Workplace segregation and the labour market performance of immigrants*

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Abstract

I study the effect of conational coworkers in an immigrant's first job on subsequent labour market outcomes using German register data. I instrument for the conational share using hiring trends in the local labour market and find that a ten-percentage-point increase in the initial conational share lowers employment rates by 3.1 percentage points in the long term, an effect not observed for non-conational immigrants, with no effect on wages conditional on employment. The employment effect appears mainly due to changes in job search behaviour induced by denser conational networks, although differential host country-specific human capital accumulation may also contribute.

Keywords: Employment, segregation, coworker networks, immigrant earnings dynamics
JEL codes: J61, J64, J31

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1 Introduction

A growing body of evidence has documented substantial segregation of workers across workplaces by country of origin in developed economies (Andersson, García-Pérez, Haltiwanger, McCue, and Sanders, 2014; Åslund and Skans, 2010; Glitz, 2014; Hellerstein and Neumark, 2008). Immigrants are significantly more likely to work with other immigrants, and in particular immigrants from the same country of origin, than observable characteristics such as education, gender, or location would predict. Not only do immigrants have on average different coworkers when compared to natives, they also earn less than natives, in part because they are less likely to be employed (documented in Borjas, 1985; Chiswick, 1978; Lubotsky, 2007; Sarvimäki, 2011). A natural question is whether these two phenomena are related.

The relationship between the composition of an immigrant's workplace and the immigrant's labour market outcomes is, however, confounded by a number of factors. Immigrants may differentially select into first jobs with a higher or lower conational share based on unobserved characteristics related to future employability. Furthermore, the initial conational share is likely to be associated with other characteristics of the first job which might affect wages in that job, such as the presence of an immigrant manager (Åslund, Hensvik, and Skans, 2014) or having received a referral (Dustmann, Glitz, Schönberg, and Brücker, 2016). The true effect of the conational share on either contemporaneous or subsequent outcomes is therefore not identified by simple comparisons of immigrants who find jobs in high- or low-conational share firms.

In this paper, I set out to provide credibly causal estimates of the effect of the conational share in the first job an immigrant holds in Germany on their subsequent labour market outcomes. To address the identification problem, I propose to instrument for the initial conational share using predicted hiring in the location and year where an immigrant is searching for her first job, similar to the instrument proposed by Arellano-Bover (2020a) for the size of the firm where a worker finds her first job. Specifically, for a given immigrant, I calculate the expected share of conationals if the immigrant were randomly assigned a different job in their district that was filled by another immigrant in the same year. Conditional on fixed effects that capture selection into searching for a job in different labour markets based on time-varying nationality-specific factors and selection into districts based on the density of local ethnic networks, I provide evidence that the predicted conational share is quasi-randomly assigned.

The instrument relies on the idea that, conditional on when and where an immigrant decides to search for a job, there is some randomness in the set of firms closest to the immigrant that are looking to hire at that time. However, other firm characteristics may be correlated with the conational share, so my proposed instrument may predicted other firm characteristics too, violating the exclusion restriction. Furthermore, simply including supplementary characteristics of the firm where an immigrant holds her first job as additional controls in the structural equation would be invalid, since these characteristics are potentially outcomes of the instrument. To ensure that the exclusion restriction holds, I therefore adopt an idea used in judge leniency IV designs (Autor, Maestas, Mullen, and Strand, 2015; Humphries, Mader, Tannenbaum, and van Dijk, 2019) and use the same procedure as I used to calculated the predicted conational share to calculated a predicted version of other firm-level characteristics. The other predicted characteristics are then used as instruments for the other realised firm characteristics which are treated as endogenous variables in the structural equation, just like the conational share.

Implementing my empirical approach on a sample constructed from the German Sample of Integrated Employer-Employee Data (SIEED), I find that starting out in a firm with a higher conational share has a negative effect on an immigrant's probability of being employed in the longer term. A ten-percentage-point increase in the initial conational share reduces employment rates by 1.9 percentage points after two years, falling to 3.1 percentage points after six or more years. Importantly, the long-term employment effect is specific to the conational share and does not exist for immigrants who do not share the immigrant's nationality, suggesting that the underlying mechanism must be specific to the conational share. The estimates are robust to selective return migration, and descriptive evidence using survey data from the German Socio-Economic Panel (SOEP) matched with administrative data, the IAB-SOEP Migration Sample, suggests the effect is not due to an increase in self-employment. In contrast, there is at most weak evidence of a negative long-term wage effect for the conational share, even when accounting for selection into employment, while the share of other migrants is, if anything, positively associated with wages in the long-term.

Having established that the initial conational share has a negative longer-term effect on employment rates, I then review the evidence for different mechanisms that might explain this finding. The effect does not appear to be due to differences in productivity or wages in the first job, which might propagate to subsequent jobs via, e.g., job-ladder effects (Burdett and Mortensen, 1998). Rather, a higher initial conational share appears to change an immigrant's job search behaviour in the longer term. Immigrants with a higher initial conational share rely more on their former coworkers to find subsequent jobs, are more likely to transition from a job into unemployment rather than another job and, conditional on becoming unemployed, they tend to stay unemployed for longer. Again, these effects are not observed for the share of immigrants from other countries of origin. I interpret these effects as evidence that a higher initial conational share reduces either an immigrant's own job search effort or the productivity of such job search in the future. Survey evidence from the IAB-SOEP Migration Sample suggests a higher conational share is not associated with worse German proficiency in the long-run. However, the conational share is negatively associated with having participated in formal job training in the longer run, so I cannot entirely rule out that part of the negative employment effect is due to differential host-country specific human capital accumulation, reducing immigrants' productivity in the longer run.

The first contribution of this paper is to provide plausibly causal estimates of the effect of workplace segregation on immigrants' outcomes. Previous work has shown that more segregated groups have worse labour market outcomes on average (Åslund and Skans, 2010; Glitz, 2014) and that higher conational shares in the first job are negatively associated with individual outcomes (Ansala, Åslund, and Sarvimäki, 2021). However, these associations are potentially confounded by the factors described above. This paper also relates to papers highlighting how working in a firm with more immigrants may benefit immigrants if their manager is also an immigrant (Åslund et al., 2014) or if it means receiving a referral when joining the firm (Dustmann et al., 2016). In contrast to those papers, I focus on the effect of the conational share *per se* and find it to be negative in the long run.

Second, this paper also contributes to a large literature studying how initial conditions upon arrival in a new country affect an immigrant's career path. Typically, prior research has focused on the initial place of residence and the relationship between the size of an immigrant's ethnic group in the initial location of residence and the immigrant's subsequent labour market outcomes (Battisti, Peri, and Romiti, 2022; Beaman, 2012; Damm, 2009; Edin, Fredriksson, and Åslund, 2003; Munshi, 2003). I extend this line of research from the neighbourhood to the firm. The switch of focus is novel; it is motivated in part by recent evidence that coworker networks are a more important determinant of an individual's labour market outcomes than residential networks (Eliason, Hensvik, Kramarz, and Nordstrom Skans, 2022).

Focusing on the firm, rather than the neighbourhood, is also motivated by the active literature on the role of firms for understanding earnings differences between immigrants and natives (Aydemir and Skuterud, 2008; Barth, Bratsberg, and Raaum, 2012; Brinatti and Morales, 2021; Phan, Ritchie, Singleton, Stokes, Bryson, Whittard, and Forth, 2022), to which I also contribute. Relative to these papers, which emphasise the role of sorting across high- or low-paying firms in determining immigrants' contemporaneous wages, I show how a specific, time-varying characteristic of firms, namely the conational share at the time of first employment, has persistent long-term effects on an immigrant's labour market outcomes and in particular employment. This is similar to the line of papers showing, for workers in general, that specific firm characteristics, and in particular the size of the firm, affect workers' outcomes beyond the time of their employment in the firm (Arellano-Bover, 2020a,b).

The final contribution of the paper is to our understanding of immigrants' labour market integration more broadly (see, e.g., Algan, Dustmann, Glitz, and Manning, 2010; Borjas, 1985; Chiswick, 1978; Dustmann and Görlach, 2015). In particular, the finding that a higher conational share lowers subsequent employment rates can help us understand the dynamic tradeoff that has been documented in relation to higher conational shares in the location of residence and immigrant earnings. Larger ethnic residential networks have been shown to increase earnings in the short-term but not in the long-term (Battisti et al., 2022). While a higher residential conational share may speed up job finding (e.g. Edin et al., 2003), I provide descriptive evidence, drawing on the IAB-SOEP Migration Sample, that immigrants who find work quicker do so in firms with a higher share of conational coworkers. This could act as a drag on their longer-term labour market performance and may afford immigrants who take longer to find work in a firm with fewer conationals a chance to to catch up.

The paper proceeds as follows. In the following section I discuss the data used in the paper. In Section 3 I describe my empirical approach and challenges to identification. In Section 4 I present evidence on the relationship between initial workplace composition and subsequent employment rates and wages. In Section 5 I assess different possible mechanisms that could explain my result and relate my findings to the existing literature. Finally, Section 6 concludes.

2 Data

In the main analysis I use the Sample of Integrated Employer-Employee Data (SIEED), provided by the Institute for Employment Research (IAB) of the German Federal Employment Agency, which is described in detail in Schmidtlein, Seth, and vom Berge (2020). The SIEED is constructed by first taking a 1.5 per cent sample of all firms making social security contributions during the period 1975–2018.[1] Second, the full employment biographies of all individuals ever employed by the sampled firms are then included in the dataset. I focus on immigrants whose first job was in one of the SIEED firms sampled at the first stage, for whom I observe the full set of coworkers in the first job, who were aged 15–64 at the time of this job, and who first appear in my dataset on or after 1 January 1991 and before 1 January 2014, so that I have at least five years of data for each individual.[2] The administrative data only contains information on nationality, not migration status. Until a reform of the German nationality law in 2000, second-generation migrants frequently did not have German nationality. As a result, to avoid misidentifying immigrants, I exclude the major guest-worker countries, Turkey, Italy, and Greece from my sample, as the children of guest workers would be entering the labour market during my sample period.[3] I also exclude individuals who ever report a foreign place of residence, to exclude commuters. The final sample includes around 39,000 individuals.

The employment biographies derived from the social security data only include employment in a job covered by the social security system. This means that work in self-employment or as a civil servant is not covered; breaks in employment biographies could therefore be indicative of unemployment, return migration, or employment in one of these categories. The data are reported as notifications, which record employment spells to the day. I transform the daily data into an annual panel, starting from the immigrant's first year of social security-covered employment. In particular, I record the fraction of days worked in the calendar year, which I refer to as an individual employment rate, as well as the average daily wage earned across all spells in the course of the year, conditional on being employed at least one day. Firm-level variables are either calculated on 30 June, or on the day an individual started working in a firm, where relevant.

I report descriptive statistics in Table 1. All wage and earnings variables are deflated to 2010

[1]Formally, the SIEED samples establishments; an establishment corresponds to all production sites of a single employer in the same municipality operating in the same narrowly defined industry class. I follow convention when working with IAB data in referring to an establishment as a firm.

[2]The IAB data only cover East Germany from 1 January 1991. I also exclude individuals who first appear in the dataset in East Germany on 1 January 1991, since these individuals were likely already working.

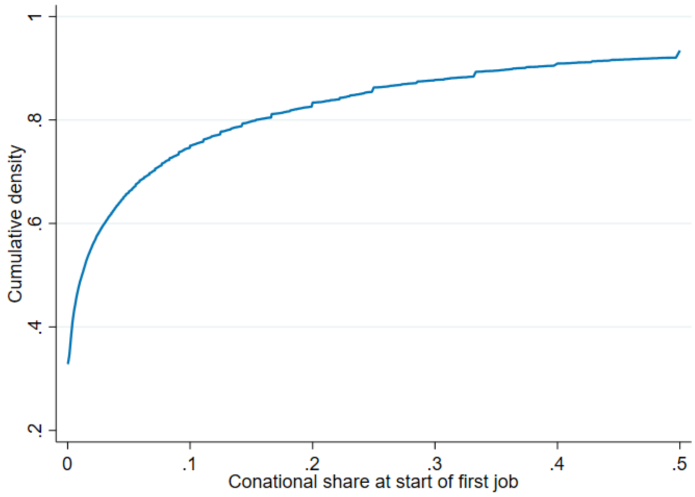
[3]In a robustness check, available upon request, I do not find employment effects for this group, though the sample is smaller and the estimates are imprecise.

Table 1: Summary statistics

	SIEED		
	Mean	St. dev.	N
Panel A			
Employment rate	0.47	0.45	626665
Employment rate, no dropouts	0.68	0.39	430245
Annual wage earnings	11164.9	15871.5	626665
Avg. daily wage	60.7	49.6	373170
$\mathbf{1}(t \in [0, 2])$	0.19	0.39	626665
$\mathbf{1}(t \in [3, 5])$	0.19	0.39	626665
$\mathbf{1}(t \geq 6)$	0.63	0.48	626665
Panel B			
Woman	0.44	0.50	39069
Low education	0.58	0.49	39069
Medium education	0.20	0.40	39069
High education	0.22	0.41	39069
Age at first emp.	29.29	9.24	39069
Panel C			
Conational share (s_i^{own})	0.11	0.21	39069
Other migrant share (s_i^{other})	0.22	0.21	39069
Daily wage	45.1	39.6	39069
Apprentice	0.068	0.25	39069
Part-time	0.34	0.47	39069
Firm size	611.1	1900.8	39069
Median firm size	62	0	39069
Firm median wage	64.2	34.4	39069
Firm age	13.9	10.1	39069
Conational manager	0.073	0.26	39069
Other migrant manager	0.11	0.32	39069

Note: Panel A reports time-varying summary statistics for the years since the first job, average earnings are conditional on being employed on June 30. Panel B reports summary statistics on individual characteristics at the start of the first job. Panel C reports summary statistics on the characteristics of the first job held after migration and the firm where the job was held. Wages and earnings are deflated and reported in 2010 Euros.

Figure 1: CDF of conational share in first job



Notes: Empirical CDF of the initial conational share in the first job held by an immigrant in my sample. The distribution is truncated at 50, for ease of representation.

values. Panel A presents time-varying statistics. The average employment rate in my sample, at 0.47, is lower than in the foreign born population as a whole, which averaged 0.64 during 2000–2018 (OECD, 2020). This reflects the fact that self-employment and return migration are not observed in the register data; individuals falling into either category are classified as non-employed. I will therefore present results that exclude individuals who drop out of employment permanently as a robustness check. The employment rate in my sample for this group is 0.68. Panel B presents time-invaryring characteristics before the start of the first job. The sample contains a greater share of males than the immigrant population as a whole, reflecting the fact that labour force participation is higher among male immigrants than among female immigrants, while the educational distribution in the sample is similar to the that in the wider immigrant population (OECD, 2020). Panel C presents characteristics of the first job or the firm where the first job is obtained. The first firm is on average large, with over 500 employees, however the distribution is highly skewed, and the median firm size is 62. Immigrants earn less on average in the first job (45 euros a day) than the median worker in the firm (64 euros).

The average conational share in the first firm is 11 per cent and the average share of immigrants from other countries of origin is 22 per cent. In Figure 1 I further plot the cumulative distribution of the conational share in the first job, truncating the distribution at a conational share of 50 per cent. Just over 30 per cent of the sample do not have any conational coworkers in their first job, while around 10 per cent start in a workplace where the majority of their coworkers are conationals. Finally, I report the distribution of countries of origin in Table A.1. The largest groups of immigrants are from new members of the EU, with a fifth of the sample coming from Poland and Romania, with the next-largest group from the former Yugoslavia, making up around 12 per cent of the sample.

In addition to the register data contained in the SIEED, I complement my analyses at certain points with survey data contained in the IAB-SOEP Migration Sample, which is linked to the social security data of the Institute for Employment Research. Officially, the linked dataset is called the IAB-SOEP-MIG-ADIAB, it is described in detail in Brücker, Kroh, Bartsch, Goebel, Kühne, Liebau, Trübswetter, Tucci, and Schupp (2013). The IAB-SOEP Migration Sample is an annual survey of individuals in Germany with a migration background (i.e. immigrants or descendants of immigrants), conducted as a supplement to the German Socio-Economic Panel (SOEP). Summary statistics on the 863 individuals in the linked IAB-SOEP data I use in supplementary analyses, who were born in a foreign country with a foreign nationality and who arrived in Germany between the ages of 15 and 64, are contained in Table A.2. The distribution of the initial conational share in the IAB-SOEP is shown in Figure A.1 and the distribution of nationalities is in Table A.3.

3 Empirical approach

3.1 Overview

To estimate the effect of the initial conational coworker share on immigrants' subsequent labour market outcomes, I model outcomes of interest t years after the start of i's first job, Y_{it}, as a function of the initial conational share s_i^{own}. In general, the outcome can be assumed to follow some nonparametric time trend, $f_2(t)$, and the effect of interest, $f_1(t)$, likewise may be non-constant over time. Furthermore, other time-varying and invariant individual factors X_{it} may affect the outcome of interest. Finally, more aggregate fixed characteristics, such as cohort effects, if the "quality" of immigrant is changing over time, nationality, or location of arrival within Germany, measured as fixed effects δ_j may affect the outcome. I therefore model the outcome of interest as

$$Y_{it} = f_1(t) \times s_i^{own} + f_2(t) + \Gamma X_{it} + \sum_j \delta_j + \epsilon_{it}. \qquad (1)$$

To make the estimation problem more tractable, I adopt a semi-flexible approach to modelling the functions $f_1(t)$ and $f_2(t)$. Ideally, I would like to model each as a set of indicator variables for all values that t takes on. However, I would then have insufficient power to identify the large set of effects of interest using the identification strategy presented below. I therefore group years together and instead model both functions as a set of indicator variables for being within 0–2 years of the first job, 3–5 years of the first job, or more than 6 years of the first job and estimate the full set of year effects by OLS as a robustness check. Within the set of control variables X_{it}, I will pay special attention to the share of immigrants from other countries of origin in the first job, s_i^{other}, whose effect I will allow to vary over time, just as the effect of the conational share does. The initial share of other immigrants is of special interest, as compared to other characteristics of the firm where the first job is held. A large part of immigrant segregation is due to the excess tendency of immigrants to work with their conationals specifically. It is therefore important to understand whether the effect of exposure to conationals is different to the effect of exposure to immigrants in general. I estimate the following equation:

$$
\begin{aligned}
Y_{it} = \sum_{g \in \{own, other\}} & \beta_1^g s_i^g \times \mathbf{1}(t \in [0,2]) + \beta_2^g s_i^g \times \mathbf{1}(t \in [3,5]) + \beta_3^g s_i^g \times \mathbf{1}(t \geq 6) \\
& + \mathbf{1}(t \in [0,2]) + \mathbf{1}(t \in [3,5]) + \mathbf{1}(t \geq 6) + \Gamma X_{it} + \sum_j \delta_j + \epsilon_{it}.
\end{aligned} \tag{2}
$$

The share variables s_i^g, $g \in \{own, other\}$, are measured on the interval $[0,1]$, implying that the coefficients β_τ^g, $\tau \in \{1,2,3\}$, measure the effect at a given time horizon of going from a firm with no coworkers of type g to an equivalent firm made up entirely of coworkers of type g. In the text, unless otherwise stated, I will scale this coefficient and discuss the effect of a ten-percentage-point increase, or approximately half a standard deviation, in the share of workers of type g. In all cases, the set of control variables will include basic demographic characteristics, gender and a quadratic in age, and pre-employment characteristics, educational attainment at the start of the first job and age at the start of the first job.

3.2 Identification

In practice, not all relevant elements of X_{it} are available. The SIEED does not contain information on most of a worker's relevant pre-migration characteristics, such as German proficiency, or how they found their first job and whether they received a referral. Furthermore, individual preferences, such as a taste for working with conationals, or fixed individual characteristics, such as employability in Germany, are not observable. As a result, OLS estimates of Equation (2) are likely to yield biased estimates of β_τ^g. I therefore adopt an instrumental variables (IV) approach to identifying the effect of the initial conational share on subsequent outcomes. The proposed instrument uses variation across districts (*Kreise*) within the same labour market in the the hiring patterns of firms for a given year and nationality. Formally, the instrument is defined as follows:

$$
z_i^{own} = \frac{\sum_{j \neq i} s_{f(j)}^{nat.(i)} \mathbf{1}(d_j = d_{0i}, t_j = t_{0i}, nat.(j) = mig.)}{\sum_{j \neq i} \mathbf{1}(d_j = d_{0i}, t_j = t_{0i}, nat.(j) = mig.)} \tag{3}
$$

The instrument for individual i is the average share of coworkers with i's nationality among other migrants $j \neq i$ hired by firm $f(j)$ in the same district as i, d_{0i} and the same year, t_{0i}.[4] The instrument is therefore a leave-out-mean and has the same structure as the instrument proposed by Arellano-Bover (2020a) for the size of the establishment where Spanish school-leavers find their first job. To avoid contamination by hires throughout the year, the share of conationals $s_{f(j)}^{nat.(i)}$ is measured on January 1 and the instrument is constructed using hires during the calendar

[4]Note the instrument is constructed using immigrant hires across the entire set of SIEED firms, not only immigrants hired for the first time. The estimation sample is therefore very small relative to the sample used to construct the instrument, so the two samples can be considered effectively independent when conducting inference.

year. The instrument can be interpreted as the expected conational share if an immigrant were randomly assigned to a position filled in the same year in the same district by another immigrant; throughout the paper I refer to it as the predicted conational share.

The predicted conational share in a district is correlated with other characteristics of the district (see Figure A.2). For example, a higher predicted conational share is marginally positively correlated with the conational share in the district's labour force, which would indicate a larger network for the immigrant to draw on when searching for a job (see, e.g., Munshi, 2003). To ensure that other district characteristics do not confound the effect of the conational share on subsequent outcomes, my main specification will therefore include labour market by nationality by year of first job fixed effects and district (*Kreis*) by nationality fixed effects.[5] The identifying variation therefore comes from comparing immigrants of the same nationality searching for a job in the same year but within different districts of a given labour market. Furthermore, the inclusion of a district-by-nationality fixed effect implies that the quasi-random assignment component of the IV identifying assumptions requires that the immigrants I am comparing do not systematically sort based on unobserved characteristics into districts within that labour market where firms that employ relatively many of their conationals are doing a disproportionately large or small share of hiring that year, relative to the long-term average of the district.[6]

To assess the validity of the instrument, I report results in Figure 2a from a series of cross-sectional regressions where I regress a set of standardised variables measuring characteristics of the district where the first job is found, individual characteristics (measured at the start of the first job), and characteristics of the first job and first firm on the predicted conational share and the set of fixed effects described above. If conditional random assignment holds, the instrument should not be associated with other characteristics of the district at the time of finding the job, or of the individual, conditional on the included fixed effects. This only appears partly true. The instrument is conditionally uncorrelated with other local characteristics such as the inflow of conationals into the district in the same year, local employment rates, or conationals' share of either the local population or the local labour force. However, the instrument is marginally associated with immigrants' education and, more strongly, with the immigrant's gender. A ten-percentage-point increase in the predicted conational share reduces the probability an immigrant is a woman by around 0.1 of a standard deviation, perhaps because women are less likely to be labour migrants and locate based on their partner's location, rather than due to labour market considerations. I will control for observed demographic characteristics and test for whether there

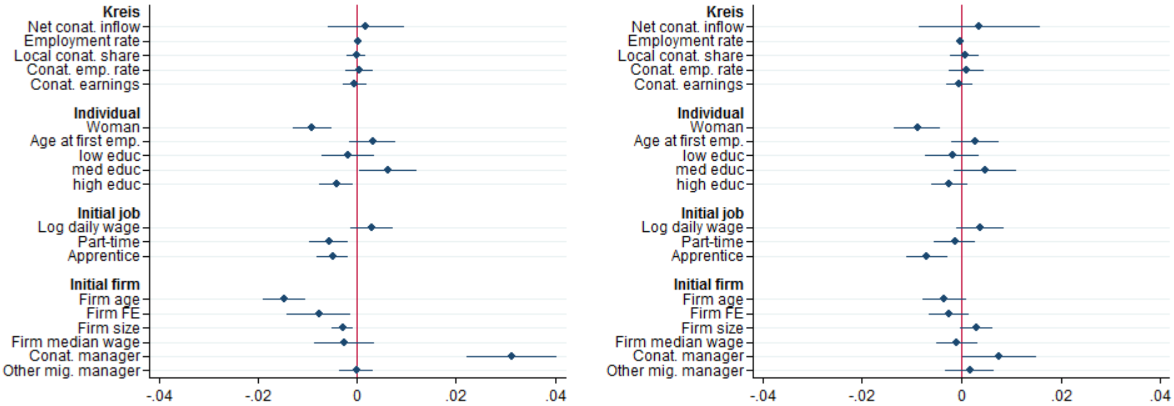
[5]Labour markets are defined by commuter flows, see (Kropp and Schwengler, 2011); there are 50 labour markets in Germany.

[6]Consider a stylised example of a single labour market made up of two districts, A and B, receiving immigrants of a single nationality. The identifying assumption is that immigrants who go to district A in years when the predicted conational share is above the sample average for the district are not selected relative to the average immigrant to that district over the sample period. This assumption will hold if immigrants sort into labour markets to search for jobs based on time-varying information about available jobs and sort into districts within labour markets based on fixed district factors, such as local density of conational networks or industry structure, but do not sort into districts within labour markets based on detailed local knowledge about transient hiring shocks in a district.

Figure 2: Instrument validity

(a) No firm/job characteristics

(b) With predicted characteristics



Notes: Effect of predicted conational share on other characteristics. Each association is estimated separately; the dependent variable in each specification has been standardised to have mean 0 and standard deviation 1, while the predicted share is rescaled to lie on [0,100]. All specifications include labour market $\times$ nationality $\times$ entry year and district $\times$ nationality fixed effects. Standard errors are clustered by entry district and 95 per cent confidence intervals shown.

is any heterogeneity in effects by gender and education.

Finally, the instrument is associated with various firm and job characteristics in the first job. The strongest association is with the presence of a conational manager in the firm, the probability of which increases by around 0.3 standard deviations when the predicted conational share increases by ten percentage points. The association of the predicted conational share with other firm characteristics suggests that the exclusion restriction does not hold, since some of these characteristics, such as the size of the firm where the first job is held (Arellano-Bover, 2020a) or the presence of a conational manager at the firm (Åslund et al., 2014), may have a direct effect on immigrants' subsequent labour market outcomes. In essence, the problem is that, while the proposed instrument leverages local hiring shocks to introduce randomness to the process of matching immigrants to firms, all of the variation in firm hiring is loaded onto the firm's conational share, which is likely correlated with other firm characteristics.

To address this problem, it is possible to use the same leave-out-mean procedure to calculate a predicted version of any initial job or firm characteristic, as proposed by Autor et al. (2015) and Humphries et al. (2019) in the context of examiner leniency IV designs. The realised job and firm characteristics can then be included as controls in Equation (2), the structural equation, and instrumented for, using their predicted versions, in the IV estimation.[7] In Figure 2b, I include

[7]In addition to supporting the exclusion restriction, including and instrumenting for other firm characteristics also strengthens the claim that the predicted conational share is conditionally randomly assigned, since the predicted characteristics account for selection into districts within labour markets in response to variation over time in the predicted other characteristics of hiring firms. Note that it would not be correct to include job or firm characteristics directly as controls in Equation (2) without instrumenting for them. Since these characteristics are outcomes of the proposed instrument, they would be bad controls

predicted part-time status, firm age, presence of a conational manager, presence of an immigrant manager from another country, and the log of predicted firm size and the predicted median wage in the firm, all calculated using the same leave-out-mean procedure, as additional controls in my cross-sectional regressions. When including the predicted characteristics as additional controls, the predicted conational share is no longer systematically associated with the job and firm characteristics. I report the same tests of instrument validity for the predicted share of workers from other countries of origin in Figure A.3. Again, there is some evidence, albeit weaker, of the exclusion restriction failing to hold when other predicted firm characteristics are not controlled for.

Table 2: First stage effect of predicted conational share on realised share.

	(1)	(2)	(3)	(4)	(5)	(6)
z_i^{own}	1.31**	1.30**	1.26**	1.10**	1.15**	0.99**
	(0.078)	(0.079)	(0.086)	(0.077)	(0.12)	(0.070)
z_i^{other}		-0.0016	0.024	0.022	0.024	0.037+
		(0.027)	(0.022)	(0.021)	(0.032)	(0.022)
Pred. charact.	No	No	No	No	No	Yes
N	39069	39069	39069	39069	37302	39069
R^2	0.19	0.19	0.52	0.60	0.65	0.60
FE	-	-	D	DxN	DxN, DxY	DxN

Note: Static first-stage relationship between predicted conational share, z_i^{own}, and the realised conational share in the first job. Included predicted characteristics are part-time status, firm age, conational manager, other migrant manager, log predicted firm size and log predicted median wage. L = labour market, N = nationality, D = district, Y = year of first job. Columns 3–6 additionally include a LxNxY fixed effect. Standard errors clustered by district + p<0.1, * p<0.05, ** p<0.01

Turning now to assessing the relevance of the proposed instrument, I report the results of cross-sectional regressions of the realised conational share in the first job on the predicted conational share in Table 2. In column one I report the bivariate relationship between the the predicted and actual conational share; a one-percentage-point increase in the predicated conational share increases the realised conational share by 1.3 percentage points and the R^2 in the bivariate regression is equal to 0.19, implying a raw correlation of 0.44. Moving through columns 2–7, I progressively include more restrictive sets of fixed effects and, finally, controls for other predicted job and firm characteristics. Throughout, R^2 rises from 0.19 to 0.65, however the instrument is highly significant and continues to predict the actual conational share almost one-to-one. I repeat the same set of regressions for the share of immigrants coming from other

in the reduced-from equation, biasing the two-stage least squares estimate of the effect of the conational share.

countries among the set of coworkers in the first job and report the results in Table A.4. While the relationship is a little weaker, the predicted share of other immigrants is nevertheless strongly predictive of the actual share of other immigrants.

Finally, when estimating the dynamic effect of the conational share, the predicted conational share and other immigrant share will be interacted with the same set of time-since-migration dummies as the actual shares, as in Equation (2). Turning from estimation to inference, I report standard errors clustered at the district level. Strictly speaking, the value of the instrument varies for each individual, however the firm-level hiring shocks from which the instrument is constructed are common to immigrants finding a job in the same labour market in the same year, suggesting that the district-year is the level at which treatment is assigned and standard errors should be clustered (Abadie, Athey, Imbens, and Wooldridge, 2017). However, firm-level labour demand shocks may be somewhat persistent over time, leading to some serial correlation in the instrument, which leads me to cluster at the district level.

4 The effect of the initial conational share

4.1 Employment rates

The main outcome of interest is individual employment rates. An individual's employment rate is defined as the fraction of days they are employed in a job covered by social security in a calendar year. I first report estimates of the reduced form effect of the predicted conational share in Panel A of Table 3. All specifications include a labour market by nationality by year of first job fixed effect, while in columns 2–4 I sequentially include district, district by nationality, and district by nationality and district by first year fixed effects. The pattern of effects is relatively consistent; the predicted conational share has a negative effect on subsequent employment rates and this effect becomes more negative over time. However, the effect attenuates somewhat as I include more detailed fixed effects. For example, six or more years after the first job, a ten-percentage-point increase in the predicted conational share lowers employment by 3.3 percentage points in the basic specification, and 2.3 percentage points when the full set of fixed effect is included. In columns 5–7 I also include other predicted characteristics of the firm and job. Now, including more-detailed fixed effects does not affect the estimated reduced form effect much, suggesting the predicted characteristics, in addition to being necessary for the exclusion restriction to hold, may also capture some residual selection into districts that the fixed effects capture when the predicted characteristics are not included. The reduced form effect of the predicted share of immigrants from other countries of origin follows a different pattern. Across the different specifications, the short-term effect is negative and generally smaller than the effect of the predicted conational share, while the long-term effect is statistically and economically insignificant.

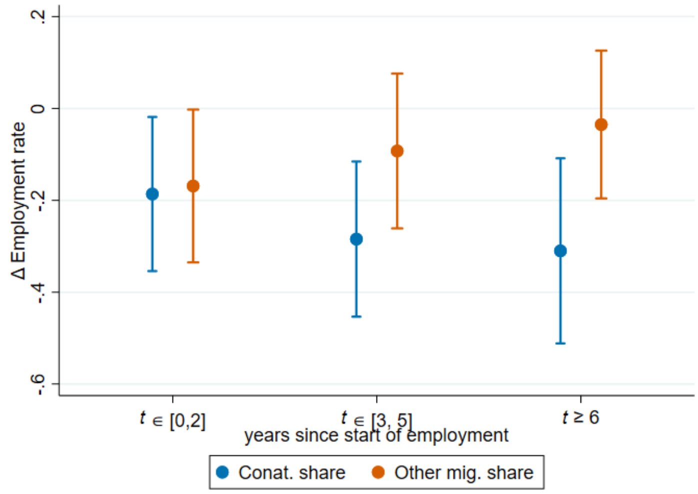
Turning to the effect of the realised conational share on subsequent employment rates, I report 2SLS estimates from the full specification, including both predicted firm characteristics as instruments for realised firm characteristics as well as labour market by nationality by year

Table 3: Individual annual employment rates

	OLS	2SLS					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Reduced form							
$\mathbf{1}(t \in [0,2]) \times z_i^{own}$		-0.17**	-0.14*	-0.075	-0.16*	-0.16	-0.15*
		(0.060)	(0.055)	(0.082)	(0.072)	(0.10)	(0.071)
$\mathbf{1}(t \in [3,5]) \times z_i^{own}$		-0.30**	-0.27**	-0.20*	-0.28**	-0.28*	-0.28**
		(0.054)	(0.059)	(0.088)	(0.074)	(0.12)	(0.074)
$\mathbf{1}(t \geq 6) \times z_i^{own}$		-0.33**	-0.30**	-0.23*	-0.31**	-0.32*	-0.31**
		(0.073)	(0.073)	(0.099)	(0.094)	(0.13)	(0.091)
$\mathbf{1}(t \in [0,2]) \times z_i^{other}$		-0.11*	-0.11*	-0.17**	-0.12*	-0.17*	-0.033
		(0.044)	(0.046)	(0.058)	(0.051)	(0.070)	(0.048)
$\mathbf{1}(t \in [3,5]) \times z_i^{other}$		-0.054	-0.053	-0.12*	-0.068	-0.11	-0.047
		(0.038)	(0.041)	(0.058)	(0.049)	(0.070)	(0.048)
$\mathbf{1}(t \geq 6) \times z_i^{other}$		-0.012	-0.011	-0.083+	-0.026	-0.079	-0.079+
		(0.034)	(0.037)	(0.050)	(0.044)	(0.060)	(0.043)
Panel B: OLS and 2SLS estimates							
$\mathbf{1}(t \in [0,2]) \times s_i^{own}$	-0.088**	-0.13**	-0.13**	-0.055	-0.19*	-0.23	-0.19*
	(0.023)	(0.046)	(0.047)	(0.067)	(0.086)	(0.18)	(0.087)
$\mathbf{1}(t \in [3,5]) \times s_i^{own}$	-0.16**	-0.23**	-0.23**	-0.15*	-0.28**	-0.33+	-0.29**
	(0.025)	(0.041)	(0.050)	(0.071)	(0.086)	(0.18)	(0.086)
$\mathbf{1}(t \geq 6) \times s_i^{own}$	-0.20**	-0.25**	-0.26**	-0.18*	-0.31**	-0.36+	-0.30**
	(0.024)	(0.050)	(0.060)	(0.079)	(0.10)	(0.19)	(0.10)
$\mathbf{1}(t \in [0,2]) \times s_i^{other}$	-0.13**	-0.17*	-0.16*	-0.28**	-0.17*	-0.21+	-0.043
	(0.017)	(0.072)	(0.078)	(0.096)	(0.085)	(0.13)	(0.083)
$\mathbf{1}(t \in [3,5]) \times s_i^{other}$	-0.065**	-0.092	-0.088	-0.20*	-0.093	-0.14	-0.065
	(0.018)	(0.067)	(0.076)	(0.096)	(0.086)	(0.13)	(0.084)
$\mathbf{1}(t \geq 6) \times s_i^{other}$	-0.037+	-0.032	-0.029	-0.15+	-0.035	-0.088	-0.12
	(0.019)	(0.064)	(0.071)	(0.086)	(0.082)	(0.12)	(0.081)
Firm characteristics	Yes	No	No	No	Yes	Yes	Yes
Observations	501605	501605	501605	501605	501605	501605	501605
Individuals	39069	39069	39069	39069	39069	39069	39069
KP F-statistic		55.5	46.2	36.1	14.0	6.3	14.0
FE	NxD	D	NxD	NxD, DxY	NxD	NxD, DxY	NxD, oY

Notes: Each coefficient measures the effect of a one-percentage-point increase the share of coworkers on a given type on subsequent employment rates, measured in percentage points. Firm characteristics are part-time status, firm age, conational manager, other migrant manager, firm size, and median wage. L = labour market, N = nationality, D = district, Y = year of first job, oY = year of observation; all specifications include a LxNxD fixed effect. Standard errors are clustered by district. + $p < .1$, * $p < .05$, ** $p < .01$

Figure 3: Employment effects estimated by 2SLS



Notes: 2SLS estimates of the dynamic effect of the initial conational share and share of immigrants from other countries on employment rates. The specification includes labour market by nationality by year and district by nationality fixed effects as well as initial firm characteristics, instrumented for using prediced firm characteristics. Standard errors are clustered by district, 95 per cent confidence intervals are shown.

of job-finding and district by nationality fixed effects in Figure 3. The conational share in the first job has a negative effect on employment, which becomes stronger over time since the start of the first job. A ten-percentage-point increase in the conational share in the first job lowers employment by 1.9 percentage points in the first two years after the start of the first job, and by 3.1 percentage points after six or more years. An analogous increase in the share of immigrants from other countries, on the other hand, will lower employment rates by 1.7 percentage points in the first two years, and by a statistically insignificant 0.35 percentage points after six or more years. This difference between the effect of conationals and the effect of other immigrants constitutes a novel finding. Furthermore, it will be important to bear this difference in mind when evaluating potential mechanisms, since it implies that any mechanism that explains the effect needs to be specific to the conational share, and cannot apply to immigrants in general.

By way of comparison, I report OLS estimates of the association between the realised conational share and subsequent employment rates in column one of Panel B of Table 3, including realised firm characteristics as controls as well as labour market by nationality by first year and nationality by district fixed effects. The same time pattern is observed as for the 2SLS estimates, however the 2SLS estimates are larger in magnitude, i.e. more negative, than the OLS estimates. A ten-percentage-point increase in the realised conational share lowers employment rates by 0.9 percentage points in the short-term and by 2 percentage points in the long-term. This could be due to the fact that finding a job in a firm with a higher conational share may be a proxy for receiving a referral, which raises subsequent employment rates (Dustmann et al., 2016) or having an immigrant manager, which lowers separations (Åslund et al., 2014), both of which would bias the OLS estimates upwards.

Finally, I report 2SLS estimates from various alternative specifications in columns 2–7 of Panel B of Table 3. In columns 2–4 I do not include other firm characteristics as controls, while in columns 5–7 I include other firm characteristics and instrument for them using predicted characteristics. The pattern of 2SLS estimates across specifications is similar to the pattern of reduced-form estimates, in Panel A. Including more-detailed fixed effects reduces the magnitude of the coefficients somewhat, however the long-term effect remains negative, significant, and larger in magnitude than the short-term effect. Including controls for other firm characteristics increases the estimated magnitude slightly, however the joint first-stage Kleibergen-Papp F-statistic is smaller, as the instrument set is larger and not all realised characteristics are equally well predicted by the equivalent predicted characteristic. Column 5 repeats my preferred specification, already shown in Figure 3, instrumenting for all firm characteristics, which, as was seen in Figures 2a and 2b, is a necessary condition for the exclusion restriction to hold. Finally, in column 7 I include a fixed effect for the year in which the outcome is observed, in case different cohorts are exposed to the national business cycle at different points in time since their arrival. The estimated effect is almost identical to my preferred specification.

To put the magnitude of the long-term employment effect into context, Glitz (2014) finds that the average employed immigrant in Germany in 2008 had 18 percentage points more conational coworkers than would be expected under a random allocation of workers, or 13 percentage points after partialling out the effects of region of residence, gender, education, and industry. The employment rate of the foreign-born in Germany at the time was 62.9 per cent, 8.7 percentage points lower than the employment rate of the native-born (OECD, 2020). Scaling the long-term effect of the conational share in my preferred specification by average segregation translates to an employment rate that is $0.31 \times 18 = 5.6$ percentage points lower, or 4 percentage points if observable characteristics are partialled out of the measure of segregation. The magnitude of the long-term association between the initial conational share and employment is therefore large relative to the difference in employment rates between immigrants and natives in Germany.

4.2 Robustness

4.2.1 Definition of employment

As noted in Section 2, return migration and self-employment are not recorded in the SIEED. As a result, the negative employment effect of the conational share could at least in part be due to immigrants leaving the country or shifting to self-employment.[8] In column 1 of Table 4, I repeat my main IV specification using a dummy for having dropped out of employment permanently, according to the SIEED, as an outcome. I find that a ten-percentage-point increase in the initial conational share does indeed increase the probability of dropping out of formal employment

[8]Note, however, that return migration and, to a lesser extent, self-employment are also indicative or reduced success in the labour market for immigrants. As such, the negative effect of the conational share on subsequent SIEED employment is still a measure of reduced labour market success, even if part of the effect were to be interpreted as increased return migration or self-employment.

altogether, that this effect is increasing over time, and that there is no such effect for the other immigrant share. In column 2 I therefore restrict my sample to those individuals who have not yet dropped out altogether, i.e. those either working, or currently unemployed but who will be observed returning to formal employment in the future. These estimates cannot be interpret causally, since I condition on an outcome of the variable of interest. Nevertheless, the initial conational share remains negatively associated with subsequent employment rates, and the effect becomes more negative over time, while the negative short-term association with the other immigrant share is again transient. Furthermore, the results on dropout in column 1 suggest that the sample of individuals who have not dropped out will become more positively selected on labour market attachment in Germany over time since the start of the first job, implying that the effects reported in column 2 are likely to represent a lower bound on the magnitude of the employment effect.

Table 4: Other measures of employment and labour force participation

	(1) Dropout	(2) Employed	(3) Employed	(4) Self-emp.	(5) Civil servant	(6) Employed
$\mathbf{1}(t \in [0,2]) \times s_i^{own}$	0.045	-0.26**	-0.0080	0.15	-0.0030	-0.069
	(0.083)	(0.083)	(0.058)	(0.16)	(0.013)	(0.049)
$\mathbf{1}(t \in [3,5]) \times s_i^{own}$	0.21*	-0.28**	-0.071	0.38*	-0.030	-0.11*
	(0.096)	(0.083)	(0.067)	(0.18)	(0.019)	(0.047)
$\mathbf{1}(t \geq 6) \times s_i^{own}$	0.24*	-0.30**	-0.14*	0.076	0.0070	-0.16**
	(0.11)	(0.10)	(0.070)	(0.061)	(0.0077)	(0.049)
$\mathbf{1}(t \in [0,2]) \times s_i^{other}$	0.048	-0.24**	-0.030	0.021	0.014	-0.15*
	(0.073)	(0.061)	(0.045)	(0.035)	(0.014)	(0.060)
$\mathbf{1}(t \in [3,5]) \times s_i^{other}$	-0.041	-0.12+	-0.053	-0.055	-0.012	-0.028
	(0.073)	(0.067)	(0.059)	(0.041)	(0.013)	(0.059)
$\mathbf{1}(t \geq 6) \times s_i^{other}$	-0.070	-0.040	-0.060	-0.0053	-0.0074	0.011
	(0.077)	(0.067)	(0.064)	(0.032)	(0.0060)	(0.060)
Observations	501605	368720	10061	1506	1506	355777
Individuals	39069	39069	863	849	849	27815
KP F-statistic	14.04	13.11	–	–	–	–
Source	SIEED	SIEED	IAB-SOEP	SOEP	SOEP	SIEED

Notes: Each coefficient measures the effect of a one-percentage-point increase the share of coworkers. Coefficients in columns 1 and 2 are are estimated using 2SLS following Equation (2). Estimates in columns 3–5 are estimated on IAB-SOEP data using OLS, including additional controls for measured characteristics. Coefficients in column 6 are estimated using OLS, including labour market by nationality by year and firm by nationality fixed effects as well as the same set of controls as columns 1 and 2. Standard errors are clustered by district when using the SIEED data and by individual when using the IAB-SOEP data. + $p < .1$, * $p < .05$, ** $p < .01$

Another perspective on the relationship between the initial conational share, return migration, and self-employment is provided by the IAB-SOEP Migration Sample. There is no scope for return migration in these data, since they are constructed by surveying immigrants still in

Germany in 2013 and 2014 and then matching their survey responses retrospectively to their social security data. However, the dataset is too small to use the estimation strategy described in Section 3.2, which relies on a relatively detailed set of fixed effects. On the other hand, the IAB-SOEP data contain detailed information on immigrants' pre-migration characteristics and how they found their first job in Germany, both of which are potentially relevant determinants of both initial conational shares and longer-term employment rates.

Taking advantage of this rich set of contextual variables, I estimate descriptive regressions on the IAB-SOEP data using OLS, where, in addition to controls for initial firm characteristics, already included in the IV specifications, I also include controls for pre-migration German proficiency, pre-migration employment status, years of work experience pre-migration, knowing people in Germany prior to migrating, age at time of migration, as well as an indicator for having found the first job through pre-existing contacts and the number of years taken to find the first job. I report estimates of the dynamic association of the conational and other migration shares with employment rates in column 3 of Table 4. The results are not directly comparable to the IV estimates using the SIEED, in light of the differences in sample construction and identifying variation. However, even in a sample where all individuals are known to still be in Germany at the end of the sample period, the initial conational share is still negatively associated with subsequent employment rates and the association becomes more negative over time; the other immigrant share is not significantly associated with subsequent employment at any time horizon.[9]

The SOEP also contains information on employment as a civil servant or in self-employment for 2013 and 2014, the categories of employment not covered in the SIEED. I use an indicator for these types of employment as the outcome in columns 4 and 5. The association of both share variables with employment in the civil service, in column 5 is quite precisely estimated to be zero. The estimated association with self-employment is more noisy, however the coefficients for the conational share are positive and, for 3–5 years after entering employment, significantly so. One therefore cannot rule out that at least part of the negative employment effect estimated on the SIEED is due to an increase in self-employment.[10] Specifically, the magnitude of the insignificant long-term self-employment effect in column 4 corresponds to half the magnitude of the employment effect estimated in the IAB-SOEP data, in column 3, implying an increase in unemployment of 0.7 percentage points for a ten-percentage-point increase in the initial conational share. It also corresponds to about a quarter of the employment effect estimated on the SIEED data contional on not dropping out, in column 2, implying an increase in unemployment of 2.3 percentage points for a ten-percentage-point increase in the initial conational share.

[9]If the conational share in the first job has a positive effect on return migration, as the SIEED estimates seem to suggest, then the effect of the conational share on subsequent employment may be underestimated in a sample that, like the IAB-SOEP Migration Sample, conditions on not having return migrated, as I discuss in Appendix B.

[10]Andersson (2021) finds that refugees' self-employment is positively affected by the share of self-employed coethnics in the municipality of entry, but not by the share of co-ethnics per se. There may therefore be no strong reason *a priori* to presume that a higher share of conationals in the first job in formal employment might have an effect on subsequent self-employment, since conationals in the first job are themselves not in self-employment, at least initially.

4.2.2 Identifying assumptions

Having established that the estimated effect of the conational share on employment is unlikely to be fully explained by either return migration or self-employment, I consider potential threats to the identification strategy. The IV estimates might be biased if, e.g., individuals who rely more on their networks to find work, or who have worse German-language skills, are disproportionately likely to move into a district in years when there is a higher predicted conational share, making them more likely to end up working in firms with a higher conational share. The descriptive estimates on the IAB-SOEP data in column 4, which control for these kinds of individual characteristics, show that even conditional on pre-migration measures of individual employability or type of job search used to find the first job, the conational share is still negatively associated with employment rates in the longer run.

A related concern is that the firm characteristics included in the main specification and instrumented for using the predicated characteristics do not fully capture all relevant firm characteristics that might affect long-term employment, potentially violating the exclusion restriction. To check this, in column 6 of Table 4 I report the results of a specification where, instead of instrumenting for the predicted conational share, I replace the district by nationality fixed effect with a firm by year fixed effect. [11] The short-term effect decreases a little relative to the comparable OLS estimate of the short-term effect in column 1 of Table 3 and is no longer significant. More importantly, the long-term employment effect is a 1.6-percentage-point decrease in employment for a ten percentage-point increase in the initial conational share, which is only 20 per cent smaller than the equivalent effect in column 1 of Table 3. This suggests that selection into firms within districts is unlikely to explain the observed employment effect of the initial conational share.

4.2.3 Other concerns

I next turn to assessing whether there is any heterogeneity in the effect by other characteristics of the individual or firm and report the estimates in Table A.5. In order to have sufficient power to test for heterogeneous effects, I abstract from the dynamic effect of the conational share and estimate a cross-sectional regression, where the dependent variable is the average employment rate over the first eight years since the start of the first job. The baseline effect is reported in column 1; consistent with the dynamic specification, a ten-percentage-point increase in the conational share lowers employment rates by 3.3 percentage points, while the other migrant share has no effect. In column 2 I confirm that these effects are homogeneous by gender. In column 3 I show that the effect is larger for less-educated immigrants; for highly educated immigrants, a ten-percentage-point increase in the conational share lowers employment by a statistically insignificant 2 percentage points. Finally, in column 4 I allow for heterogeneity by the size

[11] The sample is therefore restricted to firms by nationalities where there is variation in the initial conational share, effectively, more than one individual of a given nationality is hired by the firm, and in different years.

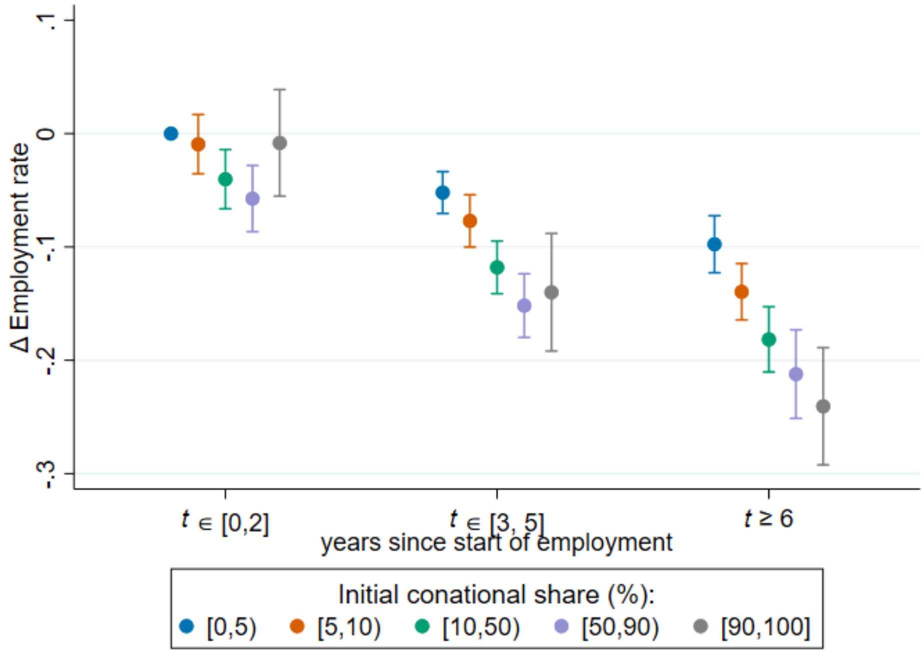
of the first firm. Since the size of the first firm is potentially an outcome of the instrument, these estimates cannot be interpreted causally. Nevertheless, the estimated coefficient on the conational share is larger in firms with fewer than 100 employees, consistent with the conational share mattering due to actual contact with one's coworkers. In larger firms, the conational share will less-accurately capture the degree of contact one has in the workplace with coworkers of different origins.

I also consider whether the conational share is proxying for other characteristics of coworkers by including other measures of average network quality in the local area or in the first firm in the cross-sectional regression. Specifically, I consider the employment rate in the district in the year of the first job, the share of conationals in the district population in the year of the first job, and the average employment rate of one's coworkers according to the SIEED over the five years prior to the start of the first job. I report the results in Table A.6, where the included measures are first standardised to have mean zero and standard deviation one. In columns 2–4 I include district or coworker characteristics as controls in the same cross-sectional IV specification as previously. Including these controls does not materially alter the effect of the conational share, even if it becomes less strongly significant when conditioning on the conational share in the district population, since these two variables are strongly correlated.

In columns 5–7 I also interact the included standardised controls with the conational and other migrant share in the first job. The only extra characteristic with a significant main effect in these specifications is the employment rate of an immigrant's coworkers before the immigrant joins the firm, in column seven, however the main effects of the coworker shares are not materially affected and the interaction terms are small and insignificant. The largest change in the effect of the coworker shares in these specifications occurs when interacting the conational share at the firm with the district-level conational share, in column six. In this case, the main effect of a ten-percentage-point increase in the initial conational share is now a statistically insignificant 2.5-percentage-point decrease in employment rates. Furthermore, interestingly, the effect of the conational share in the first job becomes less negative when the local conational share is lower, although the interaction term is not significant by itself. This might be because conationals encountered on the job are better-integrated when the local conational share is lower, or because a newly-arrived immigrant has more opportunities to interact with natives outside of work when the local conational share is lower, undoing the effect of more-intensive interactions with conationals in the workplace. The general picture to emerge from Table A.6, however, is that the conational share in the first job is not proxying in a systematic way for some other characteristic of one's initial set of coworkers.

Finally, I also asses the robustness of various assumptions I make about the functional form, embedded in Equation (2). First, the effect may be non-monotonic in the conational share (c.f. Ansala et al., 2021). In Figure 4 I plot the average employment rate for different categories of the initial conational share, conditional on included controls. All averages are expressed as deviations from the employment rate of individuals whose initial conational share is less than 5

Figure 4: Non-linear employment effect of composition of coworkers



Notes: Indicators for each category, coworker share in $[0, 5)$ in the first two years of employment is the omitted category. The full set of controls and fixed effects is included, 95 per cent confidence intervals are calculated using standard errors clustered by individual.

per cent in their first two years of employment.[12] The association between the initial conational share and long-term employment rates does appear to be monotone.

Second, the grouping of time dummies in Equation (2) may be overly restrictive. I estimate a specification by OLS where I allow the effect of both group shares to vary for each year since the start of the job.[13] The estimated coefficients are reported in Figure A.4. The time pattern of effects is similar to what I observe with the simpler specification, although there is a clear drop-off in the association between the initial conational share and employment rates between years zero and one that is obscured by the grouping of time dummies.

4.3 Wage earnings

In the aggregate, immigrants not only have lower employment rates than natives, but also have lower wages conditional on employment (Algan et al., 2010). I therefore repeat my main specific-

[12]These averages are estimated by replacing the interactions of the conational share with years since migration in Equation (2) with a full set of interactions between the years since migration and a set of dummies for the base year immigrant share taking values from $[0, 5)$, $[5, 10)$, $[10, 50)$, $[50, 90)$, and $[90, 100]$; individuals with a conational share in the 0–5 per cent range in their first two years of employment are the omitted category. The specification is estimated by OLS.

[13]To estimate this specification by 2SLS I would have to interact each of the sixteen year dummies with the predicted conational share; the resulting instrument set is too weak to reliably estimate the dynamic effects of interest.

ation using different measures of wages as outcomes, conditional on employment. In the light of the effect of the conational share on subsequent employment rates, documented in Table 3, conditioning the analysis on employment, while necessary, is problematic, since it implies that the sample is endogenously selected. The association between the initial conational share and wages should therefore not be interpreted causally, a point I will return to below.

Table 5: Relation between initial workplace composition and log wages

	OLS			2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbf{1}(t \in [0,2]) \times s_i^{own}$	0.22**	0.14**	0.089	-0.29	-0.22	-0.22
	(0.041)	(0.042)	(0.073)	(0.20)	(0.18)	(0.45)
$\mathbf{1}(t \in [3,5]) \times s_i^{own}$	0.11**	0.058+	0.093+	-0.11	0.043	-0.39
	(0.030)	(0.034)	(0.049)	(0.17)	(0.17)	(0.45)
$\mathbf{1}(t \geq 6) \times s_i^{own}$	0.010	-0.015	0.025	-0.30	0.052	-1.08*
	(0.040)	(0.044)	(0.056)	(0.27)	(0.23)	(0.43)
$\mathbf{1}(t \in [0,2]) \times s_i^{other}$	-0.027	-0.085*	-0.0038	-0.30*	-0.41**	0.027
	(0.046)	(0.039)	(0.085)	(0.14)	(0.13)	(0.20)
$\mathbf{1}(t \in [3,5]) \times s_i^{other}$	-0.10**	-0.15**	-0.11*	-0.089	-0.28*	0.17
	(0.037)	(0.036)	(0.056)	(0.14)	(0.12)	(0.18)
$\mathbf{1}(t \geq 6) \times s_i^{other}$	-0.062	-0.066	-0.16*	0.51**	0.27+	0.56**
	(0.047)	(0.044)	(0.064)	(0.17)	(0.14)	(0.19)
Observations	316315	216346	100352	316315	216346	100352
Individuals	39068	33736	20944	39068	33736	20944
KP F-statistic				14.4	9.7	4.2
Subsample	all	FT	PT	all	FT	PT

Note: Columns 1–3 report OLS estimates of relationship between initial conational share and log wages, conditional on employment, columns 4–6 report equivalent 2SLS estimates. The regression for average wages in columns 1 and 4 are estimated conditional on an individual being employed in a job covered by social security at least one day during the year, daily wages in columns 2, 3, 5, and 6 are measured on June 30 of the relevant year and condition on full- or part-time employment on that day. All coefficients are estimated using the specification defined in Equation (2), wages are deflated to 2010 values. Standard errors are clustered by initial district. + p<0.1, * p<0.05, ** p<0.01.

The results of the wage analysis are reported in Table 5. The social security data only include daily wages, rather than hourly wages, and an indicator for part-time status. In column 1 I therefore estimate the association between the initial conational share and the log of average daily earnings, defined, for individuals who work at least one day during the year, as total earnings subject to social security in a year divided by total number of days worked, deflated to 2010 values. In columns 2 and 3 I condition on working either full-time or part-time on June

30, to account for the effect of hours worked in a day, and take as my measure of wages wage earnings on June 30. There is a short-term positive association between the initial conational share and the daily wage, particularly for full-time workers, however there is no statistically or economically significant longer-term association, conditional on being employed. The share of immigrants coming from other countries appears, if anything, negatively associated with wages conditional on employment and the association appears to grow somewhat over time, particularly for part-time workers. However, the magnitudes are small—a ten-percentage-point increase in the other migrant share is associated with 0.6 per cent lower daily wages—and, pooling full-time and part-time workers, is statistically insignificant in both the short- and the long-run.

In columns 4–6 I repeat the same specifications, this time instrumenting for the conational share, the other immigrant share, as well as the same set of other firm characteristics as in the employment analysis (firm age, median wage, size, manager nationality) and part-time status in the first job. Now there is no significant association between the initial conational share and average daily wages at any time horizon. Only when conditioning on working part-time do I find a statistically significant association between the initial conational share and wages and only in the long term. The association is negative and the magnitude is quite large. A ten-percentage-point increase in the initial conational share is associated with an 11 per cent decrease in the daily wage, significant at the five per cent level. However, a relatively weak first stage means this isolated result should be interpreted with caution. On the other hand, the share of immigrants from other countries of origin appears to be negatively associated with daily wages in the short term and positively associated with daily wages in the long term. Here a ten-percentage-point increase in the other migrant share is associated with a marginally significant 2.8 per cent increase in wages for full-time workers and a 5.8 per cent increase in wages for part-time workers.

As noted previously, conditioning the analysis on any employment creates a form of selection bias. Individuals who are employed, whether full-time or part-time, in spite of having a high conational share in their first job are potentially positively selected on unobserved employability or desire to work relative to other immigrants, introducing a conditional-on-positive selection bias (Angrist and Pischke, 2009). This kind of selection would likely bias the estimated association between the initial conational share and potential subsequent earnings upward relative to the true association in the full, unobservable, population. To get a better sense for whether the true wage effect is indeed zero, or negative but biased by selection towards zero, I consider a simple model of selection into employment based on potential earnings, originally suggested by Card (2001).

Suppose that potential wages if employed for individual i, τ years after the first job, are distributed according to

$$\log w_{i\tau} = \log w_{\tau} + \xi_{i\tau}, \tag{4}$$

where $\xi_{i\tau}$ is a normally distributed, mean-zero error term. Suppose furthermore that individual i's employment status τ years after the start of the first job is determined by the sign of a latent index $H_{i\tau} = d_{\tau} + \alpha\xi_{i\tau} + \nu_{i\tau}$, where $\nu_{i\tau}$ is another normally distributed, mean-zero error term that is potentially correlated with $\xi_{i\tau}$. Card (2001) shows, under certain assumptions, that the selectivity bias τ years after entering employment, i.e. the difference between average potential wages in the whole population and average observed wages in the employed population, is approximately

$$\text{Bias}_\tau \approx 0.75\rho - 0.75\rho\pi_\tau \tag{5}$$

where $\rho = \text{Corr}(\xi_{i\tau}, \alpha\xi_{i\tau} + \nu_{i\tau})$ and π_τ is the employment rate after τ years. The results in Figure 3 imply that a ten-percentage-point increase in the initial conational share will lower employment rates by 3.1 percentage points after six or more years, thereby increasing the selectivity bias in observed log wages by $0.75\rho \times 0.031 \leq 0.023$. Subtracting the bound on the increase in bias from the estimated long-term daily wage effect reported in column 4 of Table 5 yields at most a 5.2 log-point reduction in wages after six or more years for a ten-percentage-point increase in wages. This bound on the reduction in wages is borderline significant at the five-per cent-level, using the standard error of the estimated long-term wage effect, reported in Table 5. Given that, in reality, it is likely that $0 < \rho < 1$, the long-term wage effect that would be estimated in the absence of selection into employment can reasonably be expected to lie somewhere on the interval [-0.52,-0.30].

To conclude, the pattern of associations of the share variables with long-term wages conditional on employment—a null or negative association for the conational share, and if anything a positive association for the share of immigrants from other countries—does not undo the reduction in total earnings implied by the negative employment effect of the conational share. If anything, the wage and earnings effects appear more likely that not to go in the same direction. Furthermore, the finding of a clear negative effect of the starting conational share on long-term employment, contrasting with weaker evidence of a wage effect is consistent with evidence that the total earnings gap between immigrants and natives is mostly due to differences in employment, not wages conditional on employment (Sarvimäki, 2011).

5 Mechanisms and interpretation

Having established that the conational share in the first job an immigrant holds has a negative effect on subsequent employment rates, I now turn to understanding the mechanisms that drive this result. I close by relating the negative employment effect documented here to previous evidence on the effect of neighbourhood ethnic networks.

5.1 Job search and social networks

Individuals are known to use their social networks both as a source of information about job openings (Calvó-Armengol and Jackson, 2004; Boucher and Goussé, 2019) and as a source of referrals when applying for jobs (Montgomery, 1991; Galenianos, 2013; Dustmann et al., 2016). Indeed, a common explanation for why larger coethnic neighbourhood shares at migration improve employment outcomes is that they lead to denser networks, which an immigrant can draw on when searching for work (e.g. Battisti et al., 2022; Beaman, 2012; Edin et al., 2003). It therefore seems natural to expect that larger conational shares in the first job might affect immigrants' subsequent job search behaviour, particularly since coworkers in general are a more important source of referrals than neighbours (Eliason et al., 2022).

Table 6: Referrals in subsequent jobs

	P(own ref.)			P(nat. ref.)		
	(1)	(2)	(3)	(4)	(5)	(6)
s_i^{own}	0.20**	0.21**	0.055	-0.091**	-0.092**	-0.072
	(0.022)	(0.22)	(0.11)	(0.017)	(0.027)	(0.11)
s_i^{other}	0.046**	0.042**	0.11+	-0.025+	-0.040**	-0.046
	(0.012)	(0.014)	(0.063)	(0.063)	(0.013)	(0.014)
Observations	145329	85668	2595	145329	85668	2595
Individuals	25080	21182	1806	25080	21182	1806
R^2	0.2	0.2	0.5	0.2	0.2	0.5
Subsample	all	U	C	all	U	C

Notes: OLS estimates. Dependent variable is an indicator for presence of a coworker from first job at the start of a subsequent job. U = unemployment to employment transitions; C = unemployment follows plant closure. SE clustered by initial district. + $p < .1$, * $p < .05$, ** $p < .01$

To understand the effect of a higher conational share in an immigrant's first job on subsequent job search, I first look at how the conational share affects how immigrants find out about subsequent jobs. I regress an indicator for the presence of a coworker of a given type from the first job held in Germany in the firm where an immigrant starts a new job, which I interpret as indicative of the worker receiving a referral, on the share variables of interest, as well as the same set of demographic and first-job controls and fixed effects. I report the estimates in Table 6. For all transitions into a new job, and for the subset where the immigrant is coming from unemployment, a ten-percentage-point-higher conational share raises the probability of receiving a referral from a past conational coworker by 2 percentage points and lowers the probability of receiving a referral from a past native coworker by one percentage point. The total effect of the conational share on receiving any kind of referral (not shown) is statistically significantly positive.

The composition of an immigrant's initial set of coworkers affects an immigrant's subsequent job search by changing the types of ties that make up the job search network, since the total number of coworkers is held constant. While Granovetter (1995) argued that a higher proportion of weak ties in a network improves search outcomes, Montgomery (1992) noted that this is only true if the job offer rate is higher from weak ties than strong ties and more recent evidence indicates that strong ties are a more productive source of referrals than weak ties (Gee, Jones, and Burke, 2017a; Gee, Jones, Fariss, Burke, and Fowler, 2017b). If we treat conationality as a proxy for being a strong tie, consistent with theories of homophily in social networks (e.g. Mcpherson, Smith-Lovin, and Cook, 2001), then an increase in the initial conational share increases the proportion of strong ties in an immigrant's network and the evidence in Table 6 is consistent with the recent evidence on strong ties being more productive at the margin.

It is common to think of a worker's network as providing job offers on top of the offers that come through the worker's own search on the external market (e.g. Calvó-Armengol and Jackson, 2007; Dustmann et al., 2016). In this framework, a network with more strong ties can only be beneficial, since job offers through the network channel can always be discarded if they are inferior to the offers coming from the worker's own search. However, workers endogenously choose when and how to search for a job given the composition of their networks. The effect of the conational share on the probability of receiving a referral could mean that immigrants with a higher conational share in the first job receive more or better-paid job offers from their network than immigrants with fewer conational coworkers, but it may also indicate that they receive fewer or worse job offers from non-network channels, perhaps because they decrease their own job search efforts when they expect more offers to arrive from their network.

To understand whether this is the case, I estimate the same specification on a sample of workers who were displaced from a job by an establishment closure and who are therefore forced to search for a job through whatever means are available (as in, e.g., Cingano and Rosolia, 2012, Glitz, 2017, or Eliason et al., 2022; plant closures are measured using worker outflows, following Hethey-Maier and Schmieder, 2013). For this admittedly small sample, a higher conational share only raises the probability of a referral from a conational by a statistically insignificant 0.6 percentage points and the net effect is zero. These results suggest that immigrants are indeed decreasing their own job search effort when they have worked with more conational coworkers and can expect more offers to come via their network, at least until they are forced to find a job quickly by an unexpected job loss.

Further evidence that immigrants' own job search activity decreases when they have more conational coworkers comes from studying employment outcomes of the job search process, the results of which are reported in Table 7. Again, if job offers through the network are simply added to offers from the worker's own search, a higher initial conational share should only improve other job search outcomes. I show in columns 1 and 2 that a ten-percentage-point increase in the initial conational share instead lowers the probability of moving to another job when a job spell ends, by 1.1 percentage points according to the OLS estimate, or 2.3 percentage points, when instrumenting for the initial firm characteristics. Conditional on becoming unemployed, a higher conational share also appears to weakly increase the duration of the unemployment spell. I report OLS and IV estimates for different samples of the effect of the conational share on the duration of unemployment spells, conditional on becoming unemployed, in columns 3–8.[14] While the coefficient is only significant for the OLS estimates on the full sample, according to which a ten-percentage-point increase in the conational share increases unemployment duration

[14] I do not report IV estimates for the subset of individuals who experience plant closures since this group is too small, affecting power.

by approximately 3 per cent, the point estimate is nevertheless quite stable across the different specifications. The effect of the other immigrant share, on the other hand, is much more unstable and varies substantially across specifications.

Table 7: Job-to-job transitions and unemployment duration

	OLS	2SLS	OLS				2SLS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
s_i^{own}	-0.11**	-0.23+	0.28**	0.10	0.39	0.11	0.38	0.39
	(0.017)	(0.12)	(0.097)	(0.076)	(0.30)	(0.35)	(0.34)	(0.30)
s_i^{other}	-0.022	-0.029	-0.058	-0.047	-0.60*	-0.64*	0.22	0.27
	(0.015)	(0.063)	(0.052)	(0.041)	(0.27)	(0.25)	(0.32)	(0.25)
Observations	170022	170022	141393	119902	4024	3287	141393	119902
Individuals	31088	31088	36302	29557	2955	2354	36302	29557
R^2	0.15	-0.0081	0.17	0.14	0.45	0.42	0.0052	-0.0037
Subsample	all	all	all	UT	C	UTC	all	UT

Note: Outcome in columns 1 and 2 is an indicator from moving from a job to another job, rather than unemployment, when completing a job spell. Outcome in columns 3–8 is the log of unemployment spell duration, conditional on becoming unemployed. Standard errors clustered by initial district. + p<0.1, * p<0.05, ** p<0.01

To summarise, the increased share of conationals in the first job leads to an increased reliance on coworkers when searching for subsequent jobs. The probability of receiving a referral increases, but job search outcomes on the whole worsen, suggesting immigrants respond to the increased chance of getting a referral from a conational by reducing their own search effort. A related possibility is that immigrants' search productivity might also decrease, if immigrants learn to search through their interactions with natives in the first job, or if immigrants learn to search for jobs in the host country through experience searching, such that a reduced search effort induced by a higher conational share worsens an immigrant's subsequent ability to search independently for jobs. Given that the main employment effect documented in Section 4.1 is long-lasting, it appears plausible that immigrants' search productivity, as well as their search effort, is negatively affected by a higher conational share in the first job.

5.2 Human capital accumulation

An alternative explanation for worse job search outcomes, however, is that the conational share in the first job directly slows down the immigrant's accumulation of productive skills, leading fewer employers to want to hire them at wages exceeding the worker's reservation wage. Acquiring host country-specific human capital has been shown to account for a substantial portion of the convergence of immigrant wages to native wages over time (Eckstein and Weiss, 2004). Furthermore, Battisti et al. (2022) show that a higher share of conationals in the district of residence lowers the acquisition of host country-specific human capital in the longer run. They argue that this is because a larger share of conational co-residents makes job-finding easier, lowering the benefit of acquiring host country-specific human capital. A higher conational coworker share may likewise slow an immigrant's acquisition of Germany-specific human capital, making them less productive and making it harder for them to find jobs.

Table 8: Human capital accumulation

	(1) Proficiency	(2) Training in DE	(3) Training | entry
$\mathbf{1}(t \in [0,2]) \times s_i^{own}$	-0.50**	-0.017	0.043
	(0.16)	(0.049)	(0.042)
$\mathbf{1}(t \in [3,5]) \times s_i^{own}$	-0.28	-0.088	-0.040
	(0.17)	(0.056)	(0.052)
$\mathbf{1}(t \geq 6) \times s_i^{own}$	-0.10	-0.16**	-0.14**
	(0.087)	(0.057)	(0.054)
$\mathbf{1}(t \in [0,2]) \times s_i^{other}$	-0.45*	0.029	0.083*
	(0.18)	(0.054)	(0.037)
$\mathbf{1}(t \in [3,5]) \times s_i^{other}$	-0.23+	-0.088	-0.052
	(0.13)	(0.062)	(0.045)
$\mathbf{1}(t \geq 6) \times s_i^{other}$	-0.075	-0.039	-0.025
	(0.079)	(0.077)	(0.067)
Observations	1687	10061	10061
Individuals	850	863	863
R^2	0.28	0.23	0.26

Note: The dependent variable in column 1 is an indicator for reporting being proficient in German at time t, in column 2 it is an indicator for having completed some form of post-school education in Germany by time t, in column 3 it is an indicator for having completed some form post-school education in Germany that took place after having entered the labour market by time t. All specifications include controls for pre-migration characteristics, method of finding first job, other job characteristics, and demographic characteristics. Standard errors clustered by initial district. + $p<0.1$, * $p<0.05$, ** $p<0.01$

The SIEED does not contain information on human capital formation that would allow me to test this possibility, however, the matched IAB-SOEP data on non-return migrants can provide some descriptive evidence. In Table 8, I report the estimates from a linear probability model associating the share variables and an indicator for German proficiency, measured at the time of the survey, again controlling in particular for the available premigration characteristics: employment status, quadratics in work experience and age at migration, education, whether an individual had contacts in Germany prior to migrating, method of finding first job, time to first job in Germany, and premigration German proficiency. Both the conational and other migrant shares are negatively associated with human capital in the short-run, with a ten-percentage-point increase in either decreasing the probability of being proficient in German by 4.5–5 percentage points. However, the associations between the share variables and German proficiency do not persist in the long-term and are common to both share variables. It therefore cannot explain the negative effect on job search and employment rates in the long-run that is specific to the conational share.

On the other hand, the conational share is negatively associated with having completed some form of training or education in Germany, while the other migrant share is not (column 2) and the association of the conational share with training is entirely due to training that took place after the start of the first job (column 3). This association could, however, be explained by the fact that individuals with reduced employment rates or who have dropped out of the labour market may have fewer incentives to participate in training, if they don't expect to find a job. Lower employment rates will also directly lower access to on-the-job training, such as apprenticeships, an important component of job training in Germany. As a result, while the evidence presented in Table 8 does not conclusively rule out differential Germany-specific human capital accumulation as a mechanism to explain the negative effect of the initial conational share on job-finding ability, it suggests it can at best only explain part of the worse job search outcomes induced by a higher conational share in the initial job.

5.3 Wage and productivity in the first job

The conational share in the first job may be associated with hard-to-observe characteristics of the first job. For example, a higher conational share is correlated with having received the job through a referral (Dustmann et al., 2016), or having a conational manager (Åslund et al., 2014). The immigrant share, i.e. both the conational share and the other migrant share, might also be negatively correlated with firm productivity (Damas de Matos, 2012). The immigrant share may also directly affect worker productivity in the first job, particularly if there are costs to working in mixed teams (Glover, Pallais, and Pariente, 2017; Hjort, 2014; Lazear, 1999a,b).[15]

In all of these cases, the conational share and, perhaps to a lesser extend, the other immigrant share, will have an effect on the wage in the first job. The wage in the first job might in turn affect the probability of switching jobs, either by affecting a worker's starting position on the job ladder (Burdett and Mortensen, 1998), or by altering a worker's threat point when bargaining (Postel-Vinay and Robin, 2002). Furthermore it may affect unemployment duration conditional on becoming unemployed if it affects unemployed workers' reservation wages, or if, for example, past wages are taken as a signal of productivity.

However, the types of relationships described above are arguably better classified as confounders for the effect of the composition of the set of coworkers, rather than mechanisms, since they are not direct outcomes of the conational or other migrant shares. The use of the IV estimation strategy described in Section 3.2 is in part intended to rule out such confounding by correlated job characteristics. Nevertheless, to check that the IV strategy is working as intended in this respect, I estimate the relationship between the initial conational share and other charac-

[15] Peri and Sparber (2009) and Ottaviano and Peri (2012), provide evidence of aggregate complementarities between immigrants and natives, however it is not clear whether such complementarities arise within firms, or by increasing the scope for specialisation across firms.

Table 9: Outcomes in first job

	ln(wage$_0$)		ln(duration)		EE transition	
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	OLS	2SLS	OLS	2SLS
s_i^{own}	0.19**	0.12	-0.41**	-0.42	-0.076**	0.096
	(0.037)	(0.25)	(0.13)	(0.45)	(0.022)	(0.14)
s_i^{other}	0.18**	0.31*	-0.50**	0.45	-0.054**	-0.18*
	(0.053)	(0.14)	(0.094)	(0.31)	(0.018)	(0.085)
Observations	39069	39069	37937	37937	37768	37768
KP F-statistic		17.2		17.0		17.0
Subsample	all	all	UT	UT	UT	UT

Note: Results from cross-sectional estimates of the relationship between shares in the first job and other characteristics of the first job. UT denotes untruncated job spells, i.e. completed job spells. Standard errors clustered by initial district. + p<0.1, * p<0.05, ** p<0.01

teristics of the first job. The results are reported in Table 9. The IV estimates, while imprecise, do not suggest a significant effect of the conational share on any of the outcomes considered. A ten-percentage-point increase in the initial conational share raises wages by 1.2 per cent, reduces the duration of the first job by 4.3 per cent and reduces the probability of an employment to employment transition by 1 percentage point, with all three effects statistically insignificant. On the other hand, there is some evidence that the other immigrant share has a statistically significant effect on wages, which increase 3.1 per cent, and the probability of a job-to-job transition, which decreases by 1.8 percentage points.

5.4 Interpretation in relation to prior research

Recent evidence on the effect of the conational residential network suggests a dynamic trade-off. Immigrants living in areas with more conationals are better integrated into the labour market in the short-run, but these differences disappear in the long-run (Battisti et al., 2022). In a similar vein, Gagliarducci and Tabellini (2022) find that a greater local density of ethnic social organisations, specifically Italian Catholic churches in the US, increases labour force participation but in lower-quality jobs and occupations.

Battisti et al. (2022) suggest that their dynamic effect arises because a higher conational share among neighbours, by increasing contemporaneous employment, lowers the incentive to acquire host-country specific human capital, which crowds out employment now in return for increasing employment in the future. However, the findings reported here suggest another, potentially complementary reason for the dynamic tradeoff they document. Individuals living in a location with a higher share of conationals may be able to draw on these conationals to find a job more quickly, however these jobs, potentially obtained through referrals, are likely to be in firms with a higher share of conationals. While a higher conational residential share would therefore speed up entry into the labour market, it will slow down convergence to natives once entry takes place.

The individuals in the SIEED are only observed once they find work. However, I do provide supporting descriptive evidence, drawing on the IAB-SOEP Migration Sample, for the mechanism described here. In Figure A.5, I plot the average conational and other migrant share by years until the first job. While the sample is small, a relatively clear pattern nevertheless emerges. Individuals who find work quicker do so in higher conational share firms, for which there may be a future cost, in reduced subsequent employment. The share of immigrants from other countries of origin, on the other hand, does not follow such a clear trend.

6 Conclusion

In this paper I have shown that starting one's career in an establishment with a high share of conationals has negative long-term effects on an immigrant's labour market outcomes and particularly their employment rate. This is in contrast to the literature on initial residential conditions for newly arrived immigrants, where a high share of conationals in an immigrant's location of residence, by expanding the size of an individual's network, is generally thought to have positive effects on an immigrant's labour market outcomes. The effect is also specific to an immigrant's conationals; there is no statistically significant penalty for working with immigrants from other countries of origin.

I consider whether the documented effect of the conational share is due to changes in job search or changes in immigrants' productive human capital. Descriptive evidence suggests that the negative effect is unlikely to be the result of reduced acquisition of Germany-specific human capital. Instead, I show indirect evidence that working with more conationals worsens an immigrant's job search, either by reducing job search effort or by reducing the productivity of job search effort, and that this is likely to be the main mechanism explaining the results.

Future research could dig more deeply into this mechanism, to understand how immigrants learn to search for jobs in a new country, and what affects the relative productivity of own search versus relying on social networks. It would also be instructive to move beyond the first job, to understand what role improvements to coworker networks over time spent in the host country play in longer-term immigrant earnings growth. Better data would also make it possible to more explicitly study the different margins of drop-out from formal employment: onward migration, self-employment, benefit receipt, or unemployment.

References

Abadie, A., S. Athey, G. Imbens, and J. Wooldridge (2017): "When Should You Adjust Standard Errors for Clustering?" NBER Working Paper 24003.

Abramitzky, R., L. P. Boustan, and K. Eriksson (2014): "A Nation of Immigrants: Assimilation and Economic Outcomes in the Age of Mass Migration," *Journal of Political Economy*, 122, 467–506.

Algan, Y., C. Dustmann, A. Glitz, and A. Manning (2010): "The Economic Situation of First and Second-Generation Immigrants in France, Germany and the United Kingdom," *The Economic Journal*, 120, F4–F30.

Andersson, F., M. García-Pérez, J. Haltiwanger, K. McCue, and S. Sanders (2014): "Workplace Concentration of Immigrants," *Demography*, 51, 2281–2306.

Andersson, H. (2021): "Ethnic Enclaves, Self-employment, and the Economic Performance of Refugees: Evidence from a Swedish Dispersal Policy," *International Migration Review*, 55, 58–83.

Angrist, J. D. and J.-S. Pischke (2009): *Mostly Harmless Econometrics: An Empiricist's Companion*, Princeton, N.J.: Princeton University Press.

Ansala, L., O. Åslund, and M. Sarvimäki (2021): "Immigration history, entry jobs and the labor market integration of immigrants," *Journal of Economic Geography*.

Arellano-Bover, J. (2020a): "Career consequences of firm heterogeneity for young workers: First job and firm size," IZA Discussion Paper 12969.

——— (2020b): "The Effect of Labor Market Conditions at Entry on Workers' Long-Term Skills," *The Review of Economics and Statistics*, 1–45.

Åslund, O., L. Hensvik, and O. N. Skans (2014): "Seeking Similarity: How Immigrants and Natives Manage in the Labor Market," *Journal of Labor Economics*, 32, 405–441.

Åslund, O. and O. N. Skans (2010): "Will I see you at work: Ethnic Workplace Segregation in Sweden, 1985-2002," *ILR Review*, 63, 471–493.

Autor, D. H., N. Maestas, K. J. Mullen, and A. Strand (2015): "Does Delay Cause Decay? The Effect of Administrative Decision Time on the Labor Force Participation and Earnings of Disability Applicants," NBER Working Papers 20840, National Bureau of Economic Research, Inc.

Aydemir, A. and M. Skuterud (2008): "The immigrant wage differential within and across establishments," *Industrial and Labor Relations Review*, 61, 334–352.

Barth, E., B. Bratsberg, and O. Raaum (2012): "Immigrant wage profiles within and between establishments," *Labour Economics*, 19, 541–556.

Battisti, M., G. Peri, and A. Romiti (2022): "Dynamic effects of co-ethnic networks on immigrants' economic success," *Economic Journal*, 132, 58–88.

Beaman, L. A. (2012): "Social networks and the dynamics of labour market outcomes: Evidence from refugees resettled in the U.S." *Review of Economic Studies*, 79, 128–161.

Borjas, G. J. (1985): "Assimilation, changes in cohort quality, and the earnings of immigrants," *Journal of Labor Economics*, 3, 463–489.

Boucher, V. and M. Goussé (2019): "Wage dynamics and peer referrals," *Review of Economic Dynamics*, 31, 1–23.

Brinatti, A. and N. Morales (2021): "Firm Heterogeneity and the Impact of Immigration: Evidence from German Establishments," Working Paper 21-16, Federal Reserve Bank of Richmond.

Brücker, H., M. Kroh, S. Bartsch, J. Goebel, S. Kühne, E. Liebau, P. Trübswetter, I. Tucci, and J. Schupp (2013): "The new IAB-SOEP Migration Sample: an introduction into methodolofy and the contents," SOEP Survey Papers (Series C) 216.

Burdett, K. and D. T. Mortensen (1998): "Wage differentials, employer size, and unemployment," *International Economic Review*, 39, 257–273.

Calvó-Armengol, A. and M. O. Jackson (2004): "The effects of social networks on employment and inequality," *American Economic Review*, 94, 426–454.

——— (2007): "Networks in labor markets: Wage and employment dynamics and inequality," *Journal of Economic Theory*, 132, 27–46.

Card, D. (2001): "Immigrant inflows, native outflows, and the local labor market impacts of higher immigration," *Journal of Labor Economics*, 19, 22–64.

Chiswick, B. R. (1978): "The Effect of Americanization on the Earnings of Foreign-born Men," *Journal of Political Economy*, 86, 897–921.

Cingano, F. and A. Rosolia (2012): "People I Know: Job Search and Social Networks," *Journal of Labor Economics*, 30, 291–332.

Damas de Matos, A. (2012): "The Careers of Immigrants," CEP Discussion Paper 1171.

Damm, A. P. (2009): "Ethnic Enclaves and Immigrant Labor Market Outcomes: Quasi-Experimental Evidence," *Journal of Labor Economics*, 27, 281–314.

Dustmann, C., A. Glitz, U. Schönberg, and H. Brücker (2016): "Referral-based job search networks," *Review of Economic Studies*, 83, 514–546.

Dustmann, C. and J.-S. Görlach (2015): "Selective out-migration and the estimation of immigrants' earnings profiles," in *Handbook of the Economics of International Migration*, ed. by B. R. Chiswick and P. W. Miller, North-Holland, vol. 1, 489–533.

Eckstein, Z. and Y. Weiss (2004): "On the Wage Growth of Immigrants: Israel 1990-2000," *Journal of the European Economic Association*, 2, 665–695.

Edin, P.-A., P. Fredriksson, and O. Åslund (2003): "Ethnic enclaves and the economic success of immigrants—evidence from a natural experiment," *Quarterly Journal of Economics*, 118, 329–357.

Eliason, M., L. Hensvik, F. Kramarz, and O. Nordstrom Skans (2022): "Social Connections and the Sorting of Workers to Firms," *Journal of Econometrics*, Forthcoming.

Gagliarducci, S. and M. Tabellini (2022): "Faith and assimilation: Italian immigrants in the US," NBER Working Paper 30003.

Galenianos, M. (2013): "Learning about match quality and the use of referrals," *Review of Economic Dynamics*, 16, 668–690.

Gee, L. K., J. Jones, and M. Burke (2017a): "Social networks and labor markets: How strong ties relate to job finding on facebook's social network," *Journal of Labor Economics*, 35, 485–518.

Gee, L. K., J. J. Jones, C. J. Fariss, M. Burke, and J. H. Fowler (2017b): "The paradox of weak ties in 55 countries," *Journal of Economic Behavior and Organization*, 133, 362–372.

Glitz, A. (2014): "Ethnic segregation in Germany," *Labour Economics*, 29, 28–40.

——— (2017): "Coworker networks in the labour market," *Labour Economics*, 44, 218–230.

Glover, D., A. Pallais, and W. Pariente (2017): "Discrimination as a self-fulfilling prophecy: evidence from french grocery stores," *Quarterly Journal of Economics*, 132, 1219–1260.

Granovetter, M. (1995): *Getting a job: a study of contacts and careers*, University of Chicago Press, 2 ed.

Hellerstein, J. K. and D. Neumark (2008): "Workplace Segregation in the United States: Race, ethnicity, and skill," *The Review of Economics and Statistics*, 90, 459–477.

Hethey-Maier, T. and J. F. Schmieder (2013): "Does the Use of Worker Flows Improve the Analysis of Establishment Turnover? Evidence from German Administrative Data," *Schmollers Jahrbuch : Journal of Applied Social Science Studies / Zeitschrift für Wirtschafts- und Sozialwissenschaften*, 133, 477–510.

Hjort, J. (2014): "Ethnic divisions and production in firms," *Quarterly Journal of Economics*, 129, 1899–1946.

Humphries, J. E., N. Mader, D. Tannenbaum, and W. van Dijk (2019): "Does Eviction Cause Poverty? Quasi-Experimental Evidence from Cook County, IL," CESifo Working Paper Series 7800, CESifo.

Kropp, P. and B. Schwengler (2011): "Abgrenzung von Arbeitsmarktregionen – ein Methodenvorschlag," *Raumforschung und Raumordnung*, 69, 45–62.

Lazear, E. P. (1999a): "Culture and Language," *Journal of Political Economy*, 107, 95–126.

——— (1999b): "Globalisation and the Market for Team-Mates Author(s): Edward P. Lazear Source: The Economic Journal, Vol. 109, No. 454, Conference Papers (Mar., 1999), pp. C15-C40 Published by:," *The Economic Journal*, 109, 15–40.

Lubotsky, D. H. (2007): "Chutes or Ladders? A Longitudinal Analysis of Immigrant Earnings," *Journal of Political Economy*, 115, 820–867.

Mcpherson, M., L. Smith-Lovin, and J. M. Cook (2001): "Birds of a feather : Homophily in social networks," *Annual Review of Sociology*, 27, 415–444.

Montgomery, J. D. (1991): "Social networks and labor-market outcomes: Toward an economic analysis," *American Economic Review*, 81, 1408–1418.

——— (1992): "Job search and network composition: Implications of the strength-of-weak-ties hypothesis," *American Sociological Review*, 57, 586–596.

Munshi, K. (2003): "Networks in the modern economy: Mexican migrants in the U. S. labor market," *Quarterly Journal of Economics*, 118, 549–599.

OECD (2020): "International migration database," Data retrieved from OECD International Migration Statistics, https://doi.org/10.1787/mig-data-en.

Ottaviano, G. I. and G. Peri (2012): "Rethinking the effect of immigration on wages," *Journal of the European Economic Association*, 10, 152–197.

Peri, G. and C. Sparber (2009): "Task Specialization, Immigration, and Wages," *American Economic Journal: Applied Economics*, 1, 135–169.

Phan, V., F. Ritchie, C. Singleton, L. Stokes, A. Bryson, D. Whittard, and J. Forth (2022): "Accounting for firms in ethnicity wage gaps throughout the earnings distribution," IZA Discussion Paper 15284.

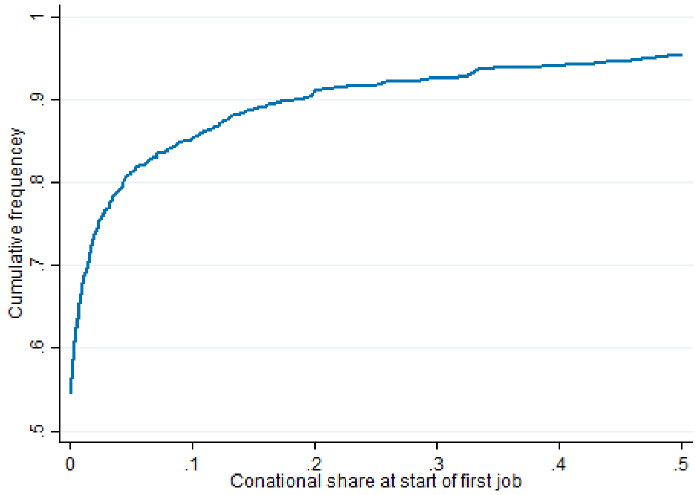
Postel-Vinay, F. and J. M. Robin (2002): "The distribution of earnings in an equilibrium search model with state-dependent offers and counteroffers," *International Economic Review*, 43, 989–1016.

Sarvimäki, M. (2011): "Assimilation to a welfare state: Labor market performance and use of social benefits by immigrants to Finland," *Scandinavian Journal of Economics*, 113, 665–688.

Schmidtlein, L., S. Seth, and P. vom Berge (2020): "The Sample of Integrated Employer-Employee Data (SIEED) 1975–2018," FDZ Datenreport 14|2020, Institute for Employment Research (IAB), Nürnberg.

A Supplementary figures and tables

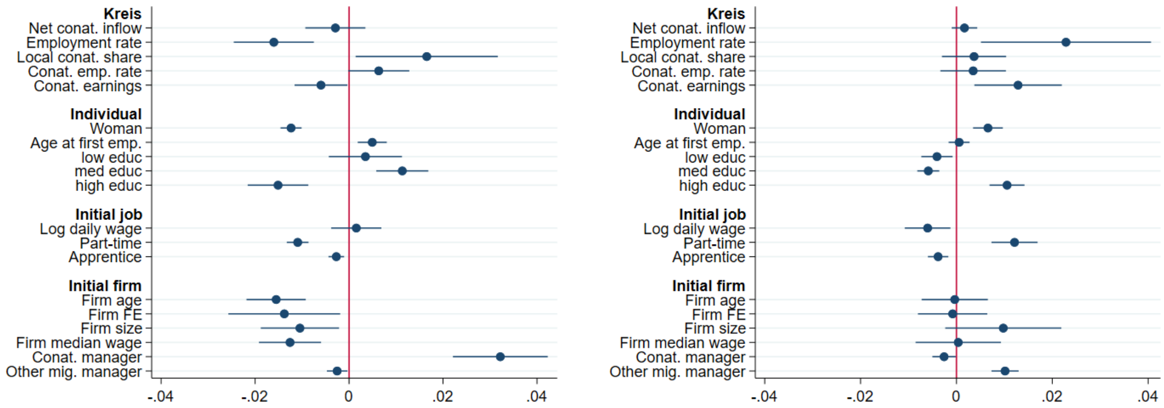
Figure A.1: CDF of conational share in first job in SOEP



Notes: Empirical CDF of the initial conational share in the first job held by an immigrant in my sample. The distribution is truncated at 50, for ease of representation.

Figure A.2: Bivariate correlations of instrument

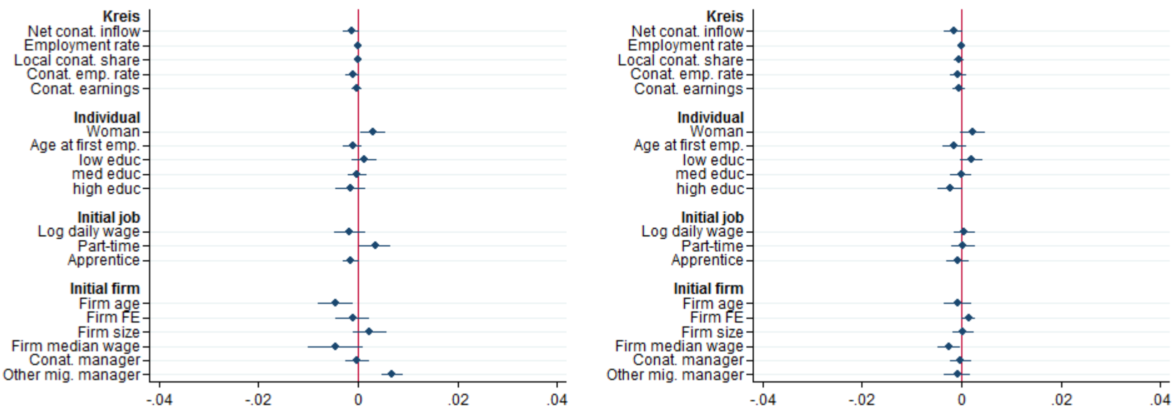
(a) Predicted conational share (b) Predicated other migrant share



Notes: Bivariate association of instrument with aggregate, individual, and realised firm characteristics. Each association is estimated separately; the dependent variable in each specification has been standardised to have mean 0 and standard deviation 1, while the predicted share is rescaled to lie on [0,100]. Standard errors are clustered by entry district.

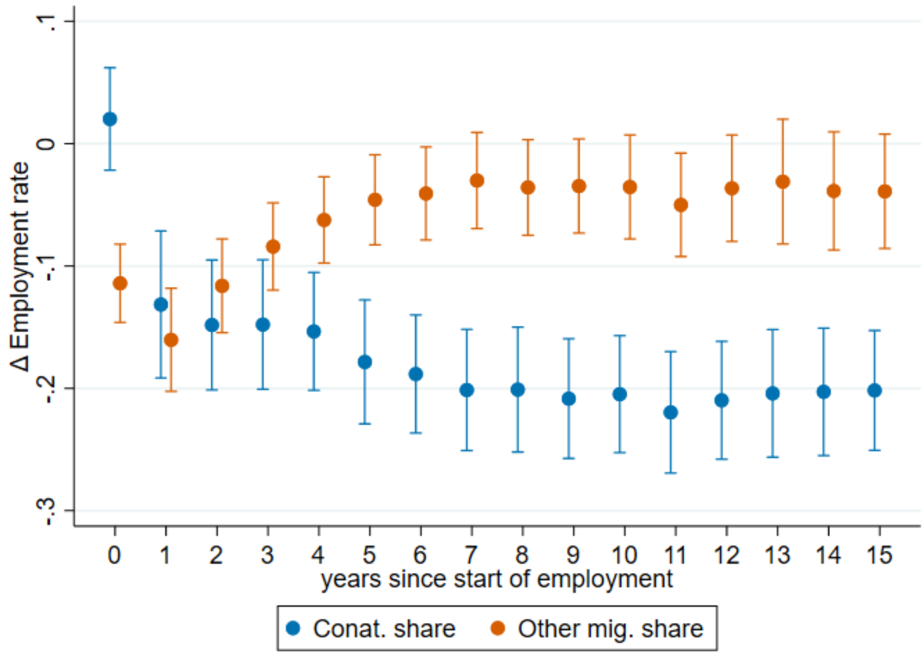
Figure A.3: Instrument validity, other migrant share

(a) No firm/job characteristics (b) With predicted characteristics



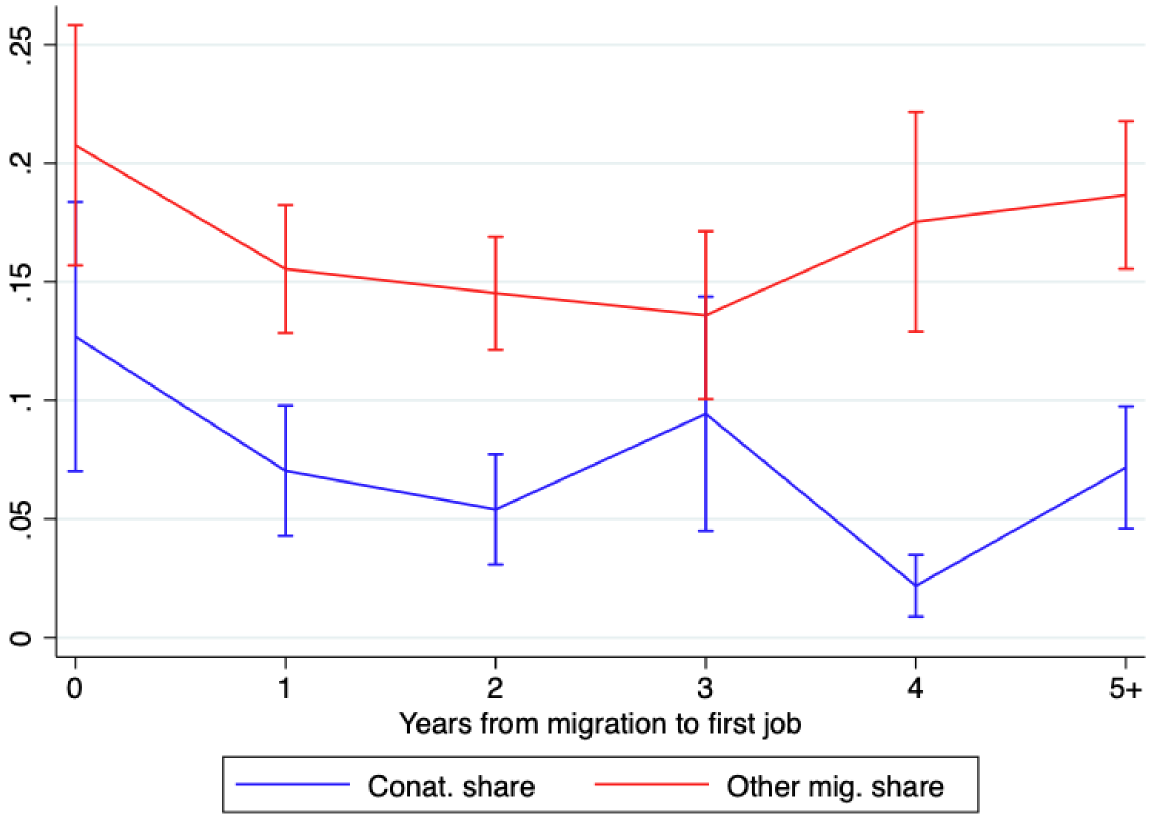
Notes: Effect of predicted share of immigrants from other countries on other characteristics. Each association is estimated separately; the dependent variable in each specification has been standardised to have mean 0 and standard deviation 1, while the predicted share is rescaled to lie on [0,100]. All specifications include labour market × nationality × entry year and district × nationality fixed effects. Standard errors are clustered by entry district.

Figure A.4: Annual associations



Notes: OLS estimates of the annual association of the conational share other immigrant share. 95 per cent confidence intervals are calculated using standard errors clustered at the initial district level.

Figure A.5: Time taken until first employment and initial share



Notes: Mean and 95 per cent confidence intervals for the conational and other migrant share in the first job. N = 863 across all years. Source: IAB-SOEP-MIG-ADIAB.

Table A.1: Country groups, SIIED

	N	Share
Poland	5744	14.70
Yugoslavia, Serbia, Montenegro	4819	12.33
other Asia	2953	7.56
Romania	2324	5.95
Russia, Belarus, USSR	2155	5.52
other Africa	1972	5.05
Croatia	1050	2.69
Portugal	1022	2.62
France	1016	2.60
Hungary	1005	2.57
China	1000	2.56
ex-Czechoslovakia	981	2.51
other America	954	2.44
USA, Canada	946	2.42
Spain	807	2.07
Ukraine, Moldova	802	2.05
Bosnia and Herzegovina	775	1.98
Morocco	775	1.98
Bulgaria	753	1.93
Uk, Ireland	743	1.90
Austria	668	1.71
Iran	627	1.60
Vietnam	624	1.60
India	491	1.26
Netherlands, Luxemburg	468	1.20
Afghanistan	439	1.12
Irak	351	0.90
Albania	334	0.85
Estonia, Latvia, Lithuania	315	0.81
other Europe	268	0.69
Thailand	230	0.59
Macedonia	221	0.57
Ghana	210	0.54
Lebanon	207	0.53
Sri Lanka	206	0.53
Denmark, Sweden	155	0.40
Tunisia	129	0.33
Philippines	126	0.32
Belgium	103	0.26
Ethiopia	91	0.23
Oceania	66	0.17
Slovenia	59	0.15
Switzerland	50	0.13
Finland	35	0.09
Total	39069	100.00

Note: Refers to first nationality reported in social security notifications.

Table A.2: Summary statistics, SOEP-IAB data

	Mean	St. dev.	N
Panel A			
Employment rate	0.74	0.38	10061
Annual wage earnings	21256.1	15024.9	7493
$\mathbf{1}(t \in [0,2])$	0.25	0.44	10061
$\mathbf{1}(t \in [3,5])$	0.23	0.42	10061
$\mathbf{1}(t \geq 6)$	0.52	0.50	10061
Panel B			
Woman	0.50	0.50	863
Age at migration	29.32	9.04	863
Employed before migrating	0.71	0.46	863
Education	0.14	0.34	863
Low education	0.40	0.49	863
Medium education	0.32	0.47	863
High education	0.29	0.45	863
Support (family)	0.47	0.50	863
Support (friends)	0.10	0.31	863
Support (both)	0.05	0.22	863
No support	0.37	0.48	863
Panel C			
First job through contacts	0.56	0.50	863
Years until first job	3.27	3.02	863
Daily wage	43.1	34.3	863
Firm size	470.4	2221.8	863
Firm median wage	74.3	39.5	863
Firm age	13.0	10.5	863
Conat. share	0.070	0.19	863
Other mig. share	0.17	0.20	863

Note: Panel A reports time-varying summary statistics for the years since the first job, average earnings are conditional on being employed on June 30. Panel B reports summary statistics on pre-migration characteristics, including whether an immigrant had any support from someone in Germany when migrating. Panel C reports summary statistics on the characteristics of the first job held after migration and the firm where the job was held. Wages and earnings are deflated and reported in 2010 Euros.

Table A.3: Country groups, SOEP-IAB

	N	Share
Russia	323	37.43
Romania	114	13.21
Poland	93	10.78
ex-Yugoslavia	71	8.23
Turkey	65	7.53
Asia	52	6.03
Italy	41	4.75
Other Europe	38	4.40
Africa	29	3.36
Greece	2*	2.55
Others	//	////
Total	863	100.00

Note: Refers to country of birth (as self-reported in the SOEP) for individuals born without German nationality. The table has been censored in accordance with IAB data protection requirements.

Table A.4: First stage effect of predicted other migrant share on the realised share.

	(1)	(2)	(3)	(4)	(5)	(6)
z_i^{own}		0.050	0.093*	0.063+	0.097+	0.13*
		(0.040)	(0.037)	(0.037)	(0.052)	(0.054)
z_i^{other}	0.69**	0.70**	0.52**	0.53**	0.59**	0.56**
	(0.029)	(0.030)	(0.029)	(0.033)	(0.045)	(0.030)
Pred. charact.	No	No	No	No	No	Yes
N	39069	39069	39069	39069	37302	39069
R^2	0.16	0.16	0.44	0.52	0.58	0.52
FE	-	-	LxNxY, D	LxNxY, DxN	LxNxY, DxN, DxY	LxNxY, DxN

Note: Static first-stage relationship between predicted share of immigrants from other countries, z_i^{other}, and the realised share of immigrants from other countries in the first job. Included predicted characteristics are part-time status, firm age, conational manager, other migrant manager, log predicted firm size and log predicted median wage. L = labour market, N = nationality, D = district, Y = year of first job. Standard errors clustered by district + p<0.1, * p<0.05, ** p<0.01

Table A.5: Effect heterogeneity by individual and firm characteristics

	(1)	(2)	(3)	(4)
s_i^{own}	-0.33*			
	(0.13)			
male$\times s_i^{own}$		-0.33*		
		(0.13)		
female$\times s_i^{own}$		-0.34*		
		(0.14)		
low educ$\times s_i^{own}$			-0.34*	
			(0.13)	
med educ$\times s_i^{own}$			-0.36**	
			(0.13)	
high educ$\times s_i^{own}$			-0.20	
			(0.14)	
small$\times s_i^{own}$				-0.46$^+$
				(0.28)
large$\times s_i^{own}$				-0.33*
				(0.13)
s_i^{other}	-0.034			
	(0.097)			
male$\times s_i^{other}$		0.0021		
		(0.11)		
female$\times s_i^{other}$		-0.072		
		(0.096)		
low educ$\times s_i^{other}$			-0.060	
			(0.097)	
med educ$\times s_i^{other}$			0.034	
			(0.11)	
high educ$\times s_i^{other}$			0.014	
			(0.19)	
small$\times s_i^{other}$				-0.056
				(0.096)
large$\times s_i^{other}$				0.0048
				(0.12)
Observations	32123	32123	32123	32123
Individuals	32123	32123	32123	32123
KP F	14.2	11.1	9.3	11.6

Notes: Cross-sectional IV estimates, see main text for details. Standard errors are clustered by district. + $p < .1$, * $p < .05$, ** $p < .01$

Table A.6: Effect heterogeneity by local and conational characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
s_i^{own}	-0.33*	-0.42*	-0.35+	-0.30*	-0.43*	-0.25	-0.35*
	(0.13)	(0.18)	(0.19)	(0.14)	(0.19)	(0.19)	(0.17)
Kreis emp. $\times s_i^{own}$					-0.054		
					(0.089)		
Kreis conat. share $\times s_i^{own}$						-0.078	
						(0.063)	
Coworker emp. $\times s_i^{own}$							-0.059
							(0.048)
s_i^{other}	-0.034	-0.020	0.051	-0.027	-0.020	0.027	-0.032
	(0.097)	(0.12)	(0.12)	(0.097)	(0.12)	(0.12)	(0.10)
Kreis emp. $\times s_i^{other}$					-0.044		
					(0.084)		
Kreis conat. share $\times s_i^{other}$						0.13	
						(0.096)	
Coworker emp. $\times s_i^{other}$							-0.056
							(0.072)
Kreis emp.		0.0087			0.026		
		(0.021)			(0.036)		
Kreis conat. share			0.0074			-0.011	
			(0.016)			(0.031)	
Coworker emp.				0.017			0.035*
				(0.020)			(0.015)
Observations	32123	23933	19529	32123	23933	19529	32123
KP F-statistic	14.2	9.0	6.5	7.7	7.1	5.6	5.6

Notes: Cross-sectional IV estimates. All estimation-specific controls and interaction variables have been standardised to have mean zero and standard deviation one. Columns 2 and 5 include Kreis-level employment rates as a control, calculated using data from the *Mikrozensus* and regional statistical offices, available from 1995. Columns 3 and 6 include the conational share in the Kreis as a control, calculated using data from the *Ausländerzentralregister* and the *Mikrozensus*, available from 1998. Columns 4 and 7 include controls for the employment rate of coworkers in the five years preceding the first job, calculated from the SIEED. All specifications include labour market by nationality by starting year and district by nationality fixed effects. Standard errors are clustered by district. + $p < .1$, * $p < .05$, ** $p < .01$

B The sign of the bias induced by selective return migration

The IAB-SOEP Migration Sample is made up of survivors, immigrants who were still in Germany in 2013 and 2014 in order to be interviewed. It is generally accepted that return migrants had worse labour market outcomes, summarised by earnings, before returning than immigrants who stay (Borjas, 1985; Lubotsky, 2007; Sarvimäki, 2011). This tells us that earnings have a negative effect on return migration, or that return migration and earnings share some common unobservable cause—return migrants might be intrinsically less productive individuals—either of which can bias estimates of the rate of earnings convergence of immigrants to natives over time (Abramitzky, Boustan, and Eriksson, 2014). However, when studying the effect of an initial condition, the conational share in the first job, on subsequent labour market outcomes, the sign of the selection bias will depend not only on the effect of earnings on return migration, but also on any effect the initial conational share might have on return migration.

To focus on intuition and to emphasise the fact that the bias induced by selective return migration is independent of the bias induced by selection into treatment on unobservables, I derive the sign of the selection bias under the simplifying assumption that (i) the initial conational share, S is randomly assigned; and (ii) there are no systematic determinants of subsequent employment rates Y besides S. Furthermore, assume that the conational share is either low or high, i.e. $S \in \{0, 1\}$. Assuming the effect of S on Y is linear, the structural equation for Y is simply:

$$Y = a + \beta S + \varepsilon_Y. \tag{6}$$

The structural error term ε_Y is mean-zero[16] and independent of S, since there is no confounding. To model selection, I assume that latent utility C^* is a linear function of S, Y, and a mean-zero structural error term:

$$C^* = \alpha_S S + \alpha_Y Y + \varepsilon_{C^*}, \tag{7}$$

where $\alpha_i \in \mathbb{R}$, $i \in \{Y, S\}$. An individual is assumed to return migrate, $C = 1$, if latent utility is below some fixed threshold:

$$C(S, Y) = \begin{cases} 1 & \text{if } C^* < K, \\ 0 & \text{otherwise.} \end{cases} \tag{8}$$

Equation (8) captures the fact that C is endogenously determined by both S and Y. The sign of α_i, $i \in \{Y, S\}$, encodes hypothetically testable assumptions about the effect of the observable variables Y and S on C. I now show how the selection bias from conditioning the analysis on $C = 0$ depends on the signs of α_S, α_Y, and β. Since the structural equation is linear and S is assumed to be randomly assigned, the true parameter of interest, β, can be defined as

$$\beta = \frac{\mathrm{Cov}(Y, S)}{\mathrm{Var}(S)} \tag{9}$$

Since we only observe individuals with $C = 0$, however, the OLS estimand on this restricted

[16]Furthermore, we must have $\varepsilon_Y \in [-a, 1 - (a + \beta)]$, since $Y \in [0, 1]$

sample is

$$\begin{aligned}\hat{\beta} &= \frac{\mathrm{Cov}(S, Y|C=0)}{\mathrm{Var}(S|C=0)} \\ &= \beta + \frac{\mathrm{Cov}(S, \varepsilon_Y|C=0)}{\mathrm{Var}(S|C=0)} \\ &= \beta + \frac{\mathrm{Cov}(S, \varepsilon_Y|C^* \geq K)}{\mathrm{Var}(S|C^* \geq K)} \end{aligned} \tag{10}$$

The sign of the bias induced by conditioning on the endogenous variable C will therefore depend on the sign of the conditional covariance of S and ε_Y, since the conditional variance of S is positive. Note that $\mathrm{Cov}(S, \varepsilon_Y) = 0$ in the full sample by assumption, but not in the restricted sample of non-return migrants. The sign of the conditional covariance can be calculated as

$$\begin{aligned}&\mathrm{Cov}(S, \varepsilon_Y|C^* \geq K) \\ &\quad = \mathrm{E}[S\varepsilon_Y|C^* \geq K] - \mathrm{E}[S|C^* \geq K]\mathrm{E}[\varepsilon_Y|C^* \geq K] \\ &\quad = \mathrm{E}[\varepsilon_Y|C^* \geq K, S=1]\Pr(S=1|C^* \geq K) \qquad (11) \\ &\qquad - \mathrm{E}[S|C^* \geq K]\mathrm{E}[\varepsilon_Y|C^* \geq K] \\ &\quad = \{\mathrm{E}[\varepsilon_Y|C^* \geq K, S=1] - \mathrm{E}[\varepsilon_Y|C^* \geq K]\}\Pr(S=1|C^* \geq K), \qquad (12)\end{aligned}$$

where the second equality follows from the law of iterated expectations and the third from the fact that S is a Bernoulli random variable, so its expectation is the probability that $S = 1$. The sign of the conditional covariance will depend on the sign of the difference of the two conditional expectations in parentheses in Equation (12), $\mathrm{E}[\varepsilon_Y|\cdot]$. Note, however, that ε_Y is a mean-zero random variable and that its distribution is truncated when calculating the expectations $\mathrm{E}[\varepsilon_Y|\cdot]$. The sign of the conditional expectations will therefore depend on whether the right or the left tail of the distribution is truncated. Furthermore, the difference between the expectations will depend on which distribution is more severely truncated. The truncation condition $C^* \geq K$ can be re-written

$$\alpha_Y \varepsilon_Y \geq K - (\alpha_S + \alpha_Y \beta)S - \alpha_Y a - \varepsilon_{C^*}, \tag{13}$$

This inequality makes clear how the sign of the bias of $\hat{\beta}$ with respect to β will depend not only on (i) the total effect of employment on return migration, captured by α_Y; but also potentially on (ii) the total effect of the conational share on return migration, that is without netting out the part of the effect that is mediated by employment, i.e. $\alpha_S + \alpha_Y \beta$. Intuitively, the sign of α_Y determines whether the distribution of ε_Y is left- or right-truncated, and the sign of $\alpha_S + \alpha_Y \beta$ determines whether the distribution is more or less severely truncated when $S = 1$. If both α_Y and $\alpha_S + \alpha_Y \beta$ are of the same sign, the bias will be negative, while if α_Y and $\alpha_S + \alpha_Y \beta$ are of opposite signs, the bias will be positive.

To see this, note that if $\alpha_Y > 0$, the condition $C^* \geq K$ truncates the left tail of the distribution of ε_Y; the expectations in Equation (12) will be positive. Furthermore, if $\alpha_S + \alpha_Y \beta > 0$, then the supplementary condition $S = 1$ truncates the distribution less severely than when the condition is not imposed, since $S \in \{0, 1\}$. As a result, we will have

$$\mathrm{E}[\varepsilon_Y|C^* \geq K, S=1] < \mathrm{E}[\varepsilon_Y|C^* \geq K] \tag{14}$$

and the bias will be negative. If, on the other hand, $\alpha_Y < 0$, the right tail of the distribution is truncated and the expectations in Equation (12) are negative. If $\alpha_S + \alpha_Y \beta > 0$, the supplementary condition $S = 1$ again means the distribution is less severely truncated, implying now that

$$\mathrm{E}[\varepsilon_Y | C^* \geq K, S = 1] > \mathrm{E}[\varepsilon_Y | C^* \geq K] \tag{15}$$

and the bias will be positive.

An interesting special case arises when the true effect of interest $\beta = 0$. Now the gross effect of the conational share on return migration is simply the direct effect, α_S. In this case, if α_Y and α_S are of the same sign, then $\hat{\beta} < 0$, while if they are of opposite signs, then $\hat{\beta} > 0$. Therefore, if the estimated $\hat{\beta} < 0$ and one has reason to believe that α_Y and α_S are of opposite signs, then the observed association cannot be entirely explained by selection into return migration; it must be that $\beta < 0$.

The estimates on dropping out of the sample, using the SIEED, reported in Table 4, suggest that a higher conational share increases return migration, i.e. $\alpha_S < 0$. Assuming that any selection bias is not so great as to flip the sign of the employment effect, then $\beta < 0$. Furthermore, evidence on the effect of employment on return migration suggests $\alpha_Y > 0$ (Sarvimäki, 2011), implying that $\alpha_S + \alpha_Y \beta < 0$. Selection bias would imply that $\hat{\beta} < \beta$ in the IAB-SOEP Migration Sample.