

How Do Firms Restructure?

Anders Humlum* Mette Rasmussen†

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Motivation: Globalization and new technology alter production tasks and skill demand within firms. Some tasks may *disappear* entirely from the firm, e.g. because the tasks are offshored or done by robots, and new tasks may *emerge*, e.g. communication with foreign producers or maintenance of robots. However, the employees may lack the *skills* required to take on the new tasks. According to World Economic Forum (2023), firms world-wide estimate that 44% of worker skills will be disrupted in the next five years. How do firms restructure, i.e. change the skill composition of employees?

Theoretically, a firm has two margins of adjustment when it wants to restructure. The firm can fire existing workers with insufficient skills and hire new workers with the desired skills, or the firm can retrain existing workers. The two margins come with different costs for the firm. The firm either has to pay for the recruitment and “onboarding” of the new worker, or for training of the existing worker, including the indirect cost of the time the worker spends training instead of working. Hence, what margin the firm chooses is an *empirical* question that depends on the relative size of these costs.

The firm’s choice of adjustment margin has starkly different consequences for the (incumbent) worker who will either be displaced or reskilled in her job and potentially enjoy a wage-skill premium. A growing literature shows that workers displaced due to structural changes, e.g. offshoring or robot adoption, suffer persistent employment and earnings losses (Humlum, 2021; Hummels et al., 2014). In earlier work, we have shown that retraining *unemployed* workers exposed to structural changes significantly increases their reemployment prospects (Humlum et al., 2023). These workers would likely prefer to be trained while employed, instead of upon displacement.

In Denmark, the government provides *subsidies* to firms that use adult vocational training programs to reskill their employees. The subsidies reduce the firms’ cost of reskilling, and could potentially induce firms to reskill existing workers. However, the subsidy could also be a pure transfer if the firms would have chosen the reskilling margin anyway. Interestingly, these retraining subsidies co-exist with *recruitment services* that lower the cost of recruitment for firms and potentially could induce firms to recruit new rather than reskill existing workers. Are these policies effective, and does it make sense to offer them simultaneously?

*University of Chicago, Booth School of Business; anders.humlum@chicagobooth.edu

†University of Copenhagen, Department of Economics; mette.rasmussen@econ.ku.dk

Research Questions: First, we will document how much of the structural labor market changes that take place within vs. across firms. Second, we will investigate *how* firms restructure. In particular, whether firms reskill existing workers or recruit new workers with the desired skills? Third, we will investigate the potential for public policy to change firms’ choice over adjustment margin. For example, do retraining subsidies incentivize firms to reskill workers, or do they just constitute a transfer to firms? And do recruitment services increase firm recruiting at the expense of reskilling?

Background: Denmark provides the perfect setting for studying these questions. The Danish flexicurity model makes it easy for firms to hire and fire workers (Kreiner and Svarer, 2022), while at the same time offering an extensive system of adult vocational training programs. Crucially for this project, these programs have been subject to various reforms.

Firms may be subsidized for using adult vocational training to reskill their employees. One type of subsidy, the so-called VEU-allowance (“VEU-godtgørelse”), is meant to compensate for the time the employee spends at training facilities instead of working in the firm. This subsidy is tied to the level of unemployment (UI) benefits, and was reduced from 100 to 80% of UI benefits in 2011, and increased to 100% again in 2017. Firms may also be subsidized for hiring an unemployed worker as a temporary subsidy for the employee in training (“jobrotationsydelse”). This type of subsidy is especially used in the public sector, e.g. for reskilling of workers in the elder care.¹ The generosity of this subsidy was reduced in 2015, e.g. the maximum duration of a subsidy hire was decreased from 12 to 6 months, and the replacement rate was reduced from 100 to 60%.

All firms can recruit workers through online job postings on *jobnet.dk*, the online job portal administered by the Danish employment authorities. The authorities also offer different recruitment services to firms to ensure that they have workers with the desired skills. For example, firms can –free of charge– place so-called “job orders” (“jobordrer”). Upon placing a job order, the job centers provide the firm with a list of candidates with the desired skills. This likely reduces the recruitment costs for firms.

Data: We plan to combine several data sources. Using Danish matched *worker–firm panel data*, we will be able to see all workers employed in Danish firms over time, including the occupational codes of workers. By linking the occupational codes to the O*net database, we can infer the tasks of workers employed in these firms.

¹See e.g. Copenhagen Municipality (2015); STAR (2021); Viden På tværs (2016)

We will combine this panel with two other sources to measure firms’ adjustment margins. First, we will use the *course participant register* (VEU) to see whether the workers employed in a firm participate in a training course. This allows us to measure the *reskilling* margin. Second, we will employ a new data set from the Danish Employment Authorities, showing firms’ job postings on the online job portal *jobnet.dk*. Thereby we can see whether a given firm makes an online job posting, including the job characteristics, e.g. the occupation. This allows us to measure the *recruitment* margin.

This combination of data sources is crucial for studying firms’ restructuring choices. Namely, the matched worker–firm data only allows us to see the realized employment in a firm, e.g. whether a new worker *ultimately* becomes employed in the firm (hiring) or whether incumbent workers change occupation codes (potentially due to reskilling). However, the firm’s *ultimate* adjustment margin may deviate from the *first* choice of adjustment margin. For example, the firm may first try to hire new employees, but if the recruitment attempt fails, the firm may ultimately resort to reskilling existing workers. A survey among Danish firms suggests recruitment failures are not rare: 14% of posted vacancies end unfilled and 13% are filled by workers with insufficient skills (STAR, 2023).

Empirical Strategy: First, we will use the matched worker–firm panel to decompose the changes in occupational employment shares in Denmark over time into a within- and across-firm contribution (see e.g. Ding et al., 2022).

Second, we will use an IV strategy to investigate how firms restructure. Namely, if we simply regressed firms’ reskilling or recruitment attempts on changes in their skill demand, e.g. measured as task changes within firms, both endogeneity and reversed causality could be a concern.² To establish causality, we will develop a shift-share (“Bartik”) instrument (see e.g. Borusyak et al., 2022). In particular, we will instrument changes in a firm’s skill demand with the economy-wide change in occupational employment, e.g. from 1995 to 2018, weighted by the firm’s occupational employment shares in some pre-period, e.g. 1995. This instrument allows us to investigate whether changes in skill demand causes firms to recruit new workers or reskill existing workers.

Third, we will use a difference-in-difference design to investigate the potential for public policy to affect firms’ choice of adjustment margin. In particular, we will exploit various reforms of the retraining subsidies, e.g. the cut in VEU-allowances in 2011 or the cut in the jobrotation subsidy in 2015, that effectively increased the firms’ cost of reskilling. We will

²Deming and Noray (2020) use a similar measure to quantify task changes within jobs.

exploit that some firms are more exposed to these subsidy cuts than others. For example, the firms that did not retrain their workers prior to the reform are likely not incentivized to do so after the VEU-allowance is reduced. This may allow us to identify subsidy elasticities; the extent to which a lowering of reskilling subsidies reduce firm reskilling (own-elasticity), and induce firms to substitute into the recruitment margin (cross-elasticity) or to not restructure at all. We also plan to investigate whether recruitment services, e.g. “job orders”, affect firms’ recruiting and reskilling choices.³

Research Contribution: A growing literature shows that a large part of the structural changes in the labor market, e.g. the fall in manufacturing and increase in services, occurs *within* firms (see e.g. Bernard et al., 2020, 2017; Breinlich et al., 2018; Ding et al., 2022). We will contribute to this literature by showing *how* firms restructure – through reskilling or recruiting –, and the potential for *public policy* to affect these adjustment margins. In addition, our study will contribute to the very sparse literature on the retraining of *employed* workers.⁴ Therefore, we also aspire to publish our study in a top five or field economic journal, e.g. the *Quarterly Economic Journal* or *Journal of Labor Economics*.

Policy Relevance: Our study will inform about the effectiveness of retraining subsidies and recruiting services offered to firms. For example, do these subsidies and services alter firms’ adjustment margins, or do they constitute pure transfers to firms? Further, does it make sense to offer these policies at the same time? We plan to present our study to the Danish employment authorities, who surely will be interested in these questions.

Time Plan: The funding for the project lasts for two years, starting from August 2023. We plan to spend the first half year preparing the data (including applying for and cleaning job postings data). In Q1-Q4 of 2024, we will work on the results and write up a draft. During this time, Rasmussen will visit Humlum at U. Chicago for a shorter period. We plan to have a first draft ready in Q1 of 2025 and to present the project at international conferences and to Danish policy makers in Q2 of 2025.

³We hope to exploit that the employment authorities call a random subset of firms to survey them about their recruitments. During these calls, the authorities also inform firms about the job orders. These calls may provide exogenous variation and allow us to estimate the causal effect of “job orders” (Buus et al., 2022).

⁴In a review of the literature on government-sponsored vocational training for adults, McCall et al. (2016) note that “more knowledge is needed about the effects of firm-provided training or more generally subsidized training for employed workers.” In their review of the literature on firm-provided training, Black et al. (2023) note that “Unfortunately, we did not find any European studies making use of matched worker-firm data.”

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