The Consequences of Labor Demand Shocks Across Countries *

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Abstract

How do firm-level shocks translate into workers' earnings? We study this question using harmonized matched employer–employee data from six European countries. We identify labor demand shocks as sharp changes in firm sales—both negative and positive—and, within a unified cross-country framework, provide the first directly comparable evidence on how shocks in both directions transmit to workers' earnings using an event-study difference-in-differences design. Earnings responses are persistent and highly heterogeneous across countries. Earnings fall by 2 to 8 percent after negative shocks and rise after positive shocks. Pass-through from firm sales to worker earnings is two to four times larger in Southern Europe than in Northern Europe. Restricting attention to job stayers substantially attenuates estimated earnings effects, highlighting the important role of worker separations, although earnings responses among stayers remain non-negligible. Finally, for large negative shocks, separations increase in all countries, but the associated earnings losses rise much less in Nordic countries such as Denmark and Sweden than in Southern Europe.

Keywords: Labor demand shock, pass-through, wage and employment dynamics, administrative data, cross-country comparisons

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1 Introduction

How do firm-level labor demand shocks translate into workers' labor market outcomes, and how does this transmission vary across countries? This question lies at the core of several strands of the labor economics literature, including research on job displacement, rent sharing, and firm-specific wage setting. While a growing body of work documents the consequences of firm shocks within individual countries, we know comparatively little about how similar shocks affect workers across different institutional and labor market environments.

In this paper, we provide new cross-country evidence on the transmission of firm-level labor demand shocks to workers' earnings (total labor income across employers), employment, wages (hourly or daily wages), and separations. Using harmonized matched employer–employee data linked to firm balance-sheet information from 2001 to 2019, we study abrupt changes in firms' sales—both negative and positive—across six European countries: Denmark, France, Hungary, Italy, Portugal, and Sweden. We identify shocks as sharp changes in firm sales following periods of stability and trace their effects using a unified event-study difference-in-differences design applied consistently across countries. Treated workers are employed at firms experiencing sharp sales changes, and control workers are observationally similar workers at firms with stable sales trajectories. Our central contribution is to provide the first cross-country comparison of earnings responses to firm-level demand shocks based on a common research design, fully comparable outcome measures, and a symmetric treatment of positive and negative shocks.

A key advantage of our cross-country setting is the substantial variation in labor market institutions across the countries we study. As summarized in the paper, Nordic countries such as Denmark and Sweden combine high spending on active labor market policies with high union density and relatively flexible employment protection, while Southern European countries such as Italy and Portugal feature more stringent employment protection and lower investment in reemployment support. These differences provide a natural setting to study how institutional environments may shape the transmission of firm-level shocks to workers' outcomes in the cross-section and over the business cycle.

We document three main findings. First, earnings responses to firm-level shocks are large and persistent across countries. As shown in event-study figures, negative sales shocks lead to sustained earnings losses of between 2 and 10 percent over the

medium run, while positive shocks generate earnings gains of similar persistence but smaller magnitude in most countries. These responses unfold gradually and remain far from pre-shock levels even five years after the event.

However, the magnitude of these responses differs markedly across countries. Pass-through from firm sales to workers' earnings is substantially higher in Southern Europe than in Northern Europe. Expressed as elasticities, earnings–sales pass-through reaches 0.29–0.34 in Portugal and Italy following negative shocks, compared to only 0.07 in Denmark and 0.10 in Sweden. Intermediate values are observed in France (0.22) and Hungary (0.15).

Similar patterns emerge for positive shocks. Pass-through remains high in Southern Europe, with elasticities around 0.29 in Portugal and 0.16 in Italy, while it is much lower in Northern Europe, at 0.11 in Denmark and 0.09 in Sweden. Overall, the transmission of firm-level shocks to workers' earnings is two to four times larger in Southern than in Northern Europe. These differences are consistent with variation in wage-setting institutions and income insurance across countries.

Finally, the transmission of positive and negative shocks is broadly symmetric within countries. For example, in Portugal the earnings–sales elasticity is approximately 0.29 for both negative and positive shocks, while in Sweden it remains low and similar across directions, at 0.10 and 0.09 respectively (a notable exception is Italy, with strong asymmetry).

A central mechanism underlying these earnings responses is worker mobility. We show that earnings adjustments are substantially attenuated when restricting attention to workers who remain with the same employer. Across all countries, earnings losses following negative shocks are markedly smaller for stayers than for the full sample, and a similar—though less pronounced—pattern emerges for positive shocks. This gap between all workers and stayers is particularly large in Southern European countries such as Italy and Portugal, where separations account for a significant share of overall earnings losses. In contrast, the difference is more limited in Nordic countries, consistent with more effective reallocation of workers and smoother earnings adjustment. These patterns highlight that cross-country differences in earnings pass-through are closely tied to differences in worker mobility and the extent to which shocks are absorbed through separations rather than within-firm wage adjustments.

Our third main result highlights how the relationship between separations and earnings losses varies with the size of the shock. We show that larger negative shocks

lead to higher separation rates in all countries, indicating that worker mobility is a key margin of adjustment when firms experience more severe downturns. However, the mapping from separations to earnings losses differs markedly differs markedly across institutional settings. In Southern European countries such as Italy and Portugal, increases in separations are closely associated with large earnings losses, resulting in a steep relationship between the two outcomes. In contrast, in Northern European countries such as Denmark and Sweden, the relationship is substantially flatter: even when separations rise following large shocks, the associated earnings losses remain comparatively limited. This evidence suggests that while large shocks trigger separations everywhere, the extent to which these separations translate into persistent earnings losses depends critically on the ability of labor markets to reallocate workers and cushion income losses.

Our approach builds on insights from both the job displacement and rent-sharing literatures, while departing from each in important ways. The job displacement literature typically identifies firm-level shocks through mass layoffs or firm closures and estimates their effects using event-study designs. While this framework has yielded influential results, it conditions on job separation and therefore focuses on a selected group of workers—often long-tenured employees—and on a particular margin of adjustment. As a result, it cannot capture the full set of labor market responses to changes in firm performance.

Instead, we identify firm-level shocks directly using changes in firms' sales and do not condition on separation. We define a worker as exposed to a shock if she is employed at time $t^* - 1$ in a firm that experiences a period of stable sales followed by an abrupt change in sales of at least 10 percent between $t^* - 1$ and t^* (we vary this threshold in a robustness test). We study both negative and positive sales shocks and compare exposed workers to observationally similar workers employed at firms with stable sales trajectories. This design allows us to analyze a broad population of workers—including those with short tenure—and to jointly study outcomes for workers who remain with their employer and those who separate following the shock.

A key feature of our analysis is its cross-country scope and fully harmonized implementation. We apply the same sampling restrictions, shock definitions, matching procedure, and event-study specification across countries. To ensure comparability, we express results as elasticities of workers' earnings with respect to firm sales, rather than as level effects, since the same absolute change in sales may have different eco-

nomic meanings across contexts. This elasticity-based approach provides a scale-free measure of pass-through and allows us to quantify how a given percentage change in firm sales translates into workers' labor earnings under different institutional regimes.

By documenting systematic cross-country differences in earnings pass-through and linking them to worker mobility patterns, the paper provides new evidence on how institutional environments shape the distribution of firm-level risk between firms and workers.

2 Literature Review

Our paper relates to several strands of the labor economics literature studying how firm-level shocks affect workers' labor market outcomes. These include the job displacement literature, the rent-sharing and firm-specific wage-setting literature, and recent work on firms' wage and employment adjustments following demand shocks. Our contribution is to connect these literatures by studying how firm-level labor demand shocks—both positive and negative—transmit to workers across countries using a harmonized empirical framework.

Job Displacement A large literature documents the consequences of job loss following firm-level shocks, typically identified through mass layoffs or firm closures. Seminal contributions show that displaced workers experience large and persistent earnings losses, driven by unemployment spells, wage losses at reemployment, and reduced job stability. More recent work decomposes these losses and emphasizes heterogeneity across workers, firms, and business cycle conditions (e.g., Lachowska et al. (2020); Schmieder et al. (2023)).

While this literature has provided important insights into the costs of job loss, it conditions by design on separation. As a result, it focuses on a selected group of workers—often long-tenured employees—and cannot capture how firm-level shocks affect workers who remain employed or how firms adjust through margins other than separations. Our paper complements this literature by studying firm-level shocks that do not mechanically imply job loss and by jointly analyzing outcomes for workers who stay with their employer and those who separate following the shock.

Rent Sharing A second closely related literature studies rent sharing between firms and workers, documenting that firm-specific shocks to productivity or profitability

are reflected in workers' wages (see Card, Cardoso, Heining, and Kline (2018) for a review). Early work includes Guiso, Pistaferri, and Schivardi (2005) and Van Reenen (1996), while more recent contributions using matched employer–employee data highlight the importance of heterogeneous effects across groups of workers (e.g., Kline et al. (2019)) or between firm owners and workers (Wang and Young, 2025).

Despite substantial progress, this literature faces important identification challenges. Many studies rely on lagged firm performance as instruments, which requires strong assumptions on the stochastic process governing productivity and may be sensitive to measurement error in firm-level variables. Other papers use industry-level shocks as instruments, which may violate the exclusion restriction if shocks affect workers' outside options or generate general equilibrium effects (e.g., Beaudry et al. (2012)). These concerns have motivated recent work exploiting more plausibly exogenous sources of firm-level variation.

For instance, Garin and Silvério (2024) use idiosyncratic export demand shocks to estimate the responsiveness of wages to firm-specific labor demand changes and find economically meaningful but moderate pass-through.[1] Balke and Lamadon (2022) emphasize how productivity shocks interact with long-term employment relationships, generating persistent earnings dynamics.

Our paper contributes to this literature by studying abrupt changes in firm sales following periods of stability, which provide transparent and easily interpretable labor demand shocks. Rather than isolating a single source of exogenous variation, we adopt a reduced-form event-study approach comparing workers exposed to sharp firm-level changes to observationally similar workers at stable firms. Importantly, we apply this design consistently across countries and focus on elasticities of earnings with respect to firm sales, facilitating cross-country comparisons.

Wage Setting Bhuller, Delgado-Prieto, Hermo, and Lorentzen (2025) show that wage-setting constraints affect firms' employment responses to demand shocks. Hermo (2025) highlight how collective bargaining networks shape the propagation of shocks across firms and workers. Dustmann, Giannetto, Incoronato, Lacava, Pezone, Saggio, and Schoefer (2025) show that opting out of these collective bargaining agreements reduces wages but increases workers' employment and retention within firms.

[1] Acabbi, Panetti, and Sforza (2025) use administrative data and exploit the 2008 global interbank market freeze as an exogenous contraction in bank short-term funding. They show that firms with higher labor share experience significantly larger employment losses and higher exit rates.

Although our analysis does not explicitly model wage-setting and employment protection institutions, our cross-country design provides a natural setting in which these factors may matter.

In sum, our paper provides the first harmonized cross-country evidence on how firm-level labor demand shocks transmit to workers' labor market outcomes. By moving beyond job displacement and focusing on firm-level sales shocks, we offer a unified empirical framework that speaks to central questions in the literatures on rent sharing, wage rigidity, and labor adjustment across institutional contexts.

3 Harmonized Research Design

This section describes the common research design implemented across countries. Our objective is to estimate the effects of firm-level labor demand shocks on workers' labor market outcomes using a harmonized empirical framework. To ensure comparability, we adopt the same definitions, sampling restrictions, and econometric approach in all datasets.

3.1 Sample Construction and Outcome Variables

We define an event year, denoted t^*, as the year in which a firm-level shock occurs. Event years range from 2005 to 2014, or the closest available years depending on data availability in each country. We construct a balanced event window spanning at least five years before and five years after the shock, using data from 2000 to 2019 whenever possible.

We restrict the sample to workers aged between 20 and 54 in year $t^* - 1$, which implies ages between 16 and 60 over the full event window. We exclude workers employed in the public sector and those who are self-employed in $t^* - 1$. To focus on meaningful labor market attachment, we require annual labor earnings in $t^* - 1$ to exceed 10 percent of the country-specific median earnings. When employment start dates are available, workers must be employed in December of year $t^* - 1$.

Firms are required to have positive sales and employment information in each year from $t^* - 3$ to $t^* - 1$. We allow firms to exit the dataset in year t^* or later. To limit the influence of extreme observations, we winsorize firm sales at the 95th percentile and firm employment at the 99th percentile. We further restrict attention to firms with at least 30 employees in $t^* - 1$ and exclude firms operating in agriculture and raw

extraction sectors (NACE Rev. 2 sections A and B).

All monetary variables are deflated to 2020 euros using country-specific price indices. Firm-level labor demand shocks are defined using annual sales at the firm level. Our main outcome variable is total annual labor earnings, defined as the sum of labor earnings across all employers before taxes, including bonuses, overtime, and severance payments when available. Workers with missing earnings in a given year are assigned zero earnings. When information is available, we additionally construct daily and hourly wage measures based on earnings and days or hours worked at the main employer.

3.2 Definition of Treated and Control Workers

We define treatment at the worker level based on shocks experienced by the worker's primary employer. A worker is classified as treated if her employer satisfies two conditions.

First, we impose a stability condition in the pre-shock period. Firm sales in years $t^* - 1$ and $t^* - 2$ must each lie within 10 percent of their value in $t^* - 3$. This restriction excludes firms already undergoing strong growth or decline prior to the event and ensures that identified shocks represent sharp deviations from recent trends.

Second, the firm must experience an abrupt change in sales between $t^* - 1$ and t^* of at least 10 percent. We consider both negative shocks, defined as sales declines of at least 10 percent, and positive shocks, defined as sales increases of at least 10 percent.

To address the possibility of fictitious shocks arising from mergers, restructurings, or changes in firm identifiers, we implement an additional correction. A shock is classified as fictitious and excluded if at least 30 percent of the firm's workforce in $t^* - 1$ moves to the same new employer in $t^* + 1$, indicating that the observed sales change reflects organizational restructuring rather than an economic shock.

The comparison group is constructed using one-to-one matching. We first exactly match treated workers to potential controls on the year of the shock, gender, industry group, age category, tenure category, and firm size category. Within these matched strata, we select control workers whose pre-shock characteristics lie within a 20 percent caliper of the treated worker in terms of log total earnings in $t^* - 2$ and $t^* - 3$, and log firm sales in $t^* - 2$ and $t^* - 3$. This procedure ensures that treated and control workers are comparable along both worker characteristics and firm-level sales trajectories prior to the shock.

3.3 Descriptive Statistics

Table 1 describes the data sources. Tables 2 and 3 report descriptive statistics for the matched samples used in the analysis, separately for negative and positive sales shocks. The tables show means and standard deviations for key worker and firm characteristics measured in $t^* - 1$, by treatment status and country.

Treated and control workers are highly comparable across all observed characteristics. Matching ensures exact balance on gender, industry, age, tenure, firm size, and shock year, while caliper matching delivers close balance in pre-shock earnings and firm sales.

The tables also show that shocks correspond to economically meaningful changes in firm sales. Sample sizes are large in all countries and support reliable event-study estimation.

Appendix Tables A3 and A4 report the descriptive statistics for the full sample (i.e before we apply the sample restrictions).

4 The Consequences of Labor Demand Shocks Across Countries

This section presents the main empirical results on the effects of firm-level labor demand shocks on workers' labor market outcomes. We first describe our event-study specification, and then discuss the baseline results on earnings, employment, and separations, followed by heterogeneity and robustness analyses.

4.1 Event-Study Specification

We estimate the effects of firm-level labor demand shocks using an event-study difference-in-differences framework. Let i index workers and let t_i^* denote the calendar year in which worker i is exposed to a firm-level shock. We estimate the following specification separately for each country:

$$y_{it} = \alpha_i + \lambda_t + \sum_{k=-5}^{5} \gamma_k \mathbf{1}\{t = t_i^* + k\} + \sum_{k=-5}^{5} \theta_k \mathbf{1}\{t = t_i^* + k\} \times \text{Treated}_i + X_{it}'\beta + r_{it}, \quad (1)$$

where y_{it} denotes the outcome of interest, primarily total annual labor earnings. Treated_i is an indicator equal to one for treated workers, and X_{it} includes a quadratic in age.

Worker fixed effects α_i absorb time-invariant worker characteristics, while year fixed effects λ_t capture aggregate shocks common to all workers. Under the assumption of parallel trends between treated and control workers, the coefficients θ_k identify the causal effect of firm-level labor demand shocks on workers' labor market outcomes at event time k. We normalize the coefficients relative to the year immediately preceding the shock ($k = -1$). Standard errors are clustered at the worker level.

4.2 Main Results

Labor demand shocks and workers' outcomes. Figure 1 presents the dynamic event-study estimates for firm sales and workers' earnings. The left column reports negative shocks and the right column positive shocks. Pre-trends are flat across all countries, supporting the identification strategy. Following the shock at $t = 0$, firm sales adjust sharply and persistently, and workers' earnings respond gradually over the subsequent years.

Earnings responses are economically meaningful and long-lasting. Negative shocks generate persistent earnings losses, while positive shocks lead to sustained earnings gains. However, the magnitude and persistence of these responses vary substantially across countries. Southern European countries, in particular Portugal and Italy, exhibit larger and more persistent earnings responses than Northern European countries.

Figures 2 and 3 decompose these earnings adjustments into employment, separations, and wage components. Negative shocks increase separation probabilities and reduce employment, whereas positive shocks reduce separations and raise employment. Wage responses move in the same direction as total earnings but are quantitatively smaller, indicating that adjustment operates along both wage and employment margins. Cross-country differences are again pronounced: separation responses are strongest in Portugal and more muted in Sweden and Denmark, consistent with the larger earnings losses observed in Southern Europe.

To facilitate cross-country comparison, Figure 4 summarizes the medium-run effects by reporting estimates three years after the shock ($t = +3$). The dynamic patterns in Figure 1 show that outcomes largely stabilize within two to three years, making this horizon representative of the average post-shock adjustment.

Panel A of Figure 4 reports the size of the underlying sales shocks, Panel B the associated earnings responses, and Panel C the implied earnings–sales elasticities. Two key patterns emerge. First, pass-through from firm sales to workers' earnings differs

markedly across countries. Elasticities are highest in Southern Europe and lowest in Northern Europe, indicating substantially stronger transmission of firm-level shocks to workers' earnings in the former group. Second, asymmetries between negative and positive shocks are more pronounced in Southern Europe. Earnings losses following negative shocks exceed gains following positive shocks by a wide margin, whereas responses in Northern Europe are closer to symmetric.

Overall, similar firm-level shocks generate markedly different earnings trajectories across countries, underscoring the importance of institutional context.

Worker mobility and earnings adjustment. Figure 5 examines the role of worker mobility by comparing earnings responses for all exposed workers with those for workers who remain with the same employer until $t = +5$ ("stayers"). The figure reports estimates at $t = +3$, separately for negative and positive shocks.

Across countries, earnings responses are systematically larger for all workers than for stayers. This pattern indicates that worker reallocation across employers is an important margin of adjustment. Following negative shocks, earnings losses are substantially attenuated among stayers, particularly in Portugal and Italy. In contrast, differences between all workers and stayers are smaller in Denmark and Sweden, consistent with more effective reemployment and smoother adjustment in Northern Europe.

Appendix Figure A1 presents the full dynamic event-study profiles for all workers and stayers. Differences between the two groups emerge shortly after the shock and persist over time, confirming that mobility plays a central role in shaping medium-run earnings trajectories.

Finally, Figure 6 explores heterogeneity by shock intensity. Plotting earnings losses against separation rates across quintiles of the shock distribution reveals a clear positive relationship for negative shocks: larger sales declines are associated with both greater earnings losses and higher separation probabilities. This pattern is particularly steep in Southern (see Figure A4 for the same analysis across deciles). For positive shocks (Figure A5), earnings gains increase with shock size as well, but the relationship with separations is weaker.

Taken together, the evidence indicates that cross-country differences in earnings pass-through are closely linked to differences in worker mobility and employment adjustment. Countries where separations rise more strongly following negative shocks also display larger earnings losses and higher earnings–sales elasticities.

4.3 Heterogeneous Effects and Robustness

Earnings effects across subgroups of workers and firms. Figure 7 examines heterogeneity in earnings responses across observable worker characteristics. We consider three dimensions—age, pre-shock earnings quartiles, and gender—and report differences in earnings responses relative to a reference group within each category, where earnings responses are defined as the percentage change in earnings relative to one year prior to the shock. For age, early-career workers (ages 21–34) serve as the reference group.

Panel A shows that earnings losses following negative shocks are smaller for mid-career (ages 35–49) and senior workers (ages 50 and above) than for early-career workers across countries. In contrast, Panel B displays no systematic age gradient for positive shocks, as relative responses vary across countries.

With respect to gender, women experience smaller earnings losses than men following negative shocks, whereas responses to positive shocks tend to be larger for women in several countries, although the magnitude of these differences is heterogeneous.

Figure 8 studies heterogeneity in earnings responses by the size of sales shocks. Estimates are expressed relative to a reference shock-size group within each panel.

Panel A reveals a clear gradient for negative shocks: larger sales declines are associated with greater earnings losses, particularly in the lower shock-size quantiles, although the strength of this relationship differs across countries.

Panel B shows substantially weaker and less systematic heterogeneity for positive shocks, with no consistent monotonic relationship between shock size and earnings gains across countries.

Robustness Appendix Figures A8, A9, A10 and A11 display the evolution of mean sales and workers' earnings separately for treated and control firms, for both negative and positive shocks. These figures complement the difference-in-differences estimates by illustrating the underlying dynamics of the two groups and help interpret the event-study results reported in Figure 1.

We conduct a series of robustness checks to assess the sensitivity of our results to alternative specifications. First, we modify the construction of the comparison group. Instead of caliper matching, we implement propensity-score matching following the job displacement literature (e.g., Schmieder et al., 2020). The resulting estimates are

very similar in Portugal and differ only modestly in Sweden, with differences on the order of one percentage point. Similar conclusions are reached when focusing on positive rather than negative shocks (Figure A6).

Second, we vary the definition of the treated group by relaxing the pre-shock stability condition. In particular, we allow firm sales in $t^* - 1$ and $t^* - 2$ to deviate by up to 20 percent from their level in $t^* - 3$, instead of the baseline 10 percent threshold. As shown in Figure A7, the results are largely unchanged.

Finally, we explore an alternative treatment of firm exit and missing sales observations. In the baseline specification, the firm panel is unbalanced. In Figure 9, we rebalance the panel by setting missing firm sales to zero, thereby treating firms and workers symmetrically.[2] The estimated sales and earnings responses remain very similar, indicating that our results are not driven by differential treatment of firm exit.

5 Labor Market Institutions and Policies

To provide context for the cross-country differences documented in the main results, Table 4 summarizes key labor market institutions and policies across the countries in our sample. Importantly, the table also includes the United States as a benchmark, allowing us to position European countries along a broader institutional spectrum.

Several dimensions of labor market policy and institutions vary substantially across countries. First, public spending on labor market policies differs markedly. We distinguish between *passive* and *active* labor market policies (LMP). Passive LMP refers to income support provided to unemployed individuals, such as unemployment insurance and related transfers. In contrast, active LMP includes policies aimed at improving workers' employability and facilitating job matching, such as training programs, job search assistance, and hiring subsidies.

Countries such as Denmark and Sweden devote substantial resources to both passive and active LMP, reflecting a model that combines income insurance with strong reemployment support. In contrast, countries like Hungary and the United States spend relatively little on both dimensions, particularly on active policies. Southern European countries lie in between, with relatively higher passive support but more limited investment in active measures.

Second, wage-setting institutions differ along the level of bargaining. The index

[2]This approach harmonizes the treatment of firm exit with our handling of missing worker earnings.

reported in Table 4 ranges from firm-level bargaining (1) to sector-level or higher bargaining (3). Northern and Southern European countries tend to exhibit more centralized or coordinated wage-setting systems, while Hungary, as in the United States, are characterized by firm-level bargaining.

Third, union density varies widely, from high levels in Nordic countries (around 65–70%) to much lower levels in France, Hungary, and the United States (below 15%). Similarly, employment protection legislation (EPL) shows substantial heterogeneity, with stricter protection in Southern Europe and weaker protection in Hungary.

A notable feature of the data is that Hungary appears relatively close to the United States along several key institutional dimensions. In both countries, wage setting is predominantly decentralized at the firm level, union density is low, and employment protection is relatively weak. These similarities suggest that Hungary represents a labor market environment with limited institutional insulation from firm-level shocks, closer in spirit to the U.S. model than to other European countries.

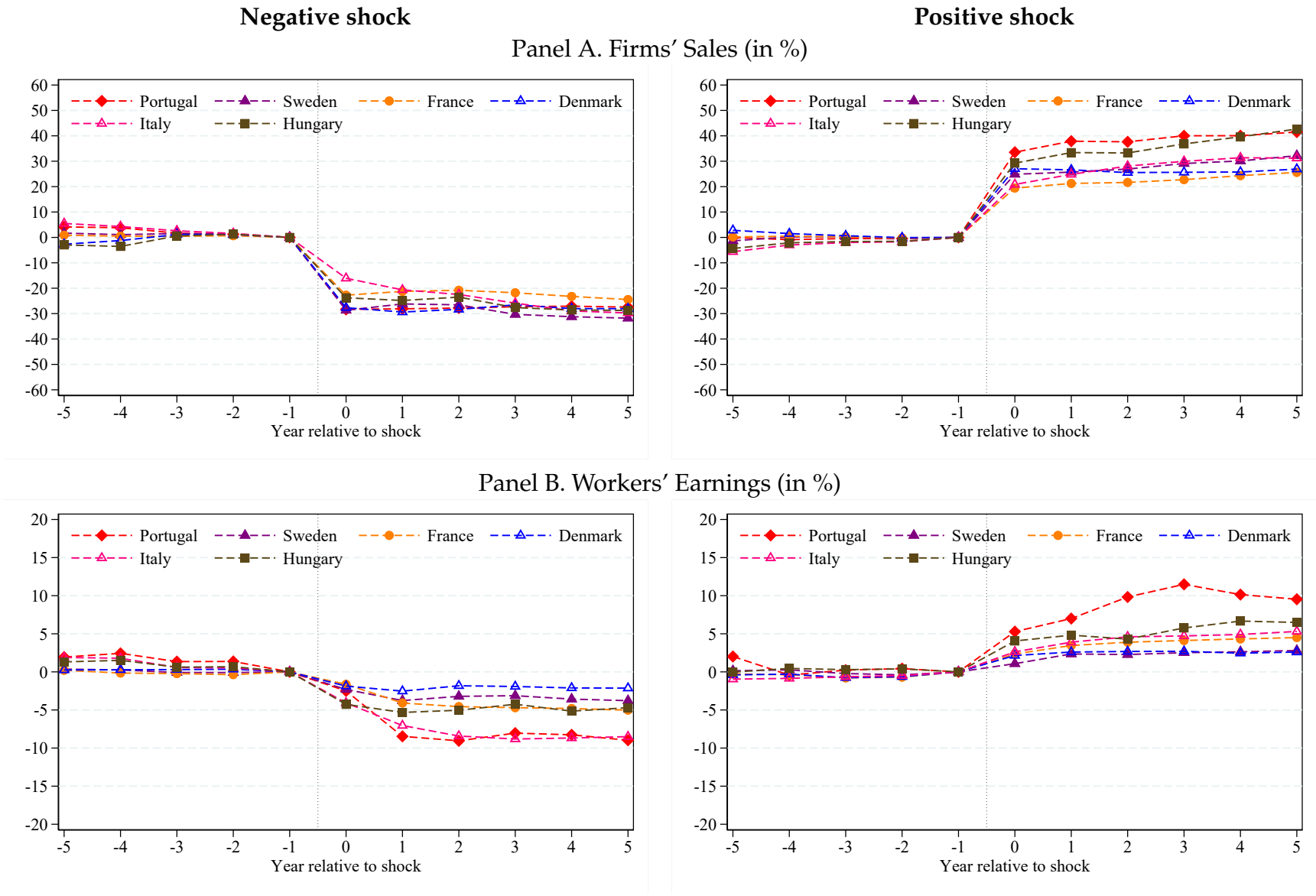
Taken together, these institutional differences provide a useful framework for interpreting the heterogeneity in earnings responses documented in the paper. In particular, variation in worker protection, bargaining structures, and reemployment policies is likely to shape both the incidence of firm-level shocks on workers and the margins of adjustment through which these shocks are transmitted.

6 Conclusion

This paper studies how firm-level labor demand shocks transmit to workers' labor market outcomes across countries. By combining matched employer–employee data with firm-level balance-sheet information and implementing a harmonized event-study design, we document how abrupt changes in firm sales—both positive and negative—affect workers' earnings, employment, and separations. Our approach moves beyond the job displacement framework by studying shocks that do not mechanically imply separation, allowing us to analyze adjustment along multiple margins and for a broader population of workers. By expressing results in terms of elasticities of earnings with respect to firm sales, we provide a measure of pass-through that facilitates meaningful cross-country comparisons.

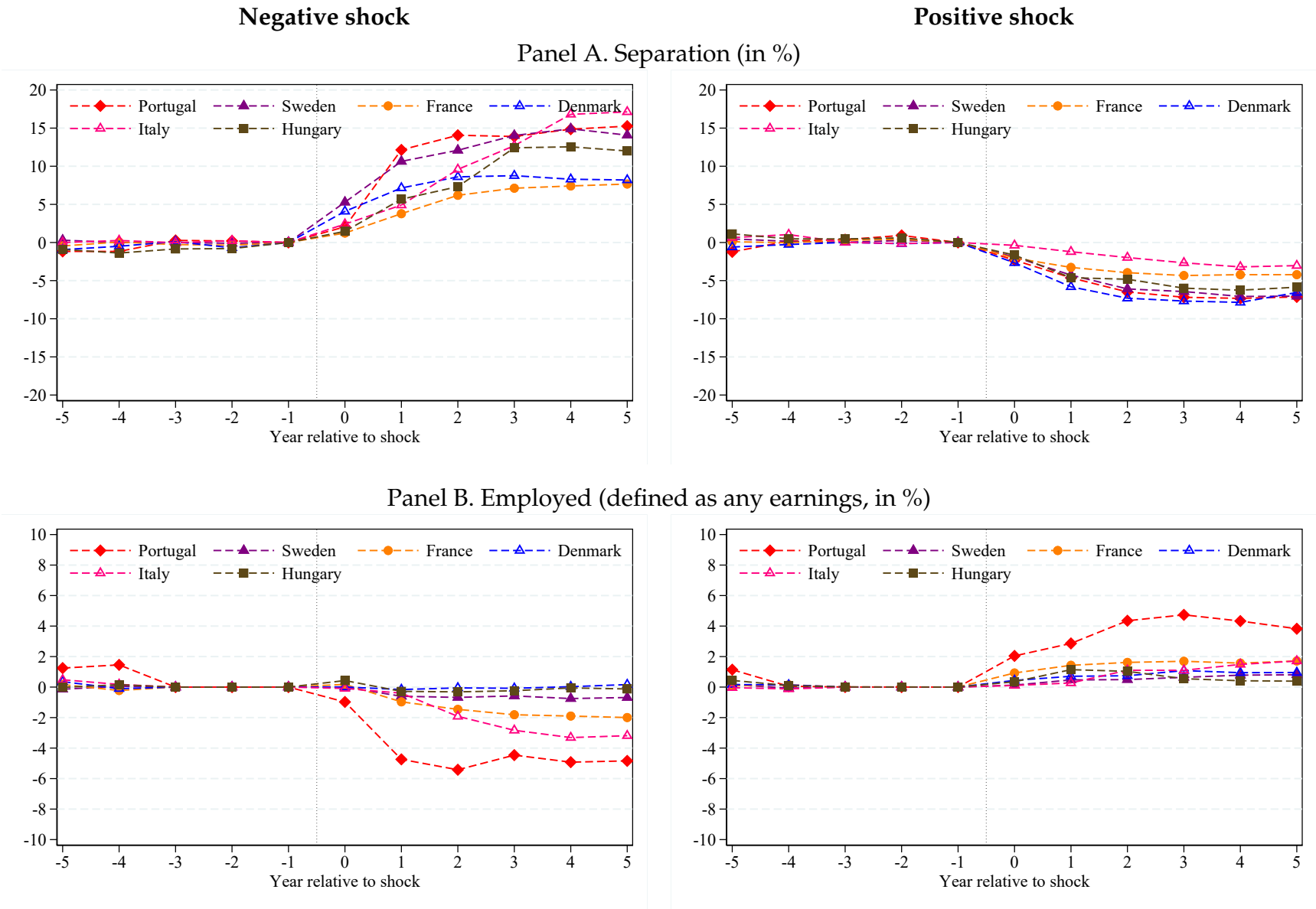
7 Tables and Figures

Figure 1: Effect of Sales Shocks on Workers' Earnings Across Countries



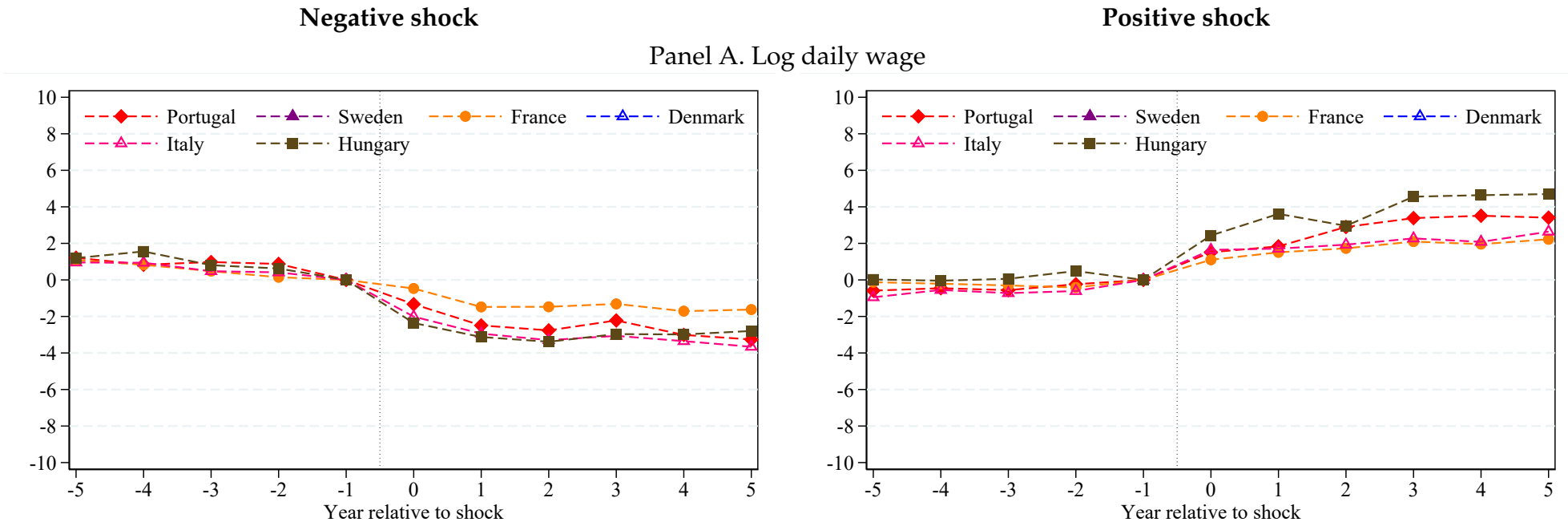
Notes: The figure reports dynamic event-study estimates for negative and positive sales shocks. Panel A shows firm sales and Panel B shows workers' earnings. Sales shocks are defined as firm-level sales changes of at least 10 percent between $t = -1$ and $t = 0$, among firms with stable pre-shock sales trends. Earnings responses measure percentage changes in workers' total earnings across all employers relative to one year prior to the shock. All estimates follow equation 1.

Figure 2: Effect of Sales Shocks on Separation and Employment Across Countries



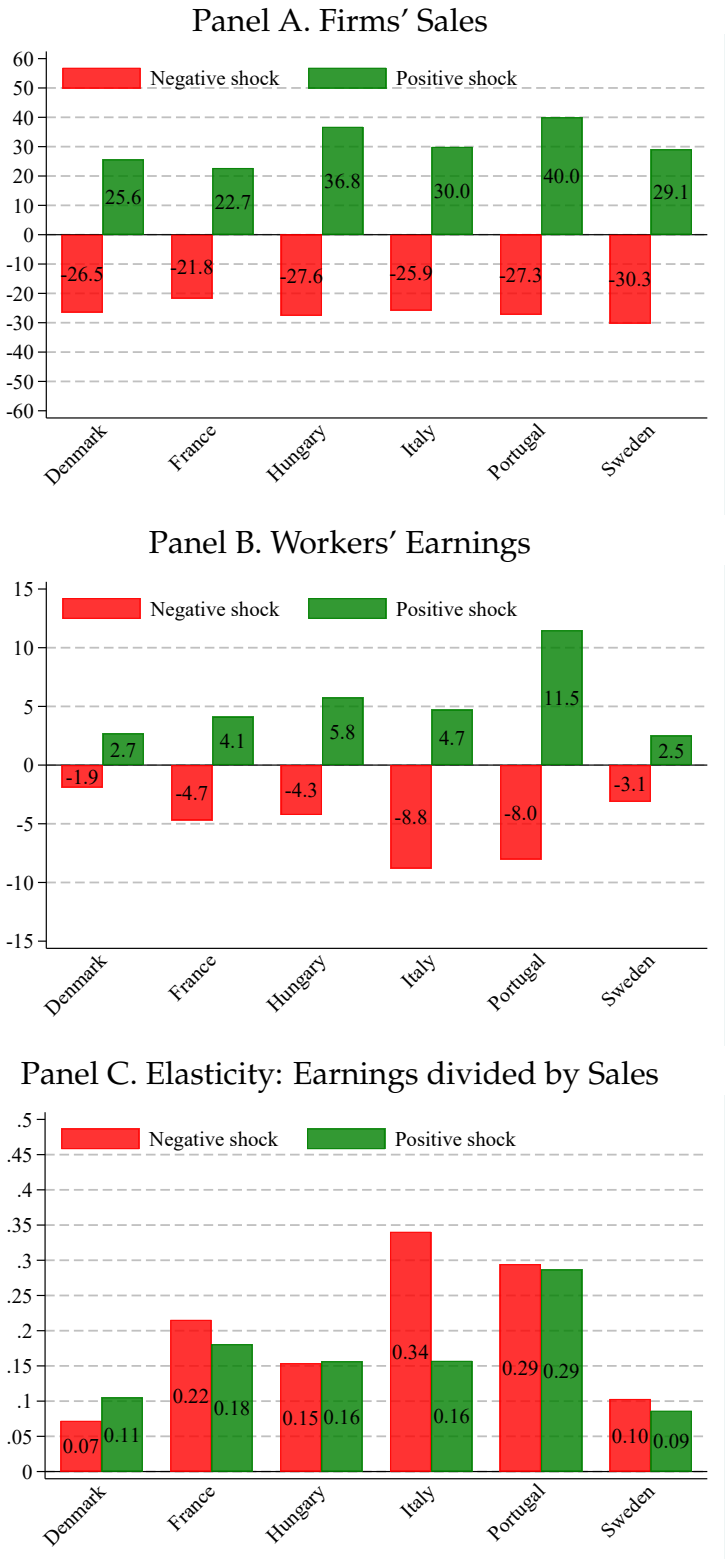
Notes: This figure reports event-study coefficients for probability of separation from the t-1 employer and the probability of being employed (defined as having positive earnings). Sales shocks are defined as firm-level sales changes of at least 10 percent between $t = -1$ and $t = 0$, among firms with stable pre-shock sales trends. All estimates follow equation 1.

Figure 3: Effect of Sales Shocks on Workers' Wages Across Countries



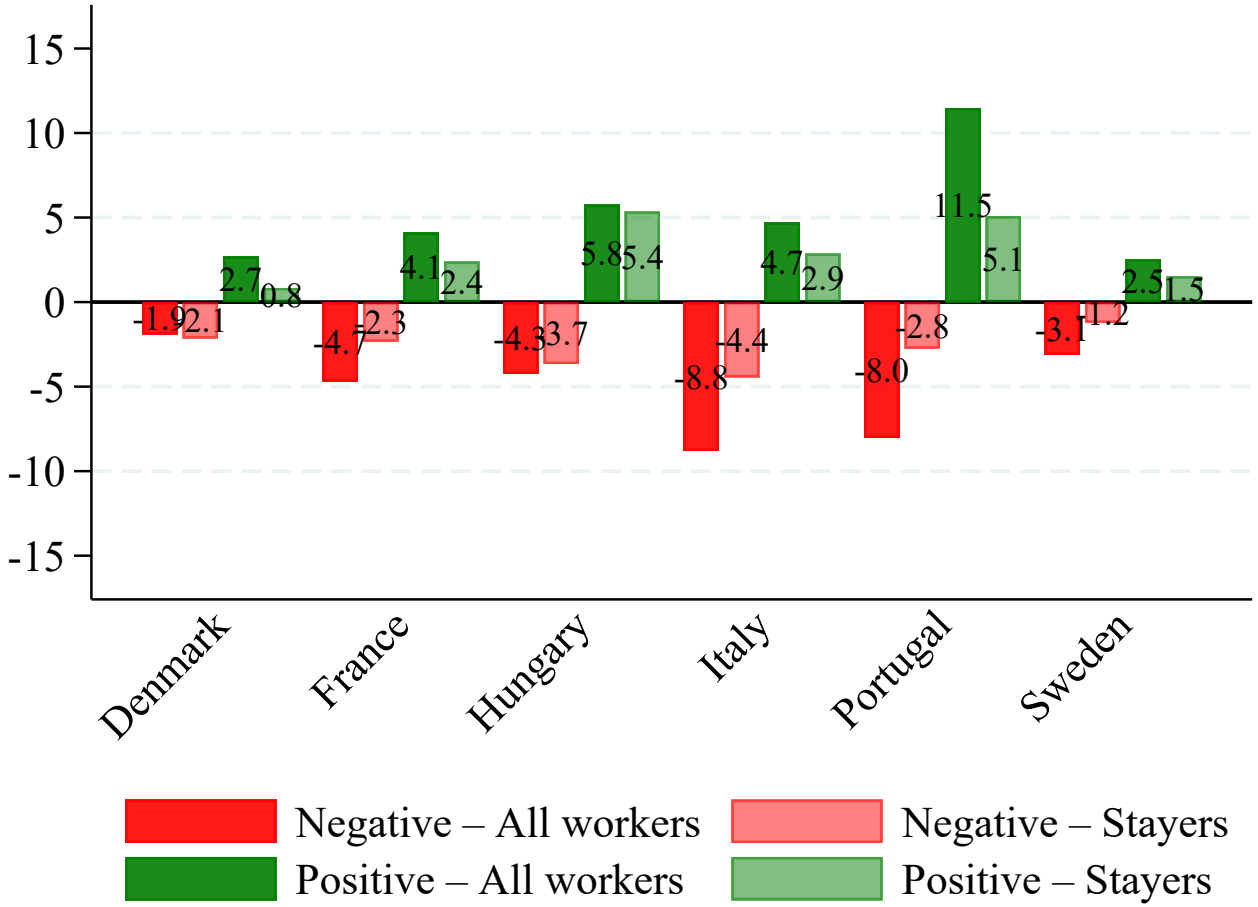
Notes: This figure reports event-study coefficients for log daily and hourly wages. Estimates are scaled by 100. Sales shocks are defined as firm-level sales changes of at least 10 percent between $t = -1$ and $t = 0$, among firms with stable pre-shock sales trends. The estimation follows equation 1. Standard errors are reported in Tables 4 and 5.

Figure 4: Elasticity of Sales Shock on Workers' Earnings Across Countries



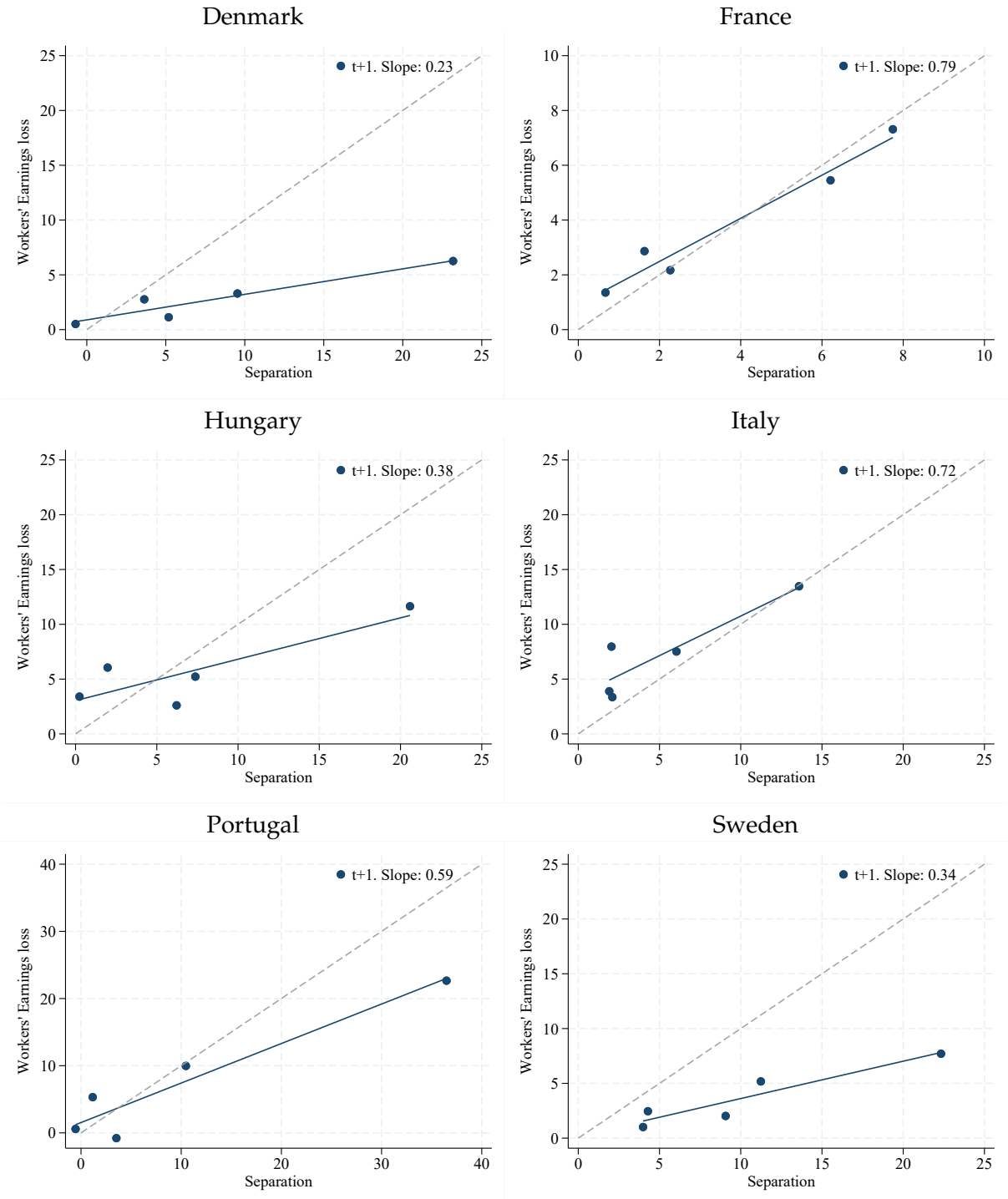
Notes: The figure reports event-study estimates evaluated three years after the shock ($t = +3$). Panels A and B show percentage changes in firm sales and workers' earnings, respectively, while Panel C reports the earnings–sales elasticity. Results are shown separately for negative and positive shocks. Sales shocks are defined as firm-level sales changes of at least 10 percent between $t = -1$ and $t = 0$, among firms with stable pre-shock sales trends. Earnings responses measure percentage changes in workers' total earnings across all employers relative to one year prior to the shock. Estimates are obtained from difference-in-differences event-study specifications comparing workers employed at shocked firms to comparable workers employed at non-shocked firms, controlling for worker and time fixed effects.

Figure 5: Earnings Responses to Sales Shocks by Worker Mobility



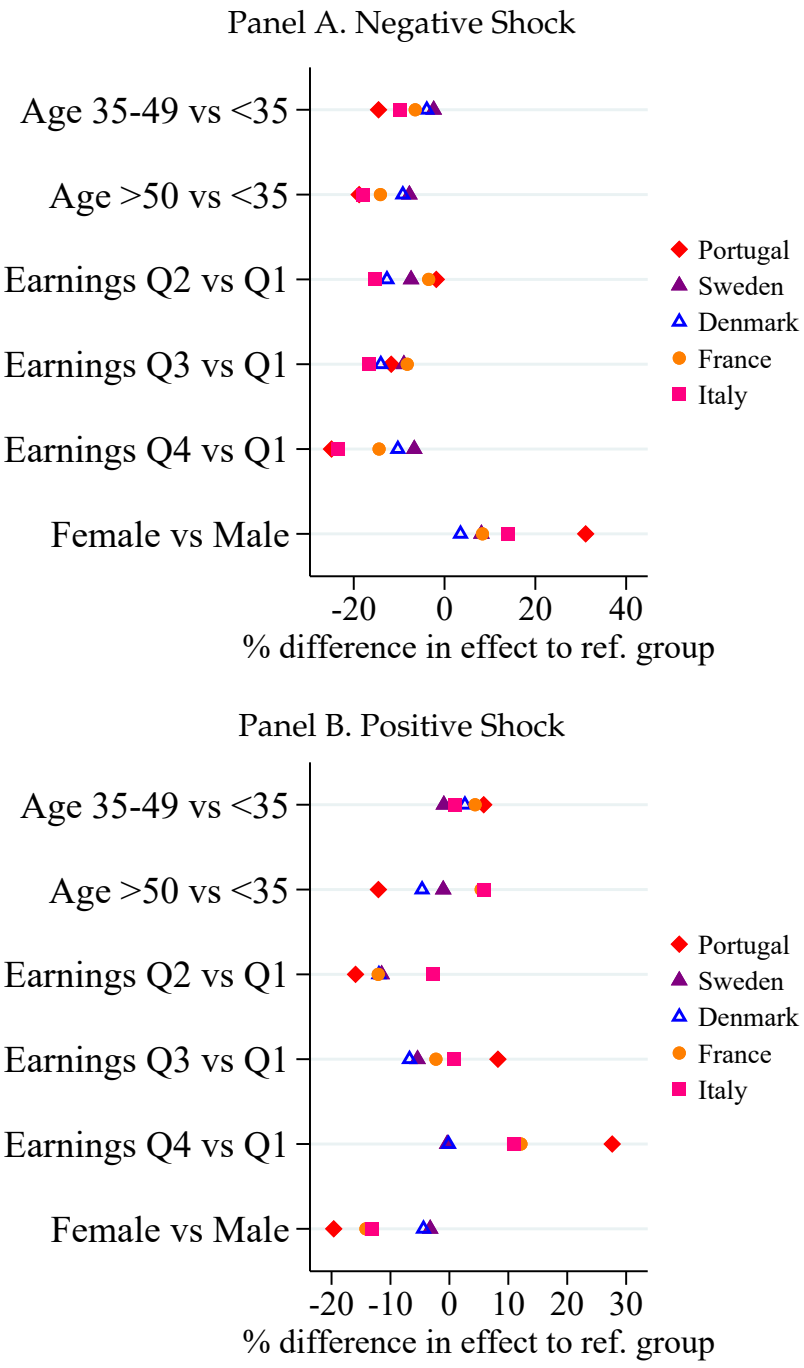
Notes: The figure reports dynamic event-study estimates evaluated three years after the shock for negative and positive sales shocks. Sales shocks are defined as firm-level sales changes of at least 10 percent between $t = -1$ and $t = 0$, among firms with stable pre-shock sales trends. Results are shown separately for all workers and for workers who remain with the same employer until t=+5 ("stayers"). Earnings responses are defined as the percentage change in workers' total earnings relative to one year prior to the shock.

Figure 6. Earnings and Separation Response to Negative Sales Shocks: across quintiles



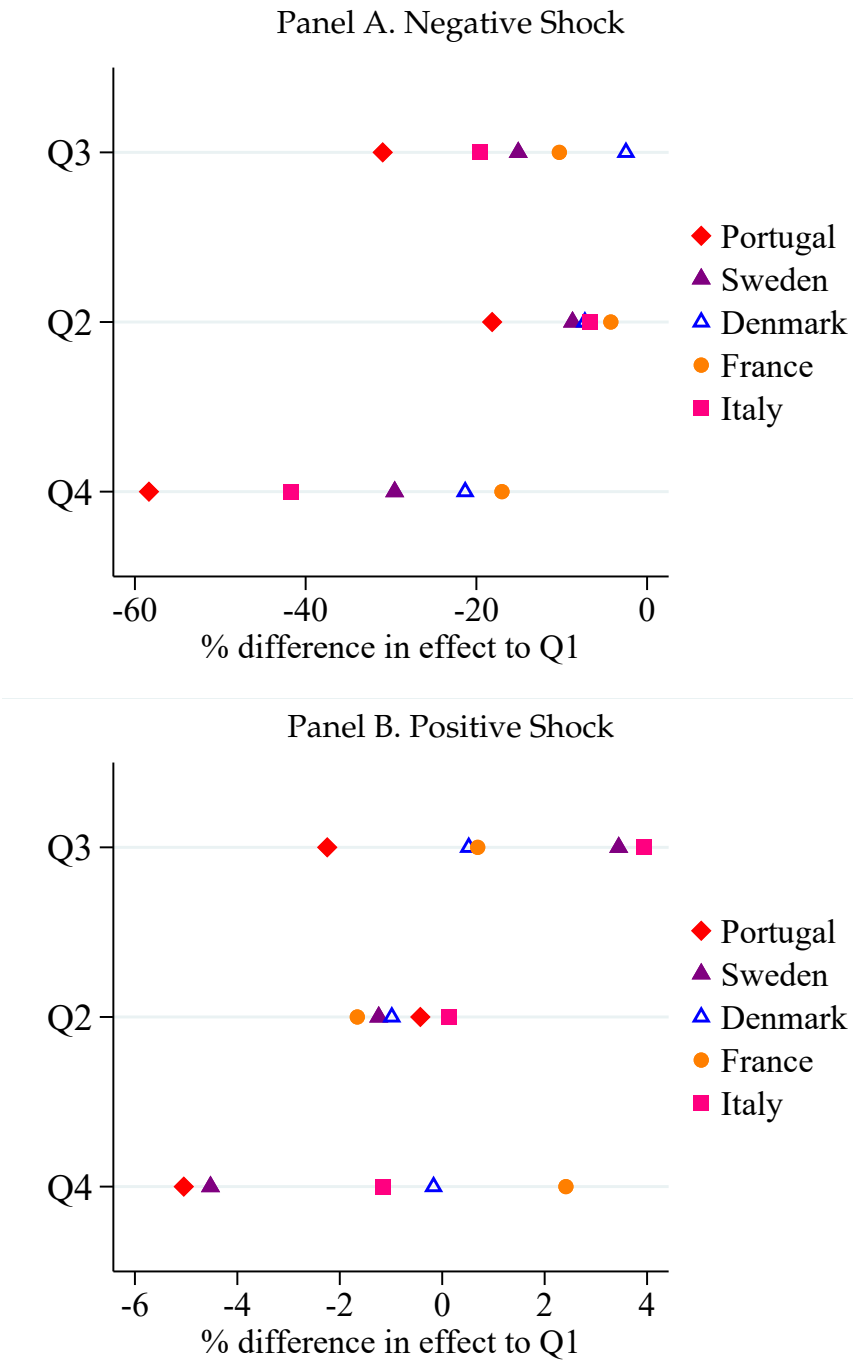
Notes: The figure plots average earnings losses and job separations measured one year after the shock across quintiles of the firm-level sales shock distribution. Each marker represents the mean outcome within a decile of the shock distribution, estimated separately by country. Solid lines show linear fits across quintiles. Earnings losses are measured as the percentage decline in workers' total earnings relative to one year before the shock, while separation denotes the probability of leaving the pre-shock employer.

Figure 7: Earnings Response to Shocks by Worker Characteristics



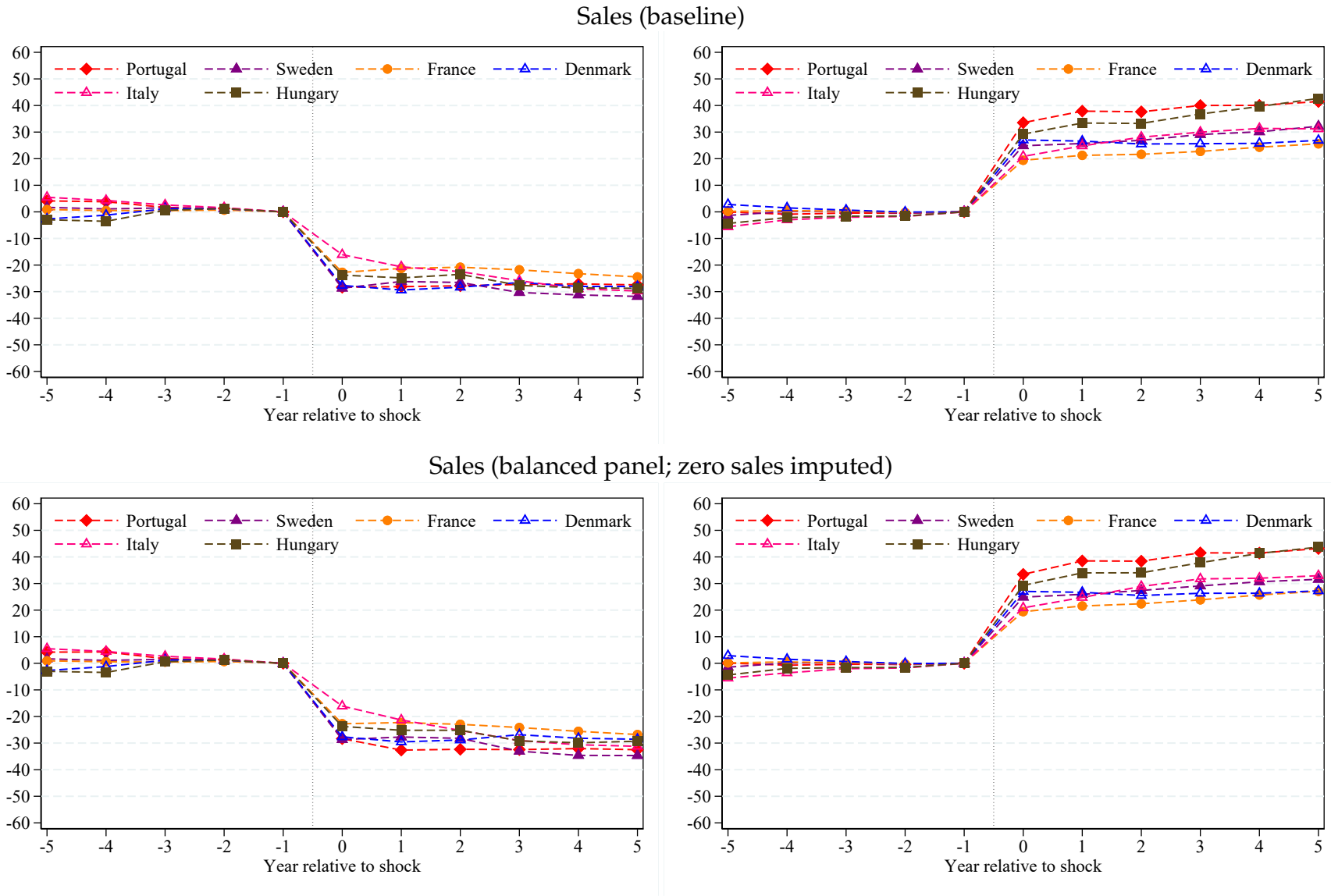
Notes: This figure reports heterogeneous earnings responses to firm-level sales shocks by worker characteristics. The estimation follows equation 1. We report the mean of t+0 to t+5 for this figure.

Figure 8: Earnings Response to Revenue Shocks: by Shock Size



Notes: This figure reports heterogeneous earnings responses to firm-level sales shocks by shock-size categories. Estimates are shown separately for negative (Panel A) and positive (Panel B) shocks and are reported for each country. The estimation follows equation 1.

Figure 9: Robustness: Sales Shock With and Without Panel Rebalancing



Notes: This figure reports the estimated percentage change in firm sales around the time of the shock with and without rebalancing the firm panel.

Table 1: Characteristics of Data Sources by Country

Characteristic	Denmark	France	Italy	Portugal	Sweden	Hungary
Time span and population						
Year coverage	2001–19	2002–19	2005–19	2003–19	2000–18	2003–17
All jobs per year	Yes	Yes	Yes	No	Yes	No
Private sector jobs (%)	100	100	50	100	100	50
Public sector jobs	Yes	Yes	No	No	Yes	Yes
Employee Information						
Earnings	Total	Total	Total	Total	Total	Total
Wage	Hourly	Hourly	Daily	Hourly	Daily	Hourly
Hours worked	Yes	Yes	No	Yes	No	Yes
Temp contract	No	Yes	Yes	No	No	Yes
Occupation (3-digit)	Yes	Yes	No	Yes	Yes	Yes
Employer Information						
Sales	Yes	Yes	Yes	Yes	Yes	Yes
Value-added	Yes	Yes	Yes	No	Yes	Yes
Export and Import	Yes	Yes	No	Yes	Yes	No
Region (2-digit)	Yes	Yes	Yes	Yes	Yes	Yes
Industry (2-digit)	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table summarizes the main characteristics of the datasets used in each country. Year coverage indicates the number of years for which matched employer–employee data are available and linked to firm-level revenue information (either sales or value-added). The range of year coverage is 2000-2019. All jobs per year indicates whether the data cover all employers within a year or not (e.g., a specific reference month as in Portugal or the main employer). Private sector jobs (%) reports the percentage of private-sector employment covered by the dataset. Public sector jobs indicates whether public-sector employers are included. Earnings indicates whether earnings measures include only contractual/base pay (labeled Base only) or also overtime, bonuses, and fringe benefits (labeled Total). Hours worked measure total paid hours (contractual and overtime hours). Hours data are available from 2008 only in Denmark. Wage indicates whether hourly wage information is available. Wage is constructed at total earnings over total hours worked at the primary employer (if not available, daily wages is used). Occupation (3-digit) refers to the International Standard Classification of Occupations (ISCO) at the three-digit level. Export and import indicates whether annual firm-level trade data are available, with exports and imports reported by destination country and at the six-digit product level (HS-6). Region (2 digits) refers to the Classification of Territorial Units for Statistics (NUTS) at level 2. Industry (2 digits) refers to the Classification of Economic Activities in the European Community (NACE) at the two-digit levels. See the Appendix for details.

Table 2: Descriptive Statistics For Negative Sales Shock, Matched Sample

		Earnings	Age	Tenure	Male	Sales	Firm size	Manu.	Services	N. Workers	N. Firms
SWE	Treated	33,793	38.8	8.0	72.6	50,994	284.4	47.6	49.0	78,863	2,130
		(13,184)	(9.2)	(6.1)	(44.6)	(46,018)	(383.8)				
	Control	33,912	38.8	7.9	72.6	52,092	288.1	45.0	51.7	78,863	8,659
		(13,212)	(9.2)	(6.1)	(44.6)	(47,444)	(384.6)				
PRT	Treated	14,882	36.6	9.4	55.6	20,527	247.8	12.6	86.8	120,587	3,546
		(12,328)	(9.1)	(8.4)	(49.7)	(20,964)	(337.2)				
	Control	15,125	36.6	9.1	55.6	20,751	248.5	12.5	86.9	120,587	9,802
		(14,343)	(9.1)	(8.1)	(49.7)	(21,241)	(337.2)				
FRA	Treated	30,462	38.0	5.4	67.2	47,686	342.2	38.8	53.3	85,575	14,376
		(17,343)	(9.6)	(5.0)	(47.0)	(45,273)	(489.3)				
	Control	30,325	38.0	5.5	67.2	47,697	342.3	38.6	53.5	85,575	36,854
		(17,541)	(9.6)	(5.0)	(47.0)	(45,034)	(486.2)				
DK	Treated	52,284	39.1	6.8	65.6	39,301	208.4	46.9	48.1	39,300	1,875
		(20,931)	(8.9)	(5.8)	(47.5)	(36,335)	(295.8)				
	Control	52,518	39.1	6.6	65.6	39,327	208.6	46.5	48.4	39,300	4,806
		(21,300)	(8.9)	(5.7)	(47.5)	(35,715)	(297.4)				
ITA	Treated	29,803	41.1	6.0	71.1	48,639	278.9	68.3	30.4	81,504	1,237
		(15,013)	(7.9)	(2.0)	(45.3)	(35,345)	(307.6)				
	Control	30,142	41.0	6.0	71.1	50,218	283.0	67.3	31.4	81,504	4,581
		(14,930)	(7.9)	(2.1)	(45.3)	(37,206)	(308.9)				
HUN	Treated	5,858	38.9	4.7	57.5	10,883	267.8	48.1	51.2	21,561	2,163
		(3,796)	(9.4)	(2.6)	(49.4)	(10,291)	(331.2)				
	Control	5,936	38.9	4.6	57.5	11,105	271.4	43.8	55.5	21,561	3,470
		(3,856)	(9.4)	(2.6)	(49.4)	(10,714)	(332.2)				

Notes: This table reports mean and standard deviation (in parentheses) by country and treatment status, measured at the end of t-1. *Earnings* refers to annual earnings in euros. Sales denotes firm sales (thousands of EUR). *Firm size* is employment-weighted and corresponds to the number of employees. Manufacturing and services do not sum to 100% because a third industry category is omitted.

Table 3: Descriptive Statistics For Positive Sales Shock, Matched Sample

		Earnings	Age	Tenure	Male	Sales	Firm size	Manu.	Services	N. Workers	N. Firms
SWE	Treated	33,081	38.4	7.2	69.2	35,849	197.6	41.3	54.7	88,044	3,046
		(13,319)	(9.3)	(5.6)	(46.2)	(35,092)	(264.9)				
	Control	32,889	38.4	7.2	69.2	36,948	194.8	41.4	54.6	88,044	8,825
		(13,388)	(9.3)	(5.6)	(46.2)	(37,794)	(262.6)				
PRT	Treated	14,103	36.1	8.7	57.9	15,543	224.2	25.3	74.2	87,334	2,434
		(12,391)	(9.0)	(8.1)	(49.4)	(15,337)	(314.1)				
	Control	14,125	36.1	8.9	57.9	15,944	222.7	25.3	74.3	87,334	9,651
		(12,557)	(9.1)	(8.3)	(49.4)	(16,348)	(312.7)				
FRA	Treated	28,973	37.4	5.0	65.0	31,997	193.6	33.5	57.8	78,375	14,262
		(17,194)	(9.6)	(4.7)	(47.7)	(30,507)	(244.3)				
	Control	28,673	37.4	5.1	65.0	32,713	195.3	33.4	57.9	78,375	40,437
		(15,931)	(9.6)	(4.9)	(47.7)	(32,536)	(247.4)				
DK	Treated	53,127	39.0	6.8	68.6	32,085	155.0	49.7	45.7	45,201	2,034
		(21,124)	(8.7)	(5.6)	(46.4)	(28,047)	(151.5)				
	Control	52,562	39.0	6.9	68.6	33,048	154.8	49.7	45.7	45,201	5,144
		(20,707)	(8.7)	(5.6)	(46.4)	(30,354)	(142.6)				
ITA	Treated	30,494	40.5	5.8	71.6	42,219	233.0	74.0	24.9	71,115	1,123
		(14,892)	(7.9)	(2.3)	(45.1)	(28,986)	(267.3)				
	Control	30,241	40.5	5.9	71.6	42,142	234.4	73.0	25.9	71,115	4,223
		(14,695)	(8.0)	(2.3)	(45.1)	(29,487)	(264.7)				
HUN	Treated	5,934	38.7	4.5	56.6	8,470	178.5	55.2	43.8	13,805	1,207
		(4,063)	(9.3)	(2.5)	(49.6)	(8,117)	(201.2)				
	Control	5,965	38.7	4.6	56.6	8,626	178.7	52.8	46.2	13,805	3,279
		(4,027)	(9.3)	(2.5)	(49.6)	(8,800)	(194.1)				

Notes: This table reports mean and standard deviation (in parentheses) by country and treatment status, measured at the end of t-1. *Earnings* refers to annual earnings in euros. Sales denotes firm sales (thousands of EUR). *Firm size* is employment-weighted and corresponds to the number of employees. Manufacturing and services do not sum to 100% because a third industry category is omitted.

Table 4: Labour Market Institutions and Policies

	DNK	FRA	ITA	PRT	SWE	HUN	USA
Policies							
Passive LMP (% GDP)	1.6 (2)	1.4 (4)	1.5 (3)	1.6 (2)	0.6 (10)	0.3 (17)	0.2 (18)
Active LMP (% GDP)	1.8 (1)	0.8 (6)	0.41 (17)	0.5 (15)	1.3 (2)	0.7 (9)	0.1 (19)
Institutions							
Wage bargaining	2	3	3	3	2	1	1
Union density (%)	67 (2)	9 (27)	35 (12)	19 (20)	67 (2)	9 (27)	11 (25)
Emp. protection	2.1 (15)	2.9 (5)	2.8 (6)	3.0 (4)	2.7 (8)	1.9 (18)	0.2 (36)
Temp. contracts (%)	9 (23)	17 (10)	14 (14)	22 (5)	17 (8)	11 (20)	4 (30)

Notes: The table reports labour market policies and institutions using OECD data for 2015 or the closest available year. Passive and active labour market policy (LMP) spending are expressed as a percentage of GDP. Wage bargaining level refers to the predominant level of wage bargaining, based on the OECD/AIAS ICTWSS database. The indicator ranges from 1 (firm-level bargaining) to 3 (sector-level or higher bargaining). Union density is the share of employees who are union members (OECD/AIAS ICTWSS database). Emp. protection corresponds to the OECD indicator of the strictness of employment protection for regular contracts (EPRC_V1), measured on a 0–6 scale. Temp. contracts refers to the share of temporary employees in dependent employment. Numbers in parentheses indicate OECD rankings, from 1 (highest) to 36 (lowest).

Table 5: Effects at = 1

	Negative Shock					Positive Shock				
	Sales	Earnings	Elasticity	Employed	Log wage	Sales	Earnings	Elasticity	Employed	Log wage
Denmark	-29.37	-2.53	0.086	-0.16		26.61	2.60	0.098	0.71	
	(1.348)	(0.487)		(0.412)		(1.107)	(0.315)		(0.135)	
Obs.	72,271	864,600	864,600	864,600		77,627	994,422	994,422	994,422	
France	-21.25	-4.08	0.192	-0.97	-1.48	21.26	3.46	0.163	1.43	1.51
	(0.435)	(0.502)		(0.377)	(0.345)	(0.348)	(0.257)		(0.218)	(0.186)
Obs.	544,236	1,882,650	1,882,650	1,882,650	1,618,751	582,111	1,724,250	1,724,250	1,724,250	1,470,987
Hungary	-24.83	-5.32	0.214	-0.28	-3.12	33.40	4.82	0.144	1.14	3.61
	(1.046)	(0.805)		(0.401)	(0.598)	(1.781)	(1.418)		(0.395)	(0.634)
Obs.	59,292	474,342	474,342	474,342	440,727	47,299	303,710	303,710	303,710	282,571
Italy	-20.64	-7.04	0.341	-0.40	-2.94	24.82	3.90	0.157	0.27	1.71
	(0.889)	(0.527)		(0.169)	(0.387)	(1.051)	(0.331)		(0.146)	(0.226)
Obs.	62,373	1,793,088	1,793,088	1,793,088	1,719,502	57,337	1,564,530	1,564,530	1,564,530	1,506,339
Portugal	-28.11	-8.46	0.301	-4.74	-2.49	37.89	7.00	0.185	2.86	1.84
	(0.963)	(1.658)		(0.745)	(0.475)	(1.458)	(2.113)		(1.174)	(0.465)
Obs.	137,599	2,652,914	2,652,914	2,652,914	2,129,500	124,758	1,921,348	1,921,348	1,921,348	1,556,624
Sweden	-26.19	-3.76	0.144	-0.60		25.72	2.35	0.091	0.47	
	(1.143)	(0.391)		(0.124)		(0.952)	(0.257)		(0.116)	
Obs.	115,718	1,734,986	1,734,986	1,734,986		127,212	1,936,968	1,936,968	1,936,968	

Notes: Sales and earnings are expressed as % change relative to pre-shock mean. Employment and log daily wages are multiplied by 100. Elasticity is reported in levels. Standard errors in parentheses.

Table 6: Effects at = 3

	Negative Shock					Positive Shock				
	Sales	Earnings	Elasticity	Employed	Log wage	Sales	Earnings	Elasticity	Employed	Log wage
Denmark	-26.54	-1.92	0.072	-0.08		25.65	2.70	0.105	1.08	
	(1.686)	(0.634)		(0.700)		(1.572)	(0.427)		(0.208)	
Obs.	72,271	864,600	864,600	864,600		77,627	994,422	994,422	994,422	
France	-21.79	-4.70	0.216	-1.81	-1.31	22.75	4.11	0.181	1.69	2.10
	(0.527)	(0.442)		(0.483)	(0.236)	(0.445)	(0.319)		(0.248)	(0.217)
Obs.	544,236	1,882,650	1,882,650	1,882,650	1,618,751	582,111	1,724,250	1,724,250	1,724,250	1,470,987
Hungary	-27.63	-4.25	0.154	-0.24	-2.97	36.80	5.76	0.157	0.55	4.56
	(1.549)	(1.087)		(0.461)	(0.796)	(2.614)	(1.774)		(0.437)	(0.882)
Obs.	59,292	474,342	474,342	474,342	440,727	47,299	303,710	303,710	303,710	282,571
Italy	-25.87	-8.81	0.341	-2.83	-3.06	29.97	4.72	0.157	1.10	2.27
	(1.242)	(0.679)		(0.386)	(0.525)	(1.702)	(0.552)		(0.290)	(0.313)
Obs.	62,373	1,793,088	1,793,088	1,793,088	1,719,502	57,337	1,564,530	1,564,530	1,564,530	1,506,339
Portugal	-27.28	-8.04	0.295	-4.46	-2.22	40.02	11.48	0.287	4.74	3.38
	(1.296)	(1.564)		(0.944)	(0.649)	(1.799)	(1.558)		(1.249)	(0.670)
Obs.	137,599	2,652,914	2,652,914	2,652,914	2,129,500	124,758	1,921,348	1,921,348	1,921,348	1,556,624
Sweden	-30.31	-3.13	0.103	-0.58		29.10	2.52	0.087	0.64	
	(1.571)	(0.468)		(0.188)		(1.448)	(0.365)		(0.155)	
Obs.	115,718	1,734,986	1,734,986	1,734,986		127,212	1,936,968	1,936,968	1,936,968	

Notes: Sales and earnings are expressed as % change relative to pre-shock mean. Employment and log daily wages are multiplied by 100. Elasticity is reported in levels. Standard errors in parentheses.

Table 7: Effects at = 5

	Negative Shock					Positive Shock				
	Sales	Earnings	Elasticity	Employed	Log wage	Sales	Earnings	Elasticity	Employed	Log wage
Denmark	-28.05	-2.13	0.076	0.16		26.90	2.60	0.097	0.96	
	(2.016)	(0.746)		(0.817)		(2.020)	(0.507)		(0.240)	
Obs.	72,271	864,600	864,600	864,600		77,627	994,422	994,422	994,422	
France	-24.45	-5.02	0.205	-2.00	-1.62	25.60	4.50	0.176	1.71	2.22
	(0.603)	(0.450)		(0.524)	(0.258)	(0.563)	(0.374)		(0.276)	(0.231)
Obs.	544,236	1,882,650	1,882,650	1,882,650	1,618,751	582,111	1,724,250	1,724,250	1,724,250	1,470,987
Hungary	-28.76	-4.70	0.164	-0.12	-2.79	42.67	6.49	0.152	0.39	4.70
	(2.130)	(1.307)		(0.488)	(0.897)	(3.641)	(1.946)		(0.476)	(0.929)
Obs.	59,292	474,342	474,342	474,342	440,727	47,299	303,710	303,710	303,710	282,571
Italy	-29.74	-8.50	0.286	-3.19	-3.66	31.22	5.31	0.170	1.71	2.64
	(1.521)	(0.704)		(0.425)	(0.412)	(2.193)	(0.647)		(0.379)	(0.360)
Obs.	62,373	1,793,088	1,793,088	1,793,088	1,719,502	57,337	1,564,530	1,564,530	1,564,530	1,506,339
Portugal	-27.44	-8.97	0.327	-4.84	-3.26	41.49	9.53	0.230	3.82	3.41
	(1.549)	(1.536)		(0.855)	(0.652)	(2.232)	(1.479)		(1.257)	(0.714)
Obs.	137,599	2,652,914	2,652,914	2,652,914	2,129,500	124,758	1,921,348	1,921,348	1,921,348	1,556,624
Sweden	-31.78	-3.78	0.119	-0.68		32.19	2.80	0.087	0.81	
	(1.839)	(0.492)		(0.194)		(1.786)	(0.380)		(0.209)	
Obs.	115,718	1,734,986	1,734,986	1,734,986		127,212	1,936,968	1,936,968	1,936,968	

Notes: Sales and earnings are expressed as % change relative to pre-shock mean. Employment and log daily wages are multiplied by 100. Elasticity is reported in levels. Standard errors in parentheses.

8 Appendix

8.1 Additional Results

Table A1: Descriptive Statistics For Negative Sales Shock, Full Sample

		Earnings	Age	Tenure	Male	Sales	Firm size	Manufact.	Services	N. Workers	N. Firms
SWE	Treated	33,005	37.5	6.6	65.6	45,429	266.7	35.0	60.5	160,796	2,314
		(19,355)	(9.6)	(5.8)	(47.5)	(42,113)	(346.9)				
	Control	32,246	37.6	6.6	56.8	92,037	797.2	23.4	72.6	2,292,222	16,572
		(20,447)	(9.8)	(5.6)	(49.5)	(52,431)	(598.5)				
PRT	Treated	16,094	36.3	8.2	53.9	33,837	528.1	13.4	83.8	359,807	3,904
		(19,847)	(9.1)	(8.0)	(49.8)	(27,319)	(525.2)				
	Control	17,255	36.1	8.2	53.7	34,341	545.5	15.3	83.7	1,179,725	14,105
		(30,078)	(9.2)	(8.1)	(49.9)	(25,387)	(501.3)				
FRA	Treated	33,966	37.6	4.9	60.7	88,888	943.1	26.2	69.3	372,869	17,002
		(31,733)	(9.6)	(5.0)	(48.8)	(51,991)	(673.5)				
	Control	30,781	36.5	4.7	56.0	71,673	693.8	19.7	75.9	1,611,052	112,899
		(27,339)	(10.0)	(4.7)	(49.6)	(50,754)	(642.1)				
DK	Treated	52,306	37.5	5.4	62.2	80,928	735.3	34.5	60.4	236,084	2,309
		(30,879)	(9.6)	(5.1)	(48.5)	(48,607)	(594.4)				
	Control	50,652	36.8	5.1	59.3	74,695	656.7	27.9	68.9	876,140	10,048
		(32,857)	(10.0)	(4.7)	(49.1)	(45,960)	(525.3)				
ITA	Treated	28,321	40.2	5.5	66.1	46,409	314.4	51.4	44.8	133,855	1,373
		(17,328)	(8.3)	(2.3)	(47.3)	(35,637)	(342.4)				
	Control	31,138	40.7	5.3	57.3	103,521	1020.7	27.9	71.5	3,545,697	8,497
		(20,545)	(8.6)	(2.3)	(49.5)	(34,224)	(450.1)				
HUN	Treated	7,260	37.2	3.7	52.8	21,502	607.0	36.4	62.2	185,821	2,755
		(5,562)	(9.5)	(2.4)	(49.9)	(12,873)	(432.5)				
	Control	6,917	37.8	3.9	52.9	17,938	538.2	26.1	71.9	333,847	6,436
		(5,321)	(9.6)	(2.7)	(49.9)	(12,579)	(439.0)				

Notes: This table reports mean and standard deviation (in parentheses) by country and treatment status, measured at the end of t-1. *Earnings* refers to annual earnings in euros. Sales denotes firm sales (thousands of EUR). *Firm size* is employment-weighted and corresponds to the number of employees. Manufacturing and services do not sum to 100% because a third industry category is omitted.

Table A2: Descriptive Statistics For Positive Sales Shock, Full Sample

		Earnings	Age	Tenure	Male	Sales	Firm size	Manufact.	Services	N. Workers	N. Firms
SWE	Treated	32,291	37.0	5.8	63.8	35,493	237.3	28.3	64.6	234,475	3,359
		(19,496)	(9.6)	(5.1)	(48.1)	(33,711)	(296.5)				
	Control	32,134	37.6	6.5	56.9	96,414	837.4	23.9	72.6	2,192,434	15,523
		(20,312)	(9.8)	(5.6)	(49.5)	(51,001)	(596.8)				
PRT	Treated	14,548	35.8	7.1	54.9	16,174	332.6	24.0	74.6	188,776	2,622
		(15,722)	(9.0)	(7.6)	(49.8)	(15,363)	(407.0)				
	Control	17,593	36.2	8.7	52.9	40,723	646.1	10.8	88.0	1,718,576	15,415
		(27,470)	(9.1)	(8.1)	(49.9)	(26,019)	(526.6)				
FRA	Treated	30,359	36.8	4.4	60.6	30,389	234.3	24.8	65.5	149,638	16,272
		(26,613)	(9.5)	(4.4)	(48.9)	(29,680)	(304.0)				
	Control	32,977	37.4	5.2	58.4	89,522	934.5	20.1	76.6	2,493,846	115,071
		(28,108)	(9.7)	(5.1)	(49.3)	(49,234)	(665.3)				
DK	Treated	51,354	37.4	5.4	64.3	30,312	212.2	32.3	59.0	131,378	2,438
		(30,306)	(9.4)	(5.1)	(47.9)	(26,598)	(252.4)				
	Control	51,439	37.2	5.2	59.5	90,947	850.3	28.1	69.5	1,349,325	9,915
		(31,292)	(9.7)	(4.6)	(49.1)	(42,337)	(530.2)				
ITA	Treated	28,583	39.8	5.1	66.3	39,497	305.2	53.9	42.9	122,819	1,261
		(17,743)	(8.4)	(2.5)	(47.3)	(29,087)	(336.0)				
	Control	31,056	40.7	5.3	57.3	103,579	1019.9	27.9	71.5	3,587,781	8,603
		(20,487)	(8.6)	(2.3)	(49.5)	(34,136)	(450.5)				
HUN	Treated	5,798	37.7	3.5	55.0	8,261	244.9	41.5	55.3	46,934	1,376
		(4,798)	(9.6)	(2.5)	(49.7)	(7,782)	(294.2)				
	Control	7,332	37.8	4.1	51.5	22,078	657.4	26.3	72.3	612,558	7,865
		(5,423)	(9.5)	(2.5)	(50.0)	(12,265)	(435.1)				

Notes: This table reports mean and standard deviation (in parentheses) by country and treatment status, measured at the end of t-1. *Earnings* refers to annual earnings in euros. Sales denotes firm sales (thousands of EUR). *Firm size* is employment-weighted and corresponds to the number of employees. Manufacturing and services do not sum to 100% because a third industry category is omitted.

Table A3: Descriptive Statistics For Negative Sales Shock, by Worker Mobility

		Earnings	Age	Tenure	Male	Sales	Firm size	Manufact.	Services	N. Workers	N. Firms
SWE	Leavers	32,457	36.8	6.4	69.5	50,878	316.3	38.8	58.2	77,415	5,374
		(14,273)	(9.4)	(5.4)	(46.0)	(47,410)	(430.3)				
	Stayers	35,198	40.7	9.5	75.5	52,184	257.2	53.6	42.8	80,311	4,623
		(11,918)	(8.6)	(6.4)	(43.0)	(46,075)	(331.2)				
PRT	Leavers	14,174	35.4	7.7	53.2	21,257	286.6	9.4	90.0	142,700	6,960
		(14,365)	(9.3)	(8.0)	(49.9)	(21,923)	(386.4)				
	Stayers	16,206	38.2	11.5	59.1	19,744	192.3	17.1	82.3	98,474	4,995
		(11,687)	(8.5)	(8.1)	(49.2)	(19,822)	(238.3)				
FRA	Leavers	27,193	35.6	4.3	64.7	44,395	317.6	31.7	60.8	86,555	25,982
		(18,508)	(9.9)	(4.3)	(47.8)	(44,170)	(460.6)				
	Stayers	33,668	40.5	6.7	69.8	51,064	367.4	45.8	45.7	84,595	22,724
		(15,615)	(8.6)	(5.3)	(45.9)	(45,894)	(512.8)				
DK	Leavers	49,817	37.6	5.6	63.7	40,078	233.5	43.8	51.2	45,423	3,711
		(21,580)	(9.2)	(5.0)	(48.1)	(37,405)	(335.7)				
	Stayers	55,938	41.2	8.3	68.2	38,268	174.3	50.7	44.2	33,177	2,877
		(19,930)	(8.0)	(6.3)	(46.6)	(34,021)	(228.3)				
ITA	Leavers	27,874	40.8	5.5	66.0	51,348	346.8	59.4	39.4	53,585	3,268
		(16,381)	(8.5)	(2.2)	(47.4)	(37,227)	(380.6)				
	Stayers	31,000	41.2	6.3	73.6	48,489	248.7	71.9	26.7	109,423	3,352
		(14,119)	(7.6)	(1.9)	(44.1)	(35,793)	(259.6)				
HUN	Leavers	5,321	37.8	4.2	54.7	10,678	280.6	40.2	59.0	24,412	3,717
		(3,675)	(9.8)	(2.7)	(49.8)	(10,412)	(353.0)				
	Stayers	6,649	40.4	5.3	61.1	11,407	255.2	53.4	46.0	18,710	2,881
		(3,889)	(8.5)	(2.2)	(48.8)	(10,612)	(301.1)				

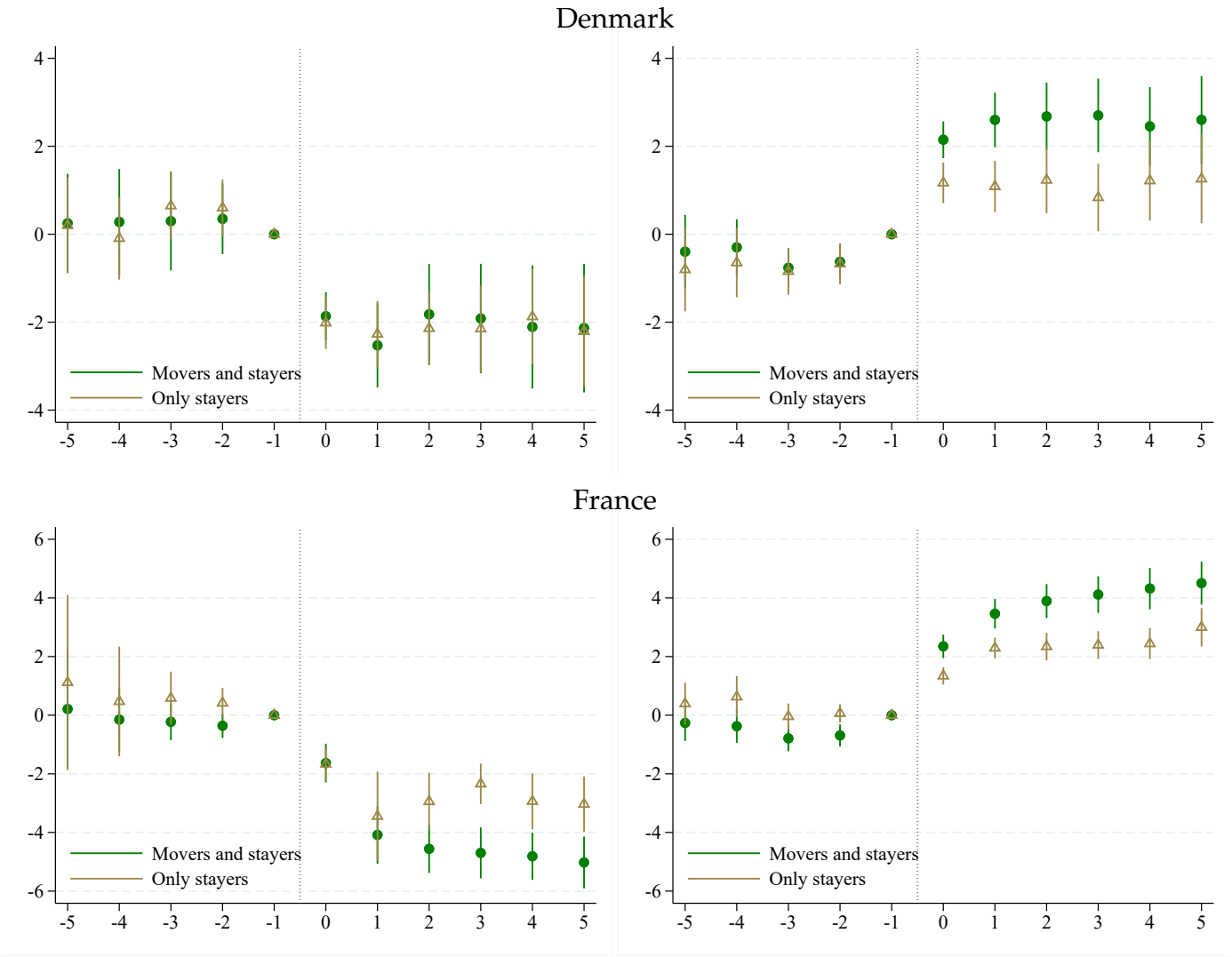
Notes: This table reports mean and standard deviation (in parentheses) by country and by worker mobility status (leavers or stayers) for treated workers, measured at the end of t-1. *Earnings* refers to annual earnings in euros. Sales denotes firm sales (thousands of EUR). *Firm size* is employment-weighted and corresponds to the number of employees. Manufacturing and services do not sum to 100% because a third industry category is omitted.

Table A4: Descriptive Statistics For Positive Sales Shock, by Worker Mobility

		Earnings	Age	Tenure	Male	Sales	Firm size	Manufact.	Services	N. Workers	N. Firms
SWE	Leavers	31,487	36.3	5.7	65.8	35,524	213.7	34.3	61.9	84,804	5,810
		(14,520)	(9.4)	(4.9)	(47.4)	(37,220)	(312.8)				
	Stayers	34,377	40.3	8.5	72.4	37,211	179.9	47.9	47.9	91,284	5,014
		(12,006)	(8.7)	(5.9)	(44.7)	(35,745)	(206.8)				
PRT	Leavers	13,181	34.7	6.8	56.2	15,945	259.5	19.2	80.4	94,260	6,517
		(13,486)	(9.2)	(7.7)	(49.6)	(16,619)	(365.2)				
	Stayers	15,207	37.8	11.2	59.8	15,507	181.2	32.5	67.1	80,408	4,810
		(11,073)	(8.6)	(8.2)	(49.0)	(14,899)	(231.6)				
FRA	Leavers	25,529	34.9	3.8	62.6	30,198	197.0	26.5	65.3	78,448	26,725
		(18,002)	(9.8)	(4.1)	(48.4)	(30,878)	(267.0)				
	Stayers	32,124	39.9	6.3	67.4	34,516	192.0	40.4	50.4	78,302	23,493
		(14,266)	(8.6)	(5.2)	(46.9)	(32,045)	(222.7)				
DK	Leavers	50,666	37.5	5.7	67.5	31,606	155.7	47.7	47.6	50,654	3,937
		(21,800)	(9.0)	(4.9)	(46.8)	(28,685)	(143.6)				
	Stayers	55,620	41.0	8.4	69.9	33,791	153.9	52.3	43.2	39,748	3,062
		(19,387)	(8.0)	(6.1)	(45.9)	(29,858)	(151.5)				
ITA	Leavers	28,593	39.9	5.1	69.3	42,939	284.0	67.7	30.9	36,617	3,065
		(16,309)	(8.7)	(2.4)	(46.1)	(29,876)	(339.7)				
	Stayers	30,983	40.7	6.1	72.3	41,917	216.3	75.5	23.4	105,613	3,125
		(14,179)	(7.7)	(2.2)	(44.7)	(29,009)	(232.6)				
HUN	Leavers	5,301	37.2	3.8	53.2	7,751	166.6	48.3	50.7	14,187	2,945
		(3,928)	(9.9)	(2.5)	(49.9)	(8,181)	(196.4)				
	Stayers	6,636	40.3	5.3	60.3	9,390	191.3	60.0	39.1	13,423	2,379
		(4,054)	(8.5)	(2.2)	(48.9)	(8,677)	(198.2)				

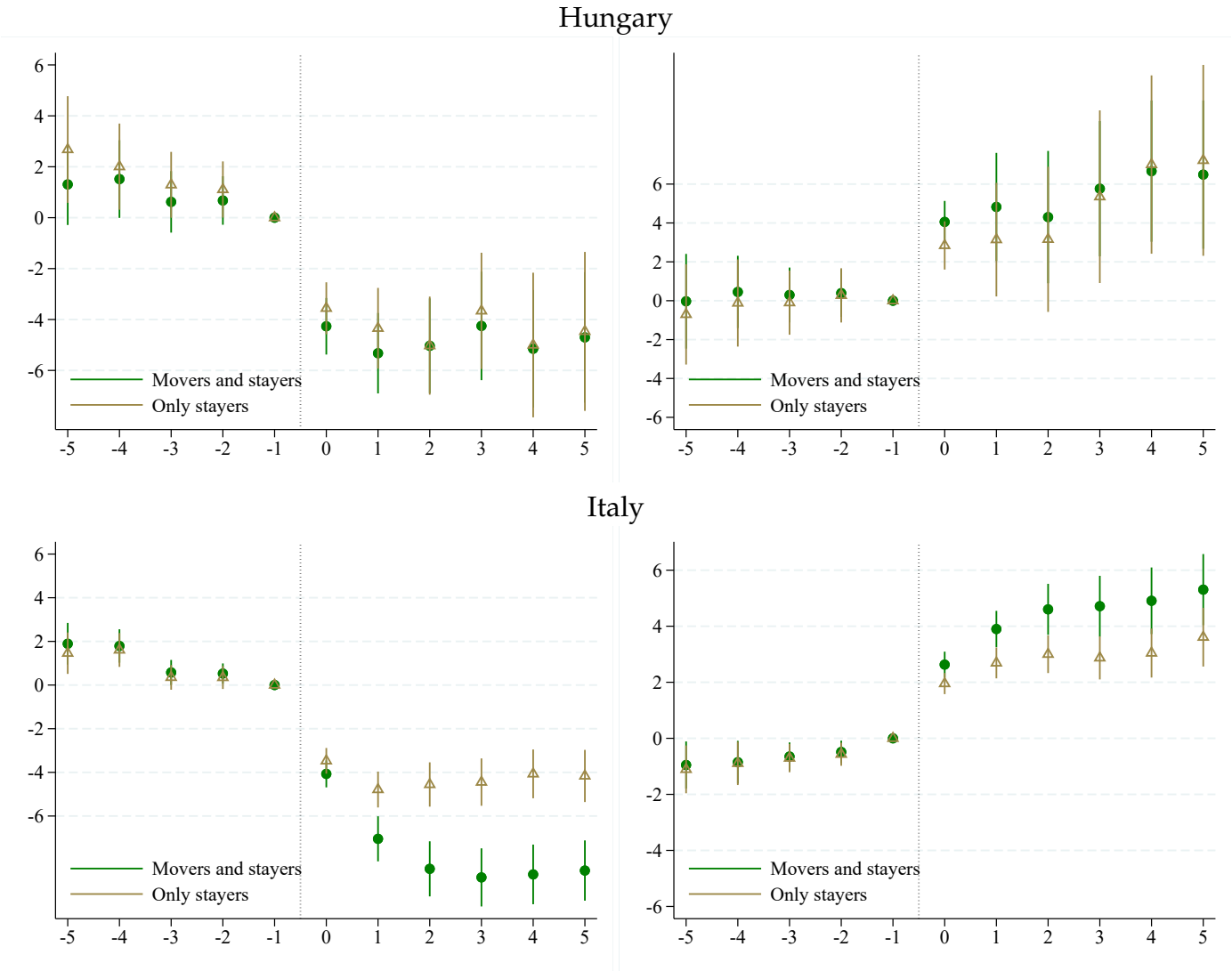
Notes: This table reports mean and standard deviation (in parentheses) by country and by worker mobility status (leavers or stayers) for treated workers, measured at the end of t-1. *Earnings* refers to annual earnings in euros. Sales denotes firm sales (thousands of EUR). *Firm size* is employment-weighted and corresponds to the number of employees. Manufacturing and services do not sum to 100% because a third industry category is omitted.

Figure A1: Earnings Responses to Sales Shocks by Worker Mobility



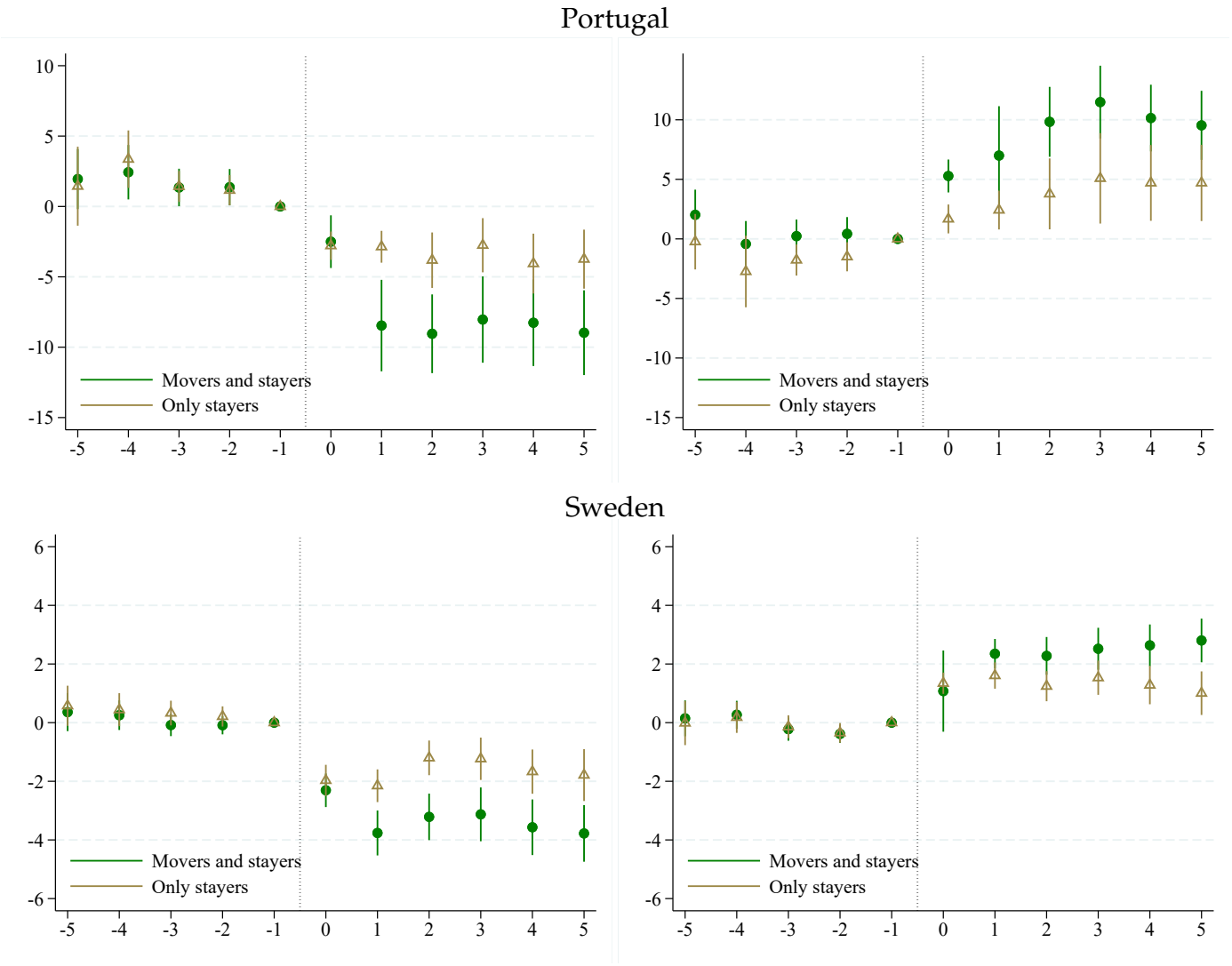
Notes: The left column reports dynamic event-study estimates for negative sales shocks, and the right column reports estimates for positive sales shocks. Results are shown separately for all workers and for workers who remain with the same employer until t=+5 ("stayers"). Earnings responses are defined as the percentage change in workers' total earnings relative to one year prior to the shock. All estimates follow equation 1.

Figure A2: Earnings Responses to Sales Shocks by Worker Mobility



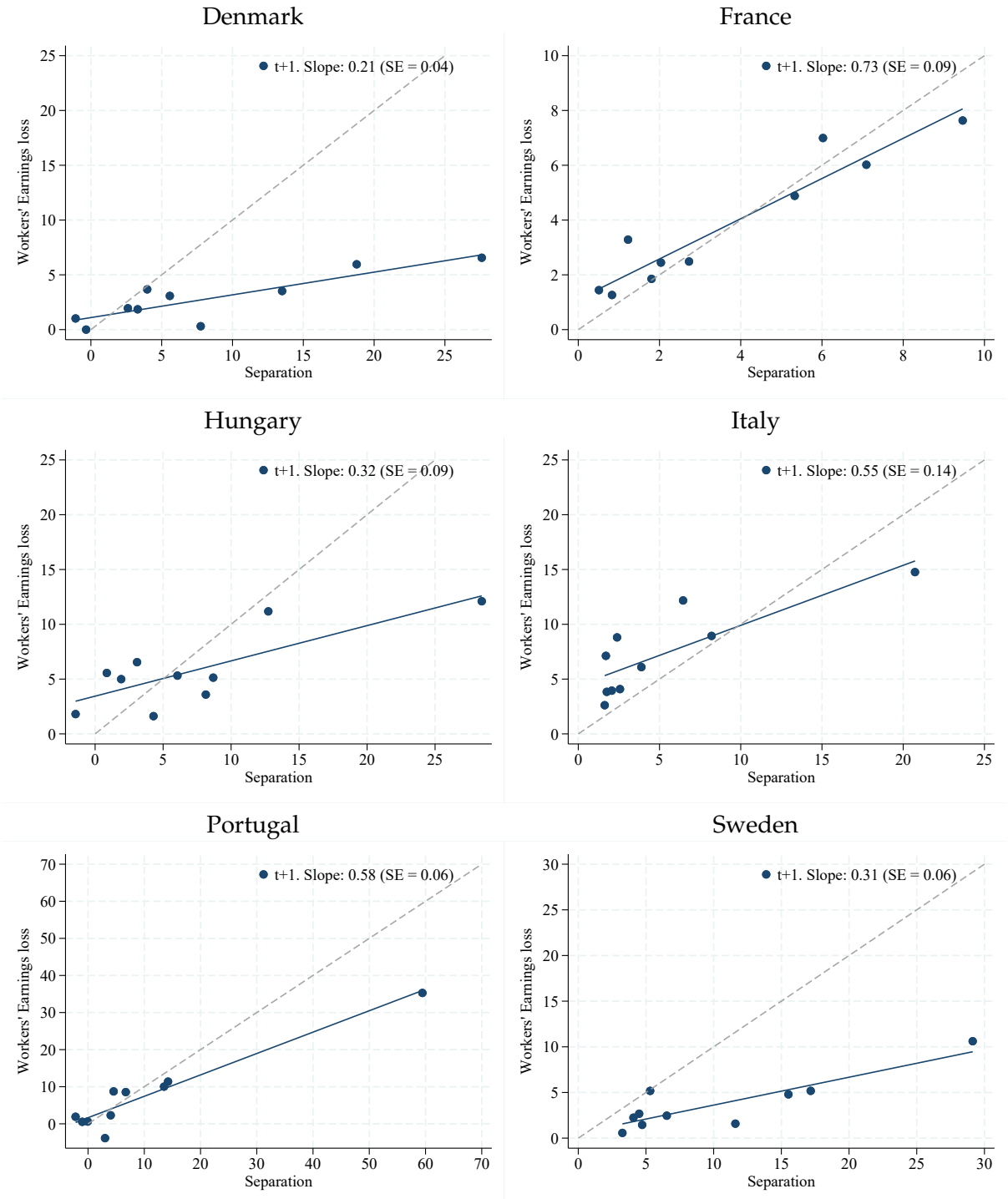
Notes: The left column reports dynamic event-study estimates for negative sales shocks, and the right column reports estimates for positive sales shocks. Results are shown separately for all workers and for workers who remain with the same employer until t=+5 ("stayers"). Earnings responses are defined as the percentage change in workers' total earnings relative to one year prior to the shock. All estimates follow equation 1.

Figure A3: Earnings Responses to Sales Shocks by Worker Mobility



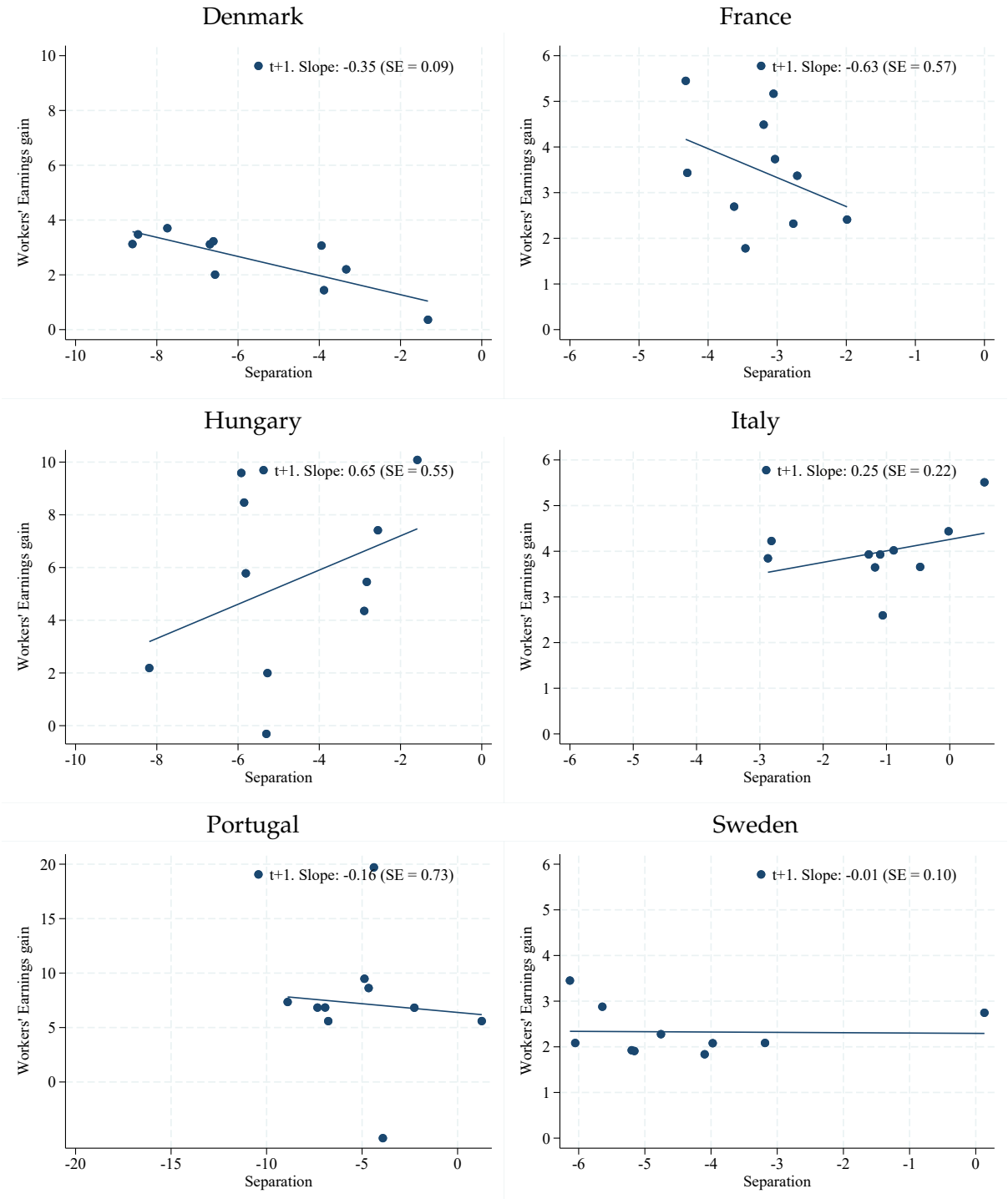
Notes: The left column reports dynamic event-study estimates for negative sales shocks, and the right column reports estimates for positive sales shocks. Results are shown separately for all workers and for workers who remain with the same employer until t=+5 ("stayers"). Earnings responses are defined as the percentage change in workers' total earnings relative to one year prior to the shock. All estimates follow equation 1.

Figure A4. Earnings and Separation Response to Negative Sales Shocks: across deciles



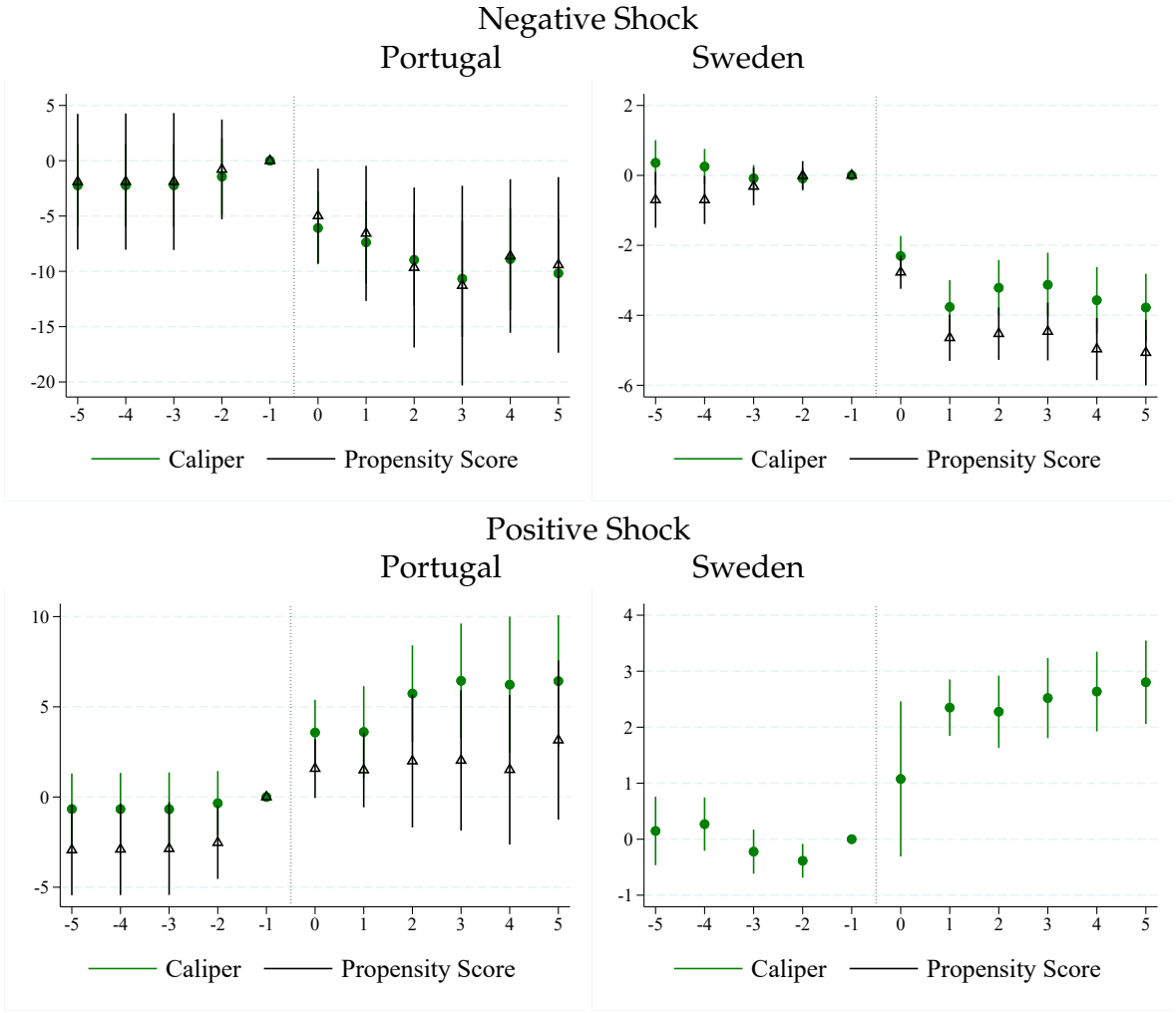
Notes: The figure plots average earnings losses and job separations measured one year after the shock across deciles of the firm-level sales shock distribution. Each marker represents the mean outcome within a decile of the shock distribution, estimated separately by country. Solid lines show linear fits across deciles. Earnings losses are measured as the percentage decline in workers' total earnings relative to one year before the shock, while separation denotes the probability of leaving the pre-shock employer.

Figure A5. Workers' Earnings and Separation in Response to Positive Sales Shocks



Notes: The figure plots average earnings losses and job separations measured one and five years after the shock across deciles of the firm-level sales shock distribution. Each marker corresponds to the mean outcome within a decile of the shock distribution, estimated separately by country. Solid lines report linear fits across decile means. Earnings losses measure percentage changes in workers' total earnings relative to one year prior to the shock, while separation measures the probability of leaving the pre-shock employer.

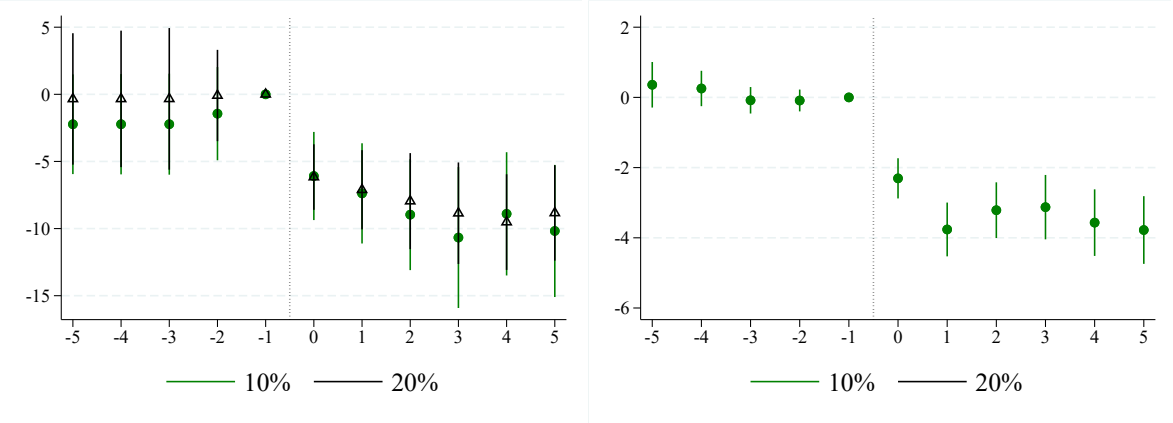
Figure A6: Earnings Response To Sales Shocks: Alternative Control Group Definition



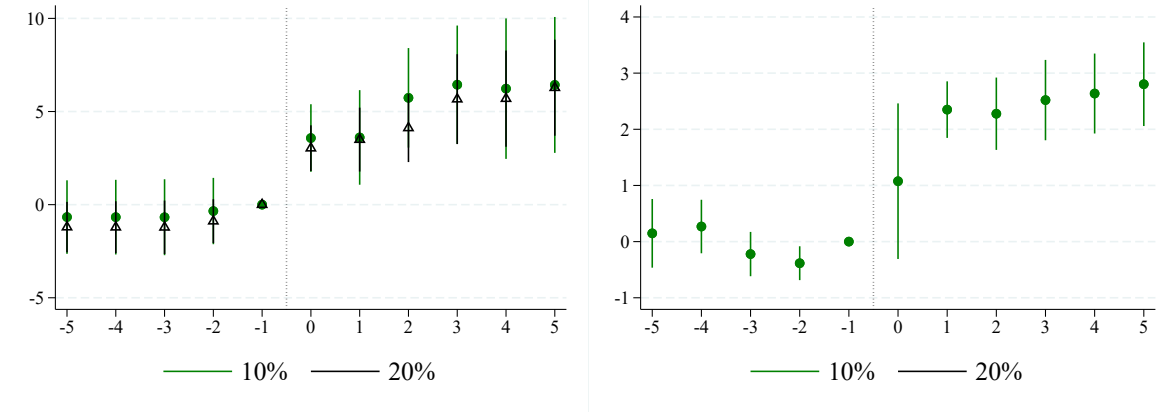
Notes: This figure reports the estimated percentage change in total yearly earnings using the baseline control-group definition (caliper matching) and an alternative specification in which the control group is constructed using propensity-score matching.

Figure A7: Earnings Response To Sales Shocks: Alternative Treated Group

Negative Shock (PRT on the left and SWE on the right)

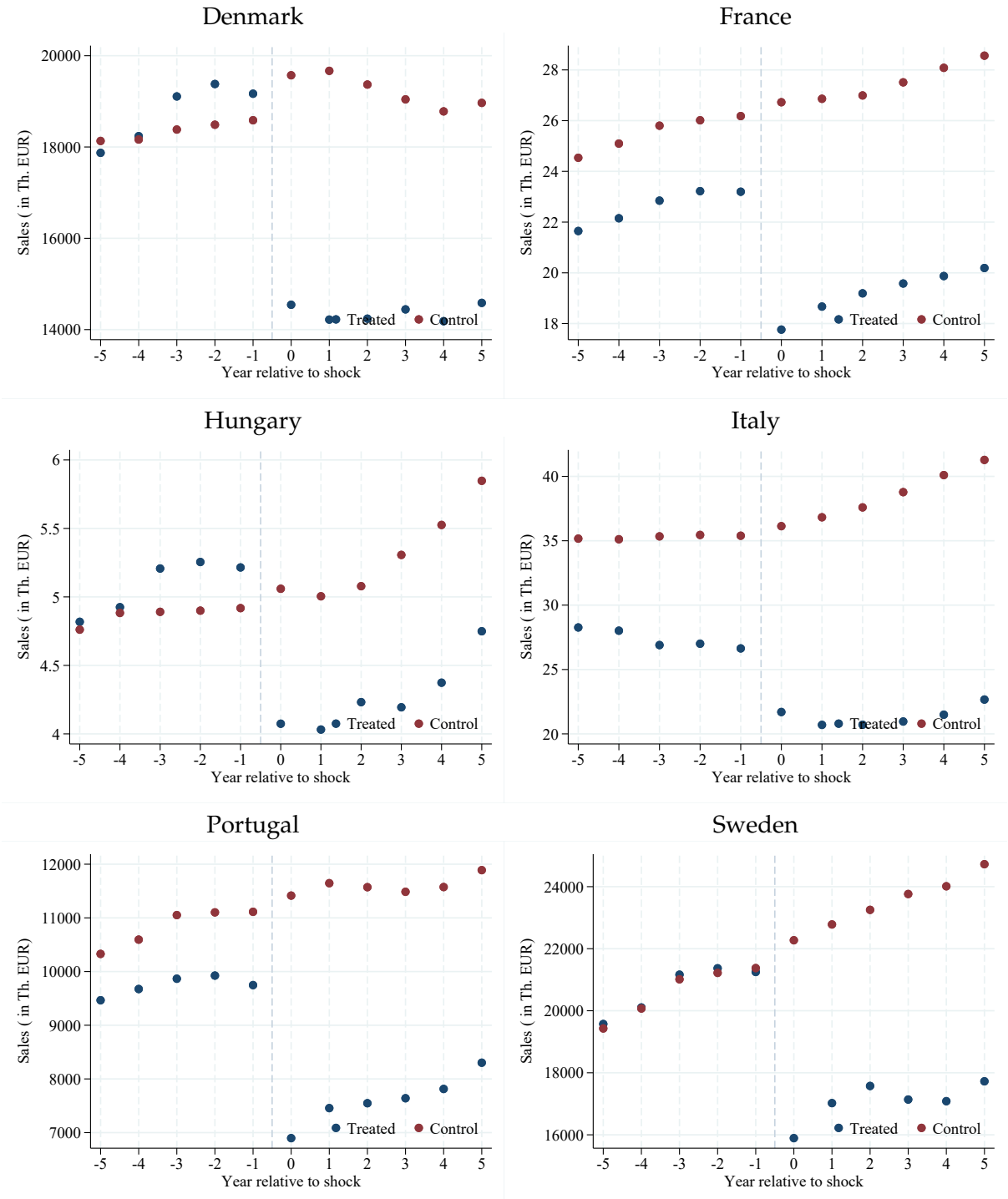


Positive Shock (PRT on the left and SWE on the right)



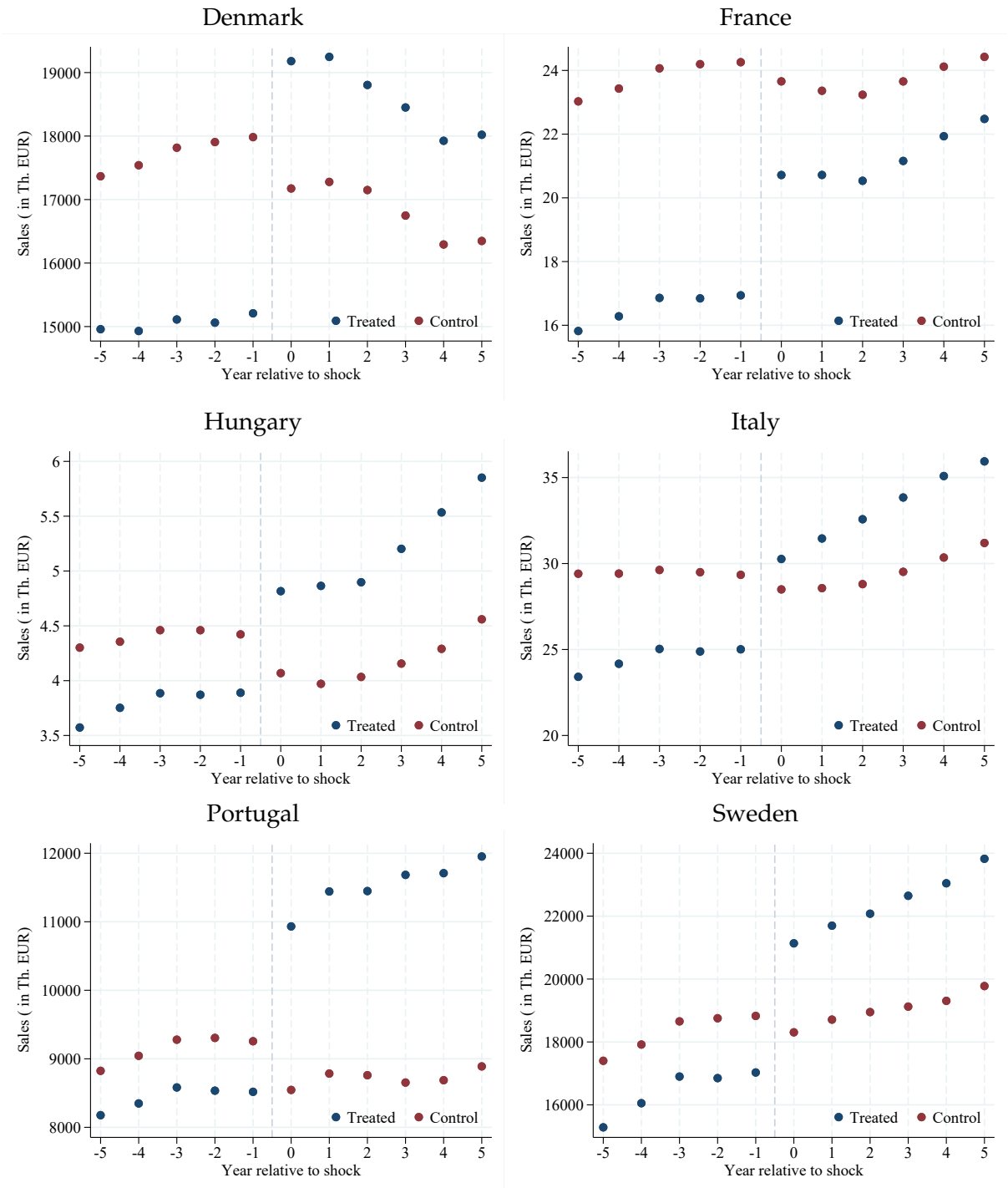
Notes: This figure reports the estimated percentage change in total yearly earnings using the baseline stability condition (sales in $t^* - 1$ and $t^* - 2$ must lie within 10% of their level in $t^* - 3$) and an alternative definition in which the threshold is 20%.

Figure A8. Evolution of Firms' Sales: For Negative Shock



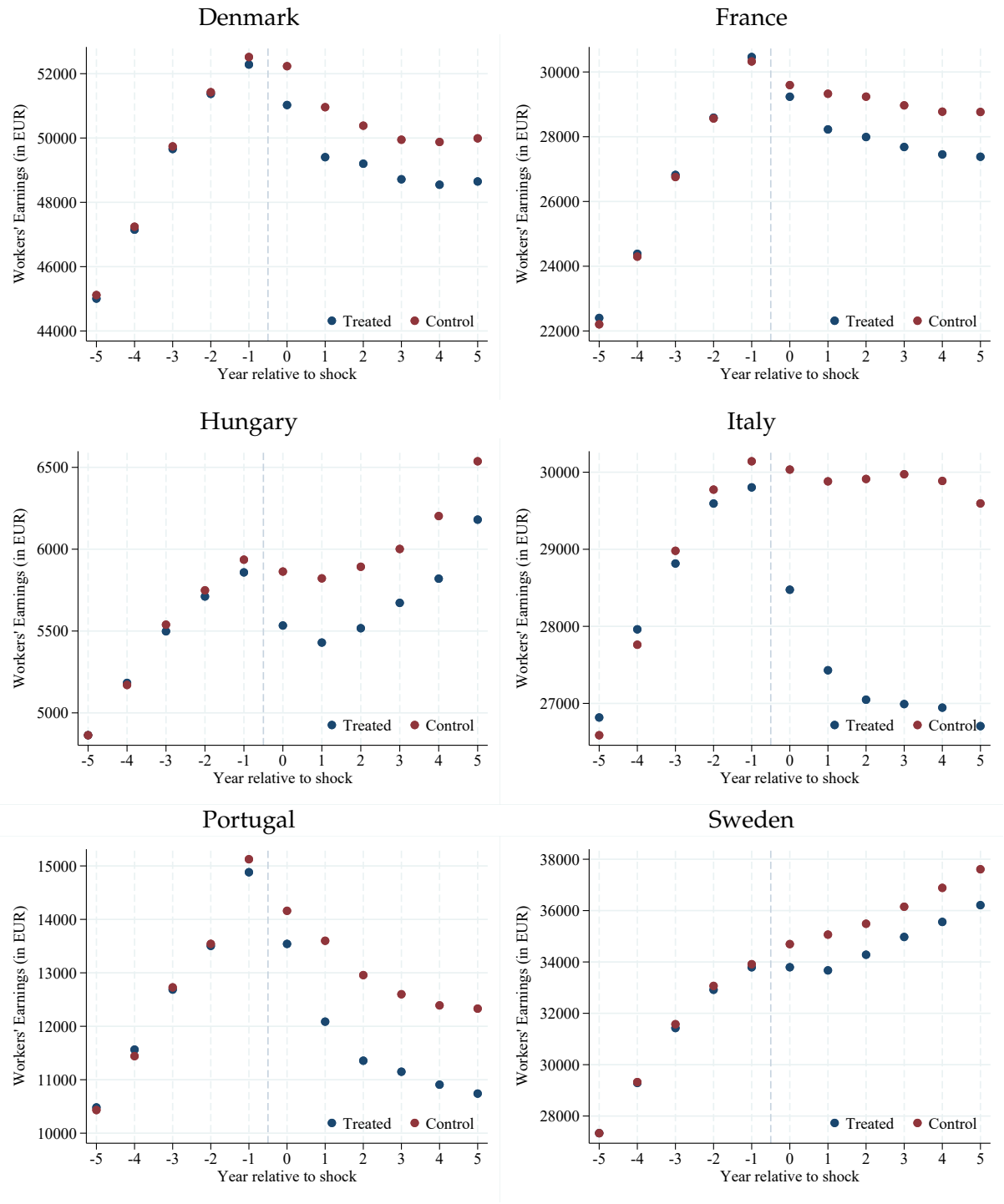
Notes: The figures show the evolution of sales for the treated and control firms.

Figure A9. Evolution of Firms' Sales: For Positive Shock



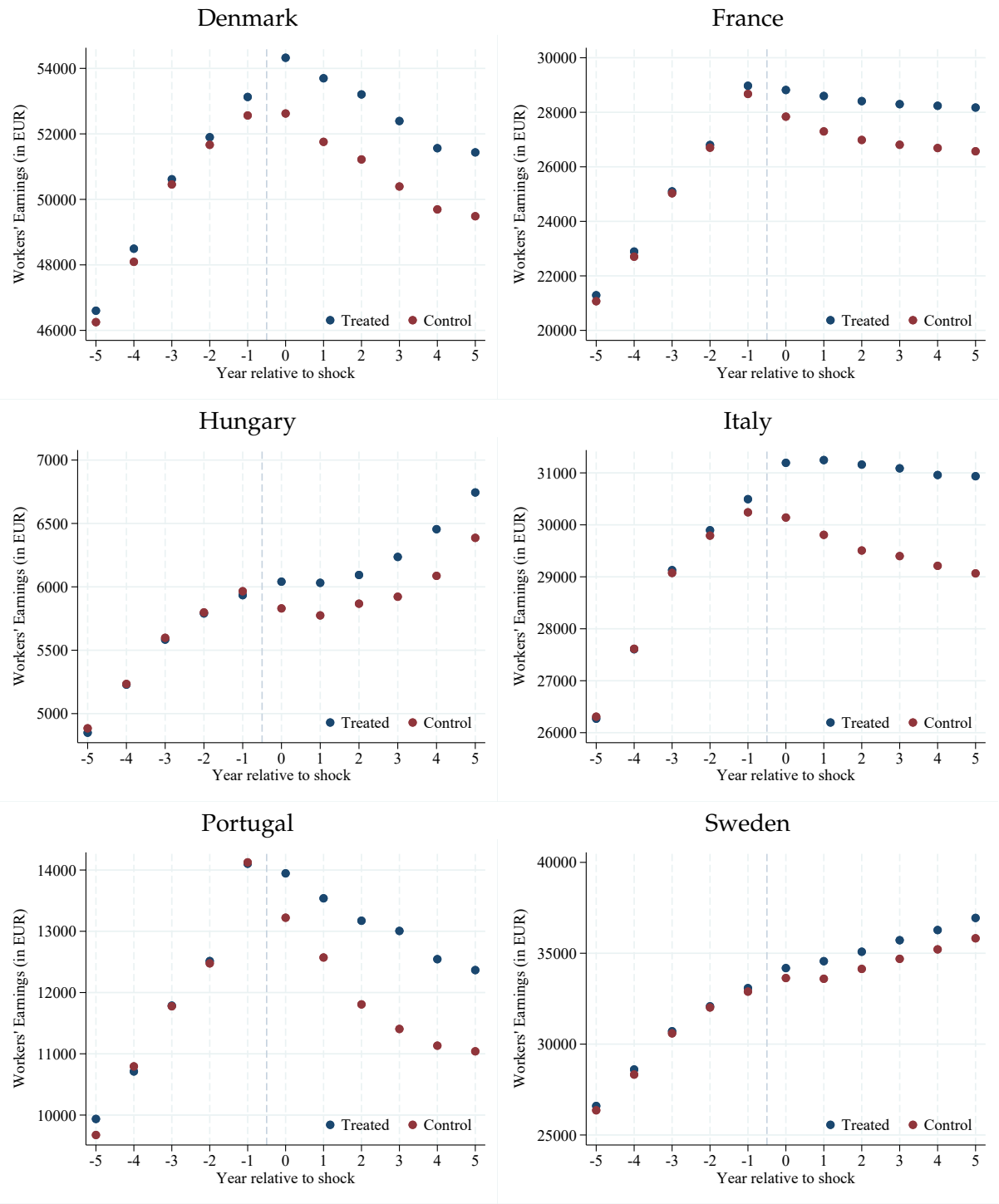
Notes: The figures show the evolution of sales for the treated and control firms.

Figure A10. Evolution of Workers' Earnings: For Negative Shock



Notes: The figures show the evolution of earnings across employers for the treated and control firms.

Figure A11. Evolution of Workers' Earnings: For Positive Shock



Notes: The figures show the evolution of earnings across employers for the treated and control firms.

8.2 Additional Information on the Data Sources

8.2.1 Denmark

Data source for information on workers We use several datasets to collect information on workers. We use a dataset called UDDA. UDDA contains information on the highest achieved education and an indicator for whether the person is currently enrolled in education. We exclude students.

We use another dataset called IDAN (*IDA ansættelser*). From this dataset, we retrieve information on occupation, earnings, hours worked, and firm identifier. We use information from this dataset to define the dominant job. Occupation classification follows the ISCO classification. This data set also contains information on whether individuals are self-employed. Hours worked are defined as paid hours worked: Include contractual and overtime hours. Earnings is defined as the near-universe of taxable income.

Data source for information firms We use the General Company Statistics called the FIRM dataset, which annually lists active companies in Denmark. FIRM is built from several Statistics Denmark registers. FIRM covers economic and employment information on all sectors and industries. Active companies are defined as companies with at least 0.5 full-time hours of work. The firm identifier is the CVR number, the legal firm identifier in Denmark. We use this dataset to retrieve information about the industry classification (NACE) and the regional classification (NUTS).

The register that is used in FIRM for the variable value-added is the Accounts statistic for Non-Agricultural Private Sector (Regnskabsstatistikken for private byerhverv), abbreviated APB therefrom.[3] APB only includes market activity and does not contain agriculture, fishing, ports, banks, insurance, public housing companies, or public administration. There is a data break in 2014 in the population of firms considered in APB. Since 2014, firms in utilities, regional and long-distance trains, and radio and TV stations have been included. Value added is defined using several items from the income statement (*Resultatopgørelse*). Those items are: sales and other operating income minus cost of materials and equipment minus costs of energy and subcontractors minus rent paid minus payments for temporary workers and operational leasing of goods, and ordinary write-offs and other external charges.

[3]This register is itself built from several sources: questionnaires, official annual accounts submitted in XBRL format to the Danish Business Authority (*Erhvervsstyrelsen*), the Danish tax authority (SKAT), Denmark's Statistics business register, and the Danish medicines agency (*Lægemiddelstyrelsen*).

Data access All datasets can be obtained by contacting the Research service (*Forskningsservice*) of Denmark Statistics. To our knowledge, datasets provided by DST do not include a DOI, complicating replicability. The datasets that are used are recorded at a yearly frequency. Establishment identifiers are available, but our analysis focuses on the legal unit firm identifier (CVR number) and only changes due to firm restructuring. Individual identifiers are anonymized social security numbers (PNR number), and doesn't change over time.

8.2.2 France

Our dataset is derived from the matched employer–employee registers in France known as the DADS data. DADS is supplemented by other administrative sources (such as public sector data), and was gradually replaced by a new administrative source, the DSN ("déclarations sociales nominatives"), starting in 2016. Our main dataset is the DADS Panel which allows us to follow a subset of workers. The sampling rate is 1/12th from 2002 onwards and 1/24th before.

Data source for information on workers For each job spell, we observe annual labor earnings and the number of hours and days worked in the year. The data also include contract type (permanent, fixed-term, or seasonal), detailed occupation, and municipality of work. The dataset further includes demographic characteristics such as gender, year of birth, and municipality of residence.

Data source for information firms At the firm level, the data provide information on sector of activity and firm and establishment identifiers. To supplement the analysis, we incorporate exhaustive firm financial data from administrative sources (FICUS/FARE files), which are matched using the firm identifier and provide information on value-added per worker and total employment at the legal unit level.

Data access Access to this data is restricted by statistical secrecy laws. Authorized researchers can request access via the Confidential Data Access Portal (CDAP) and perform computations through the CASD secure environment.

8.2.3 Hungary

Data sources Our dataset is derived from the matched employer–employee registers in Hungary known as admin3, which spans the years 2003-2017. It provides information on workers' earnings, hours worked, firm identifier. Through the firm identifier, we match the balance sheets of each firms to the social security data.

Data access Access to this data is restricted by statistical secrecy laws. Authorized researchers can request access via KRTK Hungary.

8.2.4 Italy

The data source is matched employer–employee administrative data from the Italian Social Security Archives (INPS) covering the years 2005 to 2022. The dataset is available at the Bank of Italy and includes a representative sample of firms together with the universe of multinational companies operating in the private sector. For each firm in the representative sample, we observe the full workforce and track workers over time, including those who change jobs or move across firms. The data exclude employment spells in the public sector and self-employment. In the analysis, we focus on firms in the representative sample to ensure a consistent panel of firms over time.

Data source for information on workers The INPS data provide detailed worker-level information on employment relationships. For each job spell, we observe annual labor earnings and the number of weeks and days worked, both in raw terms and in full-time equivalent units. The data also include contract type (permanent, fixed-term, or seasonal), work schedule (full-time or part-time), occupation (blue-collar, white-collar, manager, apprentice, or other), and municipality of work. We observe job entry and separation dates, as well as the reason for termination when available. The dataset further includes demographic characteristics such as gender, year of birth, migrant status, and province of residence. In addition, the data contain records of events generating notional social security contributions—such as sick leave, work-related injuries, short-time work schemes, and parental or maternity leave—which capture periods of temporary work interruption.

Data source for information firms At the firm level, the INPS data provide information on sector of activity, firm identifiers, and the dates of establishment and closure.

For incorporated firms, the dataset is linked to balance sheet information from Cerved, including value added, sales, and profits. Firm size is measured by the number of employees. These data allow us to construct measures of firm performance, including value added and sales per worker.

Definition of earnings and days worked Annual earnings are defined as total gross labor compensation received by the worker during the year from a given employer. Days worked refer to the number of days with positive contributions, and can be expressed either in raw terms or as full-time equivalent units, which adjust for part-time work intensity. These measures allow us to capture both the intensive and extensive margins of labor supply within each employment relationship.

8.2.5 Portugal

The data source is the Quadros de Pessoal (referred to as QP) from 2002 to 2019. This dataset is gathered annually by the Portuguese Ministry of Employment. Each October, it is legally required that firms with at least one salaried employee provide workforce information. The dataset encompasses virtually the universe of firms and establishments, along with information on their respective workforce as of October each year. Consequently, it only contains information on jobs for employed individuals during October. The dataset excludes the public administration and independent contractors.

Data source for information on workers The QdP data contains worker-level information reported by firms on each employee's gender, education, occupation, date of hire, earnings and hours worked.

Data source for information firms At the firm-level, the QdP data contains information on industry (NACE), regional location (NUTS), firm size (number of employees) and sales per worker. We use sales per full-time equivalent employment at the firm level to measure firm productivity. Our focus on the legal unit firm identifier, although establishment identifiers are available.

Definition of earnings and hours worked The hourly wage at the main employer in October is defined as the ratio between total monthly earnings and total hours

worked. Total monthly earnings include the individual's monthly base salary, regular salary supplements (e.g. tenure-related premiums), overtime and bonuses. Total hours worked refer to monthly contractual hours and overtime hours.

8.2.6 Sweden

Data sources We use a comprehensive RAMS matched employer-employee database from Statistics Sweden (SCB), encompassing labor earnings of all workers linked to firms and employees from 2010 to 2018. We complement the employment information with socioeconomic characteristics from the LOUISE dataset.

Data source for information on workers Demographic data are collected from Statistics Sweden's LOUISE register, including the entire Swedish population aged 16 to 74. These data include demographic information such as the year of birth, gender, and the highest completed education level.

Data source for information firms The information on employers comes from RAMS and WSS, all linked through anonymized firm and establishment identifiers. We can observe an employer's industry and calculate employer characteristics such as employment or average earnings.

Data access Data is accessed through an online portal provided by Statistics Sweden. Other researchers can purchase the data from Statistics Sweden, conditional on the same protocol as the research group. We can provide access to the data for replication purposes.

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