

## **Online Appendix:**

### **“Facts and Fantasies about Wage Setting and Collective Bargaining”**

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We provide here an overview of data sources, sample selection and variables used in our analysis, and describe the procedure for assigning job-specific wage floors to workers.

#### *Data and Sample Selection*

The Norwegian register data allow us to construct a long population panel dataset containing information on industry, occupation, labor earnings, contracted hours, and the number of days worked for each job spell. We also observe each establishment’s membership in employer associations and its collective bargaining coverage, and we have information from firm-level income statements and balance sheets, including revenue and cost of inputs. On top of this, we have collected and digitized detailed information from collective bargaining agreements. This enables us to link individual workers to the collective bargaining agreements and wage floors that apply to their jobs.

Microdata on workers’ earnings and employment histories is drawn from Norwegian administrative registers (Statistisk sentralbyrå, 2010; 2020a; 2020b), while hourly wage measures were constructed based on Statistics Norway’s Wage Statistics Surveys (Statistisk sentralbyrå, 2011). We have collected information on establishments’ membership in employer associations and their collective bargaining coverage directly from employer associations (NHO, 2022), while firm-level income statements and balance sheets are obtained from the Register of Company Accounts (Statistisk sentralbyrå, 2020c). Finally, we have collected a large number of agreement documents from the historical archives of the Confederation of Norwegian Enterprise (NHO), the Norwegian Labor Movement Archives and Library (Arbark), and the Fafo Institute for Labour and Social Research.

In our empirical analysis, we focus on the period from 2010 to 2018, where we can study firms and workers covered by one of the 18 major private sector collective bargaining agreements in Norway. While these agreements do not represent the universe of private sector collective bargaining agreements, they do represent heterogeneous workplaces and workers, with covered industries including the manufacturing and construction industries as well as service-oriented industries such as transportation and hotels and restaurants. Each agreement contains a set of wage floors for workers in different occupations, and adjustments of these wage floors is one of the key outcomes of the sectoral negotiations. We observe wage floor adjustments after the sectoral negotiations in every even year, when the collective bargaining agreements are subject to major revisions (*“Hovedoppgjør”*).

Table A.1 provides an overview of the steps we take to construct the samples used in our empirical analysis. Our initial data extracts consist of full-population employment records drawn from Norwegian registers for even years between 2010 and 2018 (Statistisk sentralbyrå, 2000a). We then restrict attention to private sector jobs that can be linked to Statistics Norway’s Wage Statistics Survey (Statistisk sentralbyrå, 2011). This survey provides data on monthly earnings and hours of work that we use to construct measures of hourly wages. Restricting further to each worker’s main job spell, workers with non-missing occupation, full-year and full-time workers, and ages 25–60, we retain about half of the linked employer-employee-wage survey sample.

Next, we restrict our sample to private establishments that are covered by at least one collective bargaining agreement. For this purpose, we use restricted-access data on whether an establishment was a member of an employer association, and, if so, which agreement(s) it was covered by in each year from 2010 to 2018. Further, we exclude managers and white-collar workers who are typically covered by firm-level agreements or sectoral agreements without wage floors (*lederavtaler, funksjonæravtaler*, and similar agreements). In the

remaining sample of (predominantly blue-collar) workers, around 15% are covered by one of the 18 private sector collective bargaining agreements.

Table A.1: Sample Selection.

|   | Sample Size: |           |         |
|---|--------------|-----------|---------|
|   | Observations | Workers   | Firms   |
| Initial Data Extracts: Private Sector Job Spells <sup>1</sup> | 8,452,183    | 2,452,406 | 257,535 |
| Matched to Wage Statistics Survey                             | 4,459,513    | 1,907,305 | 164,087 |
| Additional Sample Restrictions:                               |              |           |         |
| Main Job Spell <sup>2</sup>                                   | 4,058,574    | 1,817,436 | 153,650 |
| Non-missing Occupation  | 4,025,432    | 1,811,759 | 153,541 |
| Full-time Workers <sup>3</sup>                                | 2,792,828    | 1,303,117 | 128,027 |
| Full-year Workers <sup>4</sup>                                | 2,204,261    | 1,054,376 | 97,130  |
| Workers Aged 25 to 60   | 1,966,733    | 944,485   | 92,899  |
| Establishments Covered by Collective Bargaining               | 1,125,972    | 517,031   | 12,124  |
| Excluding Managers and White-Collar Workers <sup>5</sup>      | 807,247      | 393,157   | 11,288  |
| Workers Assigned Job-Specific Wage Floors <sup>6</sup>        | 117,123      | 66,283    | 2,538   |
| Matched to Firm Balance Sheets                                | 115,289      | 65,401    | 2,490   |

Notes:

The initial sample consists of administrative employment records for even years between 2010 and 2018.

1 Each job spell is uniquely identified by a combination of person ID, establishment ID, and calendar year.

2 Main job is defined as the job spell with the highest annual earnings.

3 Full-time is defined as working more than 35 hours per week.

4 Full-year is defined as having the same job throughout the year.

5 Workers with an occupational code (ISCO-08) that starts with either 1 or 2.

6 Workers covered by one of the 18 agreements that were transcribed and linked to our microdata as part of this project.

Table A.2: Overview of Variables.

| Variable Name                            | Notation             | Definition                           | Data Source            | Used in the Paper           |
|--|----------------------|--------------------------------------|------------------------|-----------------------------|
| Contracted Hourly Wage                   | $W_{i,t}$            |                                      | Wage Statistics        | Figure 3:(b)–(d)            |
| Total Hourly Wage <sup>†</sup>           | $\tilde{W}_{i,t}$    |                                      | Wage Statistics        |                             |
| Contracted Wage, Log                     | $w_{i,t}$            | $\ln(W_{i,t})$                       |                        | Figures 5:(a)               |
| Total Hourly Wage, Log                   | $\tilde{w}_{i,t}$    | $\ln(\tilde{W}_{i,t})$               |                        |                             |
| Wage Floor                               | $Q_{i,t}$            |                                      | Transcribed agreements | Figures 3:(b)–(d),4:(a)–(b) |
| Wage Floor, Log                          | $q_{i,t}$            | $\ln(Q_{i,t})$                       |                        | Figures 5:(b)               |
| Wage Drift, Absolute                     | $D_{i,t}$            | $W_{i,t} - Q_{i,t}$                  |                        | Figure 3:(b)–(d)            |
| Total Wage Drift, Absolute               | $\tilde{D}_{i,t}$    | $\tilde{W}_{i,t} - Q_{i,t}$          |                        | Figure 4:(a)–(b)            |
| Wage Drift Relative to Contracted Wage   | $d_{i,t}$            | $D_{i,t}/W_{i,t}$                    |                        | Figure 3:(a)                |
| Total Wage Drift, Relative to Wage Floor | $\tilde{d}_{i,t}$    | $\tilde{w}_{i,t} - q_{i,t}$          |                        |                             |
| Firm Revenues                            | $R_{i,t}$            |                                      | FirmAccounts           |                             |
| Firm Input Costs                         | $C_{i,t}$            |                                      | FirmAccounts           |                             |
| Firm Change in Stock of Produced Goods   | $\Delta G_{i,t}$     |                                      | FirmAccounts           |                             |
| Firm Wage Bill                           | $B_{i,t}$            |                                      | FirmAccounts           |                             |
| Value Added                              | $Y_{i,t}$            | $R_{i,t} - C_{i,t} - \Delta G_{i,t}$ |                        |                             |
| Firm Mean Wage                           | $\overline{W}_{i,t}$ | $E[\tilde{W}_{i,t}   i \in I_{i,t}]$ |                        |                             |
| Firm Labor Hours                         | $L_{i,t}$            | $B_{i,t}/\overline{W}_{i,t}$         |                        |                             |
| Value Added per Hour                     | $P_{i,t}$            | $Y_{i,t}/L_{i,t}$                    |                        | Figure 4:(a)–(b)            |
| Value Added per Hour, Log                | $p_{i,t}$            | $\ln(P_{i,t})$                       |                        | Figures 5:(c)               |

Note: <sup>†</sup>Total hourly wage and total wage drift include bonuses/commissions and irregular individual wage supplements (*uregelmessigetillegg*).

With these restrictions, our final sample consists of about 66,000 workers and 2,500 firms. We attach a job-specific wage floor to each worker, using information on occupation and the establishment's collective bargaining agreement coverage, as described below. Further, we can link the information on wages and wage floors to firm-level measures of value added for almost all of these workers.

Table A.2 gives an overview of the variables used in our analysis, providing information on how each variable is defined, its data source and where in the main part of the paper the variable is used. Using data from the Wage Statistics Survey, we can distinguish between contracted hourly wages and total hourly wages, where the latter includes bonuses or commissions as well as irregular individual wage supplements. Using information on hourly wage rates together with the job-specific wage floor assigned to each worker, we construct measures of wage drift. We obtain measures of each firm's value added and total wage bill from company accounts, and use these measures together with each firm's mean wage to construct a measure of value added per hour.

#### *Assigning Job-Specific Wage Floors to Workers*

In the following, we describe the procedure used to assign job-specific wage floors to workers. Due to data availability, we focused on the 18 major private sector collective bargaining agreements in Norway. These were negotiated between employer associations organized in the largest employer federation, the Confederation of Norwegian Enterprise (NHO), and labor unions organized in the largest labor union confederation, the Norwegian Confederation of Trade Unions (LO). We hand-collected the collective bargaining agreements from historical archives, where each agreement is available as a separate document for all even years between 2010 and 2018.

Most collective bargaining agreements prescribe a series of wage floors, differentiating between workers by occupation, tenure, and vocational certification (Statistisk sentralbyrå,

2000b; 2001). The first step in assigning wage floors to workers involved transcribing information on the negotiated wage floors and associated agreement coverage features. The latter includes textual information describing the prerequisites for being covered by a wage floor, such as occupational categories, tenure categories, and requirements on whether or not the worker has a vocational certificate. This textual information was categorized in a systematic manner so that each of the wage floors prescribed in the collective bargaining agreements could be associated to a set of 7-digit occupation codes. The 7-digit occupation codes are from the Norwegian Occupational Catalogue (STYRK-98), which is more detailed than the 4-digit International Standard Classification of Occupations (ISCO-08). This procedure produced a data set of wage floors associated with occupation codes, detailed tenure categories, and vocational certification requirements.

The next step required linking wage floors to microdata on workers and establishments. To implement this step, we used information on whether an establishment was a member of an employer association, and, if so, which collective bargaining agreement(s) it was covered by in each year between 2010 and 2018. Notably, whenever an establishment in Norway is covered by a collective bargaining agreement, this agreement must apply to all its regular workers irrespective of their trade union membership. Managers and white-collar workers are typically covered by other agreements or have considerably more wage flexibility. As discussed in the sample selection, we remove these workers from our analysis. By combining the information on agreement coverage with data on workers' occupation, tenure, and vocational certification, we were thus able to assign job-specific wage floors to workers.

## References

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