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Worker Power, Immigrant Sorting, and Firm Dynamics

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DISCUSSION PAPER SERIES

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ABSTRACT

Worker Power, Immigrant Sorting, and Firm Dynamics*

This paper combines two of the most central features of modern labor markets — immigrants and unions — to examine the role of worker power in shaping immigrant sorting across firms, and how that subsequently influences the performance of firms and the careers of incumbent workers. First, unions push immigrants to enter lower-paying and lower-quality firms with weaker union representation. Second, these firms with weaker union representation are able to use the cheaper immigrant labor to scale up production, thereby out-competing firms with stronger union representation and capturing market share. Third, incumbent workers in firms with weaker union representation benefit by shifting into management positions and capturing some of the firm's increased rents. Fourth, despite benefiting incumbent workers in firms with weaker union representation, these workers are more likely to become union members themselves in response to greater contact with new immigrants. Broadly, our results cut across nearly all sectors but are considerably more muted in competitive markets.

JEL Classification: J2, J3, J5, J6

Keywords: immigration, worker power, unions, firms

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1 Introduction

Immigrants make up an increasing share of the global population, and the presence of foreign-born workers has grown significantly across the OECD. In light of ongoing demographic shifts and aging populations across these societies, the importance of immigrant workers will continue to grow over the next several years. A rich literature spanning multiple decades has examined the consequences of immigration for native workers (e.g. Borjas, 1987; Card, 1990; Lewis and Peri, 2015; Friedberg and Hunt, 2018), and a much newer literature has begun to examine how immigration affects firms (e.g. Beerli et al., 2021; Doran et al., 2022). However, there remains a considerable gap in understanding why immigrants gravitate towards certain firms and how the allocation of immigrants to firms affects the dynamics of the markets they operate in.

Research across the social sciences raises the possibility that worker power may be a key determinant of which firms employ immigrants (e.g. Bonacich, 1972; Kahn, 1975; Dickens and Lang, 1993; Lindbeck and Snower, 1989, 2001; Penninx and Roosblad, 2000). These papers suggest that incumbent workers, often through the use of unions, may leverage their bargaining power to maximize their own compensation above market rates, thereby suppressing firm employment and keeping new workers out. As a consequence, immigrants may experience limited job opportunities at firms with greater worker power, and these firms may therefore also be more constrained in responding to immigration-induced shifts in labor supply. Assessing this hypothesis empirically has been challenging due to difficulties in measuring worker power, finding exogenous shocks to migration, and linking matched employer-employee panels over extended periods of time. Amidst a period of increased unionization (e.g. NLRB, 2022), developing effective immigration policy requires understanding how worker power mediates the effects of immigration on firms and workers.

In this paper, we combine two central features of the modern labor market —immigrants and unions—to provide a comprehensive causal assessment of the role that worker power plays in shaping the allocation of immigrants across firms and how that subsequently influences firms and workers. We do so by exploiting an exogenous shift in the supply of immigrants to Norway generated by the 2004 enlargement of the European Union. This more than doubled the annual inflow of immigrants into Norway, and led to the largest wave of migration in the history of the country. At the same time, the expansion had little influence on the geography of product markets in Norway since the country remained outside the European Union and the European Union Customs Union.

We estimate the role of worker power in shaping the allocation of immigrants across firms through a difference-in-differences design, leveraging pre-determined rates of firm-level worker power in combination with the exogenous shift in the inflow of migrants from the EU expansion. As much of the bargaining process in Norway operates at the firm level, worker power is measured as the union density at each firm. To prevent any endogenous response in unionization from bias-

ing our results, we calculate these rates in the year prior to the migration shock. Our identifying variation, therefore, comes from differences in baseline union density across firms within the same sector interacted with the migration-induced labor supply shock caused by the EU expansion. Using a large set of event studies and a range of alternative specifications, we provide strong support for the key identifying assumption underlying this empirical approach – that, absent the EU enlargement, the potential outcomes of firms with more and less worker power prior to the migration shock would evolve in a parallel fashion.

To perform our analysis, we use rich population-wide administrative data on the entire population of workers and firms in Norway. Detailed employer-employee linked register data and firm tax data provide us with detailed information on firms’ labor usage (share of EU2004 workers, share of other immigrants, total number of workers, total number of worker hours, mean wages, and hourly wages), other inputs (materials, capital, machines, personnel cost), production scale-up and productivity (revenues, labor share of costs and revenues, mean worker fixed effects, and revenue per worker hour), and outputs (profit, labor market share, product market share, board compensation, and firm survival). In addition, individual-level labor market data provide us with information on a large set of career outcomes (wages, occupational rank, employment, management responsibilities, and union membership). Combined, this enables us to trace out the full effect of worker power in shaping the allocation of immigrants across establishments, how it affects the behavior and performance of firms, and how it impacts incumbent workers.

The main takeaways from our paper are that worker power—as measured by union density—prevents firms from hiring new immigrants and pushes immigrants to work at lower-paying and lower-quality firms with weaker union representation. Firms with weaker union representation at baseline are able to take advantage of the immigrant-induced labor supply shift to scale up production, thereby out-competing firms with stronger union representation and capturing market shares. Incumbent workers in less unionized firms also benefit, shifting into management positions and capturing some of the firm’s increased rents. Consequently, by aspiring to protect their own members, unions constrain firms’ ability to respond to sudden labor supply shocks, with considerable implications for workers, firms, and markets.

Our main takeaways are supported by four core results. First, we show that firms with stronger union representation are larger, more profitable, pay higher wages, have lower termination rates, have greater job protection, and provide more amenities, than those with weaker union representation. In other words, firms with stronger unions dominate those with weaker unions in terms of career opportunities and monetary compensation. We then use our difference-in-differences approach to show that unions in the Norwegian labor market prevent firms from hiring new immigrants and push them to enter firms with weaker union representation. While skilled native workers self-select out of low quality firms with weaker union representation (Roy, 1951), worker power

in high quality firms prevents higher skilled immigrants from entering them, such that immigrant workers are under-matched to relatively low quality firms. Specifically, seven years after the EU enlargement took place, union-minority firms (firms with less than 50 percent union density) go from 0 to 4 percent of their workforce consisting of immigrants from the new EU countries; an increase nearly twice as large as that seen in union-majority firms.

Second, we show that firms with lower levels of union density at baseline are able to take advantage of the immigrant-induced labor supply shift of high-quality but low-cost workers to scale up their production. Not only do they hire more workers and increase their labor share, but they also increase spending on materials and capital. As a consequence of this broad-based scale-up, total revenues at firms with weaker unions increase and the probability of firm survival goes up. In other words, the production scale up allows firms with weaker unions at baseline to gain a competitive advantage, and over time they capture larger shares of both the labor as well as the product markets. While we see no effects on profits in the short-run, we identify a substantial increase in revenue-capture by the leadership (board compensation), indicating that a considerable share of the increased revenue generated by the production scale-up goes directly to the board through higher compensation.¹

Third, we demonstrate that the gains to less unionized firms also generate positive effects for their incumbent workers. Specifically, incumbent workers at these firms see an increase in their average income rank as well as in their probability of holding a managerial position. This suggests that incumbent workers manage to capture some of the additional rents generated by firms with weaker union representation, and climb the corporate ladder as the firms expand. Nonetheless, the effects we observe on incumbent workers are relatively small compared to those we see for firms. These results are consistent with recent work on cross-border mobility in Europe (e.g. Foged and Peri, 2016; Beerli et al., 2021), which shows that migration inflows can generate a simultaneous labor demand shift for natives and enabled them to pursue managerial jobs in the most affected industries. In terms of effect heterogeneity, we find that young incumbents, and incumbents with slightly lower wages, drive these results. In other words, those who benefits are younger incumbents who experience an acceleration of their career progression within the firm. For very senior incumbent workers with already high salaries, we do not see any statistically significant or economically meaningful effects.

Fourth, we find that incumbent workers from firms with weaker union representation become increasingly likely to join their local union in response to the firms increased exposure to, and employment of, the new immigrants. A large literature in economics and political science sug-

¹It is important to note that our results are directly dependent on firms being heterogeneous in their ability to exploit the new supply of migrants. Had there been no differential effect across firms in their ability to hire new migrants, we would not see the same production scale-up and market capture effects.

gests that native workers fear competition from immigrants (Williamson, 1998). Our results map onto recent results showing that even when immigrants improve the welfare of native workers, immigrants can generate incumbent backlash and increase rates of union membership amongst incumbents (Tabellini, 2020; Medici, 2023). We speculate that this effect could be caused by incumbents experiencing an increase in the salience of the perceived threat posed by competition from immigrants. Dynamically, this is an important finding. On one hand, increased unionization has the potential to improve working conditions in firms with weaker union representation (Dodini et al., 2023b). On the other hand, firms may become less capable of adapting to future shocks to their production technology as the union density at the firm increases.

Broadly, our findings generalize to all industries in the Norwegian economy. However, we observe considerable heterogeneity across firms and geographic markets within sectors. First, labor intensive firms —regardless of worker power —are most likely to hire new immigrants. Second, the effects we document are considerably more muted in larger labor markets. This finding is consistent with larger markets being more competitive on average, such that there is less scoop for unions to reallocate rents from firms to workers, as well as a larger pool of workers that firms can choose from. In other words, these are markets in which workers have less leverage in influencing the operation of, and the labor supply to, the firm (conditional on a given level of firm-level union density).

We are the first to leverage variation in worker power across firms in combination with an exogenous shift in migration to disentangle the role of incumbent workers in shaping the allocation of immigrants across firms and identify how such inflows influence firms and workers. The results from this paper make several contributions to the existing literature.

First, there is a large literature examining the effect of immigrants on native employment and wages (e.g. Borjas, 1987; Card, 1990; Friedberg, 2001; Borjas, 2003; Ottaviano and Peri, 2012; Fogel and Peri, 2016; Dustmann et al., 2016; Friedberg and Hunt, 2018; Piyapromdee, 2021). While these studies provide detailed insights on the likely impact of migrants on natives, most of these studies have estimated average effects through a competitive market framework without considering how the allocation of migrants across firms occur, and what the consequence of this is for the impact of migrants in a dynamic setting.

Our contribution to this literature is to show that incumbent workers play a key role in the allocation of immigrants across firms, and that this sorting effect has important implications not only for the impact of immigrants on incumbent workers, but also for the impact on firms and the markets they operate in. By disentangling the interaction between worker power and migration, this paper improves our understanding of how immigrants shape the labor- and product markets of countries they move to and helps explain some of the mixed results on how immigrants affect natives —and firms —that have been found in prior work.

Relatedly, there is a small but fascinating literature examining the role of labor market institutions in explaining the wage and employment effects of immigrants (Foged et al., 2022; Brücker et al., 2014; Bisin et al., 2011; Angrist and Kugler, 2003). These papers provide novel insights on the likely importance of labor market institutions in influencing the impact of migrants on natives, examining cross-country variation in immigration effects from common shocks and interpreting these differences through the lens of variation in labor market institutions. In addition, a small number of novel papers examine the relationship between employer power and immigrant wages (e.g. Hirsch and Jahn, 2015; Naidu et al., 2016; Amior and Manning, 2020). Common among these studies is the conclusion that institutional structures can impact the labor market effects of immigration by altering the competition between incumbents and new entrants.

We contribute to this literature by examining the role of worker power across firms within a country in shaping the allocation of immigrants and how that influences the economy. On the one hand, this is a more narrowly-focused research question which isolates one key driver of immigrant sorting: worker power. On the other hand, by focusing on worker power across firms—a universal phenomenon—these results are likely to have policy implications that extend beyond national borders. Further, while we measure worker power through union membership, the determinants of worker power may include several factors beyond unions. Various institutional features shape the balance of power in labor markets between firms and workers, and our results provide broad insights regarding the role of such power dynamics in shaping the way in which migrants affect people, firms, and communities.

We also contribute to the relatively new but rapidly developing literature studying the impact of immigrant workers on firm performance (e.g. Amior and Stuhler, 2024; Mahajan et al., 2024; Mahajan, 2024; Amuedo-Dorantes et al., 2023; Clemens and Lewis, 2022; Doran et al., 2022; Imbert et al., 2022; Dodini et al., 2022; Beerli et al., 2021; Brinatti and Morales, 2021; Kerr et al., 2015). These papers provide important evidence on how immigrants can help firms become more productive. However, none of these studies examine why some firms make use of immigrant labor while others do not, and none of these studies examine how such differences influence firm performance and competition between firms.

We show that firms with relatively weaker worker representation respond more quickly to shifts in the labor supply induced by immigration, allowing them to scale-up production, capture market share, and out-compete more unionized firms. These results have implications beyond the context of migration. A number of recent papers show that sudden changes in the price of key production inputs—whether due to changes in minimum wage policies, energy price hikes, or robotization—can shape firm performance (e.g. Fontagné et al., 2023; Hirvonen et al., 2022; Acemoglu and Restrepo, 2020; Harasztosi and Lindner, 2019). While prior work shows that unions can improve firm performance in relatively stable periods (Dodini et al., 2023b), our results suggest that worker

power can make firms less flexible in responding to sudden shifts in production technology.

Finally, there is a large and expanding set of studies examining immigrant integration and the mechanisms underlying the native-immigrant labor market gaps more broadly. This includes, but is not limited to, discrimination against immigrants (e.g. Rooth, 2010; Oreopoulos, 2011; Hirsch and Jahn, 2015; Alesina et al., 2018; Sahlström and Silliman, 2024), differential treatment from labor unions (e.g. Dodini et al., 2024), differential effectiveness of policies and institutions (e.g. Alsan and Yang, 2022), and differences in the skills of immigrants and natives (e.g. Bleakley and Chin, 2004; Albert et al., 2021; Rooth et al., 2023). Arellano-Bover and San (2024) show that immigrants tend to work in firms with lower non-wage amenities, suggesting that the immigrant-native wage-gap likely understates overall gaps in the labor market between immigrants and natives. We show that another important factor influencing the integration of immigrants is the power held by incumbent workers. By leveraging their power to maximize their own payoffs, they inadvertently restrict the options of immigrants and force them to enter specific firms that are of lower quality at baseline. This has the potential to not only decrease the initial wages of immigrants, but also may provide them lower non-wage amenities and less opportunities for on the job learning.

In terms of policy implications, our results show that migration shocks reduce the labor supply restrictions of firms and facilitate production scale-up. However, firms are differentially able to respond to these shocks as a function of the power that their incumbent workers possess, something that dramatically alters the competitive landscape among firms within the market. Not only does this provide important insights to the policy debates on immigrant integration and the mechanisms underlying the native-immigrant labor market gaps, but it also contributes important knowledge to our understanding of the interaction between labor market institutions and migration. Finally, these results can help policy-makers and academics predict and prepare for the dynamics of how future migration-induced labor supply shifts may affect firms and workers.

2 Institutional background

2.1 Immigration in Norway

Global migration has increased dramatically over the past several decades, from 95 million in 1970 to 150 million in 1990 and 285 million in 2020 (McAuliffe and Khadria, 2019). The rapid growth in international migration is particularly noticeable across the OECD, in which more than 15 percent of the overall workforce now consists of migrants (Figure A.1).

Norway has seen similar developments over the past several decades, moving from a relatively homogeneous society with only 57,000 migrants in 1970 to a heterogeneous society with a substantial immigrant base of 711,000 individuals in 2020 (15 percent of the total population).

Approximately 50 percent of the immigrants in Norway have a Western background, and the seven most common immigrant countries are Poland (97,197), Lithuania (37,638), Sweden (36,315), Somalia (28,696), Germany (24,601), Iraq (22,493), and Syria (20,823). The immigrants are spread across the country, though there are particularly large immigrant clusters in the big metropolitan areas of Oslo, Bergen, Stavanger, and Trondheim. Similar to other Scandinavia countries, there is a non-negligible degree of residential segregation in the country, but this has declined substantially over the past two decades (Kornstad et al., 2018).

2.2 The 2004 European Union Enlargement

Following a national referendum in 1994, Norway voted to remain outside the European Union. However, Norway has been a member of the European Free Trade Area (EFTA) since its inception in 1960 (currently consisting only of Iceland, Liechtenstein, Norway, and Switzerland). Through the Agreement on the European Economic Area (1994), the European Union's single market is extended to the EFTA (with the exception of Switzerland) as a single market governed by a common set of rules. EFTA members that are part of the EEA Agreement participate in the EU's internal market without being members of the EU or the European Union Customs Union. Importantly, these rules enable free movement of persons, including the freedom to choose residence in any country. As a result, members of countries in the European Union can freely enter Norway to live and/or work.

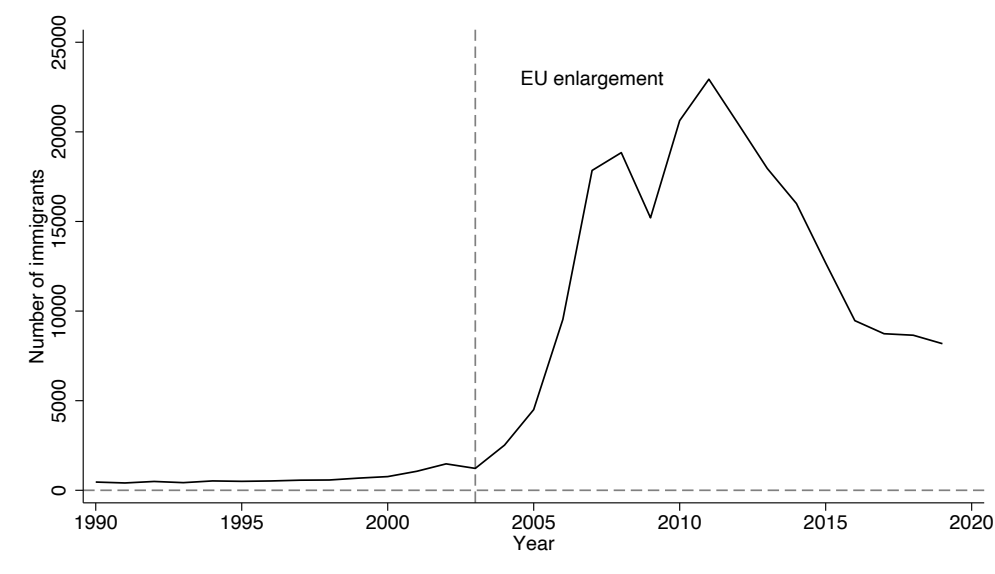
In 2004, the European Union expanded to include ten new member states —Cyprus, Czechia, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia. Through a decision Norway had little power over (since they are not part of the EU and do not have formal access to the EU decision-making process), workers from these countries were suddenly able to enter Norway to work and live. Contrary to some other European countries (such as Germany), the Norwegian border opened immediately without any transitional restrictions. Since Norway remained outside the European Union and the European Union Customs Union, the EU enlargement had little influence on the geography of product markets.

Figure 1 shows the number of new immigrants in Norway from countries included in the 2004 accession to the European Union from 1990 onwards. In what became the largest immigration shock in the history of Norway, almost 100,000 workers from Poland alone entered Norway in the years that followed. In comparison, the later accession to the European Union in 2007 – this time including Bulgaria and Romania – had a much smaller impact on immigration to Norway.² As shown in Figure A.3, the immigrants from the new accession countries are spread out across the

²The short-term effects of immigration on wages in the construction sector following the 2004 EU enlargement are studied by Bratsberg and Raaum (2012) in Norway and Kuosmanen and Meriläinen (2022) in Finland.

country.³

Figure 1: Annual immigrants from EU 2004 accession countries



Notes: This figure shows that the number of annual immigrants from the ten countries admitted to the European Union in 2004 (Cyprus, Czechia, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia) was close to zero prior to the enlargement of the European Union, but grew dramatically in the years that followed, reaching nearly 20,000 immigrants annually.

2.3 Unions in Norway

Unions and collective bargaining are central to Norway's labor market, and all workers have the legal right to join a union irrespective of which firm they work at.⁴ However, this has to be done on a volunteer basis; closed shop union agreements are not legal.

The rules and regulations governing unions are anchored in the Norwegian Working Environment Act, which oversees worker rights and regulates both individual employees and their contracts as well as unions and their collective bargaining agreements. The stated goals of the unions are to protect their members and improve their working conditions through collective bargaining. This does not only pertain to the wages of workers, but also to decisions related to the work environment, employment protection, and non-pecuniary benefits. In addition, unions offer mediation and legal help to workers who are members of the union in the event of work conflicts. Should negotiations between employers and employees fail, unions have the ability (and legal right) to engage in industrial action and strikes.

³See Dorn and Zweimüller (2021) for a discussion of the economics of migration in the European Union more broadly, and how the 2004 EU enlargement radically changed the reasons for labor-based migration in Europe.

⁴For prior work in economics on the role of unions in Norway, see, for example, Barth et al. (2012) and Dodini et al. (2023a).

Bargaining between the firm and the union typically take place both at the national level as well as the local level, and can most aptly be describes as a two-step process. In the first step, nation-wide sectoral collective bargaining agreements are established to set wage floors. These agreements are renegotiated every 2-4 years. Following the sectoral bargaining, local negotiations take place between the employer and the union. These local negotiations typically take place every year, and non-union workers are excluded from these discussions. Over the past two decades, local negotiations have come to represent the most important part of the bargaining process, accounting for more than 70 percent of total negotiated wage increases (Bhuller et al., 2022). Thus, even though the Norwegian labor market is characterized by a high coverage of collective bargaining agreements, the ability of firms and local unions to adjust individual wages and work conditions is very high.⁵

In addition to the annual local bargaining process, local unions are often represented in hiring and firing processes at the firms, not only providing input on the job ads and feedback on the suggested interview questions, but they also often sit in on interviews with potential hires and play a key role when firms decide to reduce their workforce or fire specific workers (through mediation, legal support, etc.).

The extent to which unions wield power in the bargaining process is a direct function of the union density at the workplace (Dodini et al., 2021). This is not only because a stronger union has more leverage in the negotiations (a threat of strike encompassing 90 percent of the workforce generates more leverage than the threat of a strike encompassing 10 percent of the workforce) and more resources to use during the negotiations, but also because of the institutional details in the Norwegian setting. Specifically, in Norway, employers are legally obligated to recognize and negotiate with local unions if they are present at the workplace, irrespective of the number of members it has. Hence, in contrast to the private sector in the US in which firm unionization requires a majority support through a union election, and in contrast to Germany in which a firm either is covered by a union agreement or not, unions can operate in Norwegian workplaces as long as there is a non-zero support for the union. In this regard, Norwegian unions are relatively similar to those in Sweden, Denmark, and the UK, in which both central and local negotiations occupy a large part of the process, and in which union density plays a determining role.⁶

As such, unionization in Norway is better viewed as a continuous measure of worker power, making this a particularly useful setting for answering the question in this paper.⁷

⁵For a more detailed discussion on the institutional details surrounding the wage bargaining process, see Dodini et al. (2023a).

⁶In addition, non-union workers are automatically excluded from local union negotiations, and there are substantial private goods components associated with union membership in Norway (Dodini et al., 2023a), further implying that the influence of unions grow as a function of their membership base.

⁷Our decision to focus on a continuous measure of union density is also supported by on the canonical work of Freeman and Medoff (1984), which shows that what matters for successful union bargaining is not whether a union is

Prior work has observed that rates of union membership are lower amongst immigrants than natives in Norway, and while the share of immigrants who join a union increases with the time an immigrants spends in the country, they never quite catch up (Cools et al., 2021). Additionally, other recent research from Norway suggests that the benefits of union membership accrue disproportionately to natives relative to immigrants (Dodini et al., 2024).

3 Conceptual framework

Historically, labor unions were established to counteract the power of firms through the monopolization of labor supply. By restricting the supply of workers to firms, unions can raise the wages of workers and advance the collective interest of their members (Robinson, 1969; Freeman and Medoff, 1984).

By increasing labor supply, augmenting worker competition, and putting downward pressure on wages, immigrants pose a direct threat to these goals (Bonacich, 1972). Accordingly, organizations such as the American Federation of Labor openly supported direct restrictions on immigration as a way to protect their members (Briggs, 2001; Fine and Tichenor, 2009). These observations come through in the data as well, with researchers in sociology and political science observing that places with stronger trade unions oftentimes are associated with worse labor market outcomes for immigrants (Avci and McDonald, 2000; Penninx and Roosblad, 2000; Gorodzeisky and Richards, 2013; Marino et al., 2015; Boräng et al., 2020).

The dynamics described above, whereby incumbent workers (or "insiders") advance their own interest at the detriment of new entrants (or "outsiders"), is most aptly captured by the canonical insider-outside model first conceptualized by Lindbeck and Snower more than four decades ago (Lindbeck and Snower, 1989, 2001).⁸ However, the same dynamics can be generated by any theory whereby some firms experience non-zero turnover costs, whether due to split labor markets (Bonacich, 1972) or labor market segmentation (Kahn, 1975; Dickens and Lang, 1993).

To fix ideas, consider a group of insiders (e.g., union members at the firm) who bargain over wages and work amenities with the employer. Their goal is to maximize their own work compensation, and part of this involves restricting access to the firm for outsiders (as this would put downward pressure on wages and increase competition). Provided that there exists a non-zero labor turnover cost, firms face strong incentives to engage in bargaining with the insiders. This turnover

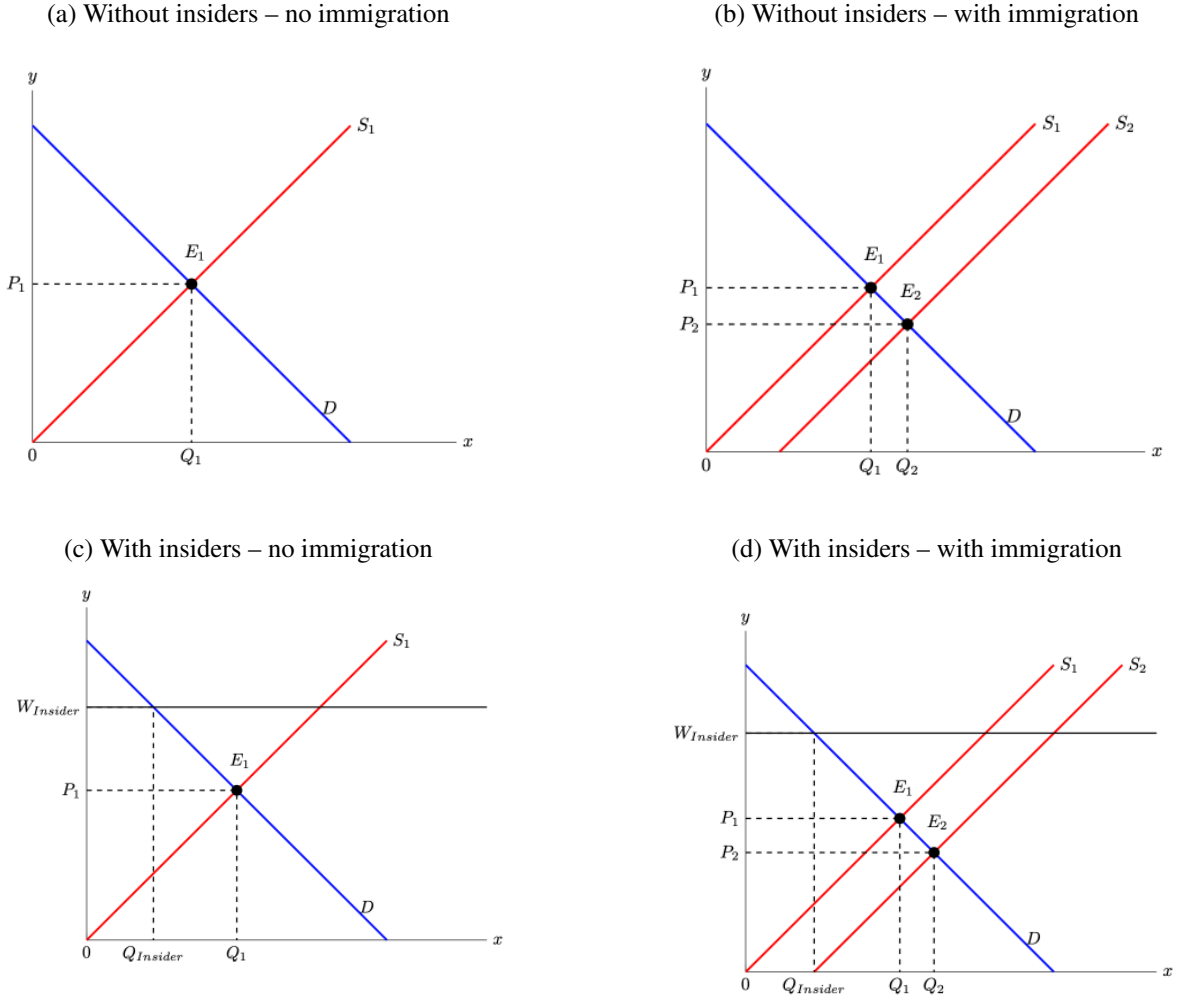
present at the firm, but how large the union is at the firm. A union with very little coverage will have negligible leverage over the firm if negotiations break down and threat of adverse action such as a slowdown or walkout is minimal. A union with universal coverage, on the other hand, will have substantial leverage as any adverse action would have considerable consequences for the productivity and revenue of the firm (e.g. Breda, 2015; Fitzenberger et al., 2013; Barth et al., 2000; Balsvik and Sæthre, 2014; Barth et al., 2020).

⁸In fact, while not explicitly concerned with labor unions or immigrants, Lindbeck and Snower use unions as an example of insiders and minorities as an example of outsiders, but they never combine them.

cost can come from a range of different channels, including hiring- and firing costs, loss of firm-specific human capital and training costs, and industrial action and threat effect costs. These costs can even come from ethical considerations – by which unions prevent firms from hiring workers for what they consider less than fair wages. Thus, even though outsiders may represent a cheaper source of labor for firms, insider power generated by non-zero turnover costs makes it harder for firms with insiders to hire outsiders (or fire insiders). This has important implications for the dynamics of labor markets, suggesting that outsiders carry the cost of insider wage-setting in the short-run. Put differently, insiders will bid up their wages by exerting power in local negotiations, and in that process reduce the job market opportunities available to outsiders.

The insider-outsider hypothesis offers clear predictions for our context and analysis. For illustrative purposes, consider two types of markets: one without insiders (Figure 2a), and one with insiders (Figure 2c). The wage rate in the market without insiders is at the market clearing rate (P_1) while the wage rate in the market with insiders is bid up above equilibrium ($W_{Insider}$). Next, consider a sudden increase in the supply of workers triggered by an exogenous inflow of migrants. This shifts the supply curve out and puts downward pressure on the equilibrium wage (Figures 2b and 2d). However, while firms without insiders are able to take advantage of this inflow of workers by hiring more at a lower price, firms with insiders are constrained to do so by the power exerted by the insiders.

Figure 2: Firm responses to shifts in labor supply with and without insiders



Notes: Figure (a) shows the equilibrium demand and supply of workers in a context where firms have no insiders. Figure (b) shows that an increase in the labor supply (from S_1 to S_2) will lower equilibrium wages. Figure (c) shows that collective bargaining by insiders can induce wage-floors, whereby insiders receive wages above equilibrium levels. Figure (d) shows that the wage floor can prevent firms with insiders from responding to the lower equilibrium wages which result from the shift in labor supply. These figures draw from Lindbeck and Snower (1989, 2001).

Firms without insiders that face little bargaining constraints and are able to take advantage of the increased supply of low-cost labor, may be able to do so as a means to scale up production, increase their market shares on both the labor- and product side, increase revenues, and gain a competitive advantage over firms with insiders. In addition to influencing the performance of firms, this may ultimately also benefit incumbent workers at these firms. Specifically, as alluded to in some previous work on cross-border commuting in Europe (e.g. Beerli et al., 2021), this initial immigrant-induced labor supply shift may actually generate a subsequent rightward shift in

the demand for labor in Figure 2). Depending on the magnitude of this subsequent labor demand shift, the long-term effects of immigration shocks on incumbent workers in firms without insiders is ambiguous.

In contrast, firms operating in markets with insiders may lose out due to their inability to take advantage of the shift in labor supply. To the extent that firms with insiders no longer are competitive, an extreme consequence of migration-induced labor supply shifts is firm market exit. This implies that union power, which typically improves the working conditions of members, may backfire in settings with sudden labor supply shocks.

In our setting, insiders refer to incumbent workers and outsiders refer to new migrant workers. In our empirical application, we focus on the relative strength of the incumbent workers across firms. To this end, we rely on local union density at the firm as a proxy. While the illustrative example above considers the extreme case of no insiders versus insiders, the model can easily be extended to the case in which there is a continuous distribution of insider power.

4 Data and Empirical Strategy

4.1 Data

Our primary data come from the central population registers at Statistics Norway, which provide annual demographic and socioeconomic information on all individuals for each year between 2000 and 2011 (Statistics Norway, 2019a). This includes information on gender, age, and primary residency location. By linking the individual-level data to the migration register (Statistics Norway, 2021), we collect information on every individual’s immigration background (if they are immigrants, which country they migrated from, and when they migrated). By linking this data to the union dues database (Statistics Norway, 2019b), we further collect information on all workers’ union status for each year over our sample period.

We merge the individual data to detailed employer-employee matched data and firm tax data. These data include information on the firm’s inputs (capital, materials, labor, and machines), workforce (size, hours, and earnings), and outputs (sales revenue, profits, board compensation, and survival). These data also enable us to construct proxy measures of productivity (worker fixed effects based on bias-adjusted AKM models as well as revenue per worker hour) and firms’ labor- as well as product market shares.⁹ Combined, these data provide us with detailed information on the operations of firms, and enables us to directly link the migration flows to the performance of

⁹Labor market shares are calculated as the firm’s share of total employment in the local labor market (akin to commuting zones and constructed by Statistics Norway to generate more aggregate markets; there are 160 in the country) and 3-digit occupation. Product market shares are calculated as the firm’s share of total sales revenue in the local labor market and industry.

the firms in the economy.

To avoid issues arising from how to define zeros when using log-based measures of outcomes, we follow Chen and Roth (2024) and define most outcomes as a percent of their levels at baseline. Since there were almost no immigrants from EU 2004 countries in Norway at baseline, this key outcome is simply measured as the percent of the firms' workers from EU 2004 enlargement countries.¹⁰ A handful of other outcomes are also defined in other ways. In particular, we study how immigrant sorting affects the composition of workers in firms as measured through mean worker fixed effects. These measures follow existing work and are simply the firm mean of estimates of worker effects from bias-adjusted AKM models based on data in the pre- and post- periods (Abowd et al., 1999; Bonhomme et al., 2023). Finally, firm survival is coded as a binary indicator variable.

Once we have obtained detailed information on immigration status and union membership of workers, and merged this data to the firm-level tax and accounting data, we link our data to a series of education, income, organisational role, and tax registries at the individual level (Statistics Norway, 2018a,b, 2012, 2014). These registers provide detailed information on each individual's education level, income, occupation, industry, and management roles (if any). We use these data to examine the impact of migrants on incumbent workers (employment, income, promotions, managerial responsibilities, occupational ranking, and union status) as well as to conduct heterogeneity analyses by proxy measures for skill levels (educational attainment). To measure income, we use annual population income ranks (0-1), which are stable in the presence of outliers (Nybohm and Stuhler, 2017) and avoids issues relating to how we code zeros (Chen and Roth, 2024). To measure occupational ranking, we use the mean income rank in each occupation. Whether an individual is a manager, employed, or changes firms, are outcomes that all are measured through binary indicator variables.

In our main specifications, we restrict attention to private sector firms that employed a minimum of 15 workers in 2000 and existed through 2003 (the year before the EU expansion took place). This ensures that we have a set of firms that we can follow for a sufficient number of years prior to the 2004 EU enlargement, and that we are not identifying effects driven by small firms with little impact on the aggregate economy. This leaves us with approximately 9,000 firms and almost 400,000 workers.

Since worker power is a direct function of union representation at the workplace, we define worker power in each firm by their baseline union density – i.e. the share of workers at the firm

¹⁰Since the share of immigrants from EU 2004 accession countries is a function of firm size, we also define EU 2004 share based on firm-size at baseline to test for sensitivity in how we define these variables. When we use this measure, the magnitude of our estimates increase (Table A.4, Panel C). However, because the range of possible values the outcome variable take when we change the denominator for firm size is no longer restricted to be between zero and one, these estimates are slightly noisier. We prefer the simple measure based on the share of a firms workers who are from EU 2004 enlargement countries each year.

in 2003 (the year prior to the 2004 EU Enlargement) who were union members. To reduce the dimensionality of our estimation problem and facilitate the interpretation of our results, we split firms into two groups: whether they had more than 50 percent union density ("union-majority" firms) or less than 50 percent union density ("union-minority" firms). This leaves us with 4,110 union minority firms and 5,041 union majority firms. However, since union majority firms tend to be larger, about 75 percent of workers in our sample are employed in union majority firms in 2003. In the online appendix, we show results from a more flexible specification in which we use a dose-response difference-in-differences specification, exploiting the continuous measure of firm union density as the dosage variable. The results closely align with the simpler two-group difference-in-differences specification that we use as the main approach.

Finally, to better understand how immigrants and natives value workplace characteristics and how they perceive unions to shape these characteristics, we use recently collected survey data from Dodini et al. (2024). This survey targets 5,200 union members and asks a battery of questions. We use results from two of these questions in this paper: (1) which job characteristics that workers value (wages, job security, promotion potential, and work environment), and (2) the extent to which they believe unions are capable of improving work conditions across these four dimensions.

4.2 Empirical strategy

Firm-level Analysis. Our analysis is based on a conventional difference-in-differences design in which we compare the outcomes of union-minority firms with the outcomes of union-majority firms before and after the eastern expansion of the EU. We focus on outcomes across four core margins of adjustment: labor usage (share of EU2004 workers, share of other immigrants, total number of workers, total number of worker hours, mean wages, and hourly wages), input substitutions and complementarities (materials, capital, machines, personnel cost, and revenues), production scale-up and productivity (labor share of costs and revenues, mean worker fixed effects, and revenue per worker hour), and outputs (profit, labor market share, product market share, board compensation, and firm survival).

We begin by estimating non-parametric event study models that allow us to trace the treatment effects over time and examine the parallel trend assumption required for causal inference in our setting. Specifically, we estimate the following model:

$$Y_{fst} = \sum_{t=2000}^{2011} \beta_t (\mathbf{1}[t_f = t] \times \text{Minority}_f) + \pi_{st} + \lambda_f + \epsilon_{fst}, \quad (1)$$

in which Y_{fst} represents an outcome for firm f in sector s at time t . In this equation, Minority_f is a binary variable measuring whether the workplace was subject to little worker power ($\text{uniondensity} <$

50percent) or not, and represents our treatment variable. The coefficient of interest, β_t , measures the difference in outcome Y between union minority and union majority firms in the same sector each year. This equation identifies both pre-treatment relative trends ($t = 2000$ through $t = 2003$) as well as time varying treatment effects ($t = 2004$ through $t = 2011$). To avoid any endogenous union change in response to the 2004 enlargement, we fix union density in the year prior to the event (2003). We obtain our first-stage results by setting Y to equal the share of workers coming from the 2004 EU accession countries.

In our main specification, we include firm fixed effects (λ_f) and sector-by-year fixed effects (π_{st}). The firm fixed effects absorb any systematic differences across firms that are constant over time. Because of the firm fixed effects, all identifying variation comes from within firms over time. The sector-by-year fixed effects remove the risk of trends or secular shocks in sectoral sorting from driving our effects.¹¹ We cluster the standard errors at the firm level, which is the level of treatment variation.

To parsimoniously summarize the large set of coefficients obtained through estimation of Equation 1, we also present results from a simplified difference-in-differences framework. To make our comparison as transparent and informative as possible, we restrict our estimation sample to observations in 2003 and 2011. We specify the estimating equation as follows:

$$Y_{fst} = \beta(Minority_f \times Post_t) + \pi_{st} + \lambda_f + \epsilon_{fst}, \quad (2)$$

in which β measures the mean difference in outcome Y between firms with a minority of union members and those with a majority of union members. With our balanced panel of firms, this approach collapses to a single two-by-two differences-in-differences approach, avoiding concerns regarding staggered difference-in-differences estimates brought up in the recent literature (Callaway et al., 2021; Athey and Imbens, 2022; Roth et al., 2023). We report the robustness of our core finding to a range of alternative specifications in Table A.4.

Individual-level Analysis. After having examined the role of worker power in shaping the allocation of immigrants across firms and influencing the behavior of firms, we disaggregate the data to the individual level and examine how incumbent workers at these firms are affected. To do so, we estimate modified versions of the event study and the difference-in-differences design presented above:

¹¹Because municipality is a fixed characteristic of firms, we do not include municipality fixed effects. Since firms may operate in more than one municipality we prefer not to include municipality-by-year fixed effects in our main specification. However, in supplementary specifications shown in the online appendix, we include such interacted fixed effects, such that we further restrict the yearly identifying variation to be within municipality groups. This has no impact on the results that we find.

$$Y_{ifsm} = \sum_{t=2000}^{2011} \beta_t (\mathbf{1}[t_f = t] \times \text{Minority}_f) + \pi_{st} + \gamma_{mt} + \lambda_f + \omega_i + \zeta_{age} + \epsilon_{ifsm}. \quad (3)$$

$$Y_{ifsm} = \beta(\text{Minority}_f \times \text{Post}_t) + \pi_{st} + \gamma_{mt} + \lambda_f + \omega_i + \zeta_{age} + \epsilon_{ifsm}. \quad (4)$$

The individual-level equations differ from the firm-level regressions in that they include additional terms for individual fixed effects and age fixed effects, ensuring that we account for any systematic differences across workers that are constant over time, as well as any time-invariant differences across individuals of different ages. Note that the firm fixed effects are based on the firm that incumbents worked for at baseline (2003), and can therefore be included in the model despite the inclusion of individual fixed effects. In our main individual-level analysis, we report standard errors clustered at the firm level (Bertrand et al., 2004). However, because these standard errors may be too conservative (Abadie et al., 2023), we also report standard errors clustered at the worker level. Given the size of our analytical sample and the precision of the effects we identify, the decision of whether to cluster on the firm level or the worker level has no impact on our results.

Identifying Assumptions. The key assumption required for causal inference in our setting is that, absent treatment, the potential outcomes of treated and untreated units would evolve in a parallel fashion. While this assumption is fundamentally untestable, we can obtain suggestive evidence of the validity of this requirement by examining the pre-treatment trends obtained through Equations 1 and 3. Encouragingly, we find no evidence of diverging trends in the share of immigrants from EU enlargement countries prior to 2004 between union-minority and union-majority firms (Figure 4).¹² In addition, we find no evidence of divergent trends in firm characteristics or worker outcomes prior to 2004 (Figures A.5, A.8, and A.9). These results provide strong evidence in support of the main identifying assumption required for causal inference in our setting, and we discuss them in greater detail below.

In addition to the parallel trend assumption, we require that there are no secular trends or shocks that occur concurrently with the EU enlargement of 2004, that differentially impact union-majority and union-minority firms, and that are correlated with our outcomes. While this assumption cannot be tested, we note that the enlargement of the EU did not coincide with any other Norwegian labor market reform or policy that could differentially influence the two sets of firms. We also note the inclusion of sector-by-year fixed effects in our main specifications, and municipality-by-year fixed effects in our robustness specification, which removes the risk of trends or secular shocks in sectoral sorting and municipality sorting from driving our effects.

¹²Because of the low prevalence of workers from these countries prior to the 2004 enlargement, a standard immigrant shift-share analysis does not perform well in our setting. See Figure A.4.

The last assumption typically implicit in causal analyses using this estimation approach —the stable unit treatment values assumption (SUTVA) —is that the response of a particular unit can only depend on the treatment to which he himself was assigned, not the treatments of others around him (Cox, 1958; Rubin, 1980). In network settings, where the treatment status of one unit may be contaminated by those of other units, this assumption often fails.¹³ A solution to such problems is often to assign treatment status at a more aggregate level, thereby avoiding spillovers.

Labor markets represent another instance in which spillovers often are present. This is because labor markets are inherently dynamic and competitive, whereby one firm gaining a competitive advantage oftentimes implicate other firms in the market. As such, these spillovers are key for understanding the dynamics of markets and how various policies and reforms shape the performance and behavior of firms. Therefore, abstracting away from these spillovers would prevent us from addressing one of the key questions we ask in this paper: how does differential access to immigrant labor between firms affect firm competition. Instead, the competitive structure of labor markets is central to what we want to study, and we therefore spend a significant amount of time in the result section to disentangle these spillover effects. In terms of interpreting our estimates, however, we need to keep in mind that any effects we document should be interpreted as relative effects across firms, and that a shift in the labor supply that affect all firms equally likely would produce a very different set of results.

Drawing from earlier work in economics and sociology (Bonacich, 1972; Kahn, 1975; Lindbeck and Snower, 1989, 2001), our hypothesis is that worker power plays a key role in shaping differences in immigrant sorting, which we proxy for using union density at the firm. As we show in Table A.1, firms with higher levels of union density outperform other firms across all the dimensions we examine, pay higher wages, and employ higher educated workers —*even conditional on industry and sector*. Given these differences, it would be surprising if immigrants themselves would prefer to work in firms with lower levels of union membership. Instead, push-factors are much more likely to explain why immigrants enter firms with higher levels of union membership considerably less. Having said that, to examine whether factors other than worker power might explain immigrant sorting into union-minority firms, and if there are any alternative mechanisms that may explain our results, we conduct a series of sensitivity and robustness checks that we present in Table A.4).

¹³For example, if some students in a classroom are randomly provided study-guides for an exam and treated students share the study-guide with their untreated friends, a comparison of the test scores of treated and untreated students will be biased.

5 Worker power and immigrant sorting

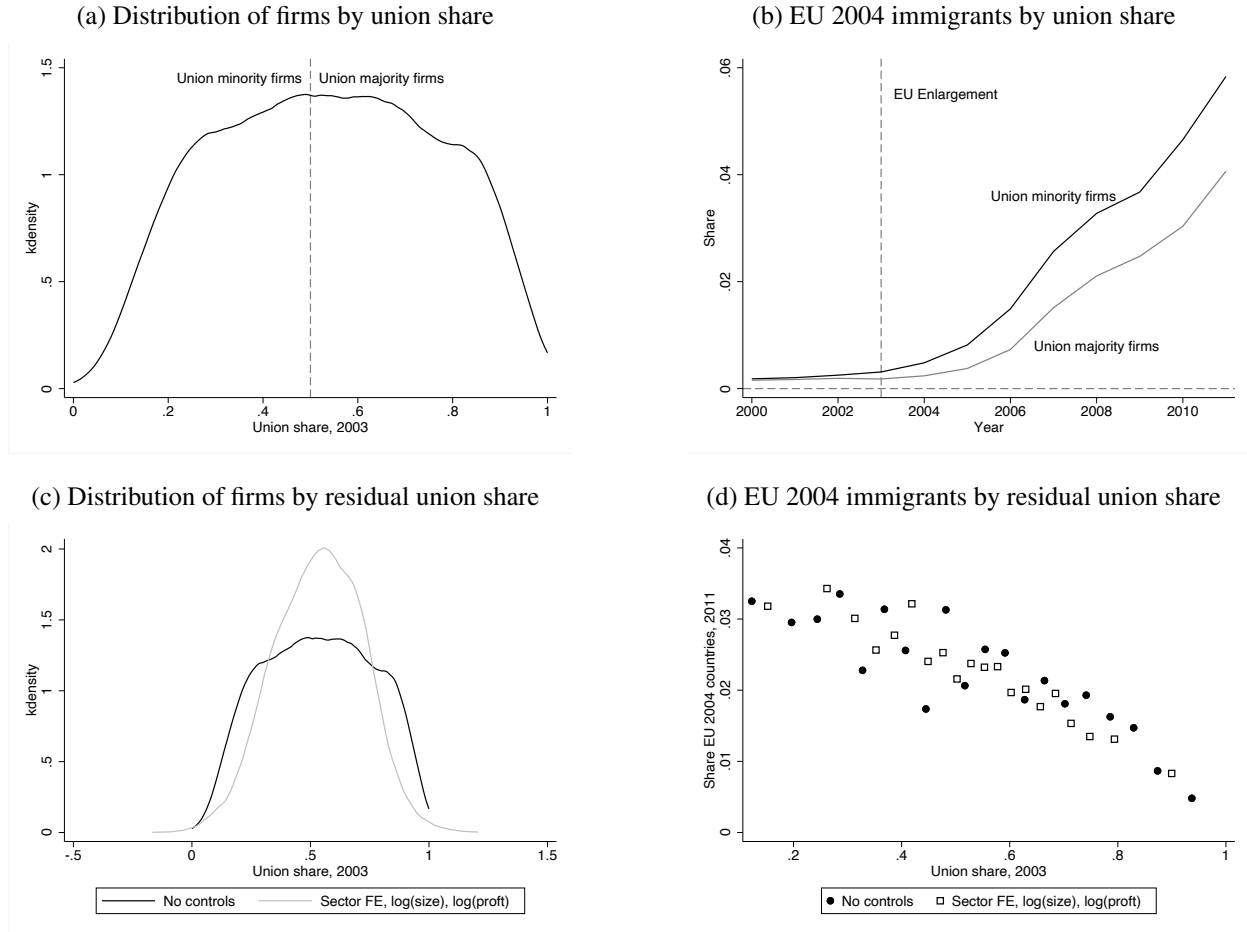
In this section, we plot the raw data and provide preliminary descriptive evidence on the role of worker power in driving the allocation of immigrants across firms.¹⁴ We start by splitting firms in two groups based on whether the minority or majority of workers in the firms are union members in 2003 (Figure 3a). Next, we plot the average immigrant share in these two groups of firms during the first seven years following the 2004 EU enlargement (Figure 3b).

We complement our binary approach to categorizing firms with one that makes use of the entire spectrum of variation in union density. We show that share of firms' workers from EU 2004 enlargement countries develops almost linearly across union density at baseline (Figure 3d). Still, firms that vary in worker power and union densities at baseline are very likely to differ across several dimensions. We demonstrate this in Table A.1, which shows that firms with stronger union representation are larger, more profitable, and operate in more profitable sectors (in the base year). These patterns align well with the evidence in Åslund et al. (2023), who show that immigrants tend to cluster in lower productivity firms. To assuage any concerns that variation in union density across firms is driven by differences in sector, firm size, or profitability, we show that most of the variation in union membership is orthogonal to these characteristics of firms (Figure 3c). Moreover, we show that the pattern of immigrant sorting across firms with different union densities observed in the raw data is not driven by these characteristics. If anything, the negative relationship between worker power and immigrant sorting becomes even stronger once we condition on these key differences between union-majority and union-minority firms (Figure 3d).

The pattern of results shown in these figures provides strong suggestive evidence in support of the idea that worker power may play a key role in the allocation of immigrants to firms. Specifically, while union-majority and union-minority firms both had close to zero immigrants from the 2004 EU enlargements countries prior to the expansion, immigrants from these countries grew to represent close to six percent of the entire workforce in union-minority firms seven years after the reform, a number which is almost twice as large as that in union-majority firms. Moreover, we show that the degree of immigrant employment at the firm level develops almost linearly across baseline union density.

¹⁴Figure A.1b shows the the distribution of firms by their immigrant shares in 2003 (black line). This figure also shows the distribution of firms by their immigrant shares *if* immigrants had been randomly allocated across firms (gray line). The third distribution represents the distribution of firms by immigrant shares *if* immigrants were in their existing sectors, but randomly allocated across firms (dashed line). This figure provides a helpful illustration of the fact that immigrants gravitate towards certain firms and are over-represented at certain firms while they are underrepresented at other firms (relative to a random allocation).

Figure 3: Worker power and EU 2004 accession country immigrants



Notes: Figure (a) shows the distribution of firms by 2003 union share, with a dashed line indicating whether half the workers in a firm are union members. Figure (b) shows the share of workers at union minority and union majority firms who were born in the set of countries admitted to the European Union in 2004 as a result of their enlargement. Figure (c) complements (a) by showing the variation in union density across firms conditional on sector, firm size, and profitability. Figure (d) plots the 2003 share of workers in each firm against the 2011 firm-level share of workers from 2004 EU enlargement countries as well against the residualized union share, after controlling for sector fixed effects, firm size, and profitability. The levels in Figure (b) and (d) differ, because (b) assigns individual weights while (d) assigns firm weights.

To further understand this pattern of sorting, we study potential push and pull factors at the worker level. We already saw that firms with higher rates of union membership were more profitable. We also see that firms with more union representation pay higher wages in the baseline period (even when controlling for observable differences in workers) and employ more educated workers (Table A.1 and Table A.2). Moreover, Table A.2 suggests that, conditional on observable worker characteristics, immigrants get paid less at firms with weaker union representation. This highlights an important point: when immigrants are employed by firms with stronger union

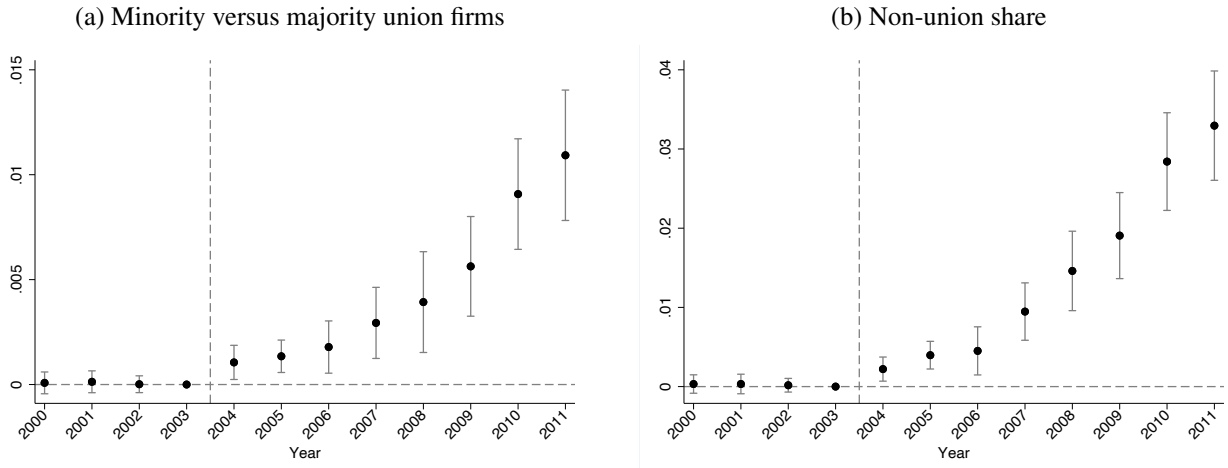
representation (conditional on observable characteristics), they get paid more. This makes firms with stronger union representation more attractive for the immigrant – but also makes immigrants less attractive to the employer. Further, because the wage gap between immigrants and natives is smaller in firms with stronger union representation, it is unlikely that these firms are discriminating against immigrants – at least not more than firms with weaker union representation. Given these differences, it would be surprising if immigrants themselves would prefer to work in firms with lower levels of union membership. We provide additional suggestive evidence of this through our survey results, which demonstrate that the workplace preferences of natives and immigrants are very similar to each other (Figure A.2). Instead, push-factors are much more likely to explain why immigrants enter firms with are less likely to enter firms with strong union representation. Still, if immigrants have worse outside opportunities in their home countries, it may still make sense for them to take up employment at the lower paying firms in Norway as a consequence of the worker power allocation rather than to return home (Roy, 1951; Borjas, 1987).

Next, we impose more structure on the relationship between worker power and EU 2004 workers, and causally estimate the effect of worker power on immigrant sorting using Equation 1. These results are provided in Figure 4 and provide clear evidence that worker power prevents firms from hiring new immigrants, pushing them to take up jobs at union-minority firms. This result holds whether we measure baseline worker power through a simple binary variable (Panel A) or if we exploit the entire spectrum of worker power through a continuous variable (Panel B). Interestingly, the event study results are very similar to the raw data results, even though the event studies condition on sector-by-year fixed effects. This suggests that sectoral sorting does not explain the pattern in the raw data. While we have more power and obtain similar results when relying on the continuous measure of union power, we prefer the binary measure of baseline union power for simplicity (Table A.4, columns 5-8).

We also probe the data for other drivers of immigrant sorting. We start with geography. If immigrants partly choose their municipality of work based on the availability of jobs, location is endogenous, and we would not want to control for it. If, however, the reason that people choose to work at a particular firm is because of the municipality they happen to move to for other reasons, then we would want to get rid of such variation. Moreover, since firms may operate in more than one municipality, adding municipality controls becomes more complex. Nevertheless, we find that the results remain largely unchanged when we include each firm’s primary municipality fixed-effects interacted with year fixed-effects (Table A.4). This tells us that, conditional on both sector-by-year and municipality-by-year, immigrants are sorting to firms with lower rates of union membership. We also study whether patterns of immigration in prior periods explain the sorting of immigrants to labor markets and firms following the 2004 EU enlargement. Since there were almost no immigrants from 2004 accession countries in Norway prior to 2004 (Figure A.3a), con-

tacts with prior immigrants from the same communities are unlikely to explain the later patterns of immigration (Figure A.3b). We also test for this more formally by using a shift-share instrument (Goldsmith-Pinkham et al., 2020). The results from this exercise show that despite their very low levels, the share of pre-2004 immigrants in local labor markets (defined by geography and sector) played a minor role in the very first waves of immigration after 2004. This is likely simply because the first waves of immigrants moved to cities. Nonetheless, later waves of immigrants quickly diffused throughout Norway (Figure A.4a) and baseline immigrant shares have little explanatory power over later moves. Finally, we study whether immigrants from 2004 accession countries sort into firms which simply had more contact with immigrants (from any country) prior to 2004. Again, our results show that while the very first waves of immigrants may have sorted into firms employing other immigrants, later waves of firms diffused into the economy more broadly (Figure A.4b).

Figure 4: Event study estimates of immigrant sorting by baseline levels of union membership



Notes: Figure (a) reports the difference in the share of workers from EU 2004 accession countries between firms with a minority versus majority of workers as union members in the baseline period year-by-year, following Equation 1. Figure (b) uses the same specification, but instead of classifying firms with a binary measure, it makes use of the full variation in baseline rates of union membership to study immigrant sorting. The results in Figure (b) in 2011 are the event study analog for Figure 3d.

Together, this pattern of results aligns well with the conceptual model in Section 3. Specifically, by increasing labor supply, augmenting worker competition, and putting downward pressure on wages, immigrants may be perceived as posing a direct threat to the ability of incumbents to maximize their own compensation. Incumbents will respond by trying to reduce the labor supply to the firm, thereby keeping wage compensation and other amenities at an artificially high level. The incumbent workers' ability to do so will be a direct function of the power they possess over the em-

ployer, something we measure through the local union density rate. This dynamic comes through not only in the canonical insider-outside model first conceptualized by Lindbeck and Snower more than four decades ago (Lindbeck and Snower, 1989, 2001), but by any theory whereby some firms experience higher turnover costs, whether due to split labor markets (Bonacich, 1972) or labor market segmentation (Kahn, 1975; Dickens and Lang, 1993). Taken together, these results imply that firms with little worker power are able to benefit from the inflow of new migrants as a means to augment their own production, while firms with a lot of worker power are constrained to do so.

6 Firm-Level Analysis

Section 5 demonstrates that worker power, as proxied by union density at the workplace, played a key role in allocating immigrants from the 2004 EU expansion across firms, with union-minority firms experiencing a substantially larger inflow of workers from the new accession countries.

The large labor supply shift generated by the EU enlargement in 2004 represents a positive shock to one of the key inputs in a firm's production process —labor. In addition, and perhaps more importantly, these workers represent a relatively cheap source of labor compared to native Norwegians. Specifically, Table A.3 shows that, conditional on firm and occupation, immigrants from these countries are five percentile ranks lower down in the 2011 national wage distribution compared to other workers with the same education level, age, and gender. To the extent that immigrants are pushed into lower-paid occupations than incumbent workers with similar educational levels and experience, this wage gap will be even larger. Supporting this possibility, Table A.5 suggests that despite being more educated, new immigrants enter lower paying occupations, are less likely to be managers, and receive lower hourly wages than other new workers. As such, firms with low levels of worker power who are able to take advantage of the new migration wave may be able to respond to the shock by adjusting their use of labor, changing the mix of inputs in the production process, see changes in productivity, potentially scale up their production, and even experience changes in profits. In addition, this differential ability to absorb the new wave of immigrants may provide firms with low levels of worker power a competitive advantage over more union-dense firms, allowing them to out-compete the more union-dense firms and capture larger parts of the markets.

To study how firms respond to the shift in labor supply as a function of the worker power they are exposed to, we rely on the empirical approach discussed in Section 5. Specifically, we use event studies and difference-in-differences designs to study firm effects across four margins of adjustment: labor usage (share of EU2004 workers, share of other immigrants, total number of workers, total number of worker hours, mean wages, and hourly wages), input substitutions and complementarities (materials, capital, machines, personnel cost, and revenues), production scale-

up and productivity (labor share of costs and revenues, mean worker fixed effects, revenue per worker hour), and outputs (profit, labor market share, product market share, board compensation, and firm survival).

Before presenting the core results from the firm-level analysis, we note that the labor supply shift may alter the composition of surviving firms in the market. This can affect the magnitude, significance, and interpretation of our findings. For all our results we, therefore, present point estimates from two separate specifications: one using the full sample and setting the outcome to zero in the event of firm exit (Panel A of each result table) and one that restrict the sample to surviving firms in the market (Panel B of each result table). While we primarily focus on the full sample analysis in this section, we discuss results from the restricted sample whenever they deviate from those based on the full sample.

6.1 Labor Usage

Our core findings from the labor usage analysis of firms are summarized in Table 1, showing the difference-in-differences estimates on the share of EU 2004 workers, share of other immigrants, total number of workers, total number of worker hours, mean wages, and hourly wages. The corresponding event studies are shown in Figure A.5 and demonstrate that there is no evidence of pre-treatment trends that differentially operate in treatment and control firms and that also are correlated with the outcomes in a way that risks biasing our results.¹⁵

Column (1) of Table 1 replicates the first-stage result discussed in the previous section, illustrating that union-minority firms are significantly more likely to absorb workers from the new EU countries. Specifically, in the previous section we saw that in 2011, roughly 3 percent of the workforce in union-minority firms were from the EU 2004 accession countries (Figure 3c). Column (1) of Table 1 shows that this is 1.1 percentage points more than in union-majority firms in the same sector. Column (2) shows that there is no concurrent increase in the relative extent to which union-minority firms employ other immigrant workers, suggesting the result in Column (1) is driven by the EU2004 labor supply shock. Moreover, this result illustrates that access to EU 2004 workers does not substitute for other immigrant workers. Rather, as Column (3) shows, the hiring of EU 2004 workers represents an overall expansion of the size of the firms. At the end of our sample period, union-minority firms are on average 9 percent larger than union-majority firms relative to their size in the base year. That said, as there are differential rates of firm survival (discussed below), the effect on firm size is driven partly by decreased exit among union-minority firms. When we restrict the sample to surviving firms, we see that firm size in union minority firms grew by

¹⁵In addition to reporting results from our main specification in which we split firms into two groups based on whether a minority or majority of their workers are union members at baseline, we also report estimates using the continuous measure of baseline union share in the Appendix (Table A.7, Panel A).

3.7 percent – and that about one third of this growth is due to new EU 2004 workers. The other two-thirds of firm growth comes from hiring additional native workers.

The above result implies substantial complementarity between natives and immigrants in the firm production process, and that access to the relatively cheaper EU 2004 labor removes a key labor restriction that enable firms to engage in a broad-based labor scale up. The notion of immigrant-native labor complementarity is a result which mirrors some of the prior literature on this topic (e.g. Beerli et al., 2021), and warrants further investigation. To this end, Appendix Table A.5 compares the new 2004 EU hires at the union minority firms with the new native hires at the same firms (conditional on sector). The table shows that the EU 2004 hires are on average older, more likely to be men, and more likely to hold a college degree (i.e., they appear positively selected), but less likely to be managers, more likely to work in lower paying occupations, earn less wages, and work more hours.¹⁶ This is in line with the predictions from a Roy model, whereby native workers with higher levels of skill self-select out of firms with weaker union representation (Roy, 1951), leaving lower-skilled natives in these firms. This also supports the idea that institutional factors prevent EU 2004 workers from reaching their potential. Instead, they provide a source of cheap labor and are under-placed to fill positions at lower quality firms. Our results suggest that these labor flows facilitate production scale-up, but that such scale-up efforts need to be complemented with additional native hires.

Column (4) of Table 1 shows that firms are not only hiring additional workers, but that they also are extending the number of hours that the employees work. As discussed above, this is driven by the EU 2004 workers being hired into contracts that require additional hours.

Lastly, Columns (5) and (6) examine the average cost of wages per worker and average hourly wages for workers, at union-minority firms relative to union-majority firms. Across both columns, we see a relatively large positive effect in response to the rapid inflow of EU 2004 workers. This result is surprising. However, when we limit our analysis to firms which survive through 2011 (Panel B of Table 1), the estimates are considerably smaller and no longer statistically significant. Nonetheless, theory would predict that a labor supply expansion generates downward wage pressure, leading to a reduction in average wages rather than to an increase in average wages.

In Appendix Table A.5, we show that the positive wage effect is not driven by the EU 2004 workers; they are hired into positions with wages that are far below those of their native colleges at the workplace. Rather, as we will show later, these effects are driven by three factors: (1) new native hires who complement lower cost immigrant labor, (2) incumbent workers who experience accelerated career ladder effects and see increased managerial responsibilities as well as wages

¹⁶This pattern is similar if we make the comparison between EU2004 new hires at union-minority firms and new hires at union majority firms (Appendix Table A.6). Specifically, new EU 2004 workers in minority firms are more likely to hold college degrees, but they are cheaper on all dimensions and fill relatively cheaper occupations.

in response to the inflow of EU 2004 immigrants, and (3) compensation to board members who extract a big share of the increased rents from the firm scale-up. (1) and (2) are indicative of the initial labor supply shift generating a subsequent labor demand shift for specific workers, and bear strong resemblance with the findings in Beerli et al. (2021). To the best of our knowledge, (3) is new to the literature.

When analyzing the overall labor responses to the immigrant supply shock in Norway, a consistent pattern emerges: firms with weak labor power take advantage of the newly-available high-quality but low-cost labor and absorb them into the workforce. The hiring of EU 2004 workers is accompanied by additional native hires, demonstrating the complementarity of native and immigrant workers in this setting and highlighting the broad-based scale-up that the the immigrant labor supply shock generated. Similar to Beerli et al. (2021), the large labor expansion at the lower end of the occupation distribution generates a subsequent labor demand shift higher up in the occupation ranking, leading to incumbent workers climbing the career ladder at a quicker pace and earning higher wages.

Table 1: Firm inputs: Union minority vs. union majority firms

	EU 2004 share	Share other immigrants	Employees	Firm man hours	Mean wages	Hourly wages
<i>Panel A: All firms</i>						
Union minority firm, 2011	0.011 (0.002)	-0.002 (0.003)	0.094 (0.021)	0.147 (0.049)	0.113 (0.019)	0.089 (0.025)
p-value	0.000	0.450	0.000	0.003	0.000	0.000
Firms	9,026	9,026	9,026	8,980	9,026	9,026
Observations	18,052	18,052	18,052	17,960	18,052	18,052
<i>Panel B: Limit to operational firms</i>						
Union minority firm, 2011	0.012 (0.002)	-0.005 (0.003)	0.037 (0.023)	0.094 (0.063)	0.056 (0.017)	0.023 (0.028)
p-value	0.000	0.090	0.114	0.136	0.001	0.412
Firms	6,608	6,608	6,608	6,589	6,608	6,608
Observations	13,216	13,216	13,216	13,178	13,216	13,216
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector X Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports differences-in-differences estimates of the effects of immigration on union minority versus union majority firms following the specification in Equation 2. For all outcomes, the end-line measure is from 2011, while the baseline measure is in 2003. Panel A shows results for the full population of firms in the estimation sample, with outcomes coded to zero when a firm is no longer operational. Panel B restricts the estimation sample to firms still operating in 2011.

6.2 Input Substitution and Complementarity

Our core findings from the input substitution and complementarities analysis of firms are summarized in Table 2, showing the difference-in-differences estimates on materials, capital, machines, personnel, and revenues. The corresponding event studies are shown in Figure A.6 and demonstrate that there is no evidence of pre-treatment trends that differentially operate in treatment and control areas and that also are correlated with the outcomes in a way that could risk bias our results. As before, estimates using a continuous measure of worker power are reported in Table A.7.

Table 2: Firm input substitutions and complementarities: Union minority vs. union majority firms

	Personnel	Materials	Capital	Machines	Revenue
<i>Panel A: All firms</i>					
Union minority firm, 2011	0.127	0.068	0.180	0.011	0.144
	(0.023)	(0.036)	(0.035)	(0.046)	(0.031)
p-value	0.000	0.058	0.000	0.813	0.000
Firms	9,026	9,026	9,026	9,026	9,026
Observations	18,052	18,052	18,052	18,052	18,052
<i>Panel B: Limit to operational firms</i>					
Union minority firm, 2011	0.055	-0.048	0.114	-0.050	0.062
	(0.023)	(0.044)	(0.039)	(0.062)	(0.033)
p-value	0.019	0.274	0.003	0.421	0.061
Firms	6,608	6,608	6,608	6,608	6,608
Observations	13,216	13,216	13,216	13,216	13,216
Firm FE	Yes	Yes	Yes	Yes	Yes
Sector X Year FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports differences-in-differences estimates of the effects of immigration on union minority versus union majority firms following the specification in Equation 2. For all outcomes, the end-line measure is from 2011, while the baseline measure is in 2003. Panel A shows results for the full population of firms in the estimation sample, with outcomes coded to zero when a firm is no longer operational. Panel B restricts the estimation sample to firms still operating in 2011.

Column (1) of Table 2 shows that total personnel costs are increasing in union-minority firms, an effect driven both by the hiring of additional workers and by an increase in the average wages of incumbent workers. Columns (2) and (3) show that this labor expansion is complemented with a somewhat smaller increase in spending on raw materials and a proportionate increase in capital spending. There is no effect on machine spending (Column 4). These results imply that the labor expansion generated by the EU 2004 workers induced a broad-based production scale-up across the firms' inputs, but that the shift in labor was greater than that in the other inputs (implying a certain degree of substitution, which we discuss below).

Column (5) of Table 2 demonstrates that the input expansion experienced by union-minority

firms induced a large increase in the sales revenue of these firms. At the end of the analysis period, sales revenue has increased by approximately the same percent as has spending on labor and capital.

Taken together, the results from this subsection highlights that union-minority firms are able to use the availability of EU 2004 workers as a means to expand and scale up their production, generating a large increase in overall revenues produced by these firms.

6.3 Production Scale-up and Productivity

To better understand the role of labor in the firm's scale-up process documented in the previous section, Table 3 shows the difference-in-differences estimates on the labor share of costs, the labor share of revenues, mean worker fixed effects, and revenue per worker hour. The corresponding event studies are shown in Figure A.6 and demonstrate that there is no evidence of pre-treatment trends that differentially operate in treatment and control areas and that also are correlated with the outcomes in a way that could risk bias our results.

Columns (1) and (2) of Table 3 show that labor is becoming increasingly important for the operation of firms both in terms of overall costs as well as revenues, though the labor share of revenues coefficient is relatively noisy. That is, even though the union-minority firms engage in a broad-based expansion across most key production inputs, the expansion of labor is greater than that of the other inputs. This implies that the union-minority firms are becoming more dependent on labor for their operations, highlighting that the immigrant labor supply shock may have removed certain labor restrictions that prevented the firms from reaching optimal input allocations in the pre period.

Column (3) shows that there is no effect on the mean worker fixed effect at union-minority firms, a variable calculated via the bias-adjusted AKM-approach detailed in Bonhomme et al. (2023). This implies that union-minority firms are not experiencing real productivity effects in response to the EU expansion, but also that they are not experiencing any productivity reductions (which could be the case if, for example, the new hires were of lower quality relative to the incumbents).

Finally, Columns (4) and (5) show that workers are putting in more hours at the firm, and that the revenue per worker hour is marginally increasing. This effect, however, is driven entirely by firm exit: once we condition on firm survival there is no impact on revenue per worker hour.

Table 3: Firm labor scale-up: Union minority vs. union majority firms

	Labor share of costs	Labor share of revenues	Mean worker FE	Hours per worker	Revenue per worker hour
<i>Panel A: All firms</i>					
Union minority firm, 2011	0.069 (0.014)	0.206 (0.446)	0.011 (0.014)	0.086 (0.016)	0.061 (0.033)
p-value	0.000	0.644	0.457	0.000	0.066
Firms	9,026	7,643	4,944	8,980	9,026
Observations	18,052	15,286	9,888	17,960	18,052
<i>Panel B: Limit to operational firms</i>					
Union minority firm, 2011	0.035 (0.011)	0.175 (0.597)	0.010 (0.015)	0.032 (0.015)	-0.052 (0.038)
p-value	0.002	0.769	0.491	0.035	0.174
Firms	6,608	5,620	4,679	6,589	6,608
Observations	13,216	11,240	9,358	13,178	13,216
Firm FE	Yes	Yes	Yes	Yes	Yes
Sector X Year FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports differences-in-differences estimates of the effects of immigration on union minority versus union majority firms following the specification in Equation 2. For all outcomes, the end-line measure is from 2011, while the baseline measure is in 2003. Panel A shows results for the full population of firms in the estimation sample, with outcomes coded to zero when a firm is no longer operational. Panel B restricts the estimation sample to firms still operating in 2011.

6.4 Outputs

So far, our analysis has focused on examining the impact of the labor supply shift on labor usage, input substitution, and production scale up. A key question that remains is to what extent the combination of these effects influence the output and end-line results of union-minority firms.

To this end, Table 4 shows the difference-in-differences estimates on profit, labor market share, product market share, board compensation, and firm survival. The corresponding event studies are shown in Figure A.7 and demonstrate that there is no evidence of pre-treatment trends that differentially operate in treatment and control areas and that also are correlated with the outcomes in a way that could risk bias our results.

Column (1) of Table 4 shows a positive but noisy effect on firm profits. The lack of a statistically significant effect could be due to the revenue expansion documented in the previous section, which puts downward pressure on output prices and involves an increase in price competition

among firms. This may prevent firms from converting the additional sales revenue into pure profits in the short-run.¹⁷

Columns (2) and (3) demonstrate that the scale-up of union-minority firms, both in terms of inputs and outputs, enable them to capture large shares of the markets; both on the product side as well as on the labor side. This is an interesting result, implying that union-minority firms may be able to acquire additional price-setting power in the long run, with important effects on labor market wage markdowns, product market price markups, and profits. On an aggregate level, however, this actually implies that certain aspects of the labor and product markets are becoming more competitive. Specifically, since union-minority firms are on average smaller, hire fewer workers, and produce less, their expansions generate a reduction in market concentration and power among the large firms.

Column (4) shows that the leadership at union-minority firms are able to reap some of the benefits from the production scale-up, enjoying a 4 percent increase in compensation relative to baseline. This is a large effect, and may help explain the lack of a profit effect in Column (1) as well (which is calculated net of board compensation).

Finally, column (5) examines firm survival as a consequence of the labor supply shock. This is an interesting outcome to examine as the competitive advantage that the migration-induced labor supply shock has afforded union-minority firms may have helped them out compete union-majority firms and therefore be more likely to remain in business. Looking at the results in Table 2, we see that firms with little worker power are able to utilize the labor supply shift as a means to remain in the market. This is consistent with our prior results on union-minority firms being able to capture larger parts of the markets.

Taken together, the results from our firm-level analysis paints a clear picture: Worker power prevents firms from being able to fully capitalize on labor supply shifts driven by new waves of migrants. As such, most of these workers are being pushed into lower-quality firms with greater employment uncertainty, lower wages, and lower levels of fringe benefits. However, dynamically, we see that these union-minority firms are able to scale up production in response to the labor supply shock, and that this scale up generates an increase in sales revenues, a weak suggestive increase in profits, and a clear change in the labor markets as well as product markets in which the firms operate. Interestingly, because the union-minority firms are smaller at baseline, the fact that they grow in size and occupy larger shares of the markets imply that the union-induced migrant sorting may generate more competitive markets.

¹⁷However, we also see increases in labor shares and product shares, suggesting an increase in price-setting power in the long run. Thus, profit effects may simply take a bit longer to show up in the data.

Table 4: Firm output: Union minority vs. union majority firms

	Profit	Labor market share	Product market share	Board compensation	Firm survival
<i>Panel A: All firms</i>					
Union minority firm, 2011	1.035	0.010	0.013	0.041	0.058
	(1.241)	(0.002)	(0.004)	(0.013)	(0.010)
p-value	0.405	0.000	0.003	0.001	0.000
Firms	9,026	9,026	9,026	9,026	9,026
Observations	18,052	18,052	18,052	18,052	18,052
<i>Panel B: Limit to operational firms</i>					
Union minority firm, 2011	1.504	0.003	-0.005	0.024	
	(1.738)	(0.002)	(0.004)	(0.017)	
p-value	0.387	0.072	0.188	0.146	
Firms	6,608	6,608	6,608	6,608	
Observations	13,216	13,216	13,216	13,216	
Firm FE	Yes	Yes	Yes	Yes	Yes
Sector X Year FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports differences-in-differences estimates of the effects of immigration on union minority versus union majority firms following the specification in Equation 2. For all outcomes, the end-line measure is from 2011, while the baseline measure is in 2003. Panel A shows results for the full population of firms in the estimation sample, with outcomes coded to zero when a firm is no longer operational. Panel B restricts the estimation sample to firms still operating in 2011.

7 Incumbent workers

In the prior sections of the paper, we show that the EU 2004 enlargement led to immigrants entering less unionized firms (Section 5) and that, as a result, firms with lower levels of union membership at baseline were able to expand their production and competitiveness (Section 6). In this section, we disaggregate the data to the individual worker level and examine the impact of this dynamic firm response on incumbent workers. To perform our analysis, we use the event-study approach and differences-in-differences design described in Section 5. The individual-level regressions in this subsection differ slightly from the firm-level regressions in that we now include individual and age fixed effects. In addition, since each individual had exactly one primary municipality of work in 2003, we can also include municipality-by-year indicators in our main specification.

Our core findings from the worker-level analysis are summarized in Table 5, showing the difference-in-differences estimates on income rank, employment, management responsibilities, and occupational rank. The corresponding event studies are shown in Figure A.9. Similar to

our firm-level results, the individual-level event studies broadly show no evidence of pre-treatment trends that differentially operate in treatment and control firms. The event studies also illustrate that there is a clear break in the flat pre-treatment trend in 2004, concurrent with the EU 2004 expansion. The only exception to this relate to the effect on management propensity among incumbent workers in union-minority firms. However, this trend is relatively small and in the opposite direction of the post-reform effect that we identify. In addition, there is a clear break in this pattern after 2004, providing strong evidence in favor of a causal effect on management probability in union-minority firms following the EU expansion.

Column (1) of Table 5 shows that workers at union-minority firms experience small but statistically significant wage growth in the years after EU enlargement: relative to incumbent workers who start out in union-majority firms, they move up half a percentile rank in the national wage distribution. Consistent with the idea of complementarity between incumbent workers and lower wage immigrant entrants, the wage effect coincides with incumbents shifting into management positions (column 3). Nonetheless, we are unable to detect that these workers move into higher paying occupations. This implies that the wage gains are coming from taking on additional management roles in their existing occupations (column 4).

While incumbent workers improve their incomes and shift into management, they also experience a slight increase in the probability of unemployment (column 4), perhaps due to increased competition with immigrants within their firms. However, this effect is not economically meaningful (0.1 percent). Interestingly, we see no statistically significant differences in effects across incumbent natives and incumbent immigrants (Table A.12). Given that we include individual fixed effects, this is perhaps unsurprising, as we control for any systematic difference between incumbent natives and immigrants in, for example, substitutability/complementarity with the new entrants. Further, while we saw that workers in union minority firms experienced significantly higher annual separation rates prior to 2004 (Table A.1, we find that in 2011, seven years after the EU expansion, there is no detectable effect on changing firms (Column 5). This suggests that the inflows of immigrant labor may have helped to stabilize employment in union minority firms.¹⁸

In terms of effect heterogeneity, we find that young incumbents, and incumbents with slightly lower wages, drive our results (A.13 and A.14). This is indicative of the labor supply shift of EU 2004 workers helping younger incumbents to fast-track through the career ladder and secure management roles sooner than they would have in the absence of the labor supply shift. For very senior incumbent workers with already high salaries, we do not see any statistically significant or economically meaningful effects.

¹⁸There are several factors that potentially can drive this reduction in separation rates in union-minority firms, some of which may involve the higher income and additional managerial responsibilities that incumbents experience, making them less likely to leave.

This paper is motivated by the idea that worker power can shape patterns of immigrant sorting, and thereby firm performance. In a final set of analyses, we flip this question around: how does exposure to immigrants shape the rates of union membership amongst incumbent workers? On one hand, incumbent workers at union minority firms are enjoying small but positive gains as a consequence of the EU enlargement event and the associated migrant sorting. On the other hand, they may experience an increase in the perceived threat posed by competition from immigrants. To examine this question, we estimate our individual-level regressions using union membership as the outcome variable of interest. Since union membership is a social phenomenon and may have spillovers within sectors and communities, we show results with and without sector-by-year and municipality-by-year fixed effects. The results are provided in Table A.11 and Figure A.10. The results illustrate that incumbent workers at union-minority firms become increasingly likely to join their local union in response to the firms increased exposure to, and utilization of, the new migrants. As in Tabellini (2020), the gifts of immigrants, therefore, generate incumbent backlash. We speculate that this effect could be caused by incumbents experiencing an increase in the perceived threat posed by competition from immigrants. Dynamically, this is an important finding. On one hand, it has the potential to improve working conditions in less unionized firms (Dodini et al., 2023b). On the other hand, firms may become less capable of adapting to future shocks to their production technology as the union density at the firm increases.

Table 5: Minority versus majority union firms

	Income rank	Employment	Manager	Occupation income rank	Change firms
Union minority firm, 2011	0.005 (0.002) [0.001]	-0.000 (0.000) [0.000]	0.023 (0.003) [0.002]	0.001 (0.002) [0.001]	0.020 (0.021) [0.004]
p-value firm clusters	0.021	0.166	0.000	0.794	0.354
p-value person clusters	0.000	0.192	0.000	0.528	0.000
Individual FE	Yes	Yes	Yes	Yes	Yes
Muni. X Year FE	Yes	Yes	Yes	Yes	Yes
Sector X Year FE	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes	Yes
Workers	137,052	137,052	137,052	132,916	137,052
Observations	274,104	274,104	274,104	265,833	274,104

Notes: This table reports differences-in-differences estimates of the effects of the effects of immigration on incumbent workers from union minority versus union majority firms following the specification in Equation 4. For all outcomes, the end-line measure is from 2011, while the base-line measure is in 2003. Standard errors from specifications with errors clustered at the firm level are shown in parentheses, while those from specifications with errors clustered at the individual level are shown in brackets. P-values from with both types of clustering are reported.

8 Market Structures and Institutional Features

So far, we have discussed the average effect of worker power in shaping the allocation of immigrants across firms, and the subsequent effect of this sorting behavior on firm performance and the careers of incumbent workers. However, these effects are likely to differ across market structures and firm characteristics, especially if those features influence workers' ability to bargain with employers or change the turnover costs that firms face. Understanding how the average effects we have identified above are influenced by market features and firm characteristics is imperative for disentangling the overall impact of worker power in immigrant integration, for developing a complete understanding of the dynamics of the effects we observe, and for thinking about these dynamics might play out in other settings. In this section, we will highlight three key features that appear particularly important for understanding such potentially heterogeneous behavior.

First, Figure 5a examines the effect of immigrant sorting between union-minority and union-majority firms across different industries. Interestingly, the figure demonstrates that the immigrant sorting behavior applies broadly across nearly all industries in the Norwegian economy, with the exception of construction. We interpret this result to imply that the effects we find likely represent general phenomenon not linked to a particular industry. This is perhaps expected, as the average

labor share of costs and revenues is relatively large across all industries, such that a change in the supply of labor has the potential to benefit a large share of firms irrespective of industry.¹⁹

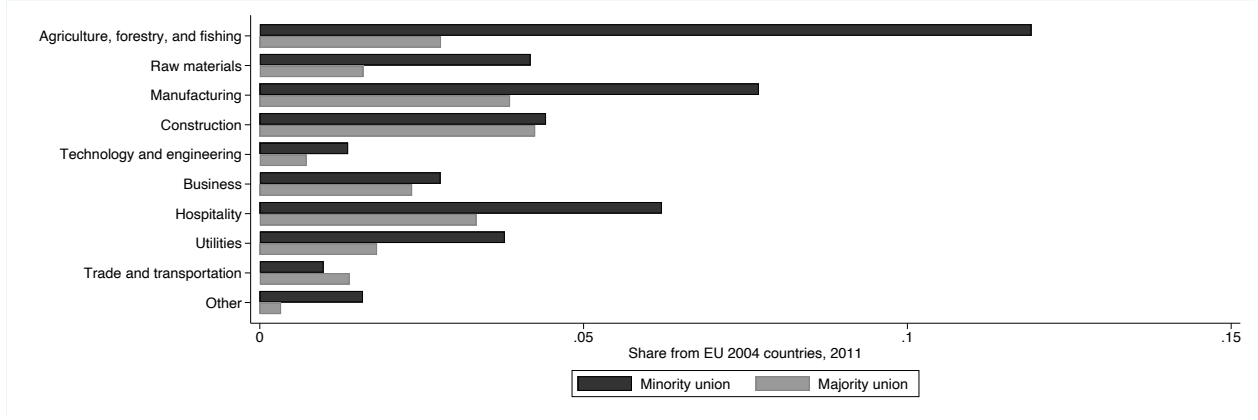
Second, Figure 5b looks at the effect of immigrant sorting between union-minority and union-majority firms across firms that differ in their dependence on labor within the same sector. The figure demonstrates that firms that are more labor intense are more likely to capitalize on the large labor supply shock of EU 2004 workers. This result is consistent with labor-dependent firms being able to benefit more from reductions in the cost of labor, and highlights an important dimension of effect heterogeneity that studies focusing on mean impacts miss.

Third, Figure 5c analyses whether the effects of immigrant sorting between union-minority and union-majority firms across firms differ depending on the size of the markets that they operate in. Interestingly, the results show a very small difference in the immigrant sorting behavior across union-minority and union-majority firms in large labor markets, while the effect is very large in smaller and more rural markets. This finding is consistent with larger markets being more competitive on average, such that there are fewer labor markdowns and less scope for unions to reallocate rents from firms to workers, as well as a larger pool of workers that firms have the ability to choose from. Relating this back to the conceptual framework in Section 2, this implies that the turnover costs that firms face is lower, and the bargaining power that unions hold is weaker, such that workers have less leverage in influencing the operation of, and the labor supply to, the firm. This result is consistent with recent work suggesting that firms are able to pay immigrants cheaper wages in less competitive markets where they exert monopsony power (e.g. Amior and Manning, 2020).

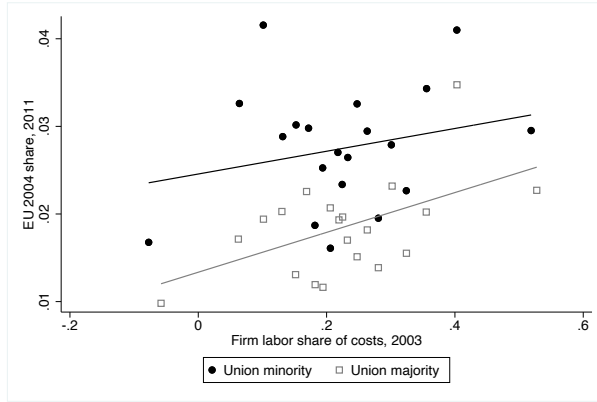
¹⁹Prior work has shown that after the enlargement of the European Union, new immigrants were most likely to work in construction (Bratsberg and Raaum, 2012). In general, we see this in the data as well. However, once we drop the smallest firms from our sample, this ceases to be the case. The deep penetration of immigrants into the construction sector in the broader population is also likely to explain why we see less sorting by firm type into construction in our sample.

Figure 5: Heterogeneity by firm characteristics

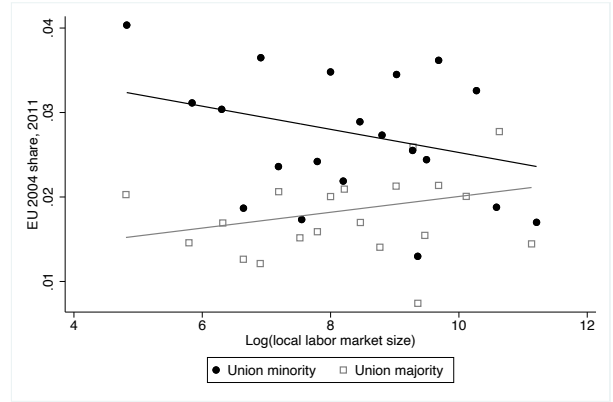
(a) 2011 EU-2004 immigrant shares by sector



(b) EU-2004 shares by baseline labor intensity-sector FE



(c) EU-2004 shares by labor market size-sector FE



Notes: Figure (a) shows differences in immigrant shares across sectors. Figure (b) shows differences by baseline labor share of costs, conditional on sector. Figure (c) shows differences based on local labor market size, conditional on sector. Local labor market size is simply measured as the log of the number of firms operating in that labor market.

Taken together, this section highlights that worker power plays a key role in allocating immigrants across firms. This phenomenon is not tied to a specific industry, but applies broadly to the entire economy. However, within industries, firms located in more rural areas, where firm competition is weaker and worker outside options are fewer, experience much stronger worker-induced immigrant sorting. In addition, firms with high labor shares of total cost are quicker to hire immigrants, but the role of worker power does not vary drastically across this dimension. Combined, this implies that the sorting effects are likely to be much stronger if the turnover costs of firms are high, or if the power that workers possess over firms is low. This aligns with the conceptual framework outlined in Section 2, and highlights that average effects – even within industries – may miss effect nuances with substantial policy implications.

9 Discussion

We study how two central features of modern labor markets —worker power and immigrant —interact to shape worker sorting, firm performance, and the labor market outcomes of incumbent workers. An important set of papers across the social sciences propose the idea that incumbent workers possess power in determining the employment patterns of new entrants to the labor market (Bonacich, 1972; Kahn, 1975; Dickens and Lang, 1993; Lindbeck and Snower, 1989, 2001). The basic idea common across these papers is that incumbent workers will attempt to constrain labor supply to the firm, thereby protecting their own position in the labor market and maximizing their compensation. Empirical work assessing how these dynamics play out in practice has been hindered by challenges in identifying worker power and disentangling the effects of worker power and firm behavior in the face of shifts in labor supply.

We focus on how the largest wave of immigration in the history of Norway shaped the landscape of competition between firms more and less constrained by worker power. We then use detailed administrative registries linking together measures of firms inputs and outcomes with worker-level data spanning more than a decade to understand how the sudden shock in immigration shaped the balance of power across firms, and its subsequent effects on workers.

Our analysis provides four key takeaways. First, we show that even though firms with greater worker power provide higher wages, better amenities, and more job security, new immigrants are considerably more likely to sort into firms with less worker power. This result aligns well with the canonical insider-outside model (Lindbeck and Snower, 1989, 2001), as well as with any theory whereby some firms experience higher turnover costs, whether due to split labor markets (Bonacich, 1972) or labor market segmentation (Kahn, 1975; Dickens and Lang, 1993). This implies that firms with little worker power are able to benefit from the inflow of new migrants while firms with more worker power are constrained to do so.

Second, we show that firms with lower rates of union density are able to capitalize on the labor supply shock by hiring more workers, investing in additional capital, scaling up their production, capturing greater market shares, and increasing their probability of surviving.

Third, we show that incumbent workers in these firms with less worker power also benefit from the labor supply shock, both experiencing wage increases as well as more rapid promotions into management positions. In terms of effect heterogeneity, we find that young incumbents, and incumbents with slightly lower wages, are driving our results. This is indicative of the labor supply inflow helping younger individuals to fast-track through the career ladder and reach the management level sooner than they would have in the absence of the labor supply shift.

Finally, we show that despite benefiting from the labor supply shift, incumbent workers in union-minority firms are more likely to themselves join the union in the future. We hypothesize that

this may be because they experience an increase in the perceived threat posed by competition from immigrants. Dynamically, this implies that these firms may become less capable of adapting to future shocks to their production technology in the future as the union density at the firm increases.

Our analysis advances several literatures. First, while a large literature spanning several decades has focused on how immigrants shape native employment and wages (e.g. Card, 1990; Borjas, 2003; Friedberg and Hunt, 2018), our results highlight the role of power-structures inside firms as a decisive channel in determining the winners and losers following shifts in labor market dynamics resulting from migration. In underscoring the role of power inside firms, our results provide the first firm-level evidence on the role of labor market institutions as factors shaping the effects of immigration (Foged et al., 2022; Bisin et al., 2011; Angrist and Kugler, 2003). We find that immigrant sorting to non-union firms is greatest in less competitive markets, in line with new research assessing the market-level determinants of immigrant wages (e.g. Amior and Manning, 2020; Naidu et al., 2016). In addition, while recent papers have begun to look at the effects of immigration on firms (e.g. Mahajan et al., 2024; Doran et al., 2022), our results help understand why some firms hire immigrants while others do not, and what the distributional effects of this are. We also build on the research focused on understanding the causes of immigrant-native wage gaps (e.g. Rooth, 2010; Oreopoulos, 2011; Alsan and Yang, 2022), highlighting a further driver of immigrant-native gaps in employment and wages – power structures within and across firms. Finally, beyond the literature on immigration, our results extend our understanding of why some firms are successful in adapting to changes in production technologies while others are not (e.g. Fontagné et al., 2023; Acemoglu and Restrepo, 2020; Harasztosi and Lindner, 2019).

Our findings raise important questions for future researchers. Can labor market institutions be designed to protect vulnerable workers without constraining the ability of firms to adapt to changes in production technology? And, equally important, how can collective bargaining institutions be developed to protect not just insiders, but also outsiders – those without a foothold in the labor market?

In terms of policy implications, our results show that migration shocks reduce the labor supply restrictions of firms and facilitate production scale-up. However, firms are differentially able to respond to these shocks as a function of the power that their incumbent workers possess, something that dramatically alters the competitive landscape among firms within the market. Not only does this provide important insights to the policy debates on immigrant integration and the mechanisms underlying the native-immigrant labor market gaps, but it also contributes important knowledge to our understanding of the interaction between labor market institutions and migration. Finally, these results can help policy-makers and academics predict and prepare for the dynamics of how future migration shocks can affect firms and their workers.

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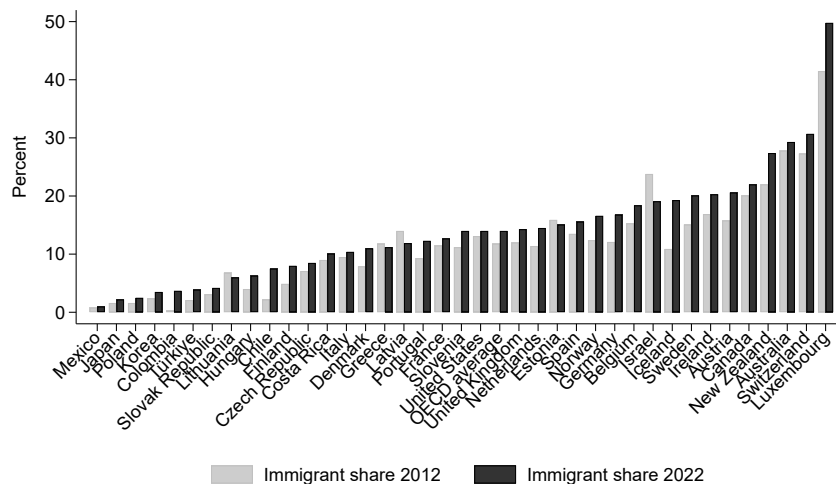
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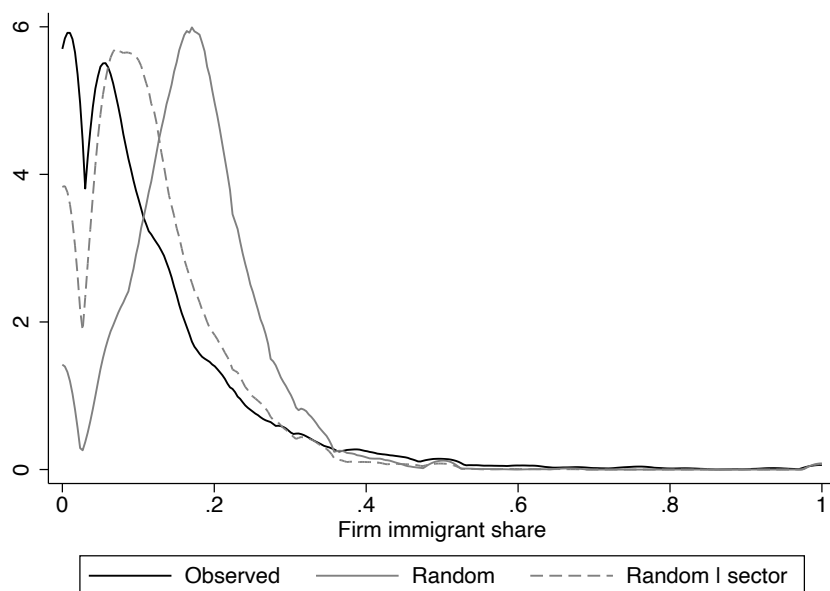
A Appendix Figures and Tables

Figure A.1: Immigrants in the workforce

(a) Immigrant share of workforce across OECD countries



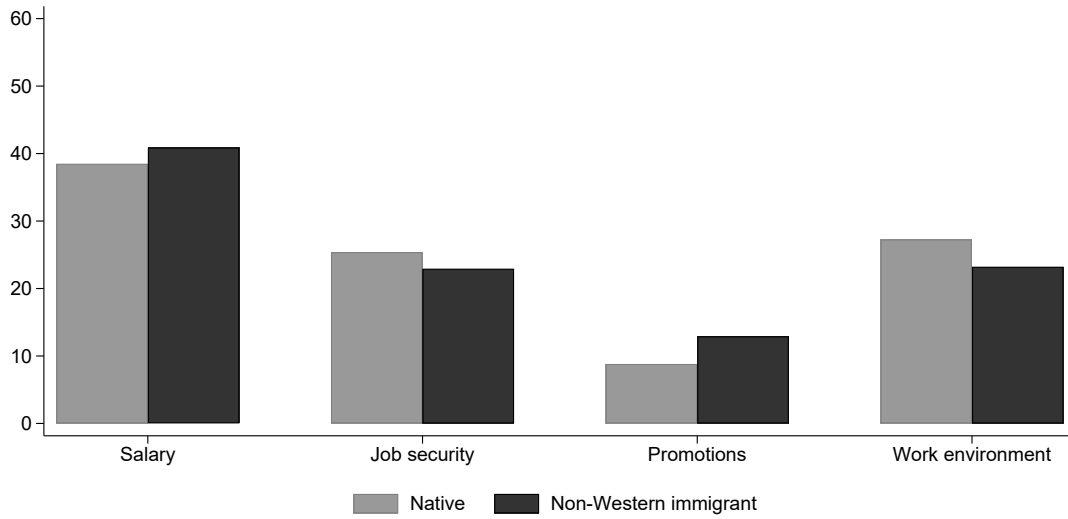
(b) Immigrant sorting into firms – Norway, 2003



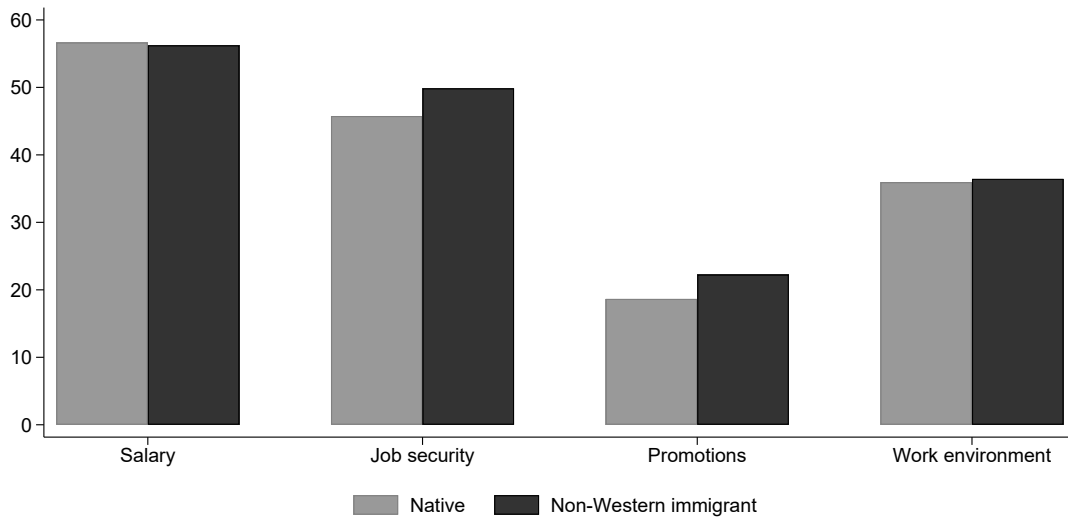
Notes: Figure (a) shows that the share of immigrants in the workforce has increased across nearly all OECD countries between the years 2012 and 2022. Data from OECD (2023). Figure (b) shows the distribution of firms by their immigrant shares in 2003 (black line). This distribution is complemented by the distribution of firms by their immigrant shares – if immigrants were randomly allocated across firms (gray line). The third distribution represents the distribution of firms by immigrant shares – if immigrants were in their existing sectors, but randomly allocated across firms (dashed line).

Figure A.2: Immigrant-native differences in values and perceptions

(a) How do workers value different workplace characteristics?



(b) To what extent do workers perceive unions as capable of improving job characteristics?

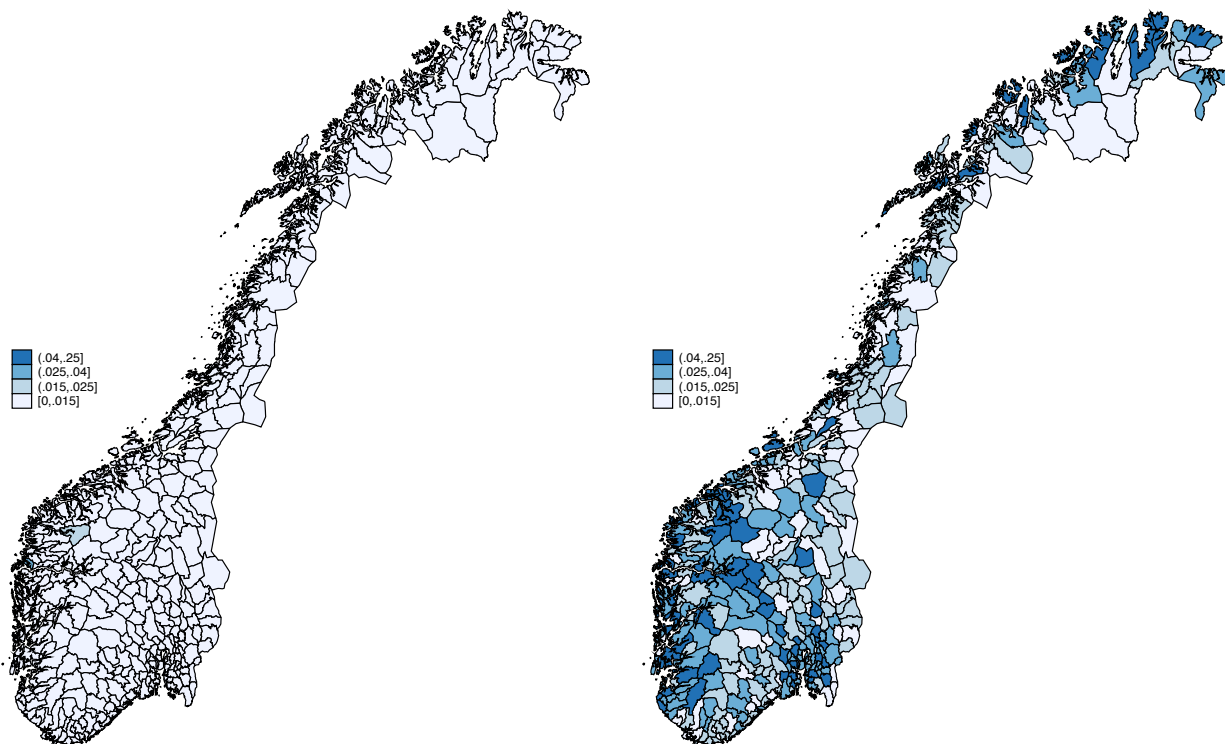


Notes: These figures show results from a survey conducted by Dodini et al. (2024). Figure (a) reports results from a survey question where respondents were asked to allocate one hundred units across four different dimensions of jobs based on how much they value each dimension. Figure (b) reports results from a survey question where respondents were asked to report the extent that they believe that unions are capable of affecting the same four dimensions of jobs: salary, job security, promotions, and work environment.

Figure A.3: Immigrants from 2004 European Union enlargement countries

(a) Share of working age population, 2003

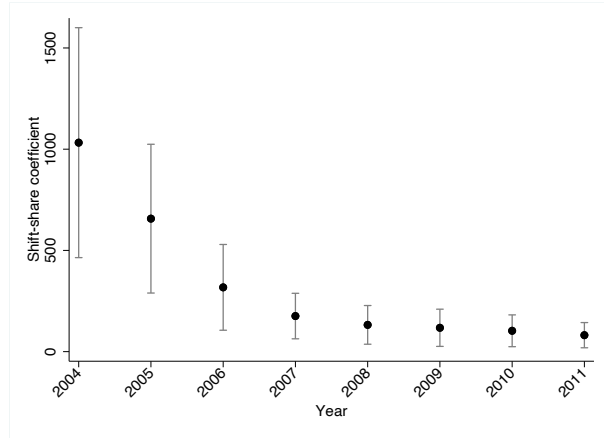
(b) Share of working age population, 2011



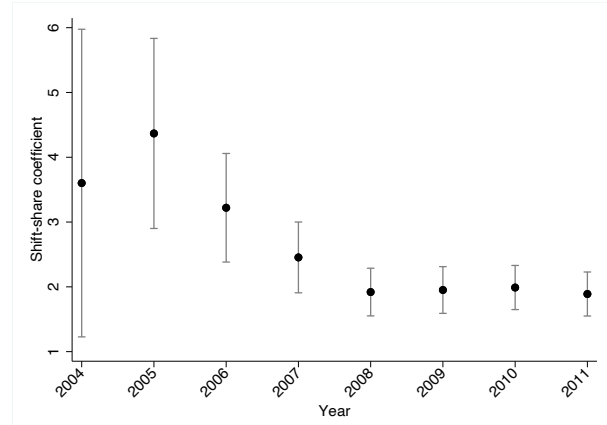
Notes: Figure (a) shows the 2003 share of the working age population made up by immigrants from countries included in the 2004 European Union enlargement. Figure (b) shows the 2011 share of the working age population made up by immigrants from countries included in the 2004 European Union enlargement. The four shades of blue correspond to equally sized quartiles of these shares in 2011.

Figure A.4: Shift-share estimates for the sorting of new immigrants into firms and local labor markets

(a) Based on pre-share of immigrants from EU 2004 countries in local labor markets

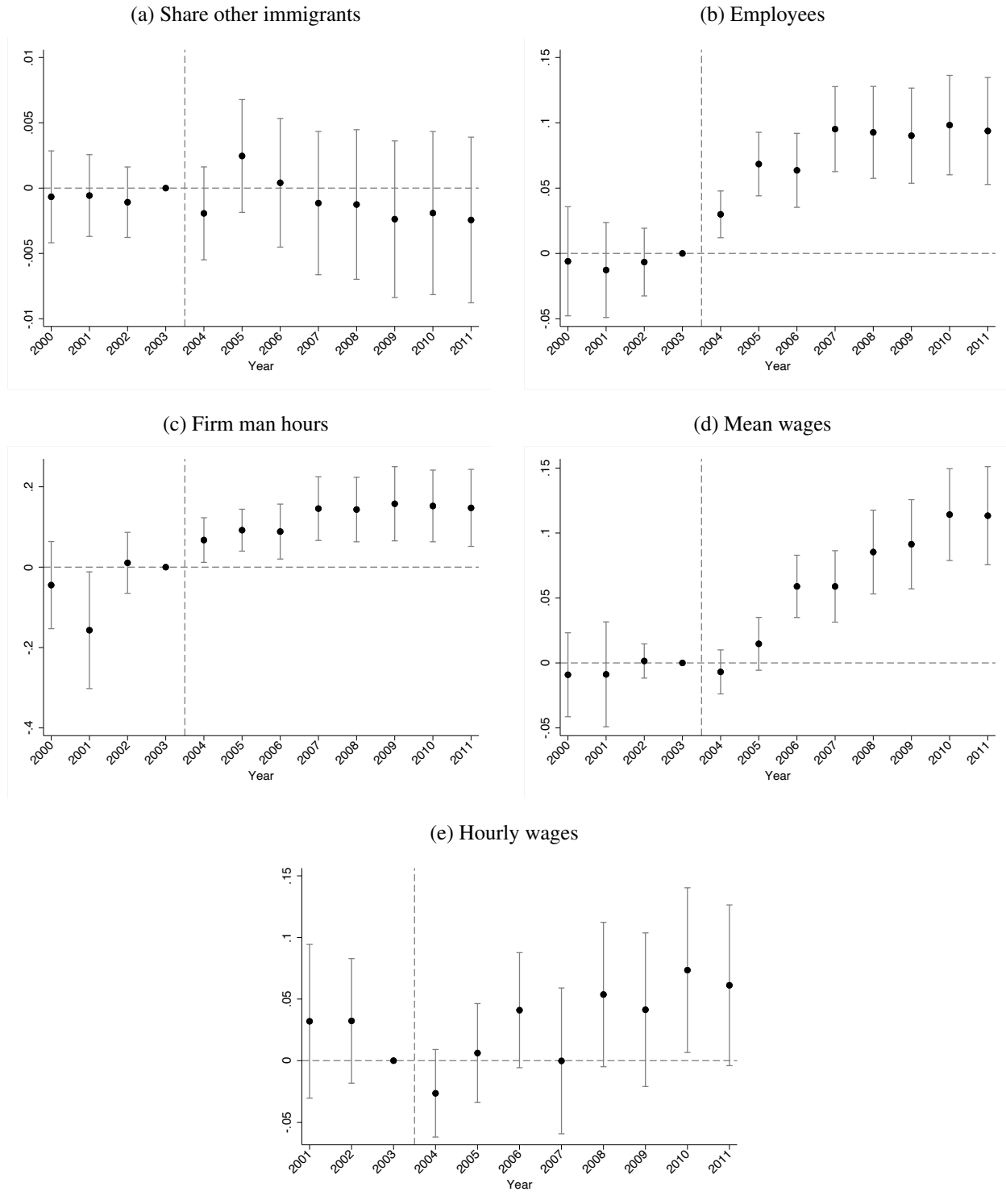


(b) Based on pre-shares of any immigrants in firms



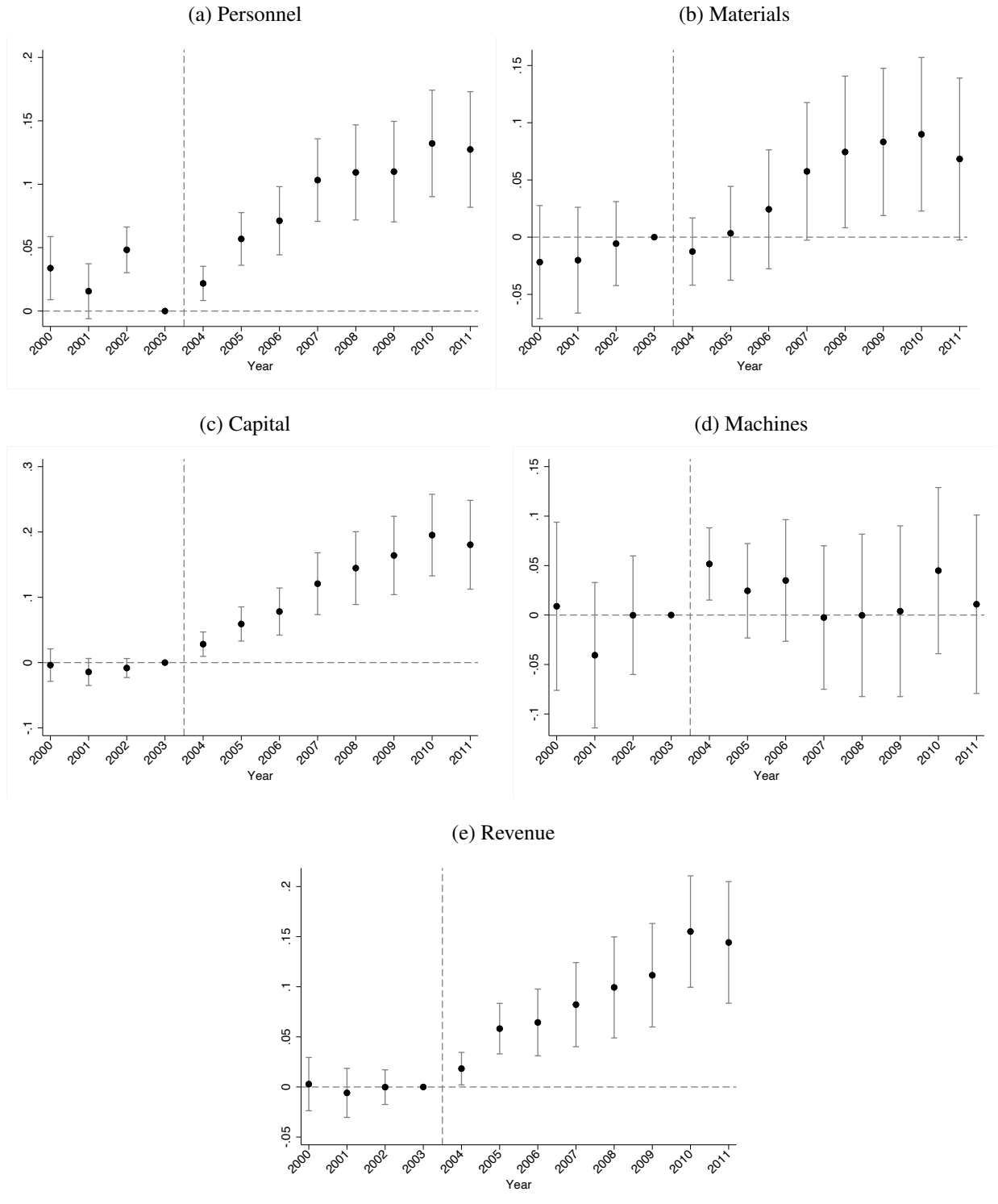
Notes: Figure (a) and (b) report event-study coefficients from regression equations which study how shares of immigrants in 2003 predict the sorting of immigrants from new EU enlargement countries after 2004 into local labor markets (a) and into firms (b). The "shift" in both specifications comes from the annual growth rate in immigrants from EU 2004 countries. The "shares" in Figure (a) are the share of immigrants from 2004 EU enlargement countries in two-digit occupation code by local labor market cells in 2003, while the "shares" in Figure (b) are the overall share of immigrants in each firm, also in the 2003. See Goldsmith-Pinkham et al. (2020) or Jaeger et al. (2018) for methodological discussions concerning the use of shift-share or "Bartik" style instruments.

Figure A.5: Firm input event studies: Minority versus majority firms



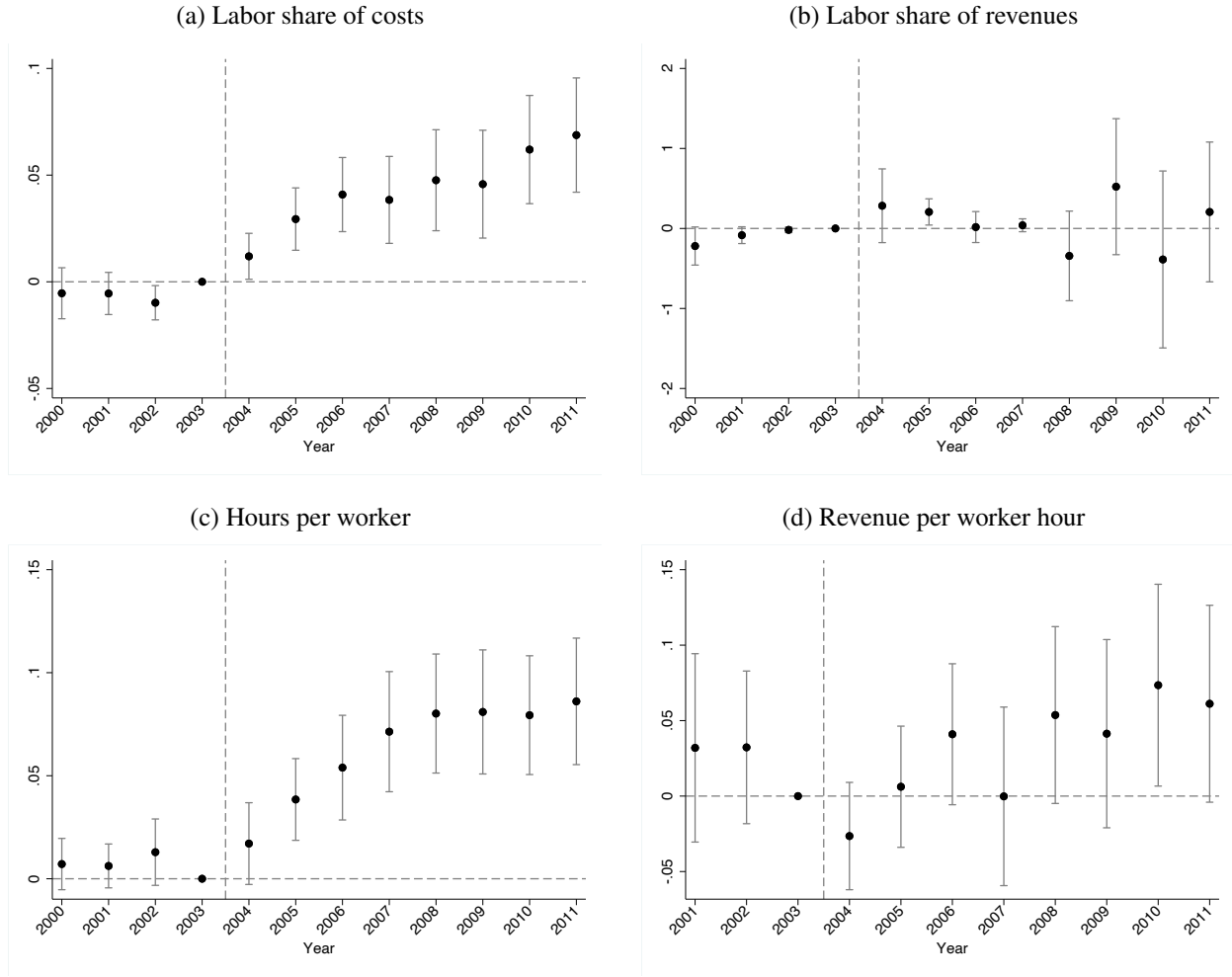
Notes: These figures report differences in the changes in firm inputs between firms with a minority versus majority of workers as union members in the baseline period year-by-year, following Equation 1. Firm inputs are measured as a percent of baseline, with firms no longer operating included in the sample but receiving the value zero.

Figure A.6: Firm input substitution and complementarity: Minority versus majority firms



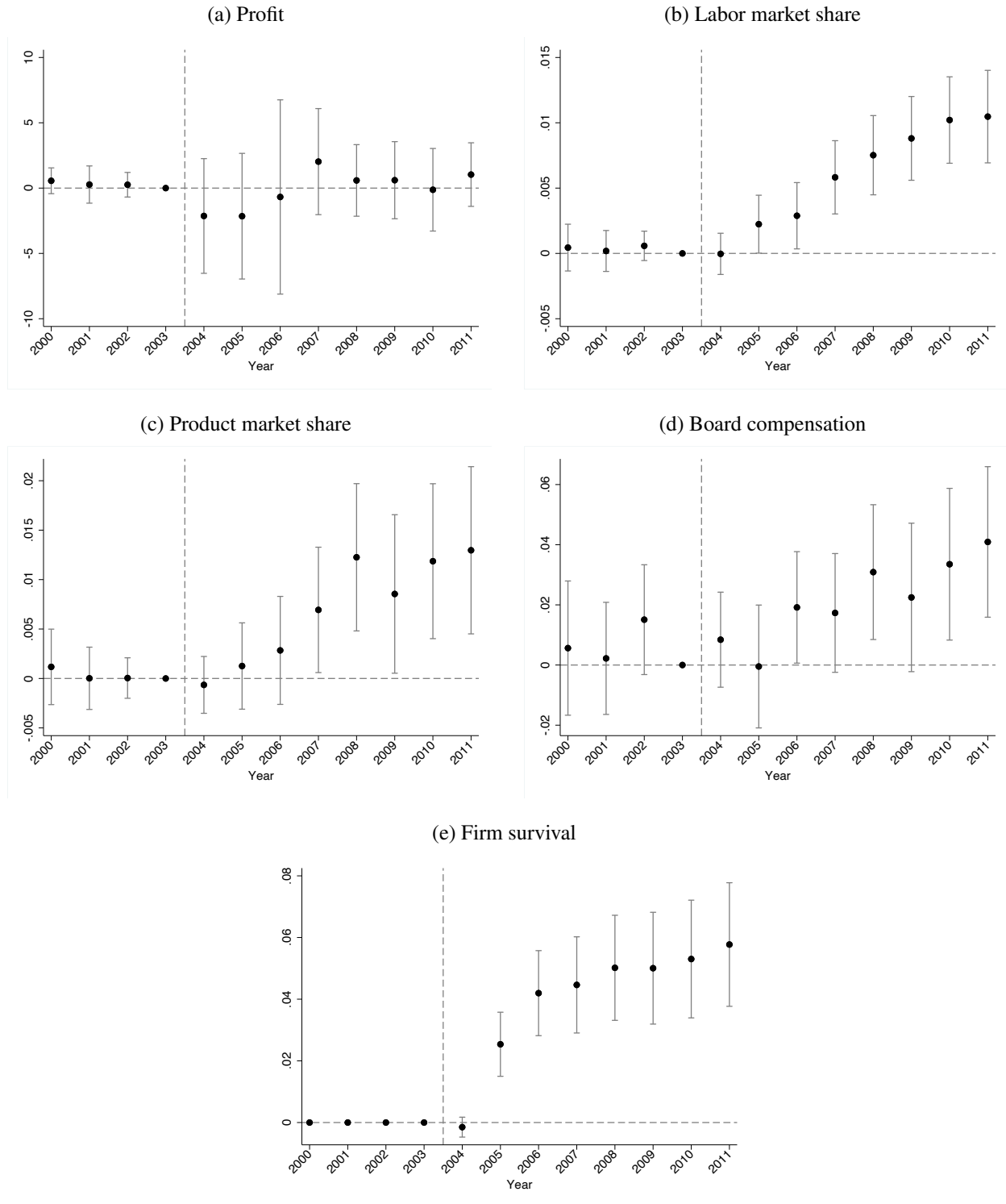
Notes: These figures report differences in the changes in firm inputs between firms with a minority versus majority of workers as union members in the baseline period year-by-year, following Equation 1. Firm inputs are measured as a percent of baseline, with firms no longer operating included in the sample but receiving the value zero.

Figure A.7: Firm labor scale-up: Minority versus majority firms



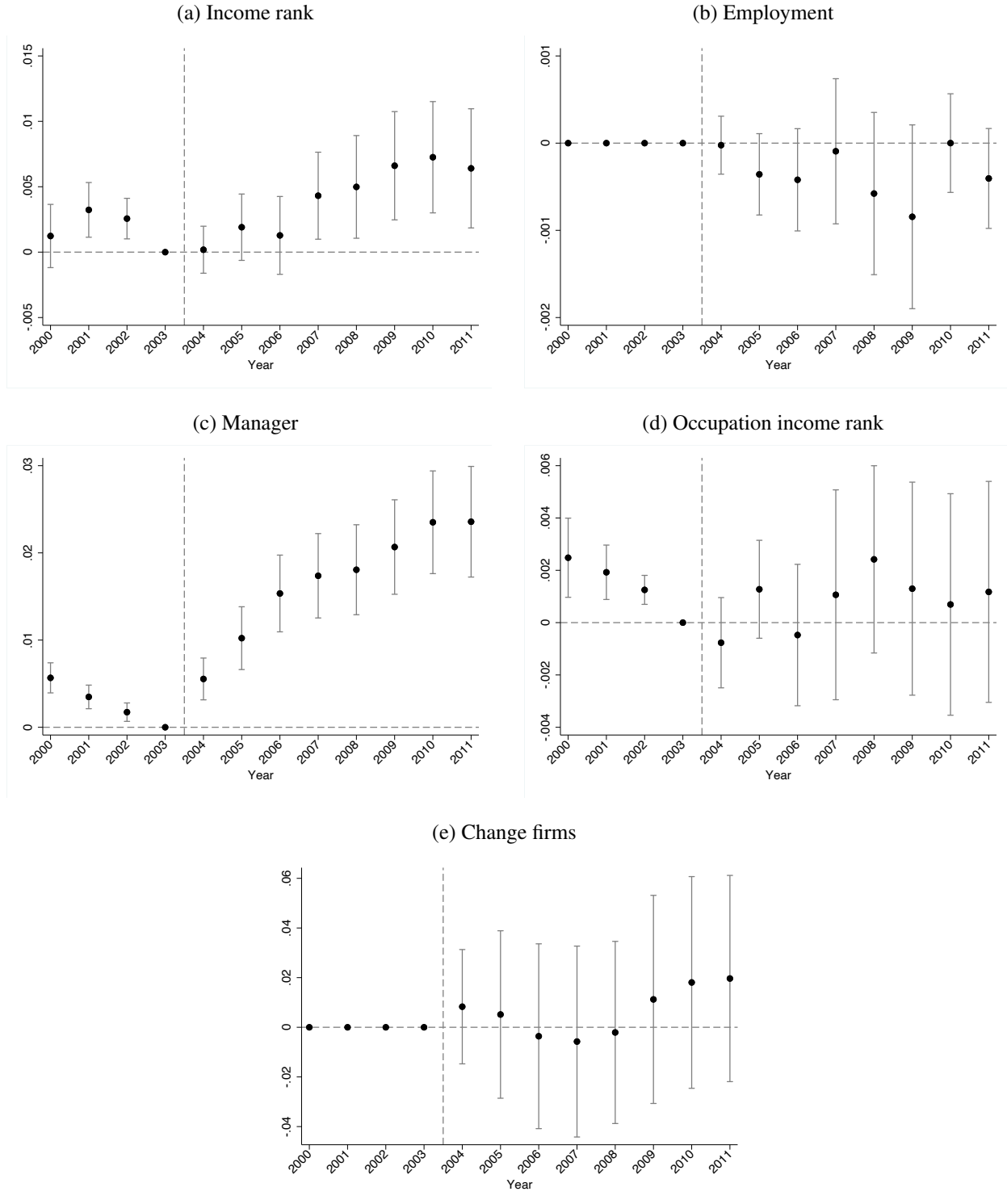
Notes: These figures report differences in the changes in firm inputs between firms with a minority versus majority of workers as union members in the baseline period year-by-year, following Equation 1. Firm inputs are measured as a percent of baseline, with firms no longer operating included in the sample but receiving the value zero..

Figure A.8: Firm output event studies: Minority versus majority firms



Notes: These figures report differences in the changes in firm outputs between firms with a minority versus majority of workers as union members in the baseline period year-by-year, following Equation 1. Firm outputs are measured as a percent of baseline, with firms no longer operating included in the sample but receiving the value zero.

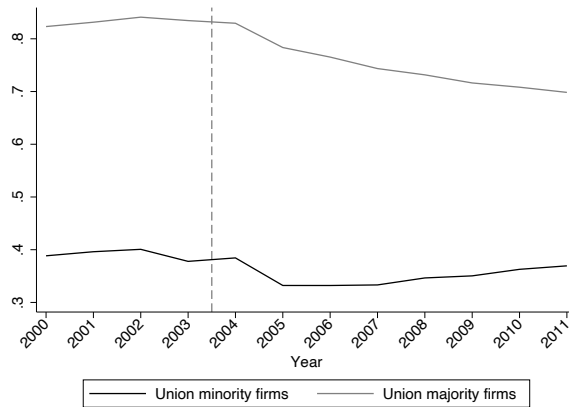
Figure A.9: Event studies - binary union instrument



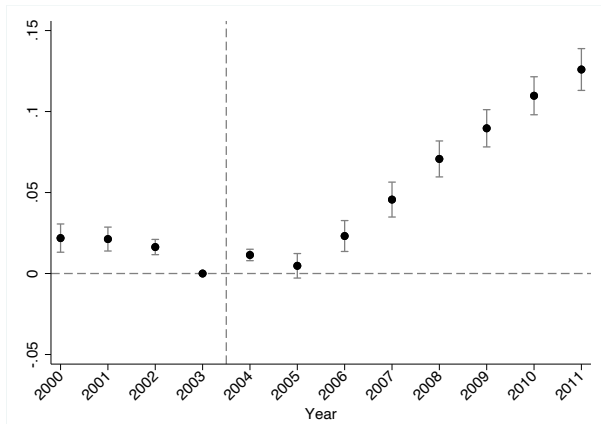
Notes: These figures report differences in the changes in worker outcomes between incumbent workers from firms with a minority versus majority of workers as union members in the baseline period year-by-year, following Equation 3.

Figure A.10: Effects of immigration on union membership

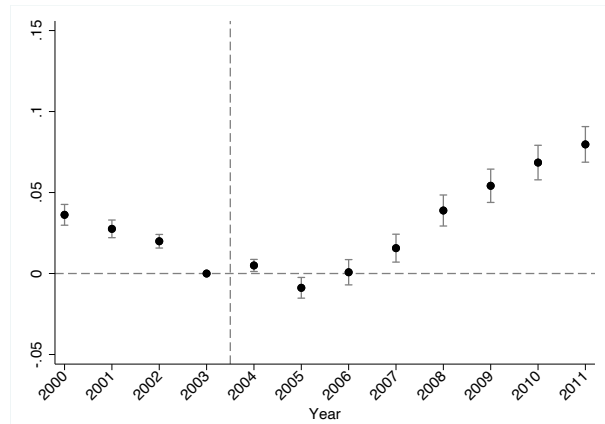
(a) Raw differences in union membership between firm type



(b) Simple event-study



(c) Fully interacted event-study



Notes: These figures show trends in union membership amongst incumbent workers in union minority and union majority firms. Figure (a) plots the raw data. Figure (b) estimates a simple event-study plot, without any controls besides firm effects. Figure (c) estimates an event-study with both sector-by-year and municipality-by-year, and, as in the main specification, with individual and age fixed effects.

Table A.1: Differences between union minority and union majority firms

	Union minority	Union majority	Difference	p-value
Panel A: <i>Firms</i>				
Firm size	41.18 (123.48)	84.71 (244.93)	-43.52	0.00
Profit	3,699.57 (66,145.65)	16,814.86 (544,655.41)	-13,115.30	0.12
Profit per worker	35.39 (524.16)	38.44 (410.32)	-3.05	0.75
Firm FE	-0.05 (0.16)	0.00 (0.14)	-0.05	0.00
Mean sector profit	5,828.21 (56,393.13)	13,688.85 (104,233.76)	-7,860.64	0.00
Mean wages	269.18 (548.88)	283.50 (329.68)	-14.32	0.12
Mean worker FE	-0.15 (0.47)	0.01 (0.35)	-0.17	0.00
Separation rate	0.06 (0.03)	0.04 (0.02)	0.02	0.00
Firms	4,110	5,041		
Panel B: <i>Workers</i>				
Immigrant	0.14 (0.34)	0.11 (0.32)	0.02	0.00
Income rank	0.58 (0.24)	0.70 (0.21)	-0.12	0.00
College degree	0.19 (0.39)	0.22 (0.41)	-0.03	0.00
Age	36.40 (12.12)	41.53 (11.46)	-5.13	0.00
Male	0.57 (0.50)	0.71 (0.45)	-0.14	0.00
Workers	94,970	266,936		

Notes: This table reports the mean and standard deviation of characteristics of firms and workers in our sample in 2003. The sample is restricted to firms which operated each year in the pre-period, had at least fifteen workers in the pre-period and are not in the public sector.

Table A.2: Difference in 2003 income rank based on firm type and immigrant status

	(1)	(2)	(3)
Minority union	-0.083 (0.000)	-0.064 (0.000)	-0.058 (0.000)
p-value	0.000	0.000	0.000
Minority union X immigrant	-0.047 (0.001)	-0.036 (0.001)	-0.032 (0.001)
p-value	0.000	0.000	0.000
Age-gender FE	Yes	Yes	Yes
Immigrant	Yes	Yes	Yes
Education FE	No	Yes	Yes
Occupation FE	No	No	Yes
Workers	452,646	452,646	439,216

Notes: This table reports the difference in income rank between workers from EU 2004 enlargement countries and other workers across all firms in 2011. All specifications control for age and gender non parametrically and include an indicator variable for immigrant status. Column (2) includes additional controls for one digit education groups. Column (3) includes further controls for occupational codes measured at the three-digit level.

Table A.3: Difference in 2011 income rank between immigrants from EU 2004 accession countries and other workers

	(1)	(2)	(3)	(4)	(5)
<i>Panel A: All firms</i>					
Immigrant	-0.127 (0.001)	-0.047 (0.001)	-0.088 (0.001)	-0.084 (0.001)	-0.057 (0.001)
p-value	0.000	0.000	0.000	0.000	0.000
Workers	897,798	897,798	596,210	540,589	505,086
<i>Panel B: Union minority firms</i>					
Immigrant	-0.127 (0.002)	-0.113 (0.002)	-0.071 (0.002)	-0.058 (0.002)	-0.039 (0.002)
p-value	0.000	0.000	0.000	0.000	0.000
Workers	70,172	70,172	66,560	70,126	66,522
<i>Panel C: Union majority firms</i>					
Immigrant	-0.174 (0.002)	-0.181 (0.002)	-0.112 (0.002)	-0.075 (0.002)	-0.053 (0.002)
p-value	0.000	0.000	0.000	0.000	0.000
Workers	145,946	145,946	141,797	145,896	141,752
Age-gender FE	Yes	Yes	Yes	Yes	Yes
Education FE	No	Yes	Yes	Yes	Yes
Occupation FE	No	No	Yes	No	Yes
Firm FE	No	No	No	Yes	Yes

Notes: This table reports the difference in income rank between workers from EU 2004 enlargement countries and other workers across all firms in 2011. All specifications control for age and gender non parametrically. Column (2) includes additional controls for one digit education groups. Column (3) includes further controls for occupational codes measured at the three-digit level. Column (4) replaces occupation codes with firm fixed effects. Column (5) includes both firm and occupation fixed effects, in addition to demographic and educational controls.

Table A.4: Immigrant sorting: sensitivity to specification, sample, and definitions

	Minority union				Non-union share			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Panel A: Worker share from EU 2004 countries, 2011</i>								
EU 2004 share	0.010 (0.001)	0.011 (0.002)	0.010 (0.002)	0.008 (0.002)	0.028 (0.003)	0.034 (0.004)	0.033 (0.003)	0.029 (0.004)
<i>Panel B: Worker share from EU 2004 countries, 2011 - surviving firms</i>								
EU 2004 share	0.013 (0.002)	0.011 (0.002)	0.011 (0.002)	0.008 (0.002)	0.036 (0.004)	0.037 (0.005)	0.037 (0.005)	0.032 (0.005)
<i>Panel C: Worker share from EU 2004 countries, 2011 - of baseline size</i>								
EU 2004 share	0.010 (0.007)	0.011 (0.007)	0.011 (0.006)	0.004 (0.008)	0.037 (0.018)	0.047 (0.017)	0.047 (0.017)	0.028 (0.023)
Year	Yes				Yes			
Sector by year		Yes	Yes	Yes		Yes	Yes	Yes
Firm			Yes	Yes			Yes	Yes
Muni. by year				Yes				Yes

Notes: This table reports differences-in-differences estimates of how workers sort into different firms after the 2004 enlargement of the European Union, based on the baseline share of workers at each firm who are union members. Columns (1)-(4) split firms into two categories, minority union and majority union and report the relative difference in EU 2004 immigrant shares in 2011. Columns (5)-(8) report estimates from a specification taking advantage of a continuous measure of baseline union membership rates at each firm. Columns (1) and (5) include only year fixed effects. Columns (2) and (6) include sector by year fixed effects. Columns (3) and (7) correspond to those in our main results and include sector by year as well as firm fixed effects. Columns (4) and (8) include both sector by year as well as municipality by year fixed effects in addition to firm fixed effects. Panel A includes the full set of firms in our estimation sample, and defines the share (between zero and one) of immigrants from EU 2004 accession countries based on firm size in 2011. Panel B is otherwise similar to Panel A, but restricts the sample to firms still operating in 2011. Panel C defines the worker share from EU 2004 accession countries based on firm size at baseline; since firms can grow or shrink, these outcomes are no longer restricted to the range between zero and one.

Table A.5: Comparing new workers from EU 2004 enlargement countries to other new workers in union minority firms

	Mean for other new workers	Difference EU 2004 - other	p-value
Age	31.70	0.91 (0.14)	0.00
Male	0.52	0.03 (0.01)	0.00
College degree	0.23	0.06 (0.01)	0.00
Manager	0.04	-0.03 (0.00)	0.00
Occupation income rank	0.49	-0.01 (0.00)	0.00
Hourly wage	213.53	-12.05 (3.26)	0.00
Hours worked	28.41	2.55 (0.13)	0.00
Income rank	0.47	0.03 (0.00)	0.00
Controls		Firm FE	
Workers	109,939	7,193	

Notes: This table reports differences between new workers from EU 2004 enlargement countries and other new workers in union minority firms using data from 2011 and a regression specification with firm fixed effects.

Table A.6: Comparing new workers in union minority firms from EU 2004 enlargement countries to new workers in union majority firms

	Mean for new workers in other firms	Difference between EU 2004 in union minority - other	p-value
Age	36.38	-2.98 (0.15)	0.00
Male	0.59	-0.06 (0.01)	0.00
College degree	0.29	0.06 (0.01)	0.00
Manager	0.05	-0.03 (0.00)	0.00
Occupation income rank	0.56	-0.04 (0.00)	0.00
Hourly wage	247.59	-28.83 (2.72)	0.00
Hours worked	32.21	-0.48 (0.11)	0.00
Income rank	0.58	-0.06 (0.00)	0.00
Controls		Sector FE	
Workers	255,268	7,193	

Notes: This table reports differences between new workers from EU 2004 enlargement countries in union minority firms and new workers in union majority firms using data from 2011 and a regression specification with sector fixed effects.

Table A.7: Firm outcomes, 2011 – union share instrument

<i>Panel A: Firm inputs</i>					
	Share other immigrants	Employees	Firm man hours	Mean wages	Hourly wages
Non-union share	-0.002 (0.007)	0.319 (0.046)	0.532 (0.136)	0.387 (0.044)	0.306 (0.059)
p-value	0.776	0.000	0.000	0.000	0.000
Firms	9,026	9,026	8,980	9,026	9,026
Observations	18,052	18,052	17,960	18,052	18,052
<i>Panel B: Input substitution and complementarity</i>					
	Materials	Capital	Machines	Total personnel costs	Revenue
Non-union share	0.267 (0.079)	0.536 (0.077)	0.068 (0.105)	0.440 (0.051)	0.490 (0.067)
p-value	0.001	0.000	0.519	0.000	0.000
Firms	9,026	9,026	9,026	9,026	9,026
Observations	18,052	18,052	18,052	18,052	18,052
<i>Panel C: Labor scale up</i>					
	Labor share of costs	Labor share of revenues	Mean worker FE	Hours per worker	Revenue per worker hour
Non-union share	0.247 (0.031)	0.420 (1.319)	0.052 (0.035)	0.282 (0.038)	0.191 (0.077)
p-value	0.000	0.750	0.135	0.000	0.013
Firms	9,026	7,643	4,944	8,980	9,026
Observations	18,052	15,286	9,888	17,960	18,052
<i>Panel D: Firm output</i>					
	Profit	Labor market share	Product market share	Board compensation	Firm survival
Non-union share	1.093 (2.091)	0.039 (0.005)	0.052 (0.011)	0.131 (0.029)	0.205 (0.024)
p-value	0.601	0.000	0.000	0.000	0.000
Firms	9,026	9,026	9,026	9,026	9,026
Observations	18,052	18,052	18,052	18,052	18,052
Firm FE	Yes	Yes	Yes	Yes	Yes
Sector X Year FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports differences-in-differences estimates of the effects of immigration on firms based on the baseline share of union membership following the specification in Equation 2. For all outcomes, the end-line measure is from 2011, while the baseline measure is in 2003. All estimates are for the full population of firms in the estimation sample, with outcomes coded to zero when a firm is no longer operational. See Table A.4 for effects on EU 2004 share.

Table A.8: Firm outcomes, 2011 – union share instrument (surviving firms only)

<i>Panel A: Firm inputs</i>					
	Share other immigrants	Employees	Firm man hours	Mean wages	Hourly wages
Non-union share	-0.014 (0.007)	0.117 (0.051)	0.363 (0.181)	0.182 (0.038)	0.065 (0.068)
p-value	0.053	0.023	0.045	0.000	0.341
Firms	6,608	6,608	6,589	6,608	6,608
Observations	13,216	13,216	13,178	13,216	13,216
<i>Panel B: Input substitution and complementarity</i>					
	Materials	Capital	Machines	Total personnel costs	Revenue
Non-union share	-0.115 (0.098)	0.290 (0.089)	-0.115 (0.145)	0.191 (0.052)	0.199 (0.072)
p-value	0.242	0.001	0.427	0.000	0.006
Firms	6,608	6,608	6,608	6,608	6,608
Observations	13,216	13,216	13,216	13,216	13,216
<i>Panel C: Labor scale up</i>					
	Labor share of costs	Labor share of revenues	Mean worker FE	Hours per worker	Revenue per worker hour
Non-union share	0.132 (0.025)	0.132 (1.832)	0.054 (0.036)	0.082 (0.038)	-0.219 (0.092)
p-value	0.000	0.942	0.128	0.032	0.017
Firms	6,608	5,620	4,679	6,589	6,608
Observations	13,216	11,240	9,358	13,178	13,216
<i>Panel D: Firm output</i>					
	Profit	Labor market share	Product market share	Board compensation	Firm survival
Non-union share	1.973 (2.934)	0.014 (0.005)	-0.009 (0.010)	0.090 (0.038)	0.000 (0.000)
p-value	0.501	0.002	0.352	0.018	.
Firms	6,608	6,608	6,608	6,608	6,608
Observations	13,216	13,216	13,216	13,216	13,216
Firm FE	Yes	Yes	Yes	Yes	Yes
Sector X Year FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports differences-in-differences estimates of the effects of immigration on firms based on the baseline share of union membership following the specification in Equation 2. For all outcomes, the end-line measure is from 2011, while the baseline measure is in 2003. All estimates are for the only for firms which survive through the year 2011. See Table A.4 for effects on EU 2004 share.

Table A.9: Effects on incumbent workers - binary union split without individual FE

	Income rank	Employment	Manager	Occupation income rank	Change firms
Union minority firm, 2011	0.007 (0.002)	-0.000 (0.000)	0.027 (0.003)	0.001 (0.002)	0.038 (0.022)
p-value	0.002	0.184	0.000	0.711	0.090
Individual FE					
Muni. X Year FE	Yes	Yes	Yes	Yes	Yes
Sector X Year FE	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes	Yes
Workers	158,658	158,658	158,658	156,338	158,658
Observations	317,317	317,317	317,317	312,677	317,317

Notes: This table reports differences-in-differences estimates of the effects of the effects of immigration on incumbent workers from union minority versus union majority firms following the specification in Equation 4. For all outcomes, the end-line measure is from 2011, while the base-line measure is in 2003. Standard errors from specifications with errors clustered at the firm level.

Table A.10: Effects on incumbent workers - union share with individual FE

	Income rank	Employment	Manager	Occupation income rank	Change firms
<i>Panel A: With individual fixed effect</i>					
Non-union share, 2011	0.018 (0.005)	-0.001 (0.001)	0.059 (0.006)	0.005 (0.005)	0.038 (0.022)
p-value	0.001	0.130	0.000	0.307	0.090
Individual FE	Yes	Yes	Yes	Yes	Yes
Muni. X Year FE	Yes	Yes	Yes	Yes	Yes
Sector X Year FE	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes	Yes
Workers	137,052	137,052	137,052	132,916	158,658
Observations	274,104	274,104	274,104	265,833	317,317
<i>Panel B: Without individual fixed effect</i>					
Non-union share, 2011	0.023 (0.005)	-0.001 (0.001)	0.068 (0.006)	0.009 (0.005)	0.040 (0.052)
p-value	0.000	0.144	0.000	0.095	0.436
Individual FE					
Muni. X Year FE	Yes	Yes	Yes	Yes	Yes
Sector X Year FE	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes	Yes
Workers	158,658	158,658	158,658	156,338	158,658
Observations	317,317	317,317	317,317	312,677	317,317

Notes: This table reports differences-in-differences estimates of the effects of the effects of immigration on incumbent workers from union minority versus union majority firms following the specification in Equation 4. For all outcomes, the end-line measure is from 2011, while the base-line measure is in 2003. Standard errors from specifications with errors clustered at the firm level.

Table A.11: Effects of immigration on union membership

	(1)	(2)	(2)	(4)
Union minority firm, 2011	0.117 (0.006) [0.003]	0.090 (0.006) [0.004]	0.105 (0.006) [0.004]	0.081 (0.006) [0.004]
p-value firm clusters	0.000	0.000	0.000	0.000
p-value person clusters	0.000	0.000	0.000	0.000
Individual FE	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes
Muni. X Year FE		Yes		Yes
Sector X Year FE			Yes	Yes
Workers	156,522	137,052	156,522	137,052
Observations	313,045	274,104	313,045	274,104

Notes: This table reports estimates of the differential effects of immigrant inflows on incumbent workers later union membership in minority union and majority union firms, as classified at baseline. Specification (1) includes age and individual FE. Specification (2) adds additional FE for municipality-by-year interactions. Specification (3) adds additional FE for sector-by-year interactions. Specification (4) includes both interacted sets of fixed effects simultaneously.

Table A.12: Minority versus majority union firms – immigrants versus natives

	Income rank	Employment	Manager	Occupation income rank	Change firms
Natives	0.005 (0.002)	-0.000 (0.000)	0.024 (0.003)	0.001 (0.002)	0.018 (0.021)
Immigrants	0.009 (0.005)	-0.000 (0.001)	0.013 (0.008)	-0.005 (0.004)	0.032 (0.026)
p-value difference (firm)	0.422	0.941	0.154	0.054	0.353
p-value difference (person)	0.342	0.943	0.162	0.024	0.205
Individual FE	Yes	Yes	Yes	Yes	Yes
Muni. X Year FE	Yes	Yes	Yes	Yes	Yes
Sector X Year FE	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes	Yes
Workers	137,052	137,052	137,052	132,916	137,052
Observations	274,104	274,104	274,104	265,833	274,104

Notes: This table reports heterogeneity in the differences-in-differences estimates of the effects of the effects of immigration on incumbent workers from union minority versus union majority firms following the specification in Equation 4. For all outcomes, the end-line measure is from 2011, while the baseline measure is in 2003. P-values, both with individual and firm level clustering, for the difference in the effects for the two groups are reported.

Table A.13: Minority versus majority union firms – old versus young

	Income rank	Employment	Manager	Occupation income rank	Change firms
Young	0.004 (0.002)	-0.000 (0.000)	0.028 (0.004)	0.003 (0.002)	0.031 (0.021)
Old	0.012 (0.004)	-0.001 (0.001)	0.002 (0.007)	-0.010 (0.003)	-0.036 (0.031)
p-value difference (firm)	0.055	0.688	0.001	0.000	0.006
p-value difference (person)	0.002	0.685	0.000	0.000	0.000
Individual FE	Yes	Yes	Yes	Yes	Yes
Muni. X Year FE	Yes	Yes	Yes	Yes	Yes
Sector X Year FE	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes	Yes
Workers	137,052	137,052	137,052	132,916	137,052
Observations	274,104	274,104	274,104	265,833	274,104

Notes: This table reports heterogeneity in the differences-in-differences estimates of the effects of the effects of immigration on incumbent workers from union minority versus union majority firms following the specification in Equation 4. For all outcomes, the end-line measure is from 2011, while the baseline measure is in 2003. P-values, both with individual and firm level clustering, for the difference in the effects for the two groups are reported.

Table A.14: Minority versus majority union firms – higher wage versus lower wage

	Income rank	Employment	Manager	Occupation income rank	Change firms
Low/middle wage	0.010 (0.003)	-0.001 (0.000)	0.015 (0.003)	0.005 (0.003)	0.031 (0.021)
High wage	-0.009 (0.003)	0.000 (0.000)	0.044 (0.006)	-0.006 (0.003)	-0.036 (0.031)
p-value difference (firm)	0.000	0.065	0.000	0.024	0.006
p-value difference (person)	0.000	0.081	0.000	0.000	0.000
Individual FE	Yes	Yes	Yes	Yes	Yes
Muni. X Year FE	Yes	Yes	Yes	Yes	Yes
Sector X Year FE	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes	Yes
Workers	137,052	137,052	137,052	132,916	137,052
Observations	274,104	274,104	274,104	265,833	274,104

Notes: This table reports heterogeneity in the differences-in-differences estimates of the effects of the effects of immigration on incumbent workers from union minority versus union majority firms following the specification in Equation 4. For all outcomes, the end-line measure is from 2011, while the baseline measure is in 2003. P-values, both with individual and firm level clustering, for the difference in the effects for the two groups are reported.

Table A.15: Simulated firm and worker outcomes under different patterns of sorting

Observed	Immigrants enter firms with equal likelihood	Immigrants enter union majority firms
<i>Panel A:</i> Revenue share: Minority versus majority union firms		
0.215	0.201	0.189
<i>Panel B:</i> Gap in income rank: minority and majority firm workers		
-0.034	-0.039	-0.044
<i>Panel C:</i> Gap in income rank: EU 2004 and other workers		
-0.037	-0.035	-0.033

Notes: This table compares observed firm and worker outcomes to those generated by simulations whereby immigrants enter all firms in our estimation sample with equal likelihood, and whereby the pattern of sorting is reversed and immigrants enter firms with higher shares of union members. We report three key parameters for each of these scenarios. Panel A reports the share of total revenues generated by minority union firms. Panel B reports the difference in income rank between workers in minority and majority firms. Panel C reports the difference in income ranks of new immigrants and other workers.