable is redefined to be a so-called re-centred influence function (RIF):

$$RIF\left(\Delta y_{it}; q_\tau, F_{\Delta y_{it}}\right) = q_\tau + \left(\tau - 1\{\Delta y_{it} < q_\tau\}\right) / \; f\left(q_\tau\right)$$

where q_τ is the τ -th quantile of Δy_{it}, $1\{\ \}$ is an indicator function, $f(\ )$ is the density of Δy_{it} and $F(\ )$ is its distribution function. We estimate

$$RIF\left(\Delta y_{it}; q_\tau, F_{\Delta y_{it}}\right) = \gamma ct_{1it} + \eta ct_{2it} + \sum_{k=1}^{n} \beta_k x_k + \theta_t + \vartheta_{ht} + \alpha_i + \delta_j + \varepsilon_{it} \quad (2)$$

using the Stata implementation of Rios Avila (2019). The notation is the same as above.

7. Results

7.1. The impacts of different contract types on wage increases

We first study how decentralization affects wage increases, controlling for both observed and unobserved individual heterogeneity. Table 2 reports estimation results from the employee-firm fixed-effects model for all employees and separately for blue- and white-collar employees. The table shows the average marginal effects from Equation (1) with respect to the local wage pot indicators.

We find that wage increases are higher when the contract includes a local pot. The effect is of a similar size, approximately 1 percent, for contracts with reduced and full fallback. However, the effects differ by employee group. For the blue-collar workers, we find that the wage increase is considerably higher with full fallback (1.8 percent) than with reduced fallback (0.5 percent). If the blue-collar employees have been reluctant to negotiate locally, then under the reduced fallback option, the wage changes are lower. We find opposite results for white-collar workers. For white-collar employees, the wage increase is larger under local pots with reduced fallback (1.6 percent) than with full fallback (0.8 percent).

The results suggest that both the contract details (local vs. general, incentives vs. no incentives) and the employee group (blue- vs. white-collar) affect the size of the wage increase. Previous studies have looked at the effect of firm-level bargaining on wages instead of wage increases. Using a job-spell fixed-effects model, Dahl et al. (2013) find that firm-level bargaining increases wages by 4.7 percent.

[Table 2 in here]

7.2. Heterogeneous effects

Next, we examine how wage increases depend on individual characteristics, such as gender, tenure, age, education, and occupation. Table 3 shows the results for the interaction of the local wage increase indicators with the female indicator. The results suggest that for white-collar employees, the effects are positive but small. Thus, wage increases for white-collar women are slightly larger when there are local pots than when there are general increases. The two coefficients are statistically significantly different from each other, meaning that the wage increases for females are larger when there are incentives to bargain locally. For blue-collar employees, the effects are negative and small. Thus, there is some evidence that

increases for blue-collar women are slightly smaller when there are local pots than when there are general increases.

[Table 3 in here]

Figure 4 shows the results for the interaction of the local pot indicators with age. The left panel shows that compared to the reference group of 18 to 25-year-old employees, wage increases are smaller for the other age groups when there are local pots. The wage changes decrease in age when the local pots are associated with a reduced fallback option. The right panel shows that the results are driven by the white-collar employees. For blue-collar employees, the estimates are close to zero, but for white-collar employees, the wage changes are largest for the youngest age group and with reduced fallback, there is a declining age-wage change profile.

Figure 5 shows the results for the interaction of the local wage increase indicators with the level of education. The figure shows that there is no clear pattern and that the results for blue-collar employees and white-collar employees are quite different. For tertiary educated blue-collar employees, wage increases are lower under local pots with full fallback than for employees who have only a primary education, but wage increases are higher for tertiary educated blue-collar employees under local pots with reduced fallback. The estimates for white-collar employees are smaller. Our results concerning education are different from those of Dahl et al. (2013), who find that the return to education is higher the more decentralized the wage-setting system is. Our results are mixed and depend both on the details of the contract and of the employee group.

Figure 6 shows the results for the interaction of the local wage increase indicators with the routine occupation indicator. These effects are estimated more precisely for white-collar employees because they have more variation in this variable. The results indicate that wage increases are smaller for white-collar employees in routine occupations (such as office

clerks) when there are incentives for local bargaining. This shows that the decentralization of wage bargaining leads to smaller wage increases for occupations for which demand is declining. Additionally, the separate analyses for blue-collar employees and white-collar employees generate different results than does the simultaneous analysis. Our results suggest that age and occupation matter the most in determining who receives higher increases under local pots. However, the details of the contract and the employee group also matter.

[Figures 4-6 in here]

7.3. Wage dispersion

Decentralization might have differing effects across the wage distribution, which is why we estimate unconditional quantile regressions. Figure 7 shows the results for the full sample for the quantiles p10, p25, p50, p75, and p90. The results show no clear pattern, although there is a slight u-shape in the case of local pots with full fallback. It is again more illuminating to study employee groups separately.

The results for white-collar employees are presented in Figure 8. The wage increases under local pots with reduced fallback increase slightly across the different quantiles for white-collar employees. This indicates increasing dispersion in wage increases. With the full fallback option, the wage increases are less stable and significantly smaller. The results for blue-collar employees are shown in Figure 9. The figure shows that wage increases decline monotonically across the quantiles under local pots with reduced fallback. With full fallback, the increases are the highest at the bottom and at the top of the distribution. Hence, local pots decrease wage dispersion for blue-collar employees.

Interestingly, there are positive effects throughout the wage distribution in almost all cases under local pots, which is consistent with Dahl et al.'s (2013) findings. They find higher premiums at the top of the wage distribution which is consistent with our results for white-collar employees under contracts with local pots with reduced fallback but not for

blue-collar employees for whom we find the largest increases at the bottom of the distribution. In the Finnish case, the differences in the results are explained by the different preferences of the different employee groups.

[Figures 7-9 in here]

7.4. Robustness checks

We have also estimated the above models with regular hourly earnings as the dependent variable and the results are qualitatively similar. The magnitudes are slightly smaller because the wage increases are smaller when using regular hourly earnings instead of total hourly earnings. We have also estimated the models by restricting the sample to contracts that include local pots at least once during our period of observation. Again, the results are qualitatively similar. The results of all robustness checks are available upon request.

8. Conclusion

We use Finnish administrative register data matched with collective bargaining data spanning the years 2005-2013 to study how decentralization has affected the incidence of wage increases and wage dispersion. To credibly estimate the effects of decentralization, we exploit time variation in the wage-setting system for individual employees, similar to Dahl et al. (2013).

During the period we study, there was a move from a very centralized collective bargaining system towards a more decentralized system in Finland. Traditionally, the key outcome in centralized collective bargaining was the general wage increase, which stipulated the extent to which wages would be increased in a given sector. The key form of decentralization was that in addition to the general increase, there was a local wage increase allowance (local pot), which could be allocated locally.

Prior research has argued that the preferences and bargaining power of the parties affect the outcomes of decentralization, but empirical research has not been conducted on these issues. We contribute to the literature by studying how the impact of decentralization varies between employee groups who have very different preferences for local bargaining and wage dispersion. We also study how the details of decentralization, in our case the fallback option for local negotiations, affect the outcomes.

We show that decentralization in Finland leads to very different outcomes for blue-collar and white-collar employees and argue that the differences in outcomes reflect differences in the preferences of the two employee groups. Our results show, for example, that local pots decrease the dispersion in wage increases for blue-collar employees and increase it for white-collar employees. There are also differences in the impact of decentralization on the incidence of wage increases between blue- and white-collar employees. For example, for white-collar workers, the local pots are more targeted towards younger employees, whereas for blue-collar employees, they are more evenly distributed. These results are consistent with prior research that has shown that blue-collar employees prefer centralized bargaining and egalitarian wage structures more than white-collar employees (Pekkarinen and Alho, 2005, Alho et al., 2003).

We also show that the details of decentralization affect the incidence of wage increases and wage dispersion. We do this by showing that different fallback options affect the outcomes of decentralization. The fallback option affects the incentives to conduct local negotiations and may thus have an impact on the outcomes of decentralization. Our results show that a fallback option that provides incentives for employee unions to conduct local negotiations, even though they would otherwise be reluctant to do so, leads to smaller wage increases and a smaller dispersion in wage increases for blue-collar employees but higher wage increases and higher a dispersion for white-collar employees.

Taken together, these results show that the impacts of decentralization are likely to be heterogeneous and context dependent. The impacts depend on the preferences of the negotiation parties and the details of decentralization. Thus, to obtain a full picture of the impacts of decentralization, more finely grained analyses are needed. These results also suggest that the external validity of results concerning a particular country or employee group is likely to be low.

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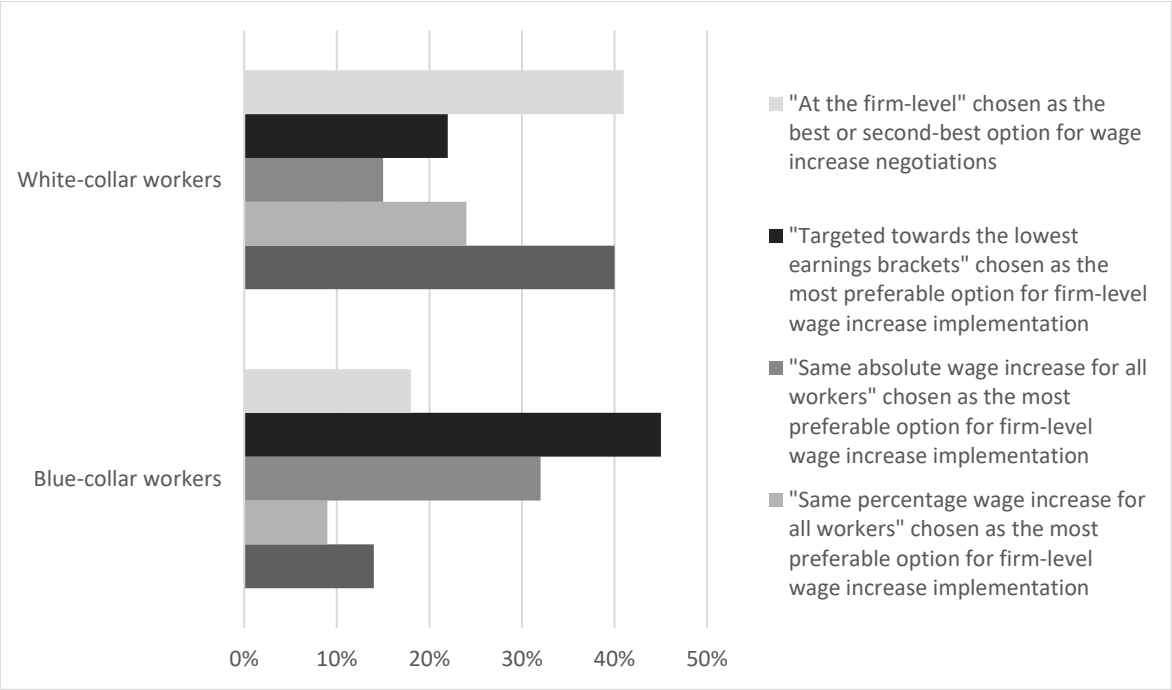
Figures and Tables

Figure 1: Survey responses to preferences in wage negotiations by worker type (Source: Alho et al., 2003)



Notes: Five options were given for the level of wage negotiations: individual level, firm level, industry level, centralized income policy agreement (TUPO), and European level. Four options were given for how the firm-level wage increases should be implemented: to increase incentives, the same absolute increase for all workers, the same percentage increase for all workers, and increases targeted towards the lowest earnings bracket. A total of 441 blue-collar workers and 804 white-collar workers responded to the survey.

Figure 2: Prevalence of local wage-increase pots 2006-2013

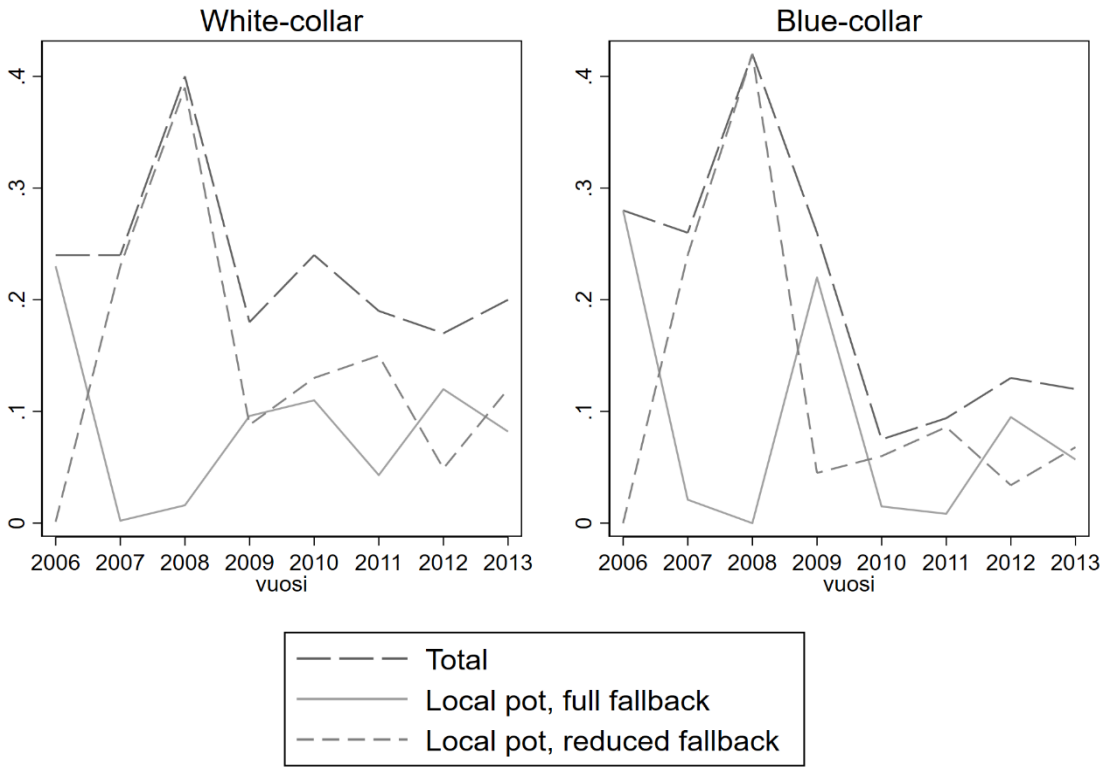


Figure 3: Wage changes and local pots

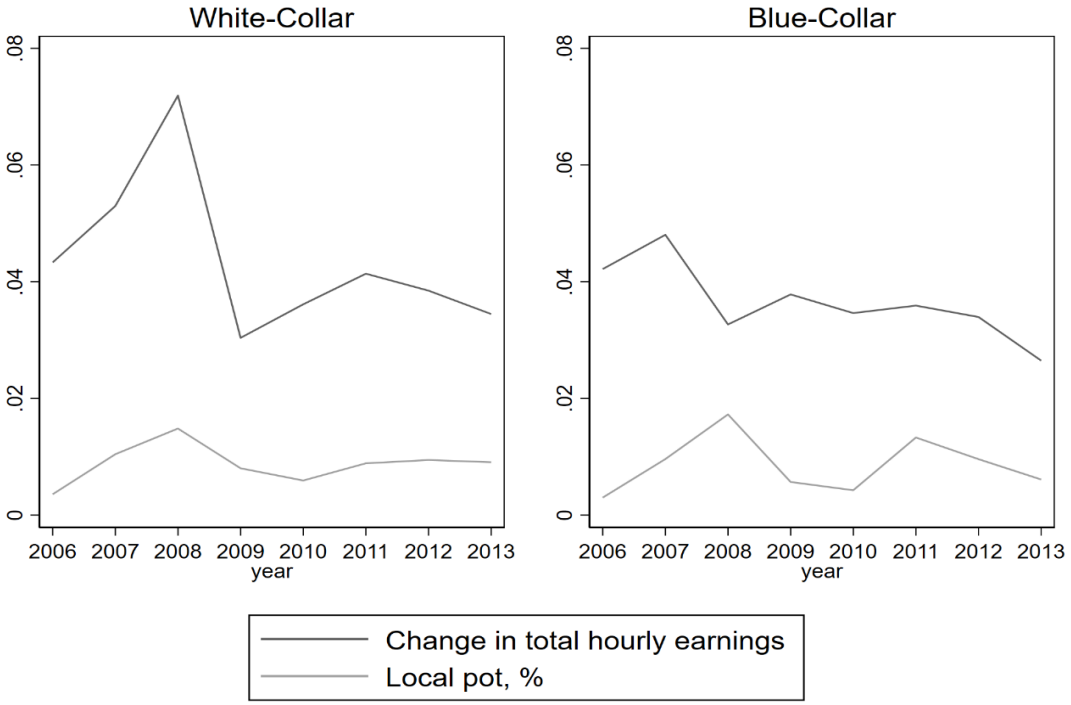


Figure 4: Age, local pots and wage changes

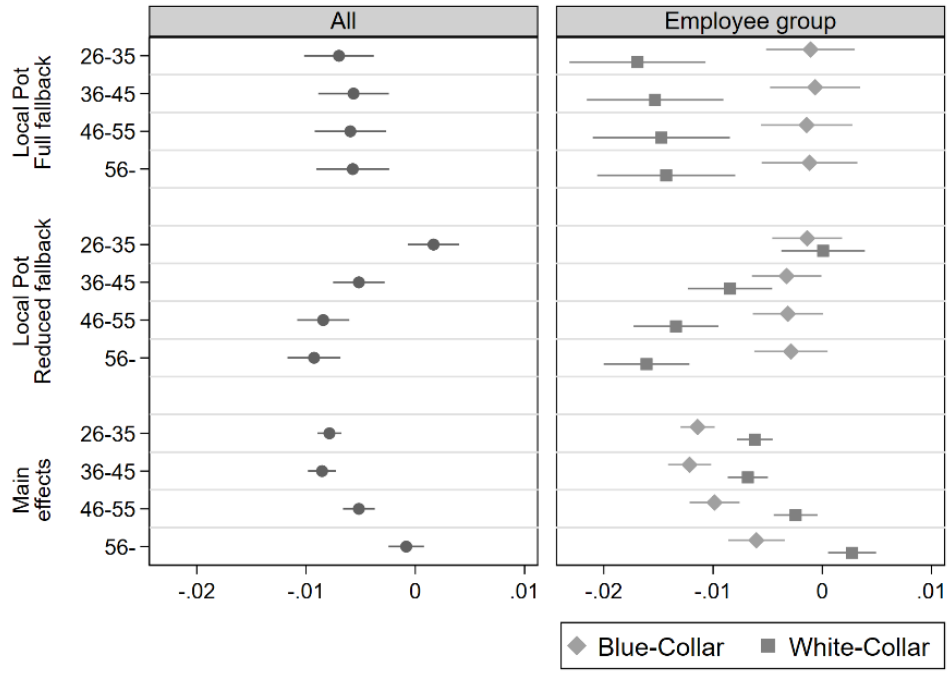


Figure 5: The level of education, local pots and wage changes

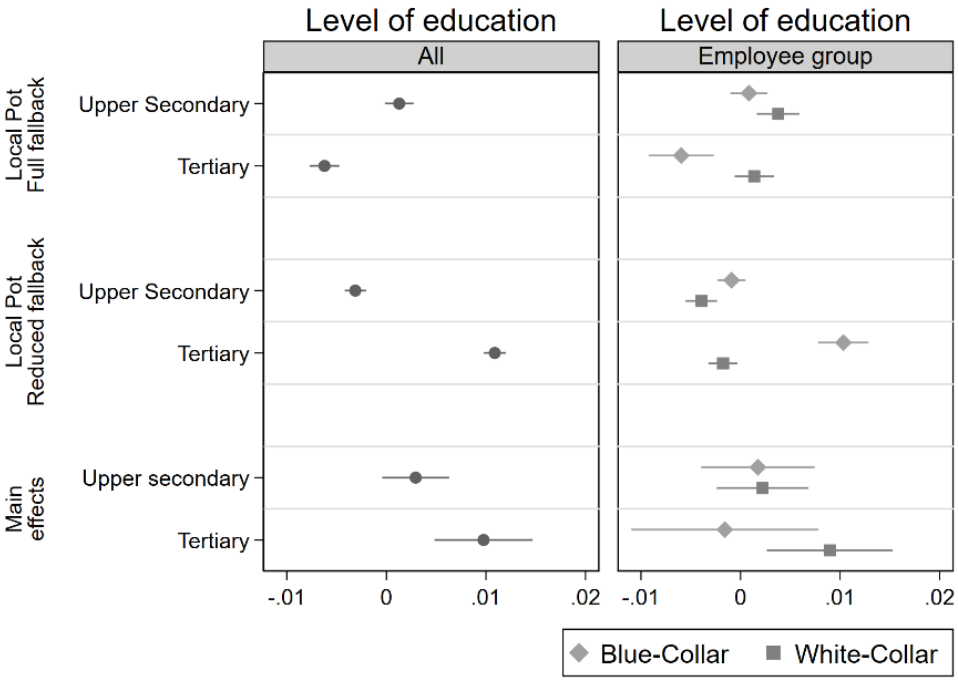


Figure 6: Routine occupations, local pots and wage changes

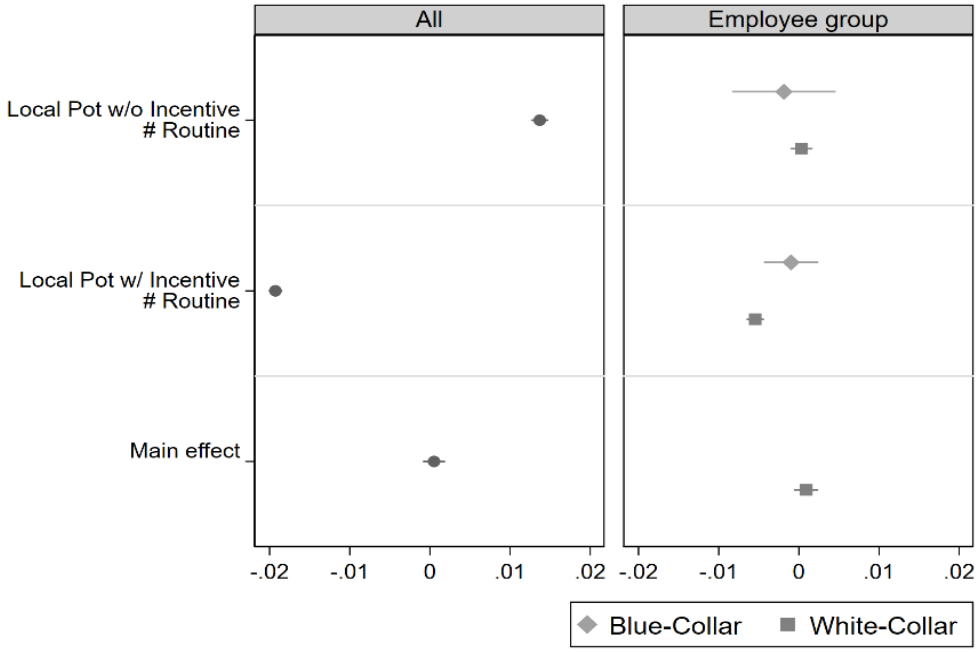


Figure 7: Unconditional quantile regressions for all employees

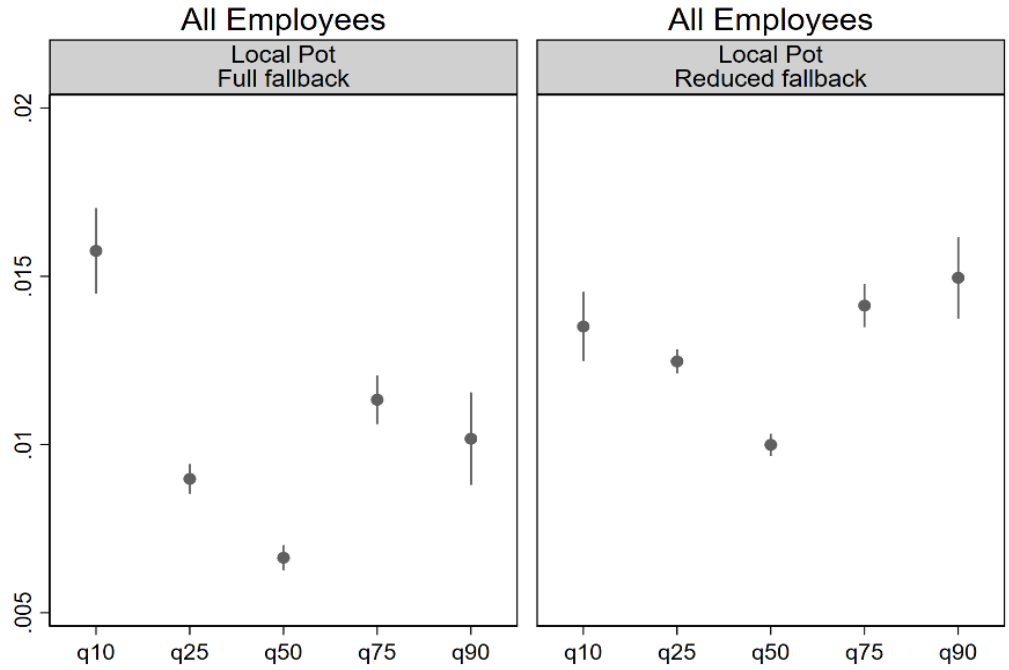


Figure 8: Unconditional quantile regressions for white-collar employees

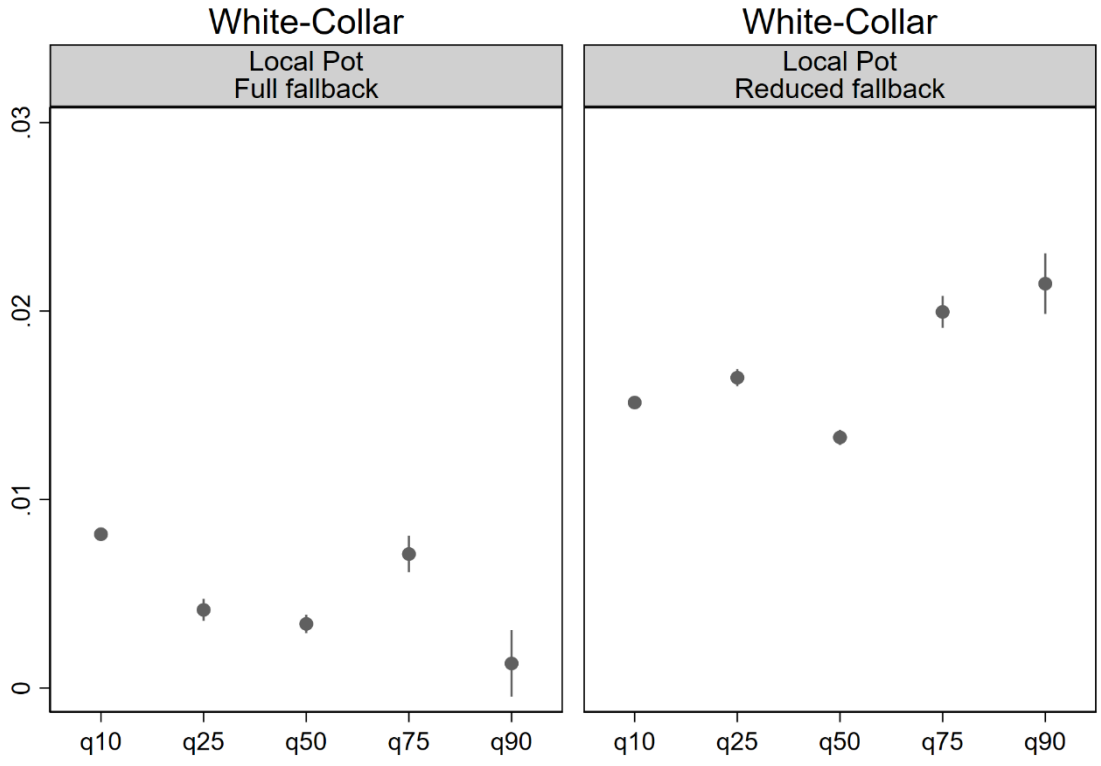


Figure 9: Unconditional quantile regressions for blue-collar employees

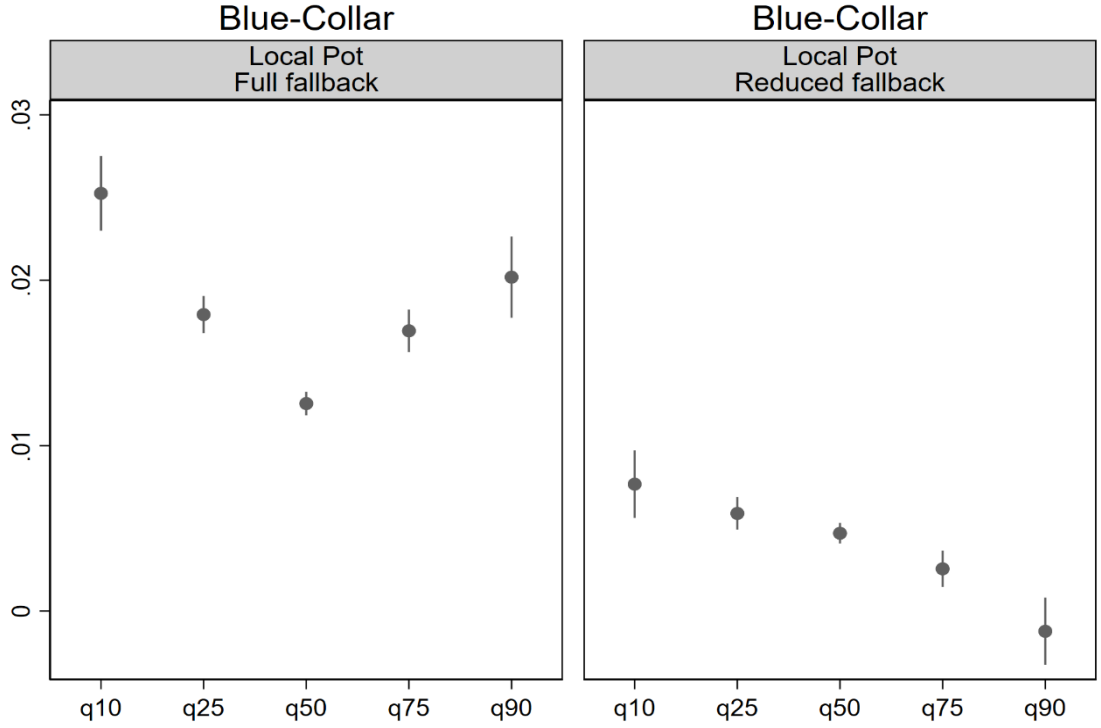


Table 1: Transition matrices for the local pot variables

Local pot, full fallback				
		Year t+1		
		0	1	Total
Year t	0	94.08%	5.92%	100%
	1	84.52%	15.48%	100%
	Total	93.18%	6.82%	100%
Local pot, reduced fallback				
		Year t+1		
		0	1	Total
Year t	0	87.92%	12.08%	100%
	1	64.74%	35.26%	100%
	Total	84.67%	15.33%	100%

Note: The table shows the transition matrices for the local pot variables at the job-spell level.

Table 2: Average marginal effects of the local pot variables

	Blue-collar	White-collar	All
Local pot with full fallback	0.018***	0.008***	0.011***
	(0.001)	(0.000)	(0.000)
Local pot with reduced fallback	0.005***	0.016***	0.010***
	(0.000)	(0.000)	(0.000)
Observations	1,378,967	1,960,688	3,365,703

Notes: Standard errors are reported in parentheses. Other controls include gender, age, tenure, occupation, education level, part-time work, routine job dummy, industry, firm size and various interactions. * p<0.05, ** p<0.01, *** p<0.001.

Table 3: Gender, local pots and wage changes

	Blue-collar	White-collar	All
Local pot with full fallback # Female	-0.003***	0.000	-0.004***
	(0.001)	(0.001)	(0.000)
Local pot with reduced fallback # Female	-0.001	0.002***	0.005***
	(0.001)	(0.000)	(0.000)
Observations	1,378,967	1,960,688	3,365,703

Notes: Standard errors are reported in parentheses. Other controls include, age, tenure, occupation, education level, part-time work, routine job dummy, industry, firm size and various interactions. * p<0.05, ** p<0.01, *** p<0.001.

Appendix

Table AI: Summary of previous research

Author(s) and publication year	Country and data	Outcome	Decentralization measure	Methods	Main findings
Card and de la Rica (2006)	1995 Wage Structure Survey from Spain	Wage level and wage dispersion (hourly wage)	Firm-level contracts versus sectoral-level contracts	OLS and QR	Firm-level contracting is associated with 5-10% higher wages, and the premium increases with skill level
Canal Domínguez and Gutiérrez (2004)	1995 Wage Structure Survey from Spain	Wage level and wage dispersion (standard deviation of hourly wages)	Firm collective agreement	OLS and BO-decomposition	Firm collective agreement is associated with ~10% higher wages and lower wage dispersion
Plasman, Rusinek and Rycx (2007)	1995 European Structure of Earnings Survey from the manufacturing sector in Spain	Wage level and wage dispersion (standard deviation and inter-decile wage gaps)	Single-employer versus multi-employer agreements	OLS and BO-decomposition	Single-employer agreements are associated with 4% higher earnings and lower wage dispersion
Dell'Aringa and Pagani (2007)	1995 European Structure of Earnings Survey from Spain	Wage dispersion (e.g., level and variance of hourly wages and percentile ratios)	Single-employer versus multi-employer bargaining	Variance decomposition, std's of parameters (OLS) and QR	Mixed and non-robust evidence on the effect of single-employer bargaining on wage dispersion
Addison, Teixeira, Evers and Kölling (2017)	Linked employer-employee data for 1996-2010 from Germany	Wage dispersion (daily wage)	Entry to and exit from collective agreements (sectoral bargaining)	DID and plant FE regression	Plants that exit from collective agreements show a modest increase in intra-plant wage dispersion.
Fitzenberger, Kohn and Lembcke (2013)	Linked employer-employee data (German Structure of Earnings Survey) for 2001	Wage level and wage dispersion (hourly wage)	Sectoral, firm-specific and individual contracts	OLS and QR	A higher share of employees in a firm covered by sectoral or firm contracts is associated with higher wages but the effect on wage dispersion is negligible
Gürtzgen (2016)	Linked employer-employee data for 1995-2008 from Germany	Wage level (daily wage), change in wages	No coverage, firm-level and industry-level coverage	OLS, plant FE and DID regressions	Leaving industry-level contracts is associated with 2-4% lower wages and firm-level contracting is associated with 0-3% higher wages than the wages associated with no contracting
Dahl, le Maire and Munch (2013)	Matched employer-employee data for 1992-2001 from Denmark	Wage level and wage dispersion (hourly wage)	Firm-level, two-tiered and standard-rate system	OLS, FE and Quantile regression	Firm-level wage premium of 4-6%, and this premium is higher among more skilled employees

Author(s) and publication year	Country and data	Outcome	Decentralization measure	Methods	Main findings
Plasman, Rusinek and Rycx (2007)	1995 European Structure of Earnings Survey from the manufacturing sector in Denmark	Wage level and wage dispersion (standard deviation and inter-decile wage gaps)	Single-employer versus multi-employer agreements	OLS and BO decomposition	Single-employer agreements are associated with 3% higher earnings and higher wage dispersion
Rycx (2003)	1995 European Structure of Earnings Survey from Belgium	Wage level (hourly wage) and inter-industry wage differentials	Company versus national and/or sectoral collective agreement	OLS and BO decomposition	Company agreements are associated with 5% higher wages but the results regarding wage dispersion is mixed
Plasman, Rusinek and Rycx (2007)	1995 European Structure of Earnings Survey from the manufacturing sector in Belgium	Wage level and wage dispersion (standard deviation and inter-decile wage gaps)	Single-employer versus multi-employer agreements	OLS and BO decomposition	Single-employer agreements are associated with 4% higher earnings and slightly higher wage dispersion
Dell'Aringa and Pagani (2007)	1995 European Structure of Earnings Survey from Belgium	Wage dispersion (e.g., level and variance of hourly wages and percentile ratios)	Single-employer versus multi-employer bargaining	Variance decomposition, std's of parameters (OLS) and QR	Single-employer bargaining is negatively associated with wage dispersion
Cardoso and Portugal (2005)	Linked employee-firm data for 1998-1999 from Portugal	Actual wage, bargained wage and wage cushion (monthly wage)	(Herfindahl) index of the concentration of bargaining within an occupation, firm or region.	OLS tobit	Lower union power is associated with higher actual wages, and this result is mediated through higher wage drift
Dell'Aringa and Pagani (2007)	1995 European Structure of Earnings Survey from Italy	Wage dispersion (e.g., level and variance of hourly wages and percentile ratios)	Single-employer versus multi-employer bargaining	Variance decomposition, std's of parameters (OLS) and QR	Mainly small (but not always robust) negative relationship between single-employer bargaining and wage dispersion
McGuinness, Kelly and O'Connell (2010)	2003 National Employment Survey from Ireland	Wage dispersion (variation in hourly wages)	Individual-, business-, industry, and national-level, other type and no majority	OLS and BO decomposition	Wage inequality is lower in firms implementing national-level or industry-level agreements.

Table A2: Variable definitions and classifications

Variable	Category/Definition	Classification/notes
Age	18-25 years old, 26-35 years old, 36-45 years old, 46-55 years old, and over 55 years old	
Tenure	Up to one year, 2-5 years, 6-10 years, 11-15 years, and over 15 years	This variable is matched to the data from Statistics Finland's FOLK database
Education	The highest schooling level completed. Primary education (=completed primary education only, ISCED level 2), Secondary education (completed secondary, but not tertiary education, ISCED level 3), Tertiary education (completed tertiary education, ISCED levels 4-8)	ISCED classification
Education field	Top level classification, 10 categories	ISCED classification
Occupation	Two-digit level	ISCO-08 classification
Industry	15 industries	Statistics Finland's Standard Industrial Classification TOL 2008
Firm size	Less than 50 employees, 51-100, 101-500, 46-55, 501-1000, and over 1000 employees	
Routine	Includes 71 occupation categories (mostly major groups 4 and 7-8 but also certain occupations from major groups 3 and 5). Includes mostly sales, clerical, production, and operator work.	The Finnish ISCO-08 classification (mainly 3-digit and 4-digit occupation categories) and Acemoglu and Autor (2011) classification. The classification follows Böckerman et al. (2019) and Kerr et al. (2020).
Non-routine	Includes 91 occupation categories (mostly major groups 1-3, 5 and 9). Includes both non-routine cognitive (abstract) tasks and non-routine manual (service) tasks. These include high-paid managers, professionals and technical workers and low-paid cleaning, elementary work, personal care, and service workers.	The Finnish ISCO-08 classification (mainly 3-digit and 4-digit occupation categories) and Acemoglu and Autor (2011) classification. The classification follows Böckerman et al. (2019) and Kerr et al. (2020).
White-collar workers	Employees in levels 2-5 in the ISCO-08 classification	ISCO-08 classification
Blue-collar workers	Employees in levels 7-9, with some exceptions. Following Kotilainen (2018) some occupations in levels 3-5 are classified as blue-collar occupations. These are occupations where the employees are typically paid hourly.	

Table A3: Summary statistics

	All	Blue-collar	White-collar
Change in total hourly earnings	0.040	0.036	0.042
Local pot	0.226	0.214	0.234
Local pot, full fallback	0.089	0.089	0.089
Local pot, reduced fallback	0.136	0.125	0.145
Female	0.425	0.244	0.552
Age			
Under 25 years	0.060	0.074	0.048
26-35	0.233	0.212	0.247
36-45	0.270	0.251	0.284
46-55	0.282	0.299	0.271
>56	0.154	0.163	0.149
Tenure			
Under 1 year	0.066	0.091	0.047
2-5	0.289	0.244	0.318
6-10	0.209	0.185	0.227
11-15	0.151	0.157	0.148
>15	0.285	0.324	0.260
Occupation			
Professionals	0.125		0.214
Technicians and associate professionals	0.228	0.007	0.385
Clerical support workers	0.121	0.070	0.157
Service and sales workers	0.173	0.070	0.243
Craft and related trade workers	0.137	0.332	
Plant and machine operators	0.145	0.352	
Elementary occupations	0.070	0.169	
Level of education			
Lower secondary	0.150	0.235	0.091
Upper secondary	0.480	0.695	0.328
Tertiary	0.369	0.071	0.581
Routine occupation	0.596	0.875	0.400
Part-time	0.098	0.076	0.112
Industry			
Mining	0.001	0.003	0.000
Manufacturing	0.361	0.533	0.242
Electricity, gas	0.014	0.011	0.016
Construction	0.062	0.118	0.023
Wholesale and retail trade	0.175	0.086	0.237
Transportation	0.084	0.142	0.043
Accommodation and food	0.031	0.033	0.029
Information and communication	0.078	0.005	0.130
Finance and insurance	0.061	0.000	0.105
Real Estate	0.001	0.000	0.002
Professional, scientific and technical	0.023	0.001	0.038

Administrative and support services	0.035	0.053	0.023
Education	0.016	0.002	0.026
Health and social	0.051	0.012	0.079
Art and entertainment	0.005	0.001	0.007
Firm size			
<50 employees	0.112	0.082	0.131
51-100	0.065	0.066	0.064
101-500	0.268	0.290	0.253
501-1000	0.138	0.138	0.139
>1001	0.417	0.423	0.413
Observations	3365703	1378967	1960688