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Does inequality migrate? The development of income inequality across German states

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Abstract

This study analyzes the evolution of educational and occupational patterns among migrants and natives, as well as income inequality in Germany from 1985 to 2015. We show that despite migrants catching up in education, employment, and income with their native counterparts, unfavorable societal attitudes toward them have remained virtually unchanged, which can be attributed to Bourdieu's conceptualization of cultural inheritance. We find that while income inequality has increased significantly over the 30-year period, this trend varied considerably by the federal state and that migration did nothing to add to inequality. Since both the German economy and society rely on migrants, there is a strong need for the narratives toward migrants to be based on empirical evidence. The findings of this study hold migrant-related policy implications not only for Germany but also for other developed nations that rely on migrants as a labor force.

KEYWORDS

catch-up, economic inequality, German states, migration, sentiment

1 | INTRODUCTION

> In Europe characterized by manifest freedom of movement, one can be born and grow up in Germany, study in Great Britain, work later in Germany or France, and spend one's "active old age" in Italy. In Germany, the neighbor will be Belgian; the work colleague Turkish; the daughter-in-law, Danish; and the fellow sports club member, Spanish or Hungarian. Europeanisation, and even internationalization, of our lives, is already taking place today. An abundance of European products—food and drink, literature, music, and art (as we have had for centuries), science and research, fashion, and design—will become a mass experience of everyday life. These are the characteristics of an already existing and growing multicultural society.
>
> Heiner Geißler, *Germany: an Immigration Country?* (Geißler, 2007)

Over the past few decades, economic inequality in Germany has been on the rise. The pace of migration has also picked up, prompting the question of whether these trends or concurrent phenomena are contributing to the widening gap between the rich and the poor. The public discourse around immigration is multifaceted and complex. This study set out to examine the evolution of public attitudes towards migrants, as well as the development patterns within the three pillars of the discourse: education, occupations, and income [inequality] in Germany between 1985 and 2015. While our study provides a thorough comprehension of the socioeconomic standing and contributions made by migrants in Germany, it primarily emphasizes a paradoxical and compelling observation that is supported both theoretically and empirically: public sentiments towards migrants show limited responsiveness to the real socioeconomic impact of migrants in Germany, but this perspective requires reconsideration.

In accordance with predictions of Bourdieu's concept of cultural inheritance (reproduction) (Bourdieu, 1977a, 1984), we observe that perceptions and attitudes towards migrants are deeply embedded into a society's cultural context, shaped by cultural markers such as historic experiences and memory which profoundly affect a culture's values, identities and collective beliefs inherited across generations. When the Gastarbeiter (guest workers) program was initiated as a temporary solution to address labor shortages following World War II, migrant workers were expected to return to their home countries once their contracts expired. The initial perception of temporariness influenced attitudes and policies, although some migrants chose to stay in Germany, the legacy of the program's initial aim as a short-term remedy remained in the collective memory, contributing to the perception of migrants as "guests" or outsiders who were not originally meant to become a permanent integral part of society. Indeed, we identify a constancy of prevailing notions and attitudes toward migrants by conducting sentiment analysis on Twitter data spanning from 2007 to 2022. The analysis uncovers a consistent prevalence of negative sentiments towards migrants, significantly surpassing positive sentiments within the German-speaking community. In agreement with Bourdieu's view, the persistence in attitudes over time suggests that these are entrenched and passed across generations.

Contrary to the rooted views transferred from generation to generation, we present empirical evidence that goes against the prevailing narratives within the public discourse, particularly voiced by right-wing supporters. Such narratives have the vigor to magnify and reinforce public perceptions to the point that immigrants are viewed as mere guests in Germany, in its mass relegated to undesirable, low-income jobs, having limited educational and occupational prospects. However, we demonstrate that the negative beliefs and narratives propagated in right-wing public discourse, entrenched in historical notions (Semyonov & Gorodzeisky, 2017), simply do not fit the data.

The empirical analysis provides insights into three dimensions of migrant's socioeconomic standing. First, we critically examine the belief that migrants have low educational levels, which underpins the constancy of negative attitudes. Second, we explore migrants' occupational prospects, and third, we scrutinize migrants' income levels. Empirical findings, supported by convergence regressions, unveil a differentiated picture. We find that individuals with a migration background have narrowed the gap with the native population regarding income, educational attainment, and occupation, gradually catching up with their native counterparts. The proportion of migrants may even contribute to a reduction of inequality. This finding significantly challenges the prevailing narrative that

immigrants inherently exacerbate educational, occupational, and income inequality. We show that fears and perceptions about immigration and inequality are not based on empirical evidence.

Germany is not alone in this context. In the United States, the notion of immigrant families and their children perpetually being relegated to a disadvantaged social class is disproved by evidence that dismisses such myths, the propagation of which may be linked to the growing polarization of narratives surrounding migration (Abramitzky & Boustan, 2022). Shiller (2020, 2017) emphasizes that collective imagination (narratives) is crucial in shaping economic events, particularly during times of rapid change and crises. If such narratives dominate collective beliefs, it is essential to shed light on educational and occupational achievements among migrants and assess to which extent these de facto shape regional income inequality in Germany, paving the way to constructive dialog that can increase the sense of justice and cease undermining social togetherness.

From a historical viewpoint, Germany emerged as an attractive destination for immigrants due to its well-established social security system. Today, migrants and their descendants from significant immigration waves[1] have become an indispensable element of German society and have made substantial contributions to the country's prosperity (e.g., Clemens & Hart, 2018) and its capacity to respond to evolving economic, demographic, and social challenges (e.g., Kahanec & Zimmermann, 2009). Given demographic shifts and labor market gaps, Germany's economy heavily relies on migrants across skill levels, from low-skilled workers in sectors like hospitality to high-skilled innovators enhancing economic competitiveness. For example, the development of the Pfizer-BioNTech COVID-19 vaccine, led by German-Turkish immunologist Dr. Ugur Sahin and German physician and entrepreneur of Turkish descent Dr. Özlem Türeci, the Chief Medical Officer of BioNTech, showcases the role of high-skilled migrants in scientific advancement.

Data for this study were collected from the German representative longitudinal panel carried out annually (SOEP), covering 1985–2015, recompiled on a federal-state level. Considering the regional perspective, we document a rise in economic inequality at the federal and state levels. Further, we find that that East Germany accommodates fewer migrants, however, these are more likely to be highly qualified compared to immigrants domiciled across other federal states.

Overall, this study critically reevaluates the prevailing narrative concerning migration and inequalities in Germany, showcasing that public opinion about the role of migrants in society should be formed by migrants' real socioeconomic impact rather than by the portrayal of migrants based on generational memory or social inheritance.

The rest of the article is structured as follows: Section 2 reviews related literature and Section 3 describes the data and the empirical model. Section 4 presents the empirical results. In Section 4.1, we analyze migration-related attitudes using migration-targeted sentiment data based on textual analysis sourced from Twitter. The analysis of the evolution of inequality across German federal states is presented in Section 4.2. Section 4.3.1 discusses educational achievements, and Sections 4.3.2 and 4.3.3 examine the position of migrants and natives across the income and occupational distribution. Section 4.4 presents the results of the regression analysis of income inequality. Sections 5 and 6 discuss and conclude the results in light of a wider migration and inequality debate.

2 | THE RELATED LITERATURE ON MIGRATION AND SOCIOECONOMIC STANDING

Before discussing the empirical evidence on the intricate relationship between income inequality, socioeconomic dimensions of migrants, and narrative migrant sentiments in Germany, which reflect the socioeconomic landscape, we conduct a thorough review of the existing literature and findings on migrants' incomes, educational attainments,

[1]Followed by a migration wave of German expellees and resettlers between 1945 and 1949 and the economic miracle during the 1950s, Germany actively recruited a workforce, the so-called "guest workers" from Southern Europe, Turkey, and former Yugoslavia to cover labor shortages to ensure and support the country's post-war flourishing economy.

and narrative sentiments. In addition, we embed these findings within Bourdieu's theoretical framework, which provides valuable insights into the socioeconomic phenomena observed in the context of migration in Germany.

2.1 | Income of migrants

In pursuit of understanding economic equity, social cohesion, and the overall welfare of both the native and migrant populations, the academic discourse has thoroughly explored the integration of migrants into labor markets. Since income serves as a critical indicator of economic integration, this section reviews the existing literature on the native-immigrant wage disparities in Germany.

A large body of literature on wage differentials between natives and migrants in Germany (e.g., Aldashev et al., 2012; Pischke, 1992; Schmidt, 1997) consistently highlights that following the first few years upon arrival, migrants earn considerably less compared to their German counterparts, but with duration of stay wages converge (Lehmer & Ludsteck, 2015; Romiti et al., 2015). This aligns with the findings of the study by Bossler (2014), which reveals that more recent migrants in Germany, as opposed to those with over two decades of residency, are more likely to occupy lower-paid positions. Several factors contribute to this substantial wage disparity among recent immigrants, including sorting mechanisms (Granato & Kalter, 2001) that allocate them to specific workplaces and job roles, limited representation in higher-paying jobs, restricted career development prospects, and instances of discriminatory practices within the labor market. Another factor is that immigrants often accept lower reservation wages (Nanos & Schluter, 2014). Over time, observable characteristics, such as education, work experience, and regional location (Brunow & Jost, 2020), collectively contribute to the substantial wage disparity observed between recent immigrants and those who have resided in Germany for an extended period.

Brücker et al. (2021) and Basilio et al. (2017) document that foreign-acquired educational qualifications and work experience hold lower value compared to domestic qualifications. This discrepancy helps explain the earnings disadvantages faced by immigrants, supporting similar findings in the international literature (e.g., Friedberg, 2000; Hajro et al., 2019).

Starting in 2010, skilled immigration from third countries has significantly contributed to addressing the shortage of professionals across various academic disciplines/fields. When exploring the wage profiles of immigrants in Germany, Zibrowius (2012) raises a fundamental question, exploring whether wages between natives and immigrants diverge or converge over time. The findings reveal that immigrants in Germany, except for those in the low and partially medium-skill group, face challenges in achieving wage parity with native Germans, even when accounting for both work experience and years since migration. Notably, the study suggests that, in particular, highly skilled immigrants face significant earnings disadvantages, prompting concerns about whether native Germans enjoy cumulative advantages and the existence of possible discrimination in terms of job opportunities. This finding is particularly concerning since highly skilled immigrants are in great demand within the German labor market. Examining the second generation of migrants, a recent study by Stockhausen (2022) found that migration background has a marginal influence on incomes in Germany.

In sum, the wage disparities between migrants and Germans diminish substantially with the increasing duration of stay, accumulation of work experience, and the attainment of additional education and training. Our empirical results show a convergence in both educational attainment and, subsequently incomes between the native and immigrant population in Germany. This convergence exhibits the accumulation and adaptation of cultural and social capital by means of education and socialization among immigrants over time. While migrants are expected to possess lower cultural capital endowment (Bourdieu, 1977b) they are not necessarily permanently relegated to lower social class. Access to education and occupational opportunities facilitates the accumulation of cultural capital among migrants to improve their positioning and climb the socioeconomic ladder.

2.2 | Education of migrants

A lot of attention on educational attainments and economic outcomes of migrants in Germany deals with the question of social mobility and assimilation across generations (Fick, 2011; Gries et al., 2022; Riphahn, 2003). Previous research yields a mixed picture regarding the educational assimilation of immigrants in Germany. Aligning with Bourdieu's theoretical expectations, migrants frequently face discrimination. This observation underscores the existence of a discriminatory mechanism that perpetuates the societal class structure, a phenomenon well-documented in studies conducted across multiple countries (e.g., Levels et al., 2008; Tubadji et al., 2017). For Germany, Riphahn (2003) examined the educational attainments of German-born migrant children and found that their educational performance falls behind that of natives, suggesting the persistence of substantial educational disparities. This view is supported by Kristen and Granato (2007), stating that primarily Turkish and Italian second-generation descendants are significantly burdened compared to natives. Contrasting the educational success of the foreign-born, second-generation migrants and natives, Algan et al. (2010) find significant differences between former *guest workers* and the natives in addition to the overall observed educational lag between the foreign-born and natives. Further, Algan et al. (2010) argue for a diminishing educational gap between second-generation migrants and Germans, however, a persistent gap for Turkish, Yugoslavian, and Italian descendants is observed. These findings are confirmed by Gries et al. (2022) identifying that immigrants with ethnic backgrounds closer to German culture and language presumably demonstrate better educational achievements. Previous research links lower socioeconomic positions to lower academic achievements and vice versa (Aikens & Barbarin, 2008; Chetty et al., 2011). Adopting a broader perspective, Alba et al. (2017) point to the importance of parental socioeconomic status for academic success in Germany and argue in favor of an educational convergence between native Germans and second-generation migrants. We provide empirical evidence in support of educational convergence suggested by Alba et al. (2017). In light of the literature, an intriguing observation in the German context is that cultural factors, possibly influenced by a local appreciation for objective merit in scientific fields, have rendered discrimination less visible in the realm of educational recognition. Nevertheless, we show that discrimination persists as an overarching societal perception within the local context, which serves as compelling evidence for the concept of cultural relativity (Tubadji, 2020), illustrating how cultural perspectives and norms influence the visibility and interpretation of discrimination in diverse regional settings.

2.3 | Sentiments toward migrants

To understand the constancy of attitudes towards migrants in Germany, we explore the concept of cultural attitude transmission as a critical perspective through which to immerse in Bourdieu's theoretical framework on cultural reproduction (Bourdieu, 1977a). In Bourdieu's theory, cultural markers represent the enduring beliefs, norms, and values characterizing a particular culture or social group (for more information see, e.g., McElreath et al., 2003). Further, these shape individuals' perceptions, preferences, and behaviors. Although migrants in Germany have experienced improvements in education, occupation, and increasing income levels, these cultural markers continue to have a significant lasting impact on how native Germans perceive and interact with migrants. Consequently, these cultural markers persistently shape attitudes toward migrants, rendering attitudes unaffected by migrants' actual socioeconomic progress. One intriguing and concerning cultural marker in this context is the historic memory, which sheds light on the reason why the native population, even in the face of evidence highlighting migrants' advancements in socioeconomic status, does not change their attitudes towards migrants. Throughout its history, Germany has witnessed several migration waves, including the guest worker program, where primarily low-skilled laborers were recruited to fill the post-war labor shortage. Over time, collective historical memory of these earlier migrant waves, being predominately low-skilled and destitute, became entrenched in society's consciousness, to the point that this contributed to the persistence of stereotypes and biases against migrants that influence

contemporary perceptions. As outlined by Abramitzky and Boustan (2022), these stereotypes include presumptions that migrants are often confined to low social class or predominantly engage in low-paid jobs.

While Bourdieu's concept of cultural transmission of attitudes provides a valuable framework for understanding the persistence of attitudes toward migrants in Germany, we now aim to bridge this theoretical foundation with current research focusing on migrant narrative sentiments. We first attend to the literature on drivers of unfavorable attitudes towards migrants (e.g., Davidov et al., 2020; Hainmueller & Hopkins, 2015; Scheve & Slaughter, 2001).

First, studies identified that increased integration (e.g., Chiswick & Miller, 2002, 2012) is likely to lead to better employment perspectives and societal participation and thus may reduce negative attitudes towards migrants. Second, an adverse public reaction can be triggered if migrants are perceived as competitors (LeVine & Campbell, 1972; Scheepers et al., 2002). These studies imply that attitudes are largely shaped by a combination of political, cultural, and economic factors, including perceptions about job competition, cultural discrepancies, and perceived threats to national identity. Moreover, it is suggested that attitudes towards distinct migrant groups differ, and media exposure to or personal interaction with migrants strongly shapes the public's attitudes towards the latter. As outlined by Alesina et al. (2023), Gorodzeisky and Semyonov (2020), and Grigorieff et al. (2020) misinformation on migrant demographics may drive the public's opinion on migration.

Several theories have been proposed to explain the rise in anti-migrant attitudes. Pioneered by Quillian's (1995) status competition theory, anti-immigrant attitudes occur due to increased status competition as a result of a substantial proportion of migrants or an increase in the migrant population. Another theoretical strand builds on the group conflict theory and the ethnic competition theory (LeVine & Campbell, 1972; Scheepers et al., 2002; Tolsma et al., 2008), this theoretical framework assumes that hostility and discrediting attitudes result from competition between the native and immigrant groups over sparse resources. Katz and Taylor (1988) identified perceived threat as the salient motive of disapproving views toward minorities. In contrast to Haaland and Roth (2020), who study attitudes towards migrants in light of labor market concerns, Stawarz and Müller (2020) do not find a significant effect of unemployment concerns on the rise of negative attitudes, instead, the authors suggest that subjective fears, such as crime being rather evocative, are more likely to shape the public's attitude towards migrants as opposed to economic concerns. In sum, research exploring the role of information provision and media parlance on attitudes finds that exposure to content providing political context and personal immigrant narrative can lead to more positive attitudes toward foreigners and increase empathy. Conversely, exposure to political messages portraying foreigners as a drain on resources and a threat to social cohesion and national security tends to result in rather negative public opinions. Overall, these studies accentuate that caution needs to be exercised while interpreting the obtained empirical evidence as the latter might substantially vary subject to the socio-political climate and sentiments within German society.

3 | DATA

In this section, we briefly describe the data set and variables that are used in the empirical analysis to construct immigration-related measures of income inequality in Germany.

3.1 | GSOEP

The data used in the analysis of immigration-related parameters and its impact on economic inequality falls into two categories. First, we use the GSOEP[2] household-level data set (version 35), which provides both household and individual-level data on personal characteristics, education, living arrangements, financial position, wages,

[2]The German Socio-Economic Panel (SOEP) is a longitudinal panel data set and one of the largest and longest-running multidisciplinary household surveys conducted since 1985. Yearly, approximately 30,000 individuals in 15,000 households are interviewed. Version: (SOEP, 2019).

employment status, migratory as well as occupational history to obtain economic and demographic control variables as well as household level income data to obtain the dependent variable, measuring economic inequality. Our analysis considers the data covering the period 1985–2015.

The dependent variable, *income inequality*, is constructed and recompiled on a federal-state level in accordance with the definition of the World Bank and current literature based on household post-government income. Popular measures of inequality are the Gini coefficient (e.g., Farber et al., 2021; Medeiros et al., 2022; Mijs, 2019) and decile ratios such as the Palma ratio (90/40) (Palma, 2011) to estimate the income earned by the richest 10% of the income distribution relative to that of the poorest 40%. Considering the entire distribution, the Gini coefficient is more sensitive to changes in the mean of the distribution and less sensitive to changes at the tails of the income distribution where most poverty and wealth accumulation is witnessed. In our baseline regression, we use the Gini coefficient to quantify income inequality. We assess the robustness of our findings by also considering the Palma ratio, as it is more sensitive to changes in the top 10 of the income distribution relative to those allocated at the bottom 40%.

With regard to the immigrant status, the GSOEP distinguishes between a direct and indirect migration background, where "direct" indicates that the individual immigrated by him/herself, and "indirect" refers to an individual who is of migrant origin (at least one parent is foreign-born) but born in Germany. The value of the underlying variable coded "no migration background" refers to individuals born in Germany holding German nationality whose parental information is nonavailable, which likely leads to distorted "indirect migration background" responses. In the following sections, our descriptive analysis accounts for the native, foreign-born, and second-generation migrant populations—hereafter referred to as subgroups.

To control for rising income inequality levels, the following parameters, based on the foreign-born population in Germany, have been included as control variables: the percentage of total labor income earned by the top and bottom 10% of the foreign-born population, the share of the foreign-born population per federal state, the percentage of highly and poorly educated foreign-born as well as the percent of GDP by the federal state. To obtain these parameters on a federal-state level, all individual-level panel data between 1985 and 2015 ($N = 2{,}951{,}438$) was cleaned and recompiled to the federal-state level (16 states), leaving us with 16 observations per control variable annually. Note that before 1992, the data was not available for five federal states that were in GDR before reunification. The data was also not available for the federal state of Saarland until 2001. Therefore, the observations (T) for each federal state ($N = 16$) range between 14 and 25 for the period covering 1985–2015, amounting to $\sum_i T_i$ (or NT) = 372 observations included in the empirical model. To assess educational accomplishments among the native and foreign-born population, consistent with the "Comparative Analysis of Social Mobility in Industrial Nations (CASMIN),"[3] individuals holding low or high tertiary degrees are assigned to "high," those holding intermediate qualifications (e.g., general qualification, intermediate vocational, general maturity certificate, and vocational maturity certificate) are coded as "medium." We classify individuals who neither completed elementary education nor basic vocational qualification as "low." Due to multicollinearity issues, we solely consider low and high educational levels. The descriptive statistics are discussed in the empirical Section 4.

3.2 | Twitter

In addition to using panel data from the GSOEP, we also retrieve Twitter data related to immigration (which has been available since 2007) and employ quantitative opinion-mining techniques to examine public narratives surrounding migrants within the German-speaking community.

[3]The education classification system makes a distinction within the hierarchy of educational levels, subject to length and level of educational experiences as well as the required intellectual abilities and the value of the degree obtained (Brauns & Steinmann, 1999; Müller et al., 1989; Müller & Michael, 1997). It also takes into account the international comparability of educational qualifications. We use the underlying classification to code educational attainments of the foreign-born population within the sample into "low," "medium," and "high," guided by previous studies (Moor et al., 2018; Schröder et al., 2020).

We use these data to better understand the public attitude towards migrants in the German-speaking community. Tweets have been filtered by at least one of the following German migrant-related words: *Migranten*, *Ausländer*, *Einwanderung*, *Einwanderer*, *Zuwanderer*, *Migrantinnen*, *Flüchtling(e)*, excluding re-tweets. Based on our search query, we collected 50,000 Tweets in the German language per year from 2007 till mid-2022 to perform the sentiment analysis by means of natural language processing techniques. Once the data was extracted, a sentiment analysis which aims to quantify the perception (polarity) of a text, was carried out. The analysis reveals whether the text is perceived as positive or negative. Hence we aim to identify the polarity of immigrant-related public sentiments among German speakers. We do not limit our Twitter data analysis to Germany in geographic terms but to the language since we assume that a German language Tweet largely affects the German-speaking community and consequently the public discourse regardless of the particular user location.

We are applying a lexicon-based approach to compute the polarity of the collected Twitter data. The sentiment analysis is based on the publicly available German language text-mining lexicon *SentiWS* (SentimentWortschatz) (Remus et al., 2010). We apply the latest available version (v2.0), the compound of 16,000 positive and 18,000 negative word forms, including their inflections, classified to positive/negative polarity connoted words, weighted/stored within the interval of [−1; 1]. *Positive* and *Negative* polarity come in separate packages, provided by the University of Leipzig, which are combined and rearranged. Our text mining analysis closely follows Wickham (2014) and Silge and Robinson (2017).

Before assigning sentiments to tweets, data were preprocessed and transformed into a tidy text format. Before transforming the data to a tidy-text format, stop words and special characters that do not convey any content and are thus deemed obsolete are removed from the data by applying two German stop word packages in `R`. The tidy-text format is achieved by means of tokenizing, which is dividing the tweet text into tokens. This results in a table containing a single word per row using the `tidytext` package. In the next step, the sentiment score and polarity are assigned to the tokenized text using the lexical resource (SentiWS). Words for which no sentiment is available have been removed.

Following the lexicon-based sentiment analysis, the annual sentiment score is computed drawing upon complied polarity scores. We first considered the median of all positive and negative scores collectively. While splitting the sentiments and generating separate scores (positive and negative, respectively), negative sentiments appeared to have a substantially higher magnitude compared to positive ones for the entire period 2007–2022. Hence instead of using the median or arithmetic average of the sum of negative and positive sentiments, which will draw out and allay the severity of negativity conveying language, we compute the sentiment scores separately in two ways: estimating the median in a first step and the most *negative* (considering the 10th percentile) and most *positive* (90th percentile) sentiment in a subsequent step. The sentiment scores are discussed and visualized in Section 4.1. Positive, negative, and the sum of sentiments are included in our extended empirical model to collectively test the impact of migrant-related public sentiment and immigrant determinants on income inequality.

Studies conducting demographic research using nonrepresentative data point to some of its limitations and caution that needs to be exercised regarding estimation errors and biases inherent in data retrieved from social media (Yildiz et al., 2017). Since the provision of residential location and personal data is a matter of choice and Twitter does not reveal the IP addresses of its account holders, demographic details of Twitter account holders, such as gender and age are sporadically available. Although we acknowledge these limitations, we believe that the findings obtained from this data are still valuable and offer insightful perspectives.

4 | EMPIRICAL RESULTS

In this section, we provide evidence for the constancy of sentiments towards migrants, the evolution of regional inequality in Germany as well as migration-related trends. First, Section 4.1 analyzes migration-related measures using sentiment data based on textual analysis of tweets from Twitter. Section 4.2 discusses the evolution of

inequality across German federal states. Section 4.3.1 discusses educational achievements, and 4.3.2 and 4.3.3 examine the position of migrants and natives across the income and occupational distribution. Section 4.4 performs a regression analysis of income inequality and migration.

4.1 | Sentiment toward migrants in the public discourse

In line with Bourdieu's theory expectation, migrants are generally found to be discriminated as documented on numerous occasions for other countries, for example in the Netherlands, Tubadji et al. (2017) document that individuals with a migration background experience labor market disadvantages stemming from lower attendance rates at high-quality educational institutions, while also noting that graduates from second-generation migrant backgrounds face similar disadvantages due to limited access to higher-quality education. In the European context considerable amount of research has been devoted to the public sentiments towards migrants, providing insights into the prevalence of normative perceptions, preferences on immigration policies, and evidence for the regional divergence of attitudes (Davidov et al., 2020; Heath et al., 2020; Helbling & Kriesi, 2014; Zick et al., 2011). These studies focus on a range of aspects related to the evolution of public attitudes towards migrants, such as perceived threat, the role of identity, along with the willingness to contribute to social integration and participation of migrants. Following Bourdieu (1977b), cultural capital in the form of cultural knowledge, skills, education, and attitudes that individuals acquire through their socialization (upbringing, education, and social experiences) is vital in shaping various aspects of an individual's life, including their attitudes and sentiments. As proposed by Bourdieu (1977b), the channels of impact associated with cultural capital are deeply rooted in the transmission of cultural attitudes, largely stemming from participation in various cultural activities and cultural consumption. Due to their exposure to different cultures, cosmopolitan experience (art, literature, and languages), and education, individuals with a higher endowment of cultural capital, are more likely to hold positive and more inclusive attitudes toward migrants. Positive attitudes can result in better integration of migrants into host societies, reduce discriminatory practices, and hence diminish levels of inequality. As opposed to that, individuals exhibiting low levels of cultural capital tend to hold rather negative and stereotyping attitudes, which may result in policies perpetuating inequality and exclusionary conduct. In sum, a significant accumulation of cultural capital endowment within society is associated with the cultivation of positive attitudes, which can lead to a reduction of barriers (Damelang & Haas, 2012) and economic inequality. Consequently, in such a society, migrants face fewer hindrances to their socioeconomic progress as opposed to being confined to low socioeconomic contexts, discrimination, and challenges impeding economic advancement. For the observed period, Germany has not implemented any migration policy that restricts migration based on specific skills, hence with no barriers to socioeconomic advancement, just like the native population, migrants can be found across the entire educational, occupational, and income distribution. Conversely, in societies where lower levels of cultural capital prevail, there will be a higher prevalence of negative perceptions that amplify inequality by perpetuating barriers and challenges to the socioeconomic progress of migrants. Based on the analysis starting with Twitter data since 2007, our estimation reveals that there is a higher proportion of negatively connoted words in contrast to positive ones. In addition, Figure 1 highlights the frequent use of *illegale* (illegal) and *kriminelle* (criminal) in the migration-related context of tweets. The word-cloud in Figure 1 illustrates the polarity of the most frequent words (as shown in Supporting Information S1: Appendix Figure S2) associated with migration in the German language context.

Rather than estimating the median sentiment, which may mask the severity of the positive/negative sentiment, we calculated sentiments separately by their polarity. First, by estimating the median of the positive/negative sentiment respectively, and second, by estimating the most negative (considering the 10th percentile) and the most positive (90th percentile) sentiments. Figure 2 and Figure 3 visualize both approaches.

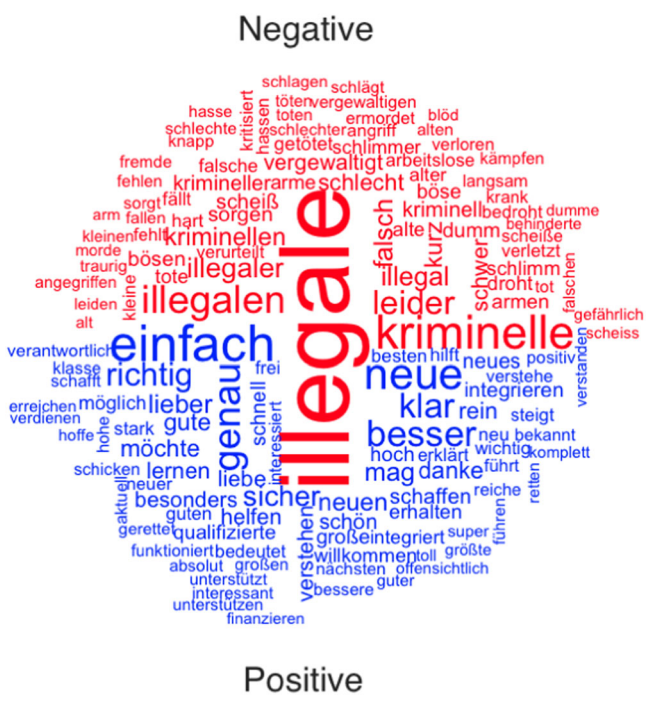

FIGURE 1 Polarity of most frequent words.

Figure 2 compares the evolution of the median positive and negative sentiment since 2007. Closer inspection shows that both positive and negative sentiments remained relatively stable in the years following 2010, while an initial marginal increase in positive sentiment and a decrease in negative sentiment is observed. In sum, however, the magnitude of negative sentiments exceeds that of positive sentiments. Although, as illustrated in Figure 3, the most negative sentiments have dropped somewhat, they still outnumber the positive sentiments. Despite the possibility of a perceived association between rising economic inequality and migrant-targeted sentiments, the presented evidence reveals no discernible impact of the latter.

4.2 | The rise of regional inequality in Germany

Figure 4 and Figure 5 show the evolution of the Gini coefficient over time by federal states. In Figure 4, the last three decades were split into six roughly equal sub-periods for simplicity to visualize the inequality dynamics following the reunification of Germany (1990). Bleaker color in Figure 4 implies less inequality, and more intensive color implies more inequality.[4] It is easy to observe an overall increase in income inequality for the estimated period. Following the reunification, income inequality in the new states (East Germany) was relatively low, however, a gradual increase in income inequality was noted starting in about 2000. Figure 6 highlights the regional income inequality dynamics between East and West Germany. A sharp rise in income

[4]Note that before 1992, the data was not available for 5 federal states that were in GDR before reunification. The data was also not available for the federal state of Saarland until 2001. Therefore, the observations (T) for each federal state (N = 16) range between 14 and 25 for the period covering 1985–2015, amounting to $\sum_i T_i$ (or NT) = 372 observations included in the empirical model.

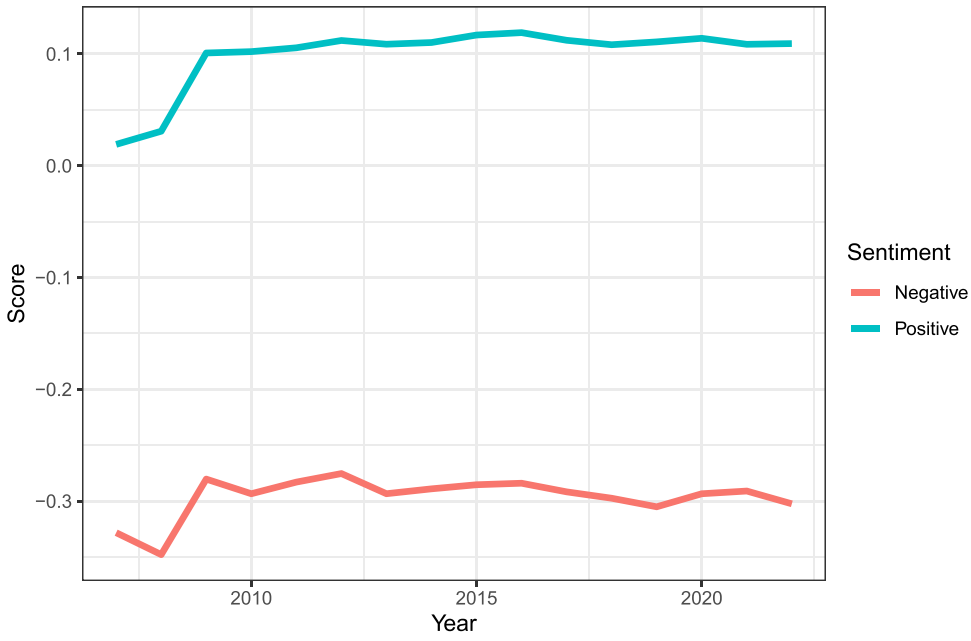

FIGURE 2 Sentiment median.

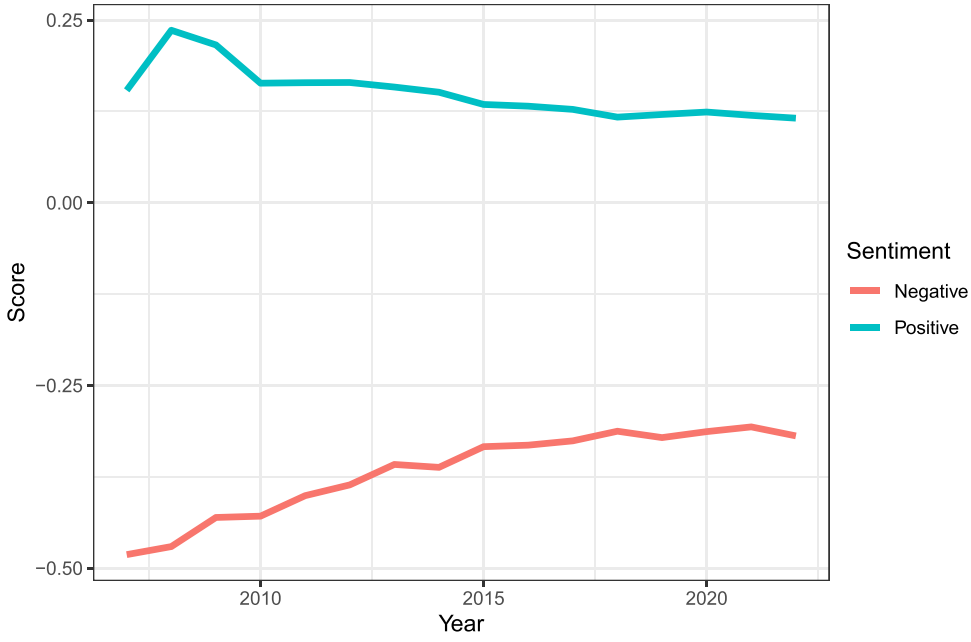

FIGURE 3 Sentiment N10th P90th. This graph illustrates the most negative (10th percentile of negative sentiments) and the most positive (90th percentile of positive sentiments). sentiments.

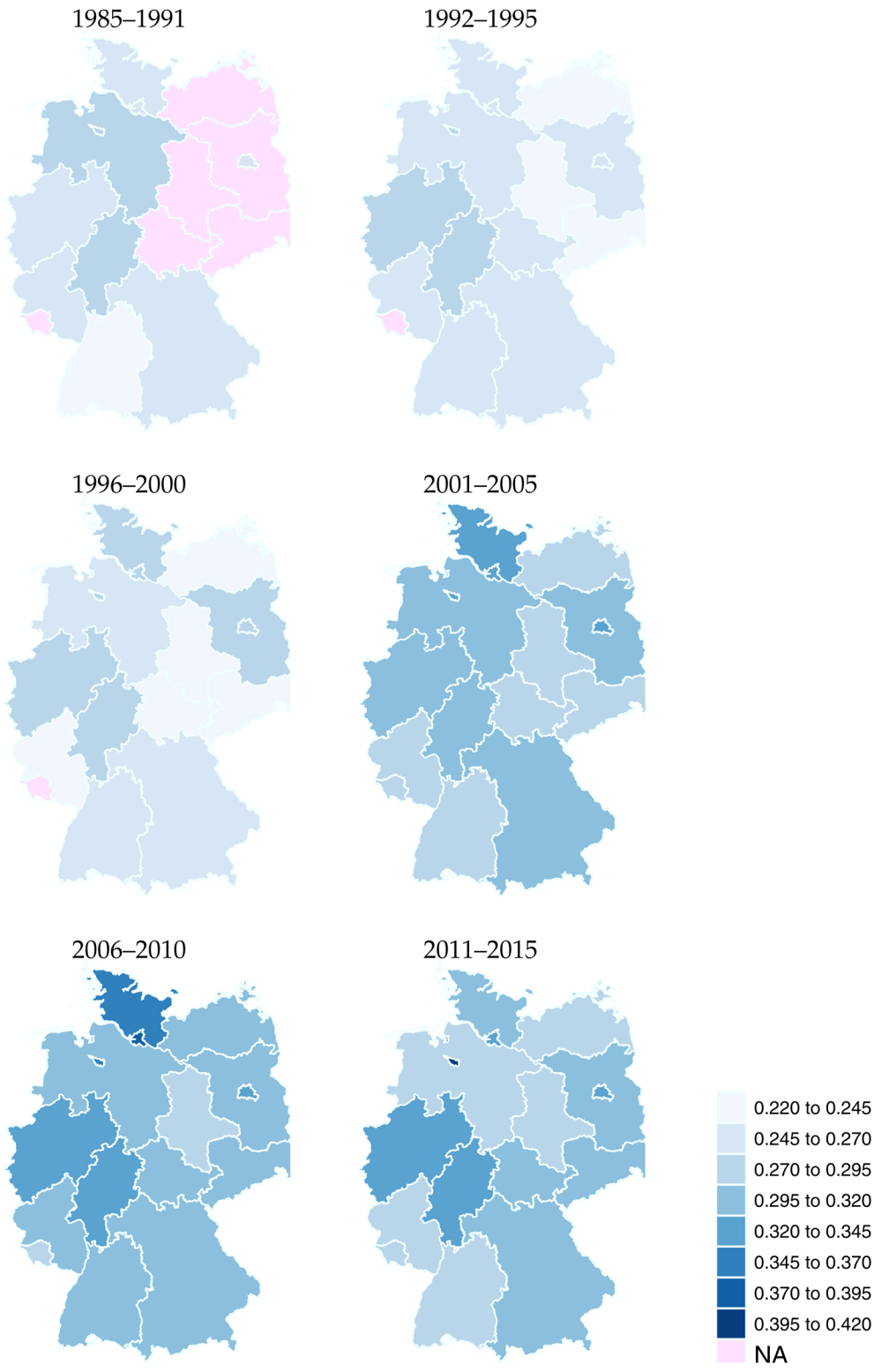

FIGURE 4 Gini, average over subperiods.

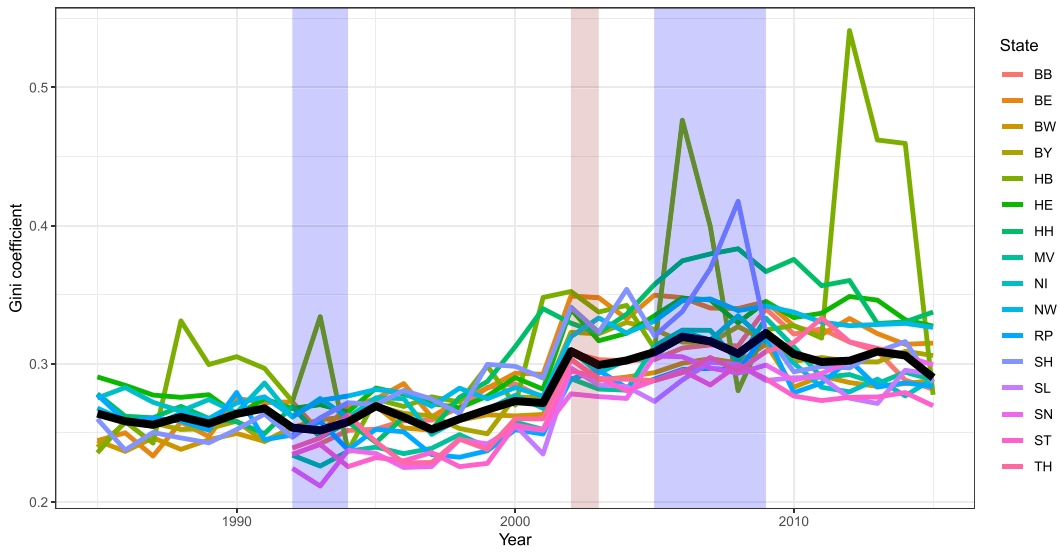

FIGURE 5 Federal State Gini inequality. Note, data for East German states is available after reunification, from 1992 onward. BB, Brandenburg; BE, Berlin; BW, Baden-Württemberg; BY, Bavaria (Free State); HB, Bremen (Hanseatic City); HE, Hesse; HH, Hamburg (Hanseatic City); MV, Mecklenburg-Western Pomerania; NI, Lower Saxony; NW, North Rhine-Westphalia; RP, Rhineland-Palatinate; SH Schleswig-Holstein; SL, Saarland; SN, Saxony (Free State); ST, Saxony-Anhalt; TH Thuringia (Free State).

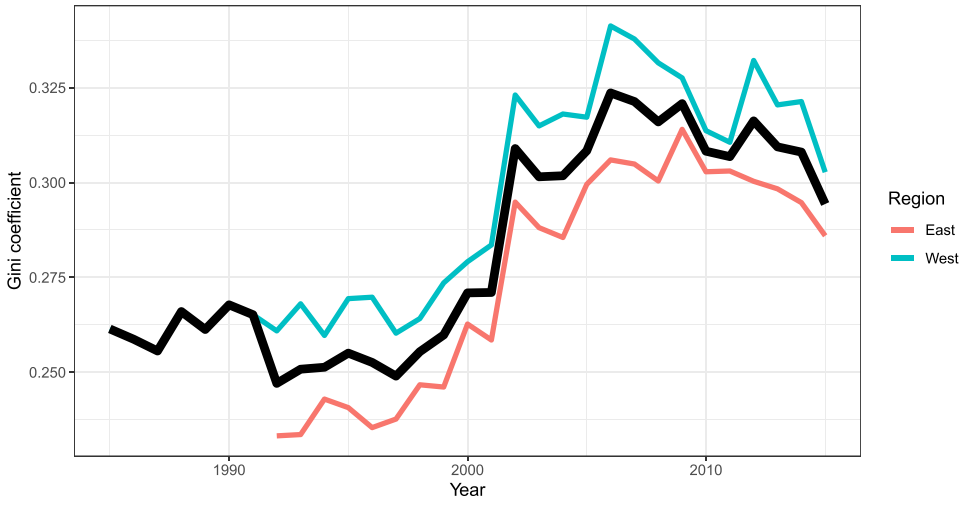

FIGURE 6 Regional Gini inequality Germany. Data for East German states is available after reunification, from 1992 onward.

inequality was recorded in both regions around 2001, however, income inequality in West Germany exceeds the rates observed in the East. Hence, there have been regional variations in the evolution and rate at which income inequality accelerates across the states, and by approximately 2005 we observe a trend towards higher levels of inequality in Brandenburg among the new states. At the same time, the highest level of inequality is witnessed in the north, Schleswig-Holstein and Bremen, between 2006 and 2010. Still, income

inequality in Bremen remains comparably highest,[5] while in the following period, income inequality in Lower Saxony and Baden-Württemberg fell, it remained stable at a relatively high level in Hesse and North Rhine-Westphalia.

From a theoretical standpoint, the observed variations in income inequality levels in Germany, as outlined above, are closely tied to disparities in human capital productivity and its spatial distribution. Regions with a more productive workforce experience greater economic growth, while those with lower human capital face economic challenges. Hence, human capital distribution is closely related to regional development and perpetual spatial economic inequalities (Dickey, 2014), which underscores the key role of equitable access to education and skill development to alleviate these disparities. Williams (2009) suggests that migration can lead to uneven regional development, benefiting some regions while weakening others through brain drain and social exclusion. Valuable insights into the impact of migration on human capital distribution and regional development, enhancing our understanding of the observed income inequality dynamics in Germany, are provided in the work by Tubadji and Nijkamp (2015).

Through the lens of Bourdieu, Tubadji et al. (2022) extends on the discussion on migrants' impact on income inequality, introducing the "Bourdieu Effect," which explores the relationship between local cultural capital and regional income inequality within the framework of culture-based development (Tubadji & Pelzel, 2015).[6]

Accounting for the reciprocity between cultural, social, and human capital across Italian regions, Tubadji et al. (2022) provide evidence for a strong culture-driven Bourdieu effect, suggesting that culture, as reflected by cultural capital, has a substantial effect on regional income inequality. Additionally, cultural capital is identified as compromising both living cultures, such as contemporary cultural practices and cultural heritage. This implies that the coexistence of geographical concentration of human capital (for instance, in the form of knowledge and skills) combined with cultural heritage alone cannot reduce regional income inequality. To address regional economic disparities, in addition to human capital and cultural heritage a region needs commitment to redistributive policies and a strong "living culture."

4.3 | Catch-up and spatial patterns

Here, we present empirical evidence on the development of educational, occupational, and income components of migrants' presence in German society. The purpose of this section is to show how the gap between the natives and migrants has narrowed over time.

4.3.1 | Educational attainment

Table 1 compares the educational attainment of the native and foreign-born population between 1985 and 2015 using the CASMIN classification. The share of foreign-born holding tertiary ("high") educational qualifications is gradually increasing. By 2015, 25% of the foreign-born population completed higher education, which is equivalent to the proportion among natives, 24.72%. The results of the chi-square test confirm that there was no significant difference in the proportion of highly educated individuals among the foreign-born and natives, respectively (the *p*-value of the null hypothesis that the proportion among natives and foreign-born is the same is equal to 0.3892).

[5]In the midst of the global economic slowdown in the 1970s, the manufacturing industry in Bremen was severely affected. Two major shipbuilding firms, which attracted thousands of guest workers, went bankrupt in the 1980s and 1990s, forcing numerous companies to close down, which led to excessive unemployment rates over the past decades. According to the Federal Statistical Office, the unemployment rate is around 10% which is the highest recorded in Germany. Today, income inequality is high, in the borrow Bremen Gröplingen the taxable annual income amounts to 17,600 EUR, in Horn, a district in the east of Bremen, it is 144,900 EUR.

[6]For a comprehensive analysis of culture-based development in Germany see Tubadji (2012).

TABLE 1 Educational attainment over time.

Educational level	Native population				Foreign-born			
	1985	1995	2005	2015	1985	1995	2005	2015
High	7.96	14.13	20.12	24.72	3.82	6.16	11.73	25.13
Medium	28.01	36.55	42.19	44.08	12.93	17.48	24.08	31.96
Low	62.09	47.92	35.14	28.74	82.44	75.28	62.47	41.52
In school	1.94	1.4	2.55	2.47	0.81	1.08	1.72	1.39
N	14319	25681	42662	45485	4627	6608	6867	10704

Notes: Data in %; classification based on CASMIN (0 = in school; 1–3 = low; 4–7 = medium; 8–9 = high). *Source*: SOEP, v.35; own calculations.

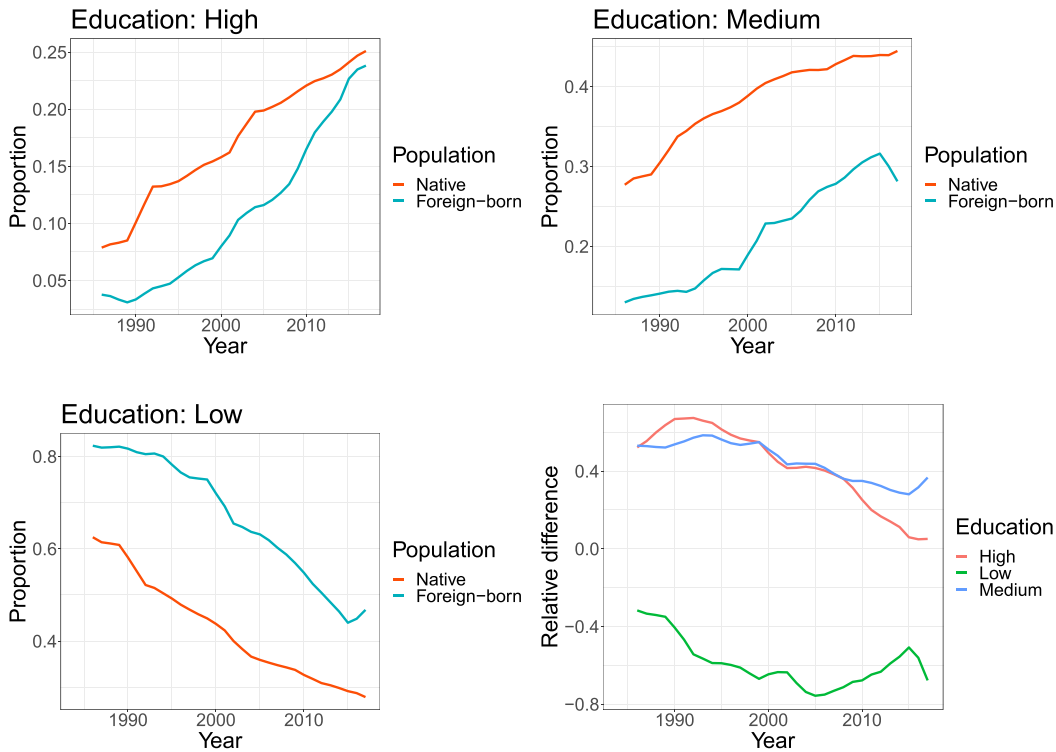

FIGURE 7 Differences in educational attainments against proportion within population. The figures show the 3-year moving average to avoid short-term fluctuations. *Source*: SOEP, v.35; own calculations.

The desire to attain higher educational levels can be rationalized by economic, societal, and personal factors. Increased educational attainments of migrants in Germany can be viewed as a possibility of social mobility (Fick, 2011). Evidence provided in Table 1 and Figure 7 (the two upper and the bottom-left panels) illustrates a clear trend of enhanced educational accomplishments among the foreign-born population. The bottom-right panel of Figure 7 presents the relative difference in proportions between natives and foreign-born, indicating catch-up in terms of education. Additionally, around one-third (31.39%, 2015) of migrants have accomplished general to high

vocational training. In essence, the comparison highlights that migrants' educational attainments are converging to the levels witnessed among natives.

To reinforce and formalize the evidence provided by the bottom-right panel of Figure 7, Figure 8 plots the difference in proportions between natives and foreign-born against the proportion among migrants for the three

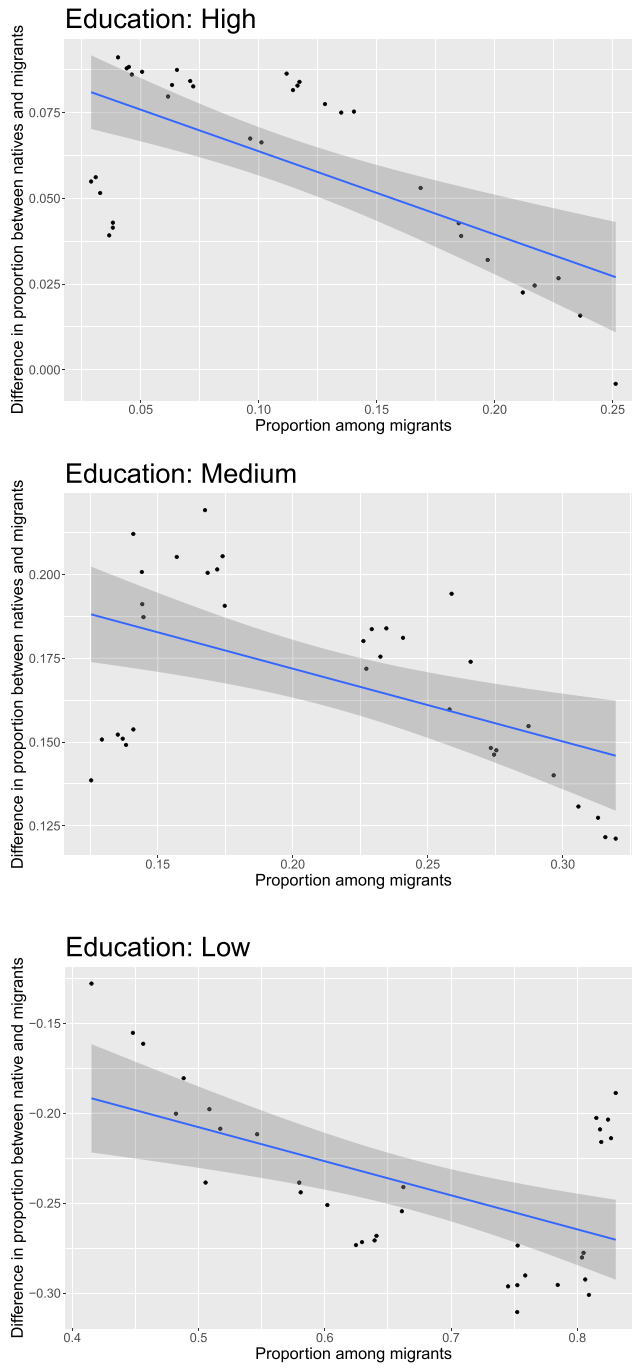

FIGURE 8 Educational convergence. The above figures show the convergence regression. The negative slope implies a convergence of educational attainment between natives and migrants.

educational levels (high, medium, and low). Akin to the economic growth convergence approach, the negative relationship would indicate a catch-up of migrants to their native counterparts. All three scatter plots indicate a downward relationship. The smaller the proportion of migrants with a specific educational level, the larger the difference between natives and migrants. As the proportion of migrants with that level of education increases, the difference in education levels compared to the natives decreases, pointing to the catch-up tendency. Figure 8 also plots the 95% confidence intervals of the convergence regression. The coefficient for "high" education is negative (−0.2426) and statistically significant (p-value < 0. 001), indicating that there is a convergence of high educational levels. Further, the model yields a negative and statistically significant coefficient (−0.21727), (p-value < 0. 01) for "medium" educational levels, and a negative statistically significant coefficient for "low" educational level (−0.18941), (p-value < 0. 001).

Although scholars have documented that educational qualification and labor market experience obtained in the source country are substantially less valuable compared with education and professional experience acquired in the recipient country (see e.g., Brücker et al., 2021, for discussion of the German context), explaining earning disadvantages faced by immigrants (e.g., Friedberg, 2000; Hajro et al., 2019; Mattoo et al., 2008), our findings imply that migrants' educational attainments are converging to educational levels of native Germans.

Our findings initially reveal that significant disparities in educational qualifications between migrants and native Germans persisted until the late 1990s. This observation aligns with Bourdieu's theory, by which migrants are expected to have lower cultural capital compared to natives due to limited access to educational resources, linguistic barriers, and unfamiliarity with the host society's cultural norms. These challenges often result in migrants entering the host country's educational system with deficient cultural capital, potentially leading to lower educational attainment. However, the subsequent figures (Figures 7 and 8), along with the convergence regression estimates, point to a narrowing gap in tertiary qualifications by 2015—thus contradicting Bourdieu's viewpoint. The evidence revealing a narrowing native-immigrant gap in terms of educational achievements can be ascribed to a couple of critical factors, first the generational impact and second, enhanced access to information and resources. Across decades since the guest worker program, subsequent migrant generations have progressively adapted to the cultural conventions, the language, and the educational system. Within the migrant population, this has acted as a catalyst for improved educational attainments, facilitating the alignment with German educational conventions. In addition, improved access to resources and information has been pivotal for educational convergence. Particularly through existing socialethnic networks (Heider et al., 2020; Williams, 2009) and enhanced information accessibility, migrants have gained valuable insights into educational opportunities and available support. Collectively, these aspects lead to the empowerment of migrant generations to efficiently navigate the educational landscape resulting in diminishing disparities across educational levels by 2015. In summary, the challenge to Bourdieu's theory in the context of Germany is a result of a complex interplay of regional peculiarities, including policies, access to resources, and generational changes. In Germany, various measures have been implemented to promote the integration and advancement of migrants. These measures span across various educational levels, from early childhood to higher education, and encompass initiatives such as bilingual early childhood programs, integration-focused language courses, specialized programs for migrant women, support for prospective students, as well as a diverse range of efforts to ease entry into the labor market, vocational training, and career progression.

4.3.2 | Employment

Since there is regional heterogeneity of industrial sites and locations in Germany, the policy is implemented on the aggregate level. Hence, we account for 34 different employing industries (2-digit industry code) provided by the individual-level panel data and aggregate it to the country level. For simplicity and clarity, we categorize the industries according to the original definition of the three-economic-sector model whereby economic sectors are classified as primary, secondary, and tertiary (Clark, 1957; Fischer, 1939; Fourastié, 1949). The primary sector

includes the extraction of raw materials, the secondary deals with the processing and manufacturing of these, and finally, the tertiary sector includes all kinds of services. Employment in any of the 34 industries will fall into one of these categories. Figure 9 shows the proportions of employment in the three sectors by migration status. When we consider migrants' occupational distribution, both natives and migrants largely benefited from the educational expansion experienced in the 1960s. For migrants, in particular, education is an important resource for improving

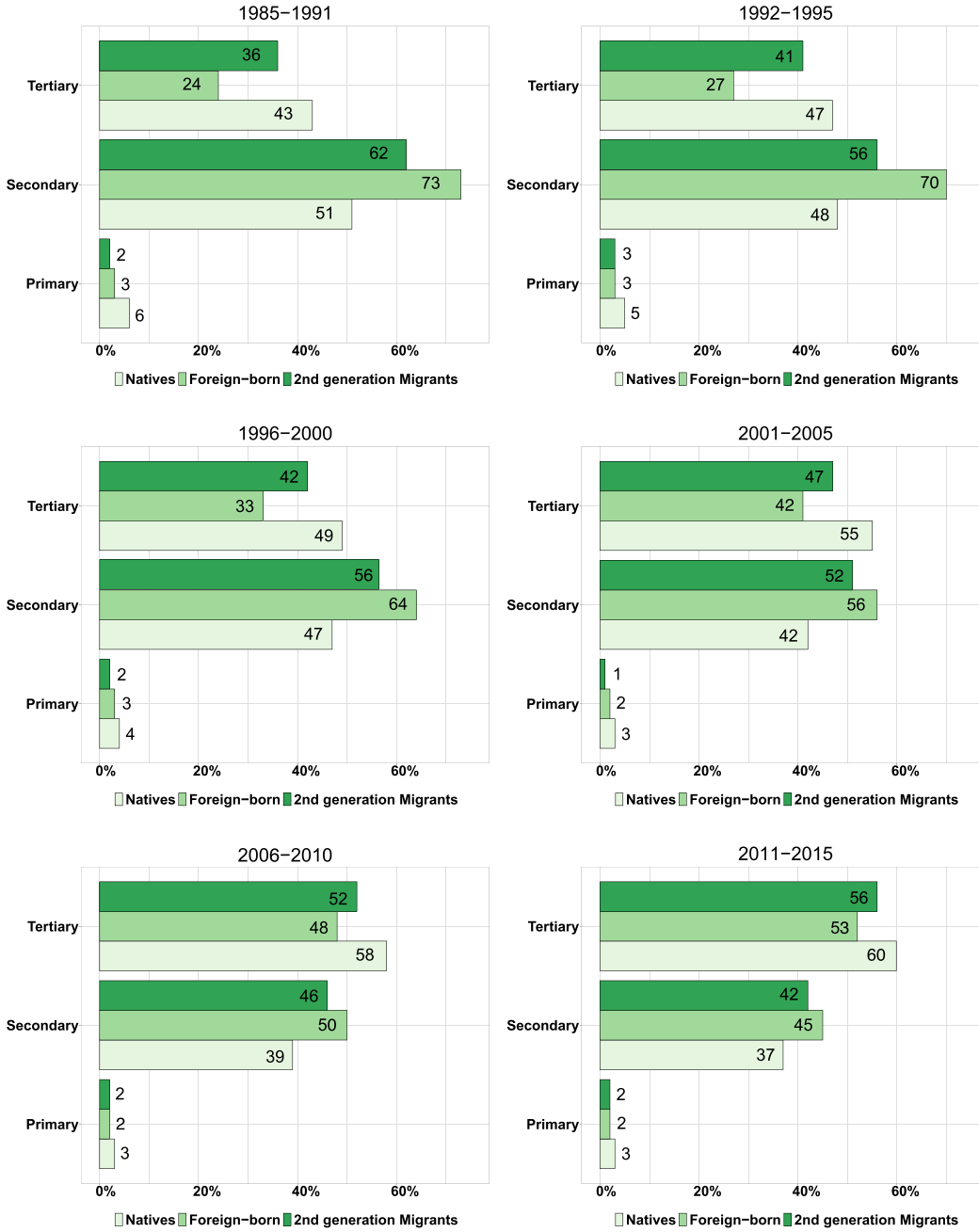

FIGURE 9 Natives and migrants across sectors.

their employability and thus socioeconomic position. Although migrants were substantially present in low-skill industrial work in Germany throughout the past decades (see e.g., Krings, 2021), Figure 9 shows that employment across sectors between the native population and migrants became more homogeneous. For policy implications, it is useful to analyze the potential convergence/divergence of occupational achievements among migrants and natives over time. By examining the trends in the occupational accomplishments of migrants and natives, policymakers can identify potential barriers to integration, assess the effectiveness of integration policies, and adjust policies to foster immigrant labor market integration.

While between 1985 and 1991, 51% of natives and 73% of foreign-born were employed in processing and manufacturing industries and 6% of natives in the primary sectors, in the early 2000s, only 3% of natives and 2% of foreign-born were still working in the primary sector. During the periods following the new century, the proportion of those working in the primary sector remained relatively stable. The shifts from the primary and secondary sectors towards the tertiary sector are non-negligible. Overall, the estimations reveal that foreign-born individuals and, notably second-generation migrants do not lag behind the native workforce in terms of occupation and education. The differences between sectoral employment of natives and foreign-born individuals, considering moving averages over 1985–2015 are highlighted in Figure 10.

What stands out in Figure 10 is the convergence trend of the two groups in the secondary and tertiary sectors. Although the service sector has become the largest employer in Germany, causing a gradual shift away from the primary sector, employment in the primary sector has remained virtually constant over time. The transition from the primary and secondary sector, heavily relying on manual routine work toward rather nonroutine cognitive service-based occupations (tertiary sector), highlights educational upward mobility applying to both migrants and natives.

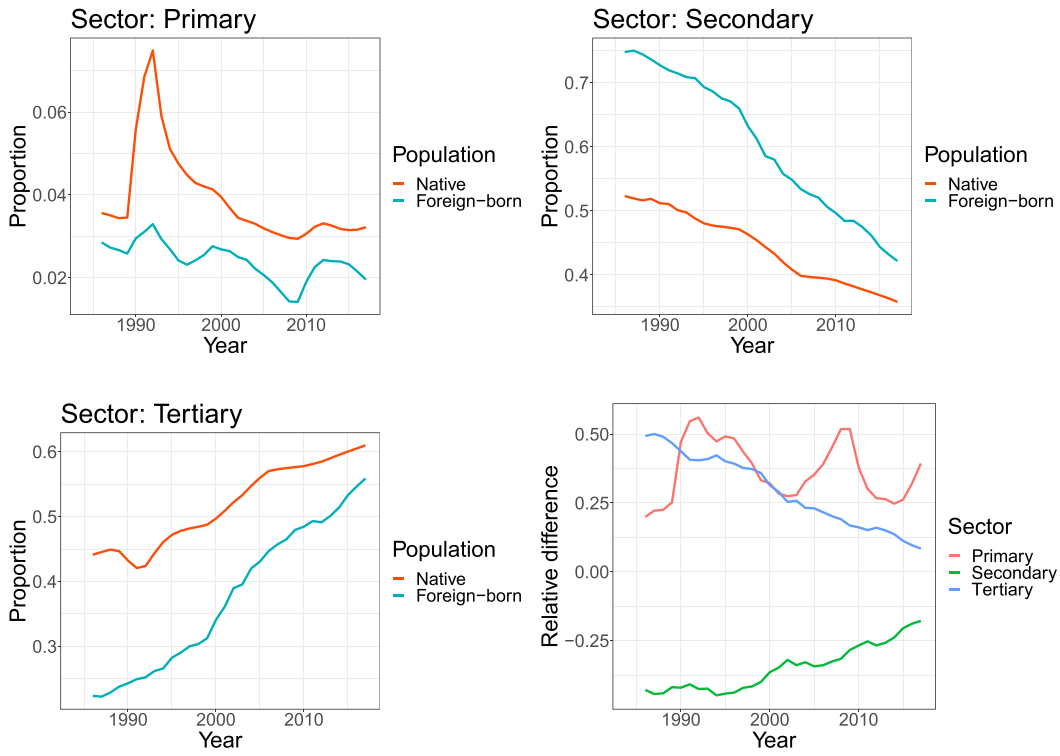

FIGURE 10 Differences in occupational attainments against proportion within population. The figures show the 3-year moving average to avoid short-term fluctuations. *Source*: SOEP, v.35; own calculations.

Figure 11 displays the convergence type analysis similar to that of Figure 8. Figure 11 illustrates the narrowing divide in sectoral occupation between migrants and natives based on convergence regression models. The relationship is negative and significant for the tertiary and secondary sectors. The coefficients are equal to −0.45 (p-value < 0. 001) and −0.49 (p-value < 0. 001). This implies occupational convergence in these sectors between

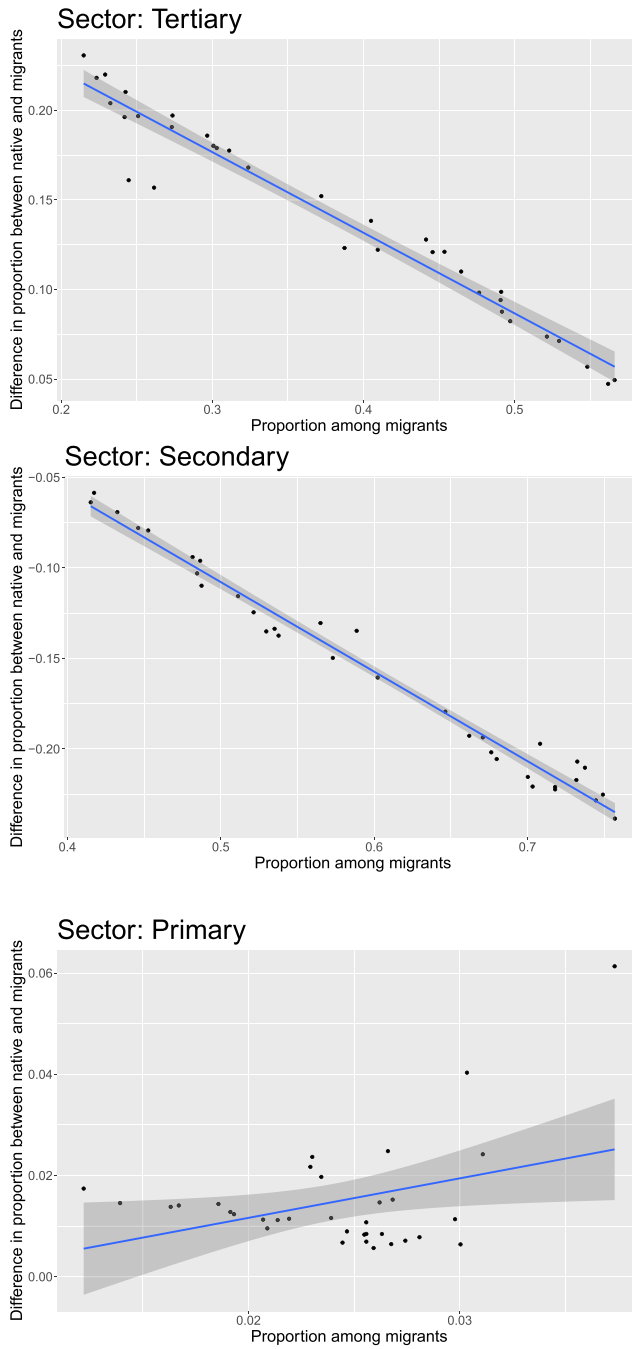

FIGURE 11 Occupational convergence. The above figures show the convergence regression. The negative slope implies a convergence of occupational allocation between natives and migrants.

the migrant and native populations. The results for the primary sector occupation go in the opposite direction (coefficient is positive, 0.78, and significant at the 5% level), however, as mentioned above, this sector represents a rather small share of the working population.

Although the literature at the end of the last century (e.g., Schmidt, 1997) highlighted minor dissimilarities within educational levels and employing sectors between post-war immigrants and native workers in Germany, data suggests that these trends seem to have been reversed.

4.3.3 | Migrants' income

The final point of negative narratives regarding migrants pertains to their low incomes. Since the guest worker program began, a low-paid workforce was recruited to cover the growing labor demand in flourishing post-war Germany, many cohorts have joined the labor market in Germany. To better understand where migrants are allocated in the income distribution relative to the native population over time, we estimate the wage dispersion distinguishing between the three subgroups.

Figure 12 shows the development of the earnings (before tax gross monthly labor income deflated by the consumer price index) between the sub-groups classifying incomes across wage brackets. The foreign-born population and those with a migration background show a distribution across wage brackets similar to natives.

Overall, the second generation of migrants tends to earn slightly more than foreign-born citizens, attributed to improved educational opportunities, and fewer discriminatory barriers as the acceptance of migrants and their descendants might have improved over time, collectively resulting in improved labor market integration (Heath et al., 2008; Kogan, 2011).

Except for the period following 2010, when Germany witnessed a rapid rise in the number of migrants, we do not observe substantial differences in the allocation across the income dispersion of the respective groups.

Considering the share of migrants along income deciles reveals similar tendencies. Figure 12 further suggests that over the past 30 years, there has been an overall upward trend towards the upper-income brackets over time. Since 2000, all three subgroups have experienced a gradual increase in incomes. Even though since the early 2000s, those with a migration background have moved considerably towards higher income brackets, the distribution of incomes among the respective groups remains virtually the same over time. This stability can be explained by educational expansion and skill upgrading (e.g., Kalter & Granato, 2002; Reimer & Pollak, 2010; Spitz-Oener, 2006). Additionally, based on individual labor income data, Figure 12 illustrates the emergence of a middle class. As a result of economic globalization and the shift from the primary towards the secondary economic sector since the middle of the 1980s, an increasing number of occupations required a qualified and trained workforce which, on the one hand, led to the growth of the upper-middle class and on the other hand, to a reduction of low-income earners and shrinking lower middle class. The emergence of the middle class is not decisive as such but rather reflects an even distribution of incomes by demographic characteristics. Since 2005, the share of natives and second-generation migrants allocated along the bottom of the distribution is decreasing, while increasingly more foreign-born individuals are distributed within the lower-income bracket.

Figure 13 illustrates the percentage of the foreign-born across the upper and lower deciles of the income distribution over the last 30 years. We note that although Germany experienced two major immigration waves in 1990 and 2015, the number of foreign-born represented within the deciles does not considerably vary over time and remains stable. Immigrants in Germany are equally represented across all deciles of the income distribution. Attitudes towards migrants remain unchanged, however, the data does not confirm the negative notion of migrants solely being found in low-wage occupations. Instead, discrepancies between the respective groups diminish, and incomes tend to converge over time.

The bottom of the income distribution has seen a rapid rise in the number of immigrants since 2014, which can be explained by the high influx of migrants allocated to low-wage occupations due to a lack of German language

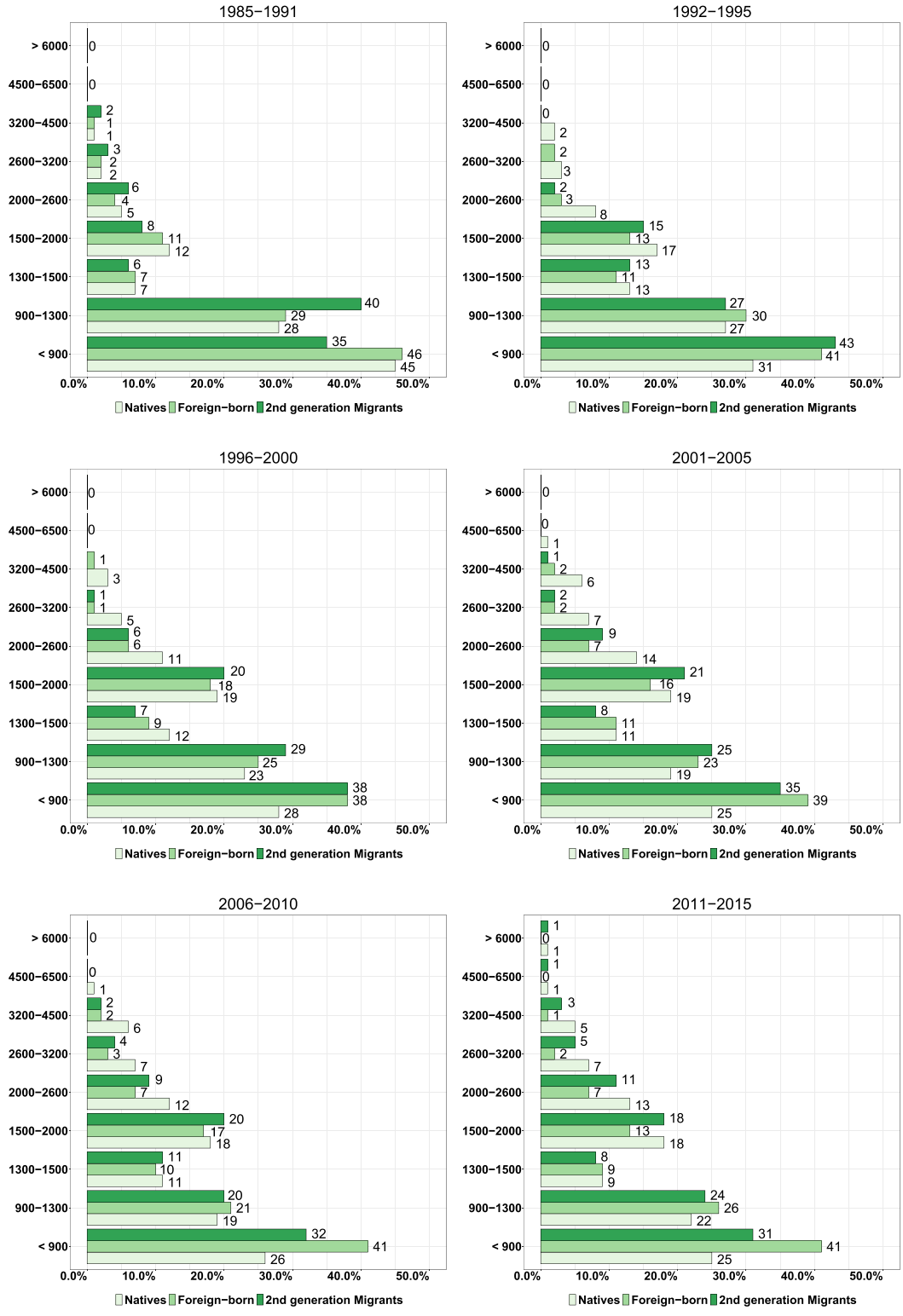

FIGURE 12 Natives and migrants across the wage distribution. The numbers at bars show rounded percentage in each of three groups. They do not add to exactly 100 due to rounding. Zeros are actually percentages that are lower than 0.5; there is not a single category where the percent is 0.

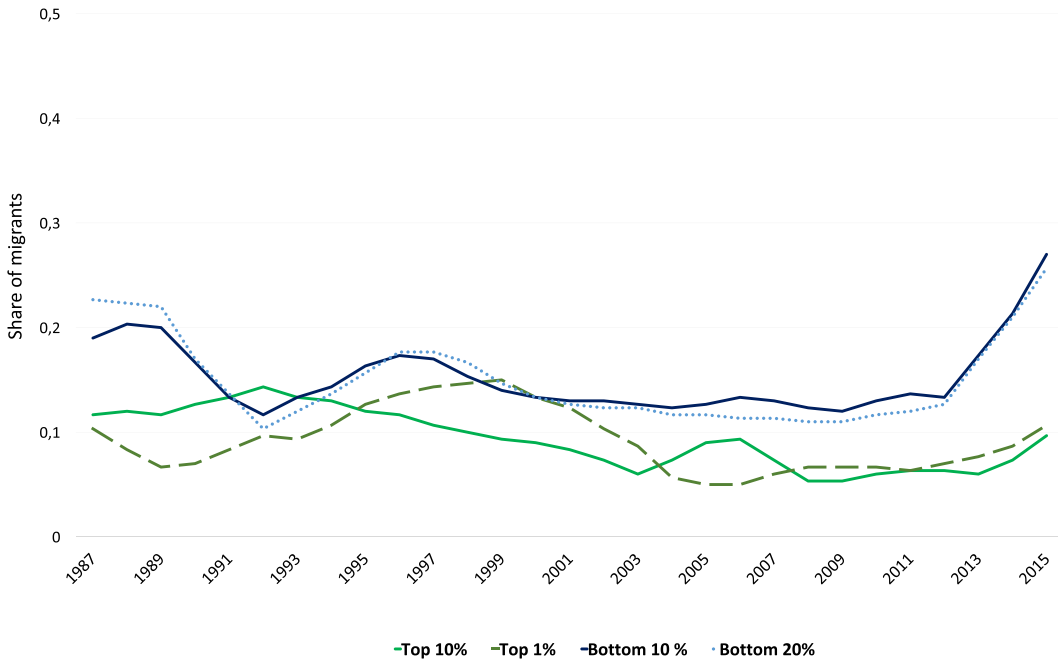

FIGURE 13 Share of migrants across income deciles. To avoid short-term fluctuations and make the lines smoother, the figure shows the 3-year moving averages.

proficiency. At the same time, in 2011, Germany was one of the last among the EU-15 countries to open its labor markets to citizens and to grant freedom of movement to workers from eight Eastern European countries that had initially joined the union in 2004. The free movement legislation permits EU citizens to access labor markets across all EU countries, including workers from Estonia, Latvia, Lithuania, Poland, Slovakia, Slovenia, the Czech Republic, and Hungary. In 2014 and 2015, the legislation was extended to individuals from Bulgaria, Romania, and Croatia. Ever since, Germany witnessed a sharp increase in immigration from Eastern Europe. It is worth noting that in 2015 most migrants allocated at the top 10 percent of the income distribution immigrated from Eastern Europe, as illustrated in the appendix (Supporting Information S1: Figure S1) more than 10% were originally from Romania, followed by Poland, Italy, and Russia.

4.3.4 | Spatial dimension

Turning to the regional component of the evolution, the share of the foreign-born population varies greatly across German federal states. Wide-ranging evidence documents the determinants and significance of immigrants' location choices (Rodríguez-Pose & Ketterer, 2012; Scott et al., 2005) to explain regional distribution and spatial assimilation. For Germany, ethnic concentration (Tanis, 2018) and existing regional ethnic networks (Heider et al., 2020) strongly determine immigrants' location choices, as opposed to merely being drawn to agglomeration.

To assess how the proportion of the foreign-born population infers inequality metrics, we analyze and include the proportion of the foreign-born population within each federal state in our empirical model. To gather information about the development of the immigrant population across time and space, as illustrated in Figure 14, individual-level panel data has been recompiled on a federal-state level. First, Figure 14 implies that the share of the foreign-born population in Germany has changed over time. Second, it reveals substantial variations across federal states. The median highlighted in

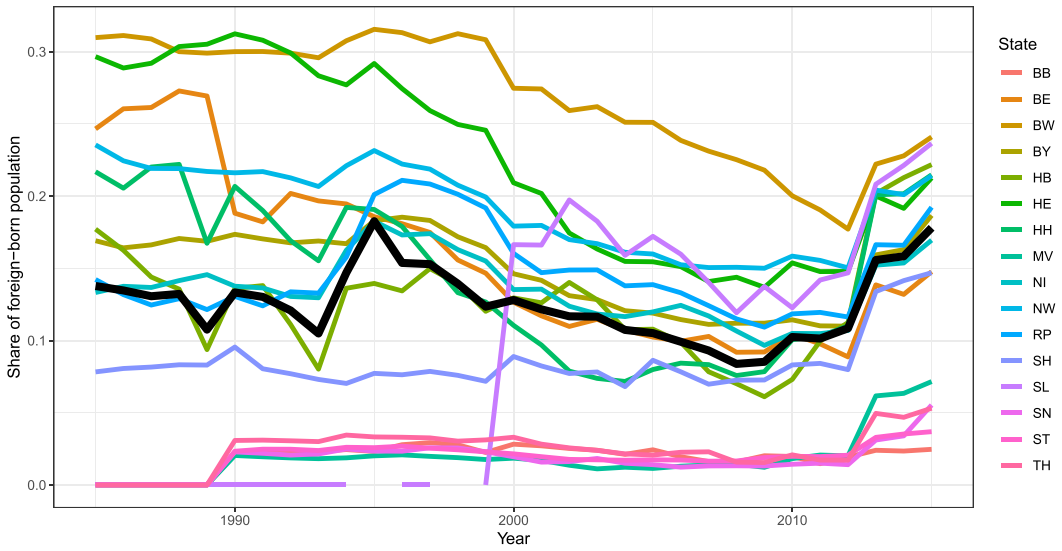

FIGURE 14 Proportion of immigrants by Federal State. Note, data for East German states available after reunification, from 1992 onward. BB, Brandenburg; BE, Berlin; BW, Baden-Württemberg; BY, Bavaria (Free State); HB, Bremen (Hanseatic City); HE, Hesse; HH, Hamburg (Hanseatic City); MV, Mecklenburg-Western Pomerania; NI, Lower Saxony; NW, North Rhine-Westphalia; RP, Rhineland-Palatinate; SH, Schleswig-Holstein; SL, Saarland; SN, Saxony (Free State); ST, Saxony-Anhalt; TH, Thuringia (Free State).

black, demonstrates some of the country's historical milestones. During the 1990s, Germany experienced a significant rise in its foreign-born population by an influx of migrants from Eastern Europe, the Balkans, and the Middle East. After Germany authorized free movement for workers from eight Eastern European countries that had joined the union in 2004, another sharp rise in immigrants was observed in the years following 2010. Overall, the data indicates that the new federal states (Eastern Germany: Brandenburg, Mecklenburg-Western Pomerania, Saxony, Saxony-Anhalt, and Thuringia) exhibit comparably lower rates of immigrants. According to the data (as shown in Supporting Information S1: Appendix: Table S1), however, the share of highly educated migrants holding tertiary education among those few migrants in Eastern Germany is considerably higher.[7]

In 2000, 10 years after the reunification the share of foreign-born in all 5 new states lies between 1% and 3% while Baden-Württemberg witnessed the highest share of immigrants with 27% of the entire population. Although Baden-Württemberg exhibited a higher share of migrants, the share of highly educated foreign-born individuals in the new states (e.g., Mecklenburg-Western Pomerania with 28%) is substantially higher than in the former (Baden-Württemberg, 4%). It is noteworthy that this trend persists over time. In 2015, the share of the foreign-born in the new states remains low (2%–7%), in Hamburg, Nordrhein Westfalia, Hesssen, Berlin, and Bavaria the share goes up to slightly more than 30%. While in Saxony 27% of the foreign-born are highly educated (degree educated) only 7% (Bremen) and 10% (Schleswig-Holstein) prove the same. A considerable convergence of educational attainments among the highly educated native and foreign-born population was found in 2015, as outlined in Table 1. In the past, the Rhine-Ruhr region formed Germany's economic hub, thus accommodating and attracting numerous guest workers. However, today the region remains an appealing location for immigrants due to established ethnic

[7]The table illustrates the federal state-level data in the year 2000, which was a time when several immigration waves settled. It presents a snapshot of the data we utilize in our empirical model. Note that data is recompiled on the federal-state level from individual-level panel data, leading to one observation per year and state. The data provide insights into the share of the foreign-born population, income inequality Gini coefficients along with the proportions of high-skilled and low-skilled migrants.

networks, despite its economic deterioration and worsening labor market conditions, compared to other regions (Glitz, 2014). According to Lehmann and Nagl (2019), the economic structure of a region, the presence of immigrant networks, coupled with demographic factors, such as age and gender, are the most salient determinants driving spatial patterns of foreign employment in Germany. Consequently, regions with a greater proportion of service sector jobs and a lower share in manufacturing, as well as a large foreign-born population and a multicultural young population, generally have higher levels of foreign employment.

4.4 | Migration and income inequality

Having demonstrated a convergence of migrants' educational and occupational accomplishments towards those of natives, we investigate the link between immigration and its relevance to rising economic inequality in Germany. We estimate the following equation,

$$y_{it} = \rho y_{i,t-1} + \boldsymbol{x}_{it}'\beta + \alpha_i + \gamma t + \delta t^2 + \varepsilon_{it} \tag{1}$$

where y_{it} is the inequality measure in federal state i in period t, $\boldsymbol{x}_{it}$ is the vector of explanatory variables, α_i is the state effect, t is time trend, and t^2 is the squared trend to account for nonlinear development over time. Our main variable of interest is the "Proportion of the foreign-born population," that is, we would like to investigate if a larger proportion of migrants is associated with an increase in inequality. However, since the period under investigation is very long, we introduce the interaction between the time trend and the variable "Proportion of the foreign-born population" to see if the sought effect is constant over time.

The lagged dependent variable is included in Equation (1) to track potential persistency in inequality. The arguments in support of and against including lagged dependent variables are discussed in Keele and Kelly (2006). The parameters in Equation (1) can be estimated using different estimators such as for example panel fixed-effects (FE) estimator. Nickell (1981) shows the FE estimator will not consistently estimate ρ when there are no exogenous regressors and that the inconsistency is approximately equal to $-(1 + \rho)/(T - 1)$, where T is the time dimension. To remedy this issue, other estimators are the GMM based on the methods suggested and popularized by Arellano and Bond (1991) and later Blundell and Bond (1998). We still choose to use the FE estimator for two reasons. The first reason is more technical and concerns the length of the data. In our case, $T = 30$, and thus the bias for ρ is not going to be considerable and there is no impact on the coefficients of the exogenous regressors if other assumptions hold. The second reason is more conceptual. The GMM estimators are designed for situations where the panel has a small fixed T and a large N. For example, Arellano and Bond (1991) showcased their method using panel data for a sample of 140 UK companies observed over 5 years, Banks et al. (1997) performed analysis on 4785 observations. Small N can be a reason for IV proliferation, loss of degrees of freedom, and the cluster-robust standard errors and the Arellano-Bond autocorrelation test being unreliable (Roodman, 2009). In our case, T is 30, where Judson and Owen (1999), who study the finite sample properties of both estimators, advocate using the LSDV estimator for an unbalanced long panel, which is exactly our case. Additionally, borrowing from the strategy adopted by the Arellano and Bond estimators, we address potential continuing endogeneity by instrumenting the lagged dependent variable with lags of the lagged dependent variable. More specifically, we use second-order lag (the lag of the dependent variable) as an instrument. The regression results of the latter estimator appear under the label "IV."

4.4.1 | Baseline analysis

Table 2 presents the estimation results of the empirical model. The unit of observation is a federal state. Considering that the Gini coefficient is less sensitive to changes at the tails of the income distribution the

TABLE 2 Dependent variables are Gini index and Palma ratio.

	Gini index		Palma ratio	
	FE	IV	FE	IV
Gini index (−1)	0.388***	0.400***		
	(7.76)	(3.46)		
Palma ratio (−1)			0.378***	0.454***
			(7.31)	(3.29)
Proportion of the foreign-born population	−0.130	−0.129	−0.114	−0.021
	(−1.44)	(−1.42)	(−0.15)	(−0.03)
Proportion of the foreign-born population × Trend	−0.002	−0.002	−0.021	−0.021
	(−0.82)	(−0.79)	(−0.92)	(−0.96)
Low skilled migrants	−0.019	−0.019	−0.013	−0.013
	(−0.99)	(−0.97)	(−0.08)	(−0.08)
Highly skilled migrants	−0.047	−0.046	−0.194	−0.135
	(−1.38)	(−1.3)	(−0.68)	(−0.45)
Migrant income share bottom 10	−0.129	−0.183	−6.803	−10.239
	(−0.11)	(−0.14)	(−0.66)	(−0.87)
Migrant income share top 10	0.052	0.053	−0.158	−0.143
	(1.00)	(1.01)	(−0.36)	(−0.33)
Percent of GDP by Federal state	1.046**	1.028**	10.158**	9.244**
	(2.09)	(1.96)	(2.44)	(2.08)
Trend	0.007***	0.006***	0.040***	0.037***
	(4.75)	(4.23)	(3.53)	(2.93)
Trend Squared	−1e-4***	−1e-4***	−1e-3**	−1e-3**
	(−3.69)	(−3.58)	(−2.58)	(−2.34)
Intercept	0.067*	0.065*	−0.334	−0.323
	(1.95)	(1.75)	(−1.19)	(−1.15)
R^2	0.6249	0.6248	0.4837	0.481
Cragg–Donald Wald test		79.50***		56.99***
Overall p-value	(<0.001)	(<0.001)	(<0.001)	(<0.001)
N (number of federal states)	16			
T (number of years)	14–25			
$\sum_i T_i$ (total number of observations)	372			

Notes: z-statistics are reported in parentheses. Unit of observation is a federal state. IV stands for the instrumental variables, and FE stands for the Fixed Effects estimation. "Foreign-born population," "Low skilled migrants," "Highly skilled migrants," "Migrant income share bottom 10," and "Migrant income share top 10" are measured as proportions.

*p < 0.10; **p < 0.05; ***p < 0.01.

robustness of the findings is assessed by running the same regression model with the Palma ratio (changes at the top 10% relative to 40% allocated at the bottom of the income dispersion) as the dependent variable. The results of the regression in the second and third columns are for the Gini index and in the fourth and fifth columns for the Palma index.

We first consider the Gini index results. The results of the Cragg-Donald Wald test in IV regressions indicate the presence of a strong instrument. The first-stage regression of lagged Gini reveals a coefficient of 0.47 with a *t*-statistic of 8.90, which signifies a strong association (the first-stage regression results are available upon request). The Underidentification test is satisfied, as evidenced by the Anderson LM statistic equal to 66.44 yielding a *p*-value <0.0001. Additionally, the Weak identification test, as indicated by the Cragg–Donald Wald *F* statistic, yields a value of 79.15, whereas the Stock–Yogo weak ID test critical value for 10% maximal IV size is only 16.38. All of these results suggest the presence of an appropriate instrument. Furthermore, the Hausman test indicates that both IV and Fixed Effects results can be relied upon, primarily due to the extensive time dimension of the panel data (1985–2015).

To address the potential endogeneity of the rest of the regressors in our analysis, we performed separate regression analyses where we instrumented each independent variable of interest, such as *migrants' income share bottom 10%* and *migrants' income share top 10%* by its lagged value.[8] In these auxiliary regressions, we performed the Davidson-MacKinnon test of exogeneity. In the case of the *migrants' income share bottom 10%* regressor, the *p*-value of the test is equal to 0.9336, indicating that there is no evidence of endogeneity for this variable. Similarly, for the *migrants' income share top 10%* regressor, the *p*-value of is equal to 0.3396; for the *proportion of highly skilled* regressor, the *p*-value is equal to 0.2564, and in the case of the *proportion of low skilled* regressor, the *p*-value is equal to 0.0856. We therefore do not find evidence of endogeneity for our regressors and proceed using these regressors as they are.

The share of the foreign-born population does not have a substantial impact on the level of income inequality in either IV or FE regression. The finding remains robust to the choice of inequality measure: the Gini or the Palma index. The result provides evidence that the proportion of migrants is not linked to rising inequality. The same holds for the number of low and highly-skilled migrants, estimates in all regression models imply statistical insignificance in the proportion of low and highly-educated migrants. With regard to the percentage of income that is allocated to migrants within the top 10 and bottom 10 of the income distribution, we do not find a significant long-term effect driving income inequality.

The interaction between the time trend and the proportion of foreign-born is statistically insignificant, however, this coefficient by itself is not informative. It is valuable to track the marginal effect of the foreign-born variable on inequality over time. Figure 15 shows how the predicted inequality parameter changes with the variation of the variable *percentage of foreign-born population* while keeping all other variables constant along with the 95% confidence intervals. The two upper panels (a) and (b) show the marginal effects for the Gini and Palma indices in Table 2.

The confidence intervals in both panels (a) and (b) are rather wide. In panel (a), the marginal effect appears to be only slightly significant beginning from around 1998. This suggests that, despite the rising proportion of migrants, there may even be a slight decrease in inequality. However, the combination of panels (a) and (b) does not offer conclusive evidence that the increasing rates of immigration are definitively linked to a rise in inequality.

4.4.2 | Extended analysis

The presented regression analysis examined migration-related characteristics on inequality measures. However, to better understand how public migration-related sentiment affects economic inequality measures, we conduct an

[8]We thank the anonymous reviewer for this insight.

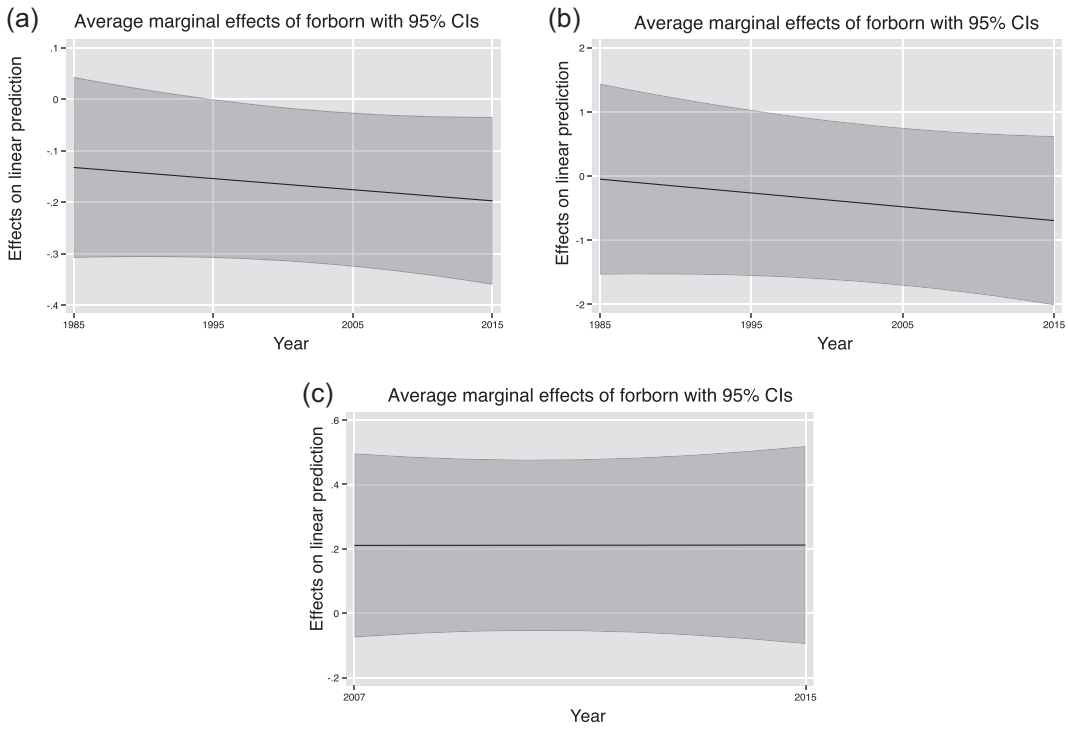

FIGURE 15 Marginsplots. These marginsplots visualize the marginal effect of the foreign-born population (%) while holding the other variables constant, on the predicted outcomes as shown in: (a) Gini; (b) Palma; (c) Gini, year >2007. The black line shows the estimated marginal effect of the foreign-born population on the inequality estimate and the uncertainty in the prediction/confidence interval is depicted in shaded coloring. A statistically significant effect is found in case the confidence interval does not overlap with zero.

extended analysis combining migration-related variables used in (1) with the sentiment data obtained from Twitter. Because these data are available from 2007, the analysis is performed for the period 2007–2015, which reduces our original sample almost by twothirds. Additionally, we control for the state-level *unemployment rate*, which has been available only for this period. Due to the above restrictions, the panel size is $\sum_i T_i = 144$. The results of this extended analysis, shown in Table 3, confirm the findings of the initial regression. Additionally, it shows that immigration narrative sentiments play a negligible role in determining levels of economic inequality in Germany. Figure 15c shows that the effect is statistically zero and is not changing over time.

5 | DISCUSSION

We show that fears about immigration and inequality are not based on empirical evidence. Our findings imply that the growing trend of inequality as illustrated by the increasing Gini coefficient in Figures 4 and 5 above is not attributed to migration-related patterns in Germany. Arguably, the rise of the Gini index in Germany may well be ascribed to a broad array of global challenges, namely, the growing polarization of incomes, residential segregation, technological advances or increases in international trade (Weil, 2012), institutional change (Antonczyk et al., 2018; Roser & Crespo Cuaresma, 2016), and specifically the growth in top incomes as outlined in Piketty (2005) and Piketty and Saez (2003) among others. The rationale behind the rise in Gini in Germany calls for further systematic research, which is beyond the scope of our study.

TABLE 3 Dependent variable Gini index.

Variable	M5	M6	M7	M8
Gini index (−1)	0.637***	0.637***	0.635***	0.639***
	(4.16)	(4.15)	(4.16)	(4.22)
Proportion of the foreign-born population	0.208	0.208	0.210	0.206
	(0.46)	(0.46)	(0.46)	(0.45)
Proportion of the foreign-born population × Trend	1e−3	1e−3	1e−3	1e−3
	(0.01)	(0.01)	(0.01)	(0.01)
Low skilled migrants	−0.036	−0.035	−0.035	−0.036
	(−0.84)	(−0.83)	(−0.82)	(−0.83)
Highly skilled migrants	−0.010	−0.011	−0.010	−0.010
	(−0.17)	(−0.17)	(−0.17)	(−0.17)
Migrant income share bottom 10	−3.373	−3.347	−3.330	−3.407
	(−0.98)	(−0.96)	(−0.97)	(−1.00)
Migrant income share top 10	−0.171	−0.175	−0.173	−0.168
	(−0.81)	(−0.81)	(−0.82)	(−0.80)
Percent of GDP by Federal state	0.046	0.046	0.046	0.045
	(0.99)	(0.99)	(0.99)	(0.98)
Unemployment rate	−0.043	0.044	−0.042	−0.043
	(−0.39)	(−0.40)	(−0.38)	(−0.39)
Trend	0.015	0.013	0.015	0.016
	(0.67)	(0.46)	(0.63)	(0.66)
Trend squared	−1e−3	−1e−3	−1e−3	−1e−3
	(−0.70)	(−0.59)	(−0.64)	(−0.69)
Negative sentiment		0.045		
		(0.13)		
Positive sentiment			0.010	
			(0.10)	
Sum of sentiments				−0.009
				(−0.09)
Intercept	−0.074	−0.016	−0.068	−0.089
	(−0.24)	(−0.03)	(−0.21)	(−0.25)
R^2	0.4720	0.4721	0.4720	0.4720
Cragg–Donald Wald test	71.72***	72.26***	71.38***	71.95***
Overall *p*-value	(<0.001)	(<0.001)	(<0.001)	(<0.001)
N	16	16	16	16

(Continues)

TABLE 3 (Continued)

Variable	M5	M6	M7	M8
$\sum_{i=1}^{N} T_i$	144	144	144	144
N (number of federal states)	16			
T (number of years)	9			
$\sum_i T_i$ (total number of observations)	144			

Notes: z-statistics in parentheses. Unit of observation is a federal state.
$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

The numerous fallacies or mistaken beliefs spread in society are analyzed here and not substantiated by empirical evidence.

A society's historical memory serves as a powerful cultural marker that shapes attitudes toward migrants. Long-standing narratives, rooted in historical memory, can significantly impact how individuals perceive newcomers. These narratives can foster bigotry, biases, or fears that have been passed down through generations, resulting in a constancy of attitudes toward migrants. We anticipate that the regional science audience will see an increased awareness of Pierre Bourdieu's scientific contribution.

Abramitzky and Boustan (2022) use textual analysis to demonstrate that attitudes toward immigration are more positive than at any time in US history—but increasingly polarized. The evidence that they provide goes against the notion of immigrant families and their children being trapped in a perpetual lower social class. Our findings show that the foreign-born population is neither overwhelmingly represented in low-wage occupations nor lags behind the native population in terms of educational attainment. Overall, the results suggest that immigration-relevant characteristics do not exhibit a sizeable effect on federal-state-level income inequality which shapes aggregate income inequality. Hence, the salient finding of the study is that a combination of immigration-related and immigration-educational dynamics does not increase income inequality. Further, the convergence of educational and occupational achievements among natives and the foreign-born suggests that neither group can be solely held responsible for rising economic inequality.

6 | CONCLUSION

This paper studies the evolution of educational, occupational, and income patterns of migrants in Germany from 1985 to 2015. The German context is particularly noteworthy for various reasons. On the one hand, the country and economy heavily depend on immigrants, a fact acknowledged by politicians across different levels. On the other hand, migrants are often subjected to unfair treatment within society, with perceptions that individuals of migrant backgrounds often have lower educational attainment, are relegated to low-skilled jobs, receive lower wages, or rely heavily on social welfare programs. This negative treatment of migrants fosters unfavorable sentiments towards them within society and contributes to the perception that migration exacerbates inequality.

By utilizing data from SOEP as well as from Twitter (now × platform), we analyze tendencies in inequality and migration. While the findings may not permit a causal interpretation, they do provide valuable insights. First, we demonstrate that migrants are catching up to their native counterparts in terms of education, occupations, and income. Second, we find no evidence to suggest that the proportion of immigrants is associated with an increase in economic inequality. On the contrary, the larger proportion of migrants has even reduced income inequality from around 2000. Finally, negative public sentiments towards immigrants are not linked to the rise in regional inequality.

The results suggest important implications. It is known that narratives can shape policies (Shiller, 2017). Consequently, it is crucial to encourage discourse in society regarding immigration and inequality that is founded on empirical evidence. This study disproves certain misconceptions about the role and impact of immigrants in the German economy and society, which may facilitate constructive dialog that promotes fairness and prevents the erosion of social cohesion.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data used in this study comes from the German Socio-Economic Panel (GSOEP), which is a comprehensive household survey conducted for more than 30 years. Oleg Badunenko and I are bound by the contract not to distribute data, so we can't share the data, but we would be happy to share detailed instructions on how to obtain the sample that was used. GSOEP is free of charge for academic researchers.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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