DISCUSSION PAPER SERIES

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ABSTRACT

Labour Immigration and Union Strength*

To what extent is labour mobility in the European Union a threat to the strength of unions? We argue that the combination of cheap labour, workforce heterogeneity, and low unionization among labour immigrants' is a potential challenge for unions. The challenge will be particularly severe if immigrant competition affects natives' propensity to unionize. We examine this claim using Norwegian administrative data in a natural experiment framework. The 2004 EU expansion led to a rapid increase in labour migration to the construction sector. Licensing demands, however, protected some workers from immigrant competition. Comparisons of protected and exposed workers reveal negative labour market effects of the EU expansion for exposed workers, but no effect on union membership. Our results question important theories of unionization and are relevant for research on immigration, political behaviour and collective action.

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1 Introduction

Migration of labour across countries can be a major force of change. Like international trade, it can create winners and losers, disrupt local and sectoral labour markets, and change domestic institutions. The impact of globalization on domestic institutions was a vibrant research area in the late 1990s (e.g. Rodrik 1997; Garrett 1998) and has re-emerged with the intensification of international trade (Busemeyer 2009) and the liberalization of labour mobility within the European Union (Afonso and Devitt 2016). The consequences of high supply of cheap labour (King and Rueda 2008), earnings inequality (McCarty, Poole, and Rosenthal 2006), and the dualization or segmentation of the labour market (Emmenegger and Careja 2012; Alt and Iversen 2017), are current political economy topics related to the consequences of labour migration. The same is true for topics in political behaviour (Colantone and Stanig 2018; Finseraas, Røed, and Schøne 2017).

The impact on trade unions takes a center-stage position in the debates on the consequences of labour migration. Although considered to be in decline, trade unions are still important agents in the political economy of many European countries. Norway, the case we study in this paper, is an important case in this context.[1] Unions and employer organizations are centralized at the national level, where coordinated wage bargaining determines wage growth intervals. Consultations between unions, employers, and the government on labour market relevant issues are frequent, and it is politically difficult for the government to oppose agreements from previous tripartite consultations. This institutional model has been characterized as a stabile, institutional equilibrium with support across the political spectrum. Indeed, some argue that this equilibrium is of key importance for the economic success of the Scandinavian economies (Barth, Moene, and Willumsen 2014).[2]

To what extent is labour migration a threat to the institutional equilibrium in the labour market? While the benefits from immigration has the potential to be net positive

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[1]See Barth, Moene, and Willumsen (2014) for an introduction to the Scandinavian model.

[2]See Acemoglu, Robinson, and Verdier (2012) for a more critical view of the Scandinavian model. There is also a large comparative political science literature on the political economy consequences of unions and wage bargaining (see e.g. Korpi 2006).

in aggregate, the net benefit will be reduced or reversed if immigration has negative effects on well-functioning institutions in the receiving country.[3] The rapid increase in labour immigration to Norway over the last decades, in particular since the 2004 EU expansion, has raised concerns regarding the future of this model.[4] These concerns are not raised only by the unions. Employer organizations and conservative politicians have also voiced concerns, which reflects the broad political support for the model.[5] Norway has a strong regulation of the labour market, which according to many observers should make our case less susceptible to the disruptive effects of labour mobility (see discussion in Afonso and Devitt 2016). Still, we document that some of the concerns are real, as labour immigration has had important economic effects on parts of the Norwegian labour market. This finding, combined with the rich data sources we apply, allows for a novel analysis of the impact of labour migration on unions. With this background, we study the impact of labour immigration on the collective organization of workers. More specifically, we examine whether immigrant competition influences natives' propensity to unionize. If so, immigrant competition will represent a particularly important concern for unions.

The concerns build on two theoretical models of union organization. The most prominent model of why workers join unions–so-called social custom theory–highlights the importance of the behavior of co-workers (Booth 1985; Naylor and Cripps 1993; Visser 2002). Unionization is a social act and your propensity to join a union strongly depends on whether co-workers are union members. As we document below, immigrants are less likely to unionize, which implies that natives should become less likely to unionize when immigrants enter the sector. A second type of models emphasize the importance of union strength as an incentive to unionize. The willingness of workers to pay their membership fee should at the margin be influenced by whether they believe that the union can improve their situation on the labour market. Union density is one indicator of union strength,

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[3]See Borjas (2015) for a discussion.

[4]Trade union density has fallen significantly in many OECD-countries over the last decades. As an average for OECD it has fallen from approximately 41 per cent in 1990 to 30 per cent in 2015. In Norway, trade union density is generally higher and the reduction has been smaller; from 58 per cent in 1990 to 52 per cent in 2015 (OECD 2016), however, the decline varies across industries.

[5]See e.g. the speech by Gerd Kristiansen (2014), then leader of the Norwegian Confederation of Trade Unions (LO), quotes from Svein Oppegaard (VG 2011) of the Confederation of Norwegian Enterprise (NHO), and quotes from Michael Tetzschner (Dagbladet 2011) of the Conservative party.

and is correlated with the existence of several types of pro-labour policies (e.g. Korpi 2006). Moreover, the ability of unions to get their wage demands accepted will be related to the pool of non-unionized workers (Wallerstein 1989). Thus, falling density due to immigration weakens both social and instrumental incentives to unionize. We elaborate on these points below, but also discuss the counterargument that increasing risk of income loss from immigrant competition strengthens incentives to unionize.

In order to identify the empirical effect of immigration on union density, we study the consequences of immigration to the Norwegian construction sector due to the EU expansion in 2004. The EU expansion led to a rapid increase in labour immigration from (in particular) Poland, Lithuania, and Latvia. We exploit that some vocational educations in the construction sector are essentially protected from labour immigration due to licensing demands. These licensing demands are tied to vocational educations. Using individual level, population wide register data we show that inflows of immigrants to different trades in the construction sector are strongly related to licensing demands. We can therefore construct treatment and comparison groups of workers in the same sector to identify the impacts of immigrant competition.

We conduct two types of analyses to study the effects of immigrant competition. First we follow workers with and without licensing protection before and after the 2004 EU expansion. To estimate the effect we rely on a differences-in-differences design and an instrumental variables approach. In these analyses we include individual job-spell fixed effects, which implies that we identify the effect of competition from variation within individuals' job spells. Thus, we capture what happens to those who remain in their job, but we miss the effects on those who change jobs or exit the labour market. In the second type of analysis we therefore identify the complete population of workers employed in the construction sector in 2003–the year prior to the EU expansion–and follow these workers year-by-year until 2013. This "starting-line" analysis provides dynamic and total effects of immigrant competition (Foegd and Peri 2016). Together, we provide a rich picture of how native workers were affected by the increase in labour immigration.

Our results show that the immigrant supply shock had negative effects on the earnings

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growth and the probability of employment for workers who were not protected by licensing demands. We find no evidence of falling union membership among workers who remained in the labour market. Neither do we find that the supply shock changed the propensity to unionize among workers entering the construction sector. Our results suggest that although unions should be concerned about low organizing among labour immigrants, immigrant competition is not a key reason for the decline of union membership. We elaborate on these points in the conclusion and relate them to the broader literature on diversity and collective action.

2 Immigration and Union Density

We emphasize two potential effects of immigration on natives' union membership. First, trades that experience an influx of immigrants tend to experience falling union density because immigrants are less likely to organize (see Table 1 and Figure 2 below). There are economic and cultural reasons for immigrants' reluctancy to join unions.[6] Irrespective of the reasons, lower unionization rates among immigrants implies that native workers exposed to immigrant competition will have a higher share of non-unionized co-workers. A large literature, building on Akerlof (1980), emphasizes the importance of organized co-workers to explain the decision to join a trade union.[7] When a large share of co-workers are union members, the social motive for joining the union is strong and free-riding has a reputation effect. Importantly, shocks to union density will be persistent and even reinforce over time, and can thus change institutional equilibria. The social motive for joining unions has empirical support, as workers typically highlight social reasons as important for why they joined a union (Visser 2002, 406). Thus, the weakening of the social norm or custom of unionization might influence natives' propensity to unionize.

A related sociological argument emphasizes the potential negative impact of workforce diversity on collective action (e.g. Korpi and Shalev 1979). This argument, particularly prevalent in the U.S. literature on unions (Ferguson 2016), can be traced back to Marx,

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[6]See Cools, Finseraas, and Rasmussen (2018) for an analysis of the Norwegian immigrant-native gap in unionization.

[7]See Booth (1985) and Naylor and Cripps (1993) for theoretical contributions, and Visser (2002) and Ibsen et al. (2017) for empirical applications.

who discussed the negative impact of Irish, Catholic workers on the organization of the British working class (e.g. Afonso and Devitt 2016, 4). As King and Rueda (2008) discuss, the prevalence of cheap labour can increase the saliency of ethnic identities in place of occupation identities, thereby threatening collective action at the workplace. A range of different mechanisms can explain why collective action becomes more difficult. Communication problems, preference diversity, distrust, or prejudice, are mechanisms that are often emphasised in the related research on the challenges of ethnic diversity (e.g. Alesina and La Ferrara 2000, 2002; Alesina, Glaeser, and Sacerdote 2001).

Second, the decline in union density can weaken instrumental incentives to unionize. While the social motive is important for joining a union, we expect instrumental motives to matter as well. Unions provide social insurance and equalize risks. On the margin, the willingness to pay the membership fee is likely to be a function of the expected material benefits from being a union member. Strong labour unions have been able to implement social insurance and labor market regulation, which is often considered to be to the benefit of labour (e.g. Korpi 2006). In this literature, falling union density is interpreted as a decline in union strength (Korpi and Shalev 1979; Garrett and Lange 1986). Since the ability to influence employers and policies is a function of organizational strength, declining density will weaken workers' incentive to unionize. Moreover, the power of unions in wage bargaining will depend on the share of the work force they represent (Wallerstein 1989; Ahlquist 2017). Labour immigrants that do not organize therefore weaken union strength and thereby native workers' instrumental incentive to unionize. Thus, the social and instrumental incentives might reinforce each other, if, as often argued, workforce heterogeneity is as an obstacle to worker unity and union organization (Korpi and Shalev 1979; King and Rueda 2008).

While arguments just discussed dominate in the literature, there is a potential case to made for a positive effect of immigration on the instrumental incentives to unionize. Immigration constitutes a labour supply shock for workers with similar skills as the immigrants. In textbook models of labour markets, an increase in supply will (in the short run) reduce the relative earnings of workers with similar skills (Borjas 2003), and can poten-

tially increase the risk of unemployment (Dustmann, Schönberg, and Stuhler 2017).[8] For a given level of union strength, labour market competition might therefore improve the instrumental incentives to unionize, as higher risk of income loss makes workers more willing to pay the membership fee to receive the insurance that unions provide (Blanchflower et al. 1990).[9]

The argument of positive effects of competition on union membership is, however, controversial both theoretically and empirically. When competition for jobs is fierce, unions might be perceived as less effective, and their demands to employers will be less credible (Ashenfelter and Pencavel 1969). Simply put, when unemployment is increasing, employers are dealt better hands. Moreover, unions in the Norwegian construction sector are so called "open shop" unions, which means that wage agreements cover all employees in firms that are covered by a tariff agreement.[10] Since there is no discrimination between union members and non-members on this account, the open shop model weakens the importance of instrumental incentives for being a union member. The empirical evidence in favour of this argument is also weak, as a recent review of the empirical literature concludes that union density tends to be pro-cyclical, that is, it falls when unemployment increases (Schnabel 2013). Similarly, Schnabel and Wagner (2005, 16) use individual level panel data from Germany and finds no relationship between previous unemployment experiences and the propensity to be a union member.

The empirical literature on the effect of immigration on union density is relatively small. The main reason for this is the scarcity of good individual level data on union membership. Studies from the US tend to find negative effects of immigration and ethnic diversity on union density (e.g. Ferguson 2016, but see Burgoon et al. 2010), while the cross-national literature produces divergent correlations (compare e.g. Brady 2007 and Lee 2005). However, most of this literature lacks research designs to disentangle the effect of immigration from correlated factors. Antón, Böheim, and Winter-Ebmer (2016) is

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[8]Negative wage effects of immigrant competition have been empirically identified in the Norwegian labour market (Bratsberg and Raaum 2012; Bratsberg et al. 2014; Finseraas, Røed, and Schøne 2017).

[9]Fall in absolute wages will work in the opposite direction if demand for union protection is a normal good. However, in line with the labour economics literature, we argue that immigration influences relative, not absolute, wages.

[10]See the Appendix for a brief description of the wage-negotiations regime.

the paper most similar to ours in motivation. They study the effect of immigration on unionization using Austrian data. Using an Instrumental Variables approach with prior, geographical distribution of immigrants to instrument for immigrant share, they estimate substantive negative effects of immigration on union density. The negative effects are not driven by natives leaving unions, but by changes in the composition of the workforce in firms that increase their immigrant share. As described in the next section, we provide a more comprehensive analysis by conducting a set of analyses using individual level rather than aggregated data.

3 The EU Expansion, Licensing Demands and Labour Immigration

Immigrant inflow to Norway has increased substantially over the last 20 years.[11] In the mid-1990s, the total gross inflow of immigrants was about 15,000 a year, while in 2012 inflows reached about 65,000. All types of immigration (refugees, family reunions, and labour immigration) increased over this period, but the most important increase is labour immigration after 2004. Norway is not a member of the European Union, but has been member of the European Economic Area (EEA) since 1994. Prior to 2004, labour immigration to Norway was fairly limited and quite stable from year to year. From 2004, the EEA was expanded with ten new member countries, including Poland. The EEA expansion led to a rapid increase in labour immigration from a couple of thousands in 2004 to about 25,000 in 2012. The majority of the labour immigrants entered the building and construction (BaC) industry, which thus experienced a positive labour supply shift.

The EU expansion provides us with an exogenous source of variation in labour immigration over time. Next, as in Bratsberg and Raaum (2012), we exploit licensing and certification demands to get variation in the immigration shock within the BaC industry. Occupational licensing occurs when the law (or insurance companies) requires that all workers in an occupation need a specialised vocational education to execute the tasks that fall into the profession.[12] For example, insurance companies and public building

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[11]Bratsberg, Raaum, and Røed (2017) provide a detailed description of immigration over the 1990-2015 period. Our description is heavily influenced by their account.

[12]We rely on the Norwegian Occupational Regulations Database (NORD) to identify these educations (Alecu and Drange 2016). We are grateful to Ida Drange for sharing their data set.
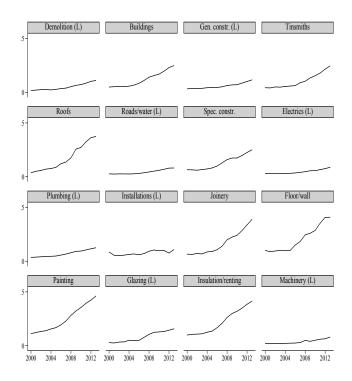
inspectors demand that plumbing and electric work is performed by workers with proper credentials, national approved licenses are necessary to operate heavy machinery, and particular certificates are needed to handle dangerous materials or to install lighting and light-signalling systems for roads, railways, airfields and harbour facilities. Similar type of educations or licenses from abroad are typically not accepted. The implication is that workers with vocational educations that demand licensing and certification are effectively protected from labour immigration.

One may worry that some workers received their license/certification protection after 2003, as a direct consequence of the increase in labour supply. If so it would represent a threat to the identification strategy. In the license-data, we have information on when the license was introduced. In general, very few licenses have been introduced after 2003, and reassuringly, none of the educations in our study changed licensing/cerification demands after 2003.

The effect of licensing on the inflow of labour immigrants is easy to observe in our data. The BaC industry can be divided into 16 business areas, or trades, defined by five-digit NACE-codes.[13] Each trade tends to be dominated by workers with one particular vocational education. In Figure 1 we graph the development of the share of natives in each of the 16 trades in the BaC industry from 2000 to 2013. Trades that are dominated by vocational educations with protection are indicated by an L in the figure. The figure shows that the increase in immigrant share from 2004 is large in most of the trades without protection, compared to the trades that are dominated by protected workers. In several of the non-licensed trades, the share of immigrants approaches 50 percent at the end of the period. Clearly, the labour supply shock and the change in the composition of the work force was substantial for the non-licensed trades.

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[13]A cross walk procedure is employed since the NACE codes changed in 2009.

Figure 1: Immigrant share by trades

Note: Own calculations. All workers in the BaC industry included. Workers' industry of employment is classified using employer-employee identifiers.

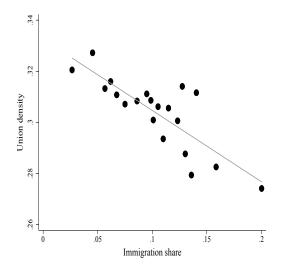Table 1: OLS regressions. Dependent variable is union membership.

	(1) Union member	(2) Union member	(3) Union member
Immigrant	-.14***	-.08***	-.07***
	(.04)	(.02)	(.02)
Trade FE	No	Yes	Yes
Year FE	No	No	Yes
N	1,689,346	1,689,346	1,689,346

Note: Robust standard errors adjusted for clustering on trade in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Labour immigrants in the construction sector are significantly less likely to unionize compared to natives. Table 1 estimates the immigrant-native union gap across the years 2000-2013. The unadjusted gap across these years, which is the most relevant number in our case, is almost fourteen percentage points. Adjusting for trade and year fixed effects reduce the gap to about seven percentage points. Moreover, the unionization rate

Figure 2: Immigrant share and union density

Note: The figure displays the relationship between immigrant share and union density controlling for year and trade FE. The bins represent the mean union density for 20 equal-sized bins of immigrant share (see Stepner 2013). The line is the regression line based on the underlying data.

of immigrants are slow to converge to that of natives (Cools et al. 2018). Another way to illustrate the relationship between immigration and union density is to aggregate the data to the trade level and estimate the relationship between immigrant share and union density within trades over time. Figure 2 visualizes the results from this analysis. Each dot consists of five percent of the observations and is displayed in the figure according to the average union density and immigrant share within that bin, controlling for trade area and year fixed effects. The regression line is the relationship between immigrant share and union density based on the underlying data (not the bins), again with trade area and year FE included. The figure shows a linear, negative correlation between immigrant share and union density.

4 Data and Empirical Strategy

The observations in Table 1 and Figure 2 constitute the background for our study of the impact of immigration on natives in the BaC industry. We study the impact on natives' labour market outcomes and the propensity to unionize. As indicated above, the crux of our approach is to leverage the EU expansion and the licensing demands to compare

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construction workers that experienced the labour supply shock with a comparison group within the same industry that did not experience the supply shock.

We conduct two types of analyses to examine how natives were affected and responded. In both analyses we exploit high quality individual register data with a panel dimension, collected and organized by Statistics Norway. In the first analysis we follow workers in the construction sector over time within their job-spell, while in the second analysis we follow workers who were employed in the BaC industry in 2003 (e.g. the year prior to the EU expansion) on a year-by-year basis until 2013. We describe these analyses closely in the following subsections.

We gather information on union membership from the administrative registers, which includes information on the annual union fees paid by the individual worker. This information is collected because union fees are tax deductable. A worker is defined as a union member if the fee is positive in the respective year. The labour market outcomes are employment and log hourly wage. Employment is a binary variable taking the value 1 if the individual is registered as wage earner in the administrative employment register in the respective year. Log hourly wage is constructed from information on total wage payments in a given job, together with information on working time per week and number of days employed. Descriptive statistics are included in the Appendix.

4.1 Protected workers

For our empirical strategy to work, it is vital to identify (otherwise) comparable workers who are differently exposed to the immigration shock in their labour markets. For this purpose we leverage the rich information about individual workers' education and occupational affiliation in the register data, combined with detailed information on licensing demands in different occupations, to identify exposed and protected workers. The key idea is to identify workers with vocational educations that are in demand in the protected occupations. The Appendix includes a detailed description of how the classification of vocational educations into the protected or exposed group is performed. From the classifications we construct the variable L_i, which is equal to 1 if worker i is exposed to

immigrant competition and 0 if not. Throughout, our sample is restricted to workers that have completed one of the 26 vocational tracks that workers in the BaC industry tend to have completed.

4.2 Follow workers within their job-spell

Our first approach is to follow workers employed in the BaC industry over time. We start out with a year-by-year sample of all native male workers aged 21-55 registered as employees in the BAC-industry in the period 2000-2013. We first estimate differences-in-differences (DD) models with the following structure:

$$y_{ijt} = \beta L_i * POST_t + \alpha_{ij} + \gamma_{ct} + \mu X'_{ijt} + \epsilon_{ijt} \tag{1}$$

where y_{ijt} is the outcome for worker i in job j in year t. α_{ij} refers to fixed effects for job-spells, while γ_{ct} are county-year fixed effects. X'_{ijt} refers to a vector of time-varying individual controls that is included in some specifications. L_i is the time-invariant indicator of whether the worker is exposed to the supply shock (the treatment group), while $POST_t$ is an indicator for the years after the EU expansion. β is the DD-estimate. The inclusion of α_{ij} and γ_{ct} absorbs the constituent terms of the $L_i * POST_t$ variable. Standard errors are clustered on the 26 vocational educations we use to construct the indicator L_i.

It is important to realize that β is identified from variation within workers' job spells. Moreover, it is evident that the spell has to cover both the pre- and post-period in order to contribute to the DD-estimate. Thus, the estimate reflects movement in y_{ijt} from the pre- to the post-period, and is not driven by changes in what type of workers that enter the two groups. The estimate is, however, clearly affected by changes in exit patterns, for instance if workers in the licensed group are less likely to change job or leave the labour market. Although changes in exit patterns are a type of variation we want to capture, we worry that longer spells for the licensed group is correlated with other characteristics of the workers, such as age, seniority, and experience. If so, β will be biased if these variables are omitted. We will therefore examine how sensitive the estimate is to this set

of controls (see e.g. Foged and Peri (2016) for a similar approach). In addition, we include interactions between L_i and an indictor for the pre-treatment years 2000-2002 to examine how sensitive the estimate is to potential deviations from the parallel trends assumption.

The estimates in eq. 1 is essentially estimates of the effect of the EU expansion. In an extension we use a similar approach to also derive estimates of the relationship between immigration share and the outcomes. More specifically, we estimate the effect of immigrant share using the following IV-set-up:

$$y_{ijt} = \beta I\widehat{MSHARE}_{bt} + \alpha_{ij} + \gamma_{ct} + \mu X_{it}' + \epsilon_{it}. \tag{2}$$

$I\widehat{MSHARE}_{bt}$ is the predicted immigrant share in trade area b.[14] The predicted share is from a first stage with $PIMFLOW_{bt} = IMFLOW_t * \frac{ELIS_{b,t=2003}}{ELIS_{t=2003}}$ as the instrument, where $IMFLOW_t$ is the inflow of immigrants to the BaC industry, $ELIS_{b,t=2003}$ is the number of workers in licensed occupations in trade area b in 2003, and $ELIS_{t=2003}$ is the total number of workers in licensed occupations in 2003. That is, we construct a predicted immigrant inflow by distributing all incoming immigrants to the BaC industry as if the initial licensing share of each trade completely determines the allocation of the incoming immigrants.[15] To interpret β from equation 2 as the effect of immigrant share, we need a set of assumptions (Angrist, Imbens, and Rubin 1996), in particular that the only impact of the licensing demands over this period is running through immigrant share. Since this assumption might be violated, the estimate should be interpreted with caution, yet we include it to provide an estimate of the structural parameter (immigrant share) of interest.

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[14]Ideally we want to construct a measure of predicted immigrant share for each vocational education rather than for the 16 trade areas, but because there is a non-negligible share of immigrants with missing information on education, we opt for a trade area share instead. The appendix includes a discussion on measurement error in the immigrant labour supply.

[15]Our instrument is a variant of the widely used shift share instrument (Bartik 1991). The key identifying assumption is that the initial shares of licensed workers in the trades are exogenous, conditional on the covariates. We consider this to be a plausible assumption since the licensing and certification demands are in place due to safety concerns and not to protect the labour market situation of the workers in those trades.

4.3 Follow workers employed in construction in 2003

The second approach is to follow all workers (aged 21-55) employed in the construction sector in 2003, i.e. the year prior to the EU expansion, on a year-by-year basis until 2013. We follow these workers irrespective of their choices after 2003, the idea being that all decisions after 2003 might be endogenous to the immigration shock. Our regression models have the following form:

$$y_{it} = \gamma_t + \delta L_i + \sum_{t=2000}^{t=2013} \beta_t L_i T_t + \epsilon_{it} \tag{3}$$

where y_{it} is the outcome for worker i in year t, γ_t are year fixed effects, and L_i is the exposure indicator. The β_t coefficients capture, on a year-by-year basis, how workers who were in the licensing area in 2003 differs, on average, from the non-licensed workers pre- and post-2003.

The key assumption in order for this "starting line"-approach to reflect the effect of the immigration shock is that the two groups would have had a similar year-by-year trajectory absent the EU expansion. This is a strong assumption. One concern is that a different composition of the two groups with respect to background characteristics will violate this assumption, for instance if there is an age difference between the two groups. We adjust for initial differences between the two groups by re-weighting the sample so that the two groups are similar on average across a large number of variables, including lagged outcomes and interactions between the variables (Hainmueller 2012). In the Appendix we describe the approach in detail and show that the two groups are balanced when the weights are applied.[16] When the weights are applied, we are more confident that divergent trajectories in the two groups after the EU expansion is not due to different initial characteristics of the two groups.

While both approaches identify effects of the supply shock on exposed workers, the employment-spell approach estimates short-run effects on workers within their employ-

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[16]In a sensitivity check we furthermore expand equation 3 by including individual-level fixed effects, so that we estimate the trajectories over time from variation within individuals. The results reported below are robust to the inclusion of individual level fixed effects, which is unsurprising since the identifying variation is from year-to-year variation at the group level.

ment spells. These estimates are useful because they are closely related to what happens with unionization at the workplace. However, as it is tied to employment spells, the approach fails to account for total and longer term effects of the shock. Therefore, the two approaches complement each other to provide a fuller picture of the consequences of the shock.

5   Empirical Results

5.1   Follow workers within their job-spell: DD

Table 2 presents the results from the job-spell DD analysis in equation 1. Panel A displays the earnings results. The first column shows the baseline estimate, which suggests that exposed workers experience a wage development that is negative compared to the protected workers. According to our estimates, annual earnings growth are on average about 2 percent lower for those exposed to immigrant competition. Reassuringly, the DD estimate does not move much when we allow the exposed and licensed workers to have a different trend in the pre-period (and the pre-trend is not significant). The estimate is also robust to the inclusion of the vector of (statistically significant) controls (columns 3). In the final column, we separate between observations early and late in the post-expansion period. More specifically, the early period is defined as 2004 to 2008, while late is defined as 2009-2013. We find that the late period coefficient is five times larger than the early coefficient, thus, exposed workers that remain in their job spell experience the strongest decline in relative earnings. This result is in line with the continuing inflow of labour immigrants over time.

Panel B shows the corresponding estimates for union membership. The results are easy to summarize: Across the models we find no significant DD estimates and the substantive size of the coefficients are very small. In the final column we find that, if anything, exposed workers that remain in their job spell are somewhat more likely to unionize. This result clearly goes against the social custom hypothesis and theories on the importance of workforce heterogeneity, and is more in line with theories emphasizing the importance of employment risk. However, the estimate is small and we cannot rule out the null

hypothesis of no differences between the groups. We therefore conclude that the labour supply shock following the EU expansion had no impact on employed workers' union membership rates.

Table 2: Fixed effects regressions.

	(1) Baseline model	(2) Add pre-trends	(3) Add age controls	(4) Two periods
Panel A: Log of hourly earnings				
$L_i * POST_t$	-.017**	-.022***	-.021***	
	(.004)	(.006)	(.006)	
$L_i * EARLY_t$				-.009*
				(.005)
$L_i * LATE_t$				-.046***
				(.010)
F added var.		0.8	139***	21***
F $L_i * EARLY_t = L_i * LATE_t$				35***
N	635,640	635,640	619,990	619,990
Spells	123,171	123,171	119,740	119,740
Y: Mean (SD)	4.88 (.5)	4.88 (.5)	4.88 (.5)	4.88 (.5)
Panel B: Union member				
$L_b * POST_t$	.002	.002	.002	
	(.007)	(.005)	(.006)	
$L_b * EARLY_t$				-.000
				(.004)
$L_b * LATE_t$				.007
				(.010)
F added var.		0.9	78***	2
F $L_e * EARLY_t = L_e * LATE_t$				1
N	635,763	635,763	620,108	620,108
Spells	123,192	123,192	119,759	119,759
Y: Mean (SD)	.43 (.5)	.43 (.5)	.43 (.5)	.43 (.5)

Note: All models include controls for job-spell and county-year fixed effects. Robust standard errors adjusted for clustering on vocational education in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

5.2 Follow workers within their job-spell: IV

Tabel 3 presents the results from the IV analysis. The first row presents the OLS estimates, which show a negative correlation between immigrant share and earnings and a small positive, but insignificant, correlation for union membership. We expect the earnings estimate to biased towards zero, as it is plausible that immigrants are recruited to trades with a high demand for labour. To the extent that these trades also have higher union density, there will also be a positive bias in the OLS estimate on unionization.

The second stage estimates confirm our expectation with regard to the earnings equation. The immigrant share estimate decreases substantively to -.78. The effect is economically important, as a 1 SD increase in immigrant share decreases earnings by .16 standard deviations. With regard to unionization, however, we find that the second stage point estimate is larger, not smaller, compared to the OLS estimate. This result implies that immigrants are recruited to low union density trades. Again, this result is more in line with competition increasing the propensity to unionize, than it is with social custom theory. As above, however, the estimates for unionization are not statistically significant.

Table 3: Instrumental variable regressions.

	Earnings	Unionization
OLS		
Im. share	-.50***	.01
	(.04)	(.10)
IV		
Second stage		
Im. share	-.78***	.04
	(.20)	(.12)
First stage		
Pred. im. inflow	.05***	.05***
	(.01)	(.01)
Reduced form		
Pred. im. inflow	-.04***	.002
	(.01)	(.007)
Kleibergen-Paap F		13
N		509,469
Individuals		103,725
Y: Mean (SD)		4.94 (.5)
Im.share: Mean (SD)		.10 (.1)
Pr. imflow: Mean (SD)		.25 (.3)

Note: All models include controls for job-spell, county-year fixed effects, age, age-sq, seniority, seniority-sq, experience and experience-sq. Robust standard errors adjusted for clustering on vocational education in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

5.3   Follow workers employed in construction in 2003

The results so far suggest that immigrant competition did not change the propensity to unionize among those who remained in the same job. However, as discussed, the above analyses captures only one part of the effect of immigration, and misses the potential impact of immigration on the decision to exit the job spell or the BaC industry. The labour market competition might push some workers to a worse job than their initial one, others might up-grade their skills to avoid the competition, while some workers might leave the labour market altogether. Movements to more precarious work are likely to be associated with falling unionization, while up-grading might imply increasing unionization, to the extent that they enter jobs where unionization is more common.[17] To better capture these

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[17]Exit from employment will be associated with falling unionization since most workers stop paying the union fee when they become unemployed. To capture union membership among employed workers—the metric that the literature tends to focus on—we condition the union membership analysis on employment. The potential downside of this approach is that we condition the analysis on a variable that might be

dynamics, we turn to the analysis where we follow workers employed in the BaC industry in 2003 on a year-by-year basis. As explained above, in this analysis we re-weight the sample so that the exposed and the protected groups have similar means and standard deviations on a large number of characteristics in 2003 (see the appendix for details).

The results from estimating equation 3 are displayed in Figure 3. The first to note is that the re-weighting of the sample–which ensures that the groups are balanced in 2003– has the consequence that the treatment and control groups are essentially balanced also in the pre-treatment years 2000-2002. Next we see that for all outcomes, there is a negative development for the unprotected compared to the protected group: Relative earnings, employment probability, and probability of union membership declines. For earnings and employment, the differences are statistically significant and in 2013 amounts to about 19 (earnings) and 16 (employment) percent of a standard deviation. Thus, the relative differences are economically important.[18]
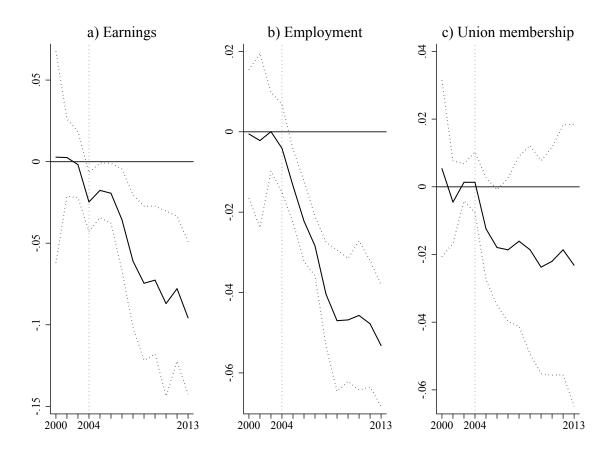
For union membership, the difference in 2013 is smaller, about 5 percent of a standard deviation, and with a p-value of .26. The increasing uncertainty in the unionization trend over time that we see in the figure suggests that for many workers, joining a union is almost a one-time decision which is resistant to changing circumstances.[19] If most workers remain as union members once they have become members, much of the variation over time comes from workers entering unions. If we restrict the analysis to those workers that were not union members in 2003, we find a negative but not significant pattern in union membership. The pattern is quite similar to the pattern for union membership in Figure 3. In any case, the results reinforce the conclusion of no support to the social custom hypothesis.

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endogenous. The conclusions below remain, however, if we do not condition on employment.

[18]While we interpret the pattern as reflecting the labour supply shock, an alternative interpretation is that workers in protected sectors are more likely to stay in their job because they have made important investments in licenses and certificates. Since all workers in our sample have completed a vocational education, we do not think this explanation is likely. Nonetheless, if the alternative interpretation is correct we should see that those in the treatment group are more likely to leave the BaC sector for work elsewhere. In Figure A2 we show the probability of remaining in the BaC sector, conditional on employment. Contrary to the investment hypothesis, we see that those in the treatment group are more likely to remain in the BaC sector.

[19]Those who where union members at least once over the period we study, were union members in about 70 percent of their observations. Thus, despite stability, there is meaningful variation over time.

Figure 3: Year-by-year development in the gap between protected and unprotected workers.

a) Earnings   b) Employment   c) Union membership

Note: The figures plot the interaction terms between year and L_i (β_t) and the associated standard errors from the regression models in equation 3. All the year estimates are relative to 2003, for which the protected and unprotected group are balanced using entropy balancing weights (Hainmueller 2012). The stippled vertical line indicates the year of the EU expansion.

Table 4: OLS regressions. Cumulative effects.

	(1) Earnings	(2) Emp	(3) Union
Panel A: Not protected			
Not protected	-3.300***	-0.348***	-0.262
	(0.639)	(0.044)	(0.569)
Constant	125.122***	9.124***	4.089***
	(0.469)	(0.030)	(0.535)
Y mean (st.d)	124 (19)	9 (2)	4 (4)
Observations	42,982	42,982	42,982
Panel B: Immigrant share			
Δ imshare	-0.246***	-0.025***	-0.100***
	(0.036)	(0.004)	(0.017)
Constant	123.361***	8.939***	3.914***
	(0.292)	(0.024)	(0.301)
Y mean (st.d)	124 (19)	9 (2)	4 (4)
X mean (st.d)	13(8)	13 (8)	13(8)
Observations	42,982	42,982	42,982
Panel C: 2SLS, second stage			
Δ imshare	-0.341***	-0.036***	-0.027
	(0.025)	(0.004)	(0.056)
Constant	123.319***	8.934***	3.946***
	(0.119)	(0.020)	(0.252)
Y mean (st.d)	124 (19)	9 (2)	4 (4)
X mean (st.d)	13(8)	13 (8)	13(8)
F first stage	34	34	34
Observations	42,982	42,982	42,982

Note: Robust standard errors adjusted for clustering on vocational education in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
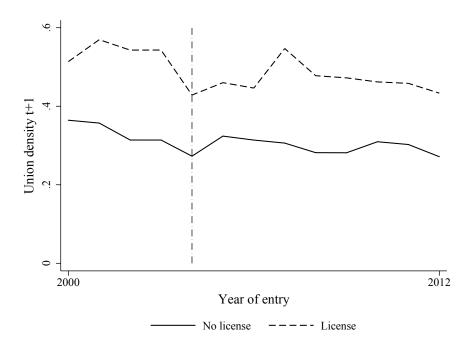

Finally we study the cumulative outcomes over the years 2003-2013 instead of the year-to-year variation. That is, we measure the cumulative yearly earnings, total years of employment, and total years of union membership. We regress these outcomes on i) the dummy for having an unprotected education in 2003 (Table 4 Panel A) and ii) on the change in immigration share in the trade of employment in 2003-2013 (Panel B). We center

the change in immigration share on its mean so that the constant in panel B refers to the mean outcomes for those experiencing the average immigration supply shock. Like before, this approach produces statistically and economically significant effects on earnings and employment. And again we find a negative and insignificant effect on union membership when we compare protected and non protected workers. In Panel B, however, we find those who were employed in trades who experienced larger increases in immigrant share have fewer total years of union membership over this period. A one standard deviation increase in immigration amounts to a decline of about .8 year units, i.e. about 10 months of union membership. When we instrument the immigration shock using the licensing demands (Panel C), we find, however, no effect of immigration. Thus, the cumulative analysis provides the same conclusion as before with regard to the effect of immigrant competition.

5.4   Propensity to unionize among entrants

So far we have studied the reaction of workers who were employed in the construction sector prior to the shock. The final issue we address is whether the propensity to unionize among those who enter the BaC industry is affected. Although workers appear to be quite willing to continue paying the membership fee once they have decided to join a union, newly recruited workers' willingness to unionize might be more sensitive to the current context (Ibsen, Toubøl, and Jensen 2017). To explore this we study union membership in year $t + 1$ among workers who entered the BaC industry in year t. We do so separately for the protected and non-protected group to examine whether the trends are different.

Figure 4: Trends in union density among entrants to the construction sector.

Note: The full line shows the union density at year $t + 1$ among non-protected workers who entered the construction sector in year t. The dotted line shows the corresponding trend for protected workers.

Figure 4 shows the trend in union density for protected and non-protected entrants, 2000-2012. We find a slight decline in union density over time. Throughout the period, new entrants with protected educations are more likely to unionize. More importantly, however, we see no change in the difference between the groups after 2004. This result further corroborates the finding that the supply shock had limited effects on natives' propensity to unionize.

6 Conclusion

To what extent is the increase in labour mobility in Europe a threat to the organization of workers in the market sphere? We show that the increase in labour supply due to the EU expansion had negative effects on the earnings and employment prospects of workers facing tougher labour market competition. We find, however, no evidence that the increase in immigrant labour had any effects on natives' tendency to unionize. Instead, the decision to join a union appears to be insensitive to the labour market situation and quite stable

over time. Our results are surprising in light of social custom theory: The exposed workers experienced a rapid increase in immigration into their labour market, which had significant economic impacts. The immigrants are less likely to unionize, implying that the native workers experienced a decline in the share of organized co-workers. Moreover, the immigrants increase the religious, cultural and linguistic diversity in these labour markets, which, as we have discussed, have the potential to make collective action, such as organizing workers politically, more difficult. Still, we find no impact on willingness to unionize.

We believe that our results are important for several literatures. First, our results speak to the literature on immigration, cheap labour, and the organization of coordinated labour markets (King and Rueda 2008; Emmenegger and Careja 2012; Alt and Iversen 2017). The labour supply shock constitutes the introduction of cheap labour into a well-organized labour market and illustrates that it can have important economic consequences also in this context. Still, we find no impact on natives' union membership. This does not mean that labour immigration constitutes no threat to unions or to labour market organization, after all, we have seen that immigrants are less likely to organize. However, our results imply that the main task for unions is to organize the newcomers. As Cools et al. (2018) show, immigrants' unionization slowly catch-up with natives' with years since arrival. The slow catch-up process implies that unions might want to spend more resources on recruitment policies target to these groups. Still, catch-up is happening, which shows that universal, encompassing unions can incorporate the type of diversity that labour immigration of this type represents. We suspect that union organization along ethnic and geographical lines–as King and Rueda (2008) seem to favor as a response to non-organized immigrant labour–is a less fruitful road for worker organization, a topic we leave to future research. We believe that empirical evaluations of successful union strategies and policies to organize immigrants is a topic ripe for research, in particular since it relates to the issue of immigrant integration into host societies more generally.

Second, the results are obviously relevant for the literature on unions and social customs (Booth 1985; Naylor and Cripps 1993; Visser 2002). While the existing literature

on union membership tends to rely on cross-sectional regression analyses of samples of workers, we have population-wide panel data and rely on quasi-experimental variation in union organization. Our design is less susceptible to conflate the impact of organized co-workers with correlated characteristics of firms or industries, which is a serious concern in most of the existing research. Our results show that union members' willingness to pay their membership fee is quite resistant to changing circumstances in their sector of work, which is difficult to analyze with the type of data typically employed in the literature.

Finally, we consider our results as useful for the broader literature on ethnic diversity and political behaviour. In some respect, the willingness to pay the union membership fee can be considered as a behavioural measure of social solidarity, since the direct personal benefit of union membership is somewhat limited. There is a vast literature that discusses the effect of ethnic diversity on various related outcomes (see Stichnoth and Van der Straeten 2013), often with the hypothesis that blue collar workers will be particularly sensitive to shocks in diversity. Our results suggest that such effects do not extend to union membership.

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Appendix

Wage negotiations in the BaC industry

Trade unions in Norway are generally so called "open shop" unions, implying that wage agreements cover all employees at the firm, conditional on the firm is covered by a tariff agreement, irrespective of union member status.

The main form of wage agreement in the BAC-industry is settlement between federations ("Forbundsvise oppgjør"). These are negations between the main employers' and employees' organizations in the BAC-industry ("Byggnæringens landsforbund" and "Fellesforbundet"). Negotiations and settlements take place every year, but the main settlement is bi-annual. It is only in the main settlement years that the negations are on the level of federations, otherwise there are central negations. Only BaC-firms that have a tariff-agreement are covered by the agreement. According to survey information in 2012, approximately 70 per cent of the BaC-industry firms were covered by a tariff agreement (WLC 2012). Agreements between the federations are followed by local negations.

In 2005, The General Application Act was introduced for the BAC-industry. The purpose of the Act was to ensure foreign employees' the terms of wages and employment which are equivalent to those of Norwegian employees, and to prevent social dumping. The Act was first introduced in the five counties Oslo, Akershus, Østfold, Buskerud, and Vestfold. Then, Hordaland followed in 2006, before the whole country was covered in 2007.

Descriptive statistics

Table A1: Descriptive statistics.

	Obs.	Mean	St.dev.
Follow workers within their job-spell			
L_i	619,990	.56	.49
Union member	619,990	.42	.49
Log hourly earnings	619,990	4.88	.49
Age	619,990	36.39	9.48
Seniority	619,990	5.96	5.77
Experience	619,990	17.38	9.48
immigrant share	619,990	.09	.07
Predicted inflow	619,990	.21	.28
Follow workers employed in construction in 2003			
L_i	551,602	.55	.49
Union member	551,602	.46	.49
Log hourly earnings	551,602	4.87	.50
Employed	551,602	.91	21
Cumulative outcomes			
L_i	42,982	.56	.49
Union member	42,982	4.35	4.38
Log annual earnings	42,982	123	19.19
Employed	42,982	8.96	2.07
Δ imshare	42,982	-.00	7.84

The construction of L_i

The definition of treatment and control groups is based on three sources of data that we can link together. First, the Norwegian educational register which on a yearly basis records the highest completed level of education of all individuals in Norway. The education code is a six digit code from the Norwegian Standard of Educational Classification (NUS).[20] Second, the Employer-Employee register which (from 2003) include the occupations of all workers with a seven digit code of the Norwegian standard of occupational classification (STYRK).[21] Third, The Norwegian Occupational Regulations Database (NORD) which registers the prevalence of occupational licensure and certifications (Alecu and Drange 2016, Bol and Drange 2017). In this database "An occupation is classified as licensed if the right to practise is regulated by the authorities by law or by regulations of the law." (Bol and Drange 2017:139). The regulations determine the educational demands which must be fulfilled to practice within an occupation.

Our starting sample when constructing L_i consists of all employees with a completed vocational education (skilled workers) that worked in the Norwegian building and construction sector in 2003-2013. We first use the NUS six-digit code to classify education categories into 255 educational groups of which many are quite similar with regard to their educational skills and the professional tasks they are supposed to exercise. We then aggregate the six-digit classification into 26 educational groups (see list on next page). Next we exploit that each employed individual in our database is characterized by the STYRK code of their occupation as well as the NUS code of their education to calculate the share of workers within the 26 groups who is employed in a licenced occupation. Then, individual workers are classified as protected or not protected by licensing according to the following rule: If the share of workers in licensed occupations is higher–within the educational group–than the overall mean share, plus half its standard deviation, then the worker is protected and $L_i = 0$. In the opposite case the worker is not protected and $L_i = 1$. Thus, the treatment group is defined as skilled workers in the BaC sector in 2003 who–according to their vocational education–are not protected by licensing in their labour market. Correspondingly, the control group is defined as all skilled workers in the BaC sector in 2003 who are protected by licensing in their labour market.

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[20]The six-digit NUS code corresponding to the ISCED code at the four digit level (https://www.ssb.no/en/klass/klassifikasjoner/36).

[21]The STYRK – code corresponding to the ISCO code at the four digit level (https://www.ssb.no/en/klass/klassifikasjoner/7).

List of the educational categories, shares in licensed occupations and of total employment 2003-2013.

	Description	NUS codes	Share in licensed occupation	Share of total employment
1	Business and administration	440001-449999	8,5	5,6
2	Chemistry unspecified	452201-452299	34,2	0,2
3	Information technology	454101-452299	9,6	0,4
4	Electrician	455101-455199	58,5	26,2
5	Mechanic	455201-455299	23,9	6,1
6	Precision mechanic	455301-455399	5,6	0,05
7	Plumber	457113, 457121	75,0	8,2
8	Div. building educations: Paperhanging, Painting, Concrete work, Carpentry aot.(all with licensed below 10%)	457101-457112, 457114-457120, 457122-457136	2,0	38,1
9	Construction vehicle/machinery operator	457901,457999	56,9	7,1
10	Food processing	458101-458199	10,0	0,5
11	Textiles and footwear processing	458201-458299	0,0	0,1
12	Glazier/glass work	458300-458308	1,1	0,4
13	Instrument making, and such	458308, 458312, 458314	40,3	0,01
14	Furniture and cabinet making, and such	458309- 458311, 458313, 458316-458329	5,0	0,6
15	Plastics mechanic	458315	23,6	0,1
16	Wood turning	458329	53,5	0,01
17	Rock blasting, mining, stone work	458408, 458408	13,7	0,7
18	Tinsmith and other sheet metal work	459901-459999	14,8	0,8
19	Ambulance service	469901	30,3	0,04
20	Nursing assistance of different kinds	461199-468999 469902-469999	4,4	1,0
21	Gardening	471101-473999	8,1	0,5
22	Forestry	474101-474999	31,1	0,3
23	Agriculture	479901-479999	24,7	0,8
24	Transport driver	481401, 481499	40,7	1,6
25	Various service and safety oriented work	481901-489999	7,5	0,4
26	Un specified vocational track	499999	9,0	0,1
Total		440001-499999	29,7	100

Note: The educational categories are aggregated from the six digit NUS codes among workers with a completed vocational education, i.e., NUS > 440000 and NUS<500000.

Entropy balancing of L_i

We conduct entropy balancing on union membership 2000-2003, log hourly earnings 2000-2003, log annual earnings 2000-2003, age, marriage, seniority, region of residence, and all possible interactions between these variables (except the lagged outcomes). We aimed for balance on two moments; means and variance. Table A3 shows the means in the treated ($L_i = 1$) and the control ($L_i = 0$) group before entropy balancing and the means in the control group after the construction of weights. Next the table shows the standardized difference between the groups before and after balancing. As evident, the sample is balanced on the means across all these variables when weights are applied. The re-weighting also achieves very good balance on the variances, results which are not included here.

Figure A1 shows the distribution of the entropy balancing weights (N=43,603 mean=1.12 , median=1 , SD=.51 , min=.00 , max=12.42). The number of large weights is small. We experimented with pruning of these large weights following Hainmueller's (2012) advice , and found that conclusions are very robust to doing so.

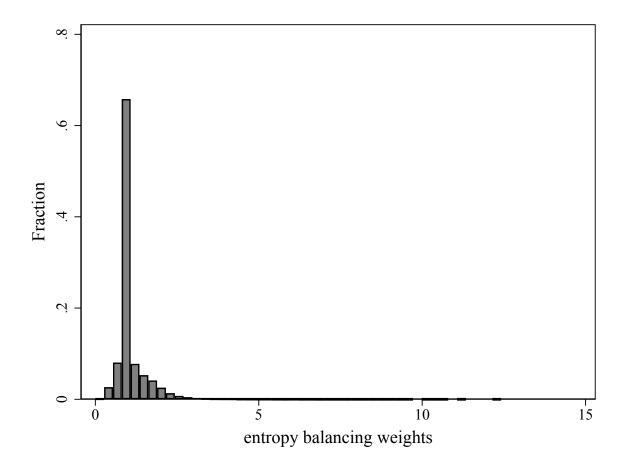Figure A1: Histogram of entropy balancing weights.

Table A3: Balance pre and post entropy balancing.

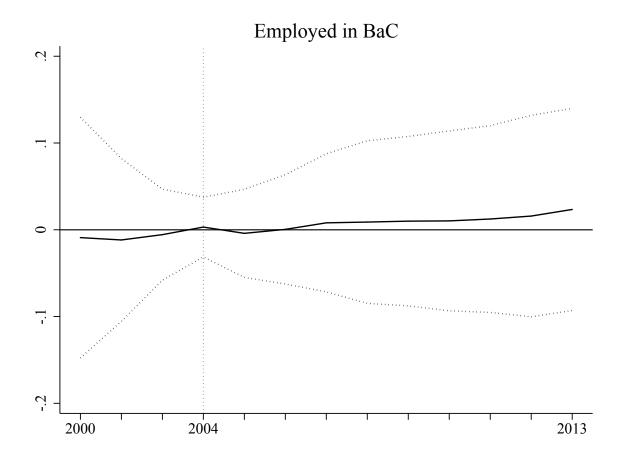|	mean treated	mean control pre	mean control post	standardized difference pre	standardized difference post
Union member	0.40	0.54	0.40	-0.29	0.00
Union member 2000	0.41	0.53	0.41	-0.26	-0.00
Union member 2001	0.40	0.54	0.40	-0.28	-0.00
Union member 2002	0.40	0.54	0.40	-0.28	-0.00
Log hourly earnings	4.66	4.72	4.66	-0.11	0.00
Log hourly earnings 2000	3.98	3.93	3.98	0.04	0.00
Log hourly earnings 2001	4.12	4.37	4.12	-0.17	0.00
Log hourly earnings 2002	4.38	4.52	4.38	-0.12	0.00
Log annual earnings	12.64	12.69	12.64	-0.12	0.00
Log annual earnings 2000	12.08	12.33	12.08	-0.13	0.00
Log annual earnings 2001	12.26	12.48	12.26	-0.13	0.00
Log annual earnings 2002	12.46	12.61	12.46	-0.11	0.00
Age	35.79	36.03	35.79	-0.03	-0.00
Married	0.41	0.42	0.41	-0.01	-0.00
Seniority	4.87	5.42	4.87	-0.11	-0.00
Region 2	0.46	0.48	0.46	-0.05	-0.00
Region 3	1.89	2.58	1.89	-0.29	0.00
Region 4	167.55	170.37	167.54	-0.06	0.00
Region 5	22.97	25.80	22.97	-0.11	0.00
h. earningsXunion	1.94	1.98	1.94	-0.02	0.00
h. earningsXage	0.50	0.45	0.50	0.04	0.00
h. earningsXseniority	1.31	1.23	1.31	0.04	0.00
h. earningsXmarried	2.13	2.27	2.13	-0.06	0.00
h. earningsXRegion 2	0.30	0.30	0.30	0.00	0.00
h. earningsXRegion 3	5.11	6.92	5.11	-0.29	0.00
h. earningsXRegion 4	453.08	457.65	453.06	-0.04	0.00
h. earningsXRegion 5	61.88	69.02	61.88	-0.11	0.00
a. earningsXunion	5.22	5.29	5.22	-0.01	-0.00
a. earningsXage	1.37	1.20	1.36	0.04	0.00
a. earningsXseniority	3.53	3.30	3.53	0.04	0.00
a. earningsXmarried	5.76	6.08	5.76	-0.05	-0.00
a. earningsXRegion 2	0.82	0.80	0.82	0.01	0.00
a. earningsXRegion 3	15.00	20.26	15.00	-0.27	0.00
a. earningsXRegion 4	1.96	2.86	1.96	-0.22	-0.00
a. earningsXRegion 5	0.17	0.24	0.17	-0.18	0.00
unionXage	0.05	0.06	0.05	-0.04	0.00
unionXseniority	0.10	0.12	0.10	-0.07	-0.00
unionXmarried	0.18	0.26	0.18	-0.20	0.00
unionXRegion 2	0.02	0.03	0.02	-0.10	-0.00
unionXRegion 3	190.17	210.72	190.19	-0.09	-0.00
unionXRegion 4	16.87	17.21	16.87	-0.02	-0.00
unionXRegion 5	3.81	3.49	3.81	0.03	0.00
ageXseniority	10.00	9.22	9.99	0.05	0.00
ageXmarried	16.33	17.25	16.33	-0.05	-0.00
ageXregion 2	2.23	2.27	2.23	-0.00	0.00
ageXregion 3	2.52	2.74	2.52	-0.05	-0.00
ageXregion 4	0.56	0.61	0.56	-0.02	0.00
ageXregion 5	1.48	1.49	1.48	-0.00	0.00
seniorityXmarried	2.11	2.53	2.11	-0.10	-0.00
seniorityXregion 2	0.33	0.30	0.33	0.01	0.00
seniorityXregion 3	0.04	0.04	0.04	0.01	0.00
seniorityXregion 4	0.13	0.12	0.13	0.03	0.00
seniorityXregion 5	0.18	0.19	0.18	-0.03	-0.00
marriedXregion 2	0.03	0.03	0.03	-0.01	0.00
marriedXregion 3	0.11	0.09	0.11	0.04	0.00
marriedXregion 4	0.28	0.26	0.28	0.04	0.00
marriedXregion 5	0.07	0.06	0.07	0.01	0.00

Measurement error in immigrant labour supply

Our measure of the immigrant labour supply may contain measurement errors for several reasons. First, a non-negligible portion of immigrant labour in recent years has been employed through temporary work agencies (TWAs). Many of these immigrants work in the BaC industry, although they are registered as workers in the TWA industry. In a recent report, Nergaard (2017) estimate that the share TWA workers in the BAC-industry is between 5 and 10 per cent. Second, after the EU expansion in 2004, a relatively large share of the immigrants in the BaC industry were hired by foreign contractors. That is, they worked in the Norwegian BaC industry, but they were employed by foreign firms (Dølvik and Eldring, 2008). As a consequence, they are not registered in the Norwegian employment registers.[22] Third, immigrants in the BaC industry, may work "off the books" to a different extent than native employees do. In a survey of Polish BaC workers in 2010, 26 percent reported that they did not pay taxes (Eldring and Friberg, 2011).

All three possible sources of measurement error will most likely lead to an underestimation of the share of immigrants in the BaC industry. Most directly it will affect the IV-analyses. If registered and unregistered immigrants in the BaC are positively correlated, and if they both have the same effect on unionisation, this will lead us to overstate the effect of immigration on unionisation. Hanson (2006) discusses the distinction between legal and illegal immigration in a US setting, and argues that because the omitted variable in this case is immigrant-related, one could, instead of classifying it as a form of measurement error, argue that the estimated effect is the total effect of immigration (both legal and illegal). Note that in the DD-analyses, the measurement problems will to large extent be reduced, since identification is not based on direct measurement of labour supply of immigrants in the BAC-industry.

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[22]From 2006 to 2011 it was 16.000-23.000 registered individuals each year, coming through a foreign contractor. http://www.arbeidslivet.no/Arbeid1/Arbeidsinnvandring/Mange-norske-bedrifter-bruker-osteuropeisk-arbeidskraft/

Propensity to remain in the BaC-sector

Figure A2: Year-by-year development in the gap between protected and unprotected workers.

Employed in BaC

Note: The figures plot the interaction terms between year and L_i (β_t) and the associated standard errors from regression models of the form in equation 3. All the year estimates are relative to 2003, for which the protected and unprotected group are balanced using entropy balancing weights (Hainmueller 2012). The stippled vertical line indicates the first year in the post-treatment period.