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'With a little help from my educated friends': revisiting the role of social capital for immigrants' labour market integration in Germany

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Abstract

This article examines the link between immigrants' social capital and their labour market access (employment) and success (occupational status) in Germany and contributes to previous research in two ways. Firstly, based on insights from theories of social capital and immigrant integration, we overcome the mere distinction between inter- and intra-ethnic ties. Instead, we approximate resources immigrants can access and mobilize by considering both the ethnic and socioeconomic compositions of their networks. Secondly, by using autoregressive cross-lagged panel models, we properly deal with the methodological challenge of endogeneity inherent to studies concerned with the relationship between social capital and labour market outcomes. Based on longitudinal data from the German Socio-Economic Panel the empirical findings indicate the necessity of considering both the ethnic and socioeconomic compositions of immigrants' networks—as both have independent effects on immigrants' labour market integration. We conclude that future research on the relationship between immigrants' social capital and their economic integration may benefit from approximating resources available through social contacts by considering not only the ethnic dimension but also the socioeconomic dimension of contacts.

Keywords: Labour market integration, Social capital, Social contacts, Social networks, Immigrants, Autoregressive cross-lagged panel model, Socio-Economic Panel (SOEP)

Introduction

In many European countries, migrants tend to be less successful than natives in the labour market (Fleischmann & Dronkers, 2010; Gorodzeisky & Semyonov, 2016; Kosyakova & Kogan, 2022; Reyneri & Fullin, 2011; van Tubergen et al., 2004). One of the several (complementary) explanations researchers have proposed for these ethnic inequalities is the social capital approach.[1] It highlights the significance of formal and informal job search methods for success in the receiving country's labour market (Lancee,

[1] Other approaches highlight the importance of human capital (Chiswick and Miller, 2002; Spörlein and van Tubergen, 2014), discrimination (Blommaert et al., 2014; Steinmann, 2019) and policies (Platt et al., 2022; Tjaden and Spörlein, 2023) to explain ethnic penalties in the labour market.

2016; Seibel & van Tubergen, 2013). The effect of social capital is well-established for a wide range of labour market outcomes, such as the transition from unemployment to employment (Baalbergen & Jaspers, 2023), self-employment (Kanas et al., 2009), income (Lancee, 2010), occupational status (Soehl & Van Haren, 2023), and labour market (mis) match (Kracke & Klug, 2021). In our article, we build on these studies and by addressing two limitations of previous research on the link between immigrants' social capital and economic integration: labour market access (employment) and success (occupational status).

Firstly, we consider both the ethnic *and* socioeconomic compositions of immigrants' networks. Previous studies have usually examined either ethnic or socioeconomic aspects of these networks. Some have investigated whether inter-ethnic ties (contact with natives) and intra-ethnic ties (contact with co-ethnics) are conducive or obstructive to immigrants' labour market integration (Kanas et al., 2012; Lancee & Hartung, 2012). While these studies emphasise the relevance of social capital, the distinction between inter- and intra-ethnic ties may not adequately describe the resources to which a person has access (Ryan, 2011). Others have studied whether the socioeconomic positions of contacts matter for economic outcomes (Chen & Volker, 2016; Lin et al., 2013; Volker & Flap, 1999)—confirming a positive relationship between them. Only a few studies have considered both ethnic and socioeconomic aspects of networks together (e.g., Behtoui & Neergaard, 2010; Cross & Lin, 2008; Hällsten et al., 2017). Overall, these studies indicate that there are fewer social resources available to immigrants, which contributes to understanding ethnic penalties in the labour market. Based on empirical evidence from these studies and on insights provided by general social capital theory (Lin, 2001) and theories of immigrant integration (Portes & Zhou, 1993), we argue that the assignment of resources based only on the contact's ethnicity may not be extensive enough. Instead, by approximating the resources linked to the socioeconomic positions of immigrants' contacts, we can unpack the relationships between immigrants' inter- and intra-ethnic contacts and their labour market outcomes and assess the resources their social networks may provide.

Secondly, we tackle the methodological challenge of endogeneity. Research on social capital and labour market outcomes typically faces the methodological challenge of endogeneity, which undermines the assumption that a correlation between social capital and economic outcomes depicts a causal relationship (McPherson, 2001; Mouw, 2003). Previous research met this challenge using longitudinal data (e.g., Kanas et al., 2012; Lancee, 2012). In addition to the data structure, we also adapt our modelling approach to this challenge. By using autoregressive cross-lagged panel models with unmeasured variables (ARCL), we address the problem of endogeneity as effectively as possible. Thereby, we check whether the effects of immigrants' social capital on their economic outcomes hold after accounting for social homophily and reverse causality.

Our study is realisable because Lancee and Hartung's comment from more than a decade ago (2012: p. 45) that "the measurement is limited to ethnic differences in social capital, it is not possible to measure the actual resources available in the ego's network" is no longer valid. We focus on first-generation immigrants and examine two dimensions of immigrants' economic outcomes: their labour market access (employment) and success (occupational status). When revising the role of first-generation immigrants' social

capital in their labour market integration, we relied on 2006–2016 data from the German Socio-Economic Panel (SOEP). We opted for the German context because drawing on longitudinal SOEP-data, allowed us to address the two above-mentioned limitations present in previous research. Thereby, we focus on a specific immigrant population—a sample of (mainly long-term) first-generation immigrants who typically came to Germany before the influx of highly skilled specialists. This group primarily migrated from Turkey and European countries, is characterised by a low to medium level of education and is comparatively disadvantaged in terms of employment and ranks in the occupational hierarchy (Kogan, 2011). Investigating whether and what type of social capital provides a means to overcome obstacles in the host country's labour market is of particular interest to a group with these limited resources.

Previous research and theoretical framework

Below, we discuss the link between social capital and economic outcomes in light of general social capital theory. We combine those insights with previous research on social capital and immigrants' labour market integration, thus establishing a basis for presenting our hypotheses afterwards. Before turning to theory, we describe the group of first-generation immigrants in Germany in more detail.

First-generation immigrants in Germany

Immigrants in Germany are by no means a homogeneous group (Vertovec, 2023). They have various immigration histories, differing in their initial motive to move, intention to return and length of stay in Germany. At the beginning of the twenty-first century, the population of first-generation immigrants living in Germany mainly consisted of so-called 'guest-workers' and their family members (e.g., from Turkey and Italy), asylum seekers (e.g., from ex-Eastern bloc countries) and inner-European labour migrants (e.g., from Poland and Romania). Many of these immigrants—often temporary at first but later increasingly permanent—remained in Germany (Green, 2013).

Since then, the descendants (and their descendants) of those who initially migrated have been born in Germany, forming the second (third) generation. First- and later-generation immigrants differ considerably from one another in several aspects. Most relevant for their labour market participation is that first-generation immigrants, unlike later-generation immigrants, rarely have German educational or vocational training (Granato & Kalter, 2001). Group differences are also visible regarding social capital and other aspects relevant to labour market integration (e.g., host-country language skills). While there is strong evidence to suggest that the lack of socioeconomic and relational resources constitutes a significant obstacle to labour market access and success for the first generation (Kogan, 2011), there is a general pattern of intergenerational progress towards the level of majority members on most relevant resources for the second and subsequent generations (Drouhot & Nee, 2019), which facilitates labour market integration. In line with most previous research on the topic (e.g., Gërxhani & Kosyakova, 2022; Kanas et al., 2012; Lancee, 2012), we focus on first-generation immigrants in Germany—a group of migrants who, due to their limited resources beneficial for economic integration, should be particularly reliant on social capital to narrow the gap between themselves and natives in the host-country labour market.

General social capital theory

Social capital is commonly defined as "investment in social relations with expected returns in the marketplace" (Lin, 2001: p. 19). Accordingly, social relations may provide an individual with various resources relevant to labour market access and success. These span from information about job openings and influence on agents to social credentials as testimonies and the reinforcement of an individual's identity (Trimble & Kmec, 2011; Lin, 2001: p. 20). However, the resources provided by different contacts can vary significantly. A contact's control over resources is related to his or her position within the social structure. Lin (2001: p. 56) proposes a pyramidal shape to describe the social structure, which comprises individuals sorted according to valued resources, such as educational attainment and occupational status. Access to and control of the resources are confined to the few individuals at the top of the pyramid, while the majority at its lower levels have less control over valuable resources. Thus, social capital is determined by the structural position in the pyramid. A higher position in the pyramid indicates greater control of and access to resources, including not only more personal resources but also more social resources.

Within these structural opportunities and constraints, people perform two types of actions: maintaining resources (expressive action) and gaining resources (instrumental action). While expressive action is more likely than instrumental action, the latter increases the likelihood of labour market success (Lin, 2001: p. 56–58). Thus, connections to individuals in high positions and access to their resources facilitate the performance of instrumental action. Correspondingly, Lin (1999: p. 470) concludes that to attain a higher position in the pyramidal structure, "the better strategy would be for ego to reach toward contacts higher up in the hierarchy".

These assumptions are corroborated by a broad range of studies conducted in different countries, for several different sub-populations and at different points in time. Under otherwise identical conditions, these studies clearly identify a positive relationship between the social positions of contacts and an individual's economic outcomes; this holds for both labour market outcomes of our interest, employment status and occupational status (Chetty et al., 2022; Chen & Volker, 2016; Lin et al., 2013; Volker & Flap, 1999; De Graaf & Flap, 1988; for a review, see Lin, 2001).

Research on social capital and immigrants' labour market integration

The insights from general social capital theory are helpful for discussing previous research on the relationship between social capital and immigrants' labour market integration. The majority of these studies show that contact with natives as a form of social capital is more advantageous for immigrants' labour market outcomes than contact with co-ethnics (e.g., Kalter & Kogan, 2014; Kanas et al., 2012; Lancee, 2010; Lancee & Hartung, 2012). Furthermore, it has been argued that inter- and intra-ethnic contacts differ in their importance for different labour market outcomes. While intra-ethnic contacts assist in 'getting by' (i.e., entering the labour market), inter-ethnic contacts are helpful for 'getting ahead' (i.e., finding a higher-status job). This is because the former points to within-group ties, comprising homophilous interactions between people with similar resources, while the latter indicates between-group ties, including heterophilous interactions between people with different resources (Lin, 2001; for a similar argument

referring to the terms 'bonding capital' and 'bridging capital', see Putnam 2000). The idea that ties differ in the resources they can provide is in line with Granovetter's notion of 'strong versus weak ties' (1973). Intra-ethnic contacts (bonding capital) are more likely to be strong ties (characterised by relationships with people who are emotionally close to you, e.g., friends) and usually lead to redundant information and resources an ego already has. In contrast, inter-ethnic contacts (bridging capital) tend to be weak ties (involving relationships with people who are more emotionally distant from you, e.g., acquaintances) and thus provide possibilities for labour market access that go beyond those already available in one's own circle.

In replicating previous research, we follow the above argument of 'getting by' and 'getting ahead' and deduce the following replication hypotheses: *Intra-ethnic contact positively affects immigrants' labour market access* (H_{1a}), and *inter-ethnic contact positively affects immigrants' labour market success* (H_{1b}).

However, well-established integration theories (e.g., Portes & Zhou, 1993) and empirical studies (e.g., Heizmann & Böhnke, 2016) challenge the dichotomy of resource-rich inter-ethnic and resource-poor intra-ethnic contact. In the words of Ryan and colleagues (2022: p. 5): "Such narrow dichotomous constructions limit our understanding of what is actually going on within networks." The mentioned research highlights the heterogeneity of social positions in the host society as well as in the ethnic community. Accordingly, contact with resource-poor natives probably is of little help for immigrants' labour market outcomes compared to contact with resource-rich immigrants. In line with the theory of segmented assimilation (Portes & Zhou, 1993), both natives and co-ethnics can provide resources that help immigrants to take an integration trajectory associated with structural integration: Engaging with the native middle class leads to mainstream assimilation while remaining socially and culturally attached to one's own ethnic group results in selective acculturation.[2]

The relationship between a contact's social capital and his or her socioeconomic position proposed by social capital theory (Lin, 2001) also translates into this reasoning: Immigrants are not necessarily located at the bottom of the social structure and are thus not necessarily without resources. Likewise, natives are not necessarily at the top and in control of resources. Furthermore, Portes (2010) highlights that even ethnic communities consist of entrepreneurs, a labour base and consumers; such communities can function as an "informal training mechanism" (Portes, 2010: p. 173) by passing along skills. Thus, resources relevant to the labour market are not restricted to natives but also associated with immigrants. A person's socioeconomic position and corresponding resources may take precedence over his or her ethnicity, for instance, when assisting during the application process and in preparation for salary negotiations.

Therefore, we consider the socioeconomic positions of immigrants' contacts, thereby extending previous research in the field which so far—apart from a few exceptions (e.g., Hällsten et al., 2017; Behtoui & Neergaard, 2010; Cross & Lin, 2008)—has solely focused on the ethnic composition of immigrants' networks (e.g., Kanas et al.,

[2] In contrast, the third pathway, called 'downward assimilation', describes a situation leading "straight in the opposite direction to permanent poverty and assimilation into the underclass" (Portes and Zhou, 1993: 82).

2012; Lancee, 2010; Lancee & Hartung, 2012). After replicating previous research by investigating the relationships between immigrants' inter- and intra-ethnic contact and their labour market integration, we examine whether these relationships can be explained (in part) by the resources linked to the socioeconomic positions of contacts.

Exclusive effect of contact's socioeconomic position

It is possible that social capital relies solely on the contact's socioeconomic position. Research that does not differentiate by contact's ethnicity concludes that the contact's general socioeconomic position is relevant for labour market access and success (Chen & Volker, 2016; Lin, 2001). Therefore, we expect that the impact of inter- and intra-ethnic contact on economic outcomes actually depicts the effect of the contact's socioeconomic position. The sociostructural hierarchy between natives and migrants suggests that higher socioeconomic positions are more often held by the former, while immigrants more often tend to have a lower status and, thus, also possess fewer valuable resources. Accordingly, we expect that the estimated effect of inter- and intra-ethnic contact on labour market integration is not generated by additional resources provided by natives; instead, it is caused exclusively by the higher socioeconomic position commonly held by natives. We therefore derive our second hypothesis: *The effect of inter- and intra-ethnic contact on immigrants' economic outcomes is fully mediated by the contact's socioeconomic position* (H_2).

Joint effect of contact's socioeconomic position and ethnicity

Economic outcomes could also result from a joint impact of a contact's socioeconomic position and ethnicity. Native contacts may have access to additional resources that are not open to their non-native counterparts. While migrating leads to a devaluation of human capital (Friedberg, 2000), natives typically possess host-country specific resources due to their longer exposure to the respective labour market. These could come in forms ranging from greater familiarity with bureaucratic and formal processes regarding the job search to general linguistic advantages (Kanas et al., 2011). We thus expect that the effect of contact with natives on labour market outcomes is only partially mediated; both dimensions–socioeconomic status and ethnicity–affect the labour market integration of immigrants by providing different resources. Therefore, we deduce our third hypothesis: *The effect of inter- and intra-ethnic contact on immigrants' economic outcomes is partially mediated by the contact's socioeconomic position* (H_3).

Methodological challenges and analytical strategy

Since the discussion of Mouw (2003), researchers analysing the interrelation of social capital and labour market outcomes face the danger of endogeneity that challenges any causal analysis. Based on Finkel (1995), in addition to a theoretical model, three fundamental conditions are necessary to identify a causal effect in social sciences: the covariation of the independent and dependent variables, the preceding of the former to the latter, and the non-spuriousness of this relationship. When estimating the impact of social capital, there are two major sources of potential bias. Firstly, researchers have

been aware of the potential bias of results due to social homophily (Shalizi & Thomas, 2011). Secondly, the impact of social capital on labour market integration is particularly prone to reverse causality (Leszczensky & Wolbring, 2022). In the following, we discuss these challenges and then justify our choice of analytical strategy.

The first potential source of endogeneity is related to social homophily. Friendship is not a random choice; it is based on similar characteristics of ego and alter. Similarity occurs along ascribed characteristics, such as ethnicity and gender as well as achieved characteristics, such as education and social class or even behaviours and attitudes (McPherson et al., 2001). Social capital and individual outcomes are affected by a shared, potentially unmeasured variable, which in many regression models leads to biased estimates. In the context of social capital and labour market integration, the similarity applies not only to the dimensions of ethnicity and socioeconomic position but also to other unmeasured shared determinants, such as attitudes and behaviours. Hence, although we conceptualise two dimensions of social capital, other correlated unobservables could bias the results.

The second source of endogeneity is linked to the danger of reverse causality: Although resource-rich friends potentially affect labour market outcomes, an enhanced economic position also offers opportunities to establish new contacts within this group. This issue is particularly discussed in integration research, as several dimensions pertaining to this field are conceived of as interdependent rather than sequential (Harder et al., 2018). Based on the assumption that social capital is influenced by labour market outcomes, the variable previously treated as independent thus turns out to be dependent.

Unless the fortunate coincidence of natural-experimental data is given (Gërxhani & Kosyakova, 2022; Soehl & Van Haren, 2023), in light of social homophily and reverse causality, it is important to choose a method carefully, as endogeneity produces highly biased results. Most researchers use a fixed effects (FE) model with lagged independent variables to address both issues (Kanas et al., 2011; Lancee, 2016; Mouw, 2006). This model controls for time-invariant unobserved heterogeneity while ensuring a temporal order of events, thus accounting for social homophily and reversed causality. Recently, Leszczensky and Wolbring (2022) discussed that FE models with lagged independent variables are prone to serially correlated error terms and should not be seen as the first choice for dealing with reversed causality.

Therefore, to account for social homophily and reversed causality but allow the simultaneity of both causal directions, we chose an alternative modelling strategy. Riedel (2015) addressed the interrelation of social capital and labour market outcomes using autoregressive cross-lagged (ARCL) panel models with unmeasured variables. ARCL models are longitudinal path models that estimate the crossed paths between two (or more) variables and their lagged values. The simultaneous estimation of both causal directions allows for determining one causal explanation over the other, either by finding only one significant path or by assessing the relative strength of the effects. When further specifying the ARCL model by adding a latent variable that captures unmeasured commonalities of the two dependent variables over all time points, it accounts for time-invariant unobserved heterogeneities and ensures a temporal order of events like the FE model (Finkel, 1995). However, the ARCL model also allows for simultaneity in

terms of the cross-lagged paths. Furthermore, by correlating the error terms within each time point, we capture shared underlying time-variant mechanisms that influence social capital and labour market outcomes in one wave but not the next (Finkel, 1995; Greene, 2008). In this way, the results provide "the most detailed estimates of the magnitude and direction of all causal effects" (Finkel, 1995: p. 83).

Data, variables and models

To test our hypotheses that the contacts' socioeconomic position (partly or fully) mediates the impact of immigrants' social capital on labour market outcomes, we base our analysis on a well-established longitudinal data set—the German Socio-Economic Panel Study (SOEP). The SOEP is a representative panel study conducted annually in West Germany since 1984 and in East Germany since 1990 (Giesselmann et al., 2019). Due to an oversampling of immigrants, the data allows for migrant-specific analyses (Goebel et al., 2019). We limit our sample to first-generation immigrants aged between 18 and 64 (see Kanas et al., 2009 or Lancee, 2012 for a similar approach). As our key independent variables (friends' characteristics) have been gathered once every five years since 2006, we only use the waves of 2006, 2011 and 2016.[3] Our analysis sample includes 299 persons for employment status and 184 for occupational status (balanced sample).[4] The operationalisation of all variables is described below.[5]

Dependent variables

Labour market integration

Regarding their access to the labour market, we measure immigrants' labour market integration in terms of employment status. Their success in the labour market, however, is captured by their occupational status (quantified in terms of the International Socio-Economic Index, ISEI-88).

Employment status is a binary variable indicating if a respondent is employed. We define all full-time, part-time and marginally working immigrants as employed, whereas those who reported not working are treated as unemployed. By excluding respondents who are still being educated, in retirement, on parental leave or unable to work due to disability, we only consider immigrants who could potentially be employed.

Occupational status is measured as ISEI, which was developed by linking education and income to maximise the role of occupation as an intervening factor (Ganzeboom et al., 1992; Meraviglia et al., 2016). The index scores distinguish the positions in the occupational hierarchy and range from '10' (kitchen helper) to '90' (judge).

Social capital

Similar to previous research (e.g., Lancee & Hartung, 2012), we use characteristics of the respondents' friends as a proxy for social capital. Participants were asked to name up to three people important to them. They were subsequently requested to characterise

[3] Questions about social capital were not included in the 2021 SOEP data, and even if they were collected that year, a Covid-19-related bias would be expected.

[4] A more detailed overview of case selection and number of cases is shown in the Appendix (Table 4).

[5] All variables, questionnaire items, and values can be found in the Appendix (Table 5).

their friends further. To measure a friend's ethnic background, participants were asked, "Where does this person come from?" If it was indicated that a friend was not from Germany, the follow-up question, "Are you from the same country?" was asked. Based on these questions, we define inter-ethnic contact as the number of German friends (0–3) and intra-ethnic contact as the number of friends from a respondent's country of origin (0–3). Friends who are neither co-ethnic nor German are not considered.

In addition, participants were requested to specify the educational backgrounds of their friends by answering the question, "Which is the highest educational degree he or she has attained?" As we aim to test the mediating impact of the friends' socioeconomic positions, we define high-position contact as the number of friends (0–3) with a tertiary education. Due to congruence and transferability, a person with a high position in one resource dimension tends to hold a similarly high position in other dimensions (Lin, 2001: p. 57). Thus, we assume that the friend's educational background is a reasonable proxy for his or her socioeconomic position.

Independent variables

Several independent determinants are included as controls for the dependent variables. Regarding labour market integration, we mainly focus on structural (work experience, education, length of stay in Germany) and socio-demographic indicators (gender, partner, children, country of origin) while we address the opportunity structure with respect to social capital. We also employ the respondent's German language competency as a shared control variable.

Independent variables for labour market integration

Structural indicators Being equipped with human capital is highly relevant for labour market access and success (Chiswick & Miller, 2002). Thus, we include the respondents' work experience and education to capture their human capital. The respondent's work experience is measured by summing up the years the respondent worked full- or part-time in Germany and the respective country of origin. We assess the educational level of immigrants, measured as years completed in full-time education. Since human capital increases with the length of stay in the host country (Kalter and Kogan, 2011), we also include the time elapsed between migration and the first interview.

Socio-demographic indicators Since gender (Sprengholz et al., 2021), relationship status (Khoudja & Fleischmann, 2017), children (Kanas et al., 2011), and country of birth (Kogan, 2011) are known to impact labour market outcomes, we add these four variables to our models. Besides gender (male, female) and country of origin (Turkey, Europe, other country), we expect that having a partner (defined as a stable relationship, either married or not) and the number of children in the household determine the likelihood of being employed as well as the occupational status.

Independent variables for social capital

Opportunity structure Since the formation of social contact is highly dependent on available meeting opportunities (Kalmijn, 1998), we include two variables. Firstly, we cap-

ture respondents' social activities by considering how often they attended certain events in their everyday lives (religious events, sports clubs, volunteer associations, occasions to help friends). We construct mean indices, where a higher value indicates more frequent social activities. The reliability coefficients calculated for the social activities scores are moderate ($\alpha = 0.616$). Secondly, we include a measure of ethnic residential segregation. Respondents were asked to estimate how many foreigners live in their residential area based on six categorical answers from 'none' to 'all'.

Shared independent variable

Several studies highlight the positive impact of German language competency not only on labour market outcomes (van Tubergen et al., 2004) but also on the likelihood of having native friends (Schacht et al., 2014). We thus include a self-assessed measure of German language proficiency by constructing a mean index with two language-related dimensions (speaking and writing). A higher value indicates greater language proficiency. The reliability coefficient for the German language competence score was satisfactory ($\alpha = 0.921$).

Missing values

Our analysis only considers respondents with complete values concerning our dependent variables. For independent variables, we impute information from the preceding years in cases where the question was not asked in the years of interest. We also use full information maximum likelihood (FIML) to impute the remaining missing values. We chose this procedure because Enders and Bandalos (2001) showed that FIML estimates are less biased and more efficient than other methods.

Models and estimation

Based on our discussion of methodological challenges, we opted to run ARCL models with correlated errors and include a latent unmeasured variable. Results for both dichotomous and continuous variables are estimated based on FIML.

Our multivariate analysis consists of two analytical steps, depicted in a simplified path diagram in Fig. 1.[6] Displayed are the paths between dependent variables, which illustrate the autoregressive effects (α, α', α'') and (reversed) cross-lagged effects (β, β'' and γ, γ''). In the first step, represented by solid lines, we replicated previous research and investigated the interrelations between immigrants' inter- or intra-ethnic contact and

[6] As an alternative to the path diagram, the following equations also show the models tested in the empirical part of the study. The equations include our three main variables, labour market integration (LMI), ethnic composition of networks (ECN), and socioeconomic composition of networks (SCN), while Z is the latent unmeasured variable and e is the random disturbance term (Finkel, 1995). Equations without mediation:

$$LMI_t = \beta_0 + \beta * ECN_{t-1} + \alpha' * LMI_{t-1} + Z_t + e_t$$
$$ECN_t = \gamma_0 + \gamma * LMI_{t-1} + \alpha * ECN_{t-1} + Z_t + e_t$$

Equations with mediation:

$$LMI_t = \beta_0 + \beta * ECN_{t-1} + \alpha * LMI_{t-1} + \beta'' * SCN_{t-1} + Z_t + e_t$$
$$ECN_t = \gamma_0 + \gamma * LMI_{t-1} + \alpha * ECN_{t-1} + Z_t + e_t$$
$$SCN_t = \beta_0' + \gamma'' * LMI_{t-1} + \alpha'' * ECN_{t-1} + Z_t + e_t$$

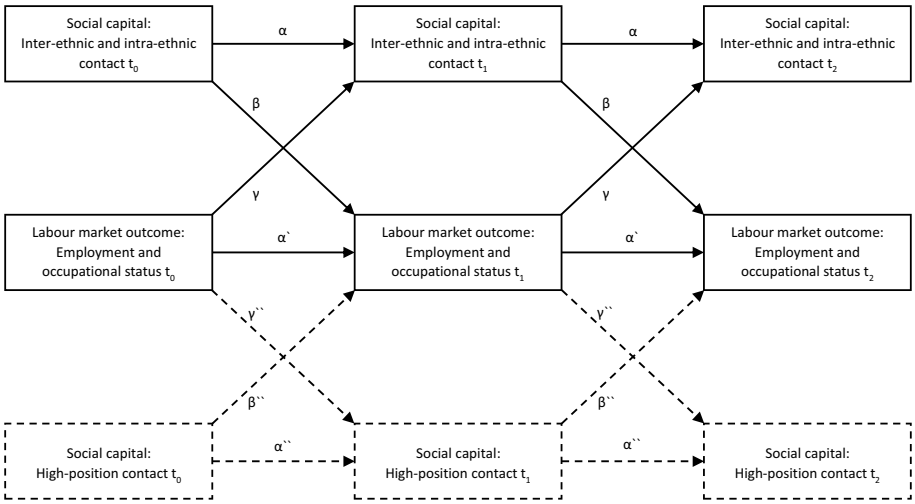

Fig. 1 Simplified autoregressive cross-lagged (ARCL) model

their labour market integration. To do so, we ran separate models for inter-ethnic and intra-ethnic contact. Separate models were necessary because respondents' contacts can evoke opposing mediational processes. If inter- and intra-ethnic ties differ in their effect directions (positive versus negative), we can still test the extent to which the socioeconomic position of the contact mediates these effects. This second step of the analysis is visualised by dashed lines, and we aim to test the theoretically proposed mediation by introducing contacts' socioeconomic positions in our models. Whether mediation occurs was tested using the Baron and Kenny method (1986).

When correlating the error terms and adding a latent unmeasured variable, we must assess the identification of our models. The correlation of the error terms indicates that our models are non-recursive, suggesting that the model may require more information than is available. Nevertheless, as no dependent variable affects another at the same time point, our models are identified under the Null Beta Rule (Paxton et al., 2011). Because we add the latent unmeasured variable, we have to constrain the structural effects and error variances for the dependent variables to be equal over time and set the variance of the latent variable to 1. Based on these specifications, our model is identified and can be estimated.

Results

Before answering the question of whether a contact's socioeconomic position (partially) mediates the effect of a contact's ethnicity on immigrants' labour market integration, we present descriptive evidence.

Descriptive results

In Table 1, we display frequencies or means and standard errors of our main variables.[7] We exemplify this by focusing on the descriptive results for the first wave. Almost

[7] Descriptive statistics for all independent variables are displayed in the Appendix (Table 6).

Table 1 Distribution of dependent variables

	Employment status		Occupational status	
	Range	Mean/%	Range	Mean/%
Labour market outcome				
Employment /occupational status t_0	0–1	71.4% (0.025)	16–88	40.62 (1.111)
Social capital				
Inter-ethnic contact t_0	0–3	1.310 (0.071)	0–3	1.311 (0.092)
Intra-ethnic contact t_0	0–3	1.253 (0.069)	0–3	1.205 (0.091)
High-position contact t_0	0–3	0.695 (0.055)	0–3	0.663 (0.070)
N	299		184	

Standard errors are in parentheses; results are presented for t_0 as an example

Source: SOEP (2006), own calculations

three out of four respondents are employed, and their average ISEI-value is a '40', which reflects, for example, salespersons and electricians. The number of contacts is rather similar in the two samples. On average, immigrants report 1.3 inter-ethnic contacts and 1.2 intra-ethnic contacts. The number of high-position contacts reported is notably lower, with less than one person per participant.

The interrelation between social capital and labour market outcomes

The following two tables show the results of the ARCL models, separately for inter-ethnic contact (Table 2) and intra-ethnic contact (Table 3). We reduce the presentation to standardised coefficients of the dependent variables for improved readability. Thus, cross-lagged and autoregressive paths are presented. By constraining all structural effects, we indicate one coefficient for all waves. Because of the low numbers of observations, we report additionally to conventional significance levels $p < 0.10$. We mainly interpret the findings of the cross-lagged effects: A positive coefficient means that employment or an increase in occupational status becomes more likely, while a negative coefficient means that employment or an increase in occupational status becomes less likely.

Employment status

In the first step (Table 2 and 3, M1a), we test the replication hypothesis and measure the effects of inter- and intra-ethnic contact on employment status. In contrast to our hypothesis H_{1a}, the findings suggest no effect of intra-ethnic contacts on the chance of being employed (−0.056; $p. > 0.10$). However, in line with previous studies, we find that the number of inter-ethnic contacts is positively associated with the chance of getting a job in the German labour market (0.092; $p < 0.10$). After adding the socioeconomic position to the models (Table 2 and 3, M1b) and testing the extent to which the contact's socioeconomic position mediates the impact of inter- and intra-ethnic contact, we find that in both models the effect of inter- or intra-ethnic contacts is non-significant (0.094; $p > 0.10$ and −0.074; $p > 0.10$) and that the number of

Table 2 Autoregressive cross-lagged panel analyses of immigrants' labour market integration, inter-ethnic contact and high-position contact (standardised coefficients)

	M1: Employment status		M2: Occupational status	
	M1a	M1b	M2a	M2b
	Employment status	Employment status	Occupational status	Occupational status
Cross-lagged paths (β and β'')				
Inter-ethnic contact$_{t0/t1}$ *(β)*	0.092 (0.031)*	0.094 (0.061)	0.921 (0.507)**	0.859 (0.548)†
High-position contact$_{t0/t1}$ *(β'')*		-0.010 (0.075)		1.760 (0.610)**
Autoregressive paths (α')				
Labour market integration $_{t0/t1}$	1.177 (0.142)***	1.143 (0.147)***	0.894 (0.047)***	0.866 (0.047)***
	Inter-ethnic contact	Inter-ethnic contact	Inter-ethnic contact	Inter-ethnic contact
Cross-lagged paths (γ)				
Labour market integration$_{t0/t1}$	0.370 (0.180)*	0.196 (0.119)	0.004 (0.005)	0.004 (0.006)
Autoregressive paths (α)				
Inter-ethnic contact$_{t0/t1}$	0.268 (0.077)***	0.243 (0.077)***	0.313 (0.071)***	0.327 (0.070)***
	High-position contact	High-position contact	High-position contact	High-position contact
Cross-lagged paths (γ'')				
Labour market integration$_{t0/t1}$		-0.093 (0.143)		0.007 (0.003)*
Autoregressive paths (α'')				
High-position contact$_{t0/t1}$		0.941 (0.091)***		0.288 (0.185)***
χ^2 (df)	293.10 (106)***	420.56 (172)***	161.84 (106)***	199.11 (165)*
RMSEA	0.063	0.082	0.054	0.038
CFI	0.726	0.660	0.923	0.960
TLI	0.606	0.596	0.888	0.937
N	299	299	184	184

† $p < .1$; *$p < .05$; **$p < .01$; ***$p < .001$; all models additionally control for work experience, education, length of stay, gender, partner, children, country of birth, German language competency, social activities, ethnic residential segregation (not shown); SEs in parentheses

Source: SOEP (2006, 2010, and 2016), own calculations

high-position contacts is not significantly associated with employment status. Since the effects of inter- and intra-ethnic contacts do not notably change after introducing the contacts' social positions, there is no support for either of our hypotheses regarding employment status (H_2 and H_3).

Further, regarding the opposite effect of labour market access on social capital, the final models do not reveal any significant effects in this direction. This may be because the effect of employment on social capital depends on the ethnic and socioeconomic compositions of the respective workplace (Martinovic et al., 2011). As expected, all autoregressive effects are strong and highly significant.

Table 3 Autoregressive cross-lagged panel analyses of immigrants' labour market integration, intra-ethnic contact and high-position contact (standardised coefficients)

	M1: Employment status		M2: Occupational status	
	M1a	M1b	M2a	M2b
	Employment status	Employment status	Occupational status	Occupational status
Cross-lagged paths (β and β'')				
Intra-ethnic contact$_{t0/t1}$ *(β)*	−0.056 (0.058)	−0.074 (0.055)	−0.794 (0.572)	−0.876 (0.556) †
High-position contact$_{t0/t1}$ *(β'')*		−0.027 (0.079)		1.990 (0.517)***
Autoregressive paths (α)				
Labour market integration$_{t0/t1}$	1.136 (0.145)***	1.123 (0.144)***	0.895 (0.047)***	0.862 (0.047)***
	Intra-ethnic contact	Intra-ethnic contact	Intra-ethnic contact	Intra-ethnic contact
Cross-lagged paths (γ)				
Labour market integration$_{t0/t1}$	−0.175 (0.183)	−0.089 (0.140)	−0.002 (0.005)	−0.002 (0.005)
Autoregressive paths (α')				
Intra-ethnic contact$_{t0/t1}$	0.278 (0.097)**	0.399 (0.047)***	0.381 (0.068)***	0.384 (0.068)***
	High-position contact	High-position contact	High-position contact	High-position contact
Cross-lagged paths (γ'')				
Labour market integration$_{t0/t1}$		0.075 (0.193)		0.012 (0.008)*
Autoregressive paths (α'')				
High-position contact$_{t0/t1}$		0.830 (0.160)***		0.623 (0.061)***
χ^2 (df)	301.29 (106)***	424.98 (172)***	162.01 (106)***	231.80 (165)***
RMSEA	0.081	0.083	0.054	0.047
CFI	0.626	0.645	0.920	0.928
TLI	0.565	0.578	0.885	0.903
N	299	299	184	184

† p < .1; *p < .05; **p < .01; ***p < .001; all models additionally control for work experience, education, length of stay, gender, partner, children, country of birth, German language competency, social activities, ethnic residential segregation (not shown); SEs in parentheses

Source: SOEP (2006, 2010, and 2016), own calculations

Occupational status

Compared to the employment status, when evaluating the replication hypothesis, we observe different results when estimating the impact of inter- and intra-ethnic contacts on occupational status (Table 2 and 3, M2a). The results support our hypothesis (H_{1b}), showing that each additional inter-ethnic contact significantly increases occupational status by 0.921 ($p < 0.10$). In contrast, each additional intra-ethnic contact tends to decrease the occupational status by −0.794 ($p > 0.10$), though the significance level is not reached in this case.

In testing our hypotheses and adding the number of high-position contacts to the models (Table 2 and 3, M2b), we found evidence of differing dynamics for the impact of inter- and intra-ethnic contacts: Table 2 (M2b) shows that roughly 7% of the impact attributed to the contact's ethnicity is explained by considering the contact's

socioeconomic position. Therefore, the impact is not significantly mediated, and inter-ethnic contacts are still positively linked to immigrants' occupational status. Comparing the magnitude of the effects, the findings suggest that the contact's socioeconomic position (1.760; $p < 0.10$) has a greater impact on occupational status than the contact's ethnicity (0.859; $p < 0.10$). In contrast, Table 3 (M2b) shows that the contact's socioeconomic position slightly suppresses the negative impact of intra-ethnic contact on labour market success, resulting in an approximately 9% increase in the coefficient. (−0.876; $p < 0.10$). In addition, the results again suggest that a higher number of contacts in high socioeconomic positions is positively associated with a higher occupational status (1.990; $p < 0.10$). In conclusion, both models show a significant positive effect of high-position contacts on immigrants' occupational status, accompanied by effects of inter- or intra-ethnic contact. These findings do not support an exclusive effect of the contact's socioeconomic position (H_2), but they do support our hypothesis of a joint effect of the contact's socioeconomic position and ethnicity on immigrants' occupational status (H_3)—though we cannot speak of partial mediation.

Regarding the reversed effect direction, we find that an immigrant's occupational status does not significantly impact their inter- or intra-ethnic contacts. This is in line with previous research showing that occupational status does not predict immigrants' contact with natives (Martinovic et al., 2009). In contrast, a higher occupational status is related to higher-position contacts. However, compared to the strong effect of contacts' socioeconomic position on immigrants' occupational status, the coefficient of the reversed effect is rather small. Again, autoregressive effects are strong and highly significant.

Conclusion and discussion

In this paper, we revisited the role of social capital for first-generation immigrants' labour market integration in Germany by refining previous research in two ways. Firstly, by taking both the ethnic and socioeconomic compositions of immigrants' networks into account, we overcome the simple distinction between resource-rich inter-ethnic and resource-poor intra-ethnic ties. Secondly, by explicitly modelling reverse causality and controlling for social homophily, we address the problem of endogeneity as effectively as possible.

Utilising longitudinal survey data from the German Socio-Economic-Panel (SOEP) and considering (primarily long-term) first-generation immigrants with limited resources, our empirical results suggest that taking both the ethnic and socioeconomic compositions of immigrants' networks into account means taking a step forward in research on the relationship between immigrants' networks and their labour market integration. We found that both the contact's ethnicity and socioeconomic position are independently associated with immigrants' economic outcomes in Germany. This finding emphasises the necessity of considering immigrants' social capital not only in terms of the contact's ethnicity but also his or her socioeconomic position. By recognising that resources available in migrants' networks have an ethnic as well as a socioeconomic dimension, we have built upon fruitful research that has considered both aspects of networks together (e.g., Behtoui & Neergaard, 2010; Cross & Lin, 2008; Hällsten et al., 2017).

Our findings corroborate previous research (Kanas et al., 2011; Lancee, 2010) that has pointed to the importance of immigrants' networks in general and has emphasised the

advantages of inter- over intra-ethnic contact for immigrants' economic outcomes in particular. However, we theoretically argued and empirically showed that this is only half the story. While the ethnicity of a contact may be important, their socioeconomic position is equally relevant for immigrants' labour market success. However, the generalisability of our results is limited because we focused on a specific group of immigrants, (mainly long-term) first-generation immigrants in Germany, with a particular profile that is atypical for immigrants who migrated very recently. Future research on other immigrant groups (e.g., later-generation and recently arrived immigrants) would benefit from additionally considering the socioeconomic dimension of immigrants' social capital when investigating their labour market outcomes.

To test whether the effects of ethnic and socioeconomic aspects of network resources hold for different labour market outcomes, we investigated both immigrants' employment and occupational status. A joint effect of contact's ethnicity and socioeconomic position could only be found for immigrants' occupational status. In the case of immigrants' employment status, neither an exclusive nor a joint effect was found. Thus, immigrants' networks are generally important for 'getting ahead' but not necessarily relevant for 'getting by'. Again, this finding may particularly apply to (long-term) first-generation immigrants.

Contact's ethnicity remains an important factor (either positive in the case of inter-ethnic or negative in the case of intra-ethnic contacts). Firstly, our findings indicate that native contacts provide additional resources that are helpful for immigrants' labour market success. Secondly, they show that resources made available by co-ethnic contacts are less beneficial for immigrants, probably because these contacts are faced with disadvantages in the labour market themselves. Overall, our findings demonstrate the multidimensional nature of immigrants' social capital and highlight that "the value of a particular social connection may depend more on the relative location of the actors […] rather than simply on their ethnic identity" (Ryan, 2016: p. 952). To re-examine this thesis of multidimensionality, a detailed recording of the resource-richness and -poorness of contacts within different immigrant groups is necessary.

Our findings speak to general social capital theory and theories of immigrant integration. Firstly, Lin (2001) acknowledges the existence of specific social capital dynamics for sub-groups (such as immigrants). Although insights from his theory are helpful when reassessing the role of the ethnic and socioeconomic compositions of immigrants' networks for labour market integration, he did not consider the interplay between general social capital and sub-group specific social capital, which shapes labour market outcomes of particular groups of interest. When investigating the effects of social capital on the labour market integration of other (not necessarily immigrant) sub-groups (e.g., unhoused people) in the future, it is crucial to consider this perspective, explicitly looking at resources available through social contacts. Secondly, by highlighting the importance of considering both ethnic and socioeconomic aspects of resources, we support the general idea of segmented assimilation theory (Portes & Zhou, 1993), namely, that immigrants do not follow a single path and are dependent on the segment of the receiving society into which they are integrated.

While our study provides evidence for a nuanced view of immigrants' networks, it is also subject to limitations. Firstly, our sample consists of a specific immigrant

group: first-generation immigrants with long durations of stay and extensive work experience. Due to these circumstances, they might no longer depend on contacts when searching for a new job, as contacts are probably most useful directly after one arrives in the host country, as hurdles for the labour market are highest then (Vergani et al., 2021). Future research should further investigate to what extent different kinds of immigrants (e.g., newly arrived and second- and third-generation immigrants) need contacts for their labour market access and success and which kinds of contacts are helpful for them. Secondly, previous studies highlighted that immigrant men and women face different challenges and differ in their trajectories taken in the labour market (e.g., Bilecen & Seibel, 2021; Sprengholz et al., 2021). Although we control for gender in our analyses, gender-specific mechanisms would need to be better addressed conceptually and tested empirically. Unfortunately, a more differentiated analysis was not possible due to the low number of observations. In addition, the effect of social capital may depend on the immigrant's accumulated host-country competencies. For instance, the benefits that immigrants derive from their contacts increase with their German language skills (Heizmann & Böhnke, 2016). Thus, future research should take such effect heterogeneities into account. Finally, the conceptualisation of social capital based on the available data poses three challenges: Firstly, our study focuses exclusively on strong ties, though Granovetter (1973) highlights the benefits of weak ties for labour market advances. However, recent work by Ryan (2011, 2016) provides more detailed theoretical arguments about the relation of tie structure and its content, questioning the direct translation of tie strength to alter's ethnicity or benefits in general. Consequently, the ambiguity of the strength of the tie is challenged, and Ryan (2022) emphasises the benefits of strong ties for immigrants' labour market performance. Secondly, we could not differentiate between potential and realised social capital. Recently, Pedulla and Pager (2019) echoed Granovetter (1973) in pointing out that having certain contacts does not automatically mean that they are willing to provide resources. By not limiting our analysis to job referrals (i.e., realised social capital) and instead measuring potential social capital, we intended to simultaneously capture various mechanisms of social capital that we cannot test directly based on observational data. Although these concrete mechanisms remain unmeasured, we argue that the effects of social capital on immigrants' labour market integration would be more likely to be underestimated by our operationalisation. Thirdly, although a contact's level of education is a reasonable proxy for his or her social position—given that having a high position in one resource dimension (e.g., education) often correlates with a high position in another resource dimension (e.g., income)—it is certainly not the only indicator of the resources available in social networks. Instead of utilising a name generator (Burt, 1984) as we have done, one could use a position generator (Lin et al., 2001) to capture networked resources via the occupational diversity of the contacts.

Overall, our study once more has shown that if people continue to rely on others to get ahead in the labour market, examining the link between immigrants' social capital and their labour market outcomes is crucial, especially since the use of networks contributes to maintaining ethnic labour market inequality in countries of immigration.

Appendix

See Tables 4, 5, and 6.

Table 4 Steps of sample creation

	Employment status	Occupational status
Original data (observations)	84,851	84,851
Limit observations to age 18–64 years	66,558	66,558
Limit observations to first-generation immigrants	18,705	18,705
Limit observations to 2006, 2011, 2016	13,038	13,038
Limit observations to active respondents in named years	2854	2854
No missing data for dependent variables	897	552
Turning observations into individuals	299	184

Source: SOEP (2006–2016)

Table 5 Model variables used in the analyses (variables, questions and values)

Variables	Survey questions	Answer categories (original)
Occupational status		
(10–90) ISEI-88	Generated variable provided by SOEP based on the following questions: What is your current position/occupation? What sector of business or industry is your company or institution active in for the most part?	(open)
Employment status		
(0) Unemployed (1) Employed	Generated variable provided by SOEP based on the following questions: Are you currently employed? Which one of the following applies best to your status?	(1) Full-time employment (2) Regular part-time (3) Vocational training (4) Marginal, irregular part-time (5) Not employed (6) Sheltered workshop
Inter-ethnic, intra-ethnic and high-position contact		
(0–3)	These variables are a combined measure based on the following questions: Please think of three people outside of your household who are important to you personally. They can be relatives or non-relatives. Respond for the first, second and third person Where does this person come from? Are you from the same country? Which is the highest educational degree he or she has attained?	[Name 1] [Name 2] [Name 3] (1) West Germany (2) East Germany (3) From a different country (1) Yes (2) No (1) No degree (2) Lower track (3) Middle track (4) Higher school certificate
Work experience		
In years	Generated variable provided by SOEP based on monthly information from the calendar dataset. We included full-time and part-time work experiences.	

Table 5 (continued)

Variables	Survey questions	Answer categories (original)
Education		
In years	Generated variable provided by SOEP indicating the school year or year in vocational training in Germany and abroad.	
Length of stay		
In years	The variable uses the interview year minus the year the respondent moved to Germany: Please indicate the year you moved to Germany:	(open)
German language competence		
(1) Not at all (2) Badly (3) Okay (4) Well (5) Very well	The variable is a combined measure based on the following question: How well do you know German? (speaking, writing)	(1) Not at all (2) Badly (3) Okay (4) Well (5) Very well
Gender		
(0) Male (1) Female	The variable is based on a generated variable provided by the SOEP.	
Partner (in the household)		
(0) No partner in the household (1) Partner in the household	The variable is a combined measure based on the following questions: Are you in a serious/permanent relationship? Do you live in the same household?	(1) Yes (2) No
Number of children (in the household)		
	The variable is a combined measure of two generated variables provided by the SOEP: Number of children in household, age 0–13 Number of children in household, age 14–18	
Country of birth		
(1) Turkey (2) Europe (3) Other	The variable is a reduced version of the question: Which country were you born in?	
Social activities		
(1) Never (2) Sometimes (3) Frequently	The variable is a combined measure based on the following questions: How often do you … … attend church or other religious events? … attend sports? … perform volunteer work? … attend social gatherings?	(1) Daily (2) At least once a week (3) At least once a month (4) Seldom (5) Never
Ethnic residential segregation		
(1) None (2) Less than one-quarter (3) About a quarter (4) About half (5) Most (6) All	How many foreigners are living in your residential area?	(1) None (2) Less than one-quarter (3) About a quarter (4) About half (5) Most (6) All

Source: SOEP (2006–2016)

Table 6 Distribution of control variables

	Employment status		Occupational Status	
	Range	**Mean/%**	**Range**	**Mean/%**
Structural indicators				
Work experience (in years)	0–33.4	10.155 (0.466)	1–33.4	12.130 (0.588)
Education (in years)	7–18	11.633 (0.138)	7–18	11.78 (0.176)
Length of stay in Germany (in years)	6–44	20.98 (0.549)	6–44	22.32 (0.713)
Socio-cultural indicators				
German language competence	1–5	3.210 (0.027)	1–5	3.185 (0.031)
Socio-demographic indicators				
Gender, female		58.9% (0.027)		52.1% (0.036)
Partner		88.4% (0.017)		91.3% (0.020)
Children	0–8	1.269 (0.069)	0–5	1.231 (0.082)
Country of birth				
Turkey		21.3% (0.022)		16.6% (0.027)
Europe		52.6% (0.027)		62.3% (0.035)
Other		26.0% (0.024)		20.9% (0.029)
Opportunity structure				
Social activities	1–3	1.884 (0.020)	1–3	5.008 (0.075)
Ethnic residential segregation	3–6	0.884 (0.017)	3–6	1.931 (0.029)
N	299		184	

Standard errors are in parentheses; results are presented for t_0 as an example

Source: SOEP (2006), own calculations

Abbreviations

ARCL Autoregressive cross-lagged
FE Fixed effects
FIML Full information maximum likelihood
SOEP German Socio-Economic Panel
ISEI International Socio-Economic Index

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Availability of data and materials
The data analysed in this study is the factually anonymous data of the 2006–2016 German Socio-Economic Panel (SOEP). The SOEP is a representative longitudinal survey conducted by the DIW Berlin. Data access was provided via a Scientific Use File supplied by the Research Data Center of the Socio-Economic Panel. All analyses relied on SOEP-Core v33.1. All documentation concerning the SOEP Sample, including questionnaires and data manuals are made available by DIW Berlin (https://doi.org/https://doi.org/10.5684/soep.v33). Due to the German Data Protection legislation, we cannot make the original data from the SOEP Sample or the dataset we generated available. Researchers can however apply for data access via DIW (https://www.diw.de/en/diw_01.c.601584.en/data_access.html). The syntax for our analysis is available from the corresponding author upon request.

Declarations

Competing interests
The authors declare that they have no competing interests.

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Publisher's Note

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