Collective Bargaining in European Countries: A systematic data-driven description*

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1 Introduction

Collective bargaining (CB) is a central feature of labor market institutions in European countries, as well as in many other developed countries (Bhuller et al., 2022). Despite numerous single-country studies, the literature lacks systematic, data-driven cross-country analyses of CB institutions.[1] A deeper understanding of the institutional features of wage setting has a profound impact for the design of public policies. For instance, the recent EU Directive 2022/2041 "Adequate minimum wages in the European Union" has sparked intense debate among Member States. To date, the literature lacks a micro-founded systematic description of CB agreements across countries. This type of analysis is essential for understanding wage setting across different labor markets, because a meta-analysis of the existing evidence would be hard to interpret due to project-specific variable definitions and sampling constraints that limit the external validity of the findings.

This project addresses the gap in cross-country CB system descriptions by providing a systematic, data-driven analysis of wage-related CB features, such as wage floors and contracted wage increases, using information from six European countries: Finland, France, Germany, Italy, Norway, and Portugal. For each country, we compiled approximately twenty years of CB agreements and linked this information to detailed linked employer-employee and balance sheet micro-data. By harmonizing variable definitions and sampling schemes, we ensure comparability across countries to make potential cross-country heterogeneities more easily interpretable. To our knowledge, this study would be the first of this kind to link matched employer-employee micro data to contracted wage floors and increases in several countries.

The harmonized data enables us to make the following contributions to the literature. First, we describe the level at which wage floors are set in different countries in common terms, such as in PPP terms, or relative to the median wages within a country. We also describe in this setting how wage floors vary from one year to another. Moreover, we describe two main features of CB that differ across European countries: wage floors and contracted wage increases, which is part of the CB in only subset of European countries. Second, we examine whether CB agreements are coordinated consistently within each country or vary substantially across sectors. Finally, we investigate the degree of CB centralization in each country. Variation in centralization essentially describes to what extent CB can affect the whole wage distribution within a country. We define it as the proportion of the workforce whose wages are directly influenced by CB through either wage floors or contracted wage increases.

[1] For single-country studies, see for instance, Gautier et al. (2019) for France, Card and Cardoso (2022) for Portugal, Adamopoulou and Villanueva (2022) for Spain, and Fanfani (2023) for Italy, among others. See also OECD (2019b) for a review of earlier papers on unions and collective bargaining. For a general institutional description of CB systems, see e.g., OECD (2019a).

Our findings firstly point to differences across countries when examining the location of levels of wage floors in common PPP terms. In Finland and France the 1 digit industry-level average wage floors are relatively concentrated, while in Norway they are not as concentrated and in France and Portugal there is much wider variation across average wage floors. Moreover, in the common PPP terms the lowest average wage floors are at much lower levels in Italy and Portugal than in our three other countries.

When examining the variation across all wage floors the picture changes somewhat. Now the description takes into account the fact that in all our countries the wage floors vary within industry based on more specific occupation and also person-specific factors, such as, tenure and education. Describing this rich variation in individual-specific wage floors reveals that wage floors are not that concentrated in Finland, while they still are very concentrated in Italy. Also, Portuguese wage floors are more concentrated when looking at all of the wage floors and their levels.

The changes in industry-level average wage floors are relatively concentrated within all of our countries. There is some variation in that in Finland and somewhat in Italy the floor changes are not as concentrated than in France, Norway and Portugal at 1-digit level while in 2-digit level there is richer variation across industries in Portugal as well. This measure indicates to what extent the CB and changes therein are coordinated across industries within a negotiating round. The individual-specific wage floor changes are very coordinated in Finland and Norway, especially towards the end of the examination horizon (2020).

The contractual wage increases are relatively concentrated in Finland and Italy and slightly less so in Norway (German results to be updated). France and Portugal do not have contracted wage increases.

Overall the results regarding variation over time in wage floors and contracted wage increases suggest that the Finnish and Italian systems are quite coordinated.

We next turn to building our centralization measure. Here we use the link between CB information and employer-employee data to examine what fraction of individuals are at or very close to the wage floor that applies to them, and / or how many individuals receive wage increases that match the contracted wage increases. The more individuals seem to be restricted in their wages by the CB system in the manner just described, the more concentrated the system is seen. What already creates extensive variation in the concentration measure across countries is the fact that in Finland, Italy and Germany the contracted wage increases are used extensively and in a binding fashion, in Norway they are binding only as industry or firm level averages, and they do not exist in France or Portugal. Moreover, the share of the workforce covered by CB varies to a great extent between countries. The combination of these two stylized facts leads to very different concentration levels of how wages are set in different countries.

Our findings reveal significant variation in CB centralization among our countries.

The wage floors seem to lead to a relatively low concentration measures across other countries, except Portugal, where the concentration measure stemming from wage floors is three-fold relative to other countries. That is, in Portugal much higher fraction of the workforce receives wages at wage floors than in our other countries. Finland nevertheless has the highest concentration measure out of our countries. This result stems from the very high fraction of individuals receiving as wage increases exactly the contracted wage increases. Interestingly, although contracted wage increases are in use in Italy as well, they do not seem to be nowhere as binding in the manner defined here as in Finland. The differences across countries is even more pronounced when examining concentration in 2006 and 2016. In 2016 the concentration measure in Finland is almost the double of that in 2006, in Portugal the concentration increases over these two years only slightly, while in other countries the concentration even declines.

We also address to what extent potential variation in CB over time and across countries reflects macroeconomic conditions. To this aim, we correlate wage floors variation with macroeconomic variables. At this stage we correlate the concentration measure with employment share and average wages within 1-digit industry, country and year. Interestingly, we find that concentration measure is not that correlated with employment share, but is strongly negatively correlated with average wages. This indicates that the more concentrated the CB the lower average wages it is associated with. The specification includes country, industry and year fixed effects, thus not capturing variation across these factors.

This article continues by describing collective bargaining institutions in all our six countries in Section 2 and data in Section 3. Section 4 presents our main results and Section 5 concludes. Tables and Figures are presented after the main text.

2 Institutional setting

Here we describe how CB institutionally affects wages. We include a subchapter for each of our six countries.

2.1 Finland

In Finland, wages of the vast majority of the workforce is affected through sectoral collective bargaining (CB). Negotiations between the social partners focus primarily on agreed wage increases but also cover wage floors that depend on job and employee characteristics for each sector. Finland does not have a statutory minimum wage, the sectoral wage floors are thought to cover the workforce well enough. In addition, Collective Bargaining Agreements (CBAs) often include terms on working time, compensation for overtime, employer provided family benefits and other employment conditions,

but wages remain the central item of bargaining. Typically CBAs are done for two years, in recent years also three-year agreements have been common (Vartiainen, 1998).

CB has long been and remains the cornerstone of the labor market despite a shift away from centralized wage agreements in the 2010s. Wage coordination has traditionally mostly followed an informal export-led idea, where the export sector, deemed most exposed to global competition, sets the benchmark for wage increases also for other sectors. Since 2018 the wage coordination is formalized to follow the export-led model, such that the contracted wage increases negotiated by the export sectors act as a ceiling for other sectors. This practice became institutionalized during the 2016 "Competitiveness Pact" (Kiky) negotiations that were led by the Government of Finland. The system aligns aggregate wage growth with the competitive pressures of the export industry with the idea of supporting employment in the export sectors.

The extension mechanism plays a key role in wage-setting: sectoral collective agreements are generally extended to be universally applicable by an independent committee under the Ministry of Social Affairs and Health if they meet representativeness criteria. As a result, almost 90% of the employees in Finland are covered by collective agreements either directly or through extensions (Ahtiainen, 2024). While union density has declined to around 55% (Ahtiainen, 2023), the system still delivers wide coverage through the extensions.

2.2 France

All workers must be paid at least the national minimum wage (SMIC). Beyond the legal national minimum wage, wages are primarily determined through collective bargaining, which occurs at both the industry level and the firm level.

At the industry level, nearly all firms are assigned to a specific "contractual industry", where wage agreements are negotiated. Once these agreements are signed by trade unions and employer organizations and then extended by the Ministry of Labour (usually within a few months), they automatically apply to all firms and workers in that industry, regardless of whether they participated in the negotiation. Firms and workers cannot opt out of these agreements. Regarding the relationship between industry-level and firm-level agreements: industry-level agreements set the minimum standards. Firms are allowed to offer higher wages, but not lower than what is set at the industry level.

Collective bargaining agreements (CBAs) mainly set legal minimum wages for each job category, rather than guaranteeing overall wage increases. Each CBA includes a classification grid that defines job levels based on factors such as skills, responsibilities, and experience. These grids establish minimum wages specific to each position, and it is illegal to pay workers below these levels. Annual wage negotiations are mandatory,

but there is no obligation to reach an agreement each year. As a result, CBAs do not have a fixed duration, they remain in effect until a new agreement replaces them.

While most wage floors are set at the national industry level, some sectors also have regional or local agreements. On average, a typical CBA includes around 20 distinct wage levels (Fougère et al., 2018). Wage floors are usually specified as monthly amounts, and they may include bonuses. Unlike the national minimum wage (SMIC), they are not automatically adjusted for inflation.

2.3 Germany

2.4 Italy

In Italy, the wage level of all private sector employees must comply with the minimum set by the most representative collective bargaining agreement (CBA) of each industry and occupation. This rule is directly derived from the national Constitution. There is some uncertainty about the concept of "most representative" collective contract, and this ambiguity has provided some margin for a minority of firms to engage in elusion behavior, such as strategic selection of CBA (e.g. Garnero and Lucifora, 2022). However, the collective bargaining coverage is virtually full among private sector employees, and the salaries set by the CBAs tend to have a strong influence on the actual pay dynamics (e.g. Devicienti et al., 2019; Boeri et al., 2021).

Negotiations regarding pay levels usually occur once every two years, whereas other rules within CBAs are usually bargained every four years. The dates of such negotiations are not coordinated across collective contracts, and there can be delays in contract renewals. Moreover, wage negotiations usually set a schedule of future minimum wage increases that will occur at regular time intervals, thus pay floor changes usually occur more often than once every two years. Pay floors represent both a statutory minimum and a fixed component of the wage. Thus, the growth in a pay floor usually implies that all wages of workers within the affected CBA and occupation must grow by the same fixed amount. Although several rules set within collective contracts can be changed into less favorable conditions by individual firms, this principle does not apply for what concerns minimum wage levels.

Collective bargaining negotiations are quite centralized, as they generally occur at the national sector-wide level. Wage negotiations are also quite coordinated, since pay rises tend to follow target inflation levels that depend on past price dynamics and are regularly published by the government. However, the frequency and speed of wage adjustments can vary between CBAs and across occupations within the same CBA, leaving some room for flexibility in wage dynamics at the industry and occupation level.

2.5 Norway

In Norway, around half of private sector workers are employed in establishments that are formally covered by sectoral collective bargaining agreements (CBAs) (Nergaard, 2022). Furthermore, in recent years, another 10 percent of workers are covered by extensions of sectoral CBAs.[2] The remaining private sector workers may be covered only through a firm-level agreement or have an individual contract with their employer. By comparison, with rare exceptions, nearly all public sector workers have their wages set through public sector negotiations. The contractual period for most sectoral CBAs is two years. However, social partners typically negotiate wages every year, leading to minor CBA revisions, while non-wage aspects (e.g., workplace amenities and benefits) can be negotiated every second year, when CBAs are renewed for another term.

The Norwegian wage bargaining system is an example of a two-tier bargaining system, where central negotiations are supplemented by local bargaining at the firm-level (Bhuller et al., 2022; Barth et al., 2014). Despite this type of flexibility embedded in the two-tier system, there is strong coordination across sectors. Importantly, the Norwegian system features pattern bargaining, where the export-oriented manufacturing sector negotiates first and sets norms for the overall wage growth for covered workers and the centrally negotiated components of wage growth.

As a result, the wage growth of workers covered by sectoral CBAs reflects both centrally and locally negotiated components. The centrally negotiated wage increases are typically implemented through a combination of (i) general wage increases that apply to broad worker groups (e.g., at industry level) and (ii) adjustments of wage floors that vary across fine-grained job titles and worker groups with different seniority and/or skill levels. In some cases, central negotiations also provide "guaranteed" wage increases for specific worker groups (e.g., those covered by certain low-wage CBAs). Nevertheless, the local components of wage growth are relatively important, with some calculations indicating that only about one-fourth of the wage growth for private sector workers can be directly attributed to centrally negotiated wage increases in recent years (AID, 2025). Notably, however, the general provisions of local bargaining are also decided in agreements between social partners, who not only negotiate central wage increases, but also provide guidelines for overall wage growth for covered workers.

[2]While the legal provisions for extensions of sectoral CBAs in Norway have existed since 1992, the first CBA extensions came in 2004. Since then, several major sectoral CBAs covering different private sector industries have been extended. As a result, the share of private sector workers covered by extensions has gradually increased. The institutional backdrop of this policy change was the eastward enlargement of the EU around mid-2000s that led to an influx of labor migrants and raised concerns about low wage pressures in certain parts of the Norwegian economy (Bratsberg and Holden, 2015).

2.6 Portugal

The overwhelming majority of the workforce in the private sector of the economy in Portugal is covered by collective bargaining (approximately 90%). Extension mechanisms are common. Firms tend to apply the terms of the contract to all of their workforce, irrespective of union membership. Workers' and employers' representatives can subscribe to an agreement that they had initially not signed. Compulsory extensions are determined by the Government when the bargaining partners fail to reach an agreement or workers are not covered by a trade union. Therefore, the impact of collective bargaining goes far beyond union membership.

Industry-wide agreements predominate in the economy, while firm-level collective bargaining covers a low proportion, less than 10 percent, of the workforce. The negotiation of different collective agreements is usually synchronized, taking effect in January each year.

Collective bargaining agreements set minimum working conditions, in particular the minimum base monthly wage for each category of workers, net of employer payroll taxes, overtime pay, and the normal duration of work. Other pay components negotiated in most agreements are tenure-indexed subsidies and a daily meal allowance, which is tax-free up to a given level set by the government. All regular monthly components of pay, with the exception of the meal allowance, must be paid 14 months a year (national law). Collectively bargained pay clauses almost always have a nominal duration of one year, even though delays in renegotiation are common. Wage floors must comply with the national minimum wage, which leads to the automatic update of the lowest floors whenever the minimum wage is raised. Other clauses prescribing work rules and practices are updated less frequently.

3 Data sources

We employ data from Finland, France, Germany, Italy, Norway and Portugal. Here we discuss the data on a general level. The more detailed data description is provided in Appendix A separately for each country.

From each of the countries the two main types of data we use are 1) data on details of collective bargaining agreements (CBAs) and 2) microlevel linked employer employee data on the labor force. The CBA data is linked to the microdata so that we are able to calculate the population shares of people affected by different CBAs. The central elements of the CBA data are the wage floors informing the lowest possible wage for a worker that depend on industry and specific occupation of the worker, and possibly also on individual level characteristics, such as tenure in occupation or industry.

Another central element in the CBA data are contracted wage increases for Finland,

Germany, Italy and Norway. The contracted wage increases are binding at worker level in the first three countries mentioned and on average workplace level in Norway. Contracted wage increases inform to what extent wages increase at minimum from one year to another.

4 Results

We first the differences in CB across our countries by describing industry-level average wage floor variation. Figure 3 presents the levels of 1-digit industry-level average wage floors in PPP terms over time in Finland, France, Italy, Norway and Portugal. The figure shows that in Finland and France the 1 digit industry-level average wage floors are relatively concentrated, while in Norway they are not as concentrated and in France and Portugal there is much wider variation across average wage floors. Moreover, in the common PPP terms the lowest average wage floors are at much lower levels in Italy and Portugal than in our three other countries.

Figure 4 presents the variation across all the wage floors by industry pooling different years together and weighting by number of employees. Now the description takes into account the fact that the wage floors vary within industry based on finer industry code, specific occupation and also person-specific factors, such as, tenure and education. Figure 4 shows that there is fair amount of variation across wage floor levels in all countries considered. Looking at all of the wage floors reveals that they are not that concentrated in Finland compared to the industry level averages, while they still very concentrated in Italy, and quite concentrated in Portugal.

Figure 5 presents similarly wage floor level variation but separately for different years pooling all industries. For Finland and Norway there seems to be widening of the dispersion of wage floors over time, while the distribution is more constant over time for Italy and Portugal.

Figure 2 presents the changes in industry-level average wage floors from one year to another for a selection of industries. Figure 3 presents the changes for all industries. Both figures shows that the changes in industry-level average wage floors are relatively concentrated within all of our countries. There is some variation in that in Finland and somewhat in Italy the floor changes are not as concentrated as in France, Norway and Portugal at 1-digit level while in 2-digit level there is richer variation across industries in Portugal as well. This measure indicates to what extent the CB and changes therein are coordinated across industries within a negotiating round. The individual-specific wage floor changes are very coordinated in Finland and Norway, especially towards the end of the examination horizon (year 2020).

Figure 6 shows the changes in all the wage floors as number of employee weighted distributions. Here Norway stands out as having most dispersion in the floor changes

followed by Finland. In Italy and Portugal the floor changes are relatively concentrated.

Figure 8 shows the contracted wage increases across industries for the countries for that have them, and Figure 7 shows contracted wage increase distributions over time pooling industries. One observation from these figures is that the variation in contracted wage increases is relatively narrow. This means that CB is relatively coordinated for these. Another observation is that average contracted wage increases seem to decline over time in our observation period from 2006 to 2020.

Overall the results regarding variation across industries and over time in wage floors and contracted wage increases suggest that the Finnish and Italian systems are quite coordinated, because the wage floor and contracted wages seem to move together for most industries.

We next turn to building our centralization measure. Here we use the link between CB information and employer-employee data to examine what fraction of individuals are at or very close to the wage floor that applies to them, and / or how many individuals receive wage increases that match the contracted wage increases. The more individuals seem to be restricted in their wages by the CB system in the manner just described, the more concentrated the system is seen. What already creates extensive variation in the concentration measure across countries is the fact that in Finland, Italy and Germany the contracted wage increases are used extensively and in a binding fashion, in Norway they are binding only as industry or firm level averages, and they do not exist in France or Portugal. Moreover, the share of the workforce covered by CB varies to a great extent between countries. The combination of these two stylized facts leads to very different concentration levels of how wages are set in different countries.

Our findings reveal significant variation in CB centralization among our countries. Table 1 shows the concentration measure results pooling all years and industries into one measure by country. The table shows the contribution of share of workforce covered by CB, wage floors and contracted wage increases (when applicable) separately and the combined concentration measure for each country. The table shows that the wage floors seem to lead to a relatively low concentration measures of between 0.045 and 0.09 for other countries, except Portugal, where the concentration measure stemming from wage floors is 0.21. That is, in Portugal much higher fraction of the workforce receives wages at wage floors than in our other countries. Finland nevertheless has the highest concentration measure out of the five countries considered. This result stems from the very high fraction of individuals receiving wage increases that exactly match the contracted wage increases in Finland. Interestingly, although contracted wage increases are in use in Italy as well, they do not seem to be nowhere as binding in the manner defined here as in Finland. This leads to overall situation where Finland has a concentration measure of 0.29, followed by Portugal with 0.21 and the rest of our countries being clearly under 0.1.

Table 2 shows the variation in concentration measure separately for two isolated years: 2006 and 2016, which correspond to the starting and ending point of the observation period that is common to all countries. The differences across countries is even more pronounced when examining concentration in 2006 and 2016. In 2016 the concentration measure in Finland is almost the double of that in 2006, in Portugal the concentration increases over these two years only slightly, while in other countries the concentration even declines.

We also address to what extent potential variation in CB over time and across countries reflects macroeconomic conditions. To this aim, we correlate wage floors variation with macroeconomic variables. At this stage we correlate the concentration measure with employment share and average wages within 1-digit industry, country and year. Equation 1 gives the estimation equation.

$$y_{ctj} = \alpha + \beta x_{ctj} + \lambda_c + \lambda_t + \lambda_j + \epsilon_{ctj} \tag{1}$$

Where y_{ctj} is the dependent variable for country c in year t and 1-digit industry j (either employment share or average wage). x_{ctj} is the main independent variable (concentration measure, "share binding"). λ_c, λ_t, and λ_j are the fixed effects for country c, year t, and industry j, respectively.

This part of the analysis is quite much in progress. Right now the countries used do not include Germany, but will be added later. Standard errors are not adjusted to any clustering (but data is aggregated already). We also include regressions (3) in the tables that are weighted by cell (country, industry, year) size.

Table 3 shows results of this regression using as the outcome the employment share of an industry and Table 4 presents similar regressions using as the outcome average hourly wages in the industry. Figures 9 and 10 present as scatterplots the variation that the regressions use. Interestingly, we find that concentration measure is not that correlated with employment share, but is strongly negatively correlated with average wages. This indicates that the more concentrated the CB the lower average wages it is associated with. As the specification includes country, industry and year fixed effects, it is not capturing variation across these factors. Especially panel (b) of Figure 10 shows that there seems to be a negative correlation between our concentration measure and average wages also within country. We will present more analysis of this sort in future editions of this manuscript.

5 Conclusions

This article describes institutional variation of CB in six European countries: Finland, France, Italy, Norway, Portugal and Germany (in progress). We showed how average

and individual level wage floors vary across countries in common PPP terms. We also showed how concentrated the changes in wage floors are across industries within a country. Moreover, we described the variation in contracted wage increases in countries that have them: Finland, Italy and Norway (and Germany, in progress).

These descriptions show that across industries the wage floors are on average quite concentrated in Finland, Norway and France, while there is more variation in Italy and Portugal. Specifically, some of the wage floors are in common PPP terms at much lower levels in Italy and Portugal than in the other comparison countries, while other average wage floors are at higher levels. Examining all the wage floors reveals quite a bit of variation in all examined countries. This suggests that while different industries might be on relatively similar levels in their wage floors within a country, within industries there is much richer variation in wage floors coming from different wage floors being applied differently in sub-industries, occupations, tenure and education levels.

The changes in wage floors and contracted wage increases revealed that they often move together. This reveals that in the CB there is much coordination within a country such that different industries reach in the same year similar negotiating outcomes.

Our second major contribution was to build concentration measures, that describe the CB concentration as a whole within a country or industry. The different components of this exercise are the share of workforce covered by CB in general, and what fraction of the covered workforce are receiving wages at or very near the wage floors, and what fraction of individuals receive annual wage increases that align with the contracted wage increases (when applicable). These different sub-components can be distilled into a single number by country, or analyzed as industry and time varying within a country. We ranked our countries such that Finland has the highest concentration measure stemming from a very large bite of the contracted wage increases on the wage increases individuals actually receive. Portugal has a concentration measure that is second highest and relatively close to Finland stemming from a relatively large bite of the wage floors. France, Norway and Italy have much lower concentration measures as neither the wage floors or contracted wage increases bite very much in those countries.

We also regressed the concentration measure against industry level employment shares and average wages in data aggregated at country, industry and year level. The regression analysis showed that the concentration measure is not very correlated with employment shares, but is quite strongly and negatively correlated with average wages. Thus, the last result indicates that higher concentration of the CB system is associated with lower average wages.

Tables and Figures

Tables

Table 1: Share of workers with binding collecting bargaining

	Share covered	Binding floors	Binding increases	Total binding
Finland	0.80	0.080	0.211	0.292
France	1.00	0.089	–	0.089
Italy	1.00	0.045	0.033	0.078
Norway	0.56	0.069	0.023	0.092
Portugal	0.89	0.210	–	0.210

Notes: share of workers covered by binding agreements. Floors between -5 and 10 pp from the wage are defined as binding. Contractual increases are binding when floors are not already binding and the wage change is between -0.25 and 0.5 percent from the contractual increase. All share of floors and increases considered binding were adjusted by the share of covered workers in the given country (column 2).

Table 2: Share of workers with binding collecting bargaining, in 2006 and 2016

		Year: 2006			Year: 2016		
	Share covered	Binding floors	Binding increases	Total binding	Binding floors	Binding increases	Total binding
Finland	0.80	0.078	0.163	0.241	0.093	0.324	0.418
France	1.00	0.130	–	0.130	0.052	–	0.052
Italy	1.00	0.074	0.020	0.094	0.048	0.040	0.088
Norway	0.56	0.081	0.016	0.097	0.058	0.019	0.077
Portugal	0.89	0.199	–	0.199	0.217	–	0.217

Notes: share of workers covered by binding agreements. Floors between -5 and 10 pp from the wage are defined as binding. Contractual increases are binding when floors are not already binding and the wage change is between -0.25 and 0.5 percent from the contractual increase. All share of floors and increases considered binding were adjusted by the share of covered workers in the given country (column 2). Portugal first three columns calculated in 2011 (first available year).

Table 3: Correlation between employment share and centralization measure

	(1)	(2)	(3)
share_binding	0.003	0.012	0.046***
	(0.015)	(0.010)	(0.000)
Constant	0.058***	-0.001	-0.028***
	(0.003)	(0.008)	(0.000)
N	1008	1008	51174105
r2	0.000	0.825	0.861

Models (2) and (3) include country, 1-digit industry and year fixed effects. Model (3) additionally weights by cell size. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

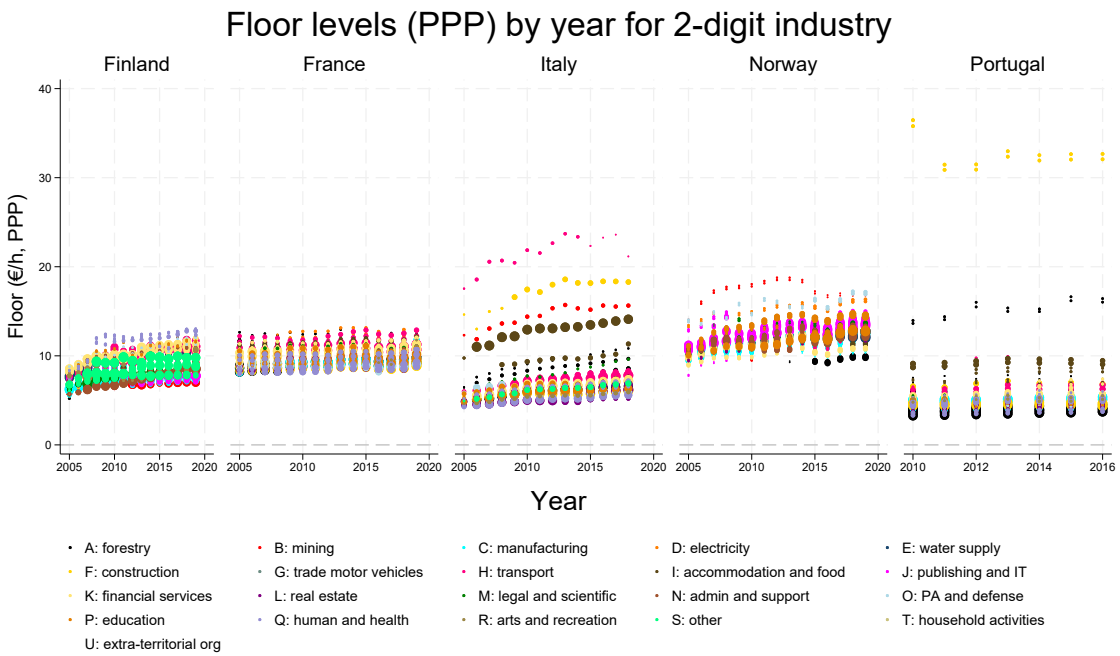
Table 4: Correlation between average wage and centralization measure

	(1)	(2)	(3)
share_binding	-8.045***	-4.965***	-6.285***
	(1.187)	(0.662)	(0.002)
Constant	16.074***	12.344***	12.914***
	(0.232)	(0.546)	(0.005)
N	1008	1008	51174105
r2	0.044	0.893	0.957

Models (2) and (3) include country, 1-digit industry and year fixed effects. Model (3) additionally weights by cell size. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

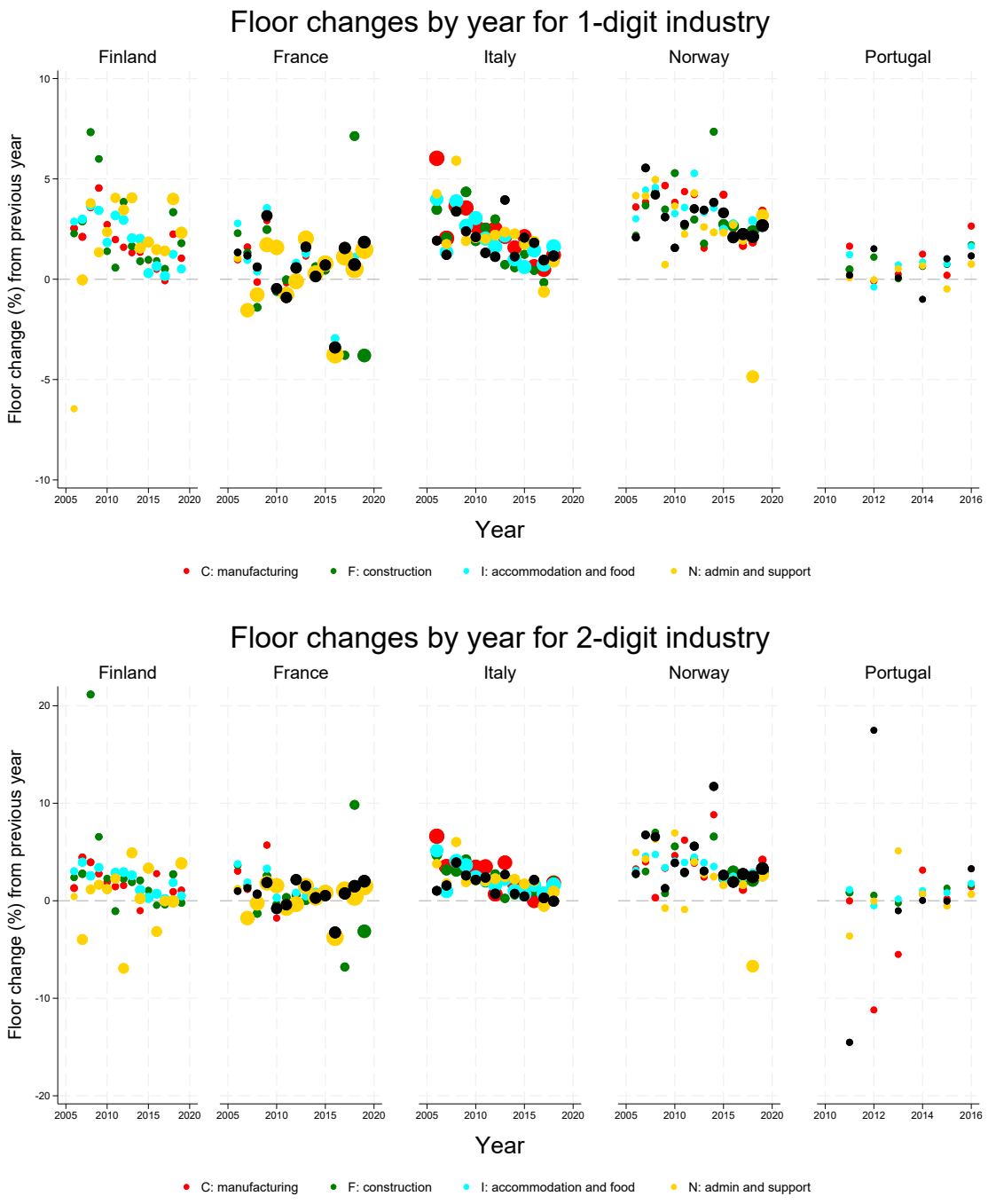
Figures

Figure 1: Average floor levels for all industries



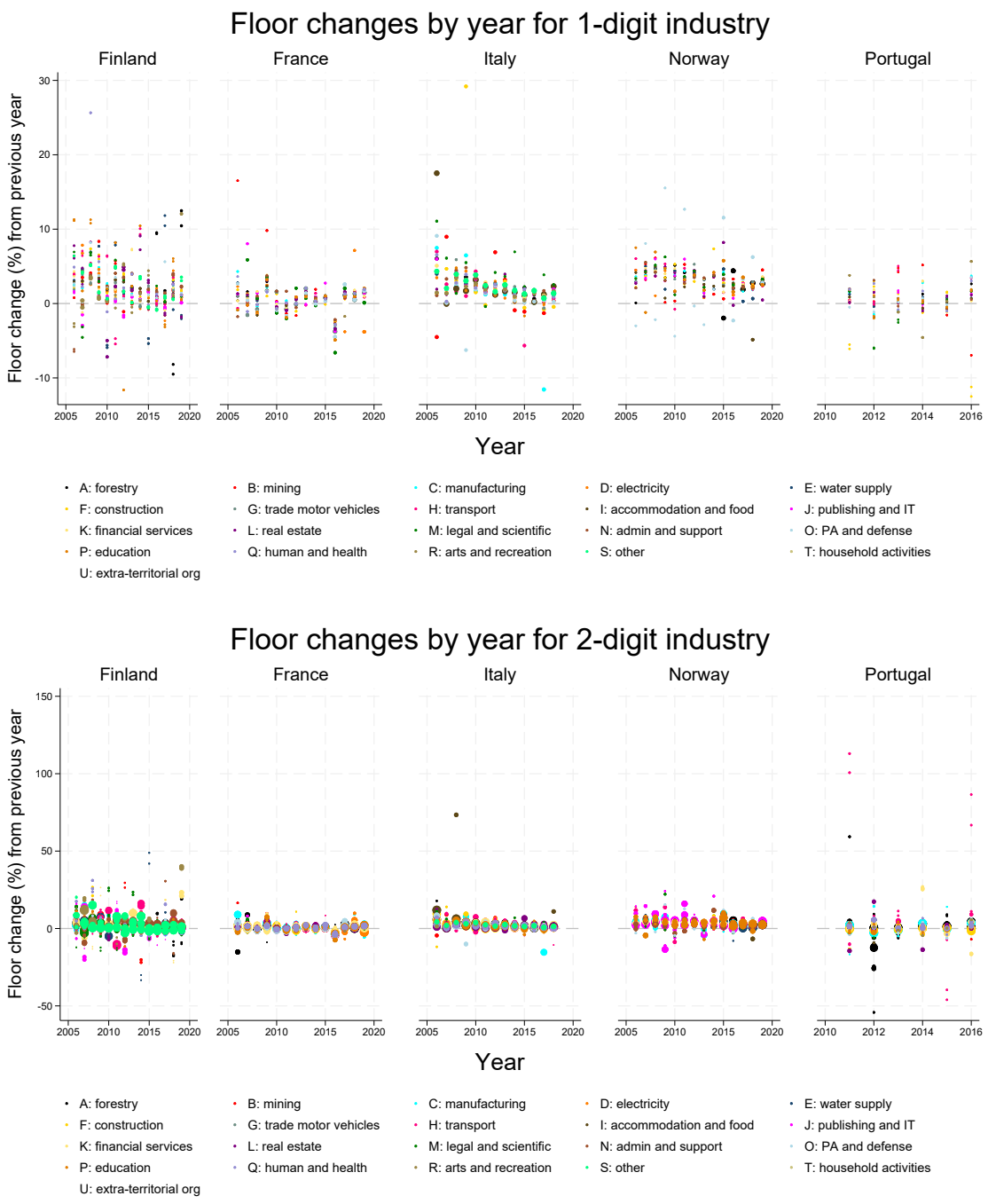
Notes: Mean floor levels by year for all industries, weighted by industry size.

Figure 2: Average floor changes for a selection of industries



Notes: Variation in the average floors by year for a selection of industries, weighted by industry size.

Figure 3: Average floor changes for all industries

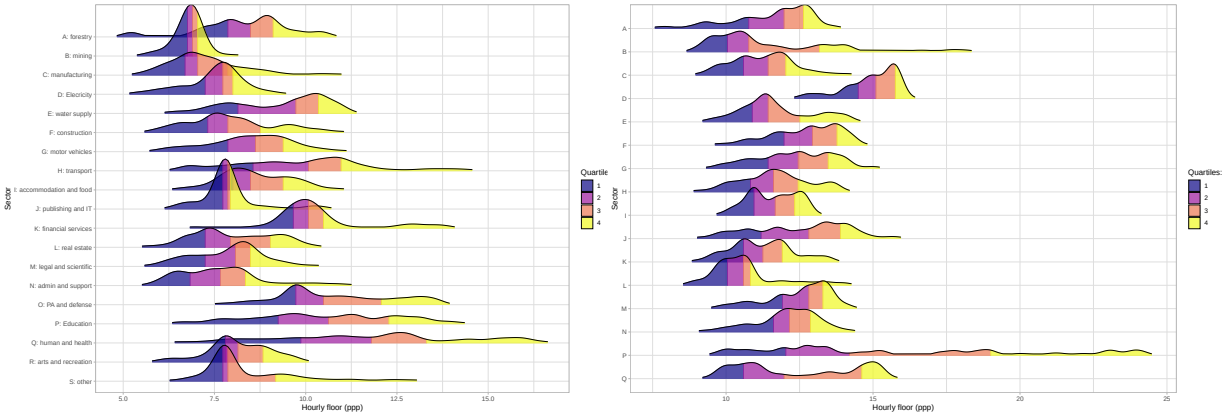


Notes: Variation in the average floors by year for all industries, unweighted.

Figure 4: Floor distributions, by industry

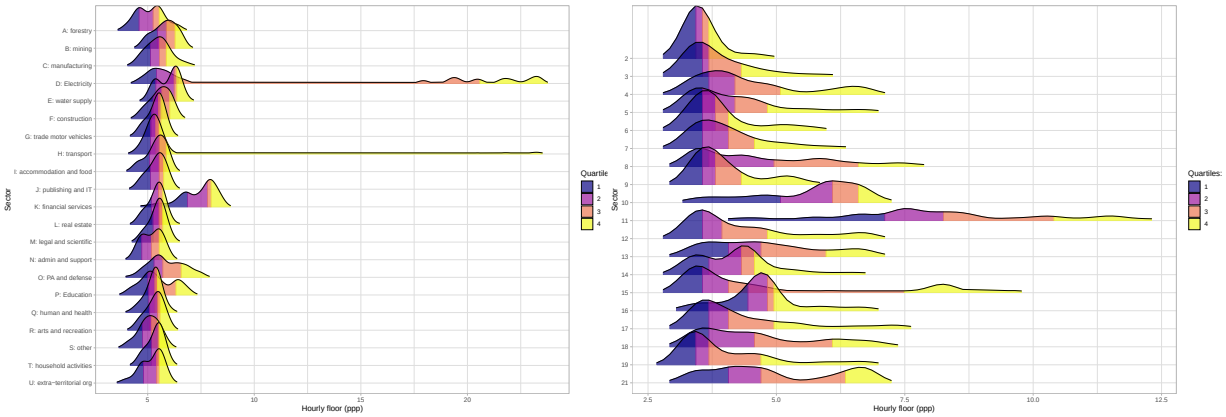
(a) Finland

(b) Norway



(c) Italy

(d) Portugal

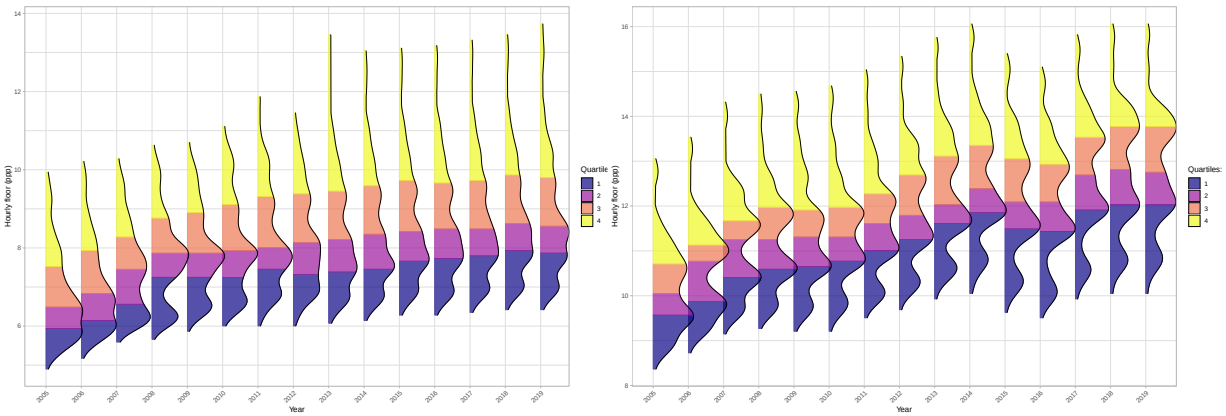


Notes: Floor distributions in the 2006-2019 period, separately by industry, in purchase power parity units.

Figure 5: Floor distributions, by year

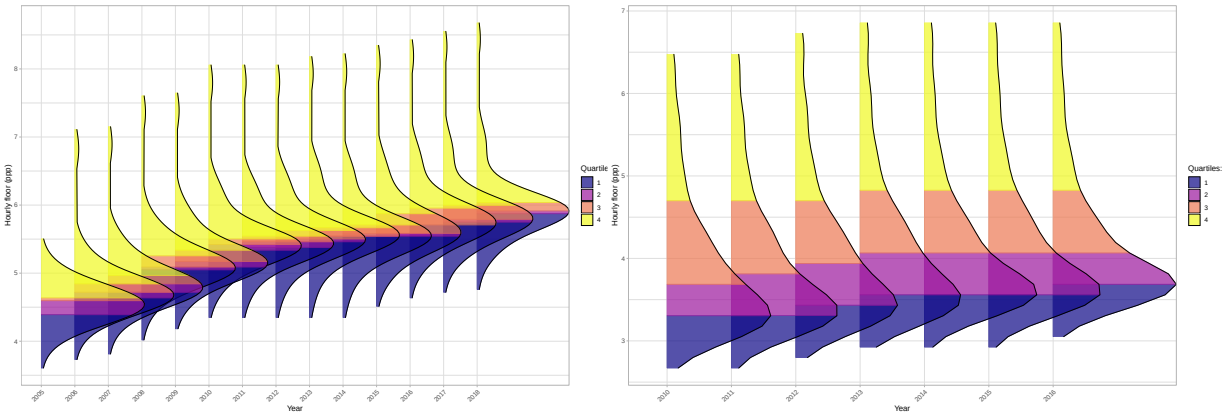
(a) Finland

(b) Norway



(c) Italy

(d) Portugal

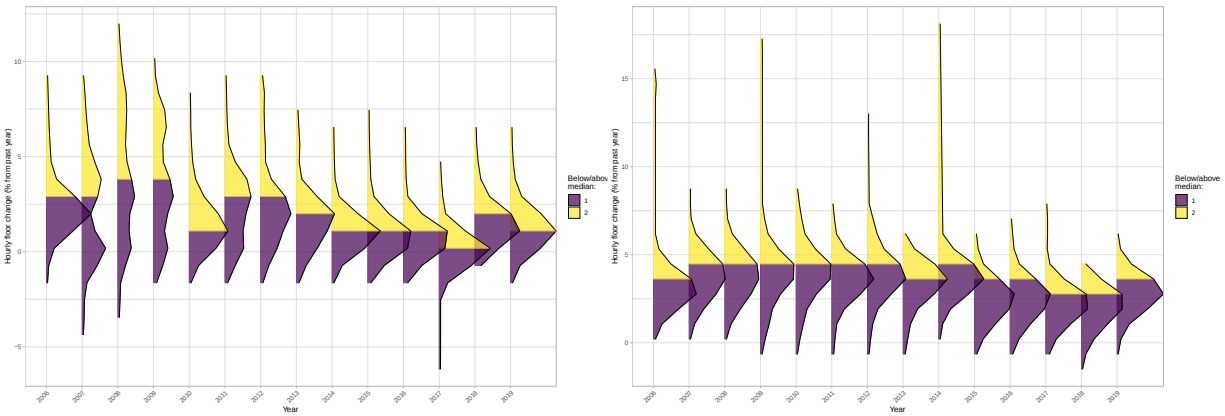


Notes: Floor distributions pooling all industries, separately by year, in purchase power parity units.

Figure 6: Floor changes from past year, by year

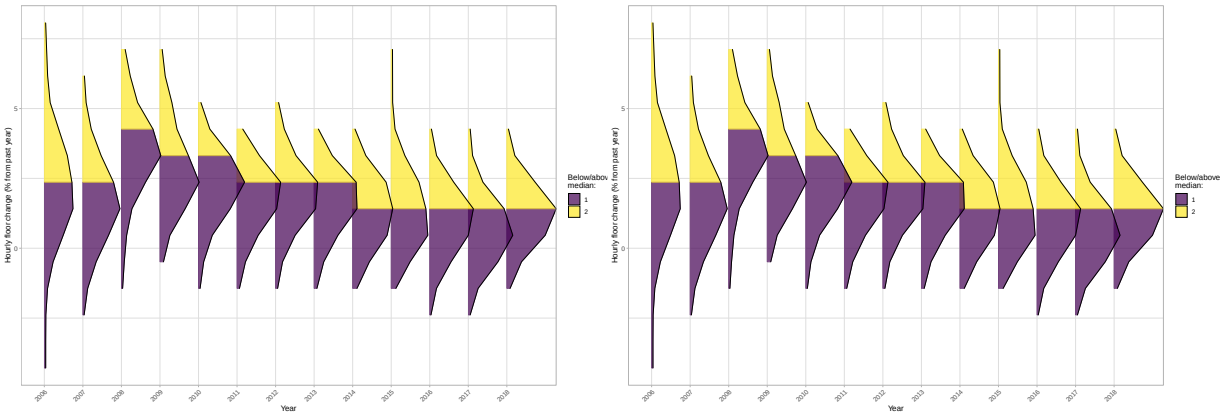
(a) Finland

(b) Norway



(c) Italy

(d) Portugal

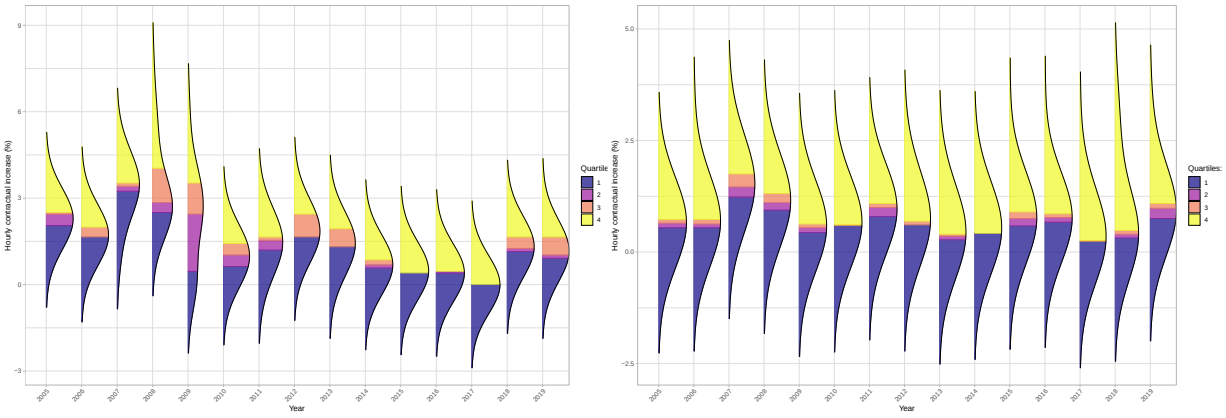


Notes: Percent changes in floors from past year, separately by calendar year and pooling all industries.

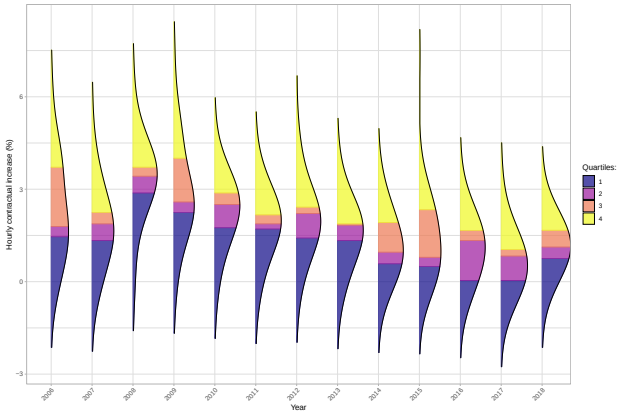
Figure 7: Contractual increases by year

(a) Finland

(b) Norway



(c) Italy

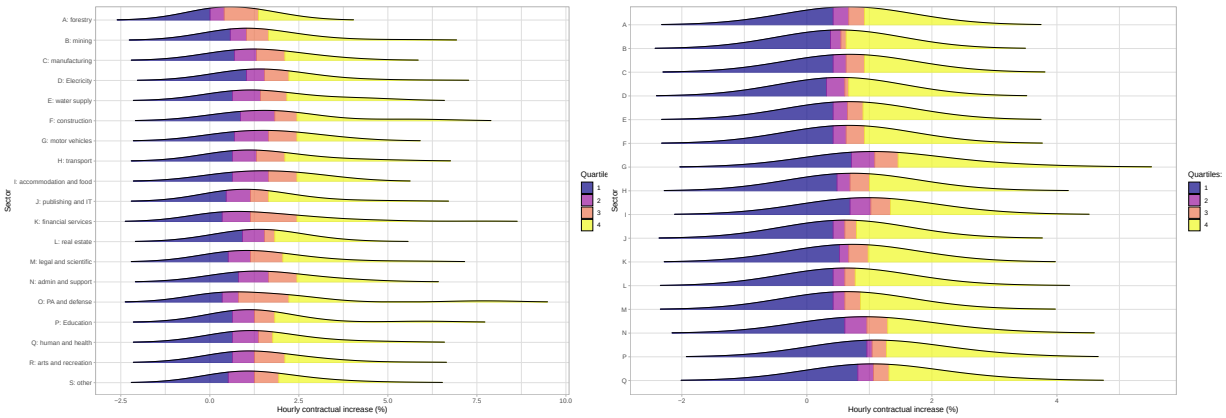


Notes: Contractual increases in percent, separately by calendar year and pooling all industries.

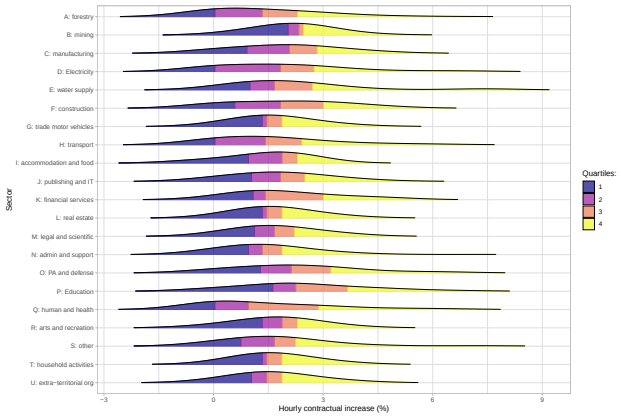
Figure 8: Contractual increases by industry

(a) Finland

(b) Norway



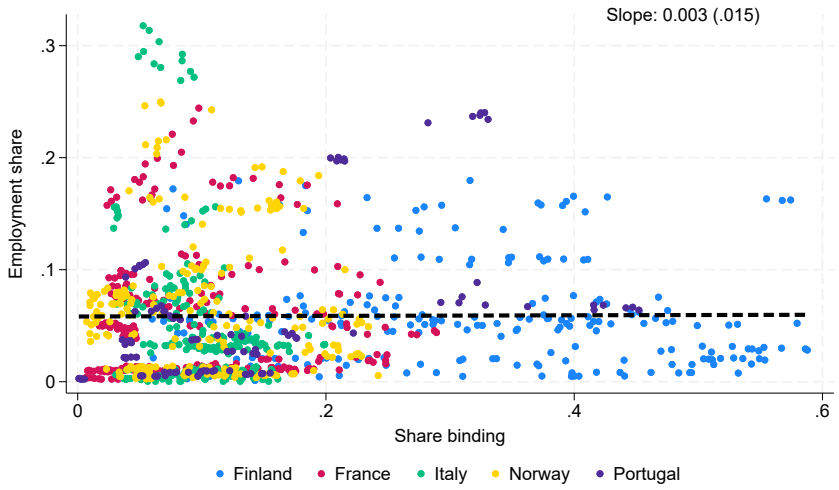
(c) Italy



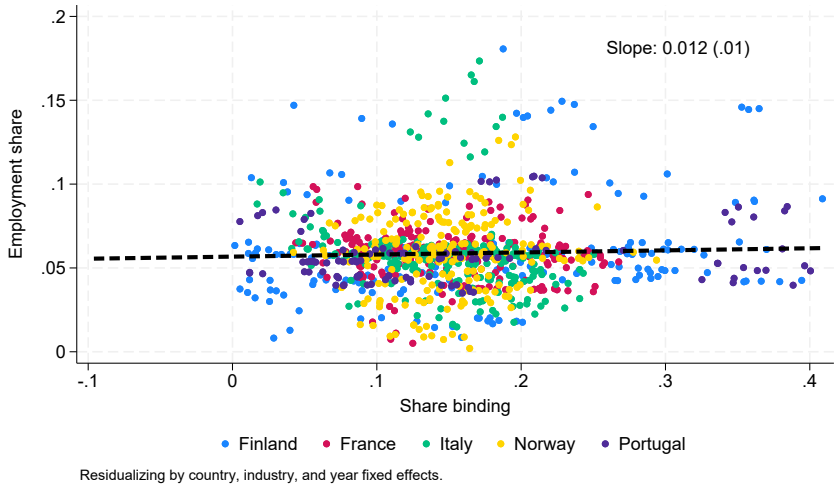
Notes: Contractual increases in percent in 2006-2019, separately by industry.

Figure 9: Share in employment and binding collective contracts, by industry and year

(a) Without controls



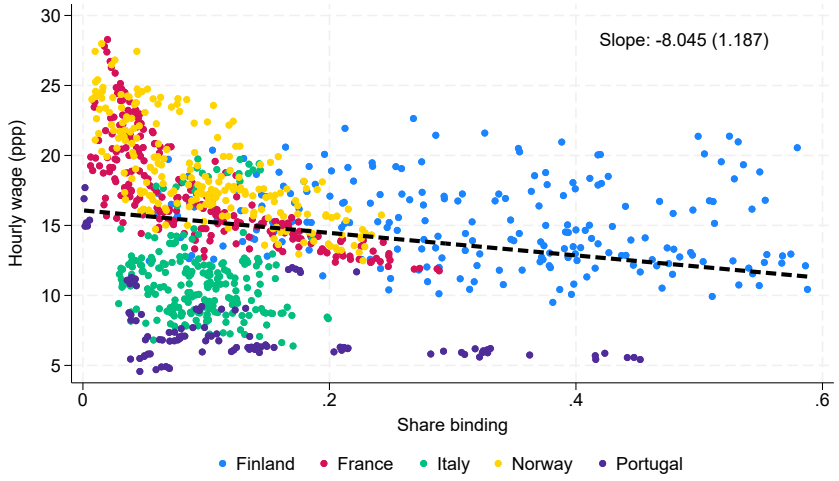
(b) Residualizing by country, industry, year fixed effects.



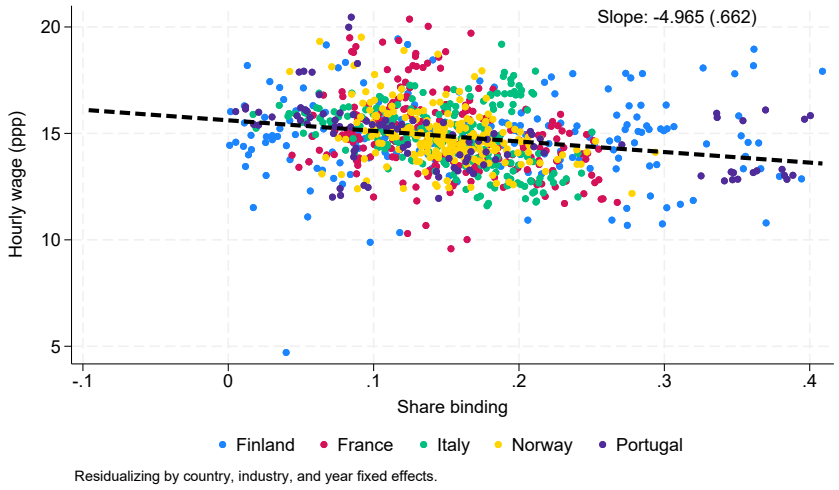
Notes: Correlation between employment share by 1-digit industry-year and share of workers covered by a binding contract.

Figure 10: Average wage and binding collective contracts, by industry and year

(a) Without controls



(b) Residualizing by country, industry, year fixed effects.



Notes: Correlation between average wage (in PPP units) by 1-digit industry-year and share of workers covered by a binding contract.

References

Adamopoulou, Effrosyni and Ernesto Villanueva (2022). "Employment and Wage Effects of Extending Collective Bargaining Agreements". *IZA World of Labor*.

Ahtiainen, Lasse (2024). "Coverage of collective agreements in 2021/2022".

— (2023). "Organisation of wage and salary earners in 2021".

AID (2025). "Grunnlaget for inntektsoppgjørene 2025 – foreløpig rapport". *Det tekniske beregningsutvalget for inntektsoppgjørene*, 1–253.

Andre, Claire and Lara Muller (2014). "Le panel Acemo de la Dares et la base d'accords salariaux de branche DGT-Dares". *Working Paper*.

Barth, Erling, Karl Ole Moene, and Fredrik Willumsen (2014). "The Scandinavian model-An interpretation". *Journal of Public Economics* 117, 60–72.

Bhuller, Manudeep (2025). *Documentation of the Database of Wage Rates in Norwegian Collective Bargaining Agreements (TARIFFLØNN), English Version 1.0*.

Bhuller, Manudeep, Karl Ove Moene, Magne Mogstad, and Ola L. Vestad (2022). "Facts and Fantasies about Wage Setting and Collective Bargaining". *Journal of Economic Perspectives* 36.4, 29–52.

Boeri, Tito, Andrea Ichino, Enrico Moretti, and Johanna Posch (2021). "Wage Equalization and Regional Misallocation: Evidence from Italian and German Provinces". *Journal of the European Economic Association* 19.6, 3249–3292.

Bratsberg, Bernt and Mari Brekke Holden (2015). "Effekter av allmenngjøring i byggebransjen". *Samfunnsøkonomen* 129.2, 68–80.

Card, David and Ana Rute Cardoso (2022). "Wage Flexibility under Sectoral Bargaining". *Journal of the European Economic Association* 20.5, 2013–2061.

Devicienti, Francesco, Bernardo Fanfani, and Agata Maida (2019). "Collective Bargaining and the Evolution of Wage Inequality in Italy". *British Journal of Industrial Relations* 57.2, 377–407.

Fanfani, Bernardo (2023). "The Employment Effects of Collective Wage Bargaining". *Journal of Public Economics* 227, 105006.

Fougère, Denis, Erwan Gautier, and Sébastien Roux (2018). "Wage floor rigidity in industry-level agreements: Evidence from France". *Labour Economics* 55, 72–97.

Garnero, Andrea and Claudio Lucifora (2022). "Turning a 'Blind Eye'? Compliance with Minimum Wage standards and Employment". *Economica* 89.356, 884–907.

Gautier, Erwan, Sébastien Roux, and Milena Suarez-Castillo (2019). "Do Minimum Wages Make Wages More Rigid? Evidence from French Micro Data". *SSRN Electronic Journal*.

Nergaard, Kristine (2022). "Organisasjonsgrader, tariffavtaledekning og arbeidskonflikter 2020 og 2021". *Fafo-notat 2022:09*.

OECD (2019a). "Facing the Future of Work: How to Make the Most of Collective Bargaining". *Employment Outlook*. Paris: OECD, 189–234.

— (2019b). *Negotiating Our Way Up: Collective Bargaining in a Changing World of Work*. Paris: OECD.

Vartiainen, Juhana (1998). *The labour market in Finland: Institutions and outcomes*. Prime Minister's Office Helsinki.

A Country-specific details

A.1 Finland

Linkage of collective bargaining agreement contracts

Country-level description of the data

A.2 France

Datasets with Information on Wage Floors We have access to two datasets that contain information on wage floors. This draft only use the BMB dataset.

1. The FGR data are constructed by Fougère, Gautier, and Roux (2018).[3] The FGR only contains a sample of the largest CBA. The data are recorded at the CBA identifier–salary grid level and at quarterly frequency. They cover the period from 2005 to 2016 and track a sample of the main CBAs in France. The strength of this dataset is that it contains the universe of wage floors for each CBA. A limitation of the dataset for this paper is that salary grid-level information is not available in the administrative data.

2. The BMB data (Branch Minimum Base, henceforth BMB) are constructed by the Ministry of Labour.[4] Like the FGR dataset, the BMB is based on CBAs (including conventions collectives, accords interprofessionnels, and accords professionnels) with 5,000 or more employees. It is recorded at the CBA identifier–occupation group–salary grid level and at quarterly frequency. However, unlike the FGR dataset, which records all salary grid levels ("grille de classification"), the BMB dataset only includes the lowest and highest wage floors for the four socio-professional categories (worker, employee, intermediate profession, and executive). Therefore, up to 8 wage floors are recorded. Negotiated minimum wages are classified into three types based on their base: hierarchical salary ("salaire hiérarchique") and guaranteed salary—monthly or annual ("salaire garanti—mensuel ou annuel"). The 2022 version of the BMB includes agreements for nearly 400 branches from 2003 to 2022.

Datasets with Information on Wages We have access to two datasets that contain wage information at the micro-level. The first one, the DADS, is the well-known matched employer-employee dataset for France. The second one, is an employer survey that records for several jobs (stratified by qualification) the base monthly earnings. A key advantage of the latter dataset is that it contains the CBA *and* the salary grid identifier.

[3] We thank Erwan Gautier for sharing the dataset with us.
[4] See Andre and Muller, 2014 for a detailed introduction to the BMB dataset.

This allows a finer link between monthly earnings and wage floors. However, an important drawback is that this dataset does not track workers but a given job position. This version of the draft only use the DADS panel.

1. The dataset "DADS panel tous salariés 2021," which includes a sample of salaried workers from 1976 to 2021. The dataset is provided by the CASD and is constructed by the French national statistical office (INSEE) from social security records. 1) for the private sector, based on records that establishments must fill out once a year for each employee (*DADS, Déclarations Administratives de Données Sociales; DSN, Déclarations Sociales Nominatives*), and 2) for central government public employees (*FPE, fichiers de paye des agents de l'État*).

   The sample corresponds, until 2001, to a 1/25 sample obtained by keeping individuals born in October of even years. Starting in 2002, the sample was doubled to include all workers born in October (the labor market history of workers entering in 2002 is not retrospectively added before 2002).

   The dataset contains establishment and firm identifiers and includes public sector jobs. The panel does not follow workers outside salaried employment (e.g., self-employed workers). Since 2008, unemployment spells have been recorded.

   This dataset contains gross salary, occupation categories, and hours worked. It does not distinguish between "base" and "total" earnings for each employer. Since 2005, the dataset has recorded the CBA identifier for each firm. We use the CBA identifier and the occupation category classification to link the DADS to the BMB dataset.

2. The dataset "ACEMO Panel 1999-2016". [5] All private sector firms (but agricultural employers) and included. The survey aims to provide short-term indicators on the evolution of the basic monthly salary and the basic hourly wage. The responding establishments select representative job positions for twelve qualification levels (three levels for each of the four major socio-professional categories: workers, employees, intermediate professions, and executives) and provide the base monthly and hourly wages. A reference sheet mapping the twelve job-level grid to the classification grid of the establishment's main CBA is provider to the surveyed establishment.[6] Using this sheet and for each of the twelve defined qualification levels, surveyed establishments are asked to select a job that they consider the most representative (typically the one with the largest number of employees in the relevant level). This should be a currently filled job that can be tracked quarter

[5] See Andre and Muller, 2014 for a detailed description of this dataset.

[6] Prepared by Dares for each applicable collective agreement, these sheets classify the different levels in the classification grid (coefficient, category, level, etc.) into the twelve job levels tracked by the quarterly survey.

to quarter. Responding establishments then provide the job title and the corresponding coefficient or hierarchical level. These responses are entered into the Acemo survey's management database. Once updated, this database allows the quarterly survey questionnaires to be pre-filled (see Figure 1).

Note that, in contrast to the DADS panel, the ACEMO survey tracks job positions and qualification levels, not individuals. When an employee in a tracked position changes their salary grid level or leaves the establishment, the responding establishment selects another employee with the same salary grid level to replace them. Reference employee changes affect roughly one in ten positions each quarter.

Construction of a Linked Dataset: Wage Floors with Wages

Sample restriction on the BMB dataset. We exclude legal texts labeled as "accord professionnel" and "avevant infranational", keeping only those labeled as "convention collective". Most legal texts are convention collective. See the text above. We retain texts at different geographical levels (national and subnational). We construct monthly wage floors using the "salaire hiérarchique" and the "salaire garanti". If monthly information is unavailable, we use annual minimum earnings divided by 12.

We use the same method to construct agreed wage increases.

Sample restriction on the DADS dataset. For each worker, we keep one person-year observation, selecting the primary employer as the one with the highest earnings. We consider full-time workers employed in the private sector. Person-year observations are excluded if the CBA, firm, or establishment identifier is missing. We deflate earnings based on 2020 EUR. The hourly wage is calculated as the ratio of earnings to hours worked at the main employer. Monthly earnings are calculated as the ratio of earnings to months worked. Since the number of months worked is not directly observed in the dataset, it is estimated by dividing the number of days worked at the primary employer by 30. We convert French classification codes (PCS) to ISCO-08.

A.3 Germany

Linkage of collective bargaining agreement contracts

Country-level description of the data

A.4 Italy

Linkage of collective bargaining agreement contracts

The source of information on actual wages, workers' and firms characteristics is LOSAI, which is an approximately 10% random sample of the universe of Italian private sector employees' social security records. This dataset is distributed by the Italian Ministry of Labor. Unlike other administrative sources, LOSAI does not contain an explicit key variable allowing us to link collective contracts to each worker. For this reason, we implemented probabilistic matching of workers to collective contracts.

Based on information derived from Fanfani, 2023, which uses the full population of private sector employees and explicit information on collective contracts applied to each worker, we calculated the most common collective contract applied within granular labor market cells. A cell was defined as the interaction between two-digit sectors, four geographic groups, three firm size groups, and two occupation groups. We then assigned to all workers within the same cell in LOSAI data the main collective contract applied according to the full population data. This procedure leads to a sample with around 70 imputed collective contracts in LOSAI.

Country-level description of the data

ISCO occupation code imputation ISCO is not reported in LOSAI data. ISCO can be derived from another Italian administrative archive (*Comunicazioni Obbligatorie*), but it is available only for workers that were hired or had a separation with the employer since 2010. Using this source of information, we have run an imputation procedure to assign 2-digit ISCO occupation codes. The procedure is similar to the imputation of collective contracts, but here the labor market cell was defined as the interaction between two-digit sector, five occupations, sex, two age groups and two wage groups (below-above the national median wage).

Selection of the relevant MW within each collective contract In Italy a collective contract sets several minimum wages, but using admin data we can only match a worker to a collective contract. Thus, we do not know which among the (usually 5-6) job-title minimum wages within a collective contract applies to the worker. For this reason, we applied the following imputation procedure, which uses a broad occupational classification available in LOSAI. Workers identified as "apprentices" or "blue collars" were

assigned to the lowest occupation-specific minimum wage of the collective contract. Workers identified as "white collars" were assigned to the median occupation-specific minimum wage of the collective contract. Finally, workers identified as "managers" or "mid-managers" were assigned to the highest occupation-specific minimum wage of the collective contract.

The share of workers paid less than the minimum could be over-estimated when using the above assignment rule, due to the fact that some managers or white collars could be assigned to higher minimum wage levels than their actual one. Similarly, minimum wage differences between blue collars and white collars could be over-estimated due to the fact that not all blue collars are paid the lowest minimum wage. Despite these data limitations, this imputation procedure allows to assign workers to minimum wages that are more likely to be the relevant one for them.

Definition of hourly wages Hours worked are not provided in Italian administrative data. For this reason, we have computed full-time equivalent (FTE) daily wages, which is feasible, and it requires adjusting the wage of part-time workers using a coefficient that can be used to impute full-time equivalent days worked. Then, we have divided FTE daily wages by 8, which is the standard duration of work schedules, to derive an estimate of hourly wages. However, if the worker has overtime hours, this information is not reported in the data. Thus, actual hourly wages could be over-estimated if the worker has a schedule that is longer than 8 hours.

A.5 Norway

Linkage of collective bargaining agreement contracts

As detailed below, our data sources provide information on which CBAs each establishment is covered for each year in our sample period. This information is crucial for us to assign CBA wage floors and wage increases to individual workers employed in these establishments. To assign wage floors, we take a few additional steps, following the approach broadly described in Bhuller et al. (2022), Online Appendix. First, our approach relies on a detailed cross-walk between the textual information in CBAs on specific job titles and worker groups categorized by seniority and/or skill levels and the information that is available in our administrative data, such as the 4- or 7-digit occupational codes corresponding to each job title and other measurable worker characteristics, such as age, education, apprenticeship status, tenure and work experience. Second, we use a dataset that provides information on manually transcribed wage floors by job title and worker category for around 150 major CBAs for each year in our sample period, covering the large majority of private sector workers covered by sectoral bargaining

in Norway (Bhuller, 2025).[7] Third, we supplement information on all extensions of CBA wage floors, relying on cross-walks between the textual information on targeted labor market segments and worker categories within each segment and corresponding indicators for CBA extension exposure based on detailed information on industry, occupation and geographic areas. Finally, for workers that based on our establishment-level records or different cross-walks could be covered by multiple CBAs, either because the establishment has adopted multiple CBAs or if there is an extension in place, we assign the highest wage floor to each worker among the alternative floors. In addition, we also assign information on centrally negotiated wage increases, for which we use public information on such increases across broad CBA areas in annual reports published by the Norwegian Technical Reporting Committee for Income Settlements (AID, 2025).

Country-level description of the data

Data from Statistics Norway Our analysis uses matched employer-employee records available from Statistics Norway. From 2005 to 2014, these records are based on the annual *ATMLTO* datasets, which cover close to the universe of employment spells in each year, with the exception of spells lasting less than a week and spells with average weekly contractual hours less than four. From 2015 to 2019, we rely on the monthly *A-ordningen* datasets, which cover all employment spells, including very short spells. Information from these two sources is harmonized and aggregated to the annual level to construct a population-level matched employer-employee dataset from 2005 to 2019, where we retain only the main employment spell for each individual per year.

While our dataset contains information on base salaries, variable supplements, bonuses, overtime pay and both contractual and overtime hours for all employment spells from 2015 and onwards, it only provides information on the total cash salaries and contractual hours before 2015. For the analysis that focuses on measures of hourly wages that include supplements, bonuses and overtime pay, we thus rely on harmonized measures of total cash salaries and contractual hours for each year in our sample period. For the analysis that uses measures of hourly wages based on base salaries and contractual hours, we use supplementary data from Statistics Norway's Wage Survey Statistics (*Lønnsstatistikk* between 2005 and 2014. The survey data allow us to construct comparable measures of base salaries for around 40 % of private sector workers in each year between 2005 and 2014.

Besides the matched employer-employee records and wage surveys, we also use register-based information from Statistics Norway's population, education and employment statistics to construct additional variables that are necessary for our analysis.

[7] By comparison, the case studies in Bhuller et al. (2022) focused on only 18 major CBAs in Norway.

Additional Data on Collective Bargaining We use several sources of information to construct reliable measures of collective bargaining coverage. In particular, we use information from the *AFP* and *SLV* schemes that are administered by major employer associations and labor confederations and are part of nearly all sectoral CBAs in Norway. These datasets provide information on the dates when each establishment adopted (and exited) either scheme. Additionally, we use information from membership records for the two major employment associations in Norway (*NHO* and *Virke*), which provide details about the CBAs covering each employer (i.e, establishment or firm) that is a member in either association. Their members employ almost 80 % of all private sector workers covered by sectoral CBAs in Norway. We use these data sources of construct an establishment-level panel dataset with information on whether each establishment had CBA coverage and details about which CBAs it was covered by in each year.

Finally, we also collected information on all CBA extensions enacted by the Norwegian Collective Bargaining Board since 2004, with information on which CBAs were extended and when, and which labor market segments (e.g., broad industry and/or geographic area) and worker groups in each segment were targeted in each extension.

A.6 Portugal

Linkage of collective bargaining agreement contracts

The Labor Bulletin (*Boletim do Trabalho e Emprego, BTE*) reports all newly negotiated collective bargaining agreements in Portugal, in pdf format.[8] We extracted the following information for agreements signed 2008-2016: denomination of the agreement, which usually includes the signatory union(s) and employer association(s); type of agreement (sectoral, company, multi-company, or government directive); starting date; planned expiration date; and reference information on the preceding agreement. We coded as well the information on the worker categories and respective wage floors within each agreement, i.e. the monthly salary for full-time work, which by law must be paid 14 months a year.

The construction of a panel of wage floors had to address several challenges (see Card and Cardoso, 2022, JEEA, for further details). The first observation for any CBA floor category occurs when the first contract renegotiation takes place after January 1, 2008. So our database will build up after that date, into a stable set of contracts from 2010 onwards. Secondly, increases in the national minimum wage will override wage floors below the new national minimum. Hence we updated all wage floors to meet the minimum wage as of the reference date of the QP. Thirdly, some agreements set different wage floors depending on firm attributes (e.g., its revenues) or workers' (e.g., their tenure or performance evaluation). Fourthly, an employer or employer association will

[8] Available at http://bte.gep.msess.gov.pt.

often sign separate but identical agreements with different unions. We consolidate such duplicate or "parallel" agreements, reducing the total number of agreements from 1,467 to 1,061. Agreements covering firms in agriculture or fisheries, or those in Madeira or the Azores are not considered. Therefore, we analyze 988 new consolidated agreements as part of our basic CBA data set.

Nearly all collective bargaining agreements nominal wage clauses have a one-year duration, but an existing CBA remains in force until a new one is negotiated.

Country-level description of the data

Quadros de Pessoal (QP): linked employer-employee data The Ministry of Employment collects an annual census of all firms with at least one wage-earner in the private sector of the economy. Firms report their full roster of workers. The worker data includes gender, age, highest level of education achieved, occupation, date of hire, nationality, monthly earnings (split into several components), hours of work (normal and overtime), as well as the name of the CBA that she is covered by (if any) and the job category within the agreement.[9] The firm data includes its region, industry, yearly sales, etc. The information refers to a reference week in October each year or to the full month of October, depending on the variable. Firm sales refer either to the previous or current year, whichever is stated.

Unfortunately, the QP does ***not*** report the actual wage floor for the worker or the name of the floor category as used in the BTE that same year. Instead, it reports a *job title* or *professional category* of the worker, which in many cases can be matched to the list of job titles or occupations reported for the floor categories in BTE.

We exclude workers under the age of 18 or over 64, those in Madeira and the Azores, and those employed in agriculture and fisheries. We also exclude apprentices (3.5% of the relevant sample), workers who are not employed full time (15.1%), and those with missing information on wages (8.9%, including unpaid family members and firm owners) or education/date of hire (0.1%). On average we have about 1.85 million workers per year.

Reliability of the procedure to link CB agreements to the worker-level information

We first matched agreements in QP to those in our BTE database. We then matched the wage floor groups within an agreement in BTE to the job category codes reported in QP. We assign the correct floor to a worker whenever the relevant variable is available in QP,

[9] To infer a worker's yearly labor income, we multiplied by 14 the monthly total pay reported for October by the data source, including the base pay, other components paid regularly on a monthly basis, irregular components paid less frequently, and overtime pay. The data refer to October because it was considered a representative month in the year. However, the 13th and 14th months of pay usually include only the regular monthly pay components.

though that is not always possible. We were able to match about half of all workers in QP covered by a CBA to their wage floor. The main challenges we could not overcome were (1) lack of information on the variable(s) needed to assign workers to a wage floor within a CBA; (2) existence of several sub-floors for each job category; (3) lack of obvious matches between the job types specified in BTE and the job titles used in QP.

The procedure used was an exact matching of the agreements and their wage floors in BTE to agreements and worker categories in QP, by direct inspection of the designation of the agreement and each job category across both data sources. Card and Cardoso (2022) report details on the subset of workers in QP that were successfully assigned a floor. They also compare covered workers with a matched floor to those for whom no floor could be assigned. The fraction of matched workers remained stable from 2010 onwards. Covered workers who can be assigned a wage floor are broadly similar to those who cannot. In particular, their gender, education, experience, job tenure, and mean log wages are quite similar. This similarity is also true year-by-year.