Workplace segregation and the labour market performance of immigrants*

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Abstract

This paper studies 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 3.2 percentage points in the long term, an effect not observed for non-conational immigrants, with no effect on wages in the long term, conditional on employment. Descriptive evidence suggests that the employment effect is due both to differential host country-specific human capital accumulation, as well as changes in job search behaviour induced by denser conational networks.

Keywords: Employment, segregation, coworker networks, immigrant earnings dynamics

JEL codes: J61, J64, J31

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1 Introduction

Immigrants make up an increasing share of the labour force in most developed countries. However, immigrants typically earn less that comparable natives and are less likely to be employed (Algan, Dustmann, Glitz, and Manning, 2010; Borjas, 1985; Chiswick, 1978; Lubotsky, 2007; Sarvimäki, 2011). A growing body of evidence has also documented substantial segregation of workers across workplaces by country of origin (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. Understanding the effect of workplace composition on wages and subsequent employment could help in addressing labour market disparities between immigrants and natives.

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 jobs with a higher or lower conational share based on unobserved characteristics related to future employability. Furthermore, the conational share when starting a job is likely to be associated with other characteristics of the job that might affect wages, 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 estimate the causal 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 predict 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. Other predicted characteristics can then be used as instruments for 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 linked employer-employee data of 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 2 percentage points after two years, falling to 3.2 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 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 somewhat more strongly associated with lower wages in the short term, but not in the long term.

I next consider two main mechanism that might explain the negative long-term employment effect: changes in the accumulation of host country-specific skills, caused by interacting more with conationals, and changes in job search behaviour, caused by shifts in the composition of the relevant job search network. Survey evidence from the IAB-SOEP Migration Sample suggests higher immigrant shares, of both conationals and other immigrants, are associated with worse German proficiency in the short run, but not in the long-run. The conational share, however, is negatively associated with having participated in formal job training in the longer run. Differential host country-specific human capital accumulation, reducing immigrants' productivity in the longer run, therefore appears to be one mechanism that might explain the negative employment effects. I also find evidence that a higher initial conational share changes immigrants' subsequent job search behaviour. Immigrants with a higher initial conational share appear to reduce their job search when employed and rely more on their former coworkers to find subsequent jobs. These effects are not observed for the share of immigrants from other countries of origin and point to changes in job search behaviour as a relevant mechanism for understanding the negative employment effect of the conational share.

The first contribution of the 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 (e.g. Glitz, 2014) and that higher conational shares in the first job are negatively associated with individual outcomes (Ansala, Åslund, and Sarvimäki, 2021), although co-ethnic hiring by new ventures founded by immigrants in the US is associated with better outcomes for the firm, at least when the local co-ethnic workforce is large (Kerr and Kerr, 2021). However, these associations are potentially confounded by selection across jobs, as described above.

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. 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) or the persistent effects of economic conditions at arrival (Barsbai, Steinmayr, and Winter, 2023). I link such macro characteristics to micro mechanisms by considering how exogenous district-level fluctuations in the composition of labour demand, which determine the value of the instrument, affect individual outcomes via their effect on which firm an individual is hired by.

Finally, focusing on the composition of the firm, rather the neighbourhood, is in itself novel. The switch is motivated in part by recent evidence that coworker networks are a more important determinant of an individual's labour market outcomes than neighbourhood networks (Eliason, Hensvik, Kramarz, and Nordström Skans, 2023), and partly 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 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 explore 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. 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 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

[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.

Table 1: Summary statistics

	SIEED		
	Mean	St. dev.	N
Panel A			
Employment rate	0.47	0.45	630219
Employment rate, no dropouts	0.68	0.39	432648
Annual wage earnings	11158.3	15888.9	630219
Avg. daily wage	60.7	49.6	375188
$\mathbf{1}(t \in [0, 2])$	0.19	0.39	630219
$\mathbf{1}(t \in [3, 5])$	0.19	0.39	630219
$\mathbf{1}(t \geq 6)$	0.63	0.48	630219
Panel B			
Woman	0.44	0.50	39371
Low education	0.58	0.49	39371
Medium education	0.20	0.40	39371
High education	0.22	0.41	39371
Age at first emp.	29.29	9.24	39371
Panel C			
Conational share (s_i^{own})	0.11	0.21	39371
Other migrant share (s_i^{other})	0.22	0.21	39371
Daily wage	45.2	39.8	39371
Apprentice	0.067	0.25	39371
Part-time	0.34	0.47	39371
Firm size	623.7	1922.0	39371
Median firm size	63	0	39371
Firm median wage	64.2	34.6	39371
Firm age	13.9	10.1	39371
Conational manager	0.074	0.26	39371
Other migrant manager	0.11	0.32	39371

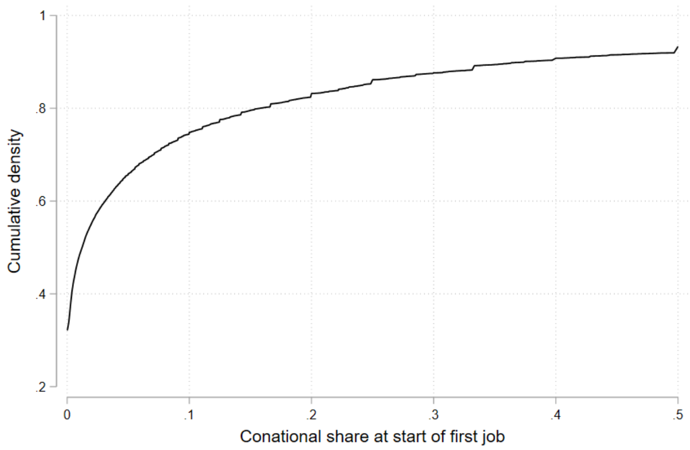
Note: Panel A reports time-varying summary statistics for the years since the first job, average earnings are conditional on being employed on June 30. Panel B reports summary statistics on individual characteristics at the start of the first job. Panel C reports summary statistics on the characteristics 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.

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-invarying 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 600 employees, however the distribution is highly skewed, and the median firm size is 63. 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

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.

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}, and the initial share of immigrants from other countries, s_i^{other}, using the following equation:

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

X_{it} is a vector of controls that always includes 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. Fixed effects δ_j capture time-invariant characteristics of immigrant cohorts, countries of origin, or initial location. The share variables s_i^g, $g \in \{own, other\}$, are measured on the interval $[0, 1]$ and interacted with 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.[3] The coefficients β_τ^g, $\tau \in \{1, 2, 3\}$, therefore 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.

3.2 Identification

3.2.1 Instrument definition

In practice, immigrants are not randomly allocated to firms, which may bias the estimation of β_τ^g if there are unobserved individual characteristics that are associated with both the initial coworker shares, s_i^g, and the outcomes of interest Y_{it}. For example, the vector of control variables X_{it} 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. 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:

$$z_i^{own} = \frac{\sum_{j \neq i} s_{f(j)}^{nat.(i)} \mathbf{1}(d_j = d_{0i}, t_j = t_{0i}, nat.(j) = mig.)}{\sum_{j \neq i} \mathbf{1}(d_j = d_{0i}, t_j = t_{0i}, nat.(j) = mig.)} \tag{2}$$

[3] A fully flexible specification with dummies for each year since the first job will be included as a robustness check.

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 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 may be correlated with other characteristics of the district. For example, a higher predicted conational share is likely to be be positively correlated with the conational share in the district's labour force. 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]

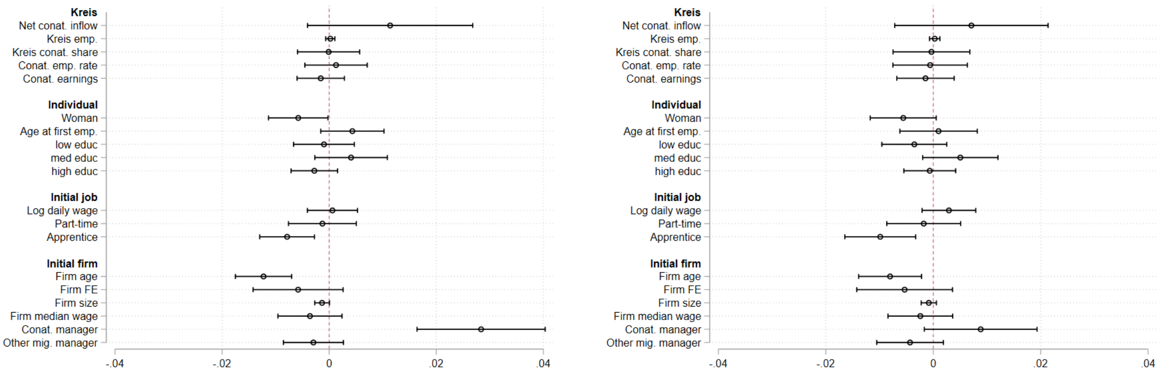
[4]Note the instrument is constructed using immigrant hires across the entire set of SIEED firms, not only immigrants hired for the first time. The estimation sample is therefore very small relative to the sample used to construct the instrument, so the two samples can be considered effectively independent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

[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 manager 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.

3.2.2 Instrument validity

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 appears to be largely true. The instrument is conditionally uncorrelated with time-varying district characteristics, including local conational stocks or net flows, conationals' economic integration, measured using conationals' earnings, or local macroeconomic factors, measured using district-level employment rates. Among individual characteristics, there is only a marginal conditional association between the instrument and the immigrant's gender.

However, the instrument is associated with some characteristics of the first firm and the first job, shown in the third and fourth panels of Figure 2a. 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.

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. As a result, there is an association between the instrument and other firm characteristics, implying that the exclusion restriction might not hold. Firm characteristics, and specifically the presence of a conational manager at the firm, may have a direct effect on immigrants' subsequent labour market outcomes (Åslund et al., 2014).

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 (1), the structural equation, and instrumented for, using their predicted versions, in the IV estimation.[7] The drawback of this approach is that the predictive power of the instrument set will decrease, the more firm characteristics one instruments for, since predicted variables will be correlated if the underlying firm characteristics are correlated. In Figure 2b, I therefore include predicted presence of a conational manager, and predicted presence of an immigrant manager from another country, calculated using the same leave-out-mean procedure, as additional controls in my cross-sectional regressions. The predicted conational share does not appear systematically associated with the job and firm characteristics in this case. I report the same tests of instrument validity for the predicted share of workers from other countries of origin in Figure A.2. Again, there is some evidence, albeit weaker, of the exclusion restriction failing to hold when predicted manager nativity is not controlled for.

To assess 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 1 I report the bivariate relationship between the the predicted and actual

[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 (1) without instrumenting for them. Since these characteristics are outcomes of the proposed instrument, they would be bad controls in the reduced-from equation, biasing the two-stage least squares estimate of the effect of the conational share.

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

	(1)	(2)	(3)	(4)	(5)	(6)
z_i^{own}	1.31**	1.31**	1.30**	0.94**	0.87**	0.85**
	(0.094)	(0.094)	(0.11)	(0.092)	(0.096)	(0.092)
z_i^{other}		-0.011	-0.029	-0.021	-0.024	-0.035
		(0.026)	(0.025)	(0.023)	(0.024)	(0.023)
Manager characteristics	No	No	No	No	Yes	Yes
Other characteristics	No	No	No	No	No	Yes
N	39371	39371	39371	39371	39371	39371
R^2	0.19	0.19	0.54	0.62	0.62	0.62
FE	-	-	D	DxN	DxN	DxN

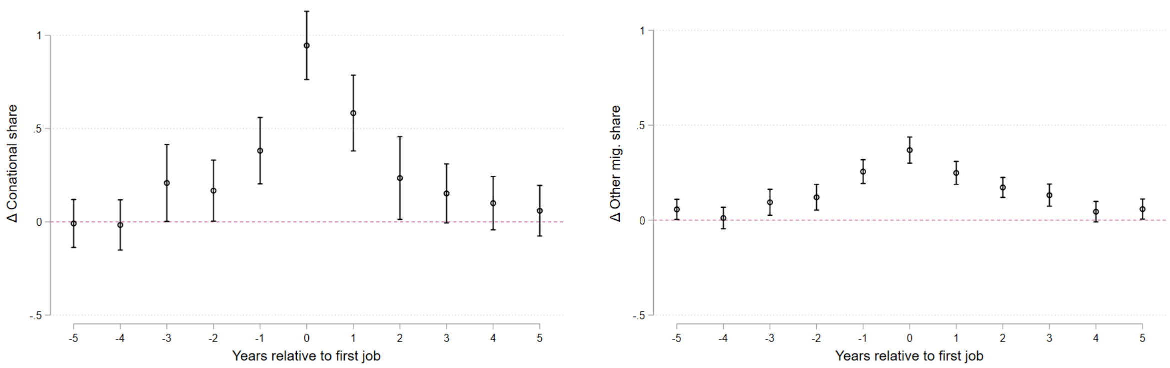
Note: Static first-stage relationship between predicted conational share, z_i^{own}, and the realised conational share in the first job. Included other characteristics are part-time status, firm age, log predicted firm size and log predicted median wage. L = labour market, N = nationality, D = district, 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

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 3–6, 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 0.62, 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 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, serial correlation in firm-level hiring shocks could threaten the validity of the instrument. If new immigrants can know the predicted conational share based on past hiring patterns, they may differentially select into districts with a high or low predicted conational share. In Figure 3, I repeat the specification in column 4 of Table 2, only replacing the instrument with the predicted conational share up to five years before or after the year in which an immigrant

Figure 3: Serial correlation in local hiring shocks

(a) Conational share (b) Other migrant share



Notes: Static first-stage relationship between predicted share variables, z_i^{own} and z_i^{other}, measured in different years and the realised share variables in the first job. Coefficients are estimated from separate regressions. Initial district by year and labour market by nationality by initial year fixed effects are included, standard errors clustered by district and 95 per cent confidence intervals are reported.

is first hired. There is only weak serial correlation in the instrument, conditional on included fixed effects. The predicted conational share is only significantly associated with the realised conational share when using the predicted share from the actual hiring year or one year before or after. Furthermore, there association is much stronger when using the actual hiring year. A one percentage-point increase in the predicted conational share one year before the hiring year is associated with a 0.38 percentage point increase in the actual conational share; the association in the actual hiring year is 2.5 times larger.

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 (1). 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, as shown in Figure 3, firm-level labour demand shocks are moderately persistent over time, which leads me to cluster at the district level.

4 Results

4.1 Employment rates

The main outcome of interest is individual employment rates, defined as the fraction of days an individual is 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. 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. The reduced-form effect appears robust to sequentially including more detailed fixed effects (column 3), predicted manager characteristics (column 4), and either other predicted job and firm characteristics (column 5), or fixed effects for the year of observation (column 6). 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 2.7 percentage points in the most detailed specification. 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, smaller than the effect of the predicted conational share, and frequently insignificant, while the long-term effect is statistically and economically insignificant in all specifications.

Turning to the effect of the realised conational share on subsequent employment rates, I report 2SLS estimates from the full specification in Figure 4. This specification includes both predicted manager nativity characteristics as instruments for realised manager characteristics as well as labour market by nationality by year of job-finding and district by nationality fixed effects. 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 a marginally insignificant 2 percentage points in the first two years after the start of the first job, and by a statistically significant 3.2 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 1.8 percentage points in the first two years, and by a 0.41 percentage points after six or more years, both of which are statistically insignificant. This difference between the effect of conationals and the effect of other immigrants constitutes a

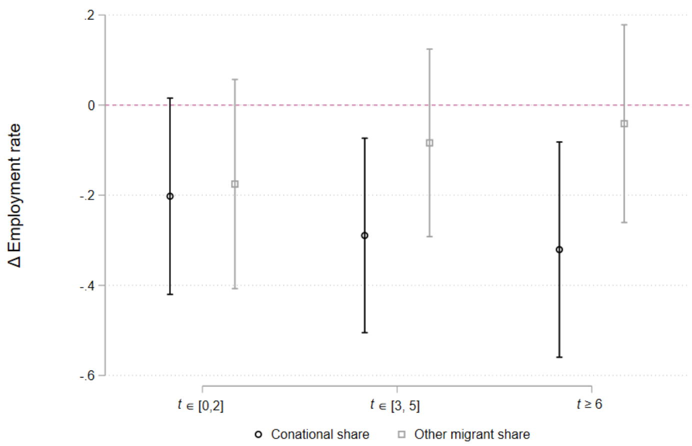
Table 3: Individual annual employment rates

	OLS	2SLS				
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Reduced form						
$\mathbf{1}(t \in [0,2]) \times z_i^{own}$		-0.18**	-0.15*	-0.13	-0.12	-0.13
		(0.066)	(0.074)	(0.084)	(0.084)	(0.085)
$\mathbf{1}(t \in [3,5]) \times z_i^{own}$		-0.29**	-0.26**	-0.24**	-0.23**	-0.24**
		(0.062)	(0.076)	(0.086)	(0.085)	(0.086)
$\mathbf{1}(t \geq 6) \times z_i^{own}$		-0.33**	-0.30**	-0.29**	-0.27**	-0.28**
		(0.073)	(0.084)	(0.099)	(0.097)	(0.096)
$\mathbf{1}(t \in [0,2]) \times z_i^{other}$		-0.085+	-0.10+	-0.090	-0.093+	0.0055
		(0.049)	(0.054)	(0.057)	(0.055)	(0.055)
$\mathbf{1}(t \in [3,5]) \times z_i^{other}$		-0.020	-0.037	-0.025	-0.028	0.0055
		(0.036)	(0.041)	(0.043)	(0.043)	(0.043)
$\mathbf{1}(t \geq 6) \times z_i^{other}$		0.016	-0.0054	0.0069	0.0046	-0.050
		(0.041)	(0.044)	(0.046)	(0.046)	(0.044)
Panel B: OLS and 2SLS estimates						
$\mathbf{1}(t \in [0,2]) \times s_i^{own}$	-0.084**	-0.14**	-0.18*	-0.20+	-0.19+	-0.20+
	(0.026)	(0.050)	(0.072)	(0.11)	(0.11)	(0.11)
$\mathbf{1}(t \in [3,5]) \times s_i^{own}$	-0.15**	-0.22**	-0.27**	-0.29**	-0.28**	-0.29**
	(0.025)	(0.048)	(0.073)	(0.11)	(0.11)	(0.11)
$\mathbf{1}(t \geq 6) \times s_i^{own}$	-0.19**	-0.26**	-0.30**	-0.32**	-0.31**	-0.31**
	(0.025)	(0.051)	(0.078)	(0.12)	(0.12)	(0.12)
$\mathbf{1}(t \in [0,2]) \times s_i^{other}$	-0.13**	-0.15	-0.20+	-0.18	-0.18	-0.042
	(0.019)	(0.097)	(0.12)	(0.12)	(0.12)	(0.12)
$\mathbf{1}(t \in [3,5]) \times s_i^{other}$	-0.059**	-0.062	-0.11	-0.084	-0.086	-0.045
	(0.018)	(0.087)	(0.11)	(0.11)	(0.11)	(0.11)
$\mathbf{1}(t \geq 6) \times s_i^{other}$	-0.027	-0.011	-0.070	-0.041	-0.042	-0.14
	(0.022)	(0.096)	(0.12)	(0.11)	(0.12)	(0.11)
Manager controls	Yes	No	No	Yes	Yes	Yes
Other controls	Yes	No	No	No	Yes	No
Observations	505412	505412	505412	505412	505412	505412
Individuals	39371	39371	39371	39371	39371	39371
KP F-statistic		26.1	18.2	9.7	2.9	9.7
FE	NxD	D	NxD	NxD	NxD	NxD, oY

Notes: Effect of a one-percentage-point increase the share of coworkers on a given type on subsequent employment rates, measured in percentage points. Other controls are part-time status, firm age, 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. + $p < .1$, * $p < .05$, ** $p < .01$

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.

Figure 4: 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 manager characteristics, instrumented for using predicted manager characteristics. Standard errors are clustered by district, 95 per cent confidence intervals are shown.

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. The difference between OLS and 2SLS estimates 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 2–6 of Panel B of Table 3. Column 4 repeats my preferred specification, already shown in Figure 4, instrumenting for manager characteristics, which, as was seen in Figures 2a and 2b, is a necessary condition for the exclusion restriction to hold. Column 5 includes controls for additional characteristics of the first job and firm, instrumented for using predicted characteristics. In general, the estimated effects change little when including more detailed controls across columns 3–5. However, the joint first-stage Kleibergen-Papp F-statistic becomes smaller as the instrument set grows when including more firm characteristics. While each firm characteristic is individually well-predicted by the instrument set (see, e.g., Table 2), some firm characteristics are highly correlated. As a result, the joint significance of the instrument set falls when multiple endogenous variables are instrumented for. However, the 2SLS estimate of the effect of the conational share does not change much; if weak instrument bias were a problem we might expect the 2SLS estimates in column 6 to be closer to the OLS estimates. 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 $0.32 \times 18 = 5.8$ percentage points lower, or 4.2 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 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, though the effect is relatively constant 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.

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 characterist-

[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.

Table 4: Other measures of employment and labour force participation

	(1) Dropout	(2) Employed	(3) Employed	(4) Self-emp.	(5) Civil servant	(6) Employed
$\mathbf{1}(t \in [0,2]) \times s_i^{own}$	0.11	-0.23^{+}	-0.0080	0.15	-0.0030	-0.051
	(0.11)	(0.14)	(0.058)	(0.16)	(0.013)	(0.050)
$\mathbf{1}(t \in [3,5]) \times s_i^{own}$	0.27*	-0.24^{+}	-0.071	0.38*	-0.030	-0.094*
	(0.12)	(0.14)	(0.067)	(0.18)	(0.019)	(0.047)
$\mathbf{1}(t \geq 6) \times s_i^{own}$	0.31*	-0.26^{+}	-0.14*	0.076	0.0070	-0.14**
	(0.13)	(0.15)	(0.070)	(0.061)	(0.0077)	(0.049)
$\mathbf{1}(t \in [0,2]) \times s_i^{other}$	-0.059	-0.34**	-0.030	0.021	0.014	-0.15*
	(0.11)	(0.088)	(0.045)	(0.035)	(0.014)	(0.059)
$\mathbf{1}(t \in [3,5]) \times s_i^{other}$	-0.15	-0.20*	-0.053	-0.055	-0.012	-0.032
	(0.10)	(0.085)	(0.059)	(0.041)	(0.013)	(0.059)
$\mathbf{1}(t \geq 6) \times s_i^{other}$	-0.16	-0.12	-0.060	-0.0053	-0.0074	0.012
	(0.11)	(0.090)	(0.064)	(0.032)	(0.0060)	(0.059)
Observations	505412	371305	10061	1506	1506	355777
Individuals	39371	39371	863	849	849	27815
KP F-statistic	9.67	7.57	–	–	–	–
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 (1). 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. $+$ $p < .1$, * $p < .05$, ** $p < .01$

ics, 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]

[9]If the conational share in the first job has a positive effect on return migration, as the SIEED

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 third of the employment effect estimated on the SIEED data conditional on not dropping out, in column 2, implying an increase in unemployment of 1.8 percentage points for a ten-percentage-point increase in the initial conational share.

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

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.

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 an initial firm by nationality fixed effect and include controls for time-varying initial firm and manager characteristics.[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 1.4-percentage-point decrease in employment for a ten percentage-point increase in the initial conational share, which is only 25 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 average employment rates by 3.2 percentage points, while the other migrant share has no effect. In column 2 I confirm that these effects are relatively 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 2.2 percentage points. Finally, in column 4 I allow for heterogeneity by the size of the first firm. Since the size of the first firm is potentially an outcome of the

[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.

instrument, these estimates cannot be interpreted causally. Nevertheless, the estimated coefficient on the conational share is larger in firms with more than 100 employees. In larger firms, where individuals will only interact with a subset of coworkers, the conational share may be more important in predicting which coworkers an immigrant will interact with than in smaller firms, where immigrants likely interact with all coworkers, regardless of origin.

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 or district-level conational employment, since these two variables are correlated with the treatment.

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. None of the interaction terms are significant, however, the instrument set is generally weaker in these specifications, complicating the interpretation of the estimated coefficients. However, there is no evidence in Table A.6 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 (1). First, the effect may be non-monotonic in the conational share (c.f. Ansala et al., 2021). In Figure A.3 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 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 (1) may be overly restrictive. I estimate both an OLS specification where I allow the effect of both group shares to vary for each year since the start of the job and the analogous reduced-form estimate for the instruments, the predicted share variables.[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 specification using different measures of wages as outcomes, conditional on employment. The results of the wage analysis are reported in Table 5. Column 2 repeats the main specification from the employment regressions, treating log daily wages on June 30 as the outcome. I find a negative and insignificant association between the conational share and own wages, which decrease by a statistically insignificant 2.9 per cent in the long run when the conational share increases ten percentage points. The other immigrant share is significantly negatively associated with wages in the short run, but not in the long run. These patterns are not affected, and magnitudes are generally smaller, when including other initial firm characteristics or observation year fixed effects, in columns 5 and 6, though the strength of the first-stage relationship may be an issue.

The social security data only include daily wages, rather than hourly wages, and an indicator for part-time status. In columns 3 and 4 I condition on working either full-time or part-time on

[12]These averages are estimated by replacing the interactions of the conational share with years since migration in Equation (1) 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.

Table 5: Relation between initial workplace composition and log wages

	OLS	2SLS				
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbf{1}(t \in [0,2]) \times s_i^{own}$	0.23**	-0.28	-0.21	-0.61	-0.16	-0.22
	(0.042)	(0.30)	(0.26)	(0.87)	(0.29)	(0.30)
$\mathbf{1}(t \in [3,5]) \times s_i^{own}$	0.13**	-0.12	0.046	-0.76	0.017	-0.16
	(0.032)	(0.29)	(0.24)	(0.86)	(0.27)	(0.29)
$\mathbf{1}(t \geq 6) \times s_i^{own}$	0.021	-0.29	0.077	-1.38	-0.14	-0.20
	(0.043)	(0.35)	(0.28)	(0.85)	(0.33)	(0.36)
$\mathbf{1}(t \in [0,2]) \times s_i^{other}$	-0.043	-1.00**	-0.86**	-0.11	-0.72**	-0.58*
	(0.053)	(0.24)	(0.21)	(0.42)	(0.22)	(0.23)
$\mathbf{1}(t \in [3,5]) \times s_i^{other}$	-0.12**	-0.80**	-0.70**	0.043	-0.51*	-0.72**
	(0.043)	(0.21)	(0.20)	(0.39)	(0.20)	(0.20)
$\mathbf{1}(t \geq 6) \times s_i^{other}$	-0.075	-0.17	-0.18	0.47	0.12	-0.62**
	(0.057)	(0.23)	(0.24)	(0.41)	(0.22)	(0.22)
Manager controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm characteristics	Yes	No	No	No	Yes	No
Observations	318467	318467	217453	101403	318467	318467
Individuals	39370	39370	33945	21191	39370	39370
KP F-statistic		8.5	6.0	1.8	2.0	8.5
Subsample	all	all	FT	PT	all	all
FE	NxD	NxD	NxD	NxD	NxD	NxD, oY

Note: The sample "all" corresponds to estimates conditional on an individual being employed in a job covered by social security at least one day during the year, daily wages in columns 3 and 4 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 (1), wages are deflated to 2010 values. Standard errors are clustered by initial district. + $p<0.1$, * $p<0.05$, ** $p<0.01$.

June 30. There is no significant association in either case between the initial conational share and wages. The magnitudes are somewhat larger for part-time workers, however the sample is small and, consequently, the first-stage is fairly week. The negative association between the other immigrant share and wages appears to be driven by the wages of full-time workers, again in the short run only, suggesting variation in hours worked does not explain the pattern in column 2.

In the light of the effect of the conational share on subsequent employment rates, documented in Table 3, the sample of employed individuals will be endogenously selected. Individuals who are employed 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. This kind of conditional-on-positive selection (Angrist and Pischke, 2009) 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

$$\log w_{i\tau} = \log w_{\tau} + \xi_{i\tau}, \tag{3}$$

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

$$\text{Bias}_{\tau} \approx 0.75\rho - 0.75\rho\pi_{\tau} \tag{4}$$

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 4 imply that a ten-percentage-point increase in the initial conational share will lower employment rates by 3.2 percentage points after six or more years, thereby increasing the selectivity bias in observed log wages by $0.75\rho \times 0.032 \leq 0.024$. 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 5.3 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 insignificant 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 [-0.53,-0.30].

To conclude, the pattern of associations of the share variables with wages conditional on employment—a negative but insignificant association for the conational share, and a negative short-term association for the other immigrant share—will reinforce the reduction in total earnings implied by the negative employment effect of the conational share. 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

5.1 Persistence of first job effects

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. The IV strategy adopted in Section 3.2 should rule out the possibility that the effect could be explained by persistent long-term effects of other characteristics of the first firm or job. The balancing tests reported in Figure 2 show that the instrument is not correlated with other characteristics of the first firm, other than the nativity of the manager, which is controlled for using predicted manager characteristics in all analyses. In particular, firm size, median wage, or AKM-style wage fixed effect are all uncorrelated with the instrument; we may therefore rule out that the long-term employment effect can be explained by the persistent effects for an immigrant of starting their career in a low-productivity firm (c.f. Damas de Matos, 2012).

Similarly, the instrument is uncorrelated with individual wages or part-time status; we may also, therefore, rule out explanations relating to the persistent effects of either receiving a referral into an immigrant's first job (Dustmann et al., 2016) or of higher initial bargaining power resulting from higher starting wages (Postel-Vinay and Robin, 2002).[14]

5.2 Human capital accumulation

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. A higher conational coworker share in the first job 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.

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 6, I report the estimates from a linear probability model associating the coworker share variables and an indicator for having acquired various forms of human capital, measured at the time of the survey. As in previous analyses with the IAB-SOEP data, I control 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 appear to slow down German language acquisition, as shown in column 1. Both share variables are negatively associated with German proficiency in the short-run; a ten-percentage-point increase in either variable decreases the probability of being proficient in German up to two years after the start of the first job 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 appears that the negative employment effect of the conational share cannot be entirely explained

[14]There is a negative association between the instrument and the first job being an apprenticeship. However, only five percent of individuals in the sample start with an apprenticeship, so we may also rule out that this is an important mechanism for understanding the results.

Table 6: 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

by slower German language acquisition that might result from working in such a workplace.

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 6 is consistent with differential Germany-specific human capital accumulation explaining at least some of the negative employment effect of the initial conational share, it does not permit us to rule out other mechanisms also playing a role.

5.3 Job search and social networks

To understand what other mechanisms might explain the negative employment effect of the initial conational share, I first explore how subsequent job search is associated with the initial conational share in Table 7. In columns 1–3, I report results from a linear probability model where I regress an indicator for an job-to-job transition (as opposed to job to unemployment) on the share variables and the same set of controls and fixed effects as before, conditional on an immigrant ending a job spell. In column 1 I report OLS estimates, I instrument for the included firm characteristics in columns 2 and 3. The initial conational share is negatively associated with the probability of a job-to-job transition. 2SLS estimates suggest this probability decreases by 2 percentage points when the conational share increases ten percentage points, though the estimates from the full specification, including manager characteristics, are imprecise.

In columns 4–6, I report estimates of the association between the share variables and the log of unemployment duration, conditional on become unemployed. Here, the 2SLS estimates, reported in columns 5 and 6, clearly indicate no association between the initial conational share and unemployment duration. The evidence in Table 7 therefore suggests that the initial conational share might influence immigrants' on-the-job search behaviour, since it makes them more likely to become unemployed at the end of a job spell, but does not increase the duration of an

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

	EE transition			ln(U duration)		
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	2SLS	OLS	2SLS	2SLS
s_i^{own}	-0.11**	-0.21*	-0.19	0.31**	0.0033	-0.034
	(0.017)	(0.086)	(0.22)	(0.091)	(0.33)	(0.49)
s_i^{other}	-0.017	0.055	0.033	-0.066	0.60	0.58
	(0.018)	(0.11)	(0.11)	(0.059)	(0.43)	(0.44)
Manager	Yes	No	Yes	Yes	No	Yes
Observations	171078	171078	171078	120833	120833	120833
Individuals	31322	31322	31322	29789	29789	29789
KP F-statistic		34.4	3.80		34.9	6.1

Note: Outcome in columns 1–3 is an indicator from moving from a job to another job, rather than unemployment, when completing a job spell. Outcome in columns 4–6 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

unemployment spell.

An immigrant's former coworkers constitute a network that immigrants may draw on when searching for jobs, either for information about job openings (Calvó-Armengol and Jackson, 2004; Boucher and Goussé, 2019), or for referrals when applying for jobs (Montgomery, 1991; Galenianos, 2013; Dustmann et al., 2016). To confirm that a change in the composition of the network towards a larger conational share alters search behaviour, I next study how the conational share affects how immigrants find subsequent jobs. For the sample of immigrants starting a new job, other than their first job, I define an indicator that is equal to one if the firm where an immigrant starts a new job is already employing a previous coworker from the immigrant's first job. This outcome is typically interpreted as indicating that the worker receiving a referral in their new workplace (Glitz and Vejlin, 2021). I regress this indicator on the share variables of interest, as well as the same set of controls, manager characteristics, and fixed effects. I report the estimates in Table 8.

In columns 1–2, I show that a 10 percentage point higher initial conational share is associated with a 2 percentage point increase in the probability of a referral into a subsequent job, regardless of whether I consider all transitions (column 1), or only transitions from unemployment (column 2). The 2SLS estimate, in column 3, is even larger, indicating a 5.7 percentage point increase.

Table 8: Referrals in subsequent jobs

	P(own ref.)			P(nat. ref.)		
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	2SLS	OLS	OLS	2SLS
s_i^{own}	0.20**	0.20**	0.57**	-0.072**	-0.090**	-0.74**
	(0.024)	(0.021)	(0.17)	(0.021)	(0.031)	(0.25)
s_i^{other}	0.038**	0.040**	0.078	-0.036*	-0.047**	-0.11
	(0.010)	(0.013)	(0.063)	(0.017)	(0.018)	(0.092)
Observations	146208	86351	146208	146208	86351	146208
Individuals	25298	21399	25298	25298	21399	25298
KP F-statistic			39.0			39.0
Subsample	all	U	all	all	U	all

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. All specifications include manager nativity indicators, instrumented for with predicted nativity in the 2SLS specifications. SE clustered by initial district. + $p < .1$, * $p < .05$, ** $p < .01$

In columns 4–6 I repeat the estimates for referrals from natives, which decrease when the initial conational share is higher. The net effect (not shown) is positive and significant for the OLS specifications, but zero for the 2SLS specifications.

Larger co-ethnic neighbourhood networks are thought to affect immigrants' job search behaviour (e.g. Battisti et al., 2022; Beaman, 2012; Edin et al., 2003). It should therefore not come as a surprise that the conational coworker networks also alter search behaviour, particularly since coworkers in general are a more important source of referrals than neighbours (Eliason et al., 2023). Furthermore, conational coworkers are likely to be particularly strong tie (Granovetter, 1973), which have larger job search effects than weak ties (Gee, Jones, and Burke, 2017; Kramarz and Skans, 2014) . To summarise, the evidence in this section, while suggestive, points to an effect of the initial conational share on subsequent search behaviour. Immigrants with a higher conational share in their first job appear to rely more on these former coworkers for subsequent jobs, reducing their efforts to search for work, at least when they are already employed.

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. The findings reported here suggest another, potentially complementary reason for the dynamic tradeoff Battisti et al. 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 (Dustmann et al., 2016). 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 immigrants' productive human capital or changes in job search. Descriptive evidence suggests that both may be at play. Larger immigrant shares lower German proficiency in the short run, but not in the longer run. On the other hand, larger conational shares specifically are associated with a greater reliance on former coworkers for job-finding and reduced on-the-job search.

Future research could dig more deeply into these mechanisms, 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. The two mechanisms explored here might also interact, since own productivity affects the value of searching for work. 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.

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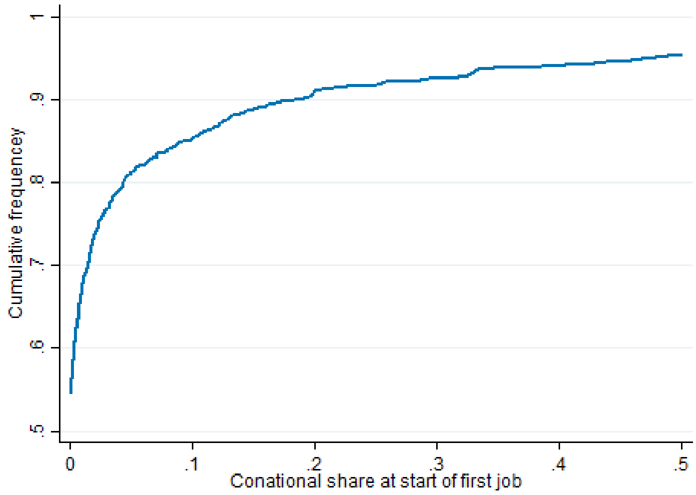
A Supplementary figures and tables

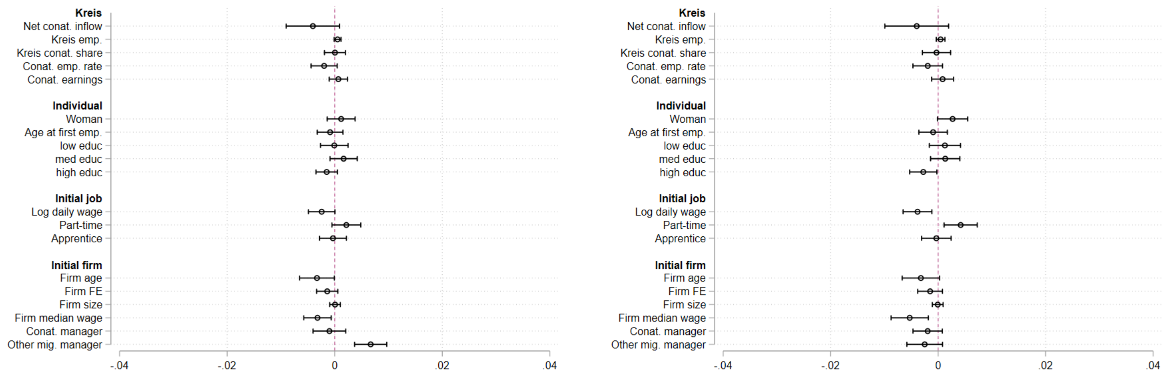
Figure A.1: CDF of conational share in first job in SOEP



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.

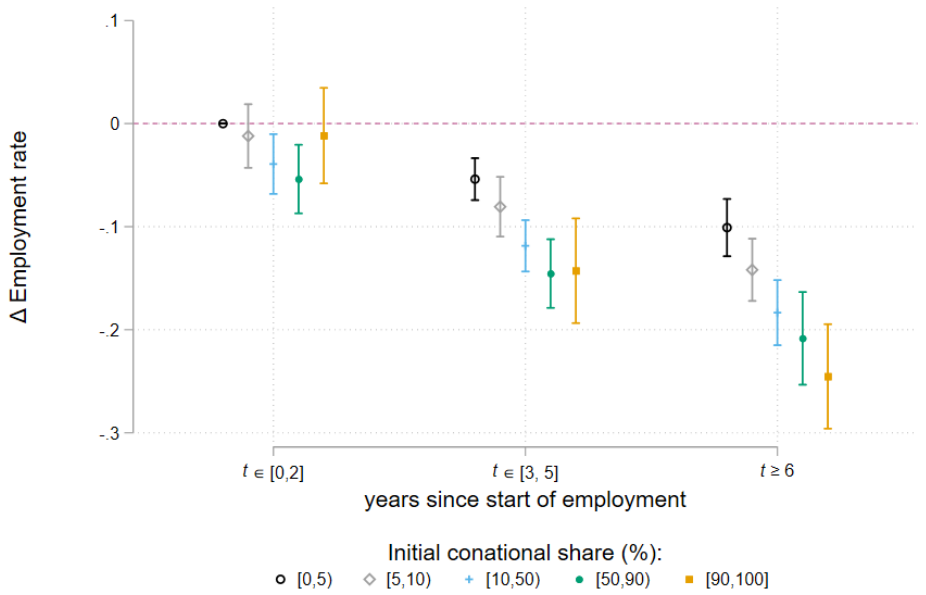
Figure A.2: Instrument validity, other migrant share

(a) No firm/job characteristics (b) With manager 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.3: Non-linear employment effect of composition of coworkers

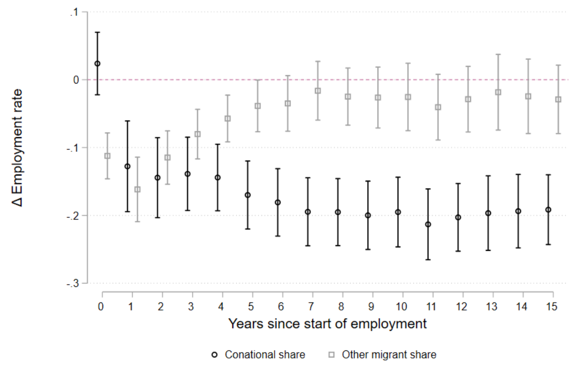


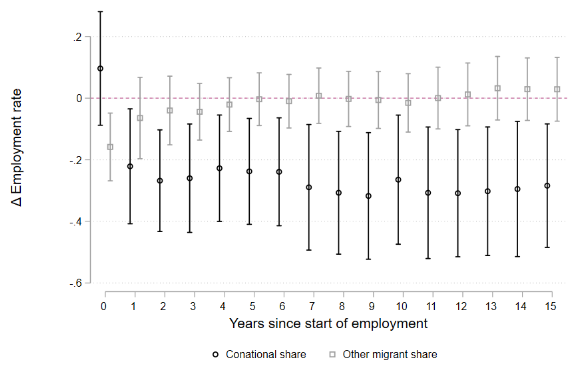
Notes: Indicators for each category, coworker share in $[0, 5)$ in the first two years of employment is the omitted category. The full set of controls and fixed effects is included, 95 per cent confidence intervals are calculated using standard errors clustered by individual.

Figure A.4: Annual associations

(a) OLS

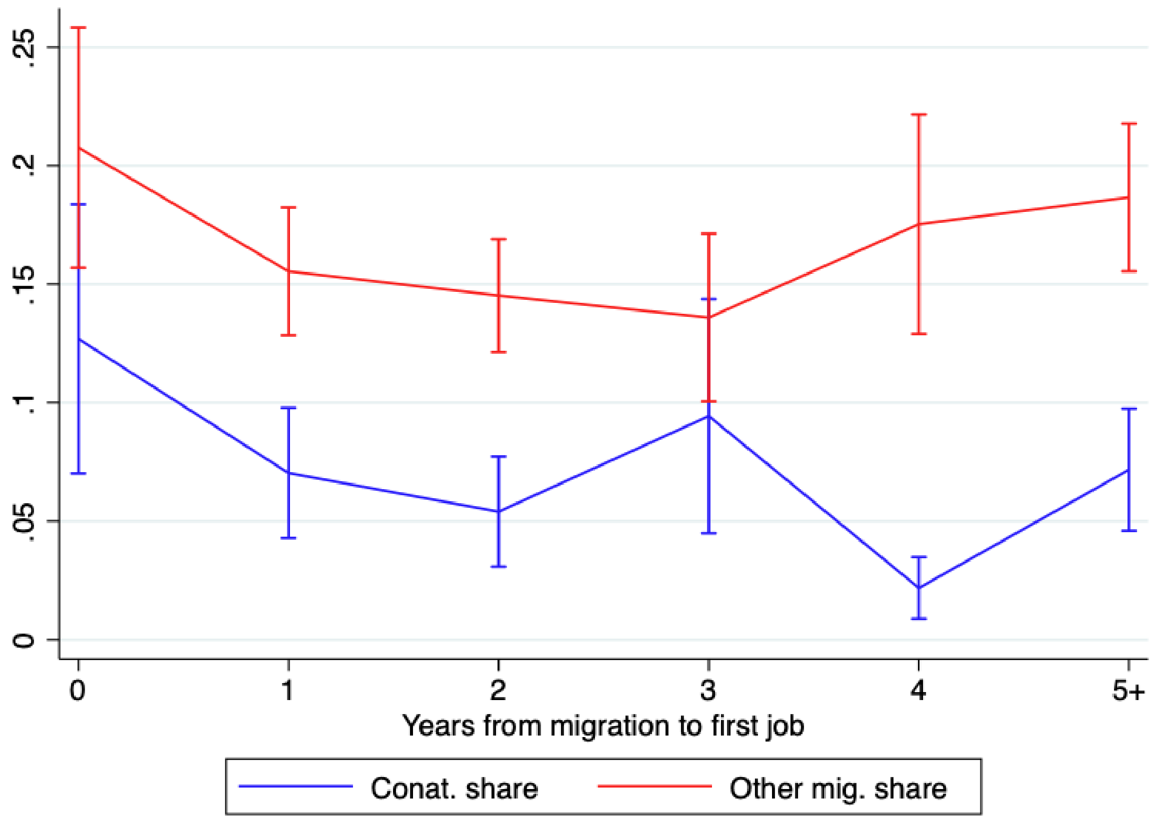
(b) Reduced form





Notes: OLS and reduced form estimates of the annual association of the conational share and other immigrant share, or predicted shares, with employment. 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	5736	14.57
Yugoslavia, Serbia, Montenegro	4820	12.24
other Asia	2964	7.53
Romania	2322	5.90
Russia, Belarus, USSR	2166	5.50
other Africa	1972	5.01
China	1047	2.66
Croatia	1043	2.65
Portugal	1033	2.62
France	1029	2.61
Hungary	1005	2.55
ex-Czechoslovakia	985	2.50
other America	944	2.40
USA, Canada	941	2.39
Ukraine, Moldova	820	2.08
Spain	819	2.08
Morocco	787	2.00
Bosnia and Herzegovina	763	1.94
Bulgaria	759	1.93
Uk, Ireland	752	1.91
Austria	670	1.70
Iran	638	1.62
Vietnam	630	1.60
India	518	1.32
Netherlands, Luxemburg	469	1.19
Afghanistan	455	1.16
Irak	389	0.99
Albania	332	0.84
Estonia, Latvia, Lithuania	298	0.76
other Europe	279	0.71
Thailand	247	0.63
Macedonia	228	0.58
Sri Lanka	212	0.54
Ghana	209	0.53
Lebanon	208	0.53
Denmark, Sweden	176	0.45
Tunisia	149	0.38
Philippines	136	0.35
Belgium	109	0.28
Etheopia	93	0.24
Oceania	69	0.18
Slowenia	60	0.15
Switzerland	53	0.13
Finland	37	0.09
Total	39371	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*	0.019	-0.031	-0.022
		(0.043)	(0.046)	(0.063)	(0.069)	(0.068)
z_i^{other}	0.69**	0.70**	0.41**	0.37**	0.41**	0.40**
	(0.031)	(0.032)	(0.033)	(0.035)	(0.038)	(0.034)
Manager characteristics	No	No	No	No	Yes	Yes
Other characteristics	No	No	No	No	No	Yes
N	39371	39371	39371	39371	39371	39371
R^2	0.17	0.17	0.45	0.54	0.54	0.54
FE	-	-	D	DxN	DxN	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 other characteristics are part-time status, firm age, 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}	-0.32*			
	(0.14)			
male$\times s_i^{own}$		-0.30*		
		(0.14)		
female$\times s_i^{own}$		-0.36*		
		(0.15)		
low educ$\times s_i^{own}$			-0.32*	
			(0.14)	
med educ$\times s_i^{own}$			-0.34*	
			(0.14)	
high educ$\times s_i^{own}$			-0.22	
			(0.16)	
large$\times s_i^{own}$				-0.65*
				(0.29)
small$\times s_i^{own}$				-0.30*
				(0.14)
s_i^{other}	-0.14			
	(0.11)			
male$\times s_i^{other}$		-0.10		
		(0.12)		
female$\times s_i^{other}$		-0.19$^+$		
		(0.11)		
low educ$\times s_i^{other}$			-0.15	
			(0.11)	
med educ$\times s_i^{other}$			-0.14	
			(0.13)	
high educ$\times s_i^{other}$			0.00090	
			(0.18)	
large$\times s_i^{other}$				-0.19$^+$
				(0.10)
small$\times s_i^{other}$				-0.12
				(0.13)
Observations	32420	32420	32420	32420
Individuals	32420	32420	32420	32420
KP F-statistic	13.1	8.7	6.2	8.4

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}	-0.32*	-0.50*	-0.32	-0.27	-0.38+	-0.34	-0.37
	(0.14)	(0.20)	(0.24)	(0.17)	(0.21)	(0.25)	(0.23)
s_i^{own} × Kreis emp.					0.18		
					(0.17)		
s_i^{own} × Kreis conat. share						-0.022	
						(0.17)	
s_i^{own} × Coworker emp.							-0.094
							(0.072)
s_i^{other}	-0.14	-0.095	0.068	-0.12	-0.042	0.052	-0.13
	(0.11)	(0.16)	(0.18)	(0.12)	(0.18)	(0.18)	(0.13)
s_i^{other} × Kreis emp.					0.094		
					(0.15)		
s_i^{other} × Kreis conat. share						0.17	
						(0.31)	
s_i^{other} × Coworker emp.							-0.041
							(0.072)
Kreis emp.		0.020			-0.017		
		(0.047)			(0.055)		
Kreis conat. share			0.014			-0.037	
			(0.016)			(0.084)	
Coworker emp.				0.019			0.035**
				(0.013)			(0.013)
Avg. share own	0.10	0.095	0.095	0.10	0.095	0.095	0.10
Avg. share other	0.21	0.23	0.24	0.21	0.23	0.24	0.21
Observations	32420	24263	20058	32420	24263	20058	32420
Individuals	32420	24263	20058	32420	24263	20058	32420
KP F	13.1	6.7	5.5	13.9	3.0	0.2	9.1

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:

$$Y = a + \beta S + \varepsilon_Y. \tag{B.1}$$

The structural error term ε_Y is mean-zero[15] 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:

$$C^* = \alpha_S S + \alpha_Y Y + \varepsilon_{C^*}, \tag{B.2}$$

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:

$$C(S, Y) = \begin{cases} 1 & \text{if } C^* < K, \\ 0 & \text{otherwise.} \end{cases} \tag{B.3}$$

Equation (B.3) 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

$$\beta = \frac{\text{Cov}(Y, S)}{\text{Var}(S)} \tag{B.4}$$

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

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

sample is

$$\begin{aligned}\hat{\beta} &= \frac{\mathrm{Cov}(S, Y|C=0)}{\mathrm{Var}(S|C=0)} \\ &= \beta + \frac{\mathrm{Cov}(S, \varepsilon_Y|C=0)}{\mathrm{Var}(S|C=0)} \\ &= \beta + \frac{\mathrm{Cov}(S, \varepsilon_Y|C^* \geq K)}{\mathrm{Var}(S|C^* \geq K)} \end{aligned} \tag{B.5}$$

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

$$\begin{aligned}&\mathrm{Cov}(S{,}\varepsilon_Y|C^* \geq K) \\ &\quad = \mathrm{E}[S\varepsilon_Y|C^* \geq K] - \mathrm{E}[S|C^* \geq K]\mathrm{E}[\varepsilon_Y|C^* \geq K] \\ &\quad = \mathrm{E}[\varepsilon_Y|C^* \geq K, S=1]\mathrm{Pr}(S=1|C^* \geq K) \qquad \text{(B.6)} \\ &\quad\quad - \mathrm{E}[S|C^* \geq K]\mathrm{E}[\varepsilon_Y|C^* \geq K] \\ &\quad = \{\mathrm{E}[\varepsilon_Y|C^* \geq K, S=1] - \mathrm{E}[\varepsilon_Y|C^* \geq K]\}\mathrm{Pr}(S=1|C^* \geq K), \qquad \text{(B.7)}\end{aligned}$$

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 (B.7), $\mathrm{E}[\varepsilon_Y|\cdot]$. 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

$$\alpha_Y\varepsilon_Y \geq K - (\alpha_S + \alpha_Y\beta)S - \alpha_Y a - \varepsilon_{C^*}, \tag{B.8}$$

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 (B.7) 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

$$\mathrm{E}[\varepsilon_Y | C^* \geq K, S = 1] < \mathrm{E}[\varepsilon_Y | C^* \geq K] \tag{B.9}$$

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 (B.7) 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

$$\mathrm{E}[\varepsilon_Y | C^* \geq K, S = 1] > \mathrm{E}[\varepsilon_Y | C^* \geq K] \tag{B.10}$$

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.