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Seniority rules and selection into job loss*

Martin Häggkvist[†]

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Abstract

How much are employers willing to pay to sidestep employment protection? I study this in the context of seniority rules, aiming to shield tenured workers from job loss. Using detailed and unique Swedish layoff notification data matched with administrative registers, I identify the set of workers at risk of dismissal and construct counterfactual displacement lists based on the mandated layoff order. I find that workplaces with relatively more productive junior workers are significantly less likely to follow the seniority order. A one-standard-deviation increase in the relative productivity of recent hires reduces compliance by 7.7 percentage points. To circumvent the default order, employers provide higher severance pay and longer advance notice to senior workers, indicating that firms pay for the right to retain more productive workers. These results indicate that seniority rules impose efficiency costs on employers as employment protection is traded for financial compensation.

Keywords: employment protection, seniority rules, productivity, severance pay

Jel: J41, J52, J63

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[†]Department of Economics, Uppsala University.

1. INTRODUCTION

A vast literature documents a large variety of labor market consequences of employment protection legislation (EPL), both on worker reallocation and effects on incumbents (Lazear, 1990; Hopenhayn and Rogerson, 1993; Pissarides, 2001; Bentolila, Dolado, and Jimeno, 2019). A prevalent example of EPL is seniority rules, which mandate the order of layoffs.¹ While these rules are typically justified as protecting older workers—who face higher re-skilling costs (Belot, Boone, and Van Ours, 2007) or potential age-related productivity declines (Lindbeck, 1994)—they also restrict an employer’s discretion over displacement and retention. Consequently, seniority rules introduce a potential trade-off between distributional equity and firm efficiency.

Despite these implications, there is very limited evidence if and how firms navigate around such regulatory constraints. This is important both from an efficiency point of view and because it has implications for which workers are most at risk of job loss. There is a body of literature suggesting that layoff risk is systematically related to productive characteristics.² Figure 1 provides an example by illustrating a strong negative association between within-occupation wage levels and the likelihood of becoming displaced. Yet, how these patterns are associated with EPL remains poorly understood.

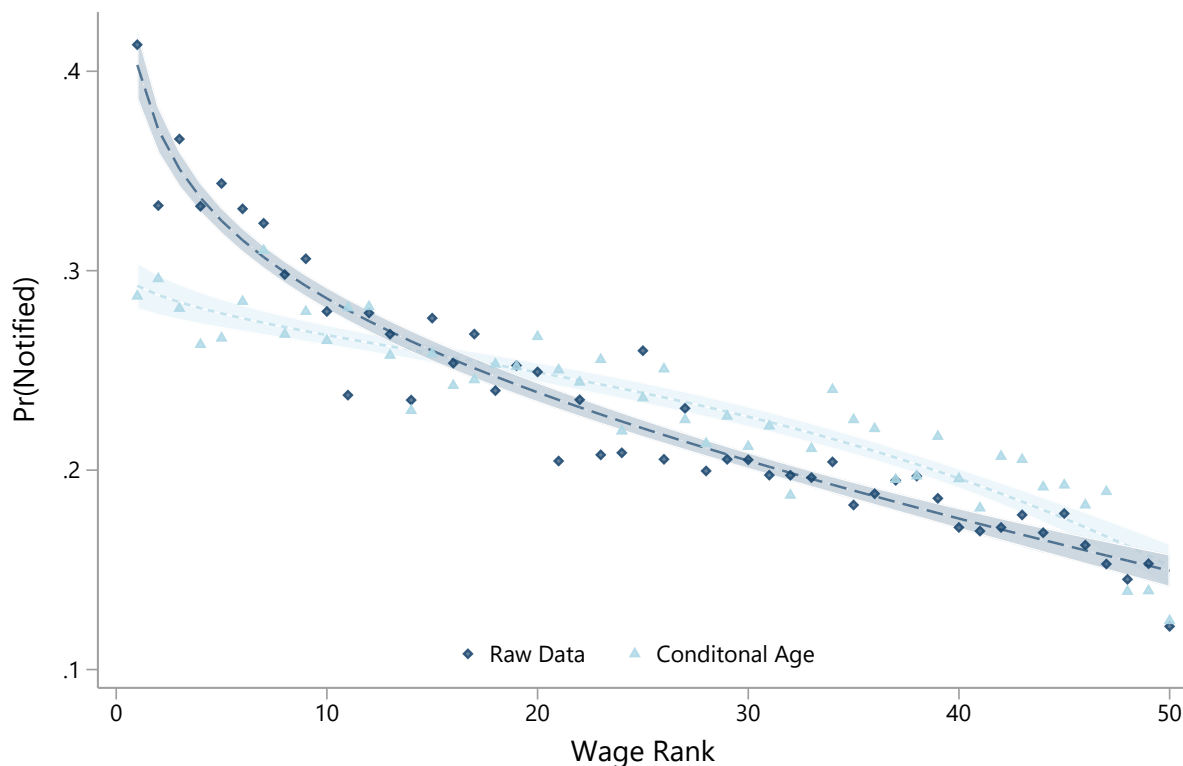
I address this gap studying Sweden, where there is a legally mandated Last-In-First-Out (LIFO) rule stipulating that less-tenured workers should be displaced before senior workers (SFS, 1982).³ Sweden serves as an ideal setting for this analysis because, while firms are mandated to comply with the seniority order, the law is *semi-dispositive*. This means that employers may sidestep the default ordering of workers if they reach an agreement on an alternative list of workers with the labor union; in the absence of such an agreement, the

¹Seniority rules exist in many countries in both age- and tenure-based forms; see Skedinger (2011) and von Below and Thoursie (2010) for a comprehensive overview.

²Gibbons and Katz (1991) discusses potential selection into job loss. Seim (2019) documents an association between cognitive ability and the likelihood of displacement, while evidence from Margolis and Montana (2024) suggests that employers use downsizing as a means to reshape a firm’s skill structure.

³Various forms of LIFO rules exist in many countries, most commonly within collective bargaining agreements (CBAs) in many European countries; in the United States, most layoffs in school districts are similarly governed by seniority rules (Boyd et al., 2011).

FIGURE 1: PROBABILITY OF BEING NOTIFIED OVER WAGE RANK



Notes: The figure plots the likelihood of notification against the within-year and occupation wage rank for downsizing events in Sweden 2005–2019. The diamond bins show the mean likelihood of being displaced for each of the 50 wage ranks. The triangle bins show the likelihood of being displaced controlling for age. The lines display flexible fits based on a fractional polynomial, while the shaded areas represent the 95% confidence intervals.

LIFO rule applies as a default.

Thus, the law provides labor unions with leverage in negotiations, particularly in situations when the most junior workers are not those the employer wishes to dismiss. However, because deviations from the mandated order often occur in exchange for concessions—such as more generous severance pay or extended notification periods—it is potentially costly for employers to persuade the union to sidestep the default list of displaced workers.⁴ This institutional feature enables me to examine when employers and unions are most likely to comply with or sidestep the mandated ordering, as well as how much employers are willing to pay to retain newly hired workers through either severance pay or increased

⁴These two types of concessions are specifically mentioned by employers themselves when the seniority rules have been evaluated (see p. 305 and p. 408 in SOU, 2020).

advance notice.

The seniority rule is arguably one of the most controversial features of EPL in Sweden. While unions generally view it as a cornerstone of job security that prevents arbitrary dismissals (Lund, 2013), many employers argue it hinders business growth by making it harder to retain key staff, reducing labor mobility, and adding bureaucratic costs (Svenskt Näringsliv, 2009). Meanwhile, some critics argue the debate is performative, noting that in practice, senior employees are rarely protected because employers have numerous ways to bypass the rules (Calleman, 2011, p. 190). This view has been challenged by several studies showing that it indeed affects a variety of labor market outcomes (Bjuggren, Olsson, and Skedinger, 2018). Given these conflicting perspectives, documenting where and when firms actually deviate from the default ordering is central to understanding how this policy operates in practice.

This study is, to my knowledge, the first to document which and when employers *comply* with the seniority ordering when downsizing. Specifically, I investigate the association between the within-workplace productivity ordering of workers and which individuals are selected for displacement. In Sweden, employers and labor unions negotiate which workers are to be displaced. These negotiations yield a list of workers, which receive advance notice of layoff. First, I identify the list of notified workers for each downsizing event, alongside those who were employed at the same time and place, but not notified. By leveraging information on individual occupations and tenure, I construct the counterfactual lists of workers who *would* have been notified under strict compliance with the LIFO ordering. I then calculate LIFO compliance as the degree of overlap between those who would have been and actually were notified. Additionally, I categorize downsizing workplaces by the relative productivity of their most junior workers, proxied using AKM worker fixed effects, to infer how binding the LIFO ordering is for each workplace. Finally, I examine systematic differences in compliance along this productivity dimension.

An important reason for the limited evidence on employer compliance with seniority ordering is the difficulty of distinguishing voluntary from involuntary exits. In many studies of job displacement, researchers cannot definitively determine whether a separation

resulted from a layoff or a voluntary quit. The existing literature typically addresses this in two ways: by relying on survey data, which may suffer from recall bias if conducted years after the event (von Wachter, Handwerker, and Hildreth, 2009), or by using mass layoff designs to isolate exogenous job loss (Jacobson, LaLonde, and Sullivan, 1993).⁵

I address this issue by leveraging unique and detailed register data on layoffs in Sweden, collected by the Public Employment Service (PES). These data include the near universe of layoff notifications in Sweden, allowing me to distinguish notified and non-notified workers through linkage with employer–employee registers.⁶ This strategy enables me to study the selection of workers for displacement versus retention with significantly less error than in designs lacking register data on notifications.

I find that workplaces with relatively more productive recent hires are less likely to comply with the LIFO ordering when downsizing. A one–standard deviation increase in the relative productivity of junior workers is associated with a reduction in compliance by 7.7 percentage points.⁷ This result indicates that employers may be willing to comply with the seniority ranking whenever it is not binding, i.e. when the productivity ranking of the workers aligns with the seniority ranking of their workers. Conversely, whenever the recent hires are relatively productive compared to other workers, employers are much more likely to sidestep LIFO and instead displace more tenured workers.

This study is also, to my knowledge, first to estimate firms’ willingness to pay to sidestep EPL. Using a measure of severance pay introduced by Cederlöf et al. (2025), I determine if deviations from LIFO are associated with increased severance packages or longer advance notice. I find that workplaces with relatively more productive junior workers pay higher severance to notified workers, consistent with employers incurring costs to deviate from LIFO by buying out more senior workers. I also find that these firms provide longer advance notice. The results indicate that exempting one extra worker incurs a cost of 45,700

⁵Even large-scale events risk conflating involuntary displacement with coinciding voluntary quits (Flaen, Shapiro, and Sorkin, 2019; Häggkvist, 2026). By design, mass layoffs likely involve less worker selection, which is the very phenomenon I aim to investigate (Gibbons and Katz, 1991).

⁶These data are available for years 2005–2019 and include all parts of the country, see Figures A.1 and A.2.

⁷I define the relative productivity as the normalized difference in mean worker fixed effects between the workers who should have been displaced vs. should not have been displaced, see Section 4.

SEK, split equally between extended notice and more generous severance.

This study contributes to several strands of the literature. First, the literature on how seniority rules affect the labor market. Existing research suggests that such mandates can suppress hiring (von Below and Thoursie, 2010; Bornhäll, Daunfeldt, and Rudholm, 2015), increase firm selectivity during recruitment (Butschek and Sauermann, 2024; Bjuggren and Skedinger, 2018), lead to worker absence (Olsson, 2009), and diminish labor productivity (Bjuggren, 2018). This is to my knowledge the first study to investigate how compliance with the seniority ordering interacts with the productivity ranking of the workplace. By analyzing who is displaced, I document the first empirical evidence on how firms navigate the trade-off between mandated compliance and the retention of workers.

Second, I extend the broader literature on the consequences of EPL (Addison and Teixeira, 2003; Autor, Kerr, and Kugler, 2007; Pissarides, 2001; Saez, Schoefer, and Seim, 2023; Skedinger, 2011) by employing register data on displacements. By combining these data with a setting where employers face restricted discretion in whom they are allowed to displace, I am able to investigate selection into job loss without the risk of conflating voluntary and involuntary separations (Gibbons and Katz, 1991).

Third, I contribute to the literature on job security provisions and advance notice for displaced workers (Lazear, 1990; Cederlöf et al., 2025). I document a previously unexplored channel through which employers buy flexibility in who they displace using severance packages and extended advance notice. This allows me to quantify employers' willingness to pay to sidestep the mandated order of layoffs.

The remainder of the paper is organized as follows. Section 2 describes the institutional setting while Section 3 presents the data and sampling procedure. Section 4 presents the empirical specification. Section 5 examines compliance with the LIFO ordering as well as worker compensation across workplaces with different skill structure. Section 6 studies heterogeneity by event characteristics. Section 7 concludes.

2. INSTITUTIONAL SETTING

In this section, I first describe the Swedish last-in-first-out rule in Section 2.1. Second, I describe how I define compliance with the rule in Section 2.2.

2.1. THE LAST-IN-FIRST-OUT RULE

The strictness of EPL in Sweden is similar to many other OECD countries, for instance Germany, Italy, France, and Spain, while it is more strict than in countries such as the United States or Canada (Figure 2). Regarding the LIFO rule specifically, it exists in more than 80 other countries (World Bank Group, 2016). In most cases, seniority rules are established through CBAs, whereas Sweden and the Netherlands stand out by explicitly anchoring them in law as the primary criterion for prioritizing among workers (Cederlöf, 2024).⁸

The Swedish LIFO rule is regulated by the Employment Protection Act (SFS, 1982).⁹ The law stipulates that newly hired workers must be dismissed before those with longer firm tenure. In cases where tenure is equal, older workers are given priority and retained. The legislation applies at the workplace $\times$ CBA level.¹⁰ These groups are called order of termination circuits (*turordningskrets*, henceforth referred to as circuits). Another important feature is the priority of recall for workers with at least 12 months of tenure who are deemed sufficiently qualified for the new job and expressed a desire for recall prior to their layoff.¹¹

Importantly, the law is semi-dispositive. This means that employers and labor unions may agree to deviate from the mandated ordering and establish an alternative list of workers.

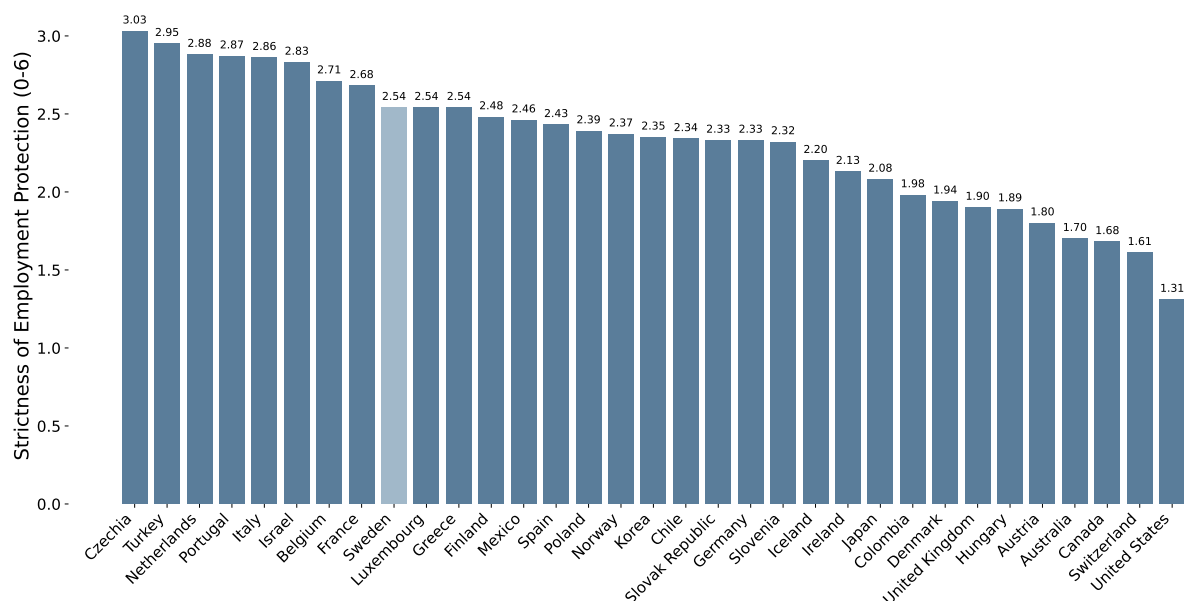
⁸See Section A for a comprehensive overview of previous EPL studies.

⁹*Lagen om anställningsskydd* (LAS).

¹⁰If an employer has several workplaces at the same locality, the labor union may request that all workplaces be treated as a single unit.

¹¹During the study period, these rules remained in effect until the worker's 67th birthday. In addition, exemptions included the employer's family members and managerial staff. Small businesses with up to 10 employees were also allowed to exempt two employees if they were considered essential to the continued operation of the firm.

FIGURE 2: OECD EMPLOYMENT PROTECTION INDEX (2019)



Notes: The figure shows the strictness of EPL for individual and collective dismissals of regular contracts across selected OECD countries. The measure is based on the OECD Employment Protection Legislation indicator (OECD, 2019), which ranges from 0 (least strict) to 6 (most strict). Countries are ranked from most to least strict. Sweden is highlighted in light blue. Values above each bar indicate the strictness score for the respective country.

When an employer intends to downsize, they are required to enter negotiations with the labor union to determine the layoff order.¹² These negotiations result in a list of workers to be notified.

The employer and union have full discretion over who is selected for displacement, under the condition that they reach an agreement, while the individual worker has no influence over who is dismissed or retained.¹³ The alternative list is sometimes constructed using more fine-grained cells within which the ranking occurs. For example, if the cells are narrower than the entire group covered by the CBA, the employer gains greater discretion in deciding who is dismissed.¹⁴ The definition of these cells is therefore part of the negotiation process, as it directly affects which workers are notified and which are retained

¹²Labor unions have the right to participate in all major decisions affecting the workforce, including downsizing, as regulated by the Co-Determination Act (SFS, 1976).

¹³Important to note is that worker membership in a labor union has no formal importance for implementation of the LIFO ordering.

¹⁴Some CBAs include all white-collar or all blue-collar workers at the workplace while other are occupation specific.

(Calleman, 1999).

However, if the employer and union fail to reach an agreement, the LIFO ordering applies as a default, giving the labor union substantial bargaining power.¹⁵ Without an agreement, the fallback option is full compliance with LIFO, meaning that displacement is governed strictly by seniority.¹⁶ In such cases, the employer must retain the most senior workers – which are not necessarily the same workers that would have been retained in absence of the law. This creates a threat point that the union can use in negotiations.

While employers are likely to prioritize the future efficiency of the firm and therefore seek to retain the most productive workers, labor unions are likely to advocate for generous severance packages or advance notice periods for displaced workers.¹⁷ Survey evidence suggests that in 90% of cases where the default order was sidestepped, the agreement also included some form of extra-legal benefits, most commonly extended notice periods or severance pay (see p. 306 in SOU, 2020).

While quantitative evidence on the motives of the employers and labor union are scarce, Saez, Schoefer, and Seim (2023) find that low skilled elderly employees are more likely to be displaced, upon reaching retirement age. There is some qualitative evidence suggesting that labor unions prefer to follow LIFO, as the cost of job loss is potentially larger for more senior workers (Calleman, 1999). This suggests that employers often have incentives to sidestep strict LIFO compliance, while labor unions typically require concessions, such as more generous severance pay, in exchange.

Survey evidence indicates that many employers perceive the mandated ordering as an obstacle. In a 2009 survey, 50% of employers reported that they would likely exempt certain workers from the ranking in the event of downsizing, and 32% had already done so in

¹⁵In negotiation theory, a superior threat point yields a stronger bargaining position and better outcomes – see Nickell and Andrews (1983) for an application to union-employer wage disputes.

¹⁶There are several additional ways for employers to deviate from strict compliance. First, during the study period, firms with ten or fewer employees could exempt two workers from the seniority ranking. Second, workers who cannot be retrained for a new job within six months after downsizing may be exempted.

¹⁷A union's preferred ordering is not ex ante obvious. For example, unions may in some instances favor retaining high-productivity workers to ensure the long-term viability of the firm. The unions have, however, strongly opposed legislation that would give the employers more discretion over which workers are displaced (Gideonsson and Rehnström, 2020).

the previous year (Svenskt Näringsliv, 2009). Among those who had used the exemption, nearly all (93%) stated that the ability to exempt workers from LIFO was vital for the firm's future.¹⁸

2.2. EXAMPLES OF DIFFERENTIAL INCENTIVES AND COMPLIANCE

Figure 3 illustrates two examples circuits, with varying degrees of LIFO compliance. The upper row depicts an example of a circuit where there is high compliance with LIFO and the bottom row low less compliance. Workers are ranked from left to right by seniority within circuit following the law. In both examples, the circuit contains ten workers, and the employer wants to lay off four.¹⁹ The four rightmost workers are the most junior and should be notified under perfect LIFO compliance. I refer to these workers as the “de jure notified”.

Once negotiations are finalized, the workers who are notified de facto and de jure are not necessarily the same, owing to varying degrees of compliance. The red colored workers are de facto notified, while the rest are retained. LIFO-exempted workers are highlighted, meaning they are de jure notified but not de facto notified.²⁰

Under perfect compliance, all four junior workers would be de facto notified. In the upper circuit, compliance is high, as three out of four de jure notified workers are actually notified. In the second example, compliance is low, as only one out of four de jure notified workers is actually notified.

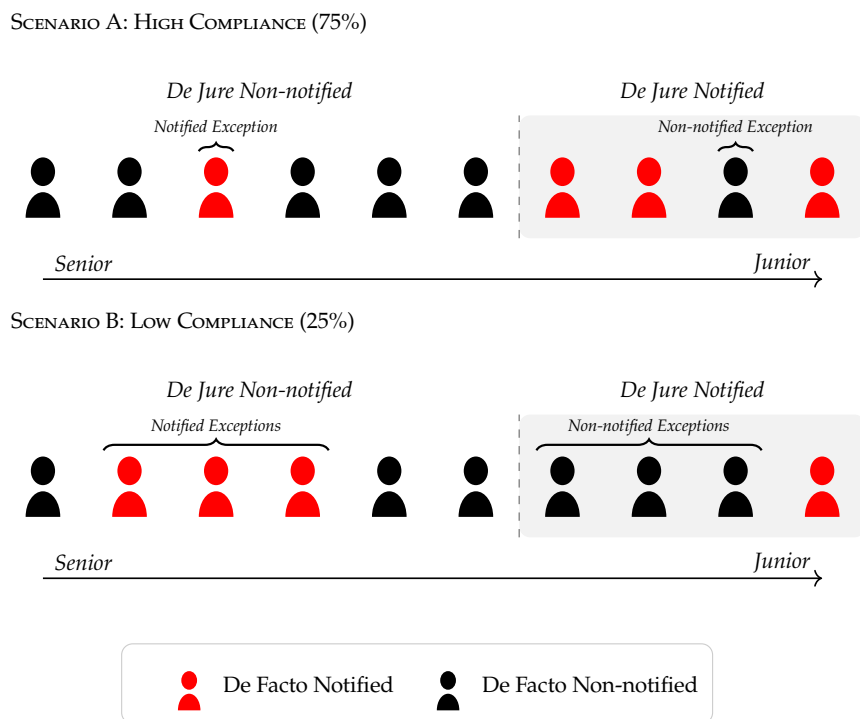
I hypothesize that because workplaces vary in the *relative within-circuit* productivity of their recent hires, they will also vary in their compliance with seniority ordering. The intuition is that because employers want to retain their most productive employees, they are willing to make concessions to the labor union if the perceived gain of sidestepping the ordering is

¹⁸The employers' organization has also argued for more relaxed rules allowing employers to prioritize competence and qualification over seniority (Dahl, 2020).

¹⁹It is possible that also the number of displaced workers is part of the negotiation. I return to this in Section 4.

²⁰Cederlöf (2024) exploits the cutoff, highlighted with the vertical dashed line, using a regression discontinuity design to estimate the cost of job loss.

FIGURE 3: ILLUSTRATION OF TWO CIRCUITS WITH DIFFERENT LIFO COMPLIANCE



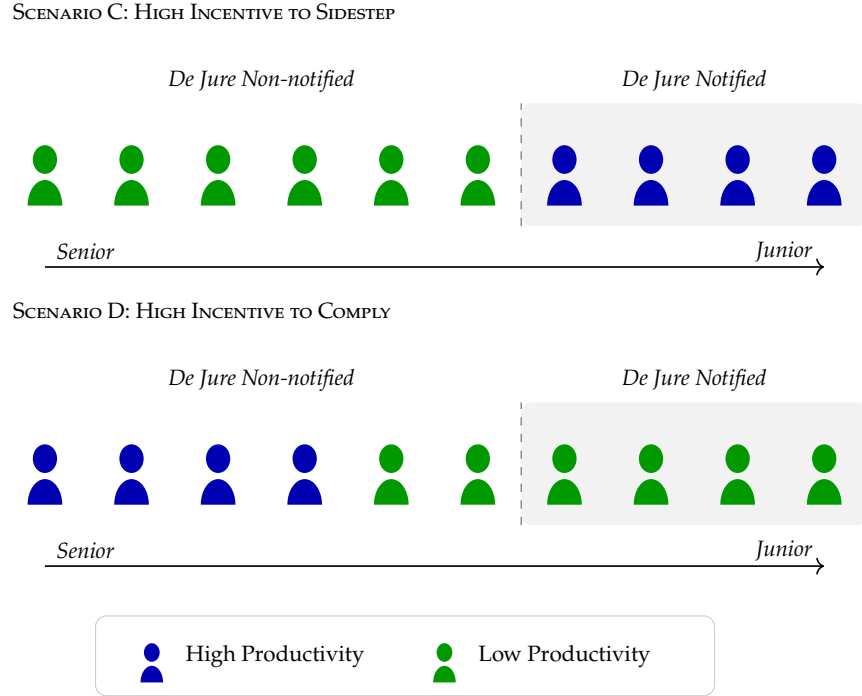
Notes: This figure illustrates varying degrees of LIFO compliance. Red figures represent workers who are *de facto* notified; black figures are *de facto* non-notified.

large enough.

This is exemplified in Figure 4. The blue workers have high productivity while the green workers have low productivity. The setup is the same as in Figure 3; there are thus two example circuits where workers are ranked by their tenure. In the upper circuit, the *de jure* notified workers are all blue meaning that the employer would have a lot to lose to follow LIFO and is therefore incentivized to sidestep. Conversely, in the bottom example, the junior workers are of low productivity meaning that the incentives to comply are larger.

In the next section, I discuss the data sources I use to estimate the relationship between the relative productivity of the most recent hires and LIFO compliance.

FIGURE 4: ILLUSTRATION OF TWO CIRCUITS WITH DIFFERENT INCENTIVES TO COMPLY



Notes: Blue figures represent highly productive workers; green figures represent less productive workers.

3. DATA SOURCES AND SAMPLING

I use detailed register data on layoff notifications collected by the Public Employment Service (PES) (Arbetsförmedlingen, 2025), which provide near-universe coverage of notified individuals in Sweden between 2005 and 2019.²¹ Under Swedish law, employers planning to lay off five or more workers within a 90-day window must file an official notification with the PES.

Notification data are rare in the previous literature. Most studies instead rely on employer–employee data to infer downsizing events, typically requiring that the event affects at least 30% of the workforce (Couch and Placzek, 2010). These approaches risk erroneously coding some voluntary quits as layoffs. The PES data resolve this by directly observing the employer’s reported list of notified workers.

²¹See Figure A.2 for the number of downsizing events over time.

I link the PES notifications with several administrative registers: (i) RAMS (SCB, 2018), covering all employer–employee matches with earnings and employment status since 1985; (ii) LISA (SCB, 2017), providing demographic characteristics including education, marital status, and migration background; (iii) the Business Register (SCB, 2025a), supplying establishment-level industry codes; and (iv) Wage Statistics (SCB, 2025b), containing full-time equivalent wages, sector information, and detailed occupation codes (SSYK).²²

I first identify all workers who appear in both the PES and employer–employee data in the notification month. I then define their colleagues as non-notified workers employed in the same establishment–month. The sample is restricted to workers with at least 12 months of tenure and monthly earnings of at least 10,000 SEK.

Ideally, I would construct LIFO circuits based on CBA boundaries, as discussed in Section 2.1. However, because Swedish registers do not contain CBA information, I approximate boundaries following Cederlöf (2024) using workplace $\times$ two-digit-occupation cells (SSYK).²³ The Wage Statistics register allows me to assign occupations to all workers in sampled establishments. My main sample therefore includes only workplaces covered by this register. Although this proxy does not perfectly capture true LIFO boundaries, I assume that any resulting measurement error is non-systematic across circuits. That is, I examine the relationship between relative productivity and LIFO compliance, while I cannot capture the true levels of compliance.

I limit the analysis to non-closure downsizing events with circuit sizes between 10 and 50 workers. This ensures that each event contains both notified and non-notified workers and that employers plausibly observe relative worker performance. Unlike the cost-of-job-loss literature, I do not impose a minimum-displacement threshold (such as 30%), since selection into job loss is the focus rather than a confounder.

I define the size of the de jure notified group based on the number of de facto layoffs reported in the PES data. Within each circuit, workers are then ranked by tenure, with

²²The Wage Statistics sample covers all public-sector workers and roughly 50% of private-sector workers, with stratified sampling at the firm level.

²³An alternative approach is to use sector-wide (i.e. blue and white collar) cells instead of occupations, in accordance with the coverage of many CBAs. As a robustness check, I also replicate the analysis using workplace $\times$ sector definitions and find qualitatively similar results. See Table A.4.

TABLE I: DESCRIPTIVE STATISTICS

	(1)		(2)		(3)		(4)	
Panel A: Workers								
	De Facto				De Jure			
	Non-Notified		Notified		Non-Notified		Notified	
Job Information								
Log earnings t-1	12.65	(0.513)	12.48	(0.575)	12.68	(0.476)	12.39	(0.647)
Tenure	115.6	(84.16)	86.21	(76.78)	126.2	(83.97)	51.33	(48.59)
Experience	237.3	(94.18)	203.6	(106.1)	245.2	(91.14)	177.8	(102.5)
Pr(Blue Collar)	0.552	(0.497)	0.623	(0.485)	0.554	(0.497)	0.618	(0.486)
Pr(White Collar)	0.448	(0.497)	0.377	(0.485)	0.446	(0.497)	0.382	(0.486)
Rank in circuit	0.549	(0.283)	0.420	(0.286)	0.615	(0.244)	0.204	(0.177)
Demographics								
Age (years)	43.57	(11.13)	41.36	(12.65)	44.69	(11.07)	37.70	(11.46)
Pr(Woman)	0.307	(0.461)	0.322	(0.467)	0.313	(0.464)	0.303	(0.460)
Pr(Immigrant)	0.139	(0.345)	0.182	(0.386)	0.140	(0.347)	0.177	(0.382)
Pr(College)	0.268	(0.443)	0.232	(0.422)	0.256	(0.436)	0.272	(0.445)
Pr(Married)	0.444	(0.497)	0.401	(0.490)	0.453	(0.498)	0.374	(0.484)
Pr(Parent)	0.507	(0.500)	0.472	(0.499)	0.498	(0.500)	0.501	(0.500)
Observations	38098		11633		38098		11633	
Panel B: Circuits								
Event Characteristics								
Circuit Size	26.48	(11.50)						
Event Size	6.194	(4.697)						
Plant Characteristics								
Firm size t-1	1472.0	(2691.5)						
Plant size t-1	218.6	(481.5)						
Layoff Cause								
Pr(Streamlining)	0.490	(0.500)						
Pr(Low Demand)	0.258	(0.437)						
Pr(Other)	0.252	(0.434)						
Observations	1878							

Notes: Table I presents summary statistics for workers (Panel A) by de facto and de jure treatment status and for the circuits (Panel B). The first two columns split the sample based on whether the worker was notified in the PES data. The two rightmost columns present the same sample but instead split it by counterfactual treatment status under perfect LIFO compliance.

the lowest-tenure individuals classified as de jure notified. For instance, in a circuit of ten where five workers were actually laid off, those five with the shortest tenure are categorized as the de jure group.

The final dataset includes approximately 1,900 event–circuit combinations and about 50,000 workers, summarized in Table I. Mean circuit size is just above 26 workers. Columns 1–2 compare notified and non-notified workers, while Columns 3–4 present the corresponding comparison under perfect LIFO compliance. As shown in the two left-most columns, notified workers are negatively selected along several dimensions: they have 17 log points lower earnings, less labor market experience, and lower educational attainment. By construction, tenure differences are even larger under the de jure assignment than in the actual notified vs. non-notified comparison.

In the next section, I describe the empirical strategy.

4. METHODOLOGY

In Sections 2 and 3, I discussed the setting and specifically how I construct the main sample. In particular, I divide the sample by whether or not a certain worker was *de facto* notified by the employer or if the worker *should have been* notified under the mandated order (de jure notified). In this section, I will define two measures, one capturing compliance with LIFO and the other capturing the relative productivity of the most recent hires.

I first define the main outcome, compliance with the LIFO ordering, denoted as θ_c , captured at the circuit level c . Let $D^{\text{de jure}}$ denote the set of workers who would have been dismissed under perfect LIFO compliance, and $D^{\text{de facto}}$ denote the set of workers who actually received a layoff notice. I then calculate compliance as the share of the de jure notified workers who are de facto notified:

$$\theta_c = \frac{\sum_i \mathbf{1}\{i \in D^{\text{de facto}} \cap D^{\text{de jure}}\}}{\sum_i \mathbf{1}\{i \in D^{\text{de jure}}\}}. \quad (1)$$

If Equation (1) yields a value of 1, it means that circuit c has perfect compliance, i.e. all

workers who were notified were the most junior ones in the circuit.²⁴ Conversely, a value of 0 means that no worker in the lower end of the seniority distribution was notified.

Next, I estimate the relative productivity of the *de jure* notified. Ideally, I would want to capture the marginal product of labor (MPL) to infer the degree of profitability of the match from the employer's perspective.²⁵ Because MPL is not directly observed, there are several ways to proxy individual-level productivity. Butschek and Sauermann (2024) suggest three potential ways to estimate worker productivity at the individual level in a similar setting: (i) GPA measured at age 16; (ii) military draft test scores at age 18, which capture cognitive ability and social aptitude; and (iii) AKM worker effects following Abowd, Kramarz, and Margolis (1999).

All three measures have been shown to be positively associated with labor market success.²⁶ GPA has the advantage of being observable by employers, whereas military test scores cannot be validated by employers. Military test scores also suffer from very low coverage among women, as conscription was only mandatory for men when they were collected. AKM worker effects are limited by their reliance on an individual's employment history, meaning they may be inaccurately measured or impossible to identify for individuals with short working histories in Sweden.²⁷

From these alternatives, I use AKM worker effects to evaluate the relative skill of the workers as my main measure. In my setting, this measure has the by far highest coverage rate. To validate that the worker effects capture productivity, I compare them to 9th grade GPA and find a strong association between the two measures (see Figure A.3).²⁸ One

²⁴This is, as previously noted, conditional upon accurately capturing the true CBA boundaries, which remain unobserved.

²⁵One body of literature discusses why employers and workers choose displacement over wage cuts. A factor is the adverse impact of lower wages on worker morale, which in turn reduces productivity (Davis and Krolikowski, 2025).

²⁶Farber and Gibbons (1996) finds that school grades strongly predict future career success. Lindqvist and Vestman (2011) and Edin et al. (2022) find a strong association between labor earnings and both cognitive and non-cognitive skill measures. Butschek and Sauermann (2019) finds that AKM worker effects positively correlate with military test scores.

²⁷In addition, it may be the case that wage-setting institutions may cause individual wages to depart from workers' MPL. Another potential concern is that there are complementarities between firm and worker productivity or frictions causing wages to be non-monotone in MPL (Eeckhout and Kircher, 2011).

²⁸GPA might also have an indirect effect on labor market outcomes by constraining the choice of upper secondary school programs in the admission process (Dahl, Rooth, and Stenberg, 2023).

major limitation of using school information is that the data only include grades from 1988 onward. Consequently, for events occurring in 2005, I can only observe the productivity of workers aged 34 and younger, whereas the worker fixed effects cover around 90% of workers. Still, using grades conditional on cohort has the advantage of not relying on labor market experience. I therefore present the results using this measure in Table A.5 as a robustness check and find qualitatively similar results.

I estimate worker effects following Abowd, Kramarz, and Margolis (1999):

$$w_{ijt} = \alpha_i + \psi_j + \tau_t + \varepsilon_{ijt}. \quad (2)$$

Equation (2) decomposes wages into worker, firm, and year fixed effects from all employment histories preceding the notifying firm.²⁹ The dependent variable w_{ijt} denotes the log earnings of worker i employed at firm j in year t . The term α_i captures time-invariant worker-specific heterogeneity, such as skill or ability, while ψ_j reflects firm-specific wage premiums associated with employer characteristics. The year fixed effect τ_t absorbs common changes over time. Finally, ε_{ijt} is an idiosyncratic error term capturing unobserved shocks to earnings.

For each circuit c , I compute the difference in mean worker fixed effects between two groups, $g \in \{\text{de jure}, \text{non-de jure}\}$. Let $\bar{\alpha}_c^g$ denote the mean AKM worker fixed effect for group g in circuit c . I then define the following standardized metric:

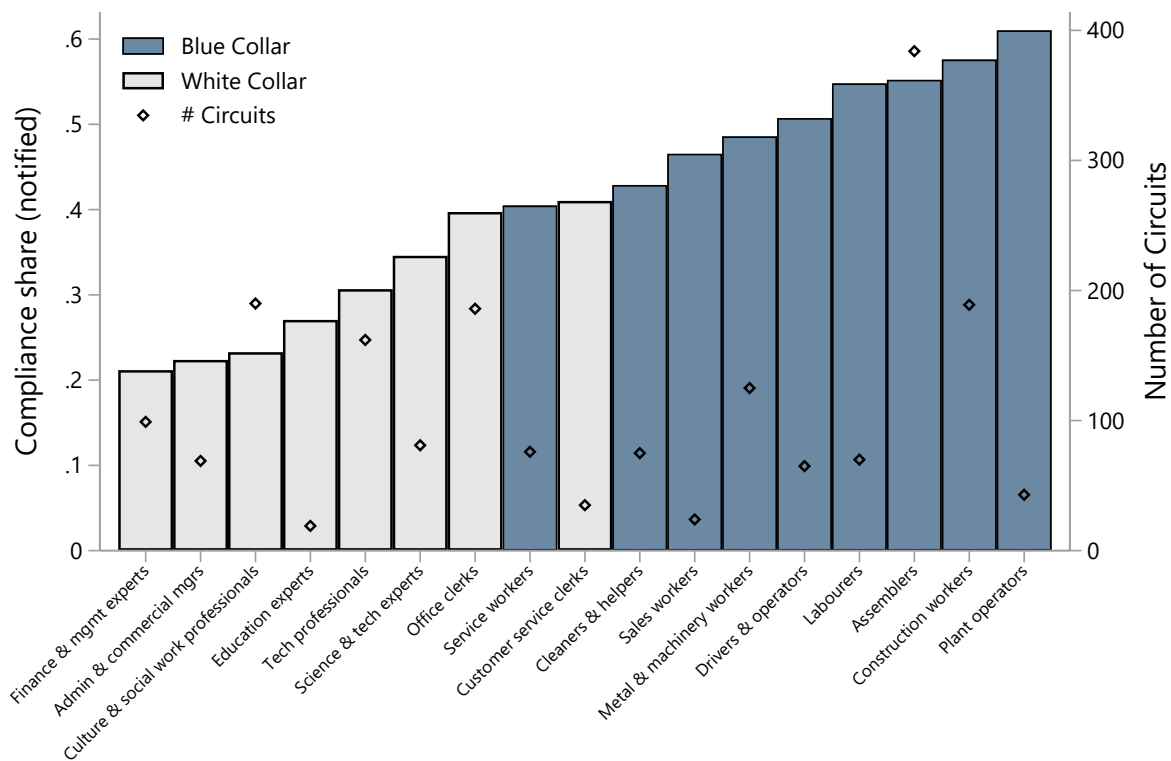
$$\phi_c = \frac{\bar{\alpha}_c^{\text{de jure}} - \bar{\alpha}_c^{\text{non-de jure}}}{\text{SD}(\alpha_c)}. \quad (3)$$

A positive value of ϕ_c indicates that the de jure notified workers have higher fixed effects than the de jure non-notified workers. I divide by the standard deviation of the fixed effects to ease interpretation. For a small share of the sample, I cannot observe the worker effects due to short employment histories. I therefore exclude these workers from the analysis.³⁰

²⁹Implicitly, the measure is only defined for workers with previous jobs. The data start in 1985.

³⁰This restriction is applied before determining event size and selecting the de jure notified sample.

FIGURE 5: COMPLIANCE SHARE OVER OCCUPATIONS



Notes: Figure 5 presents the mean compliance at the circuit level across occupations. White bars indicate white-collar occupation circuits, while blue bars represent blue-collar circuits. The black diamonds denote the total number of circuits within each occupational category.

Figure 5 presents mean LIFO compliance across the two-digit occupations in the sample. The average compliance across all circuits is 42.5%, corresponding to 3.56 junior workers exempted from the ranking. Grey bars highlight white-collar occupations, while blue bars represent blue-collar occupations. As expected, mean compliance is higher in blue-collar worker circuits. One potential explanation for this pattern is that blue-collar occupations tend to be more well-defined than white-collar occupations.³¹

Figure 6a shows the density of worker effects for the de jure notified (red) and de jure non-notified (blue) workers. In general, newly hired workers exhibit lower worker effects. When examining the differences between the two groups in Figure 6b, I find that most circuits have, on average, more productive non-notified workers, although a non-negligible share of circuits feature newly hired workers who are more productive.

³¹See Figures A.4a and A.4b for the distributions of notice time and severance pay across occupations.

The ideal experiment would involve comparing two workplaces characterized by (1) the random assignment of workers' productivity rankings along the seniority margin and (2) exposure to similar exogenous shocks that prompt identical downsizing requirements. Because a realistic scenario fulfilling both conditions is extremely rare, I cannot claim that my estimates are fully causal. Nevertheless, documenting the association between the relative productivity ordering of the workforce and compliance remains interesting in its own right. To closer approximate a causal interpretation, I control for event and circuit size, both of which may influence compliance and the relative productivity measure.³²

One potential channel through which workplaces with different recent hires might differ is if employers explicitly incorporate existing employees and their seniority into the hiring process, either by changing the number of hires or the selectivity for a given number of hires (Pries and Rogerson, 2005; Butschek and Sauermann, 2024). For instance, firms with less productive workers might abstain from hiring until they have displaced a worker lower down in the seniority distribution, meaning that low- ϕ workplaces would experience excess separations. In my setting, these workplaces have if any slightly *larger* events, suggesting this is not an important mechanism. While I cannot fully rule out unobserved differences along this margin, I find no systematic differences in pre-trends when comparing establishment size, total labor earnings, and sales prior to the downsizing events.³³

Correlating the two measures, LIFO compliance θ_c , and relative productivity of the de jure notified workers, ϕ_c , I then estimate the relationship using the following specification:

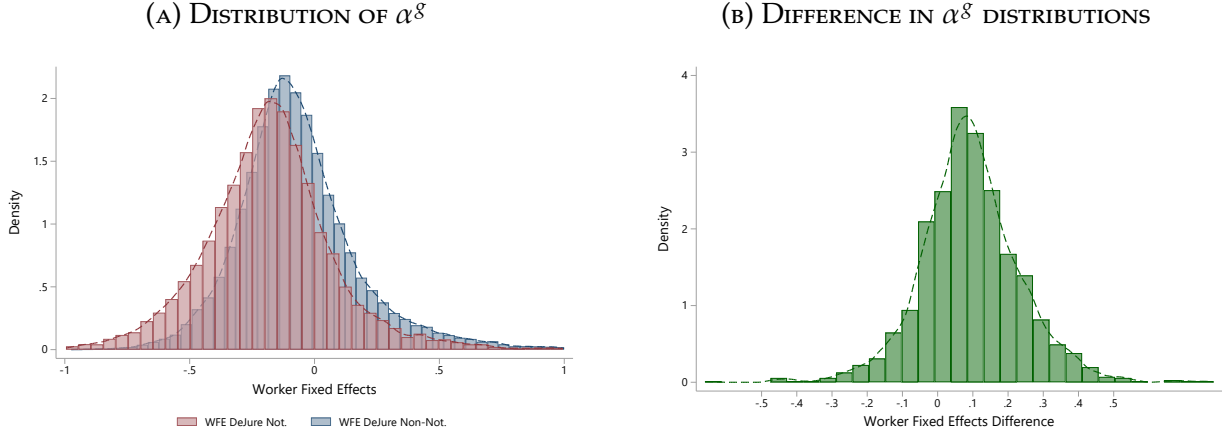
$$\theta_c = \alpha + \beta\phi_c + \gamma CS_c + \gamma TS_c + \varepsilon_c. \quad (4)$$

The coefficient of interest, β , captures the effect of the relative productivity of recent hires on LIFO compliance. A negative β indicates that as the productivity of recent hires increases relative to senior workers at the same workplace, non-compliance with LIFO increases.

³²Table A.2 describes my main sample by different levels of the variable of interest.

³³These validation exercises are presented in Figures A.5 and A.6.

FIGURE 6: DESCRIPTIVES: α^g DISTRIBUTIONS AND DIFFERENCES



Notes: Figure 6a shows the histogram distributions of α^g (as defined in Section 4) for de jure notified vs. de jure non-notified workers. Figure 6b illustrates the difference between these two distributions. The density is measured as the number of circuit observations.

CS_c and TS_c denote circuit and event size respectively.³⁴

5. COMPLIANCE WITH LIFO & WORKER COMPENSATION

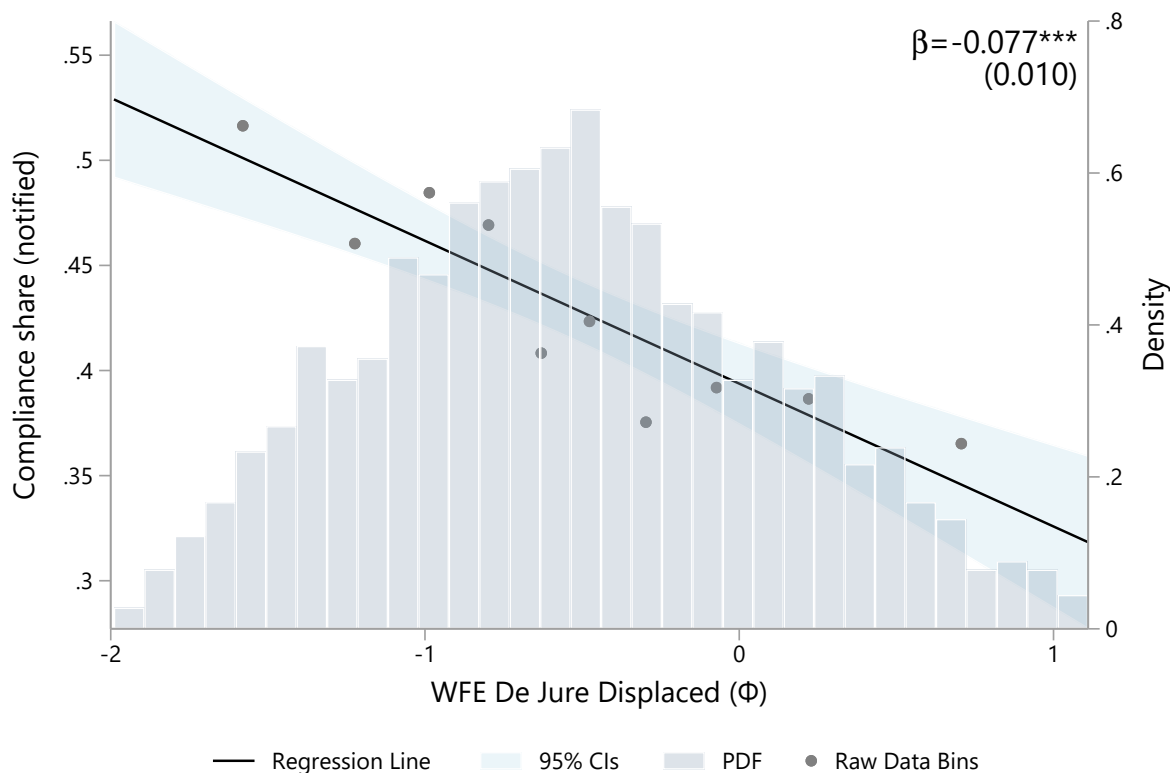
In this section, I examine the relationship between compliance with the LIFO ordering and the distribution of worker fixed effects at the circuit level.

Figure 7 plots the estimates from Equation (4) detailed in Section 4. On the x-axis, I have the circuit level worker AKM fixed effects calculated as the difference between the de jure notified and the non-de jure notified. The value 0 indicates that the worker effects of the junior workers are on average equal to the senior workers. On the y-axis, I measure compliance defined as the share of de jure notified workers who are notified, see Equation (1). The data is binned into deciles as indicated by the hollow circles while the solid line indicates the predicted regression line. The shaded blue area shows 95% confidence intervals.

In circuits where the worker effects of the junior workers are one standard deviation lower

³⁴High- and low productivity circuits have very similar circuit sizes, while high productivity events are slightly larger, as detailed in Table A.2. See Table II for the main results using different sets of controls and fixed effects. I also present the main results splitting the sample into equal sized quintiles, based on the level of ϕ . See Table A.3.

FIGURE 7: COMPLIANCE SHARE



Notes: The solid line corresponds to the predicted estimates, as defined in Equation (4) in Section 4. The light blue area represents the 95% confidence intervals. The dots show the levels of the raw data. The histogram depicts the PDF of Φ – the relative worker fixed effects of the de jure notified workers relative to the non-notified, normalized by the circuit standard deviation of the WFEs. The y-axis shows the compliance share, i.e., the proportion of de jure notified workers who are de facto notified.

compared to that of the senior workers, compliance share is 7.7 percentage points higher compared to circuits where the worker effects are similar across the seniority ladder.

This indicates that employers are more likely to comply with LIFO when the productivity of the relatively junior workers is lower, as measured by the AKM fixed effects. This finding is in line with the hypothesis that employers are more willing to comply with LIFO whenever the seniority ranking and the productivity ranking align. However, in situations when these two rankings do not align, employers are more likely to negotiate with the labor union, to have more senior workers let go first.

I have now established that in circuits where the relative productivity of the most junior workers is lower, compliance with LIFO is generally higher. This raises the question of whether deviations from LIFO impose costs on employers. There are two main provisions

displaced workers could receive in my setting, severance pay and prolonged advance notice.³⁵ I investigate this by examining the severance pay received by displaced workers.

A key challenge in estimating severance payments is that they are not reported separately in the Swedish registers, but instead lumped together with other labor earnings. This makes it difficult to separate severance payments from regular wage payments. To resolve this issue, I follow Cederlöf et al. (2025) and predict the portion of total earnings in the displacement year that stems from wage payments, using earnings from the year before.³⁶ For example, if a worker separated from an employer in March, I construct severance by subtracting three months of predicted earnings from total labor earnings. While the absolute levels of this measure may not be precise, the identifying assumption is that any differences across circuits, along the worker-effects dimension, are unbiased.

I now use this measure of severance payments as the outcome while keeping the same specification as previously. Figure 8 shows the result from this exercise. The x-axis is still the relative worker effects of the *de jure* notified.

In contrast to Figure 7, there is now a strong positive relationship between the relative ability of the most junior workers and the amount of severance paid out per worker. This indicates that while sidestepping LIFO is more attractive for employers in cases when the new hires are relatively more productive, this may come at a cost of higher severance payments.

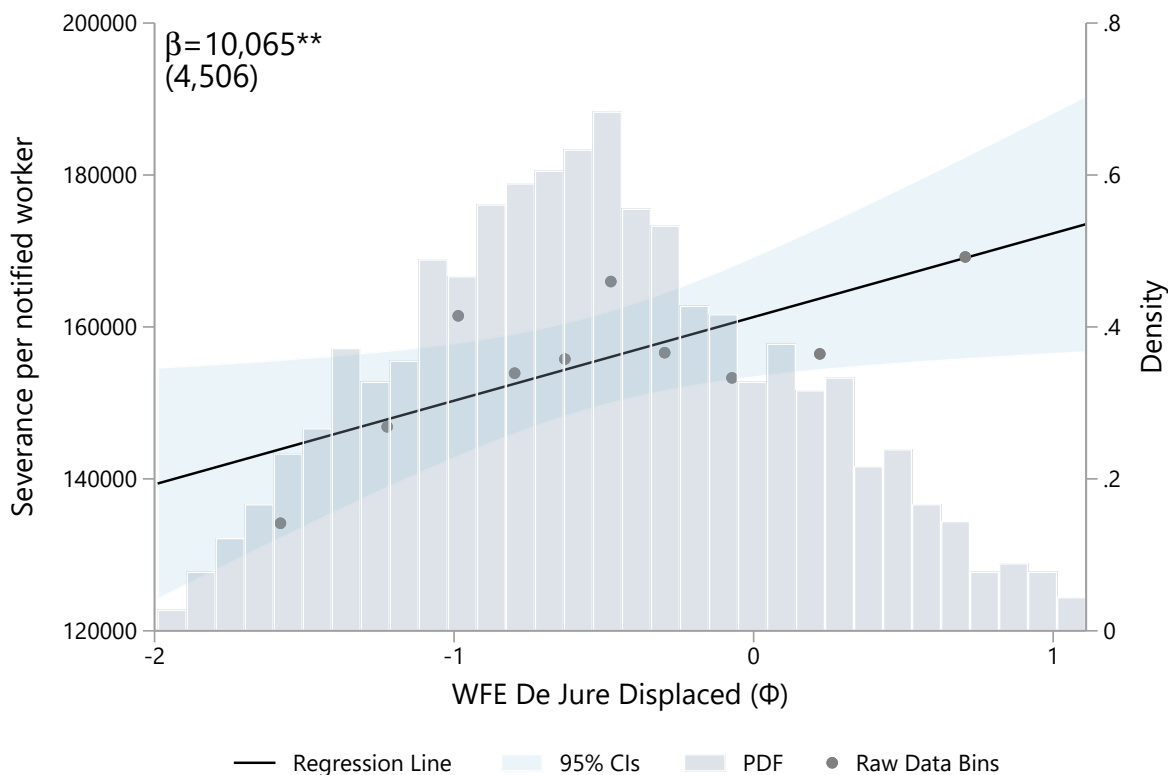
One mechanism that could generate this result is that whenever the employer wishes to make deviations from LIFO, the labor union has leverage as they always have the option of demanding full compliance. Because compliance is relatively more costly for employers in cases when there is little alignment between the seniority and productivity rankings, their willingness to pay is larger in these scenarios. The results suggest that the union understands this and are able to extract more generous severance.

While severance is the most obvious way to compensate workers for deviating from

³⁵I also investigate whether wage trajectories differ by the productivity level of the circuits in Figure A.5. One concern may be that some workers accept pay cuts to remain at a downsizing firm (Davis and Krolikowski, 2025). However, I find no evidence supporting this mechanism in my setting.

³⁶Cederlöf et al. (2025) validate this measure using external data sources on severance payments.

FIGURE 8: SEVERANCE PAY

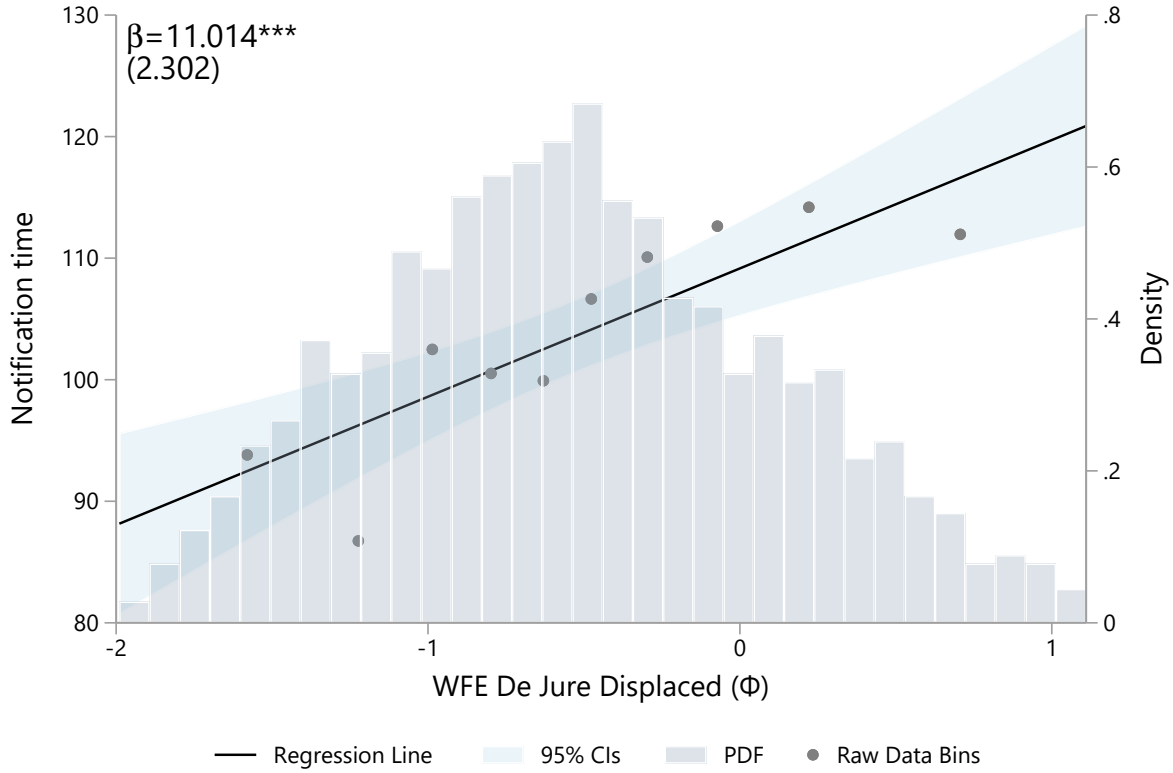


Notes: The solid line corresponds to the predicted estimates, as defined in Equation (4) in Section 4. The light blue area represents the 95% confidence intervals. The dots show the levels of the raw data. The histogram depicts the PDF of Φ – the relative worker fixed effects of the de jure notified workers relative to the non-notified, normalized by the circuit standard deviation of the WFEs. The y-axis shows the amount of severance received in the displacement year defined as the difference between actual labor earnings in the displacement year and predicted labor earnings, inferred from the year before notification and months worked in the displacement year.

LIFO it is also possible for employers to compensate workers through increased advance notice. The idea is that if notified workers receive longer advance notice, they receive (1) mechanically longer employment spell meaning they will prolong time to potential unemployment (2) more time for on-the-job search for a new job which is likely to lead to a higher reemployment wage (Cederlöf et al., 2025). However, providing longer notice time is costly for the employer as they bear the wage cost.

Figure 9 presents the regression estimates using the notice time as the outcome. I find that not only do severance increase in circuits with high relative productivity, there is also an increase in the notice time. This suggests that only looking at the severance payments underestimates the level of provisions provided by the employer and that more generous

FIGURE 9: NOTICE TIME



Notes: The solid line corresponds to the predicted estimates, as defined in Equation (4) in Section 4. The light blue area represents the 95% confidence intervals. The dots show the levels of the raw data. The histogram depicts the PDF of Φ – the relative worker fixed effects of the de jure notified workers relative to the non-notified, normalized by the circuit standard deviation of the WFEs. The y-axis shows the length of notice period received as reported in the PES data.

advance notice is a complementary channel of provisions.

As a next step, I investigate if the result vary by adding various controls and fixed effects. The results from this exercise are presented in Table II. I find that the compliance result is robust to all specifications, suggesting that the result holds also when performing the analysis within industry and occupation. However, the estimates are smaller when analyzing compliance within white- and blue collar, suggesting that this variation is important for understanding the size of the estimates.

When investigating the effect on advance notice and severance pay, I find that notice time follows a similar pattern as LIFO compliance, where sector is most important for explaining the magnitude. However, the effect on severance pay is entirely explained by across sector variation. In the next section, I investigate how these patterns vary with event

TABLE II: REGRESSION OUTCOMES WITH DIFFERENT SPECIFICATIONS

	(1)	(2)	(3)	(4)	(5)	(6)
Compliance	-0.068** (0.011)	-0.072** (0.011)	-0.077** (0.010)	-0.053** (0.010)	-0.052** (0.010)	-0.050** (0.010)
Notice Time	10.939** (2.309)	10.955** (2.313)	11.014** (2.315)	6.448** (2.248)	5.505** (2.178)	5.163** (2.182)
Severance	9655.288** (4700.373)	9637.042** (4705.902)	10064.937** (4692.696)	222.555 (4532.456)	-250.314 (4540.513)	-3353.039 (4289.986)
Total Provisions	21024.946** (6345.231)	21129.440** (6352.193)	21804.993** (6323.940)	5842.006 (5959.180)	5728.634 (5929.724)	14.452 (5419.073)
Circuit Size		✓	✓	✓	✓	✓
Event Size			✓	✓	✓	✓
White Collar				✓	✓	
Industry FEs					✓	✓
Occupation FEs						✓
N	1878	1878	1878	1878	1878	1878

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table II presents the main results across six different specifications, with each subsequent model adding a covariate control. Each cell represents its own estimate with corresponding standard error for β . Total provisions is calculated by adding severance pay with advance notice $\times$ the monthly wage. Circuit size denotes the total number of workers in the circuit, while event size represents the number of notified workers. White-collar is a dummy variable indicating whether the circuit occupation is white-collar or blue-collar. The industry and occupation fixed effects are included at the one-digit level. All models report robust standard errors.

characteristics.

Combining the severance cost and the extended notice, I find that firms pay 21,800 SEK in the main specification to reduce LIFO compliance by 7.7% when laying off 6.2 workers. This implies a cost of around 45,700 SEK per person exempted from LIFO.

6. COMPLIANCE & COMPENSATION BY EVENT CHARACTERISTICS

In Section 5, I documented large differences in both LIFO compliance and worker compensation between workplaces where the de jure notified workers have low worker effects relative to those where they have high worker effects. In this section, I investigate which types of downsizing events that drive this result using three dimensions of heterogeneity: circuit size, plant size, and sector.

TABLE III: HETEROGENEITY ANALYSIS

	Circuit Size		Plant Size		Sector	
	Small	Large	Small	Large	White-collar	Blue-collar
Compliance	-0.071*** (0.015)	-0.074*** (0.017)	-0.075*** (0.016)	-0.049*** (0.016)	-0.024 (0.015)	-0.057*** (0.015)
Notice Time	8.454*** (3.106)	13.166*** (3.409)	12.518*** (2.961)	5.256 (3.541)	-4.089 (3.763)	12.515*** (2.674)
Severance	5788.078 (6334.190)	14493.471** (6392.511)	4082.166 (5820.663)	11428.464* (6930.152)	-529.887 (8110.939)	1994.693 (4392.906)
Total Provisions	16141.414* (8502.300)	27327.509*** (8812.972)	14978.152** (7503.200)	16517.832* (9646.487)	539.410 (11385.440)	11655.868** (4979.624)
Circuit Size	✓	✓	✓	✓	✓	✓
N	959	919	934	944	831	1047

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table III presents the main results categorized by circuit size, plant size, and sector. Total provisions is calculated by adding severance pay with advance notice $\times$ the monthly wage. Circuit and plant sizes are determined by the median value within the sample. The sector variable is partitioned based on whether the circuit occupation is classified as white-collar or blue-collar.

There are several reasons why circuit and plant size might influence the degree of compliance and the provisions offered. First, the total number of employees may affect the saliency of individual worker productivity; specifically, smaller events may exhibit a lower degree of compliance if individual productivity is more visible to the employer. Second, the capacity to provide severance packages may vary by employer size.

I also investigate whether the results vary by sector. The motivation is that occupations vary in how clearly they are defined. Blue-collar occupations typically have higher baseline compliance than white-collar occupations, as illustrated in Figure 5. This indicates that the mandated ordering is more binding in blue-collar occupations, where tasks are often more standardized and concrete. In such circuits, workers are more interchangeable, making it harder for employers to justify sidestepping seniority without explicit union negotiations.

Table III illustrates the heterogeneity along these dimensions. Regarding size, I split the

sample at the median. I find that the association between productivity and severance is stronger in large plants, while small plants are more likely to provide more generous advance notice. This indicates that advance notice may be used when an employer is small and liquidity-constrained, preventing the payment of lump-sums to displaced workers. Finally, I find that nearly the entire effect is driven by blue-collar circuits. This supports the hypothesis that the results are concentrated among laborers, for whom the mandated ordering is more strictly binding than for white-collar occupations.

7. CONCLUSIONS

This study is to my knowledge first to estimate firms' willingness to pay to sidestep EPL. Using Swedish register data on notified layoffs, linked to employer–employee records, I investigate firms' compliance with the LIFO ordering. Sweden serves as an ideal setting for this analysis, as employers are mandated a default ordering, but may negotiate with the labor union for an alternative ordering, in exchange for concessions such as severance pay and more generous advance notice.

I find that firms with relatively more productive recent hires are substantially less likely to comply with the LIFO ordering. A one-standard deviation increase in the relative productivity of junior workers reduces compliance by 7.7 percentage points. This suggests that employers are generally willing to follow seniority ordering when productivity and tenure rankings align, but deviate from them when retaining newly hired workers is more valuable.

Deviations from LIFO are also associated with compensatory measures toward notified senior workers. Firms that retain productive junior employees tend to provide higher severance payments and longer advance notice, indicating that they internalize the cost of non-compliance through negotiated settlements. These findings reveal an efficiency–equity trade-off: while seniority rules protect older or longer-tenured workers, they may constrain firms from retaining their most productive employees.

The results contribute to the broader literature on EPL by highlighting heterogeneity in

firms' compliance behavior and their willingness to pay to sidestep the ordering. Overall, the findings underscore that the distributive and efficiency effects of EPL depend not only on the existence of mandated orderings, such as LIFO, but also on how firms navigate and negotiate around them.

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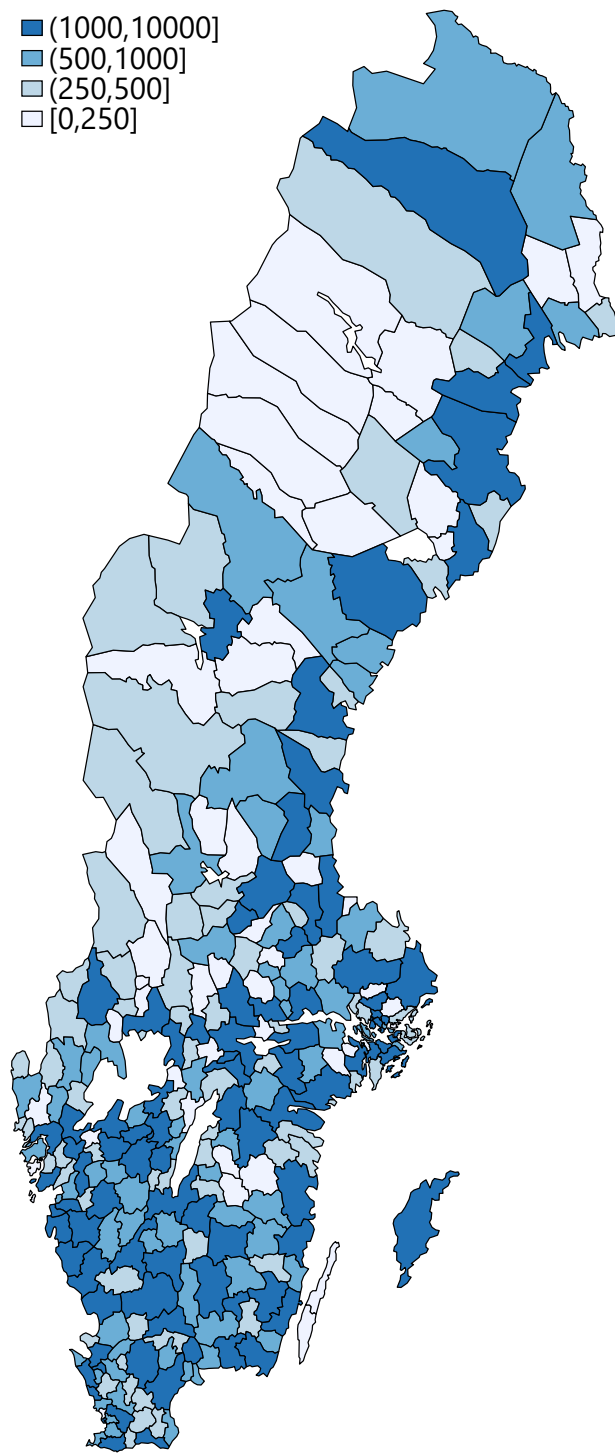
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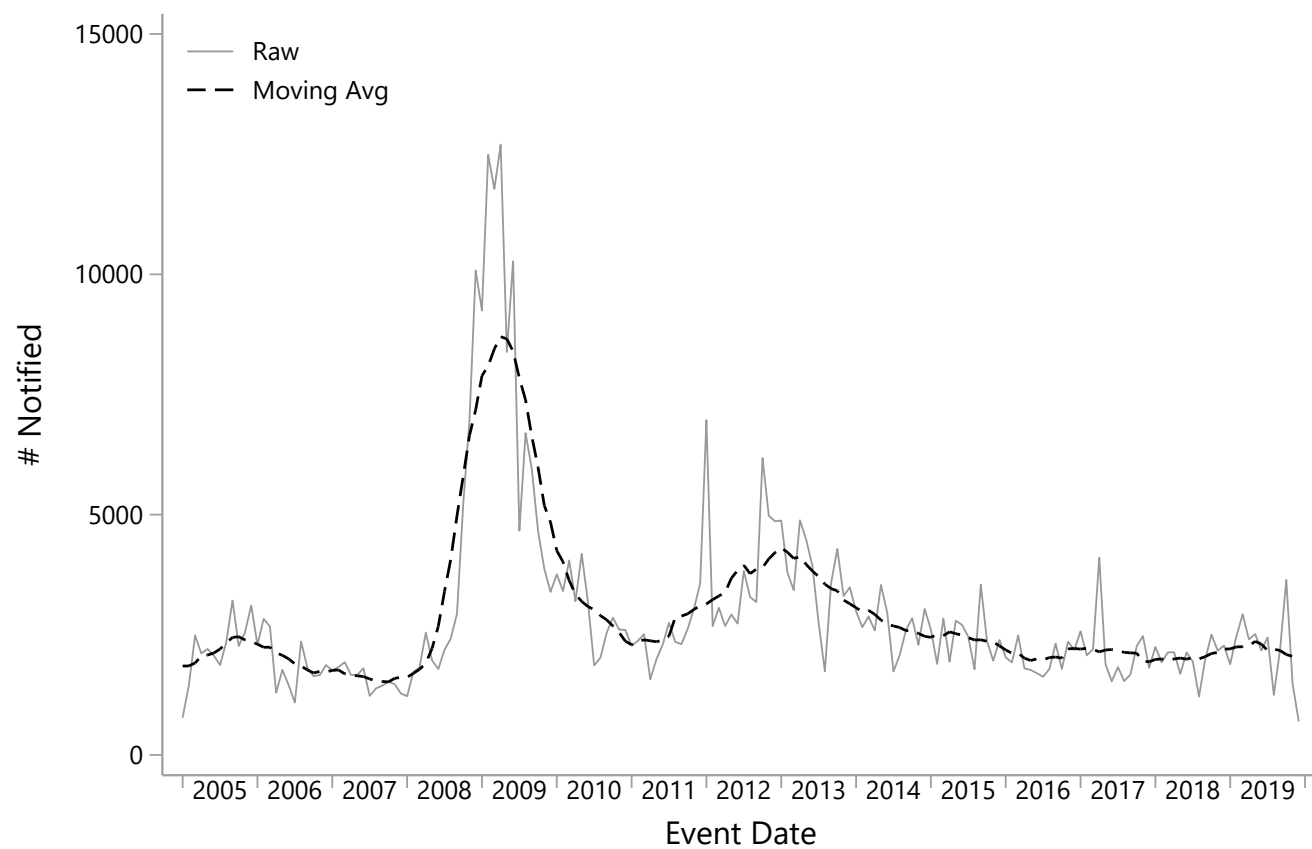
A. ADDITIONAL FIGURES AND TABLES

FIGURE A.1: NUMBER OF NOTIFIED WORKERS BY MUNICIPALITY



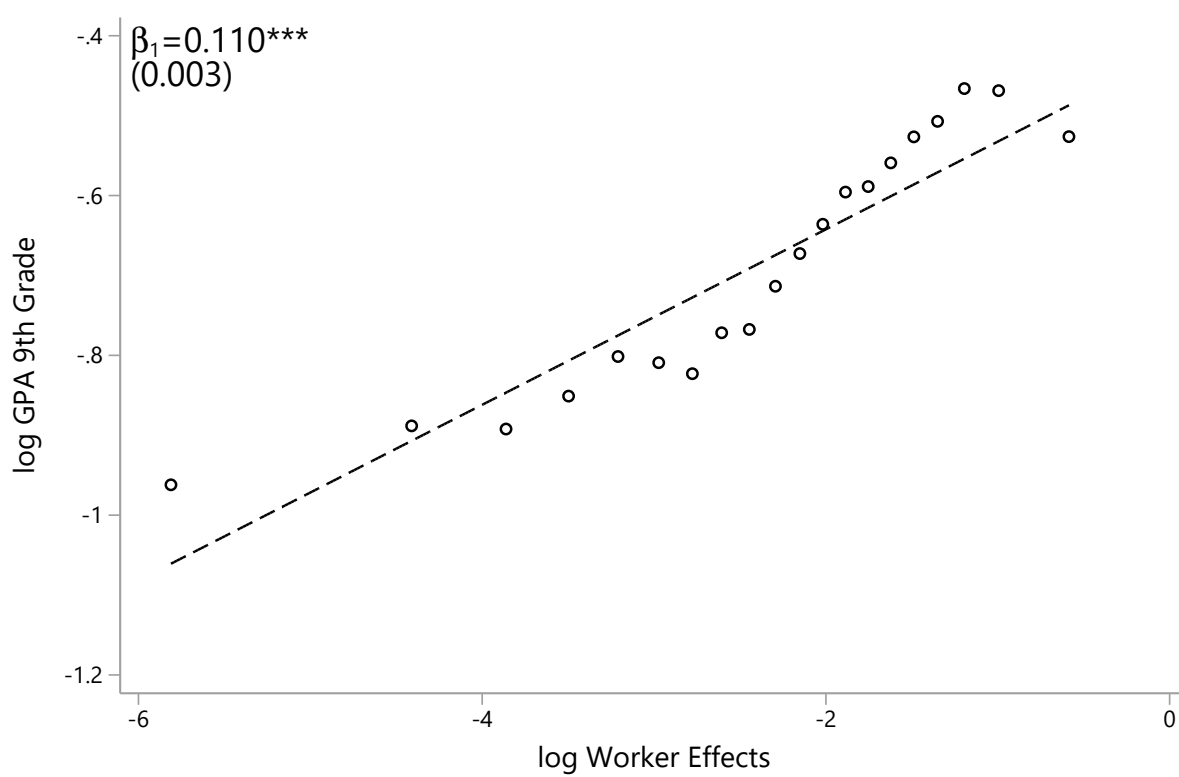
Notes: Figure A.1 plots the number of notified workers during the study period by municipality in Sweden.

FIGURE A.2: NUMBER OF NOTIFIED WORKERS OVER TIME



Notes: This figure plots the number of notified workers during the study period. The light gray line represents the raw monthly counts, while the solid black line displays the 12-month centered moving average.

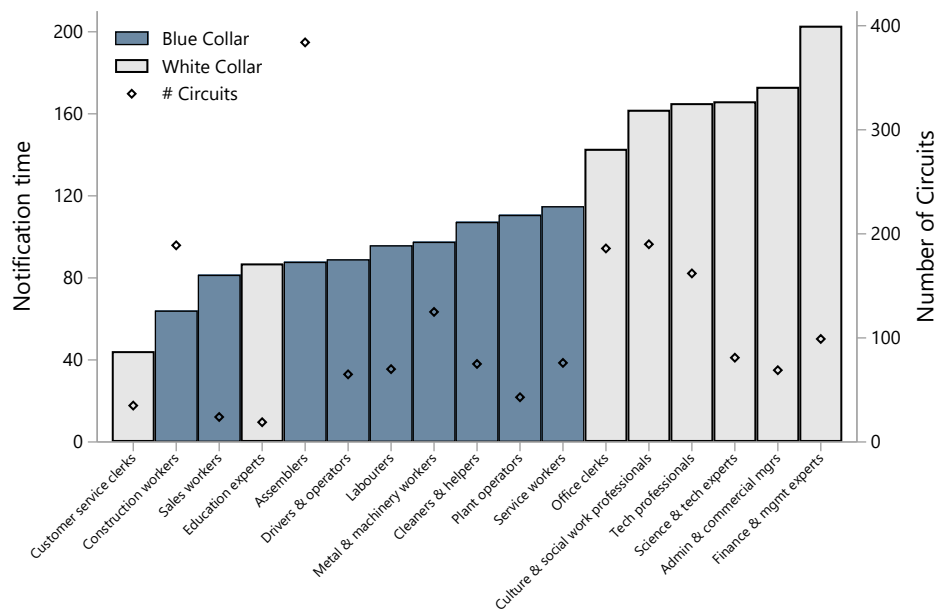
FIGURE A.3: CORRELATION WFE AND GPA



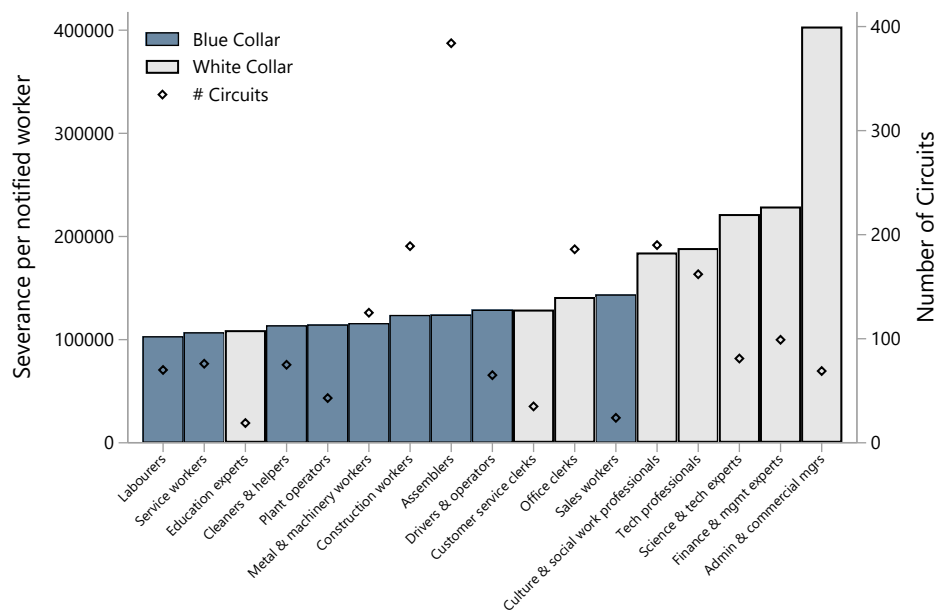
Notes: This figure shows the association between log GPA in 9th grade and log worker effects following Abowd, Kramarz, and Margolis (1999), controlling for school and graduation year effects.

FIGURE A.4: DESCRIPTIVES OVER OCCUPATIONS

(A) ADVANCE NOTICE TIME



(B) SEVERANCE PAY



Notes: Figure A.4a displays advance notice time while Figure A.4b displays severance pay across occupations. White bars indicate white-collar occupation circuits, while blue bars represent blue-collar circuits. The black diamonds denote the total number of circuits within each occupational category.

TABLE A.1: LITERATURE REVIEW ON EMPLOYMENT PROTECTION LEGISLATION (EPL)

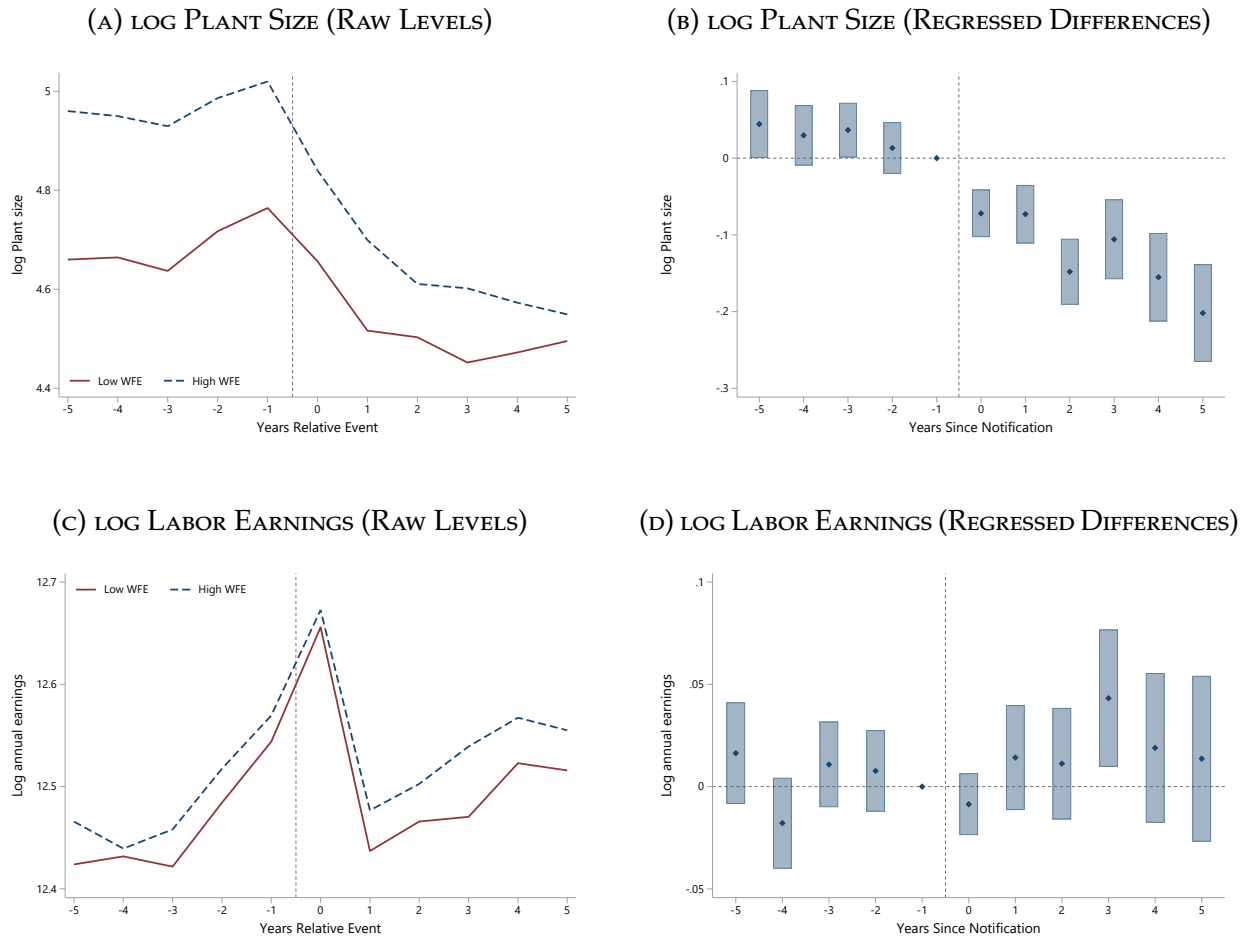
Study	Country	EPL of Interest	Outcome
Autor et al. (2007)	USA	Wrongful discharge	Firm productivity
Bauer et al. (2007)	Germany	Wrongful discharge	Hiring & dismissals
Bjuggren (2018)	Sweden	LIFO	Firm productivity
Bjuggren and Skedinger (2018)	Sweden	LIFO	Hiring selectiveness
Bornhäll et al. (2017)	Sweden	LIFO	Firm growth
Boeri and Jimeno (2005)	Italy	Dismissal provisions	Hiring & dismissals
Buhai et al. (2014)	Denmark	LIFO	Wage return to seniority
Butschek and Sauermann (2024)	Sweden	LIFO	Hiring selectiveness
Kugler and Gilles (2004)	USA	Wrongful discharge	Hiring & dismissals
Lazear (1990)	USA	Dismissal provisions	Hiring & dismissals
Marinescu (2009)	UK	Wrongful discharge	Hiring & dismissals
Martins (2009)	Portugal	Just cause	Hiring & dismissals
von Below and Thoursie (2010)	Sweden	LIFO	Hiring & dismissals
Häggkvist (2026). [this paper]	Sweden	LIFO	Employer compliance

TABLE A.2: DESCRIPTIVE STATISTICS BY QUANTILES OF VARIABLE OF INTEREST

	Q1	Q2	Q3	Q4
Earnings	29235.5 (8952.8)	30408.0 (11958.4)	31318.1 (12342.9)	31879.8 (14095.3)
Wage	28818.3 (8085.0)	29852.3 (10405.4)	30581.6 (10969.6)	31237.2 (12367.4)
Tenure	107.3 (51.14)	107.9 (59.69)	104.4 (61.66)	113.3 (60.10)
Age	42.58 (5.104)	42.60 (5.939)	43.10 (6.132)	44.23 (6.009)
Event size	5.691 (4.046)	6.599 (4.839)	6.557 (5.007)	5.930 (4.786)
Circuit size	26.44 (11.21)	27.06 (11.56)	27.32 (11.49)	25.11 (11.64)
Plant size	163.0 (291.2)	184.3 (298.8)	203.0 (241.7)	243.0 (680.1)
Firm size	1220.7 (2692.1)	1456.1 (2522.0)	1524.5 (2448.9)	1439.3 (2736.7)
White-collar	0.321 (0.467)	0.397 (0.490)	0.457 (0.499)	0.490 (0.500)
Private sector	0.970 (0.170)	0.951 (0.216)	0.966 (0.182)	0.959 (0.197)
Observations	470	469	470	469

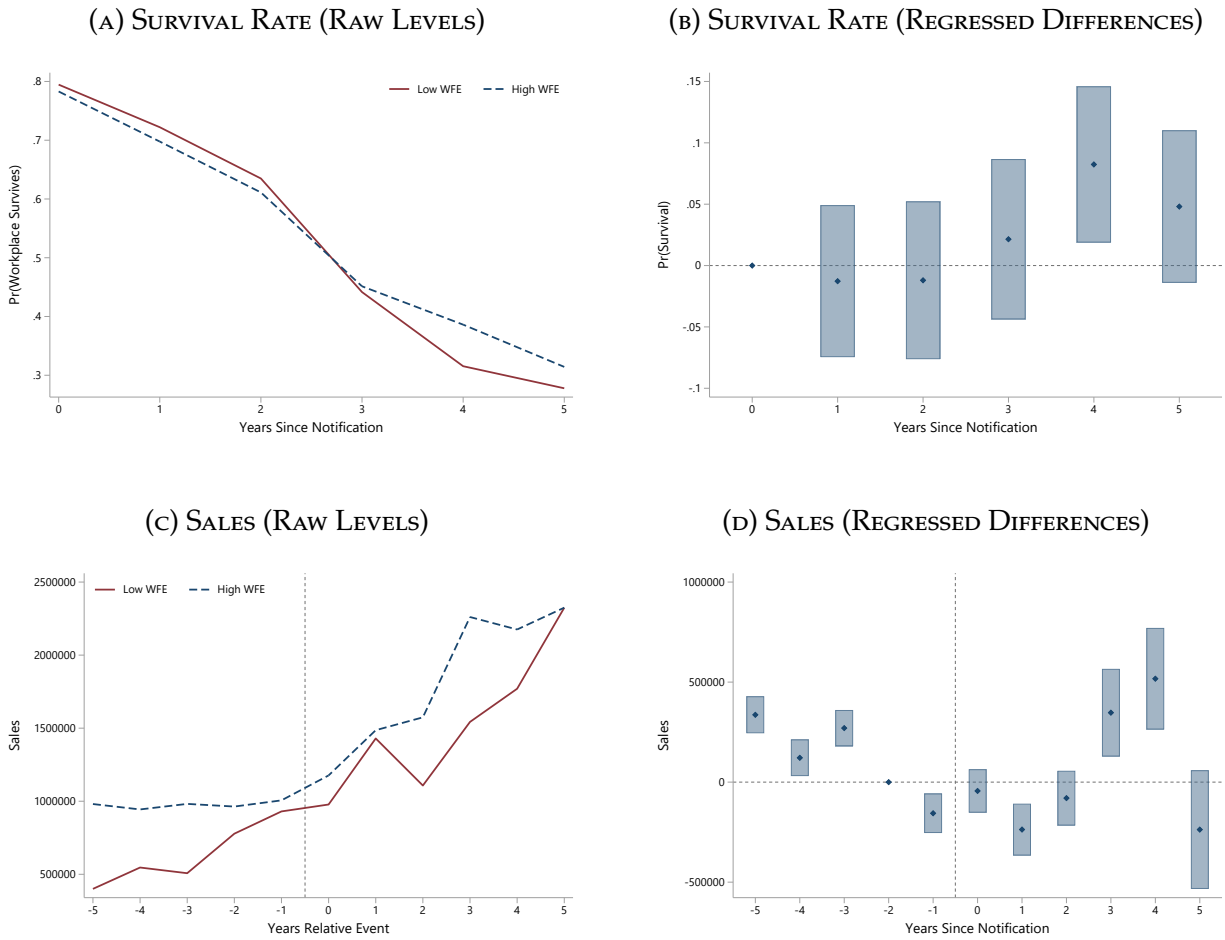
Notes: Table A.2 presents descriptive statistics across quartile levels of ϕ , as defined in Section 4. Q1 denotes the level of worker fixed effects for the junior workers, whereas Q4 is the highest. The values denote the means, standard errors in parenthesis.

FIGURE A.5: TRENDS IN PLANT SIZE AND LABOR EARNINGS



Notes: This figure displays trends in log plant size (top row) and log labor earnings (bottom row) over time in circuits belonging to below-median (solid red line) and above-median ϕ circuits (dashed blue line), as defined in Section 4. Panels (a) and (c) show the raw levels, whereas panels (b) and (d) show the regressed differences. The dashed vertical lines highlight the downsizing year.

FIGURE A.6: TRENDS IN SURVIVAL RATES AND SALES



Notes: This figure displays trends in firm survival rates (top row) and sales (bottom row) over time in circuits belonging to above-median (solid red line) and below-median ϕ circuits (dashed blue line), as defined in Section 4. Panels (a) and (c) show the raw levels, whereas panels (b) and (d) show the regressed differences. The dashed vertical lines highlight the downsizing year.

TABLE A.3: MAIN RESULTS QUINTILE DIVISION

	(1)	(2)	(3)	(4)
	Compliance share (notified)	Notification time	Severance per notified worker	Total Provisions
Quintile 2	-0.0403 (-1.77)	11.40* (2.53)	19486.3* (2.16)	234108.4** (3.08)
Quintile 3	-0.108*** (-4.81)	13.31** (2.74)	23915.6* (2.50)	232837.0** (2.99)
Quintile 4	-0.133*** (-6.09)	21.36*** (4.46)	16950.6 (1.81)	238114.8** (3.14)
Quintile 5	-0.135*** (-6.20)	22.92*** (4.84)	23531.0* (2.45)	338656.6*** (4.37)
Circuit Size	✓	✓	✓	✓
Event Size	✓	✓	✓	✓
N	1878	1644	1878	1780

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Table A.3 presents the main results using an interacted regression model, where the sample is split by ϕ level quintiles. Quintile 5 represents the highest-productivity junior workers, while Quintile 1 serves as the lowest and omitted category. Robust standard errors are reported.

TABLE A.4: MAIN RESULTS, SECTOR LEVEL CIRCUITS

	(1)	(2)	(3)	(4)	(5)	(6)
Compliance	-0.105*** (0.013)	-0.102*** (0.013)	-0.102*** (0.012)	-0.073*** (0.011)	-0.069*** (0.011)	-0.069*** (0.011)
Notice Time	15.536*** (2.558)	15.527*** (2.558)	15.506*** (2.555)	11.068*** (2.575)	11.086*** (2.512)	10.604*** (2.529)
Severance	10973.778** (4632.861)	10870.712** (4633.815)	10870.473** (4635.503)	945.036 (4607.743)	650.637 (4660.416)	256.369 (4669.763)
Total Provisions	206772.362*** (38996.389)	205156.506*** (38914.431)	205077.480*** (38930.110)	110021.208*** (38261.366)	129922.036*** (37905.396)	122966.002*** (37954.149)
Circuit Size		✓	✓	✓	✓	✓
Event Size			✓	✓	✓	✓
White Collar				✓	✓	
Industry FEs					✓	✓
Occupation FEs						✓
N	1403	1403	1403	1403	1403	1402

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table A.4 presents the main results across seven different specifications, with each subsequent model adding a covariate control, using sector instead of two-digit occupation as the unit of observation. Total provisions is calculated by adding severance pay with advance notice $\times$ the monthly wage. Circuit size denotes the total number of workers in the circuit, while event size represents the number of notified workers. White-collar is a dummy variable indicating whether the circuit occupation is white-collar or blue-collar. The industry and occupation fixed effects are included at the one-digit level. All models report robust standard errors.

TABLE A.5: OUTCOMES WITH DIFFERENT CONTROLS, GPA

	(1)	(2)	(3)	(4)	(5)	(6)
Compliance	-0.009 (0.006)	-0.007 (0.006)	-0.007 (0.005)	-0.010** (0.005)	-0.013** (0.005)	-0.013*** (0.005)
Notice Time	2.915 (2.714)	2.477 (2.708)	2.506 (2.699)	3.336 (2.651)	2.777 (2.626)	2.859 (2.609)
Severance	-1855.052 (1413.872)	-1684.116 (1412.924)	-1687.317 (1413.180)	-1539.776 (1411.830)	-1189.452 (1421.301)	-1193.018 (1425.424)
Total Provisions	1655.658 (23925.840)	-2000.942 (23901.819)	-2085.006 (23671.357)	13841.161 (21211.694)	10175.583 (20892.406)	7371.038 (20113.327)
Circuit Size		✓	✓	✓	✓	✓
Event Size			✓	✓	✓	✓
White Collar				✓	✓	
Industry FEs					✓	✓
Occupation FEs						✓
N	1490	1490	1490	1490	1490	1490

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table A.5 presents the main results across seven different specifications, with each subsequent model adding a covariate control, proxying productivity using 9th grade GPA instead of AKM worker effects. Total provisions is calculated by adding severance pay with advance notice $\times$ the monthly wage. Circuit size denotes the total number of workers in the circuit, while event size represents the number of notified workers. White-collar is a dummy variable indicating whether the circuit occupation is white-collar or blue-collar. The industry and occupation fixed effects are included at the one-digit level. All models report robust standard errors.