Why Firms Lay Off Workers Instead of Cutting Wages: Evidence From Linked Survey-Administrative Data*

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Abstract

We study how firms adjust labor in response to adverse shocks—via layoffs or pay cuts—and the reasoning behind it. To do so, we design and implement a novel large-scale survey of firms in Denmark and link it to administrative data. We find that layoffs are prevalent, even when the government-sponsored furlough schemes are available. Second, pay cuts occur, but are less common than layoffs. Third, firms do not consider pay cuts a viable substitute for layoffs during crises. Some layoffs during a crisis are not caused by the crisis. Rather, a crisis is an opportune time for firms to lay off low-productivity workers. Furthermore, the size of a hypothetical pay cut needed to save a layoff is large or unknown. Fourth, losing worker skills and subsequent search and matching costs are key considerations in the layoff decision. Morale considerations are not important for layoff but play a role in pay-cut decisions.

Keywords: Wage rigidity, Layoffs. JEL Codes: D22, J30, J63, J23.

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Contents

1 Introduction

During economic crises, firms typically lay off a large number of workers. The subsequent search and matching process is costly both for firms and workers. Presumably, instead of laying off workers, firms could cut their pay. Can pay cuts save layoffs? What are the main considerations in layoff decisions when faced with negative shocks? Despite the high stakes of these questions, evidence is scarce.

This paper adds novel and factual knowledge to the question of how firms adjust labor in response to adverse shocks. We design and implement an innovative large-scale survey of firms. The survey was fielded online in the summer of 2021 to the entire population of Danish private firms. First, the survey asks firms how they adjusted their labor input during the 2020 economic crisis – through an adjustment to the number of employees or a reduction in pay. Second, the survey asks for the reasons behind the specific labor adjustment approaches and solicits information about key considerations when laying off workers or cutting pay. We use quantitative, open-ended, hypothetical, and qualitative questions to understand how employers think about the labor adjustment process. Linking our survey with administrative data, we assess how firm-specific characteristics and labor market conditions influence the labor adjustment approaches. The resulting dataset contains information on 2,400 firms, and is a representative sample of the population of Danish firms with 5 or more employees.

The evidence that we gather draws a rich picture of the decision-making process of firms that plausibly goes beyond the specific recessionary episode of the 2020 pandemic or the specific country (Denmark). Our survey questions explicitly distinguish between the specific decision-making about the 2020 shock and the general attitudes of employers toward layoffs and pay cuts. Regarding the institutional labor market setup, the Danish legal and institutional constraints on employers are more similar to those in the U.S. than in most European economies. For example, Denmark has no specific hiring and firing regulations, and worker pay is mainly set at the firm versus the industry level.

First, we find that layoffs are more prevalent than pay cuts, but pay cuts are not rare. In the survey, we ask about pay (base pay, bonuses, fringe benefits, and promotions) and employment adjustments (hiring reductions for existing and new jobs, permanent and temporary layoffs, furlough schemes, early retirement, and hours reduction). Among companies that experienced a revenue reduction in 2020, 29% used some form of pay cut (16% cut base pay and 20% cut other forms of pay), and 68% made changes to the number of employees or working hours. We

complement our survey evidence with the annual data from a mandatory survey of firms that provides information on hourly base pay at the employee-occupation-establishment level—LONN. The LONN data are collected from firms and are likely to be subject to fewer measurement errors than data from household surveys. Using data from LONN, we also find that a reduction in base hourly pay from one year to another is not uncommon: 20% of workers experienced a cut in base hourly wages in 2020 and 15% in 2019.

Our second finding is that most firms do not consider pay cuts a viable substitute for layoffs during crises. More than 50% of firms disagree that they could have reduced pay instead of laying off workers. Furthermore, the reported size of a hypothetical pay cut needed to save a layoff is generally greater than 20%. Importantly, some layoffs during crises are not caused by the crisis. Instead, crises appear to be an opportune time for firms to lay off some workers. Most of the respondents declare that in recessions it is easier to lay off less productive employees, change employee tasks, or reorganize. In fact, 24% of firms declare that all the layoffs that occurred in 2020 would have anyway occurred in 2020 or the next two years if there had not been a pandemic. In general, our evidence is consistent with the anecdotal evidence presented in Bewley (1999). [1]

Third, we ask about the main reasons for not lowering the base pay. Approximately 70% of firms agree that pay reductions damage morale, more than 60% agree that pay reductions would lead employees to quit, and 60% see the base pay as a commitment to employees. Therefore, our evidence suggests that, while morale matters (as suggested by Bewley (1999)), the role of base pay as a commitment to employees and the fear of employee quits also play a role behind wage stickiness within employment relationships documented by, for example, Card and Hyslop (1997) and Grigsby, Hurst, and Yildirmaz (2021). Fourth, worker skills and search frictions are the most important considerations in layoff decisions. In the sample of firms that experienced a revenue reduction in 2020, 90% agree or strongly agree that they want to retain current employees to avoid loss of skills and knowledge, 70% agree or strongly agree that they may not be able to find and hire again quickly when needed during the recovery. That is, accumulated firm-specific human capital and finding a good match are important considerations in layoff decisions. Using firm-level identifiers, we link our survey data to several administrative datasets and study how firm responses about labor adjustment vary with firms characteristics or

[1] Bewley writes "I believed that an individual firm could save a significant number of jobs by reducing pay. This is rarely true, and the firms for which it is true are precisely the ones most likely to cut pay" (Bewley (1999), page 16).

local labor market conditions. We consider the following variables: firm workforce composition (by age, job tenure, level of education, gender ratio, unionization rate), firm demographics and financial characteristics (age, size, productivity, wage bill, amount of cash, capital stock) as well as the structure of ownership and the product market (i.e., family business or subcontractor for other firms). Guided by search and matching theory, we also include a measure of the labor market tightness faced by the firm. We find that the differences in firms' responses to the survey are mainly correlated with the differences in firm productivity and local labor market tightness. In particular, more productive firms are less likely to cut pay or lay off workers. Firms paying higher wages are more likely to cut pay, conditional on productivity and other firm characteristics. These results show that both firm-specific and labor market conditions matter for understanding how firms adjust labor in response to adverse shocks.

Our paper is related to the seminal literature on why wages do not fall in recessions. The classics, based on the small-scale firm surveys or interviews, are Blinder and Choi (1990), Campbell and Kamlani (1997), Bewley (1999) and studies surveyed in Bewley (2007). We complement and extend this literature by studying the question of wage stickiness in conjunction with the closely-related labor-adjustment margin—layoffs. To our knowledge, this paper is the first to study how and why firms adjust labor inputs in a large and representative sample of firms.

Our findings on the flexibility of pay are related to a large literature that studies the behavior of wages over the business cycle. That literature is motivated by wage rigidity being a key mechanism behind an amplification of shocks in a large class of macro-models.[2] Wages of incumbents appear mildly procyclical and some wage cuts take place (Bils (1985), Elsby and Solon (2019), Grigsby, Hurst, and Yildirmaz (2021), among others). The relative stickiness of wages of incumbents and relative flexibility of wages of new hires contribute to a rather procyclical price of labor, which is a key statistic for volatility of the quantities in the models (Kudlyak (2014), Basu and House (2016), Doniger (2021), Bils, Kudlyak, and Lins (2023)).

Our findings complement the work of Davis and Krolikowski (2023) who conduct a survey of the unemployed workers in the US to elicit workers' opinions on pay cuts, and find that discussions about pay cuts in lieu of layoffs are rare. However, most of the respondents express some willingness to accept a pay cut to save

[2]Downward wage rigidity is a common assumption to explain a wide range of macroeconomic phenomena such as the behavior of the Phillips curve, monetary policy, unemployment in the eurozone, and unemployment fluctuations over the business cycle (Auclert, Bardóczy, and Rognlie, 2021; Daly and Hobijn, 2014; Dupraz, Nakamura, and Steinsson, 2019; Schmitt-Grohé and Uribe, 2016).

their jobs. Our paper also complements studies on firm restructuring during recessions (Berger (2018); Koenders and Rogerson (2005)). Our evidence that firms are more likely to reorganize during economic downturns is consistent with, for example, Hershbein and Kahn (2018) who show that the Great Recession accelerated the adoption of technologies that replaced routine labor.

Our paper is also related to the perceived fairness of pay cuts and layoffs. Charness and Levine (2000)...TO ADD

The rest of the paper is structured as follows. Section 2 describes the data. Section 3 documents how firms adjusted labor during the 2020 crisis. Sections 4 studies employers considerations at the layoff margin and Section 5 studies employers considerations at the pay cut margin. Section 6 concludes.

2 Linked Firm Survey-Administrative Data

This section describes the design and implementation of our survey of firms, outlines the construction of the linked survey-administrative dataset, and provides a description of the data used in the analysis. The backbone dataset comes from our survey, which is representative of the population of private sector firms in Denmark.

2.1 Our Survey

Target population. The target population that we want to survey is all private and public limited companies (ApS, *Anpartsselskab* and A/S, *Aktieselskab*) in Denmark. The coverage error, the difference between the potential pool of respondents and the target population should be minimal as it is mandatory for firms to be able to receive digital mail from the authorities.

Recruiting respondents. We recruited an international Danish consulting firm, Ramboll, to conduct our online survey. Ramboll sent the survey invitation emails to the population of Danish firms in June 2021.[3] Ramboll sent out invitations to participate using the official email account called *e-boks*, which Danish firms use to receive official communications from the public sector, for example, the tax authority. The late spring and the beginning of summer 2021 was an appropriate time to

[3] A firm that shut down in 2020 will not be in the sample frame as the list of companies that can be contacted is updated at the monthly frequency (Ramboll uses the list of companies from May 2021).

ask about the impact of the 2020 economic recession because at that time the world economy and the Danish economy were on the recovery track.[4]

The survey closing date was at the beginning of August 2021, and a couple of reminders were sent in June and July to increase the response rate. The email contained an invitation letter stating that, on behalf of the University of Copenhagen, Ramboll is conducting a survey related to the COVID crisis (See Figure A.1). The invitation letter was designed to recruit as many respondents as possible, minimize selection bias, and to look legitimate and trustworthy. The letter used a simple language to minimize selection bias. It contained information on the deadline for completing the survey and that it could be answered using mobile-friendly devices. The actual topic of the survey was kept vague. The logo of the University of Copenhagen was clearly visible, as was that of the funding partner for this research, and we explained that all data generated comply with data protection rules. Finally, the letter stipulated the incentives for the respondents (i.e., getting an anonymized benchmarked report). The respondents were asked to fill the survey online.[5]

Response rate. The response rate of the survey was 12.76%, which corresponds to 2,787 firm-level observations (see Table A.1).

A 12.76% response rate is high for a voluntary online survey.[6]

Sample restrictions. First, we want to ensure that the person who completed the survey on behalf of the firm had sufficient knowledge of the firm's pay policy. Therefore, the survey asked "In the following questions, we ask about pay and employment practices. How close are you to such decisions?" We delete from the analysis the responses where the respondent checked "I only know a little about pay and employment practices."[7] Second, we delete observations with at least 10 missing answers on the key questions on layoffs and pay cuts. Finally, we deleted responses with incoherent answers where the respondents contradicted themselves.[8]

[4]In April 2021, the IMF released a report on economic recoveries. The American Rescue Plan Act was passed in March 2021. The number of people who received a dose of the COVID-19 vaccine peaked in May 2021 in the European Union.

[5]Online surveys have advantages in terms of selection as compared to in-person, telephone, or mail surveys. In particular, it gives respondents more flexibility to complete the survey (Stantcheva, 2022).

[6]Scur, Sadun, Van Reenen, Lemos, and Bloom (2021) report response rates of 0.1% to 13% in recent surveys.

[7]Our results are similar without this restriction.

[8]An example is choosing "None of the above" as well as other options in response to the questions that ask to "check all that apply".

As a result of these restrictions, the sample size declined from 2,787 to 2,488, corresponding to a 10.73% response rate (see Table A.1).

Question ordering. The questionnaire starts with background questions about the person who completes the survey on behalf of the firm and the characteristics of the firm. Then, it asks quantitative questions about labor adjustment strategies in 2020 and, it asks qualitative questions related to reasons, perceptions, and attitudes toward layoffs and pay cuts in general. The three blocks of questions, which contain 25 questions in total, are as follows:

1. Background questions. Respondents must state their role in the firm, their knowledge of pay and employment policies, the number of employees in the firm, and the change in revenue in 2020 compared to 2019. In the Appendix, we demonstrate in various ways that the respondents know the economic situation of the firm (see Table A.3 and A.4). The survey also asks questions about firm characteristics that are unavailable in administrative data sets. Specifically, we ask whether one person or a family owns the company and whether the firm derives its revenue primarily from subcontractor work for other firms. We also asked respondents about their expectations regarding the duration of the period of the revenue reduction.

2. Labor adjustment strategies in 2020. This block contains quantitative questions regarding whether and how the firms adjusted workers' pay and the number of employees. In most of the administrative matched employer-employee data, the reasons for worker-firm separations are not observed. Therefore, our survey questions allow us to draw a picture of the firms labor adjustment process.

3. Reasons for, perceptions, and attitudes towards layoffs and pay cuts. This block contains a series of qualitative questions to elicit employers' perceptions, reasons for, and attitudes toward layoffs and pay cuts.

Types of questions. The main questions on labor adjustment strategies in 2020 are "check all that apply" questions, and respondents are not forced to judge all items independently to reduce the burden. All qualitative questions are given a choice of answering using one of the five categories ("Strongly agree", "Agree", "Neutral", "Disagree", and "Strongly disagree") to make the Likert scale manageable following common practice (Dillman, Smyth, and Christian, 2014). The odd number of categories ensures that there is a middle option. The questions are reported in English in Appendix C.

2.2 Administrative Data on Firms and Workers

To complement our analysis, we link our survey data with administrative datasets using firm-level identifiers (the CVR number). The administrative datasets come from various sources gathered by the National Statistics Agency (Statistics Denmark), the National Employment Policy Agency (STAR), and the largest employer association in Denmark (Dansk Arbejdsgiverforening, DA).

The financial data on firms come from the General Firm Statistics (FIRM, *Generel firmastatistik*), which contain annual financial statements for all private sector firms. We use information on revenue, labor costs, capital stock (the value of fixed assets), liquid assets (the value of cash, shares, and bonds), and value added (defined as revenue minus intermediate costs), as well as nonfinancial information, such as the total number of hours worked by employees, the number of years in business, location, and industry codes. The value of liquid assets is from the FIRE dataset (*Regnskabsstatistik*).

We obtain information on firm's workers' age, job tenure, sex, educational attainment, and unionization status (via membership fees that are deducted from the worker's tax return) from administrative registers.

The administrative records of worker earnings and hours are from the BFL (*Detaljeret lønmodtagerdata fra e-Indkomst*). The BFL covers all Danish firms and contains worker-level information on a monthly frequency (location of the place of work, occupation, date of start and end of the employment period, earnings, and hours worked). Earnings include all earnings that workers receive during the month, including bonus and overtime, and hours are paid hours worked.

We complement the administrative records on earnings and hours from the BFL with data from LONN, *Lønstatistikken*, which contains information collected from a mandatory employer survey on earnings components for all firms with at least 10 employees from 2009 to 2020. The survey is run annually and contains total annual base wage, bonus and overtime pay as well as hours. LONN also contains basic information on the worker, as in BFL, and, additionally, an indicator for hourly versus salaried workers.

The unemployment and vacancy data come from the public employment service (PES) job search platform, jobnet.dk.

Appendix Table A.2 provides definitions and data sources for all variables used in the analysis that are not part of our survey.

2.3 Institutional Context of the Danish Labor Market

In a broad comparison, the institutional characteristics of the Danish labor market are closer to the US than the continental European labor market. Since the mid-1990s, the Danish unemployment rate has been lower and more volatile than the unemployment rate in the euro area (see Figure A.21 Panel A). The Danish labor market is characterized by relatively high job mobility rates and a large share of workers having their pay negotiated at the firm- versus industry level.

According to several Employment Protection Law indexes, Denmark has among the most flexible employment protection laws among advanced economies (see Figure A.19). Unionization is higher in Denmark than in the US (see Figure A.19). Unemployed workers are entitled to unemployment insurance payments if they are members of an unemployment insurance fund, with a net replacement rate of 83 percent for workers (Kreiner and Svarer, 2022). Contrary to the US, Danish firms are not subject to experience ratings with regard to their contributions to unemployment insurance.

Like most European countries, the Danish collective bargaining agreement is based on a two-tier structure. Industry agreements set the base wage for 20% of workers. For the other 80%, the base wage is set at the firm level (DA, 2018). Various pay components, such as bonuses, are set at the firm level.

The 2020 economic crisis. Between 2019 and 2020, the GDP in Denmark declined by 2%. The Danish government implemented various aid packages in March 2020, the same month as the lockdown announcement. To help retain jobs, Denmark implemented a furlough scheme (*Lønkompensationsordningen*), which had been used to a limited extent before (Hijzen and Venn, 2011). A firm that expected to lay off 30% of its workforce or more than 50 employees could apply for the furlough scheme. The firm was then able to furlough as many workers as needed for as long as needed until the end date of the scheme, June 2021. The government then paid workers up to 75 or 90 percent (depending on their job function) of their usual pay with a monthly cap of 30,000 DKK (4,033 EUR). The firm had to cover the remaining pay. Importantly, firms were allowed to cut base hourly pay or bonuses while using the furlough scheme.

The take up rate of the furlough scheme in Denmark was much lower than in other OECD countries (10% in Denmark, 50% in France, 30% in Germany; see Figure A.20 and OCDE (2023); OECD (2020)). The furlough scheme was less generous or flexible than short-time work policies implemented in other European countries.

The furlough scheme allowed only a 100% reduction of hours per employee, contrary to short-time work programs where employers could choose the percentage of hours reduced (Boeri and Cahuc, 2022). The 30,000 DKK threshold for the worker payments covered under the Danish furlough scheme was relatively low. Specifically, in 2019, the average gross monthly salary of a full-time worker in the sample of workers who were employed in firms that responded to the survey was 43,487 DKK. We find that the threshold fully covered salary for 10% of managers, professionals, and technicians; 38% of clerks, service, and sales workers; and 33% of craftsmen, machine operators, and other jobs (see Figure A.2).

2.4 Descriptive Statistics and Data Quality Checks

Table 1 reports the means of the main variables. Panel "Firm characteristics", column 1 shows the statistics from the target population and column 2 — from the survey sample ("Unweighted sample"). Although the means in columns 2 and 1 are similar, in column 3 we report the means of the variables in the re-weighted sample that we construct. We re-weigh our sample using weights that we construct from the administrative data to give more weight to firms that are underrepresented in the sample. We use entropy-balancing weighting to produce weights (Hainmueller, 2012). The weights target population means of the number of employees, industry distribution, and productivity deciles. We use these weights throughout our analysis.

Our sample somewhat overrepresents larger (33 vs 39 employees), older (17 vs 20), more productive firms (88,000 EUR vs 94,000 EUR). The characteristics of the employees are mostly balanced. The sectoral composition is mostly similar between the target population and the sample (see Figure **??**). After we apply the weights, the differences between variable means in column 1 and 3 are small.

Panel "Employee characteristics" in Table 1 summarizes the workforce characteristics. In all, Table 1 shows that our sample is a broadly representative sample of the population of Danish companies with at least 5 full-time employees, the target population.

To check the quality of our survey data, we compare the survey responses with the information in the administrative data. Specifically, we use the following two survey questions. First, we use a question about the firm size, "How many people were employed in the company on May 1, 2021?" [9] Second, we ask firms about

[9]Table A.1 reports the data quality checks that we implement through the sample restriction process. In particular, we ensure that the respondents know the firm's pay policy.

Table 1: Sample Description of the Linked Survey-Administrative Data

	(1) Population	(2) Sample	(3) Weighted sample
Firm characteristics			
Number of employees (FTE)	33.15	39.73	33.50
Age	17.88	20.11	19.61
Revenue growth in 2020 (%)	1.47	2.49	2.50
Value added per worker ('000 EUR)	88.11	94.31	93.12
Labor costs per worker ('000 EUR)	66.61	70.58	69.59
In the manufacturing sector (%)	14.50	17.48	14.93
In the services sector (%)	60.02	59.69	59.79
In other sectors (%)	25.48	22.83	25.28
Wage floors (%)	16.20	17.44	17.69
Employee characteristics			
Female (%)	28.64	28.80	28.32
Age	40.22	41.97	41.85
Furloughed workers in 2020 (%)	16.53	15.69	15.62
Unionized workers (%)	55.76	59.88	59.05
Labor market characteristics			
Tightness (vacancy/unemployment)	0.11	0.11	0.11
Observations	21835	2488	2488

Note: The table compares the mean of firm characteristics from the sample to the corresponding population of firms. Column 1 reports means from the population, i.e., firms with at least 5 full-time employees. Column 2 reports means from the raw sample and Column 3 from the sample weighted by entropy balancing as described in Section 2. "Firm characteristics" corresponds to the demographics and financial characteristics of the companies. "Sector pay-setting" is a dummy equal to one if the sectoral level collective bargaining agreements set out wage floors (*normallønssystemet*). "Employee characteristics" corresponds to the mean characteristics of the employees in 2019. "Labor market characteristics" correspond to external factors for the firm. The tightness is the ratio of job vacancies to unemployment. It is occupation-specific tightness weighted by the share of each worker in a firm in a specific occupation. Table **??** reports means of variables from the survey data.

revenue growth: "How much did revenue change in 2020 compared to 2019?" We find that the responses in the survey are similar to the corresponding information in the administrative data for these questions (see Figures A.3 and A.4), demonstrating that respondents know the economic situation of the firm well.

2.5 Regression Models

In the analysis, we assess how the firm's characteristics and the conditions of the labor market affect firms' responses regarding labor adjustment strategies. We estimate OLS models and ordered probit models. In the case of probit, we report the average marginal effects where the covariates are evaluated at their mean values.

We standardize continuous variables to have mean zero and standard deviation of one to facilitate the interpretation of predictors with different scales (i.e., firm size or percentage of unionized workers).

Firm characteristics. We are interested in how the firm characteristics such as the number of employees, firm age, capital per worker and the firm's financial situation (productivity, average wages, and liquid assets) affect its labor adjustment approaches.

We take advantage of our survey to measure firm characteristics that are not observed in administrative data. Specifically, we include the firm ownership type (whether the majority owner is family-owned) and the structure of the product market (whether the firm is a subcontractor to other firms).[10]

Labor market characteristics. The wage in the Diamond-Mortensen-Pissarides theoretical framework depends on the firm's productivity and the labor market tightness (Pissarides (2000)). We construct the labor market tightness that applies to a firm given the firm's workforce composition (see Hoeck (2023)). Specifically, the tightness for firm j, denoted by θ_j, is the weighted sum of the three-digit occupation-specific labor market tightnesses:

$$\theta_j = \sum_{o=1}^{O} w_{oj}\theta_o, \tag{1}$$

where $\theta_o = \frac{V_o}{U_o}$, V_o and U_o are the total number of vacant jobs and the number of unemployed in a given occupation, respectively. $w_{oj} = \frac{N_{oj}}{N_j}$ is the number of workers in

[10] A subcontractor is a company in which the survey respondent states that at least 50 percent of the revenue comes from subcontractor work to other companies.

a specific occupation (N_{oj}) divided by the total number of workers in the company in 2019 (N_j). Figure A.18 shows that firms facing tighter labor markets are more likely to have a greater share of unfilled vacancies four months after posting a vacancy and a greater share of filled vacancies with a worker who does not have the right qualifications for the position.

Firm's workforce characteristics. We include the following variables to measure firms' workforce characteristics: average educational attainment of all firm's employees, the percentage of female workers, average worker age, average job tenure, and the percentage of unionized workers.

Additional controls. We include the firm revenue growth rate from 2019 to 2020, the firm job growth rate from 2018 to 2019, and industry and geographic fixed effects to control for the size of the reduction in demand, and common sectoral or regional shocks. We control for differences in institutional settings by including a dummy measuring whether the base pay is set at the industry level and a dummy for the presence of an employee representative (i.e., a union member or individual who represents employees in negotiations with management on such issues as wages and work conditions). Finally, we control for the job function of the respondent who fills out the survey and their knowledge of the pay policy. These additional controls should capture the variation in the data that is not explained by the main firm characteristics that we are interested in.

To summarize, the linked survey-administrative dataset that we built contains a large and representative sample of firms with detailed information on firm and labor market characteristics. The relative flexibility of the institutional setting of the Danish labor market is close to the US labor market setting.

3 Reducing Worker Pay or the Number of Employees?

In this section, we first document downward adjustments to worker pay and the number of employees in the wake of the 2020 crisis. We then document how firm characteristics and labor market conditions influence the use of different labor adjustment methods.

3.1 Adjustments to Worker Pay and Number of Employees

Figure 1 shows how the firms adjusted labor during the pandemic crisis. The figure displays the results for the full sample and the subsamples defined by the firm's revenue change in 2020 compared to 2019 — those that experienced revenue reduction, no change in revenue, and an increase in revenue.[11] To construct the subsamples, we use information on the revenue change from the administrative financial accounts data. Panel (a) shows the share of firms that adjusted pay using adjustments to base pay, variable pay (for example, bonuses), or any adjustment to pay at all (including base pay, bonus pay, fringe benefits, or promotions). Panel (b) shows the share of firms that adjusted the number of employees through permanent layoffs, hiring reductions, temporary layoffs, government support schemes, or any of the employee reduction approach. Note that the categories are not mutually exclusive. Figure 2 shows the labor adjustment approaches when the firms are divided into detailed revenue-change categories: a decline of more than 30%, a decline between 20 and 30%, a decline between 10 and 20%, a decline between 0 and 10%, no change, an increase between 0 and 10%, an increase between 10 and 20%, an increase between 20 and 30%, and an increase of more than 30%.

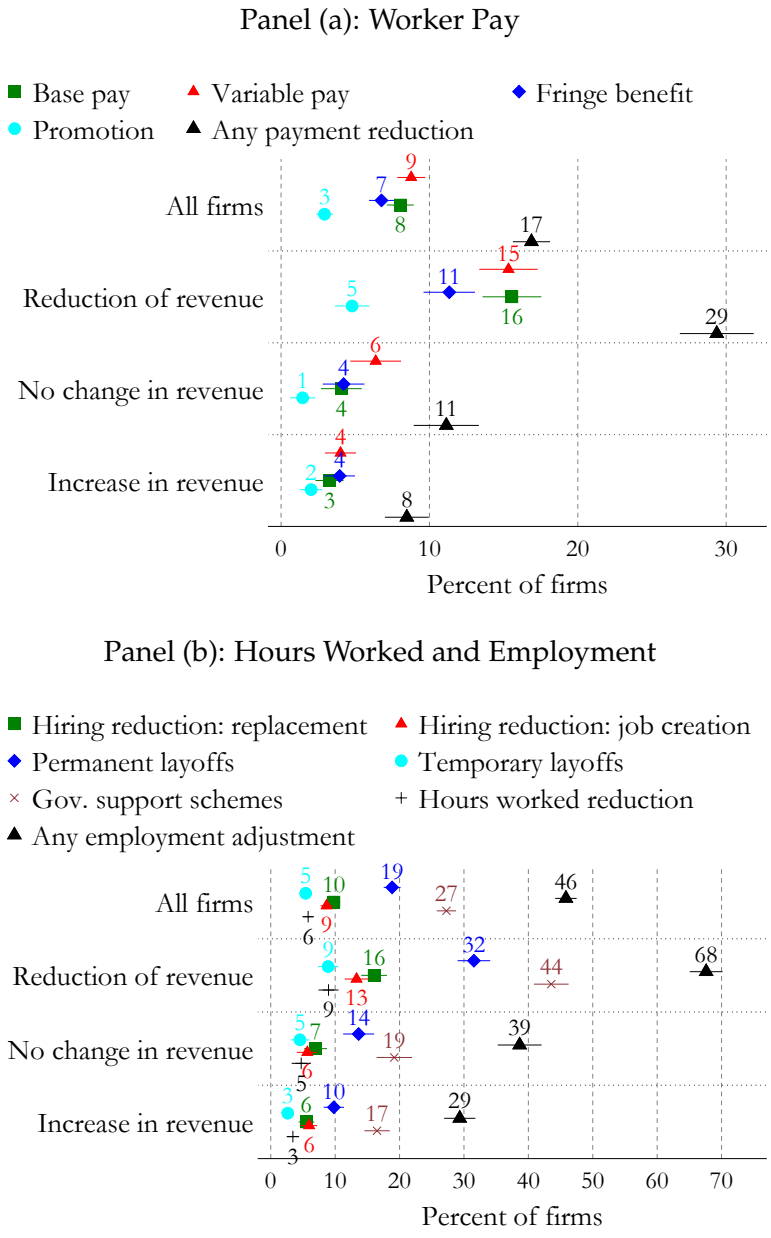
First, an overarching conclusion is that a higher share of firms adjusted the number of employees than the pay of employees (Figure 1). Among all firms, 46% made some adjustments to the number of employees (Panel (b)), and 17% adjusted pay (Panel (a)). This holds true within each revenue-change category (Figure 2).[12]

Second, pay cuts are not rare, especially among firms that experienced a decrease in revenue. Among the firms that experienced any reduction in revenue, 29% cut pay in some way: 16% cut the base pay, and 20% cut other forms of compensation (bonus pay, fringe benefits, or promotions) (Figure 1). Figure 3 shows the percentage of firm employees affected by a cut (x-axis) and how many firms experienced such impact on their workforce (y-axis), conditional on firms using pay cuts. The figure shows that the wide-spread firm pay cuts were prevalent: almost 55% of firms experienced base pay cuts that affected more than 60% employees (Panel (a)), and 50% of firms experienced variable pay cuts that affected more than 60% employees (Panel (b)). Cajner, Crane, Decker, Grigsby, Hamins-Puertolas, Hurst,

[11] Figure A.5 shows firms reasons behind the decline in revenue in 2020. Two-thirds of the firms reported a decrease in demand as the main reason behind the decrease in revenue.

[12] To express growth from t-1 to t as rates, we divide by the average of revenue in t-1 and t. This calculation yields growth rates in the interval from -200 to 200 percent, with endpoints corresponding to births and deaths of employers (Davis, Faberman, and Haltiwanger, 2006). We find the same pattern when we split the sample using value-added (revenue minus intermediate input costs) growth rate (Figure A.7).

Figure 1: Labor Adjustment Approaches in 2020

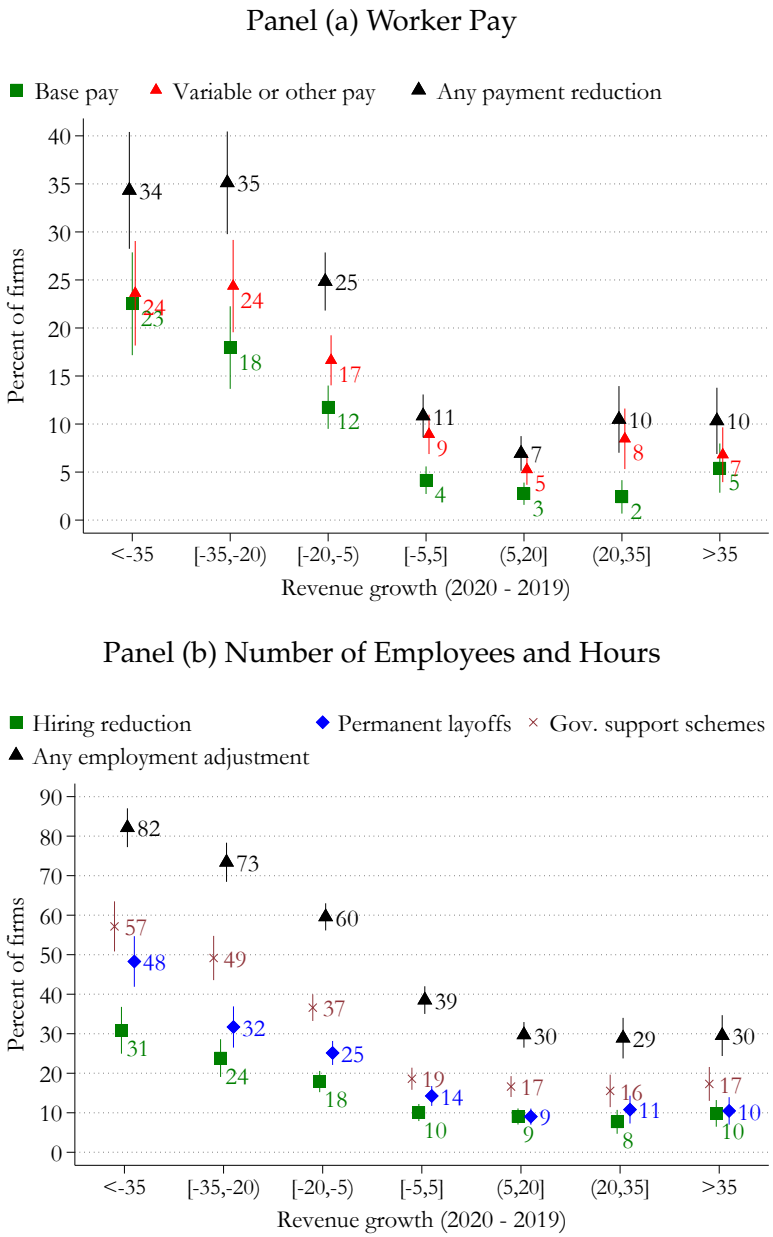


Note: Panels (a) and (b) show the percentage of firms that answered "yes" to questions about the corresponding labor adjustment method. The "All firms" category includes all firms in the sample. The "Reduction of revenue" category includes the firms with a decline in revenue in 2020 relative to 2019 in the administrative data (FIRM). Temporary layoffs are defined in the questionnaire as layoffs with expected reemployment.

Kurz, and Yildirmaz (2020) finds that the U.S labor market also experienced base pay cuts during the pandemic.

Third, the reductions in worker pay or the number of employees were most prevalent among the firms that experienced a reduction in revenue. The larger the

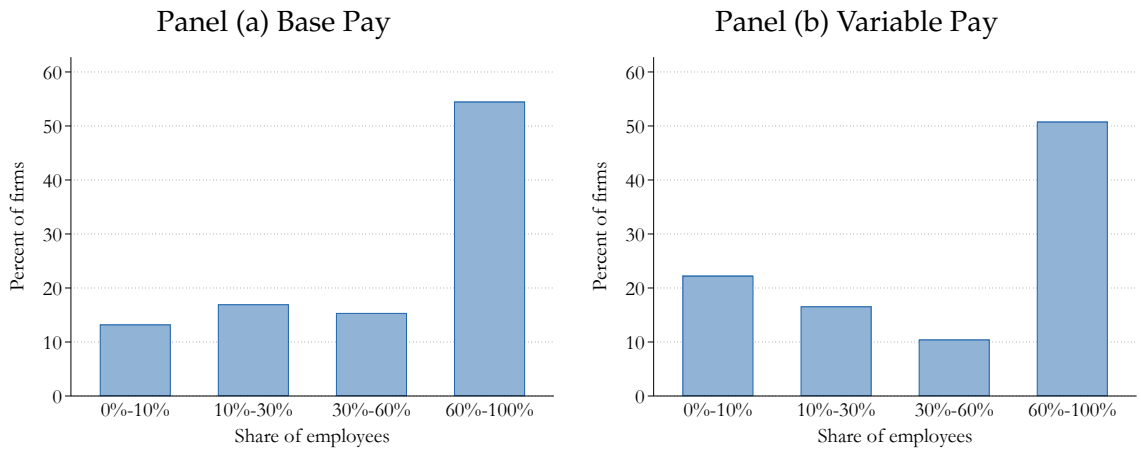
Figure 2: Labor Adjustment Approaches in 2020, by Firm Revenue Change between 2019 and 2020



Note: Panels (a) and (b) show the percentage of firms that answered "yes" to questions about the corresponding labor adjustment method. The x-axis is the revenue growth in 2020 relative to 2019 in the administrative data (FIRM).

revenue reduction, the larger the share of firms that used any worker pay reduction method or the number of employees reduction method (Figure 2). For example, among the firms that experienced a revenue reduction of more than 30%, 34% used some pay cuts and 70% used a reduction of the number of employees; among the firms that experienced a revenue reduction of less than 10%, these numbers are 23

Figure 3: Distribution of Firms by the Percent of Employees Affected by Pay Cuts, Conditional on Firms Using Pay Cuts



Note: Responses are conditional on firms that answer "yes" to questions about using base pay and/or variable pay reductions.

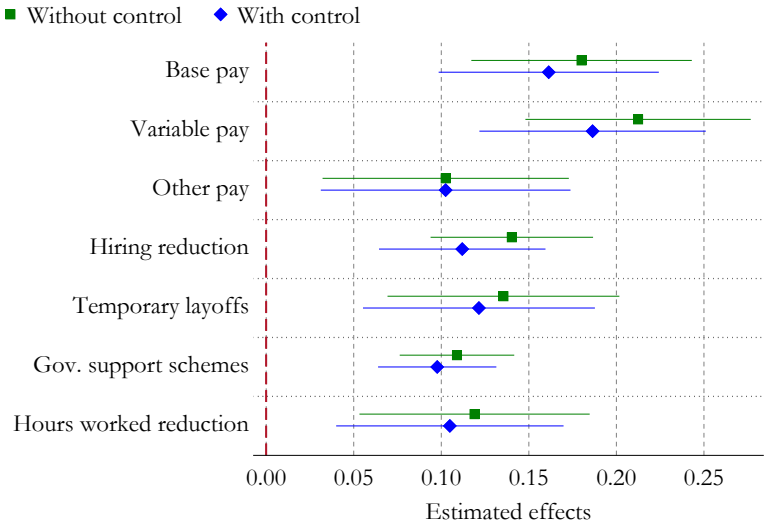
and 56, respectively.

Fourth, even firms that did not experience a reduction in revenue or those that experienced a positive revenue growth reported a reduction in the number of workers or pay (Figure 1). However, we do not see any substantial differences between those that experienced a revenue growth of 10% versus 30%. Among companies that did not experience any change in revenue, 39% adjusted the number of employees, and 11% adjusted the workers' pay. Layoffs occurring in firms that did not contract is consistent with the findings in the existing literature (Davis, Faberman, and Haltiwanger (2006)).

Fifth, the most prevalent form of reduction in the number of employees was government support schemes (furloughs) (Panel (b) in Figures 1 and 2). However, despite the use of government furlough schemes, a large fraction of companies reported permanent layoffs and a reduction in hiring.

We then further investigate how firms combined pay cuts with the reduction in the number of employees. Figure 4 reports point estimates from simple regressions of the use of permanent layoffs on another adjustment method (base or variable pay cut, or other adjustment to the number of employees), with and without additional firm-level controls. It shows that firms that used base pay cut were 15% more likely to also use permanent layoffs. Firms that used variable pay cuts were 20% more likely to also use permanent layoffs.

Figure 4: The Firms Use of Permanent Layoffs in Conjunction with Other Labor Adjustment Methods



Note: The figure shows coefficients from the regressions of the use of permanent layoffs on the use of other labor adjustment methods. Controls include the number of employees, firm age, family business, subcontractor, value added per worker, labor costs per worker, capital per worker, liquid assets per worker, labor market tightness, educational attainment, female ratio, employees' age, employees' tenure, unionized workers, the revenue growth rate from 2019 to 2020, the job growth rate from 2018 to 2019, industry and geographic fixed effects, and the following dummies: industry pay-setting, worker representative, respondent's job function and knowledge of pay policy.

3.2 Evidence on Pay Reduction from Mandatory Firm Survey and Administrative Data

Our survey shows that pay cuts during a crisis are not rare. To reinforce our findings on pay adjustment, we build a dataset to measure pay changes from the LONN and the BFL datasets. We restrict the sample to all employees (i.e., not necessarily employed by a firm that responded to our survey) who remain in the same establishment within the same job function (using a 6-digit occupation code) from year $t-1$ to year t. That is, we study job-stayers that are employed in firms for 24 consecutive months (i.e., to implement this condition, we use the fact that the frequency of administrative records is a month). To reduce the concern due to large variation in hours worked, we focus on full-time employees (i.e. at least 1820 hours per year) that have not been absent from work for at least a month. Our sample only includes salaried workers (i.e., excluding hourly workers) employed in private-sector

firms.[13] Recall that the key advantage of the LONN data is that we can define base pay as the agreed-upon base hourly pay. Hence, our measurement of hourly base pay distinguishes base pay from bonuses as in Grigsby, Hurst, and Yildirmaz (2021).[14]

Figure 5 shows the distribution of nominal annual pay cuts in 2019 and in 2020, separately for base pay (Panel (a)) and total pay (Panel (b)). We find that the distribution of individual pay changes is asymmetric, with a smaller percentage of employees receiving pay cuts than pay increases. Still, 19.8% received hourly pay cuts over 2020-2019 and 14.7% over 2019-2018 (Panel (a)). A higher percentage of workers receive hourly total pay cuts (i.e., including bonuses) than base hourly pay cuts (Panel (b)). The figure also shows fewer pay increases between 2019 and 2020 than between 2018 and 2019.

To complement the evidence from the mandatory-survey LONN, we use the administrative record BFL. This dataset includes total hours and total earnings at the monthly frequency. Figure A.8 shows that 22% of workers experienced a reduction in total hourly pay between 2020 and 2019. Figure A.9 and A.10 report monthly hourly pay for different months: January, July, October, and December. The figures show that between January 2020 to January 2019, there were as many pay cuts as between January 2019 and January 2018. After the Pandemic recession that started in March 2020, we find more pay cuts in 2020-2019 than in 2019-2018.

Our results are consistent with the findings by Elsby and Solon (2019), who summarize evidence on pay cuts focusing on administrative datasets. They find that pay cuts are common in US and European studies, typically affecting 15–25 percent of job-stayers in periods of low inflation.[15]

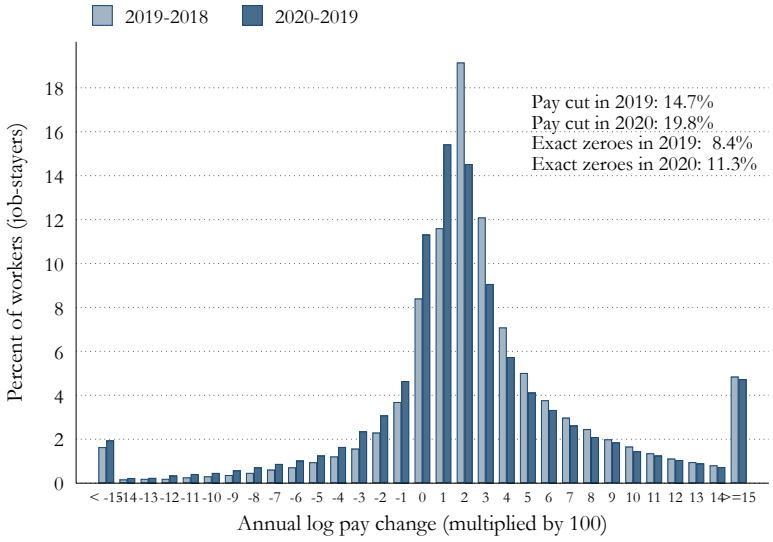
[13] In the Appendix, we show how the pay distribution varies across firm size, part-time vs full-time status, hourly vs salaried workers, and public vs private sector firms. We find more wage cuts in smaller firms, for part-time workers, for hourly-workers, and in private sector firms.

[14] A difference is that base pay in LONN includes holiday allowances paid once or twice a year. Presumably, firms affected by a negative revenue shock can reduce the amount of holiday allowances.

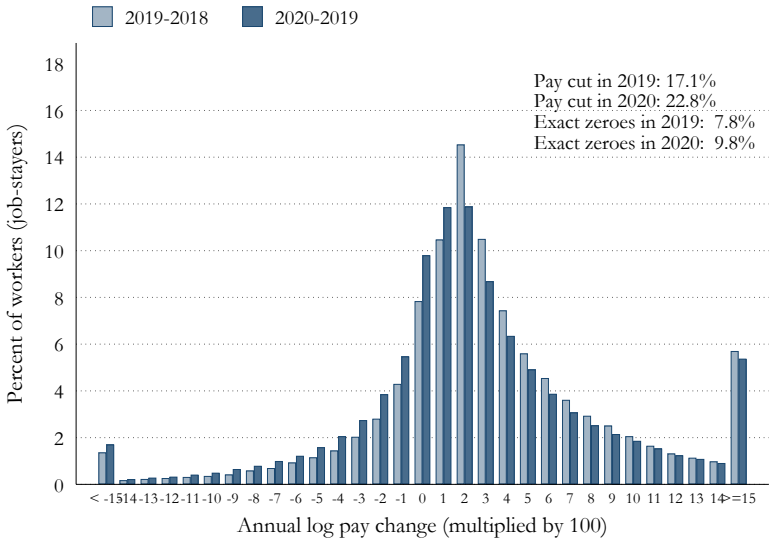
[15] Findings of pay cuts are prevalent in survey and administrative data. McLaughlin (1994) uses the PSID and reports 17 percent of nominal pay cuts. Kahn (1997), using the PSID from 1977 to 1988, finds that 24 percent of salary earners received a nominal cut. Card and Hyslop (1997), using both the CPS and the PSID, find that 11 to 20 percent of hourly workers had a nominal pay cut between 1980 and 1993. In France, Le Bihan, Montornès, and Heckel (2012) report 6% decreases in base wages at the quarterly level, leading to a 22% annual base pay decrease. Funk and Kaufmann (2022) report 27% base pay decreased in Switzerland in 2014. Finally, Grigsby, Hurst, and Yildirmaz (2021) use proprietary data to compare changes in base pay and other components. When they calculate hourly pay changes that include all forms of compensation, the results are similar to Kurmann and McEntarfer (2019), with 20-25% of workers experiencing a pay cut. Jardim, Solon, and Vigdor (2019) find between 15 to 20 percent of job-stayers receive a year-to-year pay cut in the US from 2005 to 2015. Fongoni, Schaefer, and Singleton (2023) document 18% of base hourly pay, and 26% of gross hourly pay in the UK from 2003 to 2004.

Figure 5: Growth of Nominal Base Hourly Pay and Total Hourly Pay

Panel (a): Base Pay



Panel (b). Total Pay

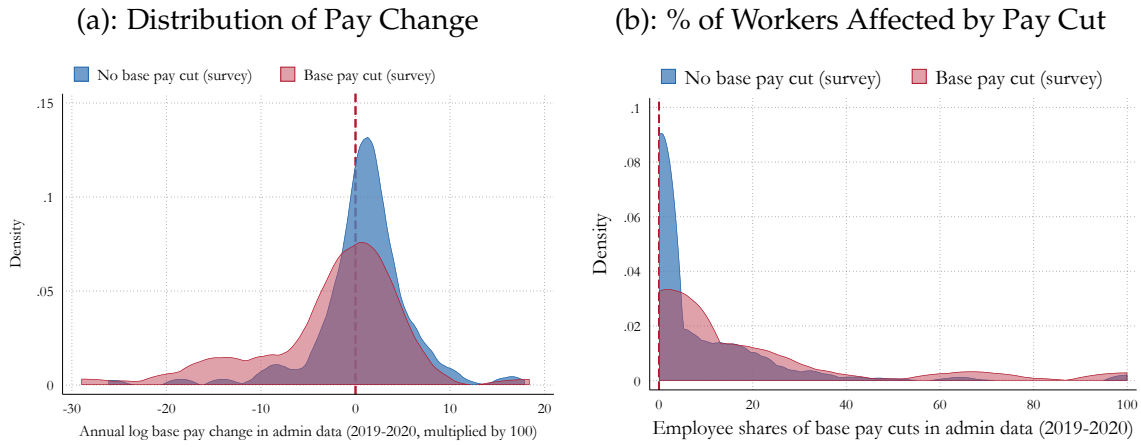


Note: The figure shows the annual nominal changes in logarithmic pay using mandatory firm survey LONN data. The pay is the agreed-upon base hourly pay in Panel (a) and total hourly pay in Panel (b). We restrict the sample to salaried workers (i.e., excluding hourly workers) who remain in the same establishment and within the same job function (6-digit occupation codes) from year $t-1$ to year t. The log pay change is computed as the log differences between year t minus year t-1, multiplied by 100. Each pay change value x includes log changes in the interval $x-0.5$ and $x+0.5$.

So far, we presented evidence from either our survey or additional data sources (i.e., LONN or BFL). Below, we present novel evidence when we link our survey

data with LONN using firm-level identifiers.[16] Figure 6 Panel (a) plots worker-level base hourly wage changes from 2019 to 2020 for two subsamples: the sample of workers employed in firms that declare to have used base pay cut in 2020 (in red) and the sample of workers employed in firms that declare *not* having used base pay cut in 2020 (in blue). The figure clearly shows that more workers received base hourly wage cuts in firms that reported having cut base pay (i.e. higher mass of workers with negative growth). Figure 6 Panel (b) shows the proportion of workers that are affected by wage cuts is higher in firms that declare to have cut the base pay. To do so, we calculate the percentage of workers that receive a wage cut (equals to one when the growth rate from 2019 to 2020 of log base hourly wages is below minus five percent) in firms that responded to our survey, and we calculate the share at the firm level (x-axis). For firms that declare not having cut the base pay (in blue) the share is typically close to zero. However, the share of employees that receive base cuts is higher in firms that declare having cut the base pay (in red) in our survey.

Figure 6: Reductions in Base Pay in the Survey and Administrative Data



Note: Panels (a) and (b) compare the change in log hourly base pay in the administrative data (LONN) and in the survey data.

3.3 Expectations, Investment and Labor Adjustment

We find that firms labor adjustment methods are associated with the expectation of the length of the shock and with future investment plans. Base pay reductions are more likely for firms that expect a reduction in revenue to last more than a year than

[16] Recall that LONN is at the worker-level, but it contains a firm identifier.

those that expect a less persistent shock (see Figure 7). Firms that reported reduced investment are more likely to cut base pay, lay off, and reduce hires (see Panel (c) and (d)).[17]

3.4 Labor Adjustment, Firm's Characteristics, and Labor Market Conditions

Table 2 shows the results from regressions of the use of a specific labor adjustment method on firm characteristics and labor market conditions. In the table, we report the re-scaled estimates of the coefficients on the number of employees, value added per worker, labor costs per worker, percentage of unionized workers, average tenure of workers, and firm-specific labor market tightness. All variables (but worker representative) are standardized to have a mean of zero and a standard deviation of one. Regressions also control for industry and region fixed effects, as well as additional firm characteristics (age, capital per worker, liquid assets per worker, employment growth from 2018 to 2019, family-owned firm, sector pay-setting), workforce characteristics (level of education, percentage of female, average job tenure, average age), and role of the respondent in the company (manager or not, and responsible for human resource policy). See Section 2.5 for further information on these controls.

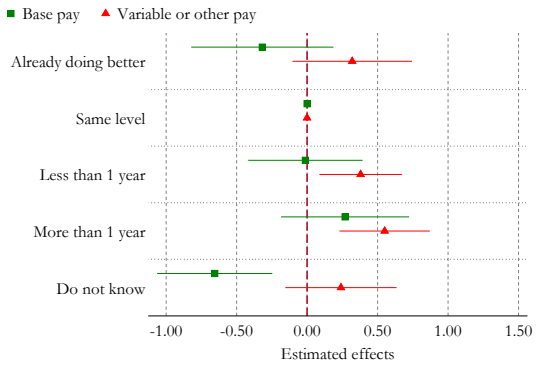
A reduction in base pay is more likely in high-paying firms and firms with a worker representative. In contrast, it is less likely when the firm grows, in high-productivity firms, in firms with more routine jobs, and in a tighter labor market. Permanent layoffs are also related to a firm's productivity, growth, and the percentage of unionized workers.

To summarize, firms reduce the number of employees and the employees' pay to adjust labor in response to adverse shocks. We confirm the instances of hourly base pay cuts in the administrative data. The firm's productivity and tightness strongly co-vary with pay cuts.

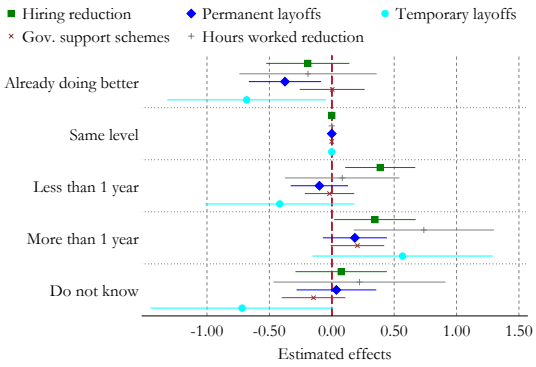
[17]The question on expectation is: "How long do you expect it will take before the revenue is back to its 2019 pre-crisis level?" The respondent is asked to choose from different time horizons. The question on investment is: "Compared to 2019, investments in 2021 will be..." The respondents could choose one of the following statements: reduced; unchanged, increased.

Figure 7: Expected Duration of the Revenue Reduction, Investment Plan, and Labor Adjustment

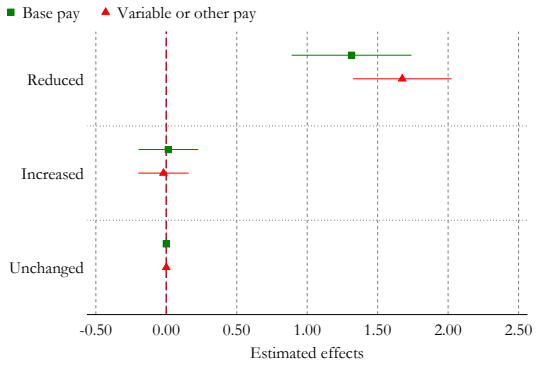
(a): Expectation and Worker Pay



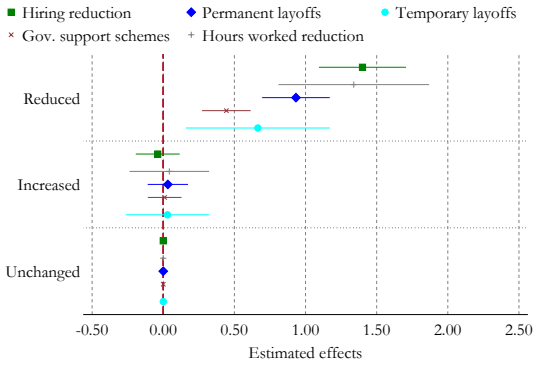
(b): Expectation and Number of Workers



(c): Investment and Worker Pay



(d): Investment and Number of Workers



Note: Panel (a) and (b) report coefficients from the regressions of using a specific labor adjustment method (e.g., base pay, permanent layoffs, etc.) on the dummies that capture firms' expectations. The question is, "How long do you expect it will take before the revenue is back to its 2019 pre-crisis level?" The respondent is asked to choose one from the following list of answers: Our revenue has already surpassed the pre-crisis level; We are at the same level as before the crisis; Less than 3 months from today; 3-6 months from today; 6-12 months from today; 12-24 months from today; Do not know. The question is conditional on the firm reporting a decrease in revenue in 2020. Panel (c) and (d) report coefficients from the regressions of using a specific labor adjustment method (e.g., base pay, permanent layoffs, etc.) (e.g., base pay, permanent layoffs, etc.) on the dummies that capture a firm's investment plan for the following year. The question is, "Compared to 2019, investments in 2021 will be ...". The statements are: Reduced; Unchanged; Increased.

4 Employer Considerations at the Layoff Margin

In this section, we examine employers' attitudes and perceptions regarding layoffs and how firm characteristics and labor market conditions are associated with these perceptions. We find that the main employer concern at the layoff margin is a loss of specific worker skills. Some respondents perceive that there is an effect on the

Table 2: Firm and Labor Market Characteristics Related to Reduction in Worker Pay and the Number of Employees

	Reduction in pay via:		Reduction in number of employees via:	
	Base pay	Bonuses	Hiring reduction	Permanent layoffs
	(1)	(2)	(3)	(4)
Firm characteristics				
Number of employees	-0.99	1.27	2.58**	2.61**
	(0.82)	(1.06)	(1.16)	(1.25)
Productivity	-2.76**	-0.14	-0.69	-1.72
	(1.09)	(1.16)	(1.24)	(1.46)
Average wages	2.17*	-0.09	0.08	0.18
	(1.16)	(0.90)	(1.33)	(1.54)
Labor share	1.69	2.23**	2.25**	5.32***
	(1.05)	(1.01)	(1.13)	(1.34)
Value-added growth (%)	-3.79***	-4.61***	-6.17***	-8.39***
	(0.72)	(0.67)	(0.81)	(0.97)
Debt ratio	1.36	1.38	1.48	1.72
	(0.83)	(1.09)	(1.15)	(1.27)
Routine task index	-1.28**	-0.35	-0.80	-1.16*
	(0.50)	(0.49)	(0.61)	(0.68)
Unionized workers (%)	-0.41	-0.14	0.65	2.40***
	(0.64)	(0.65)	(0.78)	(0.88)
Worker representative	2.32*	1.00	2.42	1.03
	(1.27)	(1.27)	(1.56)	(1.72)
Labor market characteristics				
Tightness	-1.16**	-0.17	-0.63	-0.34
	(0.53)	(0.59)	(0.65)	(0.84)
N	2446	2446	2446	2446
Mean Dep. Var.	.09	.09	.15	.2
Adj.R2	0.058	0.045	0.086	0.089
Additional controls	Yes	Yes	Yes	Yes
Industry & Region	Yes	Yes	Yes	Yes

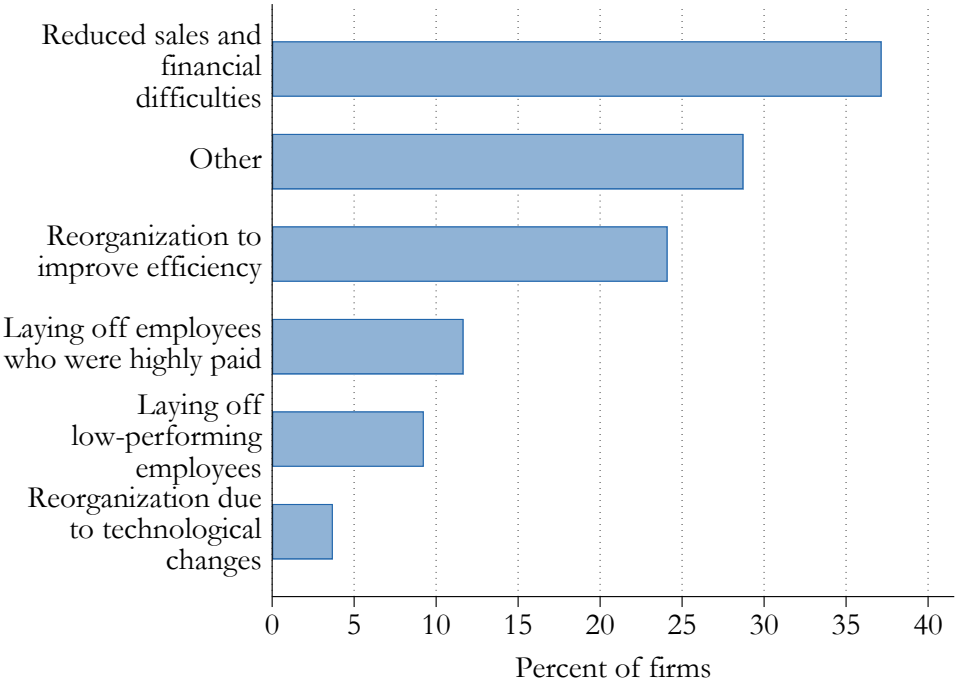
Note: The table reports the estimates from OLS regressions where the outcome takes a value of one if the respondent answers "yes" to questions about the corresponding labor adjustment method. All variables are standardized and additional controls are included as described in the text. Asterisks report statistical significance at the 1, 5 and 10% level (***,**,* respectively). Standard errors are in parentheses.

remaining employees in terms of higher workload or higher work effort. Economic crises appear to be opportune times to lay off workers as employers perceive that in recessions, it is easier to lay off bad matches, change employee tasks, or reorganize.

4.1 Crisis as an Opportune Time for Layoffs

We start the analysis of employer considerations at the layoff margin by tabulating firms reasons for layoffs in 2020 (Figure 8). Only 35% of firms marked "Reduced sales and financial difficulties." The rest of the respondents marked other reasons—such as reorganization due to technological changes or to improve efficiency, laying off employees who were highly paid relative to their productivity, laying off low-performing employees (for example, employees with outdated skills and knowledge), or other. That is, it appears that crises might be opportune times for layoffs, beyond the reduction in sales or financial difficulties concerns.

Figure 8: Reasons for Layoffs

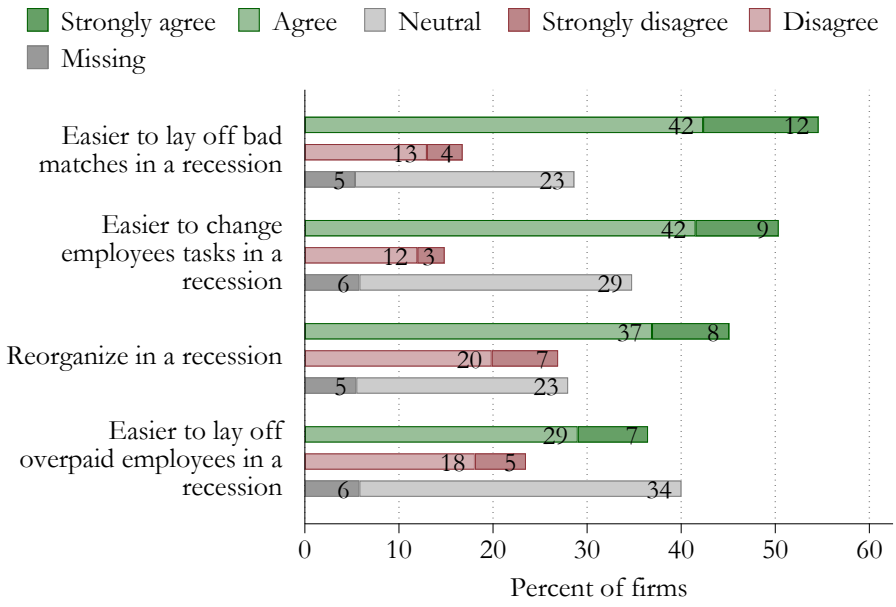


Note: The figure shows responses to the question, "What were the main reasons for the company's layoffs in 2020? Check as many as apply." The statements are: Our company did not experience layoffs in 2020 (not shown in the figure); Reduced sales and financial difficulties; Reorganization due to technological changes; Reorganization to improve efficiency (eliminate unnecessary labor); Laying off employees who were highly paid relative to their productivity; Laying off low-performing employees (for example, employees with outdated skills and knowledge); Other. Please provide details.

To investigate this question, we directly ask employers their attitude towards statements that it is easier to lay off workers during recessions due to some specific considerations such as: (1) Management has less focus on efficiency and cost reductions during good times, and therefore the firm reorganizes itself during times of

bad economic conditions; (2) It is more acceptable to lay off the less able employees in bad times (labeled "bad matches" in the figure); (3) It is more acceptable to lay off employees who are highly paid relative to their productivity in bad times; and (4) It is easier to ask employees to change their tasks / increase their work effort in bad times as employees are less likely to quit. This question was asked of respondents who declared a reduction in revenue. Figure 9 shows the responses.

Figure 9: Is Crisis an Opportune Time for Layoffs?



Note: The figure shows responses to the question "Do you agree with the following statements? Note: Even if you have laid off some employees, consider why you have not laid off more." The statements are: Management has less focus on efficiency and cost reductions during good times, and therefore the firm reorganizes itself during times of bad economic conditions; It is more acceptable to lay off the less able employees in bad times (labeled "bad matches" in the figure); It is more acceptable to lay off employees who are highly paid relative to their productivity in bad times; It is easier to ask employees to change their tasks / increase their work effort in bad times as employees are less likely to quit.

More than 50 percent of firms consider that laying off less able employees (e.g., bad matches) in recessions is more acceptable. This finding can explain why employers are reluctant to hire in recessions if they perceive workers laid off in recessions as being low-ability workers (see, e.g., Gibbons and Katz (1991)). More than fifty percent also think that it is easier to implement a change in the content of job tasks in a recession because employees are less likely to quit. That is, employers take into consideration workers' outside options and ask for changes when workers outside option is low. Forty five percent agree that it is easier to reorganize in

a recession rather than in a boom. This finding supports theoretical mechanisms behind countercyclical restructuring studied by Koenders and Rogerson (2005) and Berger (2018).

We also ask about firms' attitudes towards statement "It is more acceptable to lay off employees who are highly paid relative to their productivity during bad economic conditions." The response is mixed. We find that 36% agree, 40% are neutral, and the rest disagree with this statement.[18]

Table 3 shows how attitudes toward these statements vary with firm characteristics. A one standard deviation increase in labor costs per worker increases by 6.5% the probability of agreeing with the statement that it is more acceptable to lay off overpaid employees in bad economic times.

Figure 10 reports the response to the hypothetical question, "How many of these layoffs would have taken place in 2020 or over the next two years if there had not been a pandemic?" Firms could choose between 0 (i.e., no one would have been laid off) to 100% (i.e., everyone would have been laid off). Only about half of firms declared that 10% or less of the layoffs would have occurred. This evidence is consistent with the findings above that recessions are opportune times for layoffs whereby firms reorganize either through the dissolution of bad matches, layoffs of overpaid employees, or restructuring within the organization.[19]

4.2 Considerations at the Layoff Margin

To understand employer considerations at the layoff margin, we asked firms about their main reasons for retaining employees despite a reduction in sales or other cost pressures. The survey respondents were given a list of the following reasons: (1) We want to keep current employees to avoid loss of skills and knowledge; (2) We may not be able to find and hire again quickly when needed during recovery; (3) The employees work in teams, and we cannot lay off some of them; (4) Layoffs will be detrimental to morale among the remaining employees; (5) We can use government aid packages; (6) Instead of layoffs, we can reduce pay; and (7) Layoffs will be detrimental to the firm's reputation. Respondents were instructed to rate their

[18]Mueller (2017) argues that the pool of unemployed shifts toward workers with high wages in their previous job and that these shifts are driven by the high cyclicality of separations for high-wage workers. **?**, using Danish data, finds that workers with higher initial wages have higher separation rates. See also Schmieder, von Wachter, and Bender (2022) and Bertheau, Acabbi, Barcelo, Gulyas, Lombardi, and Saggio (2023).

[19]Figure A.14 shows these results for the sample of firms that declared a reduction in revenue. Table 4 shows that the response is not associated with specific firm characteristics except firm's growth.

Table 3: Firm Characteristics Associated with Attitudes towards Crisis as an Opportune Time for Layoffs

	Reorganize in recessions	Easier to lay off in recessions		Easier to change tasks in recessions as workers less likely to quit
		Bad match	Overpaid worker	
	(1)	(2)	(3)	(4)
Firm characteristics				
Number of employees	-7.72**	-4.42*	-7.16***	-0.11
	(3.06)	(2.39)	(2.64)	(2.87)
Productivity	-2.45	2.22	-6.31*	-1.90
	(3.13)	(3.57)	(3.32)	(3.42)
Average wages	-0.83	-2.33	7.29***	7.22**
	(2.79)	(2.86)	(2.74)	(3.34)
Labor share	-2.10	1.93	-3.40	0.26
	(2.44)	(2.46)	(2.33)	(2.40)
Value-added growth (%)	-0.25	0.78	2.28	3.75*
	(2.36)	(2.14)	(2.09)	(2.26)
Debt ratio	7.95**	0.44	4.70*	0.94
	(3.62)	(2.91)	(2.70)	(3.34)
Routine task index	-1.22	-0.16	1.85	2.60
	(1.79)	(1.79)	(1.70)	(1.78)
Unionized workers (%)	-0.41	1.71	-0.74	0.19
	(2.36)	(2.43)	(2.26)	(2.40)
Worker representative	-2.84	7.05	5.36	1.26
	(4.27)	(4.45)	(4.21)	(4.41)
Labor market characteristics				
Tightness	0.27	2.25	-1.47	-2.54
	(2.68)	(2.67)	(2.30)	(2.44)
N	640	640	637	637
Mean Dep. Var.	3.16	3.39	3.13	3.37
Additional controls	Yes	Yes	Yes	Yes

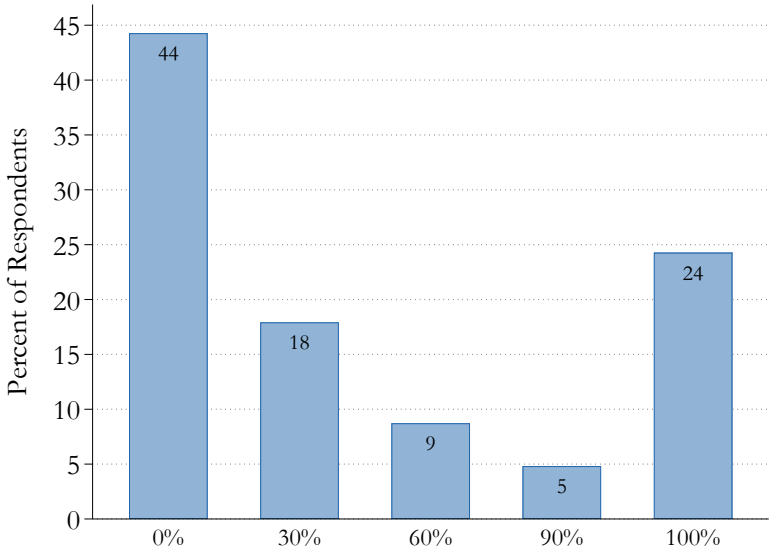
Note: The table reports marginal effects of the probability of agreeing (or strongly agreeing) from ordered probit models where covariates are evaluated at their means. Asterisks report statistical significance at the 1, 5 and 10% (***,**,* respectively). Standard errors are reported in parentheses. The question is: "Do you agree with the following statements? Note: Even if you have laid off some employees, consider why you have not laid off more." The statements are: (1) Management has less focus on efficiency and cost reductions during good times and therefore the firm reorganizes during bad economic conditions; (2) It is more acceptable to lay off the less able employees during bad economic conditions; (3) It is more acceptable to lay off employees who are highly paid relative to their productivity during bad economic conditions; (4) It is easier to ask employees to change their tasks / increase their work effort in bad times, as employees are less likely to quit during bad economic conditions.

Table 4: Share of Layoffs That Would Have Occurred Even Without the Recession. To think about. Change specification (0/1 Y var), and include types of layoffs

	(1)
Firm characteristics	
Number of employees	0.47
	(1.92)
Productivity	-0.56
	(2.48)
Average wages	-0.14
	(1.64)
Labor share	-2.91*
	(1.75)
Value-added growth (%)	4.69***
	(1.58)
Debt ratio	2.67
	(2.25)
Routine task index	-0.06
	(1.27)
Unionized workers (%)	1.26
	(1.80)
Worker representative	2.74
	(3.23)
Labor market characteristics	
Tightness	-1.02
	(1.89)
N	901
Mean Dep. Var.	35.75
Adj.R2	0.027
Additional controls	Yes
Industry & Region	Yes

Note: OLS estimates of the response to the hypothetical question, "How many of these layoffs would have taken place in 2020 or over the next two years if there had not been a pandemic?" Firms could choose between 0 (i.e., no one would have been laid off) to 100% (i.e., everyone would have been laid off).

Figure 10: Share of Layoffs That Would Have Occurred Even Without the Recession



Note: The figure reports responses to the question, "How many of these layoffs would have taken place in 2020 or over the next two years if there had not been a pandemic?" Firms could choose between 0 (i.e., no one would have been laid off) to 100% (i.e., everyone would have been laid off).

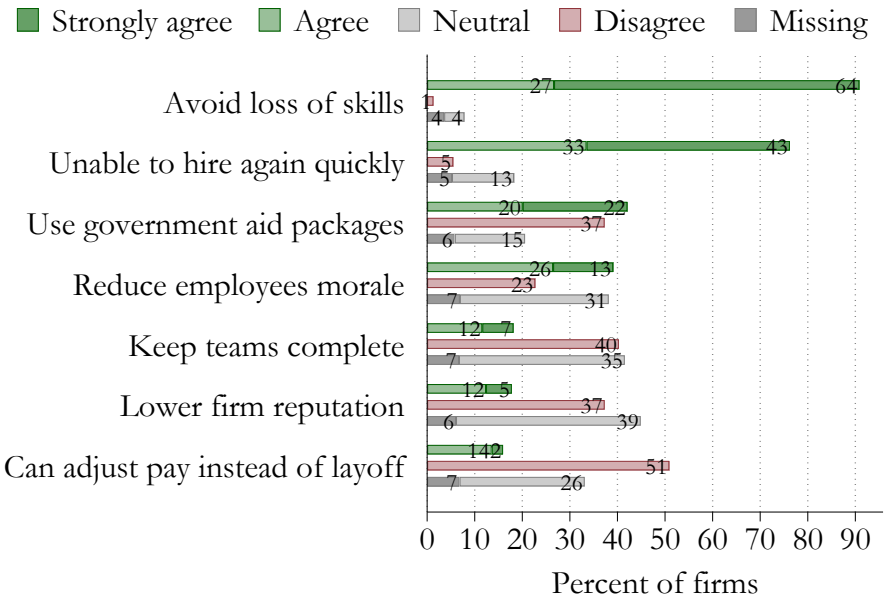
attitude toward each reason as "Strongly agree", "Agree", "Neutral", "Disagree", or "Strongly disagree". The question was asked of respondents who declared a reduction in revenue in 2020, which applies to approximately 640 respondents. Figure 11 tabulates the responses.

We find that the most important reason to retain employees when faced with a reduction in revenue is to avoid skill loss. Overall, 90% of the respondents agree with this statement, including 60% strongly agree. This result suggests that firm-specific human capital is a predominant concern for firms (see, e.g., Lazear (2009)), and is more important than, for example, search frictions.

The second most important reason to retain employees is the concern of being unable to hire quickly during the recovery: 75% of the respondents agree with this statement, including 43% strongly agree. This result shows that search and matching friction is an important consideration in the layoff decision, which is in line with the premise of the search and matching literature (e.g., Pissarides (2000)). Relatedly, Bewley (1999) (page 239) discusses the retention of employees despite bad economic times. Bewley also finds that retaining skills was an important concern for employers (16 out of 20 interviews).

An observation that stands out is that pay cuts are not perceived as an alterna-

Figure 11: Reasons for Retaining Employees despite Reduced Revenue



Note: The figure reports responses to the question, "What were the main reasons for retaining employees despite a reduction in sales and other cost pressures? Even if you have laid off some employees, consider why you have not laid off more." The question is conditional on reporting a reduction in revenue in 2020. The exact statements that the respondent could choose from are: We want to keep current employees to avoid loss of skills and knowledge; We may not be able to find and hire again quickly when needed during recovery; The employees work in teams, and we cannot lay off some of them; Layoffs will be detrimental to morale among the remaining employees; We can use government aid packages; Instead of layoffs, we can reduce pay; Layoffs will be detrimental to the firm's reputation.

tive to layoffs: more than 50% of employers disagree with the statement, "Instead of layoffs, we can reduce pay." We will return to this point in the next section. Nevertheless, 14.2% of respondents agree that they can adjust pay.

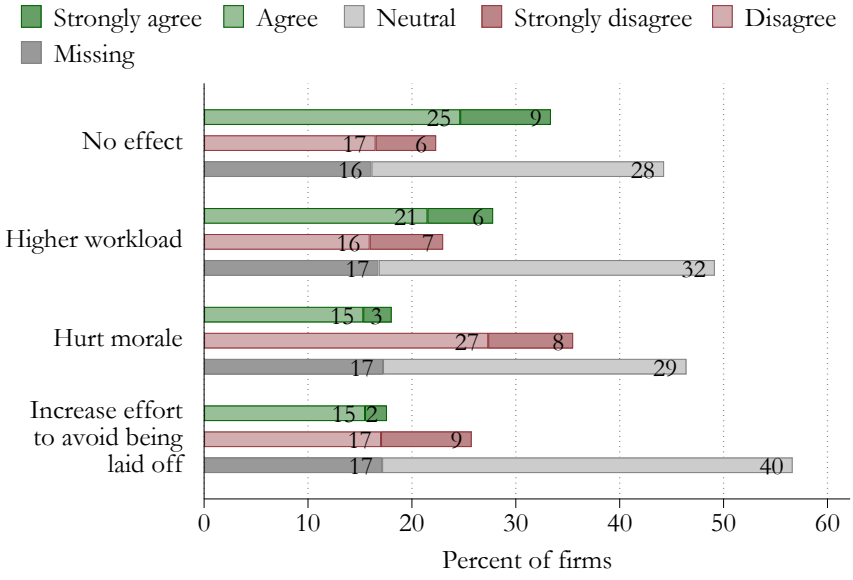
Forty percent agree that layoffs have detrimental effects on the morale of the remaining employees. However, around the same share is neutral on this point. Hence, morale concerns are not first-order concerns in the layoff decision. Similarly, we find that access to government aid packages, keeping teams complete, or reducing firm's reputation are not important reasons for not laying off employees.

The heterogeneity analysis indicates that the reasons for retaining employees despite a reduction in revenue do not largely vary with firm characteristics or labor market conditions (see Table A.5). For example, firms with different sizes, wages, and productivity share the fear of not being able to hire again quickly when needed.

4.3 Perceived Consequences of Layoffs on the Remaining Employees

Figure 12 reports responses to the question, "How have layoffs affected the remaining employees?" This question was put to all firms that declared having laid off employees in 2020. First, most respondents do not agree that layoffs hurt the morale of the remaining workers, which supports our finding above that reduced morale considerations are not of a first-order importance for the layoff decisions. Second, only 17% of the respondents agree that layoffs lead to an increased work effort of the remaining workers. Third, only 27% of firms perceive that layoffs lead to a higher workload on other employees. The last two findings suggest that there is some but not strong support for efficiency wage theories whereby in recessions workers work harder to avoid layoffs (see Lazear, Shaw, and Stanton (2016)). Table A.7 shows that respondents in more productive firms are more likely to agree that layoffs do not affect the remaining employees.

Figure 12: The Perceived Consequences of Layoffs on the Remaining Employees



Note: The figure shows responses to the question, "How have layoffs affected the remaining employees?" The question was put to firms that reported having laid off employees in 2020. The statements are: Employees have a higher workload as there are fewer; Employees work harder to avoid being laid off; Layoffs hurt morale and work ethics among the remaining employees. There is no effect on the remaining employees.

5 Employer Considerations at the Pay Cut Margin

In this section, we examine employers' perceptions and attitudes regarding reduction in worker pay as a method to save on labor costs in times of an economic crisis and assess how firm characteristics and labor market conditions are associated with the employers' views. We find that employers predominantly fear that pay cuts would demotivate employees, would not save jobs, lead to quits, or view the base pay as a commitment to their employees.

5.1 Why Employers Are Reluctant to Cut Pay

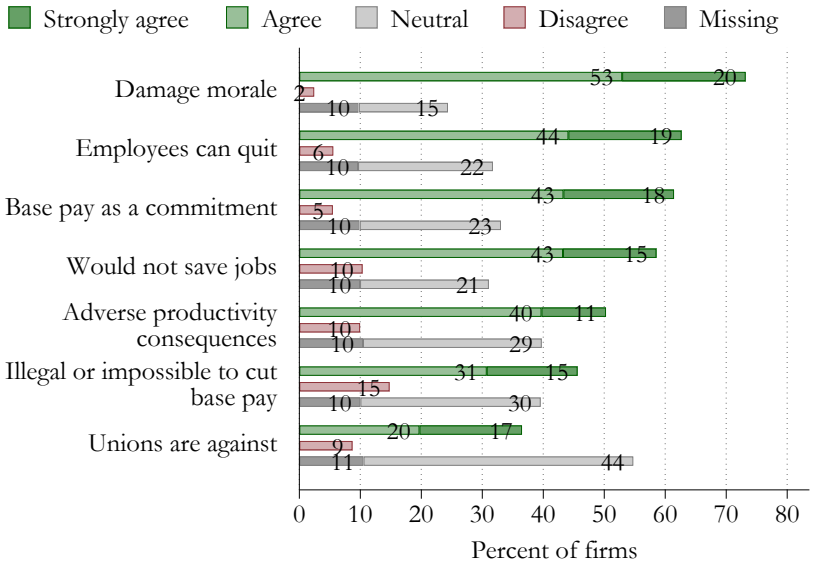
We have documented in our survey data and found support in the administrative data that pay cuts and even base pay cuts in an economic crisis are not rare. However, layoffs or other approaches of reducing the number of employees are more prevalent than reducing worker pay. We, therefore, examine employers considerations at the pay cut margin.

Figure 13 reports the responses to the question "What are the main reasons for not lowering the base pay?" We find that 73% of the respondents are concerned about a possible negative effect on employee morale and motivation. More than 60% think that it would lead employees to quit. About 60% also agree that base pay is seen as a commitment to employees. And 58% of employers agree that base pay cuts would not save jobs. Fifty one percent of firms agree that pay cuts might have adverse productivity consequences. Finally, 37% agree that base pay cuts would run against trade unions.

Figure 14 shows the responses to the question "What are the main reasons for not lowering the noncontractual supplements and/or bonuses ?" Most employers agree that reducing bonuses would not save jobs. Morale considerations in reducing bonus pay are less important than in reducing base pay.

Previous studies of the reasons behind downward pay rigidities come from interviews or small-scale surveys from large firms and do not contain a list of answer options used in our survey. We reach a similar qualitative conclusion about the concern about quits as Campbell and Kamlani (1997). Our result contrasts with Bewley (1999) who finds that the negative impact on the quit rate was two times lower in his interviews compared to the morale effects (Table 11.2, page 174). The concern of worker quitting is in line with and complements the literature that uses worker death events to show that new hires cannot easily replace incumbent workers (Bertheau, Cahuc, Jäger, and Vejlin (2022); Jäger and Hening (2022)). In their

Figure 13: Reasons for Not Lowering the Base Pay



Note: The figure reports responses to the question: "What are the main reasons for not lowering the contractual base pay? Please state your position on the following statement." The question is conditional on revenue reduction and not doing base pay cuts. The statements are: It would be illegal or almost impossible to change the base pay; The firm sees the base wage as a promise to its employees; Pay cuts damage productivity because employees do not work so hard; Pay cuts would lead employees to quit; Pay cuts damage morale and it is demotivating for employees in general; Trade unions/employee representatives are against pay reduction; Pay reduction would not save jobs.

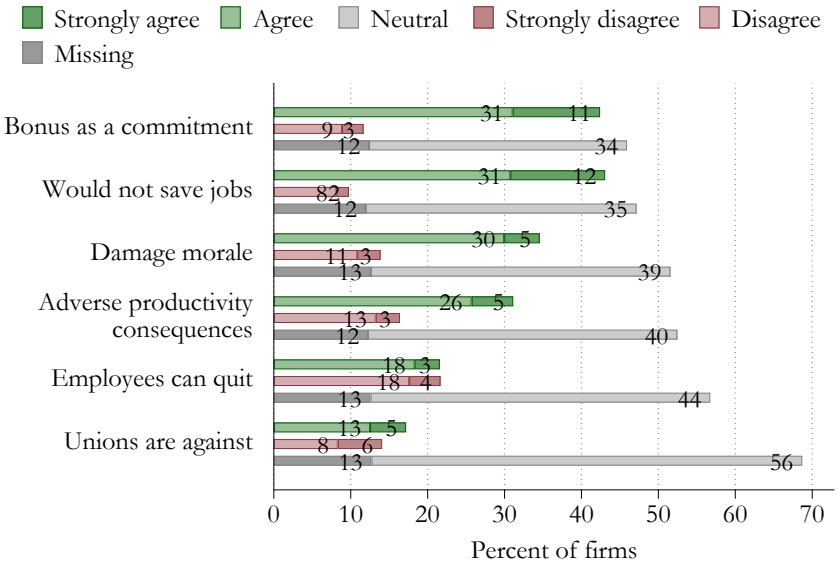
survey of unemployed workers, Davis and Krolikowski (2023) find that 37 percent of the unemployed workers doubt pay cuts would save their jobs, and 16 percent say pay cuts would undermine morale or lead the best workers to quit.

Table 5 shows that high-wage firms are more concerned that their employees would quit (see Katz and Summers (1989) on the link between a firm's average pay and quit rates).

5.2 Can Pay Cuts Save Layoffs?

Figure 15 reports the response to the question, "Why didn't you lower pay instead of laying off employees?" This question was put to all firms that declared having laid off employees in 2020. More than fifty percent of respondents agree that layoffs give better control over who leaves the firm, a pay reduction would not have saved jobs, and pay cuts would hurt morale and productivity more than layoffs. These findings relate to the recent finding by Davis and Krolikowski (2023), who

Figure 14: Reasons for Not Lowering Bonus Pay



Note: The figure shows responses to the question: "What are the main reasons for not lowering noncontractual supplements and/or bonuses? Please state your position on the following statement." The question was conditional on revenue reduction and not doing bonus pay cuts. The statements are: The firm think of bonuses as a commitment to its employees; Bonus reduction damage productivity because employees do not work as hard; Bonus reduction would lead employees to quit; Bonus reduction damage morale and it is demotivating for employees in general; Trade unions/employee representatives are against bonus reduction; Bonus reduction would not save jobs.

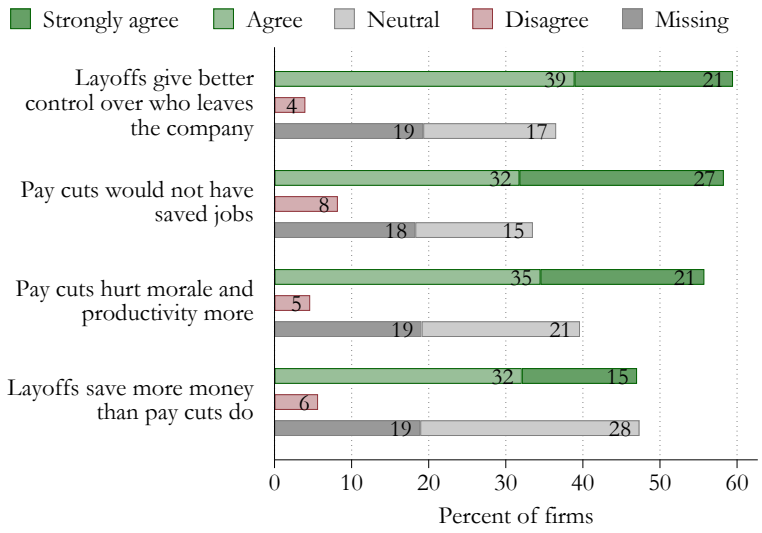
show that employers do not discuss pay adjustments with laid-off workers. The results are similar in the sample of firms that experienced a reduction in revenue (see Figure A.15).[20]

Figure 16 reports the response to the question, "What reduction in the total salary cost (base pay plus bonuses) could have prevented layoffs?" 18 percent of the respondents suggest a reduction of 21-60%. About 60 percent indicate that they do not know, suggesting that such a reduction is not a viable alternative to layoffs.[21]

[20]Consistent with evidence on job destruction from low productivity firms (Bertheau and Vejlin (2023)), low productivity firms are more likely to agree that pay cuts would not have saved jobs (see Table A.6).

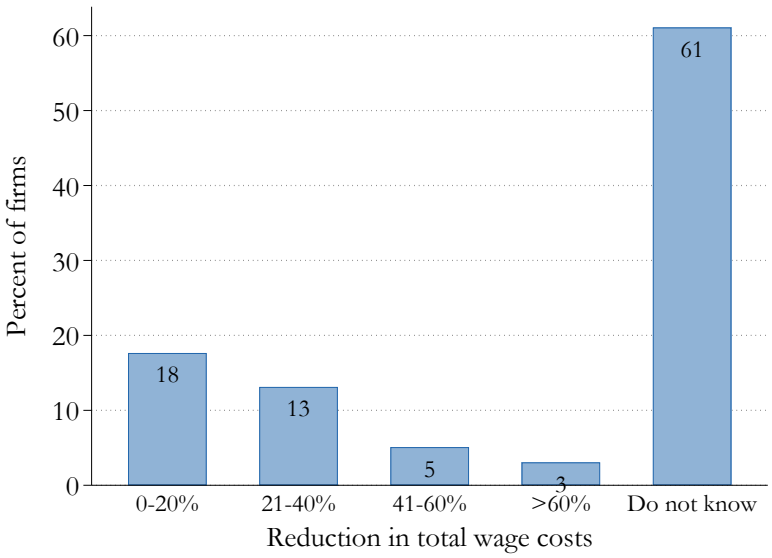
[21]Results are similar in the sample of firms that experienced a reduction in revenue, see Figure A.16.

Figure 15: Reasons for Layoffs instead of Pay Cuts



Note: The figure reports responses to the question: "Why didn't you lower pay instead of laying off employees?" The question was put to firms that reported having laid off employees in 2020. The statements are: Pay cuts would not have saved jobs; Pay cuts would hurt morale and productivity more than layoffs; Layoffs give better control over who leaves the firm; Layoffs save more money than pay cuts do.

Figure 16: What Reduction in the Total Salary Cost Could Have Prevented Layoffs?



Note: The figure reports responses to the question "What reduction in the total salary cost (base pay and bonuses) could have prevented layoffs?" The question is put to respondents that laid off in 2020 workers. The options are: 0-20 percent; 21-40 percent; 41-60 percent; 61-80 percent; >80 percent; Do not know.

Table 5: Firm Characteristics Associated with Reasons for Not Lowering Base Pay

	Commitment to employees (1)	Productivity concern (employees shirk) (2)	Quit concern (3)	Morale concern (4)	Union is against (5)	Pay cut would not saved jobs (6)
Firm characteristics						
Number of employees	2.40	-4.43	-2.01	4.98*	3.28	2.26
	(3.19)	(3.66)	(3.48)	(3.02)	(4.31)	(2.93)
Productivity	1.09	-0.42	-6.20*	2.68	11.62***	-4.47
	(3.29)	(3.59)	(3.57)	(2.60)	(4.27)	(4.09)
Average wages	1.81	2.48	7.83**	3.65	-8.52***	5.64
	(2.48)	(2.59)	(3.71)	(3.40)	(3.17)	(4.06)
Labor share	1.70	0.39	-2.03	3.23*	3.50	-3.51
	(2.46)	(2.82)	(3.00)	(1.84)	(2.83)	(2.88)
Value-added growth (%)	-2.54	2.81	1.05	1.36	2.85	0.03
	(2.64)	(2.92)	(2.60)	(2.11)	(2.66)	(2.80)
Debt ratio	0.82	7.59*	6.19**	1.26	-1.01	-6.87**
	(3.61)	(4.41)	(3.01)	(3.03)	(4.13)	(3.30)
Routine task index	1.13	4.96**	4.33**	1.81	7.88***	2.59
	(1.99)	(2.03)	(1.88)	(1.54)	(1.92)	(1.98)
Unionized workers (%)	-3.29	0.41	1.06	-0.21	2.96	0.73
	(2.46)	(2.40)	(2.24)	(2.05)	(2.71)	(2.45)
Worker representative	-4.38	10.38**	-2.83	3.23	7.53	-0.31
	(4.51)	(4.97)	(4.72)	(3.53)	(5.25)	(4.79)
Pay cut (admin data)	-2.19	-1.98	-1.30	-1.05	0.98	0.78
	(2.13)	(2.25)	(2.16)	(1.86)	(2.22)	(2.24)
Labor market characteristics						
Tightness	-1.74	-6.99**	3.65	-0.64	4.07	0.72
	(2.48)	(2.88)	(2.60)	(2.52)	(3.03)	(2.72)
N	499	496	501	500	495	499
Mean Dep. Var.	3.62	3.44	3.64	3.79	3.32	3.55
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes

-1cm-1cm

Note: The table reports marginal effects of the probability of agreeing (or strongly agreeing) from ordered probit models where covariates are evaluated at their means. Additional controls include the revenue growth rate from 2019 to 2020, the job growth rate from 2018 to 2019, industry and geographic fixed effects, and the following dummies: industry pay-setting, worker representative, manager respondent, and respondent's knowledge of pay policy. Asterisks report statistical significance at the 1, 5 and 10% (***,**,* respectively). Standard errors are reported in parentheses. The question is, "What are the main reasons for not lowering the contractual base pay? Please state your position on the following statement." The company sees the base pay as a commitment to its employees; Pay cuts can damage productivity because employees do not work as hard; Pay reduction would lead employees to quits; Pay reduction damages morale and is demotivating for employees in general; Trade unions/employee representatives are against pay cuts; Pay reductions would not save jobs.

6 Conclusion

Understanding how and why firms adjust their workforce and save on labor costs in response to adverse economic shocks is useful for researchers and policymakers (see, e.g., Yellen (2014)). Avoiding some layoffs might appear to reduce the public and private costs associated with job loss (Bertheau et al. (2023); Lachowska, Mas, and Woodbury (2020)).

Using a large-scale novel survey of firms, we study how firms adjust their labor costs — via layoffs or pay cuts — to what extent and why. We link the survey responses to administrative data in Denmark using firm-level identifiers. We then use the linked administrative-survey data to study the association between firm characteristics and labor market conditions and the different adjustment methods.

Using firms' responses to the pandemic shock, we find that layoffs are more prevalent than pay cuts, but pay cuts are not rare. Most employers do not consider pay cuts to be a viable substitute for layoffs. We also find that a crisis does not necessarily cause layoffs, instead an economic downturn constitutes an opportune time for companies to lay off low-productivity workers or re-organize. Employers believe pay cuts have detrimental effects on employees' morale or would lead them to quit.

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Online Appendix

Why Firms Lay Off Workers instead of Cutting Wages: Evidence from Linked Survey-Administrative Data

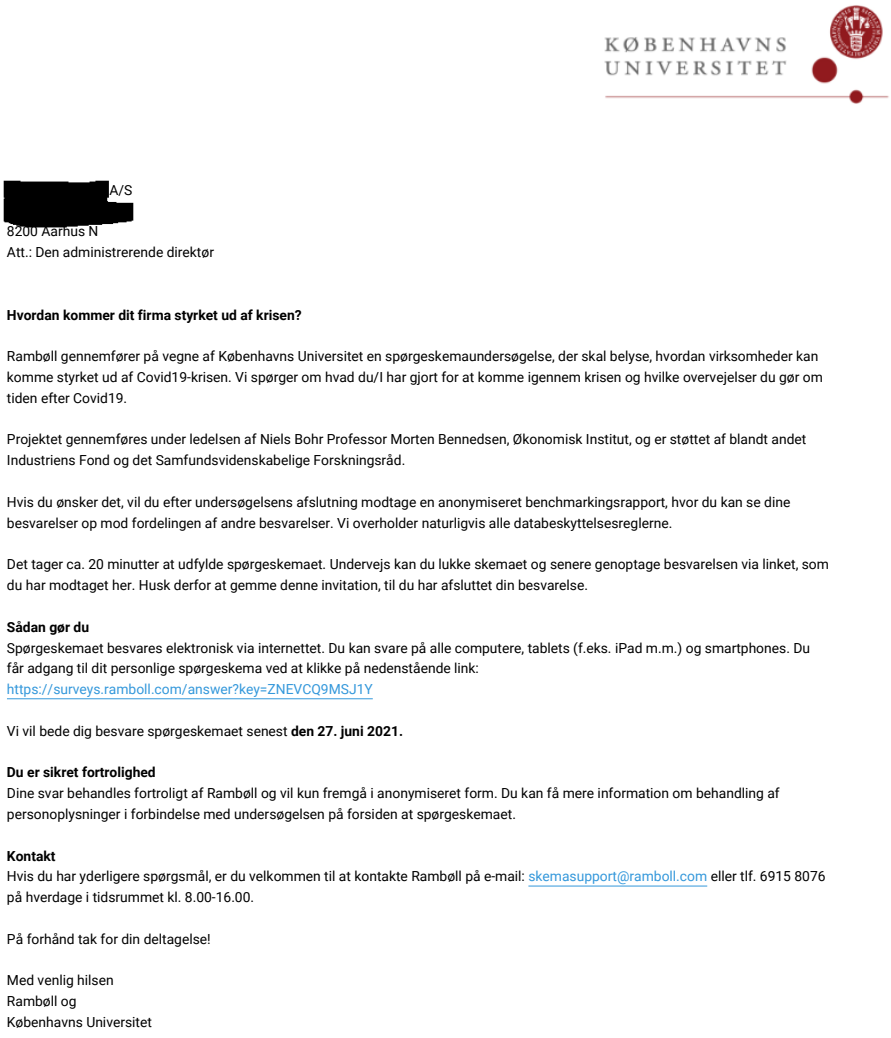
By Antoine Bertheau, Marianna Kudlyak, Birthe Larsen and Morten Bennedsen

Table of Contents

A Additional Figures

A.1 Data And Economic Context

Figure A.1: Invitation Letter to Participate in the Survey



[redacted] A/S
8200 Aarhus N
Att.: Den administrerende direktør

Hvordan kommer dit firma styrket ud af krisen?

Rambøll gennemfører på vegne af Københavns Universitet en spørgeskemaundersøgelse, der skal belyse, hvordan virksomheder kan komme styrket ud af Covid19-krisen. Vi spørger om hvad du/I har gjort for at komme igennem krisen og hvilke overvejelser du gør om tiden efter Covid19.

Projektet gennemføres under ledelsen af Niels Bohr Professor Morten Bennedsen, Økonomisk Institut, og er støttet af blandt andet Industriens Fond og det Samfundsvidenskabelige Forskningsråd.

Hvis du ønsker det, vil du efter undersøgelsens afslutning modtage en anonymiseret benchmarkingsrapport, hvor du kan se dine besvarelser op mod fordelingen af andre besvarelser. Vi overholder naturligvis alle databeskyttelsesreglerne.

Det tager ca. 20 minutter at udfylde spørgeskemaet. Undervejs kan du lukke skemaet og senere genoptage besvarelsen via linket, som du har modtaget her. Husk derfor at gemme denne invitation, til du har afsluttet din besvarelse.

Sådan gør du
Spørgeskemaet besvares elektronisk via internettet. Du kan svare på alle computere, tablets (f.eks. iPad m.m.) og smartphones. Du får adgang til dit personlige spørgeskema ved at klikke på nedenstående link:
https://surveys.ramboll.com/answer?key=ZNEVCQ9MSJ1Y

Vi vil bede dig besvare spørgeskemaet senest **den 27. juni 2021.**

Du er sikret fortrolighed
Dine svar behandles fortroligt af Rambøll og vil kun fremgå i anonymiseret form. Du kan få mere information om behandling af personoplysninger i forbindelse med undersøgelsen på forsiden at spørgeskemaet.

Kontakt
Hvis du har yderligere spørgsmål, er du velkommen til at kontakte Rambøll på e-mail: skemasupport@ramboll.com eller tlf. 6915 8076 på hverdage i tidsrummet kl. 8.00-16.00.

På forhånd tak for din deltagelse!

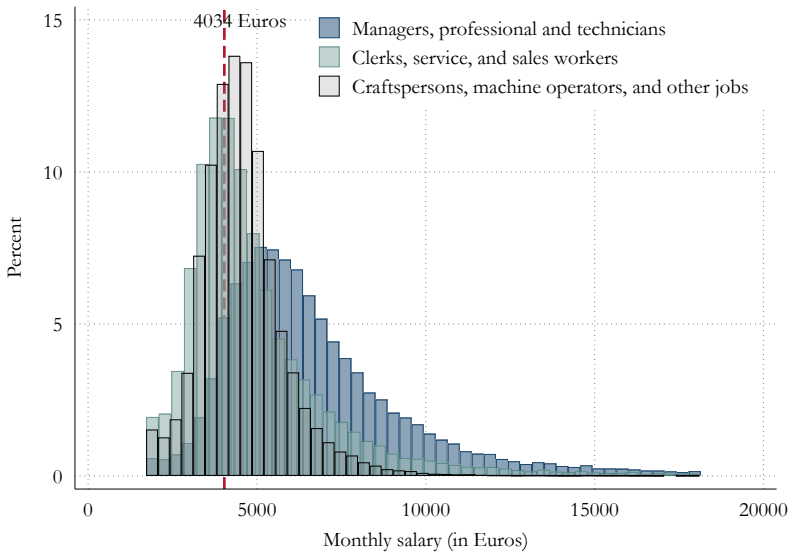
Med venlig hilsen
Rambøll og
Københavns Universitet

Note: The figure shows the invitation letter that firms received in an email asking them to participate in the survey. The invitation letter is designed to provide valuable information to recruit as many respondents as possible and minimize selection bias. In the letter, we gave the respondents the following information: The deadline date for completion of the survey; that the survey could be completed on any device, including tablets and smart phones; that all information provided was anonymous and the survey complied with all data protection regulations; and we explained the reward system for respondents. The letter was purposely vague about the actual research topic, it used a simple language, and it displayed the logo of the University of Copenhagen, which is a legitimate and trustworthy institution. See an English translation of the letter below.

Att: The Administrative Director
On behalf of the University of Copenhagen, Rambøll is carrying out a survey to study how companies can emerge stronger from the COVID19 crisis. We ask what you and others have done to get through the crisis and what thoughts you have about the time after COVID19. The project is carried out under the leadership of Niels Bohr Professor Morten Bennedsen, Department of Economics, University of Copenhagen, and is supported by, among others, Industriens Fond and the Social Science Research Council.
If you participate in the survey, we will offer you an anonymized benchmarked report that shows your responses against the distribution of the other responses. We naturally comply with all data protection regulations.
It takes approximately 20 minutes to complete the questionnaire. You can close the form and resume it later by again clicking on the link below. Therefore, please remember to save this invitation until you have completed the survey.

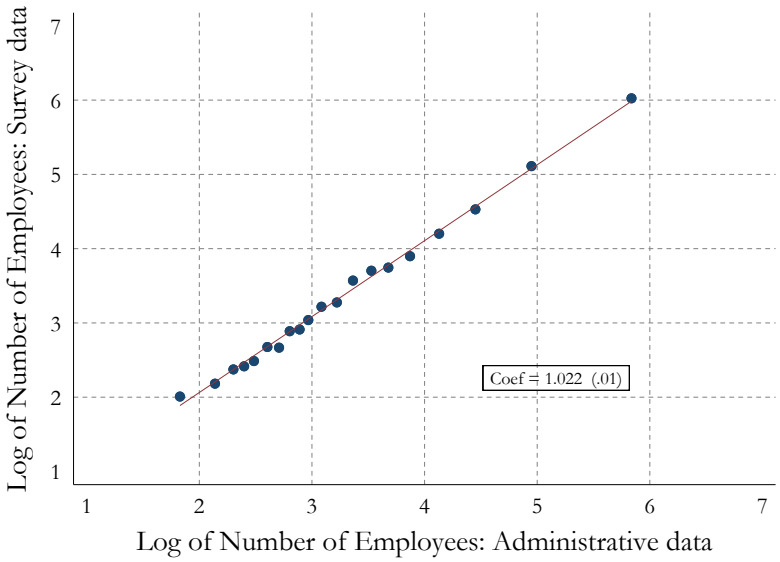
Here's how you do it
The questionnaire is answered electronically via the Internet. You can complete the questionnaire on any computer, tablet (e.g. iPad, etc.) or smartphone. To access your personal questionnaire, click on the link below: LINK
We ask that you complete the questionnaire no later than 27 June 2021. **You are guaranteed confidentiality**
Your answers are treated confidentially by Rambøll and will only appear in an anonymized form. You can find more information about the treatment of personal data in connection with the survey on the front page of the questionnaire. **Contact**
If you have further questions, please feel free to contact Rambøll by e-mail: skemasupport@ramboll.com or tel. 6915 8076 on weekdays between 8.00-16.00. Thank you in advance for your participation
Yours sincerely
Rambøll and University of Copenhagen

Figure A.2: The Furlough Scheme Covers 75% of Labor Costs for a Minority of Jobs



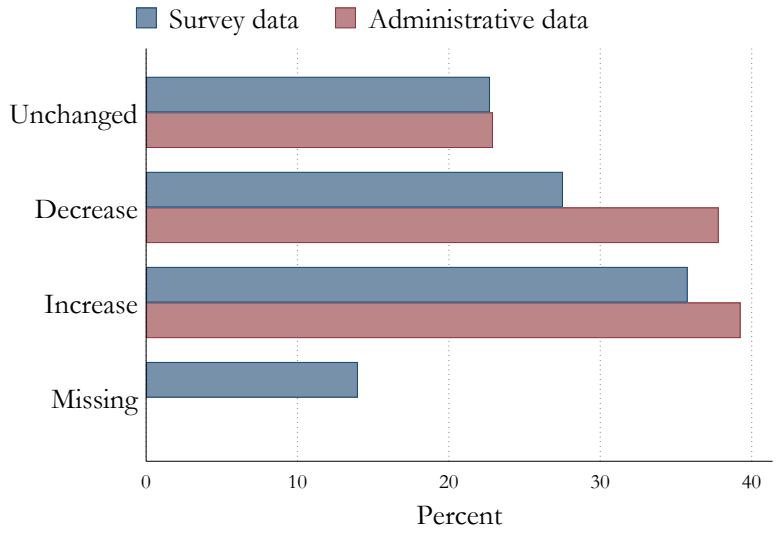
Note: The figure shows the monthly salary of full-time workers employed in a firm in 2019 in our dataset. The dotted red line corresponds to 4034 Euros (30,000 DKK), the maximum monthly salary per employee per month for which 75% compensation could be covered by the furlough scheme. The figure illustrates that a minority of firms receive a coverage corresponding to 75% of the monthly salary, as the vast majority of workers make more than 4034 EUR. Section 2.3 describes the Danish institutional context.

Figure A.3: Comparing Survey and Administrative Data: Number of Employees



Note: The figure compares the survey question, "How many employees were in the company on May 1, 2021? Note: Include all employees, including full-time, part-time, furloughed, and employees on apprenticeship and parental leave. Give your best estimate." to the number of employees in March 2021 in the matched employer-employee dataset. Both variables are in logs and are winsorized. This figure illustrates that respondents have a good knowledge of the firm. Section 2.4 in the main text describes the data.

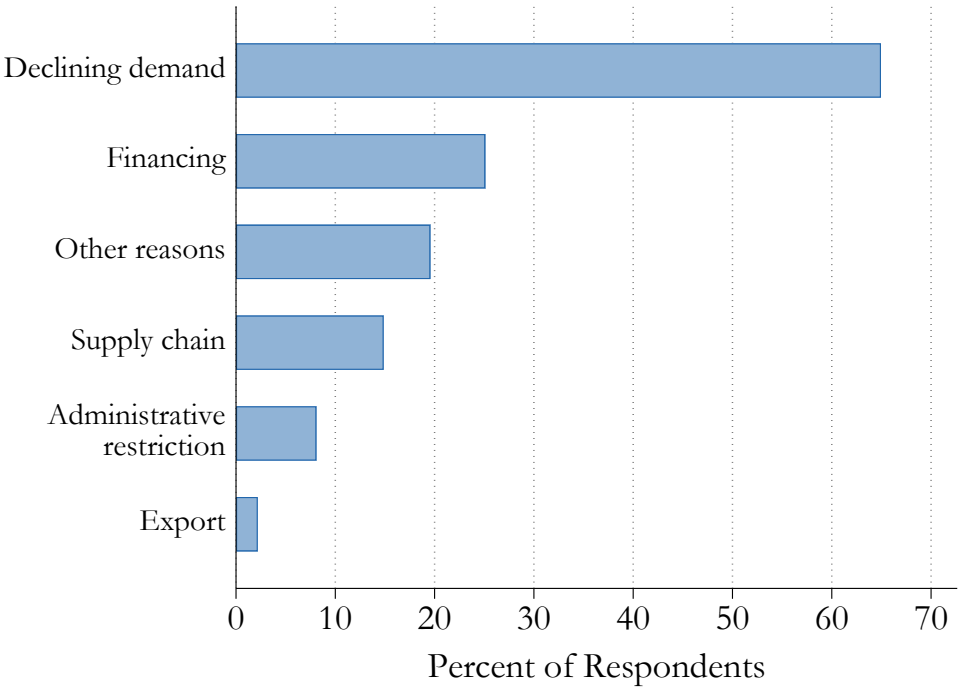
Figure A.4: Comparing Survey and Administrative Data: Revenue Change



Note: This figure compares the survey question, "How much did revenue change in 2020 compared to 2019?" with the administrative dataset (FIRM). The category "Unchanged" is defined as a revenue growth rate between -5% and +5%.

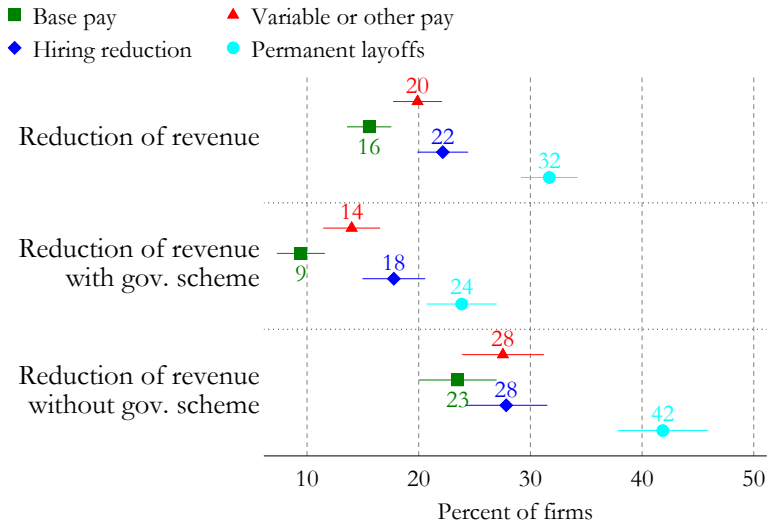
A.2 Additional Results

Figure A.5: Reasons for Declining Revenue in 2020



Note: The figure reports responses to the question, "The revenue decreased because..." The question was put to firms that declare having a reduction in revenue in 2020 compared to 2019. The statements are: Declining demand for goods and services; The administrative challenges due to COVID have made it difficult to work; Challenges of buying supplies for the company; Challenges of obtaining external funding; Challenges of buying and selling across borders; Other reasons. The figure illustrates that the decline in revenue in 2020 is mainly driven by declining demand for goods and services. Section 3.1 in the main text documents downward adjustments to worker pay and the number of employees.

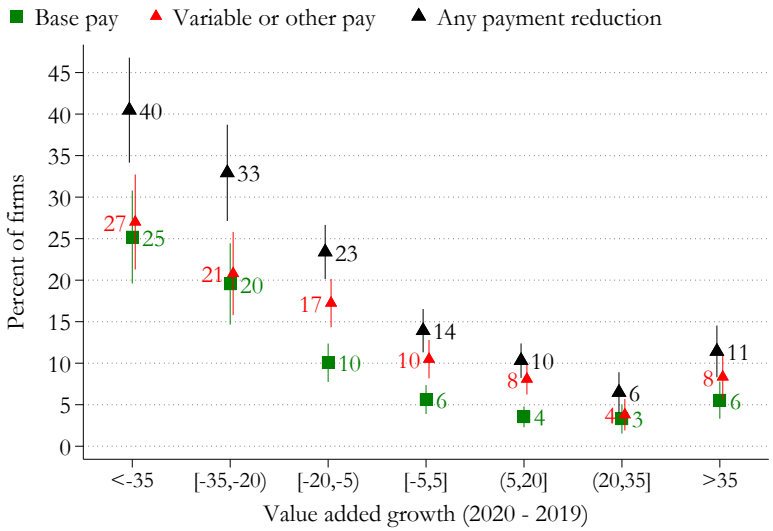
Figure A.6: Gvt Support Scheme or not (TO BE INCLUDED IN THE APPENDIX)



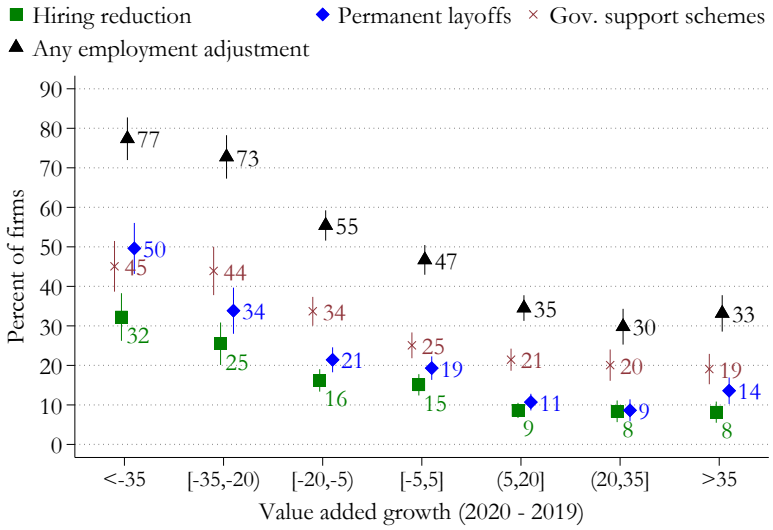
Note: XXX

Figure A.7: Labor Adjustment Approaches in 2020, by Firm Value Added Change between 2019 and 2020

Panel (a) Worker Pay

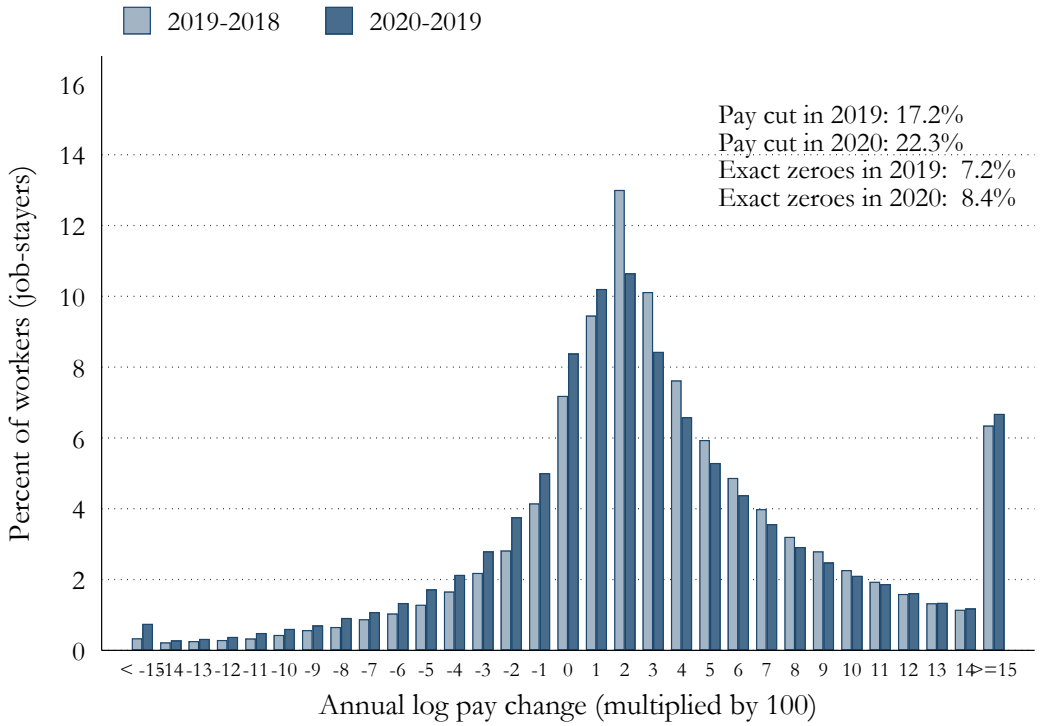


Panel (b) Number of Employees and Hours



Note: Panels (a) and (b) show the percentage of firms that answered "yes" to questions about the corresponding labor adjustment method. The x-axis is the value-added growth in 2020 relative to 2019 in the administrative data.

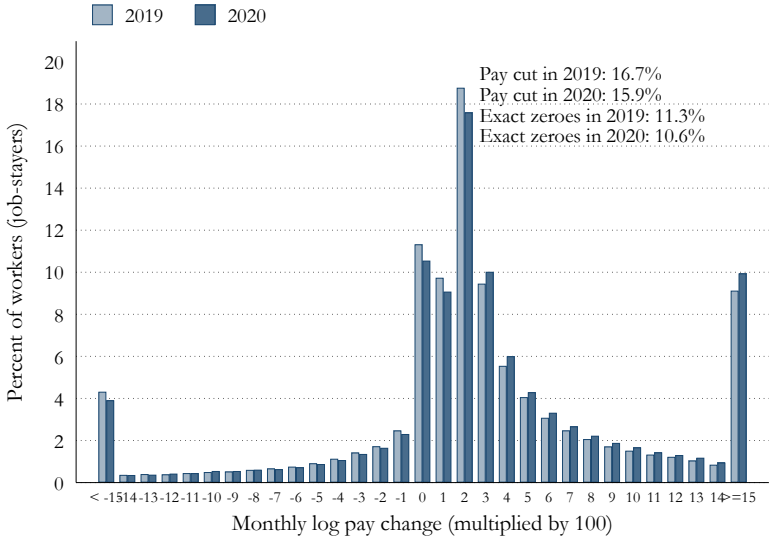
Figure A.8: Growth of Nominal Total Hourly Pay: Annual Frequency



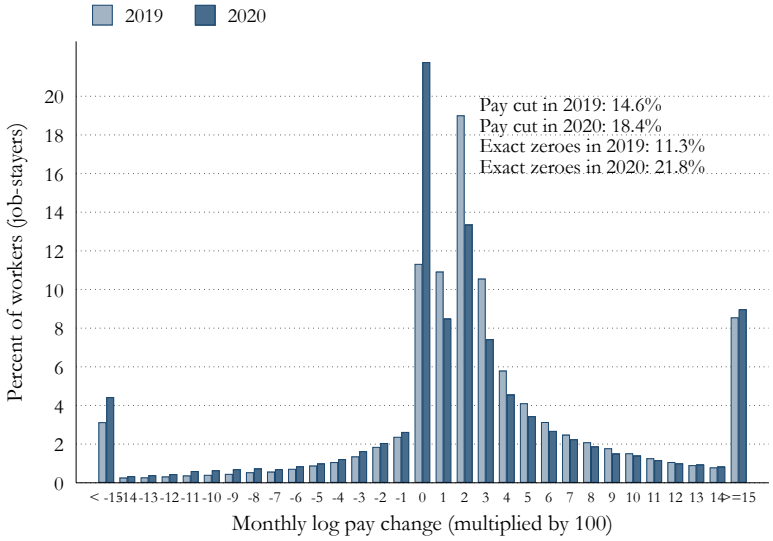
Note: The figure shows the annual nominal changes in logarithmic pay using administrative data (BFL). The log pay change is computed as the log differences between year t minus year t-1, multiplied by 100. Each pay change value x includes log changes in the interval x-0.5 and x+0.5.

Figure A.9: Growth of Nominal Total Hourly Pay: Monthly Frequency

Panel (a): January-to-January Pay Change



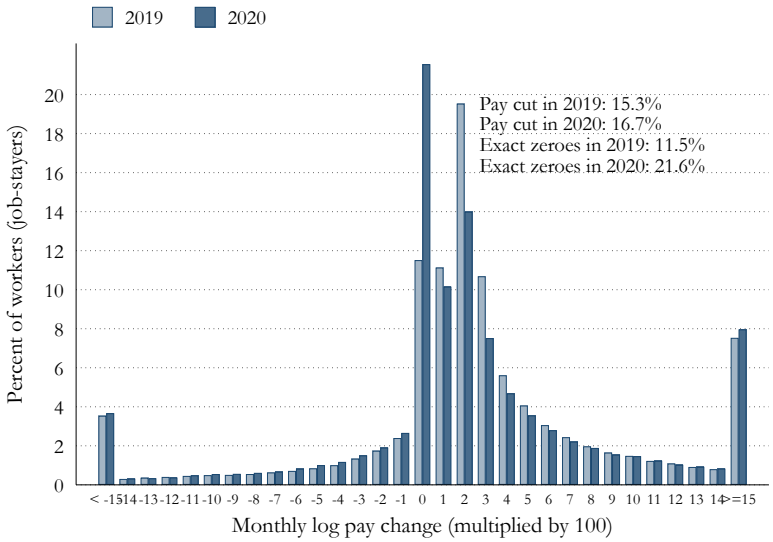
Panel (b): July-to-July Pay Change



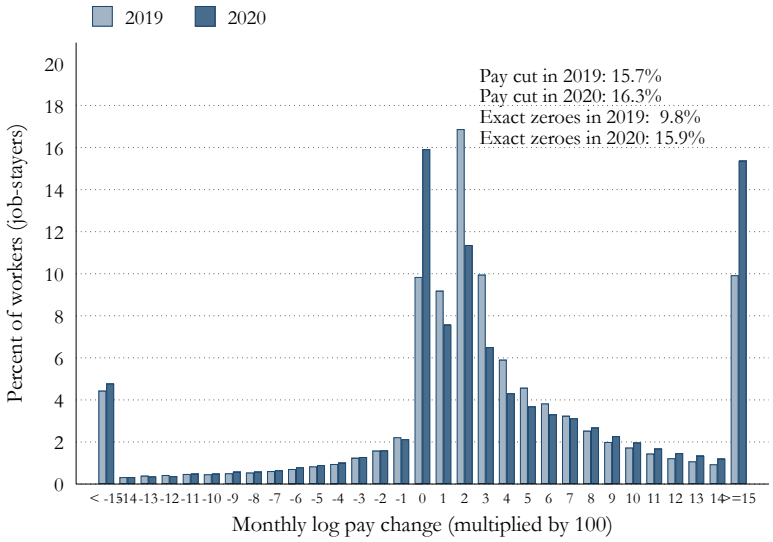
Note: The figure shows the monthly nominal changes in logarithmic pay using administrative data (BFL). The log pay change is computed as the log differences between year t minus year t-1, multiplied by 100. Each pay change value x includes log changes in the interval x-0.5 and x+0.5. The figure illustrates that the frequency of pay cuts from January 2020 to January 2019 is the same as from January 2019 to January 2018. After March 2020 (from July-to-July, Panel (b)), the frequency of pay cuts differs.

Figure A.10: Growth of Nominal Total Hourly Pay: Monthly Frequency

Panel (a): October-to-October Pay Change



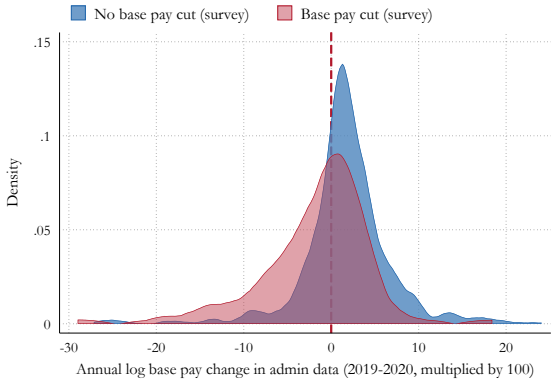
Panel (b): December-to-December Pay Change



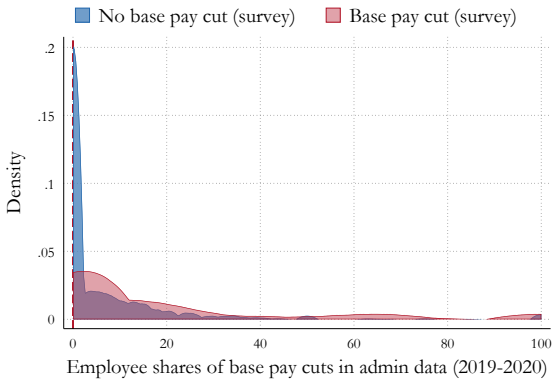
Note: The figure shows the monthly nominal changes in logarithmic pay using administrative data (BFL). The log pay change is computed as the log differences between year t minus year t-1, multiplied by 100. Each pay change value x includes log changes in the interval x-0.5 and x+0.5.

Figure A.11: Reductions in Base Pay in the Survey and Administrative Data

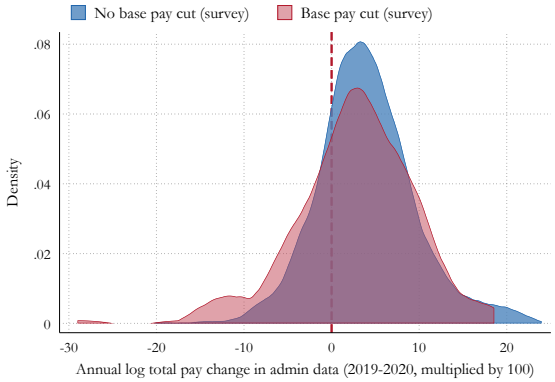
(a): Distribution of Pay Change (LONN)



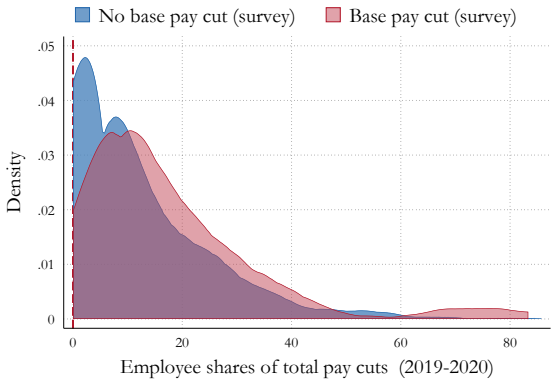
(b): % of Workers Affected by Pay Cut (LONN)



(c): Distribution of Pay Change (BFL)

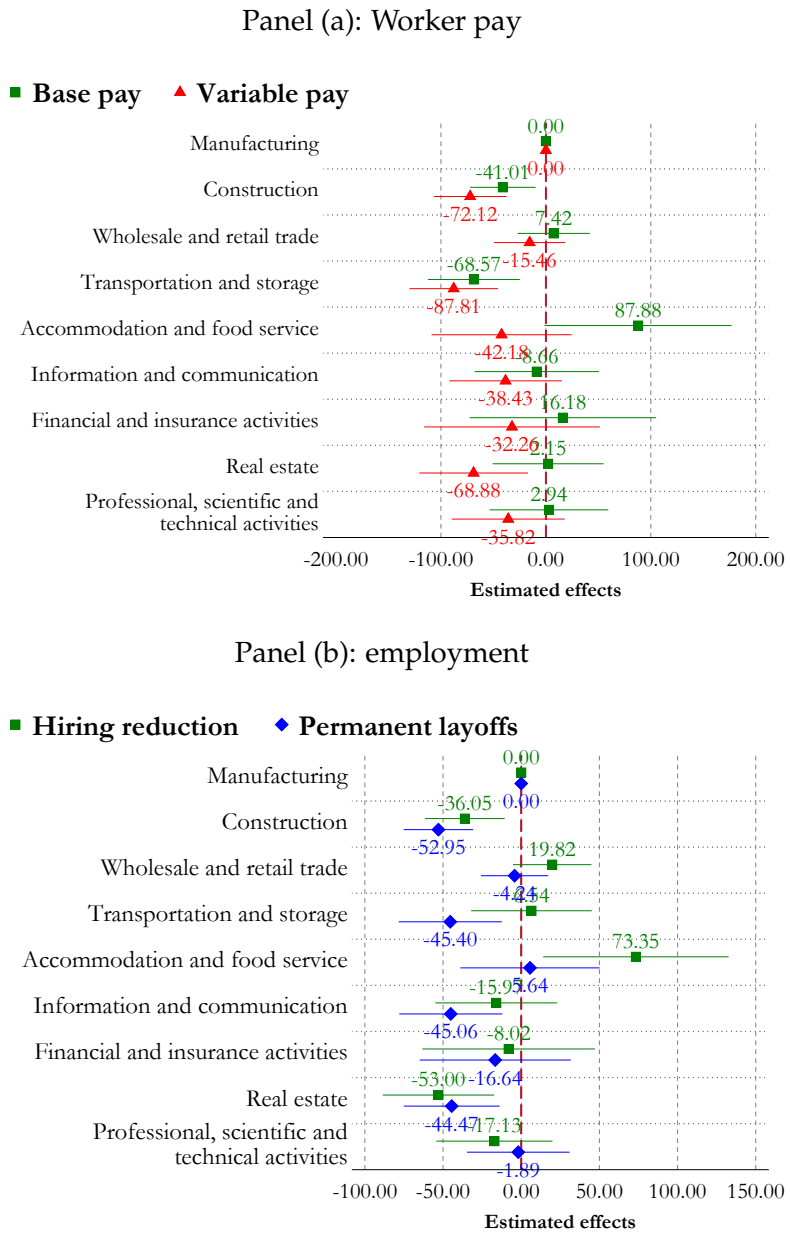


(bd): % of Workers Affected by Pay Cut (BFL)



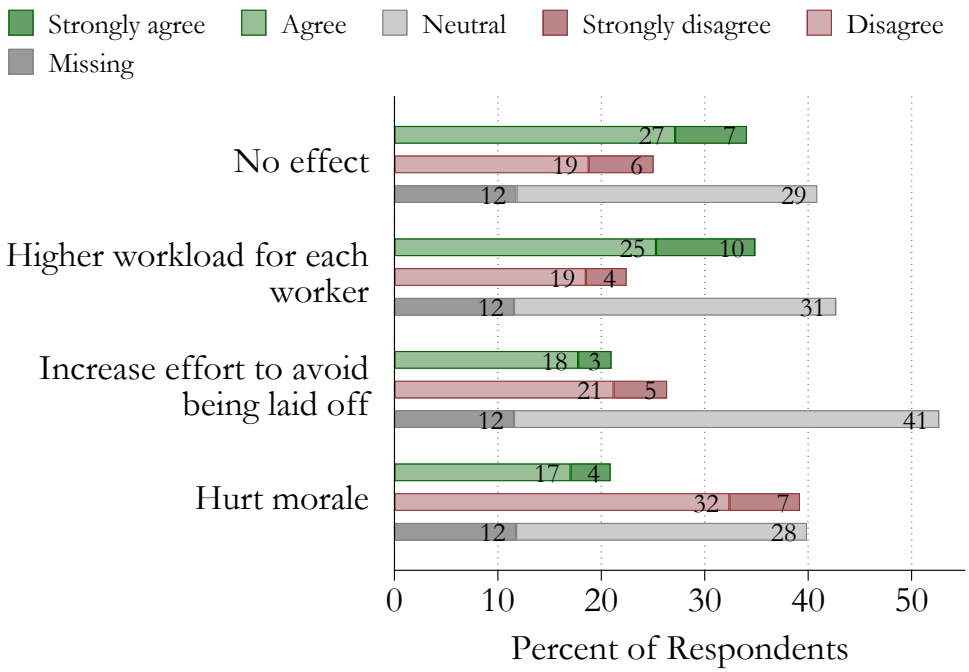
Note: Panels (a) and (b) compare the change in log hourly base pay in the administrative data (LONN) and in the survey data. Panels (c) and (d) compare the change in log hourly total pay in the administrative data (BFL) and in the survey data.

Figure A.12: Adjustments to Worker Pay and the Number of Workers: Industry-Specific Effects



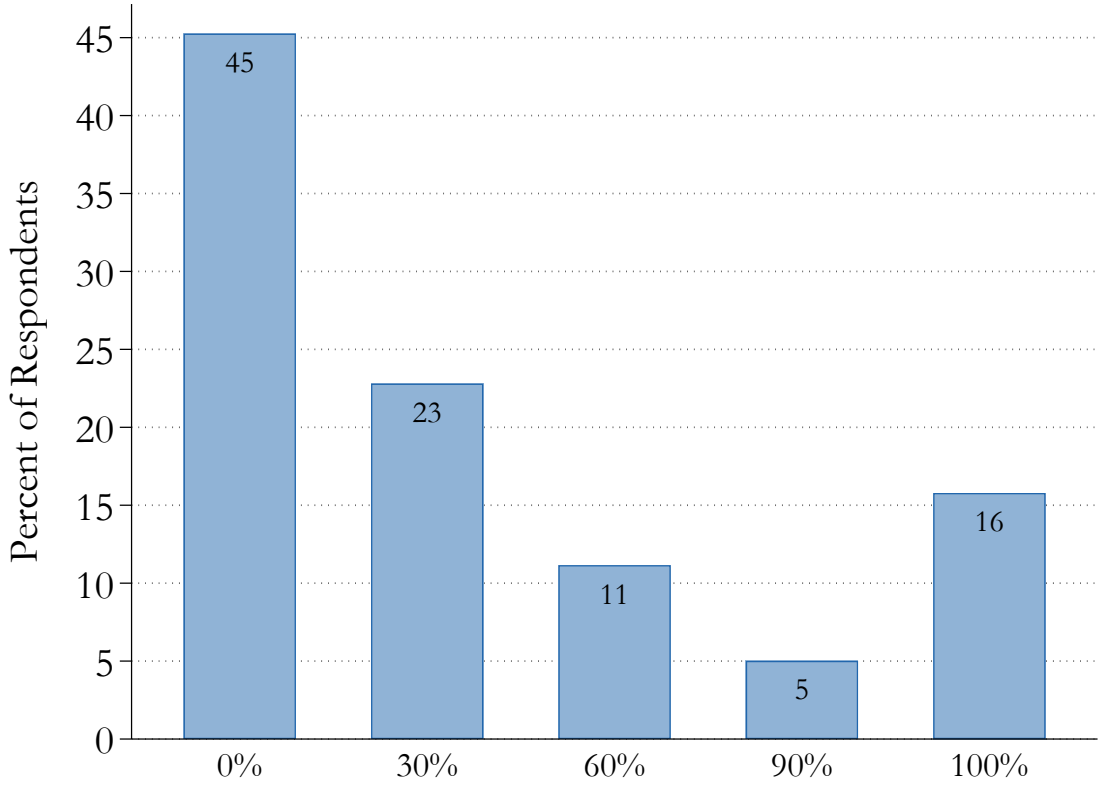
Note: The figure shows the industry fixed effects coefficients of OLS regressions where the outcome variable takes the value one if the respondent answers "yes" to questions about the corresponding labor adjustment method. Section 3.4 in the main text documents the main point estimates.

Figure A.13: The Consequences of Layoffs on the Remaining Employees, the Sample of Firms that Experienced a Reduction in Revenue in 2020



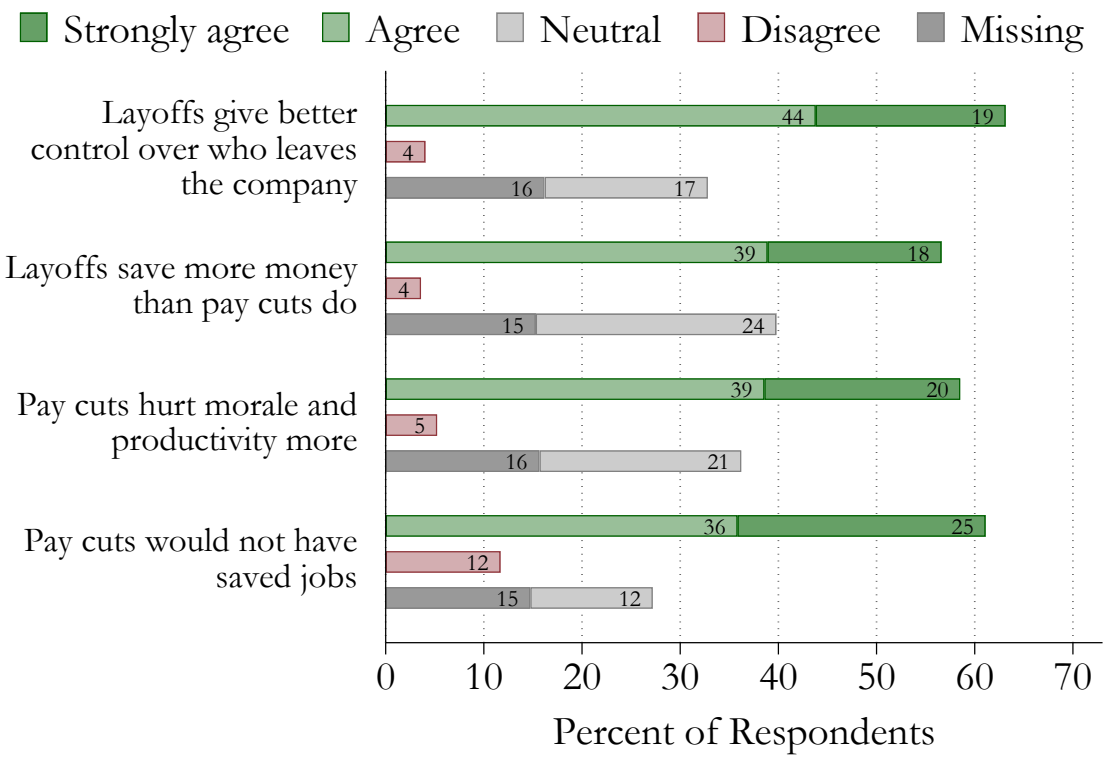
Note: The figure reports responses to the question, "How have layoffs affected the remaining employees?" The question is asked of firms that reported having laid off workers in 2020. The statements are: Employees have a higher workload as there are fewer; Employees work harder and make a greater effort to avoid being laid off; Layoffs hurt morale and work ethics among the remaining employees; There is no effect on the remaining employees. Table A.7 shows the firm characteristics that predict the probability of agreeing with the different statements. Figure 12 in the main text reports responses to this question.

Figure A.14: Share of Layoffs That Would Have Occurred Even Without the Recession, the Sample of Firms that Experienced a Reduction in Revenue in 2020



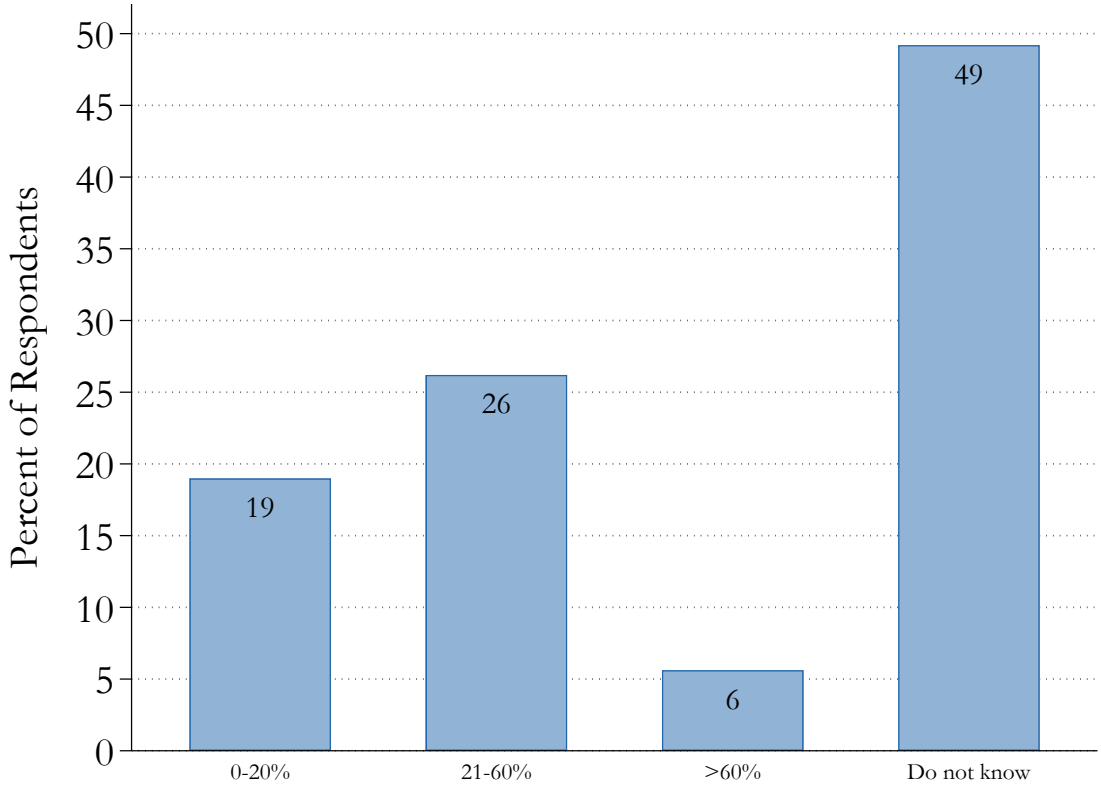
Note: The figure reports responses to the question, "How many of these layoffs would have taken place in 2020 or the next two years if there had not been a pandemic?" Respondents could choose between 0% (i.e., no one would have been laid off) to 100% (i.e., everyone would have been laid off). Here, we further restrict on firms with a revenue reduction in 2020. Figure 10 in the main text reports the responses to this question.

Figure A.15: Reasons for Layoffs instead of Pay Cuts, the Sample of Firms that Experienced a Reduction in Revenue in 2020



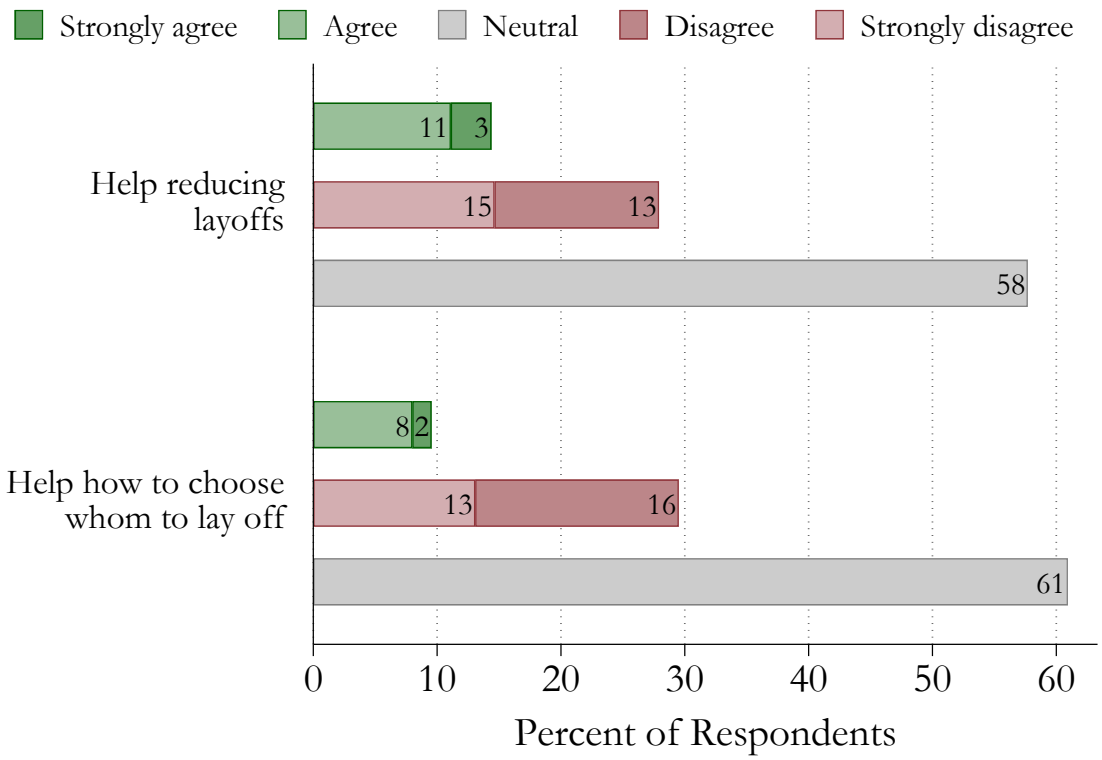
Note: The figure reports responses to the question: "Why didn't you lower pay instead of laying off employees?" The question was put to firms that reported having laid off employees in 2020. The statements are: Pay cuts would not have saved jobs; Pay cuts would hurt morale and productivity more than layoffs; Layoffs give better control over who leaves the firm; Layoffs save more money than pay cuts do. Figure 15 in the main text reports responses to this question.

Figure A.16: What Reduction in the Total Salary Cost Could Have Prevented Layoffs?, the Sample of Firms that Experienced a Reduction in Revenue in 2020



Note: The figure reports responses to the question "What reduction in the total salary cost (base pay and bonuses) could have prevented layoffs?" The question is put to respondents that laid off in 2020 workers. The options are: 0-20 percent; 21-40 percent; 41-60 percent; 61-80 percent; >80 percent; Do not know. Figure 16 in the main text reports responses to this question.

Figure A.17: The Role of Worker Representative on Layoff Decisions



Note: The figure reports responses to the question, "What is your position on the following statements? Union representatives help reduce the number of layoffs by finding alternative solutions to reduce wage costs (reorganization, wage reduction, etc.). Union representatives help implement layoff by identifying low/high-performing employees or setting criteria for who can be laid off.

B Additional Tables

B.1 Data Construction

Table A.1: Response Rate, Matching Rate and Sample Selection

	Number of observations
Matching Survey data to administrative datasets:	
Response rate:	
Response rate for participation in the survey (1, 2, 3)	15.25% (3329/21835)
1. Respondents don't want to participate (no data available)	16.28% (542/3329)
2. Respondents answer some questions (some missing data)	14.42% (480/3329)
3. Respondents answer all questions (no missing data)	69.30% (2307/3329)
Response rate for participants (2,3)	12.76% (2787/21835)
Sample Selection (Survey and administrative data):	
1)Little HR knowledge	9.22% (257/2787)
2) Missing answers	5.10% (142/2787)
3) Incoherent answers	1.44% (40/2787)
1) 2) and 3)	10.73% (299/2787)
Number of observations before sample selection is 2787 and after it is 2488.	

Note: The table reports the response rate in the survey and the sample selection steps to construct the sample. There are 21,835 firms that were contacted by email (*e-boks*) that can be linked to the matched employer-employee (BFL) and the financial account (FIRM) data sets. It represents the population of private and public limited firms (ApS and A/S) with at least five employees in 2019 and non-missing financial account data. Firms in the agricultural and mining sectors are not included. Under the column *Sample Selection (Survey and administrative data)*: 1) Little HR knowledge means that we delete observations where respondents answer "I know only a little about pay and employment conditions." to the question, "In the following questions, we ask about pay and employment practices. How close are you to such decisions?" and respondents who do not answer this question. 2) Missing answers stands for respondents who do not answer at least 10 questions out of the 34 questions on the impact of the 2020 pandemic, on pay and layoffs. 3) Incoherent answers stands for respondents whose answers contradict themselves. For example, in the question, "Did your company use the following practices in 2020?", if respondents selected *"pay cut"* and *"none of the above"* at the same time they were deleted.

Table A.2: Definition of Variables and Data Sources

Name	Label	Data source	Original variable name
Firm demographics in 2019:			
Age	Number of years in business in 2019	FIRM	JUR_FRA_DATO
Firm size	Number of employees in full time equivalent units (FTE) in 2019	BFL	AJO_LOENTTIMER
Industry	19 Industry categories (NACE)	FIRM	GF_GR019_DB07
Location	11 regions (NUTS3)	FIRM	JUR_BEL_REGION_KODE
Job growth	Net job creation rate from 2018 to 2019	BFL	AJO_LOENTTIMER
Wage floors	=1 if 50% of employees are subject to a wage floor	DA	——
Firm financial characteristics in 2019:			
Value added	Revenue minus intermediate costs	FIRM	GF_VTV
Capital stock	Monetary value of fixed assets	FIRM	GF_AAT
Cash	Monetary value of cash, bonds and shares	FIRE	VKT
Revenue growth	Revenue growth from 2019 to 2020	FIRM	GF_OMS
Productivity	Value added over firm size	FIRM	GF_VTV
Labor costs	Compensation including social security costs	FIRM	GF_LGAGMV
Average wages	Labor costs / Firm size		
Productivity	Value added / Firm size		
Labor share	Labor costs / Value added		
Workforce characteristics in 2019:			
Female	Percent of female in 2019	IDAP	KON
Unionization	Percent of unionized workers	IND	FAGFKD
Education	Average educational attainment	UDDA	HFAUDD
Age	Average age	IDAP	ALDERNOV
Tenure	Average tenure	IDAN	ANSAAR
Analysis of earnings and hours worked at the individual-level:			
Hours	Monthly paid hours	BFL	AJO_LOENTIMER
Earnings	Monthly earnings	BFL	AJO_BREDT_LOENBELOEB
Hourly wage	Constructed variable	BFL	Earnings / hours worked
Base pay	Annual change in base pay	LONN	BASIS_STAND
Total pay	Annual change in total pay	LONN	FORTJ_STAND
Firm-specific labor market conditions:			
Labor market tightness	Occupation-specific tightness	STAR	——

Note: The table reports the variables from administrative data sets that we use.

Table A.3: Respondents and Firm Characteristics in Our Survey

	Mean	Count
Knowledge of HR policies (%)	100.00	2488
Manager respondents (%)	83.64	2070
% of firm...		
Revenue reduction in 2020	27.17	685
Laidoff	40.96	1,053
Did not cut base pay	91.92	2,276
Did not cut base pay & rev. red.	22.67	567

Table A.4: Sample Description: Subsample of firms with revenue reduction

	(1) Population	(2) Sample	(3) Weighted Sample
Firm characteristics			
Number of employees (FTE)	34.24	41.81	35.38
Age	18.46	20.69	20.05
Revenue growth in 2020 (%)	-20.36	-12.91	-13.07
Value added per worker ('000 EUR)	87.33	91.07	90.68
Labor costs per worker ('000 EUR)	66.27	68.64	68.19
In the manufacturing sector (%)	15.60	20.15	17.35
In the services sector (%)	62.64	62.34	63.53
In other sectors (%)	21.76	17.52	19.13
Wage floors (%)	15.75	17.66	18.12
Employee characteristics			
Female (%)	30.43	31.19	30.94
Age	40.18	41.73	41.65
Furloughed workers in 2020 (%)	23.68	29.17	28.93
Unionized workers (%)	54.53	58.32	57.45
Labor market characteristics			
Tightness (vacancy/unemployment)	0.11	0.11	0.11
Observations	11007	685	685

Note: The table compares the mean of firm characteristics from the sample to the corresponding population of firms. Column 1 reports means from the population, i.e., firms with at least 5 full-time employees. Column 2 reports means from the raw sample and Column 3 from the sample weighted by entropy balancing as described in Section 2.

B.2 Additional Results

Table A.5: Firm Characteristics Associated with: Reasons to Retain Employees Despite Reduced Revenue

Question: What were the reasons for retaining employees despite a reduction in revenue? Statement:	Lose skills (1)	Unable to re-hire (2)	Team concern (3)	Morale concern (4)	Use gov. aid package (5)	Can reduce pay instead (6)	Reputation concern (7)
Firm characteristics							
Number of employees	0.57	-0.28	-3.41*	-5.27*	-5.05*	-0.93	-1.41
	(0.87)	(2.16)	(1.92)	(2.82)	(3.06)	(1.94)	(1.87)
Productivity	-2.13	1.37	0.84	5.10*	-7.05*	-0.68	4.74*
	(1.50)	(2.50)	(2.17)	(3.01)	(4.06)	(2.45)	(2.53)
Average wages	2.24	-0.06	0.37	1.17	-5.59	0.41	-1.45
	(1.66)	(1.72)	(2.17)	(2.62)	(3.89)	(1.91)	(2.35)
Labor share	-0.53	0.81	-1.71	2.92	0.26	1.28	3.30**
	(0.89)	(1.78)	(1.57)	(2.22)	(2.78)	(1.66)	(1.62)
Value-added growth (%)	0.90	3.58*	1.59	3.67	-1.28	0.95	-0.67
	(0.68)	(1.96)	(1.53)	(2.39)	(2.30)	(1.55)	(1.50)
Debt ratio	-2.76***	-2.02	-0.10	0.24	5.23	-0.52	-0.70
	(0.85)	(2.10)	(2.28)	(2.93)	(3.39)	(1.98)	(2.17)
Routine task index	-1.04*	0.74	-0.42	-2.43	0.58	-1.61	0.33
	(0.61)	(1.32)	(1.21)	(1.79)	(1.72)	(1.14)	(1.13)
Unionized workers (%)	0.60	-1.87	0.45	-1.89	2.87	0.78	0.81
	(0.79)	(1.91)	(1.58)	(2.25)	(2.54)	(1.38)	(1.56)
Worker representative	-0.07	3.86	0.41	-0.30	-7.42*	-0.08	3.26
	(1.31)	(3.35)	(2.92)	(4.34)	(4.36)	(2.75)	(2.83)
Pay cut (admin data)	0.04	-0.21	0.16	-1.69	4.15**	2.01	-0.59
	(0.49)	(1.37)	(1.26)	(1.80)	(1.84)	(1.23)	(1.21)
Labor market characteristics							
Tightness	-0.29	1.84	-0.66	-1.47	-0.20	-0.66	-2.55
	(0.76)	(1.88)	(1.67)	(2.43)	(2.64)	(1.51)	(1.60)
N	652	643	632	631	638	632	637
Mean Dep. Var.	3.93	3.75	2.76	3.17	3.05	2.63	2.78
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table reports marginal effects of the probability of agreeing (or strongly agreeing) from ordered probit models where covariates are evaluated at their means. Figure 11 in the main text reports the histogram of this question. Additional controls include the revenue growth rate from 2019 to 2020, the job growth rate from 2018 to 2019, industry and geographic fixed effects, and the following dummies: industry pay-setting, worker representative, manager respondent, and respondent's knowledge of pay policy. Asterisks report statistical significance at the 1, 5 and 10% (***,**,* respectively). Standard errors are reported in parentheses. The question is, "What were the main reasons for retaining employees despite a reduction in sales and other cost pressures? Even if you have laid off some employees, consider why you have not laid off more." The question was asked of those firms that reported a reduction in revenue in 2020. Possible statements are: We want to keep current employees to avoid **loss of skills** and knowledge (1); We may **be unable to find and hire again** quickly when needed during the recovery (2); The employees work in **teams** and we cannot lay off some of them (3); Layoffs will be detrimental to **morale** among the remaining employees (4); We can **use government** aid packages (5); Instead of layoffs, we can **reduce pay** (6); Layoffs will be detrimental for the firm's **reputation** (7).

Table A.6: Firm Characteristics Associated with Reasons for Layoffs Instead of Pay Cuts

Question: Why didn't you lower pay instead of laying off employees?				
Statement:	Pay reduction would		Layoffs	
	not have saved jobs	hurt morale and productivity more than layoffs	give better control over who leaves	save more mor than pay cut
	(1)	(2)	(3)	(4)
Firm characteristics				
Number of employees	0.36	-0.32	1.69	-2.74
	(2.36)	(2.38)	(2.55)	(2.18)
Productivity	-3.93	-1.45	4.08	-2.89
	(2.56)	(2.56)	(2.65)	(2.91)
Average wages	3.37	1.64	-3.26	-0.71
	(2.58)	(2.22)	(2.11)	(2.73)
Labor share	1.03	0.17	4.52***	0.30
	(1.86)	(1.89)	(1.73)	(1.91)
Value-added growth (%)	2.64	1.30	2.42	-1.60
	(1.67)	(1.72)	(1.72)	(1.68)
Debt ratio	3.35	6.47**	3.70	4.04
	(3.00)	(2.96)	(2.85)	(2.67)
Routine task index	-0.33	2.30	1.22	3.23**
	(1.41)	(1.47)	(1.34)	(1.54)
Unionized workers (%)	-0.01	2.44	2.45	1.89
	(1.89)	(1.92)	(2.03)	(2.18)
Worker representative	1.64	5.68	4.52	-4.64
	(3.61)	(3.61)	(3.28)	(3.66)
Labor market characteristics				
Tightness	-1.56	0.76	-2.05	-1.35
	(1.83)	(1.82)	(1.65)	(2.13)
N	855	847	845	849
Mean Dep. Var.	3.61	3.63	3.69	3.5
Additional controls	Yes	Yes	Yes	Yes

Note: The table reports marginal effects of the probability of agreeing (or strongly agreeing) from ordered probit models where covariates are evaluated at their means. Figure 15 presents the histogram of this question. Additional controls include the revenue growth rate from 2019 to 2020, the job growth rate from 2018 to 2019, industry and geographic fixed effects, and the following dummies: industry pay-setting, worker representative, manager respondent, and respondent's knowledge of pay policy. Asterisks report statistical significance at the 1, 5 and 10% (***,**,* respectively). Standard errors are reported in parentheses. The question is, "Why didn't you lower pay instead of laying off employees?" The statements are: Pay reduction would not have saved jobs; Pay reduction would hurt morale and productivity more than layoffs; Layoffs give better control over who leaves the company; Layoffs save more money than pay cuts do. Figure 15 presents the histogram.

Table A.7: Firm Characteristics Associated with: Perceptions of the Effects of Layoffs on the Remaining Employees

Question: How have layoffs affected the remaining employees of the firm?				
Statement:	Higher workload (as fewer employees)	Greater effort (to avoid layoffs)	Hurt morale	No effect
	(1)	(2)	(3)	(4)
Firm characteristics				
Number of employees	0.10	-0.38	-0.42	0.86
	(1.84)	(1.43)	(1.63)	(2.02)
Productivity	1.18	-1.36	-1.65	6.92**
	(2.42)	(1.92)	(2.14)	(2.98)
Average wages	-1.81	2.87*	2.47	-4.52*
	(2.37)	(1.54)	(1.83)	(2.39)
Labor share	2.80	2.54*	-1.01	2.12
	(1.81)	(1.38)	(1.51)	(2.01)
Value-added growth (%)	-2.70*	-2.85**	-2.63**	2.09
	(1.55)	(1.26)	(1.33)	(1.82)
Debt ratio	0.28	0.64	-0.39	-0.01
	(2.31)	(1.68)	(2.07)	(2.23)
Routine task index	-0.12	0.19	1.56	0.10
	(1.32)	(1.08)	(1.06)	(1.38)
Unionized workers (%)	-1.04	-0.15	0.68	-4.33**
	(1.83)	(1.46)	(1.42)	(1.94)
Worker representative	0.86	3.20	2.59	-5.89*
	(3.30)	(2.56)	(2.62)	(3.52)
Labor market characteristics				
Tightness	-2.66	-3.02**	0.83	-1.73
	(1.75)	(1.36)	(1.25)	(1.79)
N	875	871	870	880
Mean Dep. Var.	3.06	2.91	2.8	3.12
Additional controls	Yes	Yes	Yes	Yes

Note: The table reports marginal effects of the probability of agreeing (or strongly agreeing) from ordered probit models where covariates are evaluated at their means. Figure 12 in the main text reports the histogram of this question. Additional controls include the revenue growth rate from 2019 to 2020, the job growth rate from 2018 to 2019, industry and geographic fixed effects, and the following dummies: industry pay-setting, worker representative, manager respondent, and respondent's knowledge of pay policy. Asterisks report statistical significance at the 1, 5 and 10% (***,**,* respectively). Standard errors are reported in parentheses. The question is, "How have layoffs affected the remaining employees of the firm? Please state your opinion on the following statement." The question was asked for firms that reported having laid off workers in 2020 (with or without a reduction in revenue). The statements are: Employees have higher workload as there are fewer (1); Employees work harder to avoid being laid off (2); Layoffs hurt morale and work ethics among the remaining employees (3); There is no effect on the remaining employees (4).

C The Survey Questionnaire

This section reports the questions we use in this paper. While some phrases can seem uncommon in English, they are perfectly understandable in Danish. Key phrases and Danish words are reported in parenthesis in Danish for Danish speakers.

C.0.1 Background Questions

1. What is your role in the company?

   - Owner manager
   - Director without ownership
   - Board member without ownership
   - Owner without being a board member
   - Others

   All categories but "Others" are combined in this question to create the variable "Manager respondents". See Table 1 (Panel B).

2. Does a person or family have 50% or more of the ownership?

   - Yes
   - No
   - Do not know

   The category "Yes" in this question corresponds to the variable "Family business". See Table 1 (Panel B).

3. How many employees were there in the company on May 1, 2021? Note: Include all employees, including full-time, part-time, furloughed and employees on apprenticeship and parental leave. Give your best estimate.

   - _____

4. How much did revenue (*omsætningen*) change in 2020 compared to 2019? Note: If you do not know the exact change, give your best estimate.

   - Reduced by 100 percent
   - Reduced (indicate the percentage): _____
   - Unchanged
   - Increased (indicate the percentage): _____
   - Increased by 100 percent or more

5. If revenue decreased in 2020: The revenue decreased because...

   - Declining demand for goods and services

- The administrative challenges due to COVID made it difficult to work
- Challenges of buying supplies for the company
- Challenges of obtaining external funding
- Challenges of buying and selling across borders
- Other reasons

6. If revenue decreased in 2020: How long do you expect it to take before revenue reaches its 2019 precrisis level?

   - Our revenue has already passed the precrisis level
   - We are at the same level as before the crisis
   - Less than 3 months from today
   - 3-6 months from today
   - 6-12 months from today
   - 12-24 months from today
   - Do not know

7. Compared to 2019, investments in 2021 will be ...

   - Reduced (indicate percentage reduction): ——————
   - Unchanged
   - Increased (indicate percentage increase): ——————

8. Is the company primarily a subcontractor (*underlerverandør*) to other companies?

   - Yes, for 90 percent or more of the revenue
   - Yes, for 50 percent to 89 percent of the revenue
   - Yes, for 25 percent to 49 percent of the revenue
   - Yes, for 10 percent to 24 percent of the revenue
   - Yes, for less than 10 percent of the revenue
   - No
   - Do not know

   The categories "Yes, for 90 percent or more of the revenue" and "Yes, for 50 percent to 89 percent of the revenue in this question corresponds to the variable "Subcontractor". See Table 1 (Panel B).

9. In the following questions, we ask about pay (*løn*)[22] and hiring practices (*ansættelsespraksis*). How close are you to such decisions?

   - I am responsible for pay and employment conditions
   - I am not responsible, but I know about pay and employment conditions
   - I only know a little about pay and employment conditions

[22]In Danish, the word løn is usually translated as salary, pay or wages. The definition in the dictionary ordnet.dk is "payment that an employee receives for working".

C.0.2 The Adjustment of Worker Pay and the Number of Employees in 2020

10. Did your company use the following practices in 2020? Check as many as apply.

    - Base pay reduction (*lønnedgang)*
    - Fewer/smaller bonuses
    - Fewer/smaller fringe benefits
    - Fewer promotions
    - None of the above

11. If a given HR practice was used in 2020. Respondents were asked to indicate:

    - The percentage of the reduction: ————————
    - The percentage of the employees affected: ————————

12. Did your company use the following practices in 2020? Check as many as apply.

    - Freezing or reducing new hires - for existing jobs
    - Freezing or reducing new hires - for new jobs
    - Permanent layoffs
    - Temporary layoffs (expects reemployment)
    - Furloughs with support from the government COVID-19 aid packages
    - Negotiated separations via pensions or early retirement plans (efterløn)
    - Reduction in hours without the use of government aid packages
    - None of the above

13. If a given HR practice has been used in 2020. Respondents were asked to indicate:

    - The percentage of the reduction: ————————
    - The percentage of the employees affected: ————————

C.0.3 Perceptions, Attitudes and Reasoning Regarding Layoffs

14. If revenue decreased in 2020: What were the main reasons for retaining employees despite a reduction in sales and other cost pressures? Note: Even if you have laid off some employees, consider why you have not laid off more. Please express your opinion on the following statements. Respondents have five options (strongly agree, agree, neutral, disagree, and strongly disagree).

- We want to keep current employees to avoid loss of skills and knowledge
- We may not be able to find and hire workers again quickly when needed during the recovery
- Employees work in teams and we cannot lay off some of them
- Layoffs will be detrimental to morale among the remaining employees
- We can use government aid packages
- Instead of layoffs, we can reduce pay
- Laying off will be detrimental for the company's reputation

15. If revenue decreased in 2020: Do you agree with the following? Note: Even if you have laid off some employees, consider why you have not laid off more. Please express your opinion on the following statements. Respondents have five options (strongly agree, agree, neutral, disagree, and strongly disagree).

    - Management has less focus on efficiency and cost reductions during good times and therefore the company reorganizes itself during bad times (*dårlige tider*)
    - It is more acceptable to lay off the less-good employees (*mindre gode*) during bad times
    - It is more acceptable to lay off employees who are highly paid relative to their productivity during bad times
    - It is easier to ask employees to change their tasks or to increase their work effort in bad times, as employees are less likely to quit

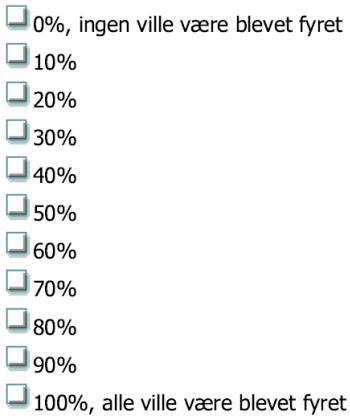
16. What were the main reasons for the company's layoffs in 2020? Check as many as apply.

    - Our company did not experience layoffs in 2020
    - Reduced sales and financial difficulties
    - Reorganization due to technological changes
    - Reorganization to improve efficiency (eliminate unnecessary labor)
    - Laying off employees who were highly paid relative to their productivity
    - Laying off low-performing employees (for example, employees with outdated skills and knowledge)
    - Other. Please provide details

17. If the company laid off workers in 2020: How have layoffs affected the remaining employees of the company? Please state your opinion on the following statement. Respondents have five options (strongly agree, agree, neutral, disagree, and strongly disagree).

    - Employees have a higher workload as there are fewer
    - Employees work harder and make a greater effort to avoid being laid off
    - Layoffs hurt morale and work ethics among the remaining employees
    - There is no effect on the remaining employees

18. If the company laid off workers in 2020: How many of these layoffs would have taken place in 2020 or over the next two years if there had not been a pandemic? If you are uncertain, give your best estimate. Please choose between 0% (no one would have been laid off) and 100% (everyone would have been laid off). See the screenshot below.



    In the next questions, respondents were asked to express their opinions on government aid packages, employee representatives and layoffs. We report only the question on the presence of worker representative in the company as the other questions are not used in this paper.

19. Which of the following forms of employee representation currently exist in the company? List as many as apply.

    - Trade union representative for the entire company without professional divisions, TR (*Tillisrepræsentant*)[23]
    - Trade union representatives divided into professional groups and with an overall joint shop steward
    - Employee representative at the board-level (*Medarbejderrepræsentanter*)[24]
    - Cooperation Committee, SU (*Samarbejdsudvalg*)

[23]The trade union representative (tillidsrepræsentant) takes up workers' day-to-day concerns with the employer and usually has a mandate to bargain locally on pay, working time arrangements and other issues. Trade union representatives also have priority with regard to the representation of employees on the Danish equivalent of the works council, the cooperation committee (Fulton, 2021).

[24]In Denmark, some employees can be part of the governance and management of firms ("company representation" and in Danish "selskabsrepræsentation") when a company has had at least 35 employees on average over the previous 3 years. See Jäger, Noy, and Schoefer (2022) for details.

- None of the above

20. In general, what are the main considerations that come to mind when thinking about reducing the number of employees? Please use the text box below and write as much as you like. Your opinion and thoughts are very important to us. There is no right or wrong answer. If you do not want to share your views, then skip this question.

C.0.4 Perceptions, Attitudes and Reasoning Regarding Adjustment of Worker Pay

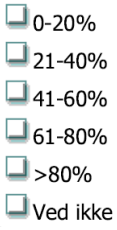
21. If revenue decreased in 2020 and base pay reduction was not used in 2020: What are the main reasons for not lowering the contractual base pay (*basisløn*)? Please state your position on the following statements. Respondents have five options (strongly agree, agree, neutral, disagree, and strongly disagree).

    - It would be illegal or almost impossible to change the base pay and contractual allowances
    - The company thinks of the base pay as a commitment to its employees
    - Pay reduction can damage productivity because employees do not work as hard
    - Pay reduction would lead employees to quit
    - Pay reduction damages morale and is demotivating for employees in general
    - Unions / employee representatives are against pay reductions
    - Pay reduction would not save jobs

22. If revenue decreased in 2020 and bonuses reduction was not used in 2020: What are the main reasons for not lowering noncontractual supplements and / or bonuses? Please state your position on the following statement. Respondents have five options (strongly agree, agree, neutral, disagree, and strongly disagree).

    - The company thinks of bonuses as a commitment to its employees
    - Bonus reduction can damage productivity because employees do not work as hard
    - Bonus reduction would lead employees to quit
    - Bonus reduction damages morale and is demotivating for employees in general
    - Unions / employee representatives are against bonus reductions
    - Bonus reduction would not save jobs

23. If the company laid off workers in 2020: Which reduction in the total salary cost (salary plus allowances and bonuses) could have prevented layoffs? The options are listed in the screenshot.



24. If the company laid off in 2020: Why didn't you lower pay instead of laying off employees? Please express your opinions on the following statements. Respondents have five options (strongly agree, agree, neutral, disagree, and strongly disagree).

    - Pay reduction would not have saved jobs
    - Pay reduction would hurt morale and productivity more than layoffs
    - Layoffs give better control over who leaves the company
    - Layoffs save more money than pay cuts do

C.1 Further Information on Data sources

D Data, Institutional Setting, and the Pandemic

This section provides additional information on the Danish institutional setting and the Pandemic recession, which complements Section 2.2 and Section 2.3 in the main text.

D.1 O*NET Classification of Tasks by Occupations

We use the following categories of jobs based on tasks. We follow Acemoglu and Autor (2011) and use composite measures of O*NET Work Activities and Work Context Importance scales. Instead of using offshorability directly, we use three components of the offshorability composite measure to define "Social interaction". Below we list the definition of the variables we use.

Non-routine cognitive: Analytical.

- Analyzing data/information
- Thinking creatively
- Interpreting information for others

Non-routine cognitive: Interpersonal.

- Establishing and maintaining personal relationships

- Guiding, directing and motivating subordinates
- Coaching/developing others

Routine cognitive

- Importance of repeating the same tasks
- Importance of being exact or accurate
- Structured v. Unstructured work (reverse)

Routine manual

- Pace determined by speed of equipment
- Controlling machines and processes
- Spend time making repetitive motions

Non-routine manual: physical

- Operating vehicles, mechanized devices, or equipment
- Spend time using hands to handle, control or feel objects, tools or controls
- Manual dexterity
- Spatial orientation

Non-routine manual: interpersonal adaptability

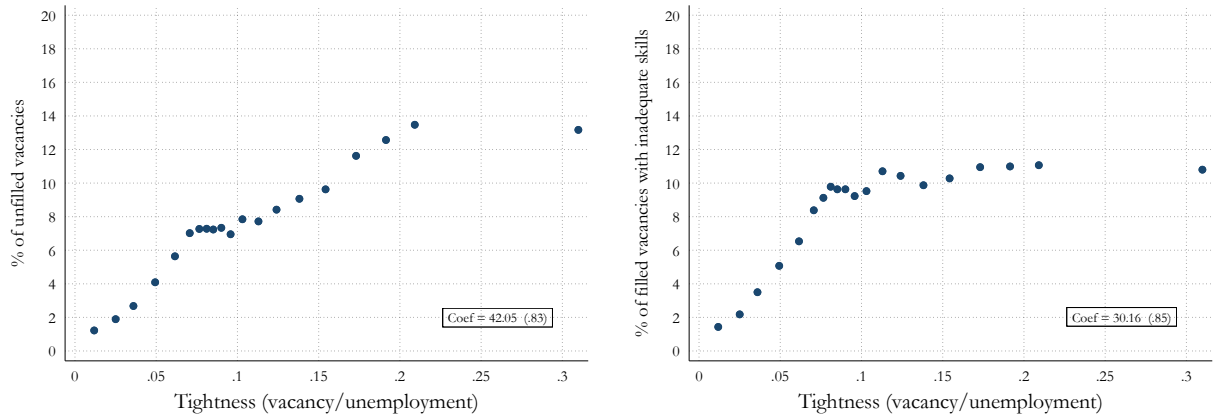
- Social perceptiveness

Social interaction

- Face-to-face discussions
- Assisting and caring for others
- Performing for or working directly with the public

D.2 Vacancy and Unemployment Data

Figure A.18: Labor Market Tightness and Vacancy Filling Rate



Note: Panel (a) links the labor market tightness and the percentage of firms reporting declaring not having filled a vacancy four months after posting it. Panel (b) links the labor market tightness and the percentage of firms declaring not having filled a vacancy with a worker with the right qualifications.

D.3 LONN

Hours are decomposed into:

- Normal hours: Normal hours are the hours worked, including paid hours during holidays, sickness, and other absences with pay. For example, for a salaried worker employed throughout the year with a normal 37 hours worked per week, this person will have 1924 reported normal hours (i.e., 37*52)
- Overtime hours: Number of additional paid hours worked.
- Paid hours: the sum of normal and overtime hours.
- Realized hours: Paid hours minus absence due to paid and unpaid absence hours (e.g., sickness, holiday).

The earnings components are:

- Base pay: The basic earnings consist of all earnings excluding absence, overtime, irregular, shift/nuisance, pension, and employee benefits earnings. It includes the base salary and holiday allowances.

- Holiday pay: There are two types of holiday allowances. Holiday pay (Feriebetalinger) and special holiday pay (særlig feriegodtgørels). Special holiday pay (særlig feriegodtgørels) is typically paid twice a year (in May and August) in addition to the monthly salary.
- Employee benefits pay. Contains taxable (A-income) employee benefits. Typically, it includes the value of a free car, meals, lodging, multimedia, taxable health insurance, canteen arrangements, and work clothes.
- Shift/Nuisance pay: Contains allowances for special work conditions (e.g., night work, work on public, outdoor work, delayed lunch, heating, on-call).
- Irregular pay: Contain all earnings that are paid irregularly. It includes, for example, annual bonuses, profit sharing plans, and pay for non-taken holidays.
- Pension pay: Contains both employee and employer contributions to pension plans.
- Overtime allowance: The overtime allowance is given for work beyond normal working hours. Includes allowances for both overtime and additional work. Includes only the overtime allowance and not the total overtime payment.
- Absence pay: Contains the employer's payments in connection with the employee's absence but also includes payments for absence, which the employer may subsequently receive a refund from the public sector.

D.4 Further Information on Institutional Setting

The Danish Flexicurity model. The job mobility rate in Denmark is one of the highest in the OECD (see Figure A.19). Unlike many European countries, Denmark has relatively few restrictive regulations on hiring and firing. According to several Employment Protection Law indexes, Denmark has among the most flexible employment protection laws among advanced economies (see Figure A.19). Unionization is higher in Denmark than in the US (see Figure A.19). Unemployed workers are entitled to unemployment insurance payments if they are members of an unemployment insurance fund, with a net replacement rate of 83 percent for workers (Kreiner and Svarer, 2022). Membership in the unemployment insurance

fund is voluntary and 80 percent of workers are members. Contrary to the US, Danish firms are not subject to experience ratings with regard to their contributions to unemployment insurance., otherwise, they receive social assistance.

Wage-setting. Like most European countries, the Danish collective bargaining agreement is based on a two-tier structure. Industry agreements set the base wage for 20% of workers. For the other 80%, the base wage is set at the firm level (DA, 2018). Various pay components, such as bonuses, are set at the firm level.

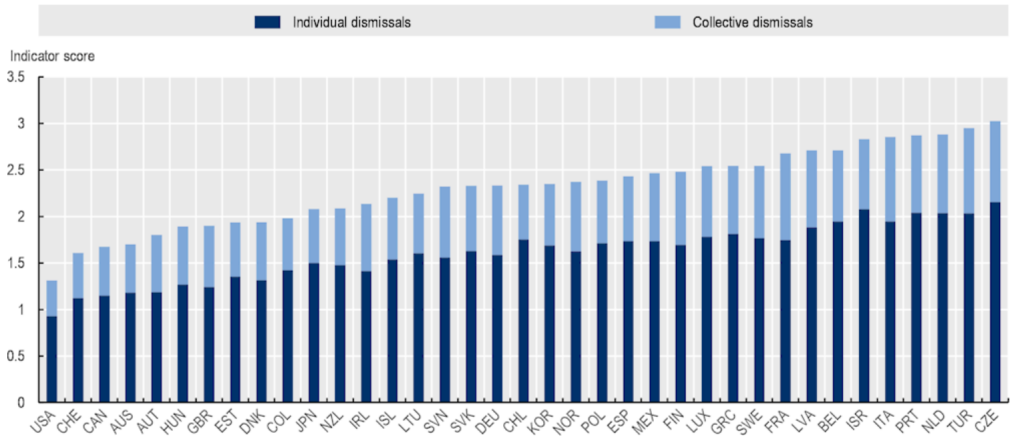
A collective agreement covered 87% of private sector employees in 2017 (DA, 2020). Eighty-seven percent is comparable to other Scandinavian countries (Norway and Sweden) and around ten percentage points higher than in Continental Europe. See Figure 1 in Bhuller, Moene, Mogstad, and Vestad (2022). As noted in Bhuller et al. (2022), there is a wide range of 'sectoral' bargaining levels in Europe. Denmark is classified as "some sectoral" and not as a "sectoral" bargaining level by Bhuller et al. (2022).[25] Specifically, for 80% of workers, pay is established through local negotiations at the firm level (see Table **??**). Industry-level agreements are limited to other conditions. For some industries, although not all, these industry-level agreements also set a wage floor, which applies in very few cases. These correspond to the practices called "*minimallønssystemet*" and "*uden lønsats*". *The General Agreement* sets the framework for collective agreements. The General Agreement is signed between the Danish Confederation of Trade Unions (LO, since 2019 named the Danish Trade Union Confederation "*FH*") and the Danish Employer Confederation (DA). The General Agreement established the rules for issues that the labor code would regulate in many other countries. See Fulton (2021) for more information. For the remaining 20% of the workers, the sectoral level agreements set out all the main terms, including pay, followed locally. However, even in this case, various pay components, such as bonuses, are set at the firm level. A notable difference compared to the US is the percentage of employee representation coverage, which is one of the highest, even within Europe (see Figure A.19). Therefore, as summarized in Dahl, Le Maire, and Munch (2013), pay is mainly negotiated at the firm level in Denmark. How does this wage setting compare with other countries? This wage-setting system is between two groups (see Bhuller et al. (2022); Cazes, Garnero, and Martin (2019)). In some countries, employment conditions are established directly at the firm level. In other countries, there is little room for firm-level

[25]Denmark is in the same group as Israel, Luxembourg, Australia, Switzerland, Spain, Finland, Sweden, Norway, and the Netherlands. This level of negotiation contrasts with Portugal, France, Italy, Iceland, Germany, Austria, and Belgium, where pay negotiations are at the sectoral level.

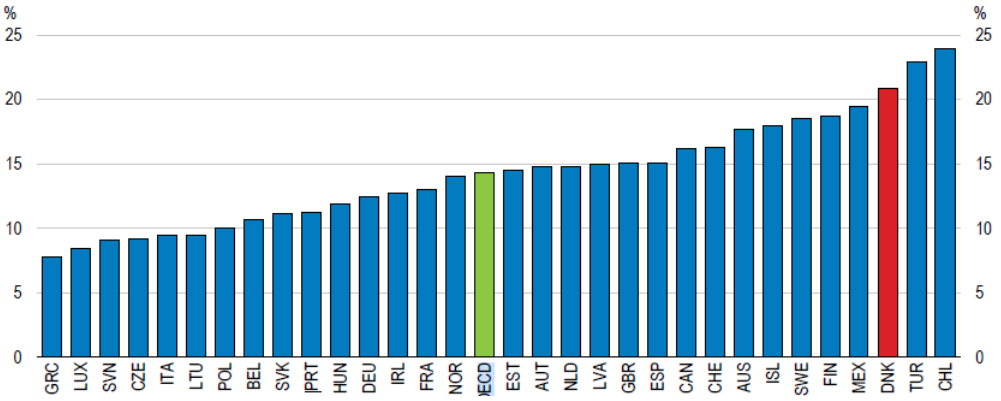
agreements, and most pay conditions are set at the industry level. See the website Worker Participation.eu for a historical account of the Danish collective bargaining system.

Figure A.19: Institutional Features of the Danish Labor Market

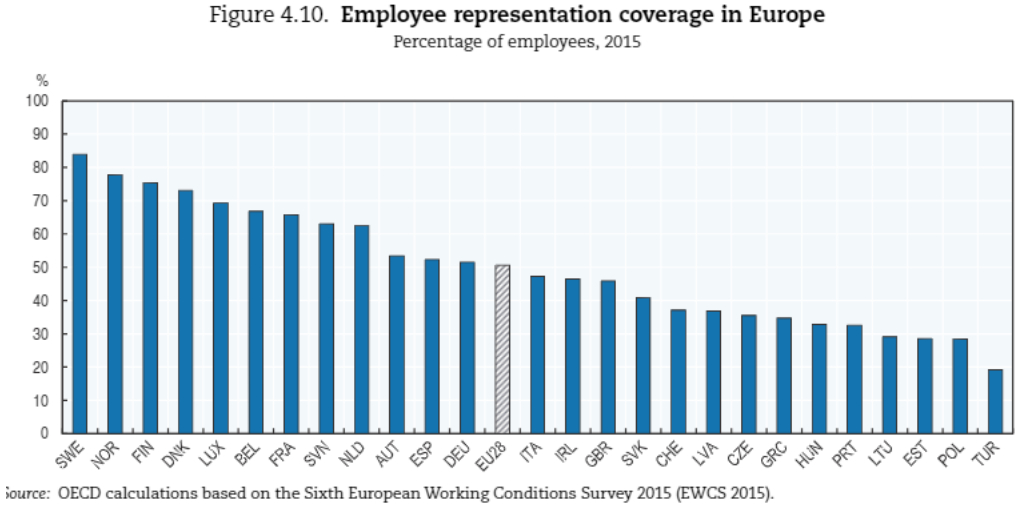
Panel (a): Employment protection is low



Panel (b): Job mobility is high



Panel (c): Employment representation coverage is high



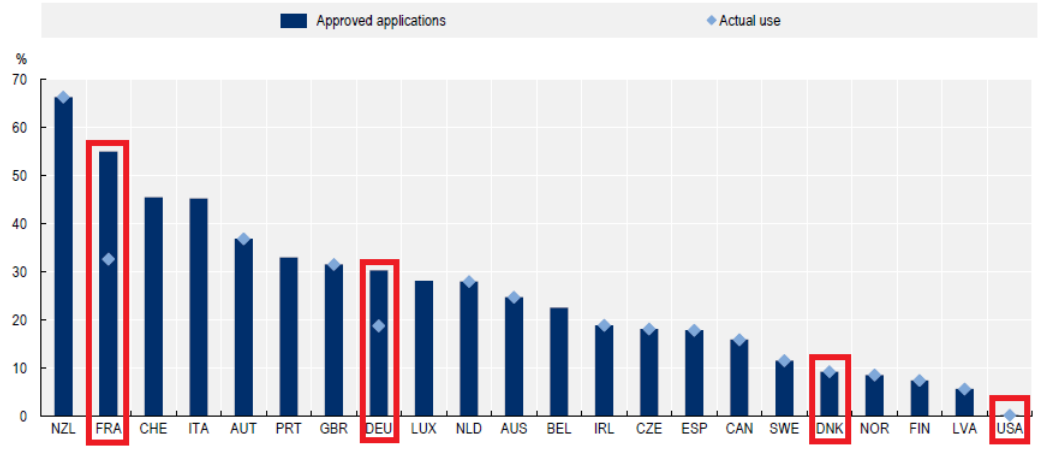
Note: The different panels report different features of the Danish labor market. This Figure illustrates that worker representation is high, employment protection is low, and that job mobility is high in Denmark. Source: OECD (2017, 2019, 2020b). Section 2.3 in the main text describes the institutional context of the Danish labor market.

D.5 The Pandemic Recession

Timeline. On March 11,2020 the Prime Minister announced the closure of public schools and cultural institutions. A few days later, businesses with close customer contacts (e.g., hairdressers, bars, etc.) were also closed. See Borgensgaard (2022) for a timeline of public policies in 2020 in Denmark. Restrictions were removed on 10 September 2021. By already 13 April 2021, Denmark had begun reopening in many places. We decided to send the survey in the Summer of 2021 as the pandemic recession was thought to be over. For example, IMF talked about recoveries in the Spring of 2021, and Congress passed the American Rescue Plan in March 2021. Also, the vaccination rate was high in Denmark and worldwide.

Government programs. Wage subsidy, furlough, and short-time work (STW) schemes were extensively used in 2020 across OECD countries (the US being an exception) and had also been used during the Great Recession. Importantly, in Denmark, the furlough program was less generous and flexible than other job retention schemes implemented in most OECD countries (OECD, 2020a; Scarpetta, Carcillo, and Hijzen, 2022). Indeed, most countries implemented Short Time Work programs (STW). Giupponi and Landais (2020) provide evidence on the effects of STW on firms' and workers' outcomes during the Great Recession in Italy. In addition, the government offered a loan guarantee to firms. Additionally, between 25% and 80% of fixed costs could be compensated for firms that stayed open but experienced between 35% and 100% decreases in revenue. For firms forced to close, 100% of fixed costs were compensated. Bennedsen, Larsen, Schmutte, and Scur (2022) analyze the use of different aid packages during the pandemic in Denmark and find that better-managed firms were more likely to take up aid. Mattana, Smeets, and Warzynski (2020) and Bess and Darougheh (2021) show that the use of the furlough scheme is concentrated among people with low education, consistent with Figure A.2. Borgensgaard (2022) shows that furlough workers experienced a decrease in earnings, which may reflect this, and which is consistent with our findings that firms reduced base pay.

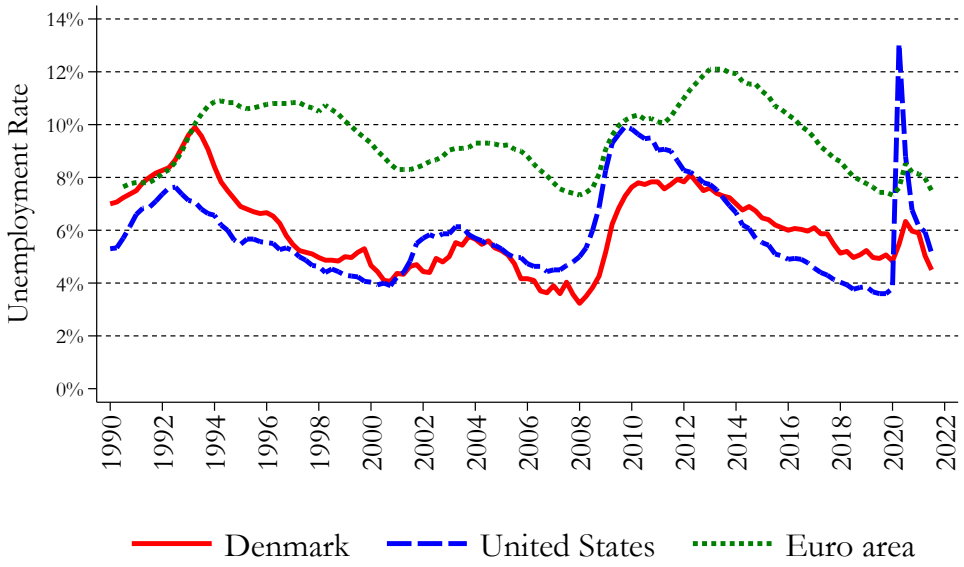
Figure A.20: Job Retention Scheme in Denmark Compared to Other OECD Countries



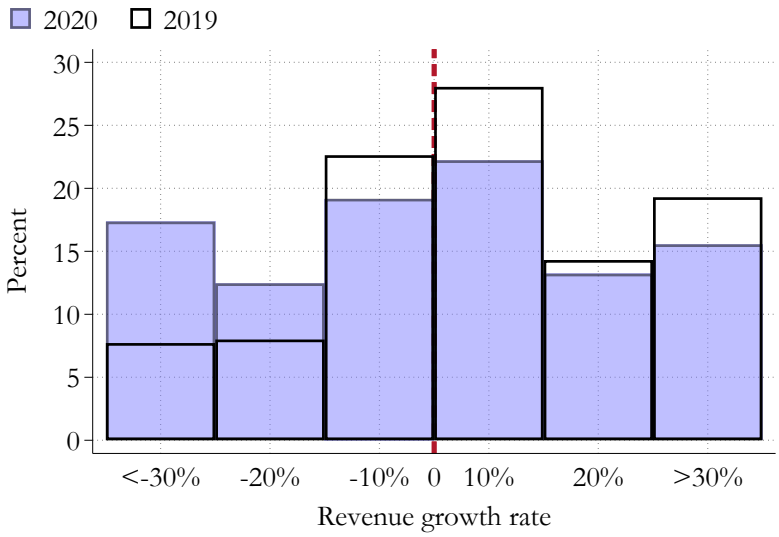
Note: Take-up rates of job retention schemes in May 2020, calculated as a percentage of dependent employees in 2019 Q4. The figure illustrates that the use of the job retention scheme in Denmark was less prevalent than in other European countries (e.g., France and Germany) during the Pandemic recession. Source: OECD (2020a). Section 2.3 describes the Danish institutional context.

Figure A.21: The Magnitude of the 2020 Pandemic Shock

Panel (a): Unemployment Rate in Denmark, the US and the Euro Area



Panel (b): Revenue growth rate in 2020 and in 2019



Note: Panel (a) reports the unemployment rate in Denmark, the US and the Euro area, measured as the number of unemployed people as a percentage of the labor force and is seasonally adjusted. Panel (b) compares the revenue growth rate from 2019 to 2020 (in blue) and the revenue growth rate from 2018 to 2019 (transparent) in our data set. The figure illustrates that the Danish unemployment rate is lower and more volatile than the unemployment rate in the Euro area. More firms in 2020 had a negative revenue growth rate compared to 2019. Source: The unemployment rate series is from the OECD database (from 1990-Q1 to 2021-Q3) based on labor force surveys.

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