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# Dark Half: Decentralized Bargaining and Well-being at Work

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## Abstract

Using information on collective agreements and administrative data on mental ill-health, sickness absence, and job separations, we study the effect of decentralization on well-being at work in Finland. Our regression results with individual-and firm-level fixed effects show that decentralized wage bargaining leads to distinct outcomes for different employee groups. For example, white-collar employees in white-collar intensive firms show increased well-being at work. In contrast, all employees in blue-collar intensive firms show quite strong and negative responses to decentralization. Decentralization affects mostly job-separation behavior and mental ill-health, whereas no consistent effects for sickness absence are observed. Whether the mechanisms between decentralization and worker's well-being is explained by pay dispersion, wage level, or different preferences toward wage policy needs to be explored further.

# Tiivistelmä

## Parempi työhyvinvointi paikallisesti sopien?

Aikaisemmassa kirjallisuudessa ei juuri ole tutkittu neuvottelujärjestelmässä ja sopimusten sisällössä tapahtuneiden muutosten vaikutuksia yksilöiden työhyvinvointiin, vaikka palkkaneuvottelut ovat yksi keskeisimpiä työelämän suhteiden kysymyksiä. Työehtosopimusten sisältö voi vaikuttaa työtyytyväisyyteen muun muassa palkkatason, palkkahajonnan tai paikalliseen sopimiseen liittyvien preferenssien kautta. Työhyvinvoinnin, työurien pidentämisen ja tuottavuuden näkökulmasta onkin tarve tuottaa uutta, päivitettyä tutkimustietoa palkkojen muodostumisesta ja niiden vaikutuksista myös työssä jaksamiseen. Esimerkiksi sairauspoissaoloista ja työpaikan vaihdosta koituu kustannuksia paitsi yksilöille myös yrityksille ja koko yhteiskunnalle.

Tässä tutkimuksessa tarkastellaan työehtosopimusjärjestelmän vaikutuksia työhyvinvointiin Suomessa. Työhyvinvoinnin mittareina käytämme rekisteritietoja sairauspoissaoloista, mielenterveydestä ja työpaikan vaihdosta. Erityistä huomioita kiinnitetään vaikutusten vaihteluun eri työntekijäryhmissä. Hyödynnämme yhdistettyä työnantaja-työntekijätilastoaineistoa vuosilta 2005–2013. Näihin aineistoihin yhdistetään tietoja työehtosopimusten sisällöstä ja maksetuista sairauspäivärahoista sekä tietoja mielenterveyteen liittyvistä lääkekorvauksista ja sairaalakäynneistä. Analyyseissä käytämme regressiomallia, jossa on sekä yksilö- että yritystason kiinteät vaikutukset.

Tulokset osoittavat, että paikallinen sopiminen on pääosin yhteydessä korkeampaan työhyvinvointiin. Toisaalta havaitsemme eroja eri työntekijäryhmien ja yritysten välillä. Esimerkiksi, toimihenkilöt (perinteistä teollisuustyötä tekevät) vaihtavat epätodennäköisemmin (todennäköisemmin) työpaikkaa, mikäli palkankorotuksissa on ollut paikallinen erä. Tämä yhteys on ilmeinen asiantuntijaintensiivisissä yrityksissä. Toisaalta paikallinen sopiminen voi johtaa heikentyneeseen mielenterveyteen kaikilla työntekijäryhmillä yrityksissä, joissa suurin osa työvoimasta koostuu perinteistä teollisuustyötä tekevistä työntekijöistä.

Erityisesti työntekijäryhmässä havaittu heikentynyt työhyvinvointi ei johtune palkkatasosta, sillä paikallinen sopiminen johtaa korkeampiin palkankorotuksiin. Yhteys voikin selittyä esimerkiksi paikalliseen sopimiseen liittyvien kielteisten näkemyksien kautta. Jatkotutkimuksessa onkin tärkeää pyrkiä ymmärtämään paikallisen sopimisen ja työhyvinvoinnin välisen yhteyden mekanismeja.

Tutkimustulokset tuottavat tärkeää ja politiikkarelevanttia tietoa työelämän laadun ja työhyvinvoinnin edistämiseksi, sillä työehtosopimuksien sisältöihin voidaan vaikuttaa sopijaosapuolien keskuudessa. Erityisesti tulevaisuuden pula-ammateissa työskentelevien työntekijöiden työhyvinvointi on tärkeää esimerkiksi väestön ikääntymisen vuoksi. Tulostemme mukaan erityishuomiota tulee keskittää teollisuustyöntekijöiden työhyvinvoinnin takaamiseksi.

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**Keywords:** Decentralization, Collective agreements, Mental health disorder, Sickness absence, Job separation, Blue-collar, White-collar

**Asiasanat:** Neuvottelujärjestelmän hajautuminen, Työehtosopimukset, Mielenterveys, Sairauspoissaolot, Työpaikan vaihto, Työntekijä, Toimihenkilö

**JEL:** J31, J51, J52

## 1. Introduction

There is a substantial literature exploring the relationship between unionization and job satisfaction (see, e.g., Hammer and Avgar 2005 for a review). Union members typically report lower job satisfaction than non-members, although this correlation is often explained by reverse causality (Laroche 2016). Moreover, numerous studies have analyzed how performance pay and other forms of flexible wage contracts are related to various domains of employees' well-being, such as job satisfaction (McCausland, Pouliakas and Theodossiou 2005, Green and Heywood 2008), workers' efforts in terms of workplace absenteeism (Pouliakas and Theodoropoulos 2012, Battisti and Vallanti 2013), and absence due to sickness (Dale-Olsen 2012). Although there has been a strong tendency toward enterprise-level wage negotiations in European countries (Visser 2016), the implications of this decentralization on employees' well-being at work have been rarely studied. This is the novel contribution of our paper.

How the decentralization of wage negotiations affects employees' well-being is a highly policy-relevant question. First, several reforms have increased the decentralization of collective bargaining in many OECD countries (including Finland) since the late 1980s (OECD 2019), but it is unknown how these changes are linked to well-being. Second, employees' well-being is an important determinant of absenteeism at work. Furthermore, absenteeism and job turnover generate substantial costs for the employee, employer, and society. Thus, it is important to know whether decentralization has a positive or negative influence on the well-being of employees.

There are at least three potential pathways through which decentralization can affect the well-being of employees. First, decentralization is related to higher earnings (e.g., Card and de la Rica 2006, Plasman, Rusinek and Rycx 2007, Dahl, le Maire and Munch 2013), and higher earnings are related to improved mental health (Reeves, McKee and Mackenbach

2017), worker effort (Charness and Kuhn 2007), and job satisfaction (Clark, Kristensen and Westergård-Nielsen 2009). Second, decentralized bargaining can affect wage dispersion, which is found to be an important determinant of job quitting behavior (Riddell 2011, Bradley, Green and Mangan 2012), work absenteeism (Pfeifer 2010), and job satisfaction (Card et al. 2012). Third, employees' preferences, beyond actual or relative wages, toward a more egalitarian wage policy might affect their well-being at work. For example, in the Nordic countries, white-collar workers favor redistribution or wage equality less than blue-collar workers (e.g., Arndt 2018, Alho et al. 2003).[1]

We contribute to this debate in two major ways. First, this is one of the first papers analyzing the effects of decentralization on workers' well-being. To the best of our knowledge, there is only one empirical study on the topic that examines the relation between firm-level collective agreements and job satisfaction in Spain (García-Serrano 2009). Second, we are not aware of any studies that have analyzed the effects of decentralization using objectively measured indicators of well-being at work. These indicators include mental health disorders, sickness absence, and the incidence of job separations.

The analysis is conducted using administrative employer–employee register data matched with collective bargaining data during 2005–2013. These panel data allow us to follow employees over time and link them to their employers and contracts for wage setting. To these data we have matched administrative information on long-term sickness absence

[1] Arndt (2018) examines the differences in the attitudes toward income inequality, redistribution, and state-market relations between white- and blue-collar union members from Denmark, Sweden, and Norway. Alho et al. (2003) find that in Finland, white-collar workers prefer wage negotiations to be held at the firm level more than blue-collar workers. Accordingly, blue-collar workers believe that locally bargained wage increases should be used to decrease wage dispersion, whereas white-collar workers believe that they should be allocated in a way that increases wage dispersion (Alho et al. 2003, Kauhanen et al. 2020).

and mental health disorders of workers. We exploit time variation in the wage-setting system of individual workers. The effect of wage policy is identified from workers who change wage-setting systems within a job spell (see also Dahl et al. 2013).

We find that, for the entire sample, decentralized bargaining leads to a slightly improved well-being of workers. However, there is heterogeneity in the results between blue- and white-collar workers and whether the employees work in firms with low or high concentrations of blue-collar employees. We argue that different factors, such as wages, pay dispersion, individual preferences toward wage policy, or group solidarity, partly contribute to these patterns. For example, white-collar employees in white-collar-intensive firms show increased well-being at work as a response to decentralized wage agreements. In contrast, all employees in blue-collar intensive firms show quite strong and negative responses to decentralization. Our results demonstrate that decentralized wage bargaining mostly affects job-separation behavior (the effects vary between 3 and 53 percent) and mental ill-health (3–5 percent), whereas no consistent associations were found for long-term absence due to sickness. These findings thus indicate that workers respond mostly at the extensive rather than intensive margins of adjustment.

In the next two sections, we review the relevant literature and describe the Finnish institutional setting. Then, we present the register datasets used in the empirical analysis, describing the main independent variables and objective measures for workers' well-being. Next, we present our empirical model and carry out an econometric analysis to estimate the effects of decentralization on mental ill-health, sickness absence, and the incidence of job quits. Finally, we conclude our paper by setting the findings into a larger context.

## 2. Conceptual framework

### *2.1. Literature review*

To the best of our knowledge, so far, only García-Serrano (2009) has investigated the relation between decentralized bargaining and a worker's well-being. The study indicates a positive association between firm-level agreements and subjective job satisfaction in Spain, although this correlation disappears after working conditions and industrial relations are controlled for in the analysis. We are not aware of any studies that credibly estimate the effects of decentralization on objectively measured indicators of employees' well-being.

However, the relation between union membership and job satisfaction has been extensively investigated (see also Table A1). Unionization is positively related to sickness absence (Mastekaasa 2013)[2] and negatively related to job satisfaction in various contributions (see, e.g., Hammer and Avgar 2005, for a review), although differences in industrial relations (van der Meer 2019) and whether the employees are covered or uncovered also matter (Bryson, Cappellari and Lucifora 2010, Green and Heywood 2015).[3] The negative correlation between unionization and job satisfaction can often be explained by changing working conditions (Bessa, Charlwood and Valizade 2021), worse union job quality (e.g., García-Serrano 2009), unions attracting inherently more dissatisfied workers, or unionized workers being more encouraged to express their discontent (the "voice" hypothesis). A meta-analysis comprising 59 studies shows that the relation indeed disappears

[2] Mastekaasa (2013) shows that union membership is related to 9–47 percent increases in the probability of sickness absence compared to nonmembers, depending on the choice of the absence measure and dimensions of fixed effects.

[3] Bryson and White (2016) account for fixed unobserved differences between covered and uncovered employees and find that union coverage is positively associated with satisfaction with pay and hours of work.

after controlling for the endogeneity of membership (Laroche 2016).[4] Blanchflower and Bryson (2020) also show that the relation between union membership and job satisfaction turned into positive in the 2000s.

Decentralization of bargaining can affect workers' well-being through changes in the level of wages and wage dispersion.[5] We only review a selected set of studies that examine the effects of wages or wage dispersion on various domains of health-related outcomes and job satisfaction (see Table A1). A higher wage level is positively related to job satisfaction (Clark, Kristensen and Westergård-Nielsen 2009) and negatively related to absenteeism (Pfeifer 2010). Many studies have used local increases in minimum wages to evaluate their causal effects on workers' health. Lenhart (2017) finds that receiving a wage raise through the introduction of the national minimum wage improves both objectively and subjectively measured health status in the UK. These health improvements are mainly driven by decreased financial stress and changes in health behaviors, such as smoking quits. Reeves, McKee, and Mackenbach (2017) also use data from the UK and find that an increase in minimum wages decreases mental ill-health problems but has negligible effects on other health-related factors. A systematic review has also been conducted (Leigh, Leigh and Du 2019). This review demonstrates that increases in minimum wages tend to decrease smoking, but no other consistent effects or correlations were found.[6] Overall, the introduction of the

[4] Related to unionization literature, Krieg et al. (2013) use the US data on postsecondary faculty workers and find that bargaining agreements increase satisfaction with pay but reduce satisfaction with workload.

[5] Decentralized bargaining is positively related to wage increases (e.g., Canal Domínguez and Gutiérrez 2004, Card and de la Rica 2006, Dahl, le Maire and Munch 2013), although its effect on wage dispersion is quite mixed (e.g., Canal Domínguez and Gutiérrez 2004, Card and de la Rica 2006, Dell'Aringa and Pagani 2007, Plasman et al. 2007). See, also, Kauhanen et al. (2020, Table A1) for a review on the impacts of bargaining regimes on wage levels and wage increases.

[6] However, out of the 52 reported estimates, 27 were statistically significant.

minimum wages, or small increases in the minimum wage level (e.g., one dollar), are found to be associated with 6–8 percent increases in various health statuses, on average (Lenhart 2017, Leigh et al. 2019 for a review). Bossler and Broszeit (2017) use data from Germany and report increased satisfaction with pay as a response to policy change but a small or zero effect on work engagement.

Another strand of literature deals with wage dispersion. Higher relative wages or wage dispersion are linked with lower job satisfaction (Shaw 2014) and increased sickness absence (Mahy, Rycx and Volral 2015). Wage dispersion also enhances job-quitting behavior (Haltiwanger and Vodopivec 2003, Riddell 2011, Bradley, Green and Mangan 2012).[7] For example, a one-log-point change in dispersion (~1.5 standard deviation from the mean) increases quit rates by approximately 20 percent in Canada (Riddel 2011). Some of the studies have indicated interesting heterogeneity in the results, depending on the employee's position in the earnings rank. The relation between wage dispersion and job satisfaction or job-quitting behavior is stronger among low performers (Carnahan, Agarwal and Campbell 2012) and among workers with pay below the median (Card et al. 2012). In particular, a one-standard-deviation increase in dispersion increases the likelihood of job quits among poor performers by approximately 6 percent in the US, whereas high performers are less likely to quit as a response to wage dispersion (Carnahan et al. 2012). Pfeifer (2010) also reports nonlinear relations. He finds that higher relative wages are negatively related to work absenteeism, and this association is stronger among better-paid employees. Moreover, a study from Sweden shows distinct differences between horizontal pay dispersion (within the same job levels) and vertical pay dispersion (between job levels) and their association with

[7] Charness and Kuhn (2007) and Bartling and von Siemens (2011) present data on laboratory experiments and show only limited or zero importance of wage inequality on participants' effort.

job-quitting behavior (Kacperczyk and Balachandran 2018). The authors show that horizontal pay dispersion is positively related to cross-firm mobility, whereas vertical pay dispersion is negatively related to cross-firm mobility, especially among the bottom earner group.

We finally present a short overview of the literature that has studied performance pay, which has been found to affect both absolute and relative wages (e.g., Pekkarinen and Riddell 2008, Lemieux, MacLeod and Parent 2009). Performance-related pay and other forms of flexible wage contracts are positively related to job satisfaction (Green and Heywood 2008)[8] and negatively related to absenteeism of between 6–20 percent (Pouliakas and Theodoropoulos 2012, Dale-Olsen 2012). As mentioned before, these effects are typically stronger among highly paid employees (McCausland et al. 2005, Battisti and Vallanti 2013).[9]

*2.2.Analytical framework*

To summarize the previous results, a higher wage level is linked to improved well-being, whereas higher pay dispersion is typically linked to decreased well-being. There is, however, heterogeneity in the results regarding pay dispersion, depending on the position in the earnings rank and whether the pay dispersion is horizontal or vertical. We thus hypothesize that the decentralization of collective bargaining should lead to different outcomes for blue- and white-collar employees. Next, we discuss why this pattern may exist.

[8] The quantitative magnitude of this effect is economically significant. For example, the profit-related pay increases the probability of being in the most satisfied category in overall job satisfaction by 9 percent (Green and Heywood 2008).

[9] Performance pay (or piece rate) can lead employees to work too fast and for longer hours, which increase the risk of injuries and increase health limitations among low-wage workers (DeVaro and Heywood 2017, Davis and Hoyt 2020).

Many factors contribute to the observed relation between decentralization and different domains of well-being. The theoretical predictions of the effects of decentralization on these potential factors and well-being are summarized in Table 1. First, white-collar workers prefer wage negotiations to be held at the firm level more than blue-collar workers (Alho et al. 2003). Thus, the effects of decentralized wage bargaining can differ for these two groups of workers. It is assumed that positive (negative) attitudes toward decentralized wage bargaining increase (decrease) well-being among white-collar (blue-collar) employees. Second, a recent study from Finland shows that decentralization is linked to higher wage increases among both blue- and white-collar employees (Kauhanen et al. 2020). These wage gains should lead to increased well-being among both employee groups, as shown in the literature.

Third, in Finland, decentralization decreases pay dispersion among blue-collar workers but slightly increases it among white-collar workers (Kauhanen et al. 2020).[10] This can also lead to improved well-being, based on previous empirical evidence, if workers care about their wages relative to coworkers at the same occupational level (i.e., horizontal pay dispersion). The findings regarding decentralized wage bargaining and pay dispersion in Finland indicate that decentralization is related to lower overall pay dispersion within firms with a high concentration of blue-collar workers and slightly higher overall pay dispersion within firms with a high concentration of white-collar workers. This is important, as workers are likely to care about their wages relative to coworkers within the same organization (i.e., vertical pay dispersion), as suggested by Kacperczyk and Balachandran (2018).

[10] These positive or negative correlations between pay dispersion and decentralization are shown in Table 1, column 3.

In summary, we hypothesize that decentralization leads to improved well-being among white-collar workers in white-collar intensive firms. This positive effect is partially mediated through the wage compensation received by workers, as well as through the pay dispersion and overall satisfaction toward the decentralized wage policy. However, the effect is unclear for white-collar workers working in blue-collar intensive firms. Lower vertical pay dispersion can reduce well-being, which might dominate the positive confounding effects of higher wage increases and preferences toward firm-level wage agreements.

We also hypothesize that decentralization leads to reduced well-being at work among blue-collar workers in blue-collar intensive firms. We argue that dissatisfaction with lower vertical pay dispersion, combined with general negative views of firm-level agreements, dominates the positive effects of wage increases. Finally, the effect is unclear for blue-collar workers working in white-collar intensive firms. The effect is presumably positive if the dissatisfaction toward decentralized wage policy does not exceed the positive well-being effects of pay dispersion and wage increases.

Furthermore, other factors such as social aspects of work or autonomy at work could partly drive the results. For example, peer pressure toward solidaristic wage policy or group solidarity within an organization could affect individual behavior. Loosely related to our study, Høgedahl (2014) and Parsons, Tranaes, and Lilleør (2015) discuss the possibility that employees working in firms that are highly dominated by unions are more exposed to peer pressure to join unions or voluntary UI funds. Thus, this mediating role of peer pressure is likely stronger in blue-collar intensive firms, although it is difficult to be documented directly.

[Add Table1 here]

## 3. Institutional background

### *3.1. Collective agreements*

Collective agreements play an important role in wage setting and employment contracts in Finland (e.g., Jonker-Hoffrén 2019). The main reasons for this are high union density (~70 percent), widespread extension of collective agreements, and wide scope of agreements. The coverage of collective bargaining is approximately 90 percent.

Bargaining occurs at the sectoral level, where the actors are the employer's federations and trade unions. In each sector, blue-collar, white-collar, and sometimes upper-white-collar employees have different contracts. Blue-collar employees are paid hourly, and their remuneration is based on time pay, piece-rates, and reward-rates[11]. White-collar employees are paid monthly. Both groups can also receive performance-related pay, which is not governed by collective agreements.

The contract applied to each employee is determined by their employer's federation or industry if they do not belong to the employer's federation. Employers have very limited possibilities to choose their contract. In some cases, they might be able to choose which employer's association to belong to, but that is quite rare.

Collective agreements cover, for example, wage formation, working time, holidays, social provisions, and parental leave (e.g., Jonker-Hoffrén 2019). The central issue in the negotiations is the stipulated wage increase. Historically, blue-collar unions have favored absolute wage increases, whereas white-collar and upper-white collar unions have favored relative increases (Marjanen 2002).

[11] Piece-rates are paid based on the quantity produced. Reward rates can include broader performance measures, such as quality, in addition to the quantity produced.

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 element, which means that everyone's wages are increased similarly. For our purposes, the most interesting element is the local wage increase allowance. These are wage increases that are negotiated and implemented locally according to the rules set in the collective agreement. This is the way in which the Finnish collective bargaining system has decentralized.

There has been a significant history of centralized bargaining in Finland (e.g., Andersen et al. 2015). Before 2006, Finnish industrial relations were characterized by tripartite centralized collective agreements (the so-called TUPO). In this process, first, central organizations negotiated an agreement, and then, sectoral organizations decided whether they followed this agreement. The centralized bargaining rounds meant that the sectors had very similar wage increases.

In 2007, the confederation of Finnish Industry and Employers (EK) decided that it would no longer be a part of centralized bargaining (Andersen et al. 2015, p. 144). This led to two rounds of industry bargaining. Employers wanted more local bargaining, but labor unions resisted this, especially blue-collar unions (Heikkilä and Piekkola 2005). The readiness to accept more local bargaining was the highest among upper-white-collar employees, followed by white-collar employees, and blue-collar employees had the most negative view of it (Pekkarinen and Alho 2005, Fig. 10). In this round, many contracts included local wage increase allowances. Thus, at this point, there was organized decentralization in the Finnish collective bargaining system. In the 2009–2010 bargaining round, the role of local wage increase allowances decreased, especially in blue-collar contracts. The following bargaining round took place in 2011, and it again resembled the old, centralized agreements. In this so-called "framework agreement," the national

centralized agreement gave guidelines for industry-level bargaining. Despite the centralized nature of the bargaining round, many contracts still included local wage increase allowances, although they were less common than those in the 2007–2008 bargaining round. Thus, from 2005 to 2013, the Finnish collective bargaining system experienced some degree of organized decentralization, although there was some movement toward the old system toward the end of the period.

Figure 1 shows the evolution of collective agreements with a local wage increase allowance between 2006 and 2013 for white- and blue-collar workers. There is variation over time in the share of employees in contracts with local pots. There was a spike in 2008, when approximately 40 percent of all employees had a local pot in their agreements. Afterward, the prevalence declined. The prevalence of local pots is quite similar between blue- and white-collar workers except for the year 2010. On average, approximately 21 percent of employees had a local pot in their agreements between 2006 and 2013.

[Add Figure 1 here]

*3.2. Occupational health care*

In Finland, everyone is entitled to health services regardless of their ability to pay or their place of residence. Municipalities are responsible for providing health care in their area. However, the role of occupational (and private) health services has increased over time. According to the Occupational Health Care Act of 743/1978, employers must arrange preventative health care for their employees. In addition to compulsory occupational health care, employers can also voluntarily provide medical care and additional health care for their employees. Today, the coverage of occupational health services among wage earners is 87 percent (Kela 2021).

The primary motivation for occupational health care has been to prevent work-related illnesses and accidents rather than curing them (Martimo and Mäkitalo 2014). However,

currently, the occupational health expenditures on medical care are roughly the same as those on preventive care (Kela 2021). Thus, occupational health services are important for the promotion of employees' health, work capacity, and productivity in the workplaces more generally in Finland. Employers often buy occupational health services from a private clinic or municipal health center. The share of private clinics among service providers increased during the 2000s. The numbers of physicians, psychologists, and physiotherapists working in occupational health care have also increased (Lappalainen et al. 2016).

Employers are entitled to receive compensation for necessary and reasonable costs resulting from occupational health care (50–60 percent of acceptable costs). Employees cannot be charged for the use of occupational health care, but both employers and employees participate in financing the scheme through national health insurance payments. The expenditures on occupational health care have increased almost every year since 1965 (Kela 2021, Martimo and Mäkitalo 2014).

## 4. Data and variables

### *4.1. Register sources*

Our analysis is based on rich linked data that combine five data sources. The key data are the Harmonized Structure of Earnings Survey (HSES) data from Statistics Finland, which contain individual and firm identifiers.[12] All measures and variable classifications, such as occupation and industry, are consistent across years and sectors, which makes the data suitable for panel analysis. This harmonization is important in our setting, as it takes into account the differences and changes in the bargaining structure. The HSES data are available

[12] Description of the data can be found at

https://taika.stat.fi/en/aineistokuvaus.html#!?dataid=YA246a_19952013_jua_harmonpalrakyks_003.xml

for private sector firms annually from 1995 onward. In our analysis, we use the 2005–2013 period and focus on individuals aged 18–64. The coverage of the data is 55–75 percent of all employees in Finland, depending on year and industry. Firms with fewer than five employees are not included in the HSES data. There is also limited coverage of i) employees in mostly small unorganized firms; ii) top management and owners and their family members; and iii) employees whose job contracts began or ended during the months of data collection. The data also exclude household employers, agriculture, forestry and fishery industries, and international organization employment. To the HSES data, we add job tenure information obtained from the FOLK register from Statistics Finland.

To these data, we match the data collected by Kotilainen (2018, p. 66–69) from private sector collective agreements and supporting documents. The collective agreements' data include information on the magnitudes and timing of wage increases stipulated by the contracts. The data include 776 manually collected contracts, of which approximately 80 percent are generally binding. For our purposes, the most important information concerns whether the contract includes a local wage increase allowance.

HSES data do not contain information on specific collective agreements at the worker level. However, Kotilainen (2018) create a mapping of the collective agreement data to the HSES data based on detailed information on occupation and industry. Approximately 17 percent of workers in the HSES data can be mapped to more than one collective agreement. In these cases, the workers are mapped to a generally binding agreement. If all agreements are generally binding or nonbinding, then the contract with the largest number of workers is chosen.[13]

[13] The number of employees covered by the agreement is available in the documents of the body that decides on the extension of collective agreements.

The HSES data are linked with individual-level register information about health. Our first health data source is the Finnish Hospital Discharge Register (HDR), compiled by the Finnish Institute for Health and Welfare. The register contains care notifications on inpatient spells at the health center wards (1969–2018) and specialized outpatient day visits (1998–2018), including the dates of admission, dates of discharge, and the primary reason for hospitalization. Mental health-related hospitalizations correspond to diagnosis codes starting with the letter *F* in the International Classification of Diseases (ICD-10).[14]

Second, we use population data on the sickness absence spells over the period 2004–2016 from the Social Insurance Institution of Finland (Kela). Kela records spells of absence that last longer than the waiting period of nine full working days. The data also contain sick leave spells caused by mental health disorders. The cause of the sick leave is recorded according to the doctor's statement.

Additionally, we use Kela data on the reimbursed medications related to mental health disorders that are dispensed at Finnish pharmacies over the 1995–2016 period. The medications are listed in the World Health Organization (WHO)'s Anatomical Therapeutic Chemical (ATC) classification system as codes beginning with "N05" (i.e., psycholeptics), "N06A," "N06B," or "N06C" (i.e., psychoanaleptics, excluding anti-dementia drugs). The data contain prescriptions reimbursed under national health insurance.

### *4.2. Outcome variables*

We focus on objectively measured outcome variables for well-being at work. The first indicator variable captures worker's mental ill-health. The measure gets a value of one if an individual has at least one mental health-related medicine purchase per year, if an individual has been hospitalized due to mental health disorders in a given year, or if an individual has

[14] Validation studies have shown that the HDR is of high quality (Sund 2012).

been on the sick leave spell caused by mental health disorders (0 otherwise). Hospitalizations are quite uncommon, as they include only severe mental health disorders.

The second outcome concerns the sickness absence. We create an indicator variable that indicates whether an individual has a spell of sickness absence lasting longer than nine full working days in a given year. The third outcome is the incidence of job change. The measure gets a value of 1 if an employee has changed employer between the years *t* and *t+1*. Here, we focus solely on job-to-job movers and, thus, exclude those who have switched from employment to nonemployment, such as retirement, unemployment, or labor force inactivity.

*4.3.Measure for collective agreements*

We characterize the decentralization of collective bargaining by an indicator variable that gets a value of one if the collective agreement has the possibility for a local wage increase allowance (local pot) in a given year.[15] The reference category is collective agreements without local (i.e., firm-level) wage increase allowances. Most often, the contracts in this reference category involve only a general increase.

*4.4. Control variables*

The regression models include the following individual-level controls: age (five categories), tenure (five categories), part-time work, occupation (2-digit ISCO classification), and level and field of education that are based on the International Standard Classification of Education (ISCED) classification. They are measured using 3 and 10 indicators,

[15] There are two types of local wage increase allowances in Finland: the fallback option is of the same size as the local wage increase allowance and the fallback option is smaller than the local wage increase allowance. We used these two separate local pot variables in robustness analyses, but the conclusions presented in this paper remained intact.

respectively. The regression models include firm-level controls for firm size (five categories) and 15 industry indicators that are based on Statistics Finland's Standard Industrial Classification TOL 2008. A detailed description of the variables is provided in Table A2. The displayed variables represent typical controls from the literature on job satisfaction and health.

## 5. Empirical strategy

We study how decentralized wage bargaining affects well-being at work using administrative data for the 2005–2013 period. To examine the heterogeneity in the associations, we also estimate separate models for blue- and white-collar employees because their contracts and views about local bargaining differ, and their health and job satisfaction responses to more flexible wage contracts differ. With our data, we estimate the following linear probability model:

$$y_{it} = \gamma \cdot lp_{it} + \sum_{k=1}^{n} \beta_k x_k + \theta_t + \vartheta_{ht} + \alpha_i + \delta_j + \varepsilon_{it}, \qquad (1)$$

where $y_{it}$ represents different indicators for well-being, at work, of individual *i* in year *t* (job change, sickness absence, and mental health disorders), $lp_{it}$ is an indicator variable for local wage increase allowance ("local pot"), and $x_k$ is a vector of individual and firm characteristics, including age, tenure, level and field of education, occupation, part-time work, and firm size. Parameter $\theta_t$ captures the time effects. Following Dahl et al. (2013), we include the fixed effects of individual $\alpha_i$ and firm $\delta_j$, as well as the interaction of industry *h* and year *t* in the regressions ($\vartheta_{ht}$). Adding firm and employee fixed effects is equivalent to adding job-spell fixed effects. Finally, $\varepsilon_{it}$ is an error term.

The identification of coefficient of interest $\gamma$ comes from time variation in the worker's wage-setting system during a spell with a given employer. These changes occur if the wage-setting system in the collective agreement changes. We cannot completely rule out the

possible endogeneity of wage-setting system changes due to the decentralization process. Some unobserved characteristics, such as work practices, similar unobserved qualifications of the employees, or technology, might affect both wage-setting systems in a firm and well-being at work. However, Dahl et al. (2013) argue that such time-varying shocks are more likely to be correlated with decentralized bargaining if they hit firms within entire bargaining segments or are industry wide. Thus, to capture these possible shocks, we include a full set of industry dummies interacted with a full set of year dummies, as in Dahl et al. (2013).

Another potential threat to our identification is firm-level selection to contracts. This is, however, unlikely in our setting because firms have limited possibilities in choosing the collective agreement in Finland. Moreover, the contracts are negotiated at the industry level, so that individual firms have very limited possibilities to influence the contracts. The final potential threat is that workers have selected themselves into wage-setting systems. This self-selection means that the observed well-being at work after decentralization might only reflect their observed and unobserved characteristics. Using panel data on individuals and adding individual fixed effects in the model enables us to control for the time-invariant unobserved characteristics. There might still be time-varying unobserved attributes that drive changes in wage-setting systems and well-being at work, which can lead to biased estimates. However, given that collective agreements are typically generally binding, the employees' possibilities to choose their collective agreements are limited. In practice, they would have to change industries to be covered by a different agreement.

## 6. Results

### *6.1. Descriptive evidence*

Table 2 reports the descriptive statistics of the most important variables by wage-setting status. The wage increases have been lower under general increase agreements than under

agreements with a local pot, i.e., local wage increase allowance (3.9 versus 4.5 percent). Employees have changed their employers more often under general increase agreements (15.7 versus 14.1 percent), and a higher share of them have had a spell of sickness absence lasting longer than nine full working days in a given year (3.5 versus 2.9 percent). Approximately 11 percent of all employees in both wage-setting statuses have had mental health disorders, measured as mental health-related medicine purchases, or hospitalization or sick leave due to mental health disorders. Employees under agreements with a local pot are more often men, older, more educated, and less likely part-time workers than employees under agreements without a local pot.

Table 3 shows the transition matrix of the local pot variables at the job spell level between years *t* and *t+1*. This variation is used in the empirical analysis to identify the effects of local pots on employees' well-being. There is enough variation in wage setting agreements. Approximately 12 percent of the observations moved from general agreements to agreements with a local pot. Also, approximately 47 percent of the observations that had local pots in year *t* did not have them in year t + 1.

[Add Tables 2–3 here]

*6.2. Empirical results*

Table 4 reports the marginal effects of the local pot dummy for each outcome variable for the entire sample and for blue-and white-collar workers separately. The results show that more decentralized wage bargaining is associated with a 0.6 percentage point reduction in the incidence of job separation. As the average rate of employer change is 15.3 percent, this marginal effect translates into a reduction of 3 percent in the job separation probability. Accordingly, decentralized bargaining is related to a decreased (0.1 percentage points) incidence of sickness absence lasting longer than nine full working days. This is equivalent to a reduction of approximately 3 percent in the sickness absence probability. However, no

statistically significant association between decentralized bargaining and mental health disorders is found. We can rule out effects that are larger than 0.2 percentage points (and smaller than zero), relative to the mean of 11.1 percent.

As expected by the hypotheses, we observe striking differences in the results between the blue-and white-collar worker groups. All these marginal effects of local pot dummies are statistically significantly different from each other.[16] Decentralized bargaining is associated with a 3 percent increase in the job separation probability among blue-collar employees and a similar decrease among white-collar employees. Decentralized bargaining is also associated with increased mental health problems (approximately 2 percent) among blue-collar workers, but no statistically significant association is found for white-collar worker groups. However, there is some heterogeneity in the results by occupation group, which is in contrast with the evidence for mental ill-health and job change behavior. We find that decentralization is negatively linked to sickness absence among blue-collar employees (minus 4 percent), but no statistically significant association is found among white-collar employees.

In the previous section, we found differences in the effects of decentralization between blue-and white-collar employees. The findings for white-collar workers are as hypothesized, i.e., they show some increased well-being at work as a response to decentralized wage bargaining. For blue-collar workers, the evidence is more mixed. We argue that the results also strongly depend on the occupational structure of the employees in the firms (see Table 1). Table 5 reports the marginal effects of the local pot dummy separately for blue-collar intensive firms (over 50 percent of the workforce are blue-collars) and white-collar intensive

[16] We have tested whether the coefficients are statistically significantly different between groups by using z-tests. Results were also similar when we used interaction coefficients to test the heterogeneity in the effects between groups.

firms (over 50 percent of the workforce are white-collars) and by occupation group. The results for white-collar employees working in white-collar-intensive firms are as hypothesized. They show increased well-being at work in terms of decreased job-separation behavior of 5 percent. The results for blue-collar workers working in blue-collar intensive firms are also as hypothesized, as they show decreased well-being at work in terms of a 4 percent higher probability of mental health disorders. Although the results also indicate that decentralization leads to decreased sickness absence, the coefficients are not statistically significantly different from each other by firm type among blue-collar employees.

The results are mixed for blue-collar employees working in white-collar intensive firms. We hypothesized that the effect will be positive if, for example, the negative attitudes toward firm-level agreements do not dominate the positive effects derived from higher wage increases and higher vertical pay dispersion. We find that, on one hand, decentralization is negatively related to mental health problems, and on the other hand, it is strongly and positively related to job-separation behavior. The magnitude of this effect is high, at 53 percent.

Finally, the model yields interesting results for white-collar employees working in blue-collar intensive firms. Based on the theoretical assumptions, we cannot make any clear hypotheses about the sign of the effect. It turns out that the association between decentralization and the well-being of employees is highly negative. White-collar employees working in blue-collar intensive firms show a 12 percent increased likelihood of job separation behavior as a response to local pot. Accordingly, they show an increased likelihood of mental ill-health by 3 percent.

[Add Tables 4-5 here]

*6.3. Additional results: Heterogeneity by gender and education level*

Table 6 further reports the marginal effects of the local pot dummy separately for females and males (columns 1–2) and for primary, upper secondary, and tertiary educated workers (columns 3–5). The results show that decentralized bargaining is negatively related to job separation behavior for both men and women (4–5 percent) and for employees who have secondary or tertiary education (3–5 percent). Moreover, the coefficients of local pot dummies are statistically significantly different from each other by education level. This indicates that the negative association between decentralized bargaining and job separation is stronger among more skilled individuals, as expected by the hypotheses. Decentralized agreements are negatively related to sickness absence for both men and women (3–5 percent), as well as among upper secondary educated workers. Finally, no statistically significant associations are found between decentralization and mental health problems.

[Add Table 6 here]

## 7. Summary and conclusions

We study the effects of decentralization of wage bargaining on workers' well-being in Finland. Focusing on a country that has a strong history of centralized bargaining, we conduct an analysis using rich administrative panel data on employees and their employers, matched with information on collective agreements, mental ill-health, and absence due to sickness. Using the panel structure of the data, the effect of a wage policy is identified from workers who change wage-setting systems. To the best of our knowledge, this is the first study to examine decentralization and objectively measured indicators of well-being at work.

In general, decentralized bargaining leads to improved well-being. Wage agreements with local pot are associated with a reduction in the probability of job separation and a decrease in the incidence of long-term sickness absence of approximately 3 percent. We also

document heterogeneity in the effects, which are mostly in line with the theoretical predictions. For example, the well-being at work for white-collar employees in white-collar intensive firms is positively associated with decentralization. In turn, blue-collar workers in blue-collar intensive firms show some signs of a negative association between well-being at work and decentralization. We argue that the latter effect is partly mediated through the overall dissatisfaction toward more decentralized wage bargaining and decreased vertical pay dispersion within an organization. Decentralization is also associated with an increase in the incidence of job separation among blue-collar employees in white-collar intensive firms. The magnitude of these effects is large, at approximately 53 percent, and contrary to our expectations. Strikingly, decentralized bargaining is associated with a 3–4 percent increase in mental ill-health in blue-collar intensive firms but not in white-collar intensive firms. These results are as expected according to the theoretical assumptions.

The quantitative magnitudes of these effects should be contrasted with previous evidence. It is also important that the measures of the effects are comparable between studies, for example, evaluated at the mean.[17] In short, there have typically been 6–20 percent changes in various measures of well-being (such as health status, job satisfaction, job-quitting behavior, or work absence) as a response to the introduction or increases in minimum wages (Lenhart 2017, Leigh et al. 2019 for a review), a small increase (one euro) in own wages (Pfeifer 2010), introduction of performance-related pay (Green and Heywood 2008, Dale-Olsen 2012, Pouliakas and Theodoropoulos 2012), increases in pay dispersion (Riddel 2011, Carnahan et al. 2012), and union membership (Mastekaasa 2013). The effect

[17] García-Serrano (2009) shows that firm-level agreements are associated with 0.03–0.09 log odds increase in job satisfaction. The average partial correlation between unionization and job satisfaction is -0.04 in a meta-analysis comprising 59 studies (Laroche 2016). It is, however, difficult to compare these estimates to, for example, marginal affects.

sizes from our analysis are thus in line with previous findings that are relevant to our study setting.

The policy lessons from this exercise are important. Although there is rich literature on the associations between decentralized wage bargaining and wages or pay dispersion, little is known about the consequences of such decentralization on worker's well-being. As expected from the hypothesis, we find notable differences between worker groups and whether they work in blue-or white-collar intensive firms. The focus of our concern should be increased job separation rates as a response to decentralization, especially among blue-collar workers. Job turnover results in substantial costs for the employee, employer, and society. Moreover, it is important to focus on potential increased mental health problems associated with decentralization within blue-collar intensive firms. Further research is required to fully understand the forces behind the observed associations between wage-setting systems and employees' well-being at work, and whether we could find similar results for other Nordic countries or countries with more distinct labor markets and health care institutions.

Despite the strengths of the administrative data and study methodology, our analysis has its limitations. For example, it is not possible to eliminate all sources of potential individual-or firm-level self-selection bias into agreements. We also argue that further research is needed to investigate the effects of wage bargaining systems on other aspects of health, such as adverse health behaviors and subjective job satisfaction.

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## Tables and Figures

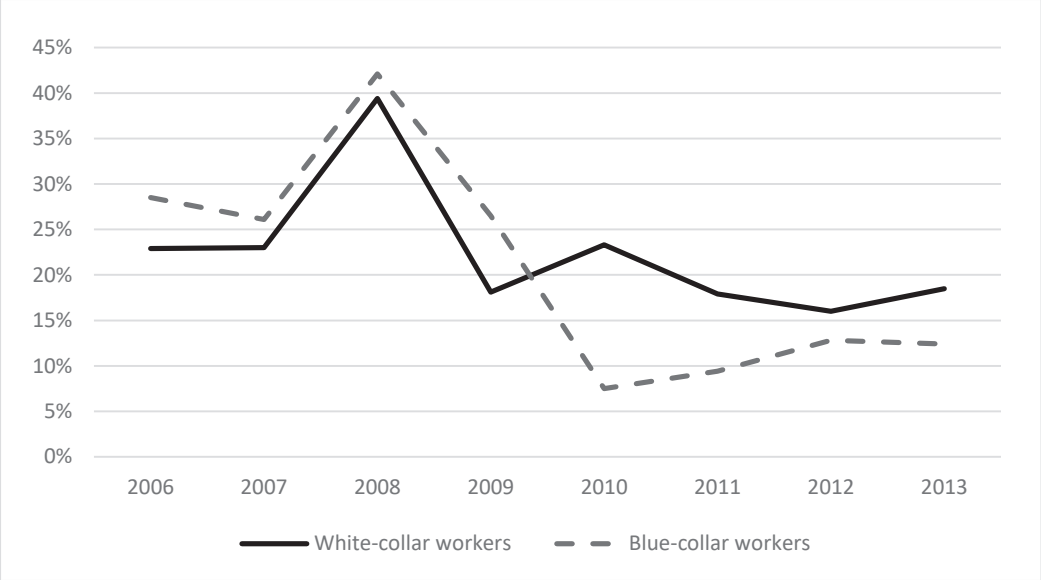


**Figure 1:** Share of local pots between 2006 and 2013 by occupation group

**Table 1:** Theoretically predicted effects of decentralization by worker groups

| | Preferences toward wage policy | Wage increases | Pay dispersion[a] | Well-being at work |
|---|---|---|---|---|
| Blue-collar workers | - | + | - | +/? |
| White-collar workers | + | + | + | + |
| Blue-collar intensive firms | | | | |
| Blue-collar workers | - | + | - | - |
| White-collar workers | + | + | - | ? |
| White-collar intensive firms | | | | |
| Blue-collar workers | - | + | + | +/? |
| White-collar workers | + | + | + | + |

Notes: [a] Horizontal pay dispersion in upper panel and vertical pay dispersion in lower panel

**Table 2:** Descriptive statistics: Mean values

| | General wage increase agreements | Local pot |
|---|---|---|
| Change in total hourly earnings, % | 3.90 | 4.50 |
| Job separation (yes/no) | 0.157 | 0.141 |
| Sickness absence (yes/no) | 0.035 | 0.029 |
| Mental health disorders (yes/no) | 0.111 | 0.108 |
| Female | 0.443 | 0.375 |
| Age (years) | 42.8 | 43.4 |
| Primary education | 0.153 | 0.130 |
| Upper secondary education | 0.485 | 0.420 |
| Tertiary education | 0.362 | 0.450 |
| White-collar worker | 0.592 | 0.608 |
| Part-time work | 0.108 | 0.061 |
| Firm size (employees) | 2341 | 3353 |
| Yearly observations | 2696746 | 760253 |

Notes: General wage increase agreements are signed under centralized bargaining. Local pot refers to local wage increase allowance under decentralized bargaining.

**Table 3:** Transition matrix for the local pot variable

| | | Local pot | | |
|---|---|---|---|---|
| | | Year t+1 | | |
| | | 0 | 1 | Total |
| Year t | 0 | 88.29% | 11.71% | 100% |
| | 1 | 46.62% | 53.38% | 100% |
| | Total | 78.69% | 21.31% | 100% |

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

**Table 4:** Estimation results: Marginal effects

| | Job separation (1) | Sickness absence (2) | Mental health disorder (3) |
|---|---|---|---|
| Panel A: Total sample | | | |
| Local pot = 1 | -0.006*** | -0.001*** | 0.001 |
| | (0.0008) | (0.0004) | (0.0005) |
| Mean of the outcome | 0.153 | 0.034 | 0.111 |
| Observations | 2969905 | 3456999 | 3456999 |
| Panel B: Blue-collar workers | | | |
| Local pot = 1 | 0.004 ** | -0.002 ** | 0.002 ** |
| | (0.0016) | (0.0008) | (0.0009) |
| Mean of the outcome | 0.154 | 0.048 | 0.100 |
| Observations | 1210894 | 1384768 | 1384768 |
| Panel C: White-collar workers | | | |
| Local pot = 1 | -0.005 *** | 0.000 | 0.000 |
| | (0.0010) | (0.0004) | (0.0007) |
| Mean of the outcome | 0.149 | 0.024 | 0.118 |
| Observations | 1734889 | 2045944 | 2045944 |

Notes: Reference category is general wage increase agreements. Other controls include age, tenure, field and level of education, occupation, part-time work, firm size, and interactions between year indicators and industry indicators. Regressions are estimated with high-dimensional firm and individual fixed effects. Standard errors (in parenthesis) are clustered by individual level. *** $p < 0.01$, ** $p < 0.05$.

**Table 5:** Estimation results by worker group (marginal effects) and blue-collar (B-C) versus white-collar (W-C) intensive firms

| | Blue-collar intensive firms | | |
|---|---|---|---|
| | Job separation | Sickness absence | Mental health disorder |
| B-C, Local pots = 1 | -0.002 | -0.002 ** | 0.004 *** |
| | (0.0016) | (0.0009) | (0.0009) |
| Mean of the outcome | 0.155 | 0.047 | 0.098 |
| Observations | 1022562 | 1165865 | 1165865 |
| W-C, Local pot = 1 | 0.016 *** | -0.000 | 0.003 ** |
| | (0.0021) | (0.0008) | (0.0014) |
| Mean of the outcome | 0.136 | 0.017 | 0.098 |
| Observations | 291953 | 334229 | 334229 |
| | White-collar intensive firms | | |
| | Job separation | Sickness absence | Mental health disorder |
| B-C, Local pots = 1 | 0.067 *** | 0.001 | -0.006 * |
| | (0.0061) | (0.0025) | (0.0032) |
| Mean of the outcome | 0.127 | 0.054 | 0.115 |
| Observations | 171996 | 201516 | 201516 |
| | -0.007 *** | -0.000 | -0.001 |
| W-C, Local pot = 1 | (0.0012) | (0.0004) | (0.0008) |
| Mean of the outcome | 0.148 | 0.026 | 0.122 |
| Observations | 1420038 | 1687145 | 1687145 |

Notes: Reference category is general wage increase agreements. Other controls include age, tenure, field of education, occupation, part-time work, firm size, interactions between year indicators and industry indicators, and education level. Regressions are estimated with high-dimensional firm and individual fixed effects. Standard errors (in parenthesis) are clustered at individual level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

**Table 6:** Estimation results by worker group (marginal effects)

| | Women (1) | Men (2) | Primary (1) | Upper secondary (2) | Tertiary (3) |
|---|---|---|---|---|---|
| Panel A: Job separation | | | | | |
| Local pots = 1 | -0.008 *** | -0.006 *** | 0.002 | -0.004 *** | -0.008 *** |
| | (0.0014) | (0.0010) | (0.0024) | (0.0013) | (0.0012) |
| Mean of the outcome | 0.157 | 0.151 | 0.170 | 0.151 | 0.146 |
| Observations | 1266366 | 1702609 | 450488 | 1395244 | 1107700 |
| Panel B: Sickness absence | | | | | |
| Local pot = 1 | -0.002 *** | -0.001 * | -0.001 | -0.002 *** | 0.000 |
| | (0.0006) | (0.0004) | (0.0013) | (0.0006) | (0.0004) |
| Mean of the outcome | 0.038 | 0.031 | 0.051 | 0.042 | 0.018 |
| Observations | 1479892 | 1976074 | 506466 | 1618244 | 1311373 |
| Panel C: Mental health disorder | | | | | |
| Local pot = 1 | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 |
| | (0.0010) | (0.0006) | (0.0015) | (0.0008) | (0.0008) |
| Mean of the outcome | 0.145 | 0.085 | 0.122 | 0.106 | 0.112 |
| Observations | 1479892 | 1976074 | 506466 | 1618244 | 1311373 |

Notes: Reference category is general wage increase agreements. Other controls include age, tenure, field of education, occupation, part-time work, firm size, interactions between year indicators and industry indicators, and education level if applicable. Regressions are estimated with high-dimensional firm and individual fixed effects. Standard errors (in parenthesis) are clustered at individual level. *** $p < 0.01$, * $p < 0.10$.

**Table A1:** Summary of previous research

| Author(s) and publication year | Country and data | Outcome variables | Independent variable | Methods | Main findings |
|---|---|---|---|---|---|
| García-Serrano (2009) | Spanish Working Conditions Survey for 2000–2003 | Job satisfaction (JS) | Union membership and firm-level agreement | Ordered probit | Negative (positive) relation with unionization (firm-level agreements). Relations disappear after controlling for working conditions and industrial relations |
| Bryson, Cappellari, and Lucifora (2010) | 1998 Workplace Employee Relations Survey from Britain | Satisfaction with pay, own influence over work, sense of achievement, and respect from managers | Union membership and collective agreement coverage | Ordered probit with endogenous selection into union status coverage | Job satisfaction is lower for union members only among those who are not covered by collective bargaining |
| Krieg, Wassell, Hedrick, and Henson (2013) | US National Study of Postsecondary Faculty for years 1988, 1993/9 and 2004 | Satisfaction with job, workload, compensation, and authority | Collective bargaining | RE ordered logit + faculty FE | Bargaining agreements increase satisfaction with compensation but reduce satisfaction with workload |
| Mastekaasa (2013) | Linked employer–employee data from Norway for 2003–2007 | Sickness absence | Union membership | FE regression | Unionization is positively related to sickness absence |
| Green and Heywood (2015) | British Household Panel Survey (BHPS) for 1995–2008 | JS, and satisfaction with pay and security. Satisfaction with working hours. | Union membership | POLS + worker and match FE | FE results show that covered union members typically report greater dissatisfaction |
| Laroche (2016) | Meta-analysis from 59 studies | Job satisfaction | Union membership | Meta-regression analysis | Negative relation between unionization and JS, but the effect disappears after controlling for endogeneity of membership |
| Bryson and White (2016) | British Household Panel Survey (BHPS) for 1995–2008 | Overall JS, and satisfaction with pay, security, work and hours | Union membership and union coverage | OLS and FE | FE results indicate mainly a positive relation between union coverage and membership with different domains of job satisfaction. |

| Author(s) and publication year | Country and data | Outcome variables | Independent variable | Methods | Main findings |
|---|---|---|---|---|---|
| van der Meer (2019) | European Social Survey for 2010 (13 countries) | Job and pay satisfaction | Union membership and three measures for empowerment | OLS with country FE | No negative association between job satisfaction and union membership in Continental Western Europe |
| Blanchflower and Bryson (2020) | GSS survey for 1972–2018 from the US; European social survey (2006/2010/2012); BHPS and Usoc for 1996–2014 from Britain. | Job and life satisfaction and happiness | Union membership | Ordered logit and OLS | Mainly positive association between union membership and satisfaction in the 2000s. Job satisfaction is higher among younger cohorts. |
| Bessa, Charlwood, and Valizade (2021) | BHPS and UKHLS data for 2004–2015 from Britain | Overall job satisfaction | Union membership | POLS + worker and job FEs and DiD and discontinuity analysis | Changes in working conditions more likely cause job dissatisfaction among union members |
| Lenhart (2017) | BHPS for 1994–2004 | Health status, medication use, doctor visits, and health behavior | Increase in minimum wage | DiD ordered logit + individual FE | Increase in NMW improves several measures of health |
| Reeves, McKee, and Mackenbach (2017) | British Household Panel Survey for 1998–2001 | Mental health, smoking, blood pressure, and hearing ability | Increase in minimum wage | DiD | Increase in minimum wage decreases mental ill-health problems but has zero effect on other health-related factors |
| Bossler and Broszeit (2017) | German linked personnel panel (LPP) for 2013–2015 | Job and pay satisfaction | Increase in minimum wage | DiD | Minimum-wage increase increases pay satisfaction but has small or zero effect on overall JS or work engagement |
| Leigh, Leigh, and Du (2019) | A review of 33 studies | Several health-related outcomes | Increase in minimum wage | Different methods | Increase in minimum wage decreases smoking, but shows no other consistent effects or correlations between increased wage and the outcomes |
| Haltiwanger and Vodopivec (2003) | Employer–employee data for 1997–1999 from Slovenia | Job quits | Wage dispersion | OLS | Higher wage dispersion is positively related to job quits |

| Author(s) and publication year | Country and data | Outcome variables | Independent variable | Methods | Main findings |
|---|---|---|---|---|---|
| Charness and Kuhn (2007) | Laboratory experiment, University of California students | Worker effort | Own and co-worker's wages | Laboratory experiment | Work effort is positively related to own pay level but not significantly related to others' pay level |
| Clark, Kristensen and Westergård-Nielsen (2009) | Danish sample from ECHP matched with register data for 1994–2001 | Job satisfaction | Own and Co-worker earnings | RE ordered probit, FE linear model | Job satisfaction is higher when own wage is higher and when other workers in the same plant are well-paid. This is explained by signal theory. |
| Pfeifer (2010) | Personnel data from German company for 1999–2005 | Absenteeism | Wages, relative wages, and position in a firm | Tobit and probit models | Wage, level of hierarchy, and relative wages are negatively associated with absenteeism, especially among high-paid workers |
| Bartling and Von Siemens (2011) | Laboratory experiment, University of Munich students | Worker effort | Wage dispersion | Laboratory experiment | Wage inequality has no effect on effort choices |
| Riddell (2011) | Toronto Board of Trade survey for 2001 | Quit rate | Wage dispersion | OLS and firm RE and FE | Wage dispersion is positively related to quit rates |
| Carnahan, Agarwal, and Campbell (2012) | U.S. linked employer-employee data from service industry for 1990–2004 | Employee turnover | Wage dispersion | OLS + firm FE | Wage dispersion is negatively (positively) related to employee leave among high (low) performers |
| Card, Mas, Moretti, and Saez (2012) | A randomly chosen subset of employees of the University of California in 2008 | Job and pay satisfaction and job-quitting intentions | Peer salaries | Linear models | Workers with pay below the median report lower job and pay satisfaction and increased likelihood of looking for a new job |
| Bradley, Green, and Mangan (2012) | Australian personnel records of the Queensland Government for 2001 | Job quits/turnover | Relative wage | Hazard model | Higher relative wages are associated with job quits |
| Mahy, Rycx, and Volral (2016) | Employer–employee data from Belgium for 1999–2006 | Sickness absenteeism | Wage dispersion | OLS + firm FE | Positive relation between wage dispersion and sickness absenteeism |

| Author(s) and publication year | Country and data | Outcome variables | Independent variable | Methods | Main findings |
|---|---|---|---|---|---|
| Kacperczyk and Balachandran (2018) | Employer–employee data from Sweden for 2001–2008 | Cross-firm mobility | Wage dispersion | OLS + firm FE | Horizontal (vertical) pay dispersion is positively (negatively) related to job separation, especially among low earner group |
| McCausland, Pouliakas, and Theodossiou (2005) | British Household Panel Survey (BHPS) for 1998–2001 | Job satisfaction | Performance-related pay | 2SLS | Performance pay is positively related to job satisfaction among high-paid workers |
| Green and Heywood (2008) | British Household Panel Survey (BHPS) for 1998–2004 | Overall satisfaction, satisfaction with pay, job security and hours | Performance pay | Ordered probit + individual FE | Performance pay increases job satisfaction and the effect is more profound among union members |
| Battisti and Vallanti (2013) | A survey from Italian manufacturing and service industries for 2008–2009 | Absenteeism | Flexible wage contracts | 3SLS | Wage flexibility is positively associated with worker's effort. The effect is stronger among white-collar employees. |
| Dale-Olsen (2012) | Norwegian panel data for 1996–2005 | Sickness absence | Performance pay | Poisson regression + FE | Performance pay is negatively related to sickness absence |
| Pouliakas and Theodoropoulos (2012) | British 1998 and 2004 cross-sections of WERS matched with ASHE | Workplace absenteeism | Performance-related-pay | OLS | Variable pay schemes is negatively correlated with absenteeism, and this effect is confounded by higher job satisfaction |

**Table A2:** Variable definitions and classifications

| Variable | Categories/Definition | Classification/notes |
|---|---|---|
| Age | 18–25 years old, 26–35 years old, 36–45 years old, 46–55 years old, and 55–63 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 level | The highest schooling level completed. Primary education (=completed compulsory 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 2011 classification |
| Education field | Top-level classification, 10 categories (general, educational science, humanities & arts, social sciences and natural sciences, technology, agriculture, health and welfare, service, others) | ISCED 2011 classification |
| Occupation | Two-digit level (32 categories) | ISCO-08 classification |
| Industry | 15 industries | Statistics Finland's Standard Industrial Classification TOL 2008 |
| Firm size | Less than 50 employees, 51–100, 101–500, 501–1000, and over 1000 employees | |
| Part-time work | Employees who report to work part-time in their main job | |
| White-collar workers | Employees in 2–5 levels in the ISCO-08 classification | ISCO-08 classification |
| Blue-collar workers | Employees in 7–9 levels, with some exceptions. Following Kotilainen (2018), some occupations in 3–5 levels are classified as blue-collar occupations. In these occupations, employees are typically hourly paid. | |

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