

The Integration of Migrants in the German Labor Market: Evidence over 50 Years

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Pooling waves from the microcensus, we study the labor market integration of immigrants in Germany over the past 50 years. Despite large differences in composition and migration contexts, the integration profiles follow a few key patterns. Ten years after arrival, the mean employment gap between male immigrants and natives has narrowed to about 10 percentage points. However, income gaps are widening with more time spent in Germany. After providing descriptive evidence we focus on more substantive questions. Three findings stand out: First, basic characteristics such as educational composition can explain most of the differences in labor market outcomes between immigrant cohorts. Second, conditional on cohort composition, the integration of newly arrived cohorts has remained stable over time, neither improving or worsening. Third, macro-economic conditions matter and contributed to a dramatic employment collapse among Turkish migrants in the early 1990s. Finally, we study the likely integration path of recent arrival cohorts triggered by the Arab spring and the 2022 Russo-Ukrainian war. While the former found employment at a faster rate than earlier cohorts, their trajectories look less favorable when accounting for unusually favorable labor market conditions at the time. The predicted long-term outcomes for Ukrainian refugees are more favorable.

Keywords: Immigration, Labor market integration, Long-run trends

JEL classification: J11, J61, J68

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1 Introduction

Immigration ranks among the most debated policy issues in Europe, and migrant flows are likely to remain high for decades to come (Hanson & McIntosh, 2016). The German case is particularly interesting: Since the recruitment of the first so-called *guest workers* in the late 1950s, Germany gradually became the world’s second most important migrant destination in absolute numbers (after the US). By 2021, the share of foreign-born reached 17.1 percent, rising to 27.2 percent when including second-generation migrants (DESTATIS, 2021).¹ They form an integral part of Germany’s economy, but the realization that Germany has become a classic immigration country (“Einwanderungsland”) is quite recent. Most immigration episodes took Germany by surprise and were accompanied by controversial political debates² rather than by a positive narrative about the opportunities of immigration. Contrary to other destination countries, it took until the 2000s for Germany to adopt explicit immigration and integration policies for foreign nationals. Accordingly, the labor market integration of immigrants was long neglected by policy makers and at least until the 1990s only marginally discussed by researchers - also due to the lack of suitable data before that time.

In this paper, we provide detailed evidence on the labor market integration of immigrants in West Germany over the last 50 years. To provide comparable evidence over such a long period, we use cumulated data from 30 waves of the *microcensus*, an administrative survey that covers 1% of the resident population in Germany in each of its waves – resulting in more than 800,000 individual observations for the most recent waves. Compared to other data sources that have been more widely used in migration research³, the (pooled) microcensus combines several key advantages. It is representative of the total population, including the self- and non-employed (unlike social security registers and derived data products), while also offering very large sample sizes (unlike surveys such as the German Socio-Economic Panel, GSOEP). Most importantly, immigrants are included right after arrival and not only when they enter the labor force or when refreshment samples are taken. For these reasons, the microcensus is the best available data source to study the long-run integration of different immigrant groups in Germany. However, no other study has used a comparably broad set of waves from the microcensus, with Sprengholz, Diehl, Giesecke & Kreyenfeld (2021) as a recent exception. While we focus on the labor market integration of male immigrants (to abstract from cultural differences in labor supply, and the

¹Among the population younger than 20, numbers are even higher: 38.9 per cent have a migration background.

²Recurring topics in these debates include wage dumping (“Lohndumping”), asylum abuse (“Asylmissbrauch”) and pressure on the welfare state resulting from poverty immigration (“Armutszuwanderung”).

³Our choice of data source distinguishes our study from earlier work, which has primarily been based on the GSOEP (e.g., Kogan, 2004; Riphahn, 2004; Constant & Massey, 2003; Basilio, Bauer & Kramer, 2017), social security records (Lehmer & Ludsteck, 2015; Gathmann & Monscheuer, 2019) or individual waves from the microcensus (Algan, Dustmann, Glitze & Manning, 2010; Kalter & Granato, 2002; Kogan, 2011). Limitations of the microcensus data are discussed in Section 3.1.

resulting low employment rate among female migrants), Sprengholz et al. (2021) provide evidence on the gender dimension of immigration that is complementary to our work.

The labor market integration of immigrants in the host country has been widely studied for the United States and other traditional immigration countries. A common finding is that immigrants tend to earn systematically less than natives with similar education and work experience, a phenomenon referred to as “downgrading” (Eckstein & Weiss, 2004; Dustmann, Schönberg & Stuhler, 2016). Such wage gaps may reflect differences in productivity due to a lack of country-specific skills among new arrivals Chiswick (1978); Borjas (1985, 1995), but also differences in pay due to imperfect competition on the labor market Arellano-Bover & San (2020). Over time, immigrants’ and natives labor market outcomes converge as immigrants acquire more country-specific human capital and move to better jobs and firms. However, the extent of this convergence – whether immigrants *fully* catch up with their native counterpart – and its speed remains a topic of intense debate (e.g. Card, 2005) and the evidence for Germany is not conclusive.

In the first part of our study, we provide a broad overview on the labor market integration of immigrants in Germany. We distinguish 36 different immigrant “cohorts” defined by time of arrival and region of origin, and track their *employment* (including education) and individual *income* (including non-labor income and welfare benefits). We focus on unconditional comparisons, i.e. the difference between immigrants’ labor market outcomes to the average German population of similar age, without controlling for any other covariates like education. We do not attempt to account for return migration as we are focused on the overall gap in labor market outcomes between natives and immigrants – a change in that gap due to selective return migration would be part of the “net” effect that we aim to capture.⁴

Many of our findings are consistent with prior findings from Germany: Integration profiles in employment and income are concave, with rapid improvements in the first years after arrival.⁵ In accordance with earlier evidence, we document considerable heterogeneity, not only between different arrival periods, but also between origin regions: Recent migrants from low-income countries and the former Eastern Bloc experience larger initial gaps, but also faster employment and wage growth compared to the “guest workers” of the 1960s and 70s and EU citizens. (Sprengholz et al., 2021; Gathmann & Monscheuer, 2019; Lehmer & Ludsteck, 2015; Gundel & Peters, 2008).⁶ Similar patterns have been found for refugees that experience very large initial

⁴Apart from that, several empirical studies indicate that return migration does not seem to generate bias in cross-sectional estimates of wage assimilation in Germany (Constant & Massey, 2003; Lehmer & Ludsteck, 2015).

⁵While most earlier studies on guest workers and their families did not find wage assimilation (Schmidt, 1997; Bauer, Dietz, Zimmermann & Zwintz, 2005), more recent studies tend to conclude that with the duration of stay, wage and employment gaps of immigrants compared to natives decline (Gathmann & Monscheuer, 2019; Fertig & Schurer, 2007; Lehmer & Ludsteck, 2015; Sprengholz et al., 2021; Constant & Massey, 2005).

⁶Gathmann & Monscheuer (2019); Gundel & Peters (2008); Riphahn, Sander & Wunder (2013) have noted the

gaps, but do catch up to other immigrants eventually (Fasani, Frattini & Minale, 2021b; Brell, Dustmann & Preston, 2020). We also find that the employment and income gaps decrease in the second generation, but do not fully close for most cohorts (Algan et al., 2010).

Other findings are more novel. First, we show that there is only partial convergence between immigrant and natives in employment, with large and persistent gaps remaining for most immigrant groups. On average, the employment gap ten years after arrival is about 10 percentage points (compared to a baseline employment rate of similarly aged German men of 91 percent), with little further progress in subsequent years. Consistent with these observed gaps in employment, welfare dependency is much higher among immigrants. Second, we find that the income gaps between immigrants and natives start to widen again after some years in the host country (i.e., divergence rather than convergence).⁷ This is at odds with some earlier studies that estimated the duration over which full wage convergence to natives is likely to take place based using the GSOEP, concluding that full convergence takes around 20 years Gundel & Peters (2008); Constant & Massey (2005); Beyer (2019) or less Fertig & Schurer (2007).⁸ Most importantly, we document that the integration profiles are frequently non-monotonic, with some groups experiencing a strong decline in employment and increased dependency on welfare in the early 1990s.

We then address a number of more substantive questions. In Section 5 we ask how *predictable* integration profiles are. We first show that cohort-level characteristics are predictive of individual trajectories, even conditional on an individuals' own education. We then study how well integration outcomes can be predicted based on cohort characteristics that are set before arrival (such as education) or shortly after arrival (such as the initial employment gaps or local economic conditions). Most of the variation in employment and income between cohorts can be explained by only a handful of variables. The average education level and refugee share of a cohort are particularly predictive, but economic conditions at the time of arrival likewise matter. Immigrant-

particularly unfavorable labor market integration of Turkish males exhibiting none or very low levels of assimilation with more time spent in Germany.

⁷The explanation for this divergence is the well-known relation between income growth and education, as captured by the Mincer equation: the income of the more educated native Germans grows at a much faster rate than the income of less educated immigrants. This observation has received less attention in previous studies as most authors focus on potential integration mechanisms, and therefore on *conditional* comparison, comparing immigrants and native within narrowly defined education groups. We focus instead on unconditional comparisons, to measure the *overall* gap in labor market performance between immigrants and natives. In section 5.1, we test how much of these overall gaps can be explained by education or other characteristics.

⁸However, none of these studies observed the assimilation paths over the entire duration of stay of the respective cohorts, something that we can achieve with our dataset. The main challenge using the GSOEP for this kind of analysis is that there is very limited observations in very early years since arrival for two reasons: First, immigrant samples are refreshed on an irregular base, so that most immigrants only enter the sample after already having spend several years in Germany. Second, The first wave of the GSOEP is conducted in 1984, while our microcensus data start 8 years earlier, in 1976. In addition, given the relatively small sample size and panel attrition, most samples become very small after several years in the study, limiting the ability to perform longer-run analysis. All these limitations do not apply to the microcensus data.

native gaps, and differences in integration outcomes between immigrant groups, are therefore highly predictable.

We next test whether those integration outcomes have improved or worsened over the past five decades (Section 6). We find that the raw employment gap 10 year after arrival has widened substantially – by 3.3 percentage points for each decade, corresponding to a widening of more than 15 percentage points over five decades. However, this systematic worsening of labor market integration can be fully explained by compositional changes and changing macroeconomic conditions. Controlling for education, refugee share and unemployment, the estimated long-term trend is close to zero – after abstracting from changes in composition, the long-run integration outcomes have remained remarkably stable over the past five decades. Hopes that integration outcomes will improve over time as German institutions and policies adapt have therefore remained unfulfilled so far.

We conclude our study with case studies of two particularly interesting immigration episodes. First, we document a striking employment collapse in the early 1990s: after a long spell of high employment, the employment rate of earlier arrival cohorts from Turkey collapsed by nearly *30 percentage points*. We show that the 1993 recession and, in particular, a structural decline of immigrant-intensive industries contributed to this collapse. This episode is therefore in line with earlier findings of migrants being disproportionately sensitive to changing macroeconomic conditions and shocks (Barth, Bratsberg & Raaum, 2004; Bratsberg, Barth & Raaum, 2006; Dustmann, Glitz & Vogel, 2010; Bratsberg, Raaum & Røed, 2010), but the scale and speed of the employment loss is surprising. This observation has worrying implications: labor market integration is not a one-way street, and policy makers have to worry not only about the successful integration of new immigrant arrivals to the labor market, but also the potential for sudden evaporation of those gains in later years – a concern that might become pressing in the face of potential labor market shocks related to the 2020 global pandemic and the 2022 Russo-Ukrainian War.

Finally, we compare the labor market integration of refugee cohorts that came to Germany around the year 2015 to the experience of earlier refugees. Consistent with findings by Brücker, Kosyakova & Schuß (2020), we find that these recent refugees integrated more quickly into employment than earlier refugees. However, we also show that these more favorable integration outcomes were likely due to the unusually favorable economic conditions (with the unemployment rate reaching a historic low in 2018). Abstracting from these differences in economic conditions, the integration profiles of recent refugees follows closely the profiles of earlier arrivals – in line with our finding that integration outcomes of immigrants have remained remarkably stable over the past 50 years. To conclude our study, we predict the likely future path of employment of recent refugee arrivals under different counterfactual scenarios. We show that given previous

pattern and high educational attainment, Ukrainian refugees have a comparatively good labor market outlook.

2 Background: Immigration to Germany since the 1950s

In the second half of the 20th century, Germany became one of the most important destination countries for international migrants. As Figure 1 illustrates, the migrant inflows have been unsteady and highly heterogeneous: Overall arrivals have strongly increased since the mid-1970s, with peaks in the early 1990s and around 2015. Not only the regions of origin have changed over time, but also educational composition, with higher shares of immigrants who hold vocational or academic degrees. Despite high immigration, it took until the 2000s that the public debate acknowledged that Germany was a major “immigration country” and a more explicit immigration policy was adopted.⁹ We provide a brief overview of the most important immigration episodes here, while Appendix A provides more information on the institutional and legal aspects of migration and integration policy over time.¹⁰

The first important episode of international immigration after World War II consisted of so-called “guest workers”, who were recruited by German manufacturing firms during the economic boom of the 1960s and early 1970s from countries in Southern Europe and Turkey. They were composed primarily of young men with low formal education and were expected to stay only temporarily, so that little efforts were put into their social integration. Nevertheless, a considerable share eventually brought their families to Germany and did not return, even after recruitment had been stopped during the economic downturn in 1973. As unemployment increased and social tensions rose during the following decade (“consolidation period”), the political response focused on restricting further immigration and supporting return migration (Bade & Oltmer, 2004; Dustmann, Bentolila & Faini, 1996). Consequently, fewer new immigrants arrived and the composition shifted from labor migration to family reunification.

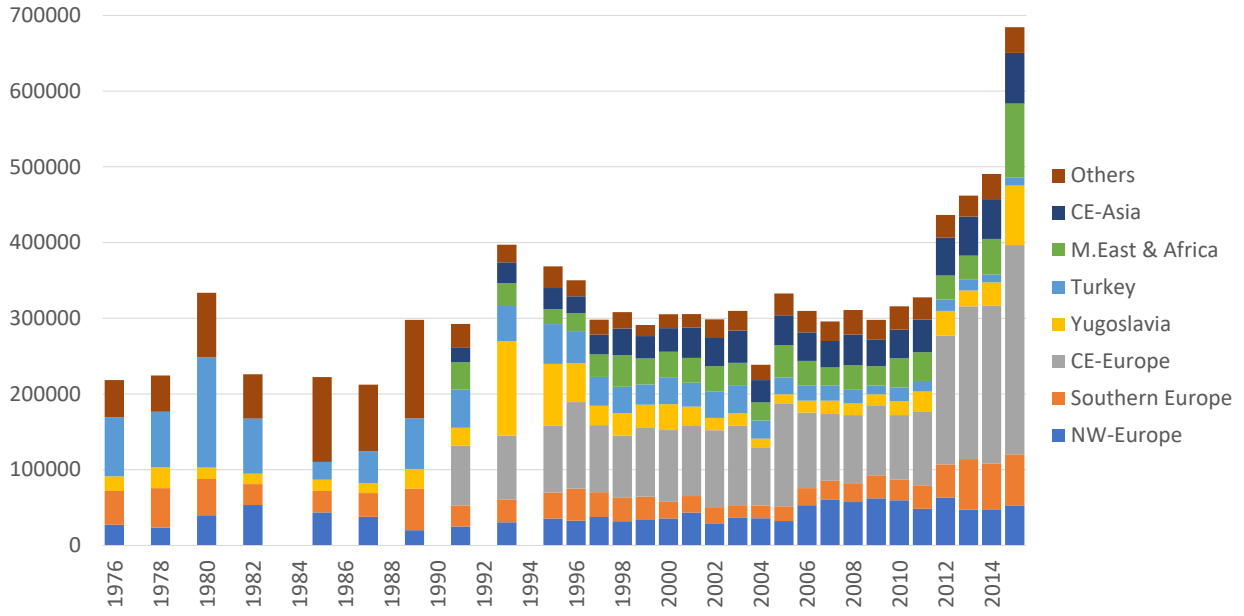
During the 1980s, the number of humanitarian arrivals from eastern Europe, but also countries like Vietnam, Iran and Turkey started to increase. As a response, several policies were introduced to curb access to humanitarian protection (Münz, 1997; Herbert, 2001). This led to a temporary drop in asylum applications, before the number started to rise again in the 1990s during the Yugoslav Wars and as the Kurdish-Turkish conflict intensified. Around the fall of the Iron Curtain and German reunification, international migration in Germany experienced a second

⁹A historical reluctance to immigration is also reflected in West-Germany’s citizenship law, which gave priority to the criteria of descent (*ius sanguinis*). Until the late 1990s, Germany was reluctant to naturalize foreigners, with the exception of ethnic Germans (mainly from Eastern European countries) that were granted immediate citizenship and full labor market access upon arrival. We exclude ethnic Germans from our analysis as we cannot consistently identify them in our data because of their German citizenship.

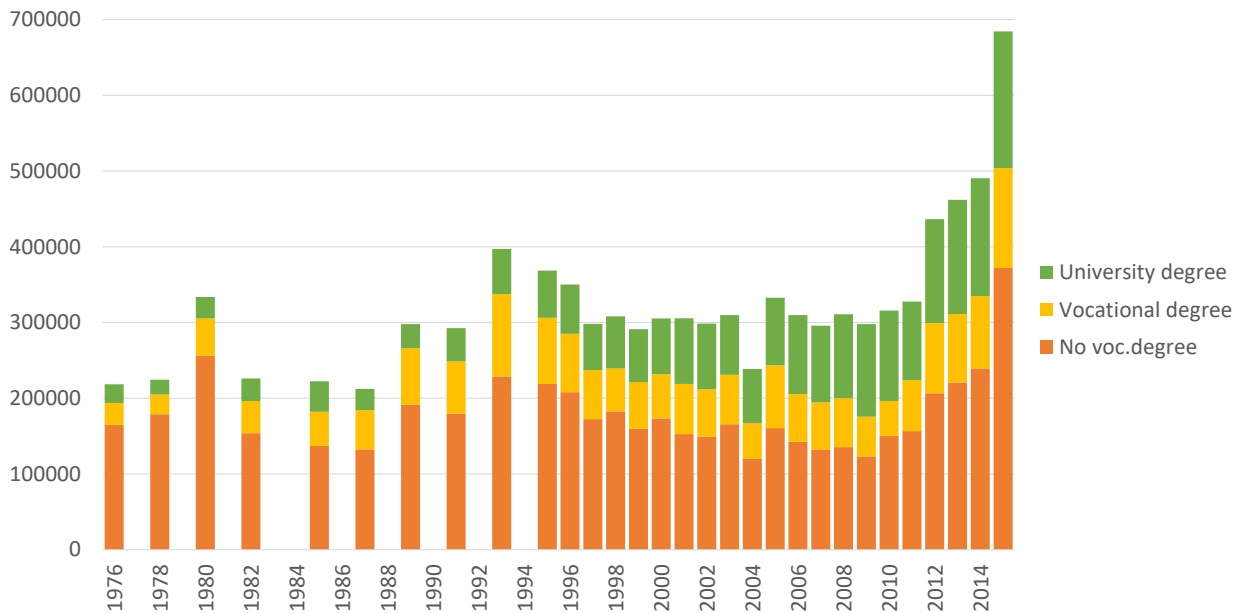
¹⁰See also Bauer et al. (2005) for a comprehensive overview about immigration to Germany until the early 2000s.

Figure 1: Immigration to Germany 1976-2015

(a) Recently arrived immigrants by nationality



(b) Recently arrived immigrants by education



Note: Microcensus, interpolated to total population (using interpolation weights). They include immigrants with foreign nationality that have migrated to Germany within the past year, regardless of gender and age. Prior to 1991, "others" includes immigrants from Central and East Asia and the Middle East and Africa.

peak, primarily driven by immigrants from the former Eastern Block, including large numbers of ethnic Germans, but also seasonal workers, cross-border commuters and so-called “posted workers” (*Werkvertragsarbeitnehmer*). The initial enthusiasm in facilitating temporary forms of immigration to address high labor demand following reunification turned however into a more hostile political climate following the 1993 recession and complaints about a violation of labor standards and “wage dumping” (?).

Since the late 1990s, German migration policy underwent important changes that acknowledged the gradually changing perception of Germany as an “immigration country”: In 1999/2000, a reform of the citizenship law allowed second-generation foreigners to adopt the German nationality. The immigration act of 2005 (“Zuwanderungsgesetz”) opened the German labor market for high skilled foreigners. In contrast to previous legislation, it explicitly envisaged integration measures like language courses. Since the 2000s immigration of EU citizens, and in particular from central and Eastern European countries that joined the Union in 2004 and 2007, became increasingly important and played a crucial role in satisfying high labor demand during the employment boom of the 2010s. Nevertheless, persisting fears of labor market competition led the government to restrict labor market access for these new EU citizens until 2011.

As a consequence of armed conflicts in Afghanistan and the Arabic World, arrivals of asylum seekers increased again, peaking in 2015. Overall, more than one million asylum seekers reached Germany in the years 2014-2016. The public response to this sudden migration wave has been polarized, ranging from broad solidarity with newly arrived refugees to sharp criticism and protests. Most recently, as of June 2022, about 670,000 Ukrainians have been registered as refugees in Germany since the Russian attack in February 2022, with women and children representing the majority.

3 Data and empirical approach

3.1 The German microcensus

For our analysis we use cumulated data from 30 waves of the German microcensus (*Mikrozensus*) that cover the years 1976-2015 (RDC, 2015). The microcensus (in recent years annual) survey of a representative 1%-sample of the resident population. This means that in recent years, about 380,000 households with 820,000 individuals participate annually. The survey is part of the German official statistics and respondents are obliged by law to provide information for the majority of the questions.¹¹ The topics covered in the questionnaires include socio-economic

¹¹However, interpreters are not provided, so in case of linguistic difficulties respondents have to find a workaround, e.g. by switching to English or consulting with other household members. Despite the legal obligation to provide answers to the questionnaire, this might affect the representativeness for some immigrant groups (see Marbach,

background, household composition and detailed information on employment and income. We use the factually anonymized 70% sub-samples from the original microcensus that are provided as Scientific Use Files for the years 1976, 1978, 1980, 1982, 1985, 1987, 1989, 1991, 1993 and all years between 1995 and 2015.

Compared to other popular datasets in migration research, the microcensus offers several unique features: It is representative of the total population, including self-employed and persons outside the labor force (unlike social security registers and derived data products, such as SIAB) while at the same time offering very large sample sizes (unlike surveys such as the Socio-Economic Panel, GSOEP). In contrast to these other two datasets, immigrants are included right after their arrival and not only when they enter the labor force or when refreshment samples are taken. For these reasons and because it offers comparable questionnaires over more than 40 years¹², the microcensus is the best-suited available data source to study the long-run integration of different immigrant groups in Germany.

However, the microcensus also has important limitations: First, it consists of repeated cross-sections, so that we cannot track any particular individual over time. Instead, cohorts are defined by arrival year and nationality (synthetic cohorts). One consequence is that we cannot directly account for selective return migration.¹³ We are not very concerned about this limitation as we are interested in the overall integration of different arrival cohorts regardless of whether their composition has changed over time. Indeed, compositional changes due to selective return migration could be one mechanism contributing to the labor market gaps that we aim to capture. Moreover, previous work using panel data suggests that possible return migration does not strongly bias estimates of immigrants' labor market assimilation in Germany (Constant & Massey, 2003; Fertig & Schurer, 2007; Lehmer & Ludsteck, 2015).¹⁴

Second, the microcensus does not collect information about the specific country of birth, but only about the nationalities of respondents. This implies that in the earlier waves, we cannot consistently identify immigrants who have obtained the German citizenship and thereby lost their former nationalities (see Appendix B). In particular, this study does not cover ethnic Germans that were granted German citizenship as "Spätaussiedler" upon arrival. For other groups, our results could be biased if selective naturalization affects their composition over time. Since 2005, the microcensus also asks about previous nationalities and earlier naturalization so that we can

Hainmueller & Hangartner, 2018).

¹²The questionnaire has been gradually expanded and changed over time, which requires harmonization of some variables. This is not always possible without loss of information, in particular for early waves. We build on valuable harmonization work by Lengerer, Schroedter, Boehle & Wolf (2019).

¹³Selective return migration can bias estimates of individual assimilation profiles, especially when they are based on repeated cross-sections (Dustmann & Görlach, 2016a,b).

¹⁴Constant & Massey (2003) suggest that return migration is generally slightly negatively selected with respect to labor market attachment and social ties to Germany.

infer how many immigrants from different cohorts eventually naturalize and whether they differ with respect to their labor market performance from other immigrants. In Appendix B we provide evidence that naturalization is a relatively minor issue and not very selective for most groups.¹⁵

3.2 The German Socio-Economic Panel GSOEP

We use the German Socio-Economic Panel (GSOEP), which features much smaller sample sizes but more information on individual characteristics, to approximate the share of refugees for each cohort, which turns out to be an important predictor of labor market integration. To consider recent asylum seekers (Section 7.2) we additionally use the IAB-BAMF-SOEP subsample of the GSOEP, which covers refugee arrivals between 2013 and 2016. Specifically, we use the survey waves 2016 to 2019 and interpolate backwards employment in 2015 based on retrospective questions. Similar to the microcensus, the GSOEP is representative of the population and contains a broad variety on questions on employment, wages and socio-economic background. However, for the particular group of recent asylum seekers it holds a few key advantages in that (1) asylum seekers are strongly oversampled and (2) information on the reasons for migration and asylum applications are included.

3.3 Definition of immigrant cohorts

We limit our analysis to males in working age (18-58 years) living in West Germany, including Berlin.¹⁶ We keep only first-generation migrants that have at least one foreign nationality. We focus on men to abstract from cultural differences in labor supply, and the resulting large variation in female employment between immigrant groups.¹⁷ We exclude immigrants who arrived at ages younger than 18 as we want to track labor market outcomes from the first day of arrival. Germans that are born in Germany and do not possess a second nationality are the reference group.

We divide these immigrants into 36 distinct cohorts based on origin regions and arrival periods, while keeping sufficient observations for each cohort over time. We drop immigrants who do not belong to any of these cohorts (4.3 per cent of all immigrants in 2015). Table 1 provides

¹⁵With the exception of immigrants from Central-Eastern Europe, early cohorts from Turkey and immigrants who arrived from the Near and Middle East around 1990. For these groups, we observe well their initial outcomes (before naturalization) and long-run outcomes (once the microcensus contains information on previous nationalities and naturalizations), but not their mid-career outcomes.

¹⁶While only West Berlin is included in previous years, since German reunification the entire city of Berlin is included. This change is negligible for our analysis, as for those origin groups that were most common in Eastern Germany (Eastern Europeans and Asians, in particular Vietnamese) we include only cohorts who arrived after the fall of the Iron Curtain. Therefore, the overwhelming majority (at least 90 percent Bade & Oltmer, 2004) of immigrants that arrived to East Germany previous to the late eighties are excluded. We chose to keep (West) Berlin in our sample, because it is home to sizeable immigrant communities (in particular Turkish).

¹⁷Moreover, Sprengholz et al. (2021) already provide a comprehensive discussion of the long-run labor market integration of immigrants from a gendered perspective.

a descriptive overview. Cohort characteristics are taken from the first available wave after the complete cohort arrived (e.g., the 1995 microcensus for the 1988-95 cohorts). The implied cohort size in the total population varies between 34,000 and 135,000. The mean age at migration varies surprisingly little, with a mean of 29.26 and a standard deviation of about 1.73 years across immigrant cohorts, while educational attainment varies substantially.

3.4 Empirical approach

Non-parametric comparisons. In the first step of our analysis, we focus on unconditional, non-parametric comparisons of immigrant cohorts and natives of the same gender and age. Specifically, we predict the (individual) immigrant-native gap

$$\hat{y}_i^{gap} = y_i - \hat{y}_i \quad (1)$$

where y_i is the actual outcome of immigrant i and \hat{y}_i is his counterfactual outcome, defined as the average outcome of natives with the same gender, age and observation year. Specifically, we predict this counterfactual outcome from the regression

$$y_n = \sum_{a=18}^{58} \delta^N A_a + \sum_{t=1976}^{2015} \gamma_t^N \Pi_t + \sum_{t=1976}^{2015} \sum_{a=18}^{58} \zeta_{ta}^N (A_a \times \Pi_t) + \varepsilon_n \quad (2)$$

where y_n denotes the labor market outcome y for native n , A_a denotes a set of dummy variables for age $a = [18, \dots, 58]$, Π_t denotes a set of indicator variables for each calendar year t , and $A_a \times \Pi_t$ are full interactions of age and calendar year. The superscript N emphasizes that the coefficients are estimated based on our native reference sample as defined in the previous section (working-age men living in West Germany with German but no other nationality).

To compare the integration profiles of different immigrant groups, e.g. arrival cohorts by country of origin and years since migration, we consider the group mean of the immigrant-native gaps \hat{y}_i^{gap} or its components y_i and \hat{y}_i . In parts of our analysis we also consider *conditional* immigrant-native gaps that control for education. In that case, we additionally include indicator variables for educational levels interacted with year dummies in equation (2). This allows us to abstract from differences in the educational composition, by comparing an immigrant to natives of the same age and with the same educational degree.

Parametric estimates. To study the role of macro-economic conditions and to predict immigration profiles for more recent cohorts we additionally implement a parametric framework that is similar to Borjas (1995) and Bratsberg, Raaum & Røed (2014). Specifically, we model the

Table 1: Definition and characteristics of immigrant cohorts

	Cohort size (extrapolated) arrival 10 years		Age at migr. (mean)	Share university degree (%) arrival 10 years		Refg. share (%)
1. Recruitment period (1955-1973)						
North-West Europe 55-73	82,000	56,000	27.7	24.5	22.3	0
Italy 55-67	-	82,000	27.2		1.2	0
Italy 68-73	67,000	50,000	28.7	3.2	1.1	0
Turkey 55-67	-	73,000	28.7		1.4	0
Turkey 68-70	-	118,000	29.7		1.8	0
Turkey 71-73	135,000	110,000	29.5	2.3	2.1	0
Yugoslavia 68-70	-	135,000	27.7		2.4	0
Yugoslavia 71-73	64,000	57,000	28.1	0.9	3.0	0
Other recr. states 55-67	-	91,000	28.1		2.5	0
Other recr. states 68-73	139,000	75,000	29.4	1.6	2.1	0
2. Consolidation period (1974-1987)						
North-West Europe 74-87	58,000	45,000	28.3	22.0	26.3	0
Southern Europe 74-78	53,000	25,000	28.8	7.6	5.0	0
Southern Europe 79-87	45,000	26,000	27.3	9.0	6.7	0
Yugoslavia 74-87	34,000	19,000	29.2	4.9	8.2	13
Turkey 74-78	55,000	31,000	30.2	8.1	5.7	0
Turkey 79-87	52,000	41,000	25.7	7.2	5.0	6
3. Fall of the Iron Curtain (1988-1995)						
North-West Europe 88-95	50,000	41,000	30.4	48.3	34.4	0
Southern Europe 88-95	81,000	60,000	29.8	10.0	6.1	2
Centr.-East Europe 88-91	41,000	26,000	33.1	29.0	16.8	3
Centr.-East Europe 92-95	89,000	50,000	31.2	25.7	24.6	9
Yugoslavia 88-91	29,000	21,000	29.2	9.6	3.1	41
Yugoslavia 92-95	112,000	57,000	30.6	8.5	7.5	77
Turkey 88-91	48,000	39,000	25.7	8.6	5.8	19
Turkey 92-95	51,000	53,000	26.1	7.7	5.0	29
Mid.East & Africa 88-95	85,000	78,000	27.9	27.9	19.0	57
Central & East Asia 88-95	54,000	41,000	28.5	30.4	14.5	65
4. Period of East-West integration (1996-2005)						
North-West Europe 96-05	103,000	39,000	31.8	50.1	50.5	2
Southern Europe 96-05	59,000	35,000	28.7	28.8	18.9	0
New EU states 96-00	45,000	27,000	31.2	30.4	22.1	4
New EU states 01-05	46,000	43,000	31.3	27.2	22.3	3
Former USSR 96-00	43,000	62,000	33.4	28.5	22.6	36
Former USSR 01-05	77,000	52,000	33.3	26.7	24.7	28
Yugoslavia 96-05	43,000	48,000	28.4	10.4	9.2	46
Turkey 96-05	91,000	83,000	26.4	9.4	7.7	17
Mid.East & Africa 96-05	126,000	96,000	28.7	27.8	29.8	55
Central & East Asia 96-05	60,000	37,000	28.2	64.9	40.9	39

Notes: Cohort sizes and characteristics measured in the first available census wave after the end of the arrival period and 10 years after the end of the arrival period. Total population numbers interpolated using the microcensus interpolation weights. Refugee share taken from the GSOEP. See appendix table A4 for a precise definition of the origin regions.

outcome y_i for immigrant i of immigrant cohort I in calendar year t as

$$y_i = \phi^I X_i + \delta^I A_i + \alpha^I YSM_i + \sum_{t=1976}^{2015} \gamma_t^I \Pi_t + \varepsilon_i \quad (3)$$

where X_i a set of socio-economic characteristics, most notably education, A_i a third-order polynomial in age, and YSM_i a third-order polynomial of years since migration. As previously, Π_t denotes a set of indicator variables for each calendar year. The corresponding regression model for natives reads:

$$y_n = \phi^N X_n + \delta^N A_n + \sum_{t=1976}^{2015} \gamma_t^N \Pi_t + \varepsilon_n \quad (4)$$

If immigrant group I is defined by arrival years, the parameters in equations (3) and (4) are not jointly identified (because of collinearity between YSM_i and observation year). Therefore, an additional assumption is necessary, such as identical period effects for immigrants and natives, $\gamma_t^I = \gamma_t^N$. In that case, the predicted immigrant-native gap for immigrant i simplifies to:

$$\hat{y}_i^I - \hat{y}_i^N = (\hat{\phi}^I - \hat{\phi}^N) X_i + (\hat{\delta}^I - \hat{\delta}^N) A_i + \hat{\alpha}^I YSM_i \quad (5)$$

In reality, the assumption of equal periods effects is unlikely to hold, as immigrants' labor market outcomes tend to be more sensitive to recessions than natives (Barth et al., 2004; Bratsberg et al., 2006; Dustmann et al., 2010). Following Barth et al. (2004) and Bratsberg et al. (2014) we adjust equations (3) and (4) in two ways. First, we include in the empirical model a full set of interaction terms between indicators for educational attainment and year of observation, so that period effects differ by attainment. Second, we include the regional unemployment rate and allow for its effect on the outcome y_i to be different for natives and immigrants.

4 Integration Profiles over 50 Years

We begin by providing non-parametric evidence on the economic integration of male immigrants in Germany over the last five decades. Specifically, we compare the mean labor market trajectories of immigrant cohorts (defined by arrival year and origin region, see Section 3.3) since migration to the corresponding mean trajectories for natives with an equivalent distribution of age and birth year. To measure labor market success we focus on two outcomes, employment (including education) and post-tax individual income.

4.1 Results: Employment

Figure 2 plots the average employment rate for immigrants from different origins by years since arrival, separately for four broad arrival cohorts (1955-1973, 1974-1987, 1988-1995 and 1996-2005). Our definition of employment includes any kinds of regular employment and formal education.¹⁸ Immigrants from EU-15 countries (North-West and Southern Europe) are coded blue, non-EU-15 immigrants with a refugee share of less than 50 percent red, and origin groups with a higher share of refugees green. For comparison, we include the average employment rate of natives of comparable age and birth years (grey line), which corresponds to the prediction based on equation (2).¹⁹

Five observations stand out. First, the immigrants' profiles are generally concave, with low employment rates in the year of arrival but rapidly increasing employment over time. This typical assimilation profile (Borjas, 1995; Gathmann & Monscheuer, 2019) reflects the hurdles that migrants have to overcome, including barriers to formal labor market access, language acquisition and the imperfect translatability of skills and qualifications from their home countries. The observation that employment gaps close rapidly over the first 10 years after arrival for *all* groups is positive from a policy perspective. However, the size of those initial gaps is nevertheless highly predictive of the size of immigrant-native gaps in the long run, as we show below.

Second, most origin groups have substantially lower employment rates than natives of comparable age. The exceptions are migrants from North-West and Southern Europe (who tend to have similar or *higher* employment rates) and immigrants from Yugoslavia who arrived in the 1960s and 1970s (who reach employment rates above 90 percent). Migrants from Turkey do less well, in particular those arriving in the 1980s, for whom the employment rate remains 10-20 percentage points lower than for similarly-aged natives. Cohorts from Central and Eastern Europe (including Yugoslavs arriving during the Yugoslav wars) and Asians²⁰ do comparatively well (reaching employment rates above 80 percent), while immigrants from the Middle East and Africa (1988-95 and 1996-05) have particularly low employment rates. Ten years after arrival, their employment rates are around 70 percent, a 20 percentage point gap to similarly aged natives.

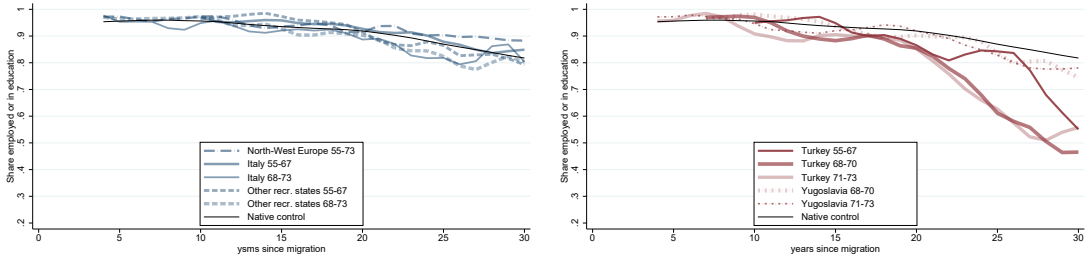
¹⁸Specifically, it includes the self-employed, civil servants and military personnel as well as part-time, marginal and family employment. We additionally include persons in formal education (schools and universities), as education may be desirable with respect to integration, and educational attainment at younger age would strongly influence the initial employment gaps. We do not include training programs of the employment agency or language and integration courses for immigrants that do not lead to a general or vocational degree. Our findings are otherwise robust to classifying persons in education as non-employed.

¹⁹The slight concavity of these employment profiles for “counterfactual natives” reflects the correlation of years since migration with age and the decline of employment rates at older ages.

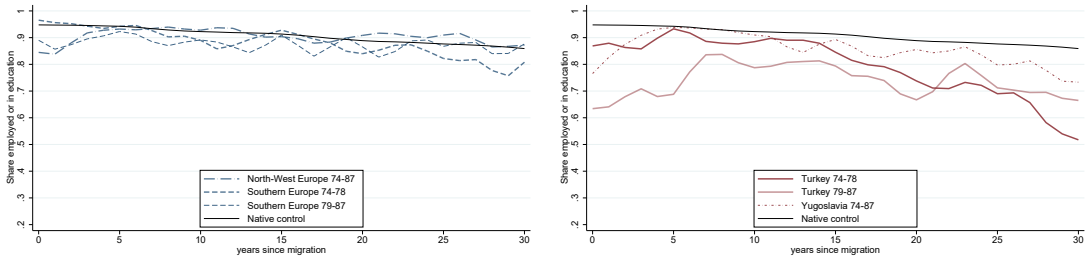
²⁰About 60 per cent of immigrants from this group that includes an important share of refugees originate from Afghanistan, Pakistan and Vietnam.

Figure 2: Employment shares of cohorts (including in education)

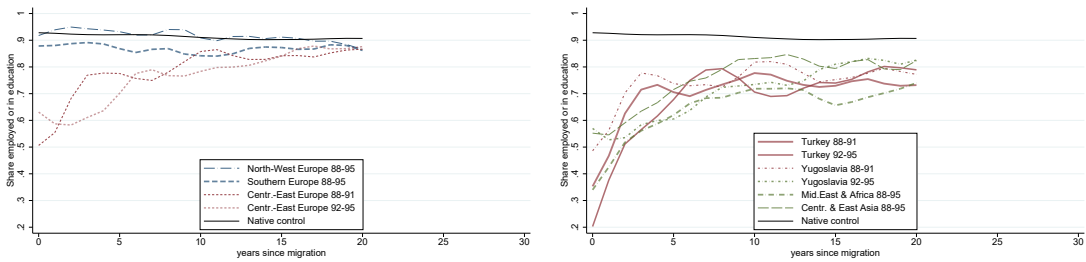
(a) Arrival period: 1955-1973



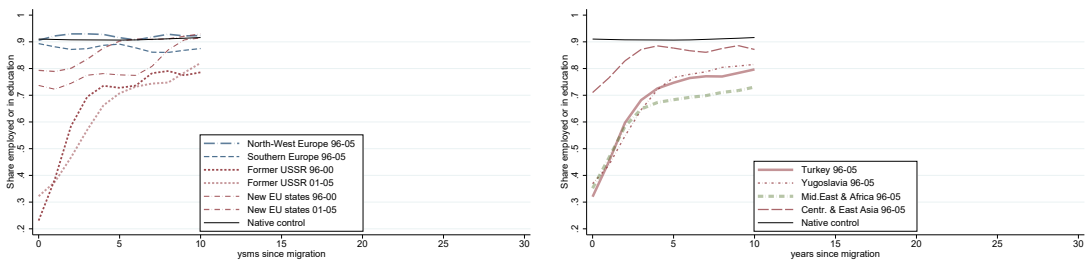
(b) Arrival period: 1974-1987



(c) Arrival period: 1988-1995



(d) Arrival period: 1996-2005



Notes: Share in employment or formal education by year since migration, for different immigrant cohorts and a native control group (of the same age and observation year, see eq. 2). The thickness of lines is proportional to the cohort size in the first year after complete arrival.

Third, the employment gaps do not close fully for those groups who have initial gaps. While immigrants catch up rapidly over their first years, the gap to native workers stabilizes around 10 years after arrival for most origin groups. Averaging across all immigrants, the employment gap relative to natives one decade after arrival is 10 percentage points. For comparison, the employment gap in mid-life (age 35-50) between native men with and without a university degree has been around 6 percentage points throughout the period of our study. While previous researchers expected full assimilation for immigrants in terms of wages (Gundel & Peters, 2008; Constant & Massey, 2005; Fertig & Schurer, 2007), less attention has been put so far on the question whether immigrants fully catch up to natives in terms of employment. We find that the initial gaps cannot be fully overcome, with one notable exception: immigrants from the new EU member states caught up fully to natives, even though their initial gaps were non-negligible.

Fourth, the slope of the employment profiles differs for refugees and other migrants. Cohorts with low refugee shares assimilate quite quickly after arrival, but show little convergence – or even divergence – after about 7-8 years in Germany. In contrast, the integration process for refugee cohorts takes longer, with ongoing convergence even 10 years after arrival. As a result, refugee cohorts tend to catch up to other immigrants over time, as we show more explicitly in appendix C.1. These patterns also reflect differences in labor market access. While most migrants from European countries “migrate into” an employment contract, refugee migrants are often banned from formal labor market access upon arrival (see Appendix A for details).²¹

Fifth, for some cohorts, the employment gaps started to worsen again after the initial convergence. This pattern is particularly pronounced for arrivals from Turkey and Yugoslavia between the 1960s and 1980s, for whom employment rates dropped massively – by up to 30 percentage points – in the early 1990s. This pattern can be considered an extreme example of the more general finding that immigrant employment tends to be “fragile”, in the sense of being more sensitive to economic conditions and shocks than the employment of natives (Bratsberg et al., 2010). We consider specific explanations in Section 7.1.²² The employment gaps remain more stable for more recent cohorts. However, these groups have not been affected by similarly economic downturns, and have not yet reached the age for which we found increasing employment gaps among older cohorts. An important policy concern is therefore if a similar collapse in employment rates could occur for the current immigrant population, given the recent pandemic- and war-related worsening of economic conditions.

So far, we focused on an unconditional comparison of migrants to similarly aged natives,

²¹These employment bans may not only delay labor market integration, but also affect their long-term outcomes adversely. In particular, Fasani, Frattini & Minale (2021a) and Marbach et al. (2018) find that the exposure to temporary employment bans imposed by many European countries also reduces the employment probability of asylum seekers in the *post*-ban years.

²²Figure 5 shows that the widening employment gaps cannot be explained by age-specific factors such as different retirement behaviour between immigrant and natives.

without attempting to match their education or other characteristics, as our aim is to quantify the overall economic integration of migrants compared to natives. Still, conditional comparisons can be indicative about the mechanisms that contribute to the immigrant-native gap in employment. In appendix C.1 we therefore illustrate that the longer-run employment gaps of immigrants compared to natives can indeed partly be explained by differences in the educational composition: When comparing immigrants to natives with similar educational levels, employment gaps after 20 years shrink almost by half. Similarly to cohorts with high refugee shares, also unskilled immigrants start with particularly high conditional employment gaps, but also exhibit a stronger and steadier reduction in gaps compared to other immigrant groups. Conditional on employment, they eventually catch up or even overtake them. Finally, we also provide additional evidence that the conditional employment gaps are much larger in contexts of high regional unemployment.

Summarizing, the immigrant-native employment gaps shrink for (non-EU) cohorts in the first years after arrival, but never catch up completely. For a few cohorts, the gaps even start to widen again after many years with high employment rates in Germany. We attribute these patterns partly to differences in the educational compositions between immigrants and natives, to particular labor market barriers for refugees and the higher sensitivity of immigrants to changing economic conditions. This is relevant information for policy makers as it indicates that a quick assimilation in the first years after arrival is of course desirable, but not a guarantee for high employment in the long run.

4.2 Results: Income

Figure 3 plots the integration profiles for income. We consider real individual post-tax income in 2010 Euros that includes labor earnings, but also other forms of income like capital gains or welfare benefits. The overall pattern is similar when considering log earnings (Figure A8).²³

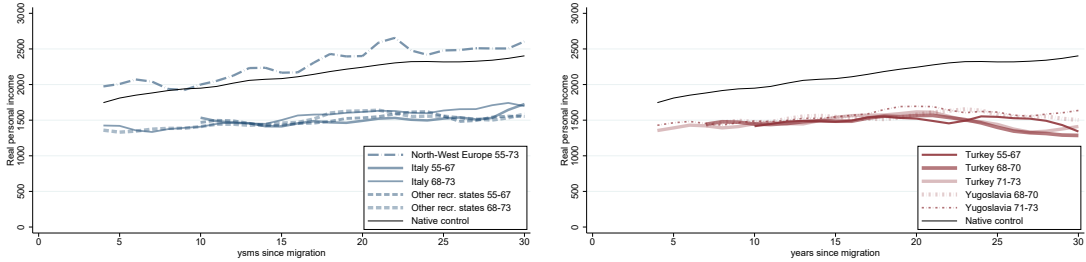
One interesting pattern in Figure 3 is how stable the income pattern of different origin groups has been over the past 50 years. In particular, the income trajectories of Southern Europeans have changed surprisingly little since the so-called “guest worker” period: 10 years after arrival, their average income reaches around 1,500 Euros in real terms and experience only moderate income growth over time. Turkish and Central-Eastern European cohorts arriving after the recruitment period start with larger initial gaps (average income below 1,000 Euros) but experience faster growth, so that they eventually catch up to Southern-Europeans.²⁴ Groups with

²³Average incomes increase less than one might expect over the long time period studied. We identify several reasons for this pattern: First, unemployment rates have grown from close to zero in the 1970s to 12 percent around the year 2000 and average weekly working hours conditional on employment have dropped from 37.7 to 33.3 between 1976 and 2015. Both trends mask an increase in hourly wages of more than 30 percent. Additionally, we focus on working age males and therefore ignore the increase in female labor supply that strongly contributes to an increase in average per-capita household income of more than 40 percent.

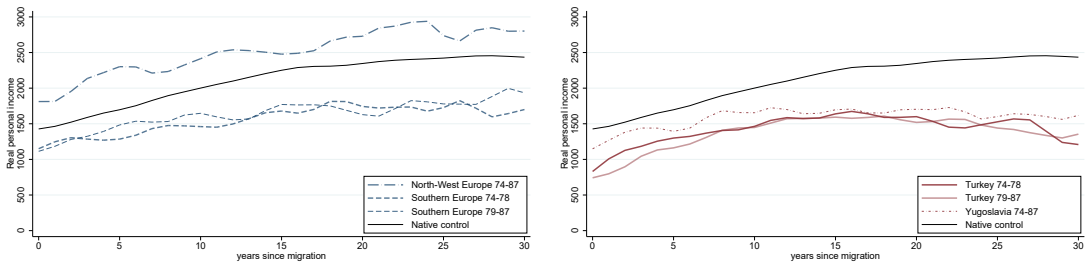
²⁴The large initial income gaps for Turkish immigrants reflect this group’s tendency to rely on support from

Figure 3: Mean income of cohorts

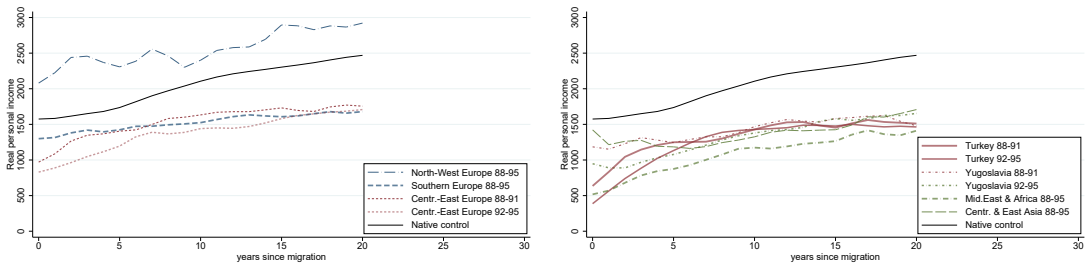
(a) Arrival period: 1955-1973



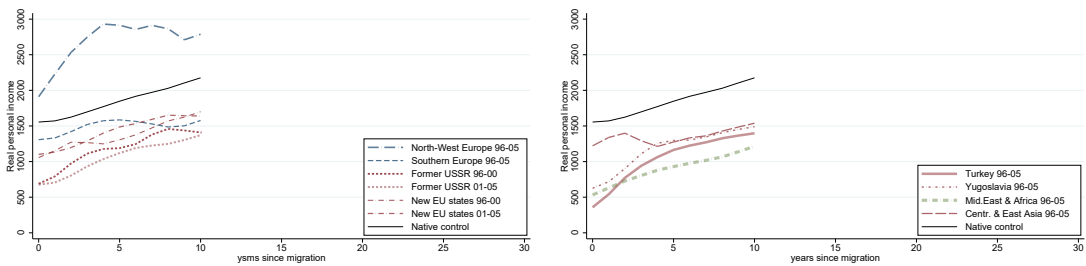
(b) Arrival period: 1974-1987



(c) Arrival period: 1988-1995



(d) Arrival period: 1996-2005



Notes: Mean real personal post-tax income (in 2010 Euro) by year since migration, for different immigrant cohorts and a native control group (of the same age and observation year, see eq. 2). The thickness of lines is proportional to the cohort size in the first year after complete arrival.

family or friends as opposed to welfare in the first years after arrival.

a high share of refugees receive particularly low incomes and show relatively slow, but steady income growth, in particular those from the Middle East and Africa. Asian groups²⁵ show similar patterns, but on a substantially higher level. Finally, immigrants from North-Western Europe outperform natives. Their income gap has increased strongly over time, from a few percents in the 1955-73 arrival cohort to a 20-30 percent gap for the 1966-2005 cohort.

Although personal income tends to increase with more time spent in Germany, the income of the similarly aged natives increases at a similar or higher pace (with migrants from North-West Europe being the only exception). More specifically, the immigrant-native income gap tends to be stable or decrease for a few years after arrival, but then widens considerably. Twenty years after arrival, the average income gap between migrants and natives has grown to 1,000 Euro/month in the 1974-87 cohort, and similar or more pronounced gaps are visible for later arrival cohorts. This lack of convergence, and even divergence for most groups, may appear at odds with previous studies that found wage assimilation, at least for groups who arrived after around 1990 (Gundel & Peters, 2008; Constant & Massey, 2005; Fertig & Schurer, 2007; Lehmer & Ludsteck, 2015; Gathmann & Monscheuer, 2019). These studies differ in two important aspects from our work. First, they evaluate the wage profiles of *employed* immigrants, which reflects selection into employment (as shown in Gathmann & Monscheuer (2019)). We instead consider all immigrants independent of their employment status, and also include non-labor earnings. Second, most other studies control for individual characteristics, such as education. In contrast, we focus on an unconditional comparison between immigrants and natives, holding only their age and observation year fixed. The divergence of income profiles in Figure 3 is therefore partly due to the lower education of immigrants (but not fully, as we show in appendix C.2)

Surprisingly, the integration profiles vary much less across immigrant cohorts for income than for employment. In employment, we see large differences between groups; for example, after one decade the employment rate of Turkish 1979-87 arrivals is more than 15 percentage points below the corresponding rate for natives, while there is essentially no gap for the 1974-87 arrivals from Yugoslavia. However, both groups earn substantially less than similarly-aged natives. Indeed, according to Figure 3 the mean (monthly) income stabilizes at around 1,500 Euro (1955-73 cohorts) or slightly higher (later cohorts) for all origins, with North-Western Europeans as the only exception. That the income profiles vary so little across groups is puzzling, given that their educational and employment levels differ so widely.

The steadily increasing income gaps shown in Figure 3 stand in contrast to the corresponding pattern for employment, for which we observe rapidly decreasing gaps within the first years after arrival. One potential explanation is that immigrant's income may not improve much when finding their first job, with welfare payments being crowded out by labor earnings. However,

²⁵including Iran, Afghanistan, Vietnam and Pakistan

comparing immigrants who recently found a job with those who did not, the mean income is considerably higher for the former.²⁶ The rapid convergence in employment as documented in the previous section should therefore contribute to convergence in income. Instead, the main explanation for divergence in income is that, compared to natives, migrants may have lower earnings growth conditional on being employed. One obvious factor that is their lower educational attainment, and the observation that highly educated workers tend to have steeper income growth than those with low educational qualifications, which is discussed in more detail using conditional income gaps in appendix C.2.

What is the (policy) relevance of these findings? The good news is that in absolute terms, the economic situation of immigrants improves considerably with more time spent in Germany. However, the *relative* income gaps compared to natives of similar age do not shrink and in fact increase in most cases. Immigrants tend to have worse career opportunities compared to natives over their entire lifecycle, even when being employed, a finding that is discouraging from a distributional perspective. Another important finding is regarding the role of education in the integration process. On the one hand, education explains some of the employment gap between immigrants and natives (as shown in appendix C.2). This results suggests that educational policies – which can be directly affected by policymakers – might have a quite direct effect on the employability of immigrants. On the other hand, the immigrant-native gap in income remains very high even conditional on education, and is in fact highest among the university-educated. This finding is more negative, as it suggests that educational policy alone might have only a limited effect on the socioeconomic standing of immigrants in Germany.

4.3 Other outcomes

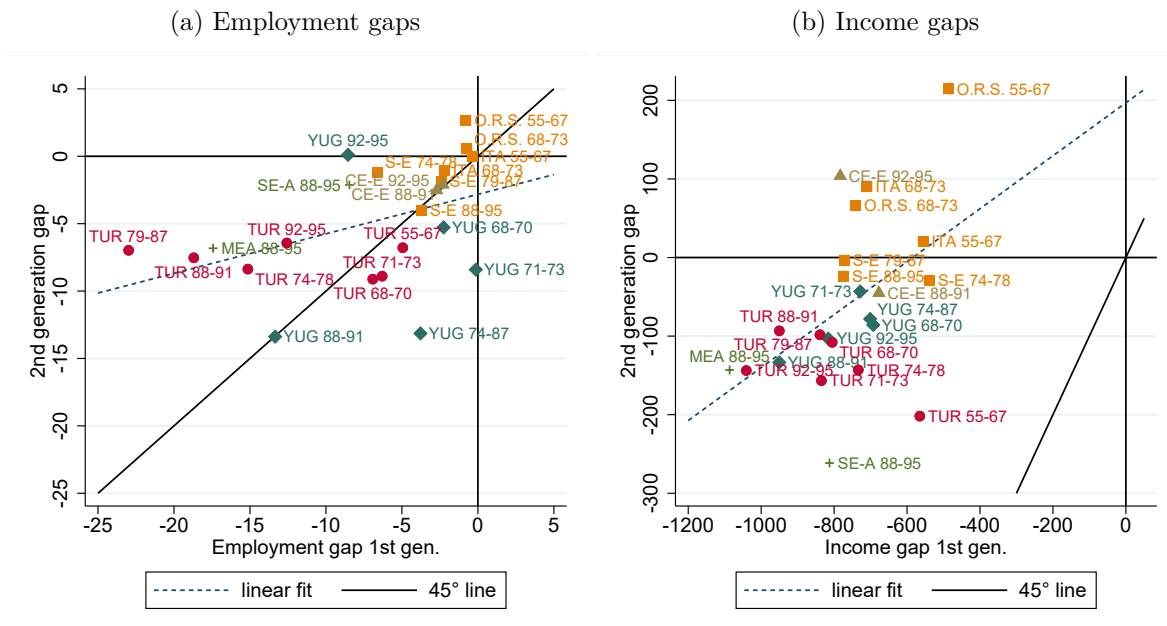
As auxiliary outcomes we also track welfare dependency (to measure the direct costs of immigration) and intermarriage rates (as an indicator for social segregation, which may interact with economic segmentation). The results are shown in Appendix Figure A6 and Table A1 and discussed in Appendix section D. Immigrants from most cohorts are more likely to be dependent on welfare benefits as their main source of income compared to the native residence group. The results generally mirror our results on employment. In terms of marriage pattern, the differences between origin groups are striking: While immigrants from the traditional “guest worker countries” are very likely to marry within their ethnic communities, immigrants from North-Western Europe tend to be married to a native German spouse instead.

²⁶Among immigrants living in Germany for 10 years or less, the earnings for those who found a job within the past year is 1000 Euros compared to only 556 Euros for those who did not find employment.

4.4 Second Generation immigrants

Do these employment and income gaps persist for the second generation? Studies from the US suggest that wages of first-generation immigrants do not fully catch up to natives, but that the wage gap closes for their children (Card, 2005). Thus, full assimilation might take more than one generation. To identify second-generation immigrants reliably, we exploit that in the years 2005, 2009 and 2013, the microcensus includes a supplementary questionnaire on the migration background of parents.²⁷ To be consistent with the rest of our study, we define second-generation immigrants as working-age males born in or migrated to Germany at age 6 or younger, whose fathers migrated to Germany with a foreign nationality. The definition is thus independent of the mother’s nationality or migration status.

Figure 4: Labor market gaps for first and second generation immigrants



Notes: Unconditional immigrant-native gaps estimated non-parametrically according to eq. 2. 2nd generation gaps measured in the years 2005, 2009 and 2013. First generation gaps measured 20 years after migration to Germany. The labels refer to region of origin (See table A4) and arrival year: CE-E: Central and Eastern Europe; ITA: Italy; MEA: Middle East and Africa; O.R.S: Other recruitment states; CE-A: Central and East Asia; S-E: Southern Europe; TUR: Turkey; YUG: (former) Yugoslavia

Figures 4a and 4b plot the employment and income gaps of first generation migrants (measured 20 years after migration) against the second generation gaps (measured in 2005, 2009 and 2013).

²⁷The questions cover their current nationalities, previous nationalities and their year of arrival to Germany. We drop second-generation immigrants from North-Western Europe because of low observation numbers and drop cohorts that arrived after 1995, as their children have not yet reached working age by the time of observation.

We focus on 20 years since migration for the first generation because we do not want to capture the initial convergence after arrival. Recall that the immigrant-native gaps as defined in equation (1) condition on age and observation year, which partly addresses the fact that children of more recent cohorts are observed at younger ages than children of older cohorts.²⁸

Three observations stand out: First, the employment and income gaps generally shrink between the first and second generation. For employment, the average gap shrinks from -7.1 percentage points in the first to -4.9 percentage points in the second generation (i.e., by about 30 percent). The income gains are particularly impressive: for most cohorts, the income gaps ranged between -400 and -800 Euros for the first generation, while gaps are on average between -200 and 100 for the second generation -but with high variation across cohorts.

Second, the relationship between labor market gaps across the generations is positive: The children of groups with favorable labor market performance tend to be successful as well, while integration difficulties are likely to be passed on to the next generation. Third, there are clear clusters by regions of origins: Southern European cohorts (green squares) and East Europeans (brown triangles) had small negative employment and large negative income gaps in the first generation, but generally catch up to natives in the second generation. The employment gaps of Turkish and Yugoslav cohorts instead remain large, although they experience large income gains across generations. Turkish and Yugoslav guest worker cohorts who arrived before the mid-1970s even experience a widening of employment gaps across generations.

From a policy perspective, the large improvements for the second generation are good news, suggesting that most immigrant groups will catch up to natives eventually. However, the employment gaps are very persistent for those groups that struggled most in the first generation.

Our results provide more details on the findings by Algan et al. (2010), who find that the evidence for labor market progress is not so clear-cut in Germany. While we confirm their finding that the employment gaps tend to worsen for second-generation Turkish immigrants, we find a more positive pattern for other groups, such as Southern Europeans. Albeit in the somewhat different context of expellees from former German territories after World War II, also Bauer, Braun & Kvasnicka (2013) provide evidence that wage gaps have remained stable and do not close over generations. However, our analysis differs from previous research in two important ways: Firstly, we do not only look at wages, but also at non-labor earnings (including welfare benefits). Secondly, we do not rely on a single cross-section and therefore do not necessarily observe first and second generation at very different ages.

²⁸Even when additionally residualizing all age variation in the second-generation immigrant-native *gaps*, the overall patterns and slopes of the linear fit change only marginally.

5 Can integration be predicted?

Labor market outcomes vary substantially across origin groups: while some groups catch up with natives, for others the employment gap remains as large as 20 percentage points. One key question is how predictable those differences are – is it possible to predict which groups will or will not integrate well into the labor market, based on information that policymakers have readily available at arrival? To address this question we study the extent to which simple summary statistics, such as educational shares, can predict the average labor market performance of each immigrant group. We focus on the explanatory power of group-level characteristics for integration profiles. This is reasonable because *group-level* characteristics are important predictors even conditional on *individual* characteristics, as shown and discussed in appendix E.

5.1 How predictable are the integration profiles of cohorts?

We show that assimilation profiles are highly predictable: most of the differences in labor market integration between immigrant groups can be explained by a small set of observable characteristics that are readily available to policymakers. To show this, we report the coefficient estimates from a regression of the unconditional labor market gaps \hat{y}_i^{gap} as defined in equation (1) and averaged for each of the 36 cohorts, on different sets of regressors on the cohort level in Table 2.²⁹

In Panel A we consider the *initial* gaps upon arrival. Columns (1) and (4) show that about 40 percent of the variation in the initial employment and income gaps can be explained by the average education of each cohort (the share with secondary school or vocational degree, and the share with a university degree). As shown in columns (2) and (5), the cohort shares of refugees and a dummy for EU-15 origins (see Section 3.3) are even more predictive, explaining 57 percent of the variation in employment and 65 percent of the variation in income gaps upon arrival. While the gaps are mostly explained by characteristics of the origin groups themselves, economic conditions in Germany do matter. As shown in columns (3) and (6), the employment or income *gaps* to similarly aged natives are much greater when the average unemployment rate at arrival is higher. For a one-standard deviation increase in the unemployment rate (2.3 percentage points), the employment gap between natives and immigrant arrivals increases by more than 10 percentage points (and the income gap by 200 Euros). Pooling both cohort characteristics and the unemployment rate, we can explain more than 3/4 of the variability in initial labor market gaps between groups.

²⁹For cohorts that arrived before 1974 we cannot observe employment and income at the time of arrival and instead take values from the earliest available census wave in 1976. The results change only marginally if we exclude these early waves from our analysis. We report standard errors that are robust to small samples in these tables (STATA’s `vce(h3)` option, based on Davidson, MacKinnon & others (1993)), but conventional standard errors are similar.

Table 2: Explaining cohort-level labor market gaps

	Employment gaps (p.p.)			Income gaps (Euro)		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Initial gaps						
Share school degree	10.26*** (1.81)		-1.45 (2.76)	185.20*** (45.11)		-59.91 (65.29)
Share university degree	-5.83** (2.85)		1.05 (3.34)	157.99* (79.44)		243.70*** (82.28)
Refugee share		-12.03*** (2.77)	-4.30** (1.72)		-85.67*** (29.31)	-62.36 (101.53)
EU-15 (dummy)		2.59 (1.56)	6.04** (2.49)		278.91*** (64.46)	203.69*** (57.58)
Unemployment rate			-10.65*** (2.46)			-198.68*** (54.61)
Number of cohorts	36	36	36	36	36	36
adj. R^2	0.414	0.572	0.755	0.397	0.652	0.784
Panel B: Gaps 10 years after arrival						
Share school degree	4.88*** (0.94)		0.87 (1.10)	203.15*** (48.22)		13.05 (68.77)
Share university degree	-1.37 (0.88)		2.28** (1.07)	114.24 (74.69)		217.61** (105.81)
Refugee share		-5.21*** (1.03)	-1.76** (0.66)		-109.19*** (26.71)	-78.73 (132.55)
EU-15 (dummy)		0.33 (0.82)	0.67 (0.72)		195.86** (78.75)	103.34 (75.02)
Unemployment rate			-2.20* (1.19)			-151.32** (63.36)
Number of cohorts	36	36	36	36	36	36
adj. R^2	0.551	0.558	0.829	0.486	0.558	0.724
Panel C: Explaining 10-year gaps with initial gaps						
Initial gap			6.29*** (0.60)			314.41*** (30.97)
Number of cohorts			36			36
adj. R^2			0.790			0.864

Notes: Dependent variable: Cohort-level gaps in employment or in education in percentage points (columns 1-3) or real individual post-tax income in 2010 Euros (columns 4-6) according to Equation 1. Explanatory variables are measured upon arrival and standardized (mean=0, standard deviation=1). We report small sample robust standard errors (STATA's vce(h3) option, based on Davidson et al. (1993)). ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel B of Table 2 shows estimation results for the corresponding gaps 10 years after arrival. The cohort composition remains a strong predictor of immigrant-native gaps, although the relative importance of different characteristics changes: while refugee status is a particularly strong predictor for the initial labor market gaps, education is a better predictor for the gaps 10 years after arrival. The explanation for this observation is that refugee arrivals are less likely to have immediate access to the labor market, but tend to slowly catch up relative to non-refugees over the following decades (see Figures 2c and 3c). Overall, cohort characteristics at arrival predict the integration outcomes after 10 years as well as the initial gaps – while immigrant group catch up with natives, the differences between immigrant groups remain highly predictable. Considering the unemployment rate at arrival in columns (3) and (6), we again find coefficients of the expected sign: employment and income gaps are more negative for cohorts that arrived in times of high unemployment.³⁰ However, economic conditions explain a much smaller share of these gaps than cohort characteristics, and are imprecisely estimated. Overall, we can explain 83 percent of the variation in employment and 72 percent of the variation in income with simple summary statistics for each immigrant group. Alternatively, long-run integration outcomes can be predicted based on initial employment and income gaps. As shown in Panel C, the initial employment gaps explain 79 percent of the employment gaps one decade later (column 3), and the corresponding R-squared is even higher for income (column 6).

Overall, our estimates suggest that integration outcomes are highly predictable: historically (i.e., in sample), basic summary statistics on the composition of each origin group or their initial labor market performance have been highly predictive of how well those groups integrate into the German labor market.³¹ We illustrate the potential use of this result in Section 7.2, by predicting the likely integration paths of (i) the large refugee cohort that arrived to Germany around 2015 and (ii) the more recent refugee wave who fled the recent war in Ukraine.

6 Have integration outcomes improved over time?

Has the labor market integration of immigrants in Germany structurally improved over the past 50 years? European countries have become exposed to immigration much later than the US, and Dustmann & Frattini (2013) argue that this lack of experience of institutions and societies with immigrants may be one of the factors hindering their successful integration. According to this argument, the institutional setting and thus integration outcomes might be expected to improve

³⁰Interestingly, the unemployment rate upon arrival is a better predictor of current employment and income gaps than the current unemployment rate.

³¹To show that these results are robust to specification, we repeat this analysis for a finer definition of arrival "cohorts" defined as origin group x arrival period. x education x age at migration. The results are similar and available upon request.

over time.

A visual inspection of Figures 2 and 3 however suggests that in Germany, the *initial* employment and income gaps have grown larger for recent cohorts. Multiple factors might explain this pattern: On the one hand, the composition of cohorts has changed, with increasing shares of refugees who tend to require more time to gain a foothold in the labor market than other migrants. Basilio et al. (2017) and Constant & Massey (2005) argue that poor transferability of foreign human capital has slowed down job mobility in the long-run.³² On the other hand, Germany’s immigration policy today is placing a greater emphasis on integration measures and language acquisition, which could improve long-run integration prospects but reduce employment in the first years after arrival. General labor market conditions, such as the high unemployment in the late 1990s and early 2000s, might further contribute to changing integration patterns.

The pattern is less obvious for integration outcomes at later points. Table 3 therefore reports linear time trends from the regression

$$\hat{y}_i^{gap} = \alpha + \rho Year_t + \phi X_{i,c(i)} + \theta UR_{r(i),t} + \varepsilon_i$$

where \hat{y}_i^{gap} is the predicted labor market gap as defined in equation (1) for immigrant i from cohort c in region of residence r , observed 10 years after arrival in year t , $Year_t$ represents a linear time trend, $X_{i,c(i)}$ a vector of controls that – depending on the specification – include dummies for individual school degree and university degree and the refugee share of each cohort, and $UR_{r(i),t}$ is the regional unemployment rate in year t .

Panel A confirms that the initial employment gaps have widened over time, by about 5 percentage points for each decade (column 1, $\hat{\rho}/10 = -5.1$) – corresponding to an enormous increase of 25 percentage points over 50 years. This increase cannot be explained by changing educational composition over time; if anything the time trends are more negative conditional on the educational composition of more recent immigrant cohorts (column 2). This observation is in line with previous findings by Kogan (2011) who emphasizes that the cohorts that arrived since the 1990s were not able to translate their higher levels of formal education into better employment prospects compared to the earlier groups of “guest workers” and their families. The remaining gap is highly correlated with refugee shares and changing labor market conditions over time; indeed, when additionally controlling for refugee share and regional unemployment the sign of $\hat{\rho}$ becomes insignificant and close to zero (column 4).³³ The results are similar when studying conditional gaps, i.e. gaps that compare the difference between immigrants and natives

³²In addition, the educational expansion among Germans and increasing returns to education might have contributed to a widening of socio-economic gaps between immigrants and natives over time (Kalter & Granato, 2002; Gundel & Peters, 2008).

³³The results remain similar when using national rather than regional unemployment rates, or when controlling for region of origin dummies instead of refugee shares (as the two are highly correlated).

Table 3: Time-trends in immigrants' labor market gaps

	(1)	(2)	(3)	(4)
Panel A: Employment gaps at arrival (p.p.)				
Time trend (10 years)	-5.07*	-6.84**	-3.81*	-0.69
	(2.77)	(2.61)	(2.14)	(1.98)
Observations	20,613	20,594	20,594	20,594
Panel B: Employment gaps 10 year since arrival (p.p.)				
Time trend (10 years)	-3.27***	-3.97***	-2.17***	-0.94*
	(0.64)	(0.60)	(0.50)	(0.47)
Observations	21,296	21,151	21,151	21,151
Panel C: Income gaps at arrival (Euros)				
Time trend (10 years)	-104.44	-122.66**	-56.20	-11.44
	(97.82)	(55.49)	(59.73)	(64.15)
Observations	19,776	19,757	19,757	19,757
Panel D: Income gaps 10 year since arrival (Euros)				
Time trend (10 years)	-60.97	-84.74***	-15.56	3.05
	(37.03)	(22.98)	(32.22)	(36.57)
Observations	20,632	20,502	20,502	20,502
Education contr.	No	Yes	Yes	Yes
Refugee share	No	No	Yes	Yes
Regional unempl. rate	No	No	No	Yes

Standard errors clustered on the level of cohorts in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: The dependent variables are individual migrant-native employment gaps (including education) predicted according to equation 1. The variable that captures the linear time trend is year/10, thus coefficients capture a change over one decade. The educational control variables are measured as cohort means at arrival.

not only of the same age and observation year, but also of the same education.

Panel B shows that the employment gaps 10 years after arrival have also widened substantially (column 1, $\hat{\rho}/10 = -3.3$), although the time trend is less pronounced in absolute levels – as is expected, given that the employment gaps generally shrink with time after arrival. Its statistical significance however is much higher, suggesting a clear worsening of immigrant-native gaps over time. The high refugee share of recent arrival cohorts explain a small part of this pattern (column 3), while additionally controlling for the regional unemployment rate dampens the time trend further (column 4). Income gaps as reported in Panels C and D have also been widening over the past 50 years. When controlling for education (column 2), these time trends become more negative and statistically significant, both at arrival and after 10 years: Every decade, the immigrant-native gap in income 10 years after arrival has widened by about 120 Euros, amounting to 600 Euros over 50 years.

To summarize, the unconditional labor market gaps between immigrants and natives have increased considerable over time, supporting previous evidence by Fertig & Schurer (2007) and Sprengholz et al. (2021). Much of this negative time trend can be explained by changing cohort composition and economic conditions: accounting for these factors, the labor market prospects of immigrants have remained fairly stagnant (with employment gaps shrinking slightly but income gaps increasing). We do not find support for the claim that structural integration conditions have improved as a consequence of new policy approaches that acknowledge Germany’s role as an immigration country more explicitly. While the increased emphasis on integration and language training that accompanied this shift may have been beneficial, it has as yet not led to an overall improvement in the labor market situation of immigrants in Germany.

7 Case Studies

We conclude our study with two case studies. First, we provide a deeper analysis of what we consider the most striking observation in the integration profiles depicted in Figure 2: the sudden collapse of employment among Turkish immigrants and some other groups in the early 1990s, after two decades of high attachment to the German labor market. Second, we study and forecast the employment profiles of the most important recent immigrant arrivals: the large cohort of refugees that arrived to Germany around 2015 and a more recent refugee wave who fled the 2022 war in Ukraine.

7.1 The 1990s employment collapse

After a long spell of high employment, the employment rate of Turkish 1955-73 arrival cohorts collapsed by nearly *30 percentage points* in the early 1990s (relative to natives, and even more in absolute level).³⁴ The implication is that labor market integration is not a one-way street, and policy makers have to worry not only about the successful integration of new immigrant arrivals to the labor market, but also the potential for sudden evaporation of those gains in later years.

Our goal here is to identify potential explanations for this sudden collapse. In a first step, we analyze whether the drop in employment is due to *time effects* (e.g., caused by sudden political or economic events around the fall of the iron curtain) or *age effects* (e.g., reflecting a difference in retirement behavior of immigrants relative to natives). In Figure 5 we compare, separately

³⁴Bratsberg et al. (2010) find a similarly large decline in employment for migrant workers who arrived during the 1970s in Norway. While in the Norwegian context this decline in employment was spread over 15-20 years, the drop in employment was much more sudden in Germany. Our observations here are also consistent with evidence on high unemployment and welfare dependence among Turkish migrants in the 1990s in Germany (Uhlendorff & Zimmermann, 2014; Riphahn, 2004; Riphahn et al., 2013). In contrast to these previous studies with limited data for earlier years, we emphasize that these labor market disadvantages have not been around forever, but only evolved in the early 1990s and attribute this to changing economic conditions.

for Turkish cohorts who arrived between 1955-67, 1968-73 and 1974-78, the actual drop in employment with the drop that can be explained by the increasing age of those cohorts.³⁵ The trend in the age component (dashed line) is always negative, illustrating that the employment gaps between immigrants and natives do widen at older age. However, these age effects are minor, and nearly the entire drop is instead explained by time effects – for each cohort, the employment rate starts to drop around 1990, and continues to drop in the next years. A comparison across arrival cohorts in Sub-figures (a)-(c) suggests however that older workers were more suddenly and more strongly affected, a pattern that we confirm by splitting workers by birth year in Appendix Figure A7. Sub-figure (d) of Figure 5 shows that other immigrant groups were less affected, although the employment gaps are also widening for migrants from Southern Europe, Yugoslavia and other recruitment states.

The explanation for the collapsing employment shares must therefore be an event or structural change that occurred in the early 1990s. Indeed, the West-German labor market was subject to several important shocks at that time: First, a recession in 1993 and high levels of unemployment over the following years. More generally, the 1990s were characterized by increasing automation and structural adjustments, and a strong decline in (mainly low-skilled) manual work in manufacturing (Spitz-Oener, 2006). And finally, after the fall of the Iron curtain and German reunification in 1990, a large inflow of new immigrants³⁶ (see Figure 1), as well as increased trade exposure to Eastern European countries.

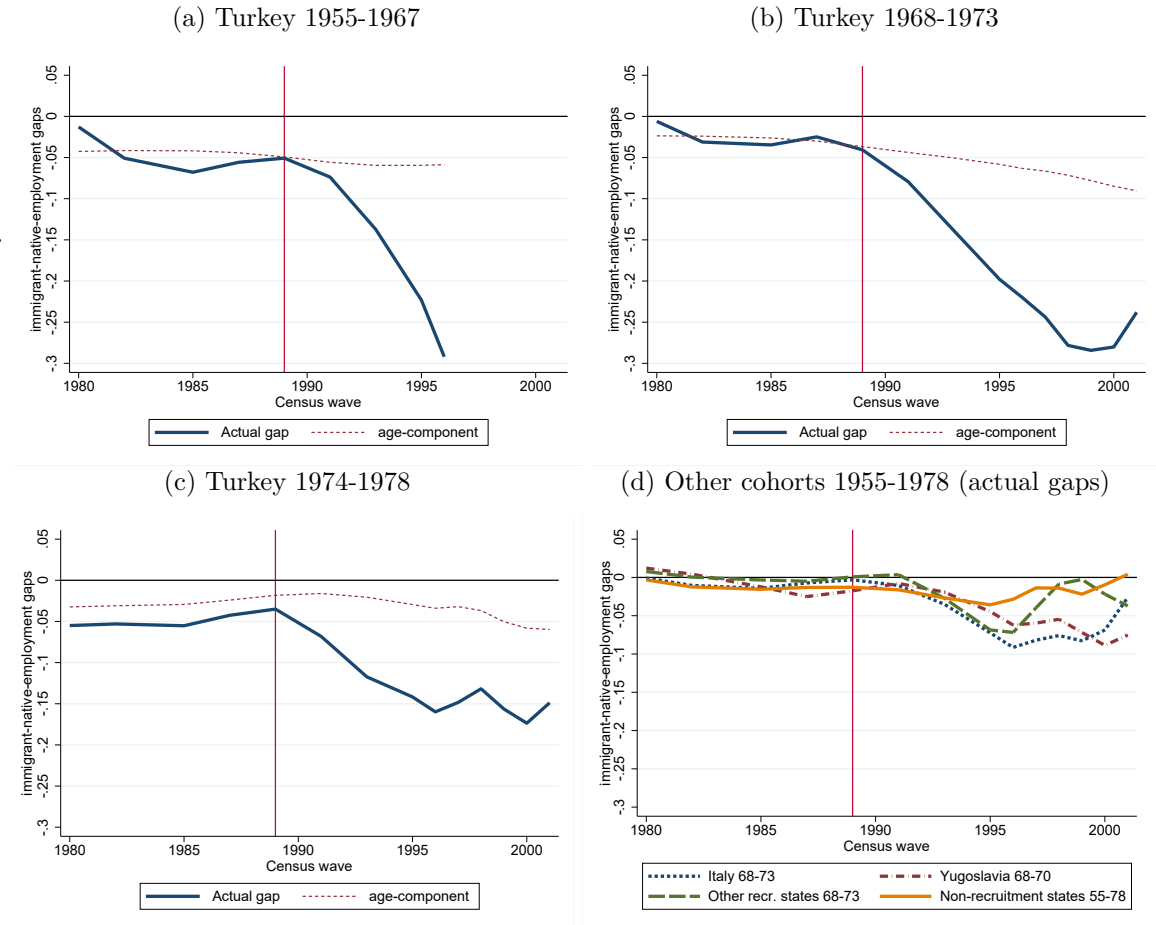
To probe these explanations, we assign to each individual the regional time-invariant unemployment shock during the 1993 recession (measured at the federal state level) and an aggregate proxy for structural change on the level of immigrant cohorts or birth years for natives. This type of Bartik-shifter predicts how much the employment of a population group would have changed based on their 1989 allocation across industries and industry-wide employment trends between 1989 and 1997 (See appendix G for details). We then use Oaxaca-Blinder decompositions to study whether the employment gaps between immigrants and natives as shown in Figure 5 are due to immigrants being clustered in regions and industries that were more heavily exposed to adverse shocks, or due to immigrants being generally more sensitive to adverse economic conditions (see Appendix H for methodological details).

Figure 6 shows the results, where the thick blue line represents the change in the employment gap explained by each shock (change in regional unemployment or industry-level employment), the dotted green line represents the component that is due to differences in exposure (i.e. whether immigrants were allocated into regions or sectors that were struck by more adverse shocks) and the orange dashed line the component that is due to differences in sensitivity (i.e. immigrants

³⁵These results are based on a regression of the individual immigrant-native gaps as defined in equation (1) on a full set of age and year dummies (see Appendix F for details).

³⁶East Germans, ethnic Germans from the former Eastern Bloc, and new foreign arrivals

Figure 5: The 1990s employment collapse

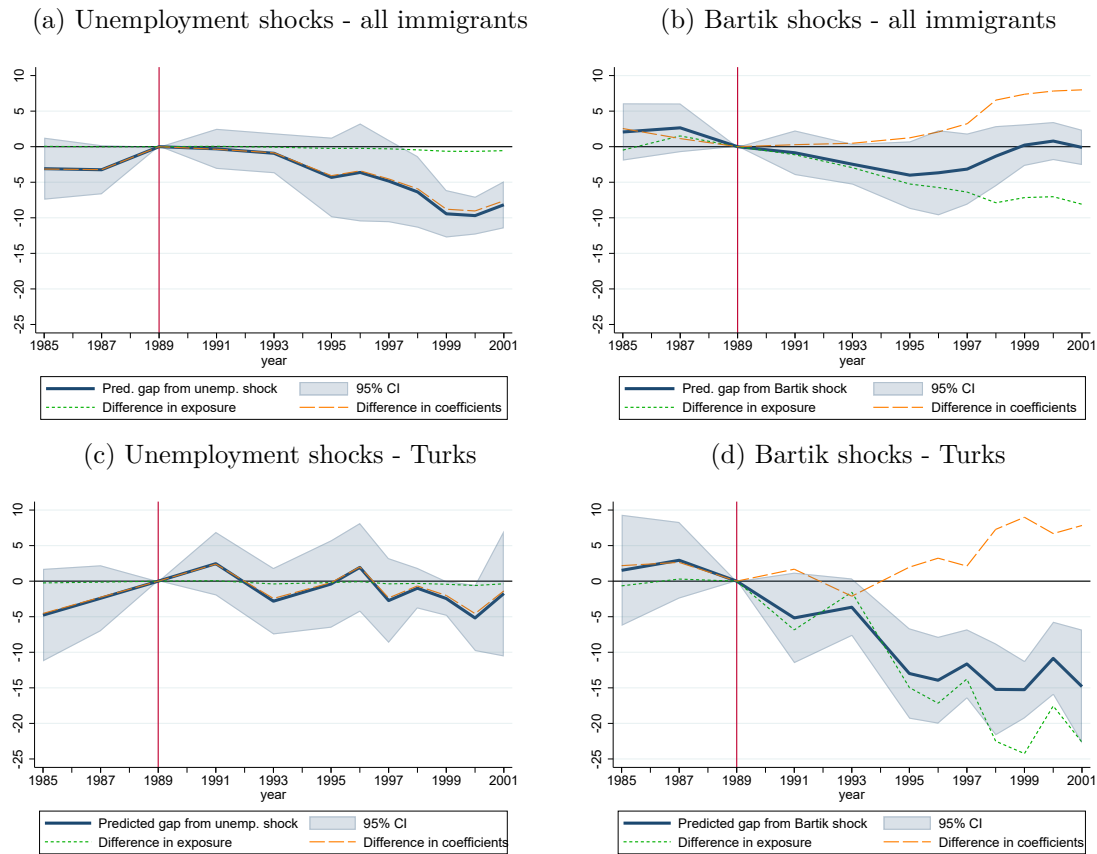


Notes: See Appendix F for details. Sub-figures (a)-(c) show the actual immigrant-native employment gap as defined in eq. (7) (solid lines) and the age-specific component as defined in eq. (8) (dotted lines). Sub-figure (d) shows actual gaps only.

being more strongly affected by a given shock than natives). Sub-figure 6a suggests that increasing unemployment rates indeed contributed to the widening of employment gaps between immigrants and natives – in particular after the 1993 recession. This is entirely driven by the higher sensitivity of immigrants to a given unemployment shock (difference in coefficients) and not by immigrants systematically sorting into regions with higher exposure. For sectoral decline, the pattern is the opposite (Sub-figure 6b), as different exposure (i.e. immigrants having sorted into declining sectors) entirely explains the negative employment trend in the early 1990.³⁷ This pattern is

³⁷The fact that the difference in coefficients (orange line, see Appendix H for details) is positive reflects that the employment gap would have widened even more if native’s employment rate would have responded as elastically to their positive sectoral shock as immigrant’s employment responded to their negative sectoral shock.

Figure 6: Determinants of the 1990s employment collapse



Notes: Results from Oaxaca-Blinder decompositions (See Appendix H for methodological details). The thick blue line plots the predicted immigrant-native gap that can be explained by regional 1997-1989 unemployment shocks (Sub-figures a and c) and cohort-level Bartik shifters (Sub-figures b and d).

particularly pronounced for Turkish cohorts (Sub-figure 6d): in 1997, 15 percentage points of the widening of the employment gap can be explained by their unfavorable allocation into declining industries.

The results in Figure 6 therefore confirm that worsening economic conditions amplified the immigrant-native gap in the early 1990s. Both regional variation in the severity of 1993 recession as well as the declining fortune of certain industries contributed to this pattern, in line with the insight that immigrants are more vulnerable to economic downturns as they are more likely to work in volatile sectors or precarious employment relations (Bratsberg et al., 2006; Dustmann et al., 2010). The primary explanation for the drastic employment collapse among Turkish cohorts was their unfavorable allocation across sectors. This observation is related to the findings by Kogan (2004) and Uhlenborff & Zimmermann (2014) that sectoral and other job

characteristics contributed to the dynamics of unemployment among the so-called “guest workers” and in particular among those from Turkey. Nevertheless, to the best of our knowledge this study is the first one to emphasize that low employment rates among Turkish immigrants are not a long-lasting phenomenon, but the result of an abrupt and very strong decline in the early 1990s. One reason why this observation has not been made before might be that it requires large consistent data sets over a longer time horizon.³⁸

7.2 Recent refugee migration

Motivated by the observation that integration profiles are quite predictable (Section 5), we study the likely implications for two large recent refugee cohorts: those that arrived around 2015 and those that fled Ukraine in 2022.³⁹ Despite wide-spread solidarity, the challenges related to the integration of such large refugee cohorts have been one of the leading policy issues and a source of major concern in large parts of the population. The policy response was intended to avoid mistakes made in the past, with a stronger emphasis on the early provision of language courses and other integration measures (such as integration courses or job counseling) in order to support the integration of refugees into the labor market. A highly relevant question is therefore whether the labor market integration of recent refugees is developing more favorably than the integration of similar cohorts in the past. A second, related question is whether their long-term integration trajectories can be predicted based on the experience from these earlier arrivals. To address these questions, we complement the microcensus with individual-level data from the IAB-BAMF-SOEP survey for the years 2016-2020, which is representative of refugees who arrived to Germany between 2013 and 2016 (see Section 3.2).

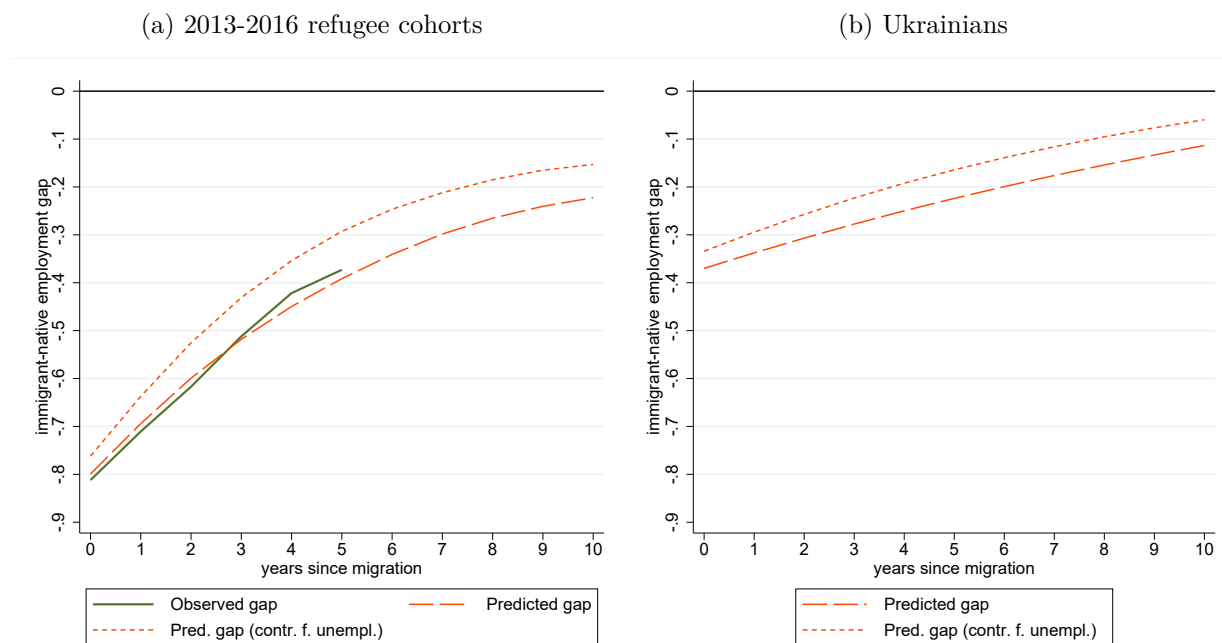
2015 refugee arrivals. Figure 7a compares the actually observed employment profile of refugees who arrived between 2013 and 2016 with the progress that we would expect based on the pattern observed for earlier migrant cohorts. Specifically, the solid line shows the *actual* employment gap of refugees observed in the IAB-BAMF-SOEP data relative to the corresponding Germans of the same age and observation year. The dashed orange line represents the *predicted* employment gap, based on the integration of earlier cohorts observed in the microcensus, accounting for the age composition and education of the 2013-16 refugee cohort (as described further in Appendix I). During the first years after arrival, the actual employment gap is slightly larger than the

³⁸The GSOEP data only start shortly before the collapse in 1985 and feature very small sample sizes - in particular when distinguishing between different origin groups.

³⁹As a consequence of armed conflicts in regions of the Middle East and Africa, the number of refugees in Germany increased by about 1.2 million between 2013 and 2018, reaching a sharp peak in late 2015. The most important origin countries were Syria, Afghanistan, Iraq, Iran, Eritrea, Pakistan, Nigeria and Somalia. Only a few years later, the Russian invasion of Ukraine led to another peak in refugee arrivals with around 670,000 registered refugees by June 2022 and probably more that had not yet been registered.

predicted gap, but after about three years, recent refugees catch up and are slightly more likely to be employed than earlier refugee cohorts with similar education and age. After 10 years, the employment gaps are predicted to be around 20 percentage points.

Figure 7: Employment gaps for recently arrived refugees



Notes: Figure (a): Green line: Actually observed immigrant-native employment gaps from IAB-BAMF-SOEP survey, estimated non-parametrically based on eqs. (2) and (1). Orange dashed and dotted lines: Predicted gaps estimated parametrically based on the Microcensus (including cohorts since 1974), accounting for age, education, refugee share (dashed line) and the regional unemployment rate in 2021 (dotted line). See Appendix I and eq. (15) for details. Characteristics for the new refugee cohorts are taken from the IAB-BAMF-SOEP survey (Figure a) and from Ukrainian immigrants in the most recent microcensus wave 2015 (Figure b).

Our findings on the first years after arrival are consistent with evidence by Brücker, Fendel, Guichard, Gundacker, Jaschke, Keita, Kosyakova & Vallizadeh (2020), who combine the IAB-BAMF-SOEP with an earlier sample from the GSOEP to show that after a slower start three years after arrival, recent refugees start to overtake earlier refugee cohorts who arrived in 1990-2013 in terms of employment rates. Brücker et al. (2020) mention two potential explanations for this pattern. On the one hand, it could reflect Germany’s stronger emphasis on language acquisition in Germany’s revamped integration policy, delaying labor market entry but improving employment prospects in the longer run. On the other hand, refugees might have benefited from labor market conditions that were more favorable than in earlier decades, with the unemployment rate at a historic low in 2018.⁴⁰

⁴⁰Several studies underpin the importance of local economic conditions and attitudes for the short- and medium

Probing the first hypothesis, we provide evidence that the initially larger employment gaps compared to previous cohorts are indeed due to the provision of integration and language courses. During the first years after arrival, refugees with favorable perspectives of staying who had immediate access to this kind of courses experience *lower* employment rates, but quicker employment growth than refugees with unfavorable prospects, overtaking them after three years (see Appendix Figure A9).⁴¹ From a policy perspective, this is probably good news as the large initial gaps appear to be related to participation in integration and language classes that are likely to pay off in the longer run.

To explore the second hypothesis of Brücker et al. (2020), we construct another prediction that additionally includes full interactions of years since migration with regional unemployment rates to account for changing economic conditions.⁴² The implied employment gaps (Figure 7a, dotted line) are now between 5-10 percentage points smaller than the actually observed gaps. We conclude that when taking into account that the macro-economic conditions were unusually favorable, the integration of the 2015 refugee cohort has in fact been slower than for earlier cohorts. One potential reason for this could be the sheer size of the refugee cohort, which could lead to increasing competition for jobs among immigrants (Albert, Glitz & Llull, 2021).

We may go one step further and predict their likely long-term employment trajectories. Appendix Figure A10 plots the results. For this purpose, we take the initial employment gap as given and add it as an additional predictor.⁴³ The underlying idea is to use the best information available at arrival for predicting integration in later years. The resulting forecast is very close to the actual integration trajectory that we can observe during the first five years since migration. For the following years, our forecast predicts the employment gap to narrow further, before widening again slightly to stabilize at around 25 percentage points (reflecting the tendency of immigrant-native gaps to widen at older age among earlier cohorts)

2022 Ukrainian arrivals. In comparison to refugees who arrived around the year 2015, our predictions for the employment profile of Ukrainian refugees are much more favorable (Figure 7b). Since representative microdata on Ukrainian refugees living in Germany are not yet available,

run integration of refugees (Aksoy, Poutvaara & Schikora, 2020; Jaschke, Sardoschau & Tabellini, 2021; Barreto, Berbée, Torres, Lange & Sommerfeld, 2022).

⁴¹In 2016 the Federal Office for Migration and Refugees (BAMF) classified asylum seekers from Syria, Iraq, Eritrea, Iran and Somalia as having "good perspectives of staying" because more than 50 percent of asylum claims from these countries were accepted. Only asylum seekers from these countries were eligible for language and integration classes and labor market support even before a decision on their asylum claim was made. Immigrants from all other countries usually had to wait until they had been granted asylum, before enrolling. These other countries without favorable perspectives of staying include Afghanistan and Pakistan as the most numerous origins.

⁴²Assuming that unemployment will remain constant after 2020.

⁴³In particular we force the initial gap to be the intercept of our predictions and we use only parameters measured in the first year after arrival, but account for actual regional unemployment rates, assuming that unemployment remains constant after 2020 (Appendix I for more details).

we impute their age composition and average educational outcomes from previous Ukrainian immigrants in the microcensus wave 2015.⁴⁴ To be consistent with the rest of our study, predictions are made for Ukrainian men even though the majority of recent arrivals are women. For this reason, these figures should be interpreted with a lot of caution and as a comparative benchmark to other groups rather than accurate predictions. Nevertheless, they illustrate the comparatively high labor market potential of Ukrainian arrivals.

The predicted initial employment gap of Ukrainians is less than half the size of the 2015 cohort, reflecting their substantially higher education levels (42.5 percent of Ukrainians vs. 18.6 percent with tertiary education and 95.0 vs. 56.6 percent with secondary education, respectively).⁴⁵ This applies to both the initial gaps in employment (predicted to be 37 percentage points) as well as the longer-term gaps (predicted to be around 10 percent one decade after arrival). Taking into account that Ukrainians are immediately granted refugee status and labor market access without lengthy application processes (which should aid integration, Fasani et al., 2021a), these results are likely to represent a lower bound.⁴⁶

8 Conclusions

With Germany now the world’s second most important migrant destination after the US, the integration of more than 13 million foreign-born has become a leading policy issue. The aim of our study was to provide insight into how well immigrants integrated into the German labor market over the past 50 years, drawing on a comparatively broad and representative data source.

While there is much heterogeneity between different groups, the integration profiles follow a few key patterns. First, immigrants’ employment profiles tend to be concave, with low initial employment rates upon arrival but rapidly increasing employment over time (convergence). In contrast, income gaps *widen* with more time in Germany (divergence). Second, most immigrant groups have substantially lower employment rates and income than natives of comparable age. Third, those gaps do not close within the first generation (i.e., no full convergence), but close for some groups in the second generation. Fourth, the integration process takes much longer for refugees than for other groups. Fifth, after the initial convergence the employment profiles worsened for many cohorts, in some cases dramatically so.

⁴⁴The implied composition in terms of secondary schooling, university attendance and age composition (in the age group 18-58) are very similar to pre-war Ukrainian census data. Ukrainian women have a similar educational level as Ukrainian men.

⁴⁵Specifically, 42.5 percent of all Ukrainian immigrants in the last wave of the microcensus aged 18-58 have a tertiary education. This share is similar to the reported tertiary share in Ukraine itself, which amounts to 31 percent for Ukrainians older than age 10 (see the CReAM database on Ukrainian immigration).

⁴⁶While previous refugees were still subject to important restrictions when it comes to labor market access (see Appendix A), Ukrainians were granted immediate labor market access under the EU’s Temporary Protection Directive that was invoked in March 2022.

We then examined the differences in integration outcomes across groups and time. Differences between groups are quite predictable, as most of the variability can be explained by a limited set of cohort characteristics that are readily available to policymakers (such as average education, the share of refugees in a cohort or the economic conditions at arrival). These characteristics also explain why the raw labor market gaps between immigrants and natives have increased over time: accounting for the higher share of refugees among recent arrivals, and changing economic conditions, the labor market prospects of immigrants have remained stagnant. These findings are not incompatible with the claim that structural integration conditions have improved as a consequence of new policy approaches that acknowledge Germany's role as an immigration country more explicitly. But while an increased emphasis on integration and language training may prove to be beneficial in the long term, it has as yet not led to a significant net improvement in the labor market situation of immigrants in Germany.

One striking observation in our analysis is the sudden collapse of employment among immigrants from Turkey and some other groups in the early 1990s. After two decades of high attachment to the German labor market, the employment rate of Turkish "guest worker" cohorts collapsed by nearly *30 percentage points* (relative to natives, and more in absolute level). This observation implies that policy makers have to worry not only about the successful integration of new immigrant arrivals to the labor market, but also a sudden and drastic evaporation of those gains when labor markets are hit by major economic downturns or shocks.

In the final parts of our study we focused on the likely integration path of *recent* arrival cohorts. The 2015 European refugee crisis and the 2022 Russian invasion of Ukraine led to the arrival of million of refugees in Germany, and the challenges related to their integration has been the dominant policy issue in Germany for many years. We find that the 2015er cohorts had larger initial gaps but then caught up more rapidly than earlier cohorts. While the latter finding may reflect Germany's revamped integration policy (delaying labor market entry but improving long-term employment prospects), it also reflects unusually favorable labor market conditions: accounting for the record low level of unemployment, the 2015er cohort integrated slightly *less* rapidly than earlier arrivals. Their predicted long-term gaps in employment (about 20-25 percentage points) are more than twice as large as the corresponding gap for Ukrainian refugees (about 10 percentage points), who have comparatively high educational attainment.

Compared to the US, [...]

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Appendix

A Institutional details of immigration and integration since 1955

Recruitment of so-called “guest workers”: Since the original intention was that the workers that were recruited between 1955 and 1973 would soon return to their home countries again, they obtained only temporary (usually one-year) residence and working permits. Since these permits were linked to their jobs and they were assigned to firms by the employment agency, their freedom of settlement was very limited (Danzer & Yaman, 2016). However, migrants could be joined by their family. Upon pressure from firms that had an interest in reducing the rotation of workers, temporary residence permits could be renewed since 1965 and since 1971 5-year residence permits could be issued for foreigners that were living in Germany for 5 years.

Consolidation period: On one side, family migration was facilitated by more and more countries joining the European Community⁴⁷, granting freedom of settlement and free labor market access to their citizens. On the other, economic and political instability in Turkey and eligibility of foreigners to family benefits (“Kindergeld”) reduced incentives to return home (Velling, 1993). During the 1980s, a series of policies was pursued that was meant to (1) restrict new immigration, (2) to reduce the movement of foreigners into metropolitan areas where already large migrant communities existed, and (3) to actively support return migration by offering financial incentives and counseling.

Refugee migration in the 1980s and 1990s: Although most of the immigrants that claimed asylum during this period fled from civil wars, the German constitution only grants protection from individual political persecution. Although many asylum requests were rejected for these reasons, many refugees were allowed in Germany because the Geneva Convention prohibited sending people back to conflict regions. At the time, applying for asylum was de facto the only legal way of obtaining residence for non-EU citizens beyond family reunification and the naturalization of ethnic Germans. During the 1980s, policies were introduced, limiting the options for appealing against asylum decisions, limiting the freedom of settlement and movement, introducing visa bans for origin countries and making the asylum procedures stricter. While accepted refugees generally had labor market access, a one-year long employment ban for asylum applicants was increased to two years in 1982 and to five years in 1986. In 1991, these employment bans were abolished again. In the early 1990s, unprecedented violent attacks against refugee accommodations took place at several locations and in 1992/1993 the parliament adopted the so-called “asylum compromise” including institutional amendments and strictly reducing the access to the asylum system for persons that entered German territory from countries defined as safe, including all neighbor states. Between 1997 and 2000, a general employment ban for asylum applicants was put into practice again, before it was replaced by a priority review (“Vorrangprüfung”), meaning that asylum seekers would only get permissions to work in jobs where no other suitable candidate could be found.

Eastern European immigration since the Fall of the iron curtain: *[To be extended by Jan]*
Immigration in the 2000s:

- 2000: Green card initiative

⁴⁷Most notably the “guest worker countries” Italy, Greece, Spain and Portugal.)

- EU enlargement and delayed
- 2005 immigration law, including language and integration courses
- increasing numbers of foreign students that are allowed to stay and look for a job
- Integration law 2016

Recent refugee migration: Until being accepted as a refugee, which could take more than a year during the 2015/2016 peak, asylum seekers faced significant labor market barriers (like a priority check and the requirement to obtain an individual working permit). A strict employment ban only applied for the first three months however. Asylum applications from countries defined as safe were massively complicated, which in particular affected refugees from many African states and the West-Balkans. In order to create alternative migration options than applying for asylum, labor market access was eased for citizens of West-Balkan states was eased in 2016. In contrast, Ukrainians who fled the war in their home country in 2022, were granted asylum and full labor market access immediately without an asylum procedure.

B Immigrant definitions and naturalizations

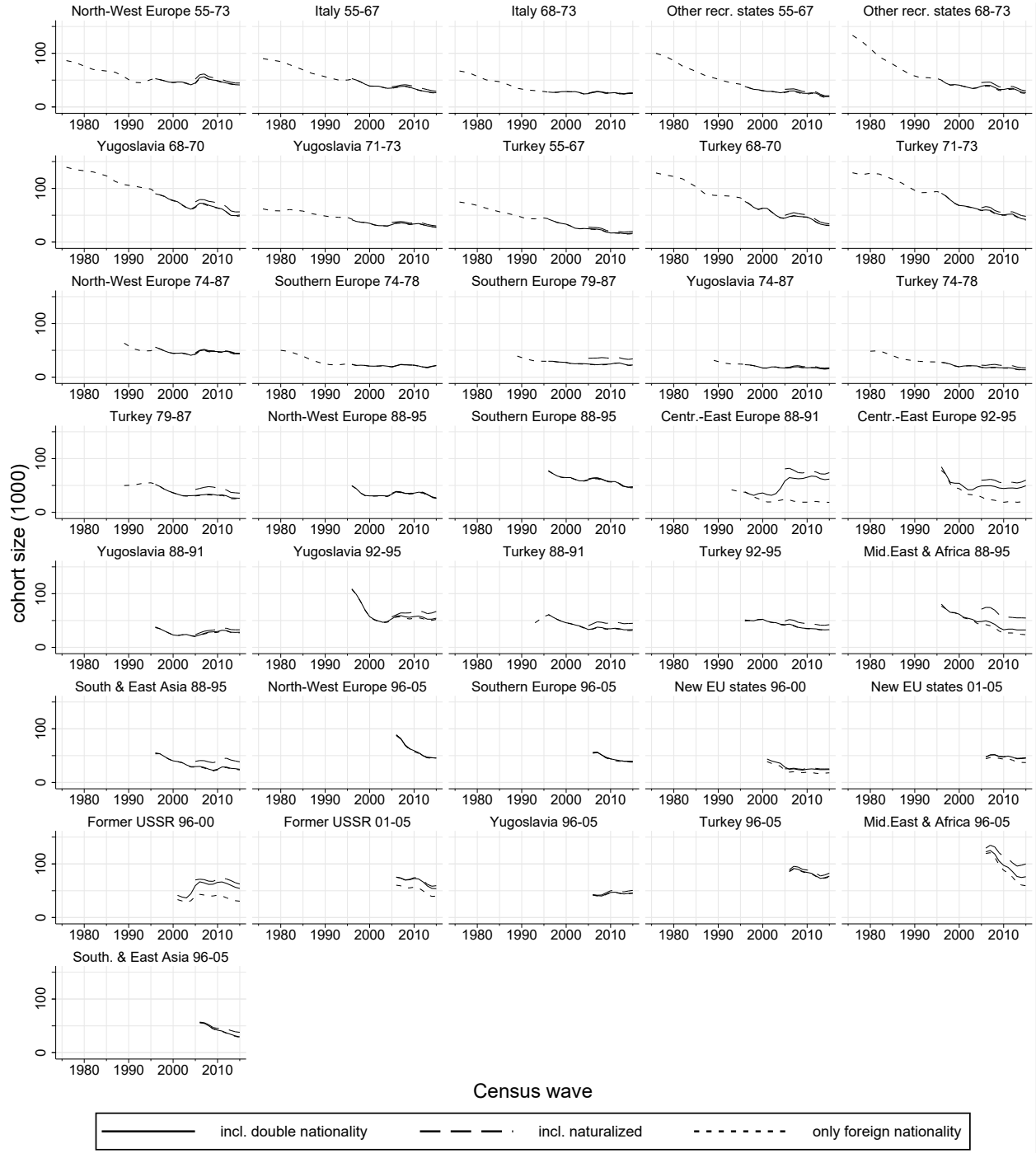
Immigrant status can only be identified based on nationality in the microcensus, while there is no information included on country of birth. Until 1995, the questionnaire includes only one item on whether respondents possess German citizenship or not and one additional item on the nationality for foreigners. Since 1996, all respondents, including those with German nationality, are asked whether they possess a second nationality. Since 2005, additional information is included on whether and when a respondent has obtained the German nationality by naturalization, and on previous nationalities.

These expanding questionnaires reflect the changing citizenship law in Germany: Until the 1990s, only persons of ethnic German ancestry had the right to obtain German citizenship (with some exceptions for immigrants that lived in Germany for longer than 15 years and second-generation immigrants that were born in Germany). Against this background we are confident that nationality captures true immigrant status very well, at least until the mid 1990s and with the important exception of Ethnic Germans that came mainly from Central and Eastern Europe.

Figure A1 presents the size of the different cohorts (interpolated to match population numbers) based on different migrant definitions over the census waves from 1976 till 2015. We only show numbers for males that have migrated to Germany at age 18 or older. The dotted lines represent the number of immigrants that only possess a foreign nationality and not the German. The solid line additionally includes immigrants with a double nationality since 1996. At that point in time, none of the cohorts included any substantial number of dual nationals, which is to be expected because former law required foreigners to abandon other nationalities when obtaining German citizenship and that was only loosened by the new citizenship law in the year 2000. After that time, dual citizenship became relatively wide-spread in particular among immigrants from Central-Eastern Europe and the Middle East and Africa. Before 1996, the sample for our analysis consists of only of foreign nationals without German nationality and since 1996 of all foreign nationals, including those with double citizenship. The dashed line additionally includes

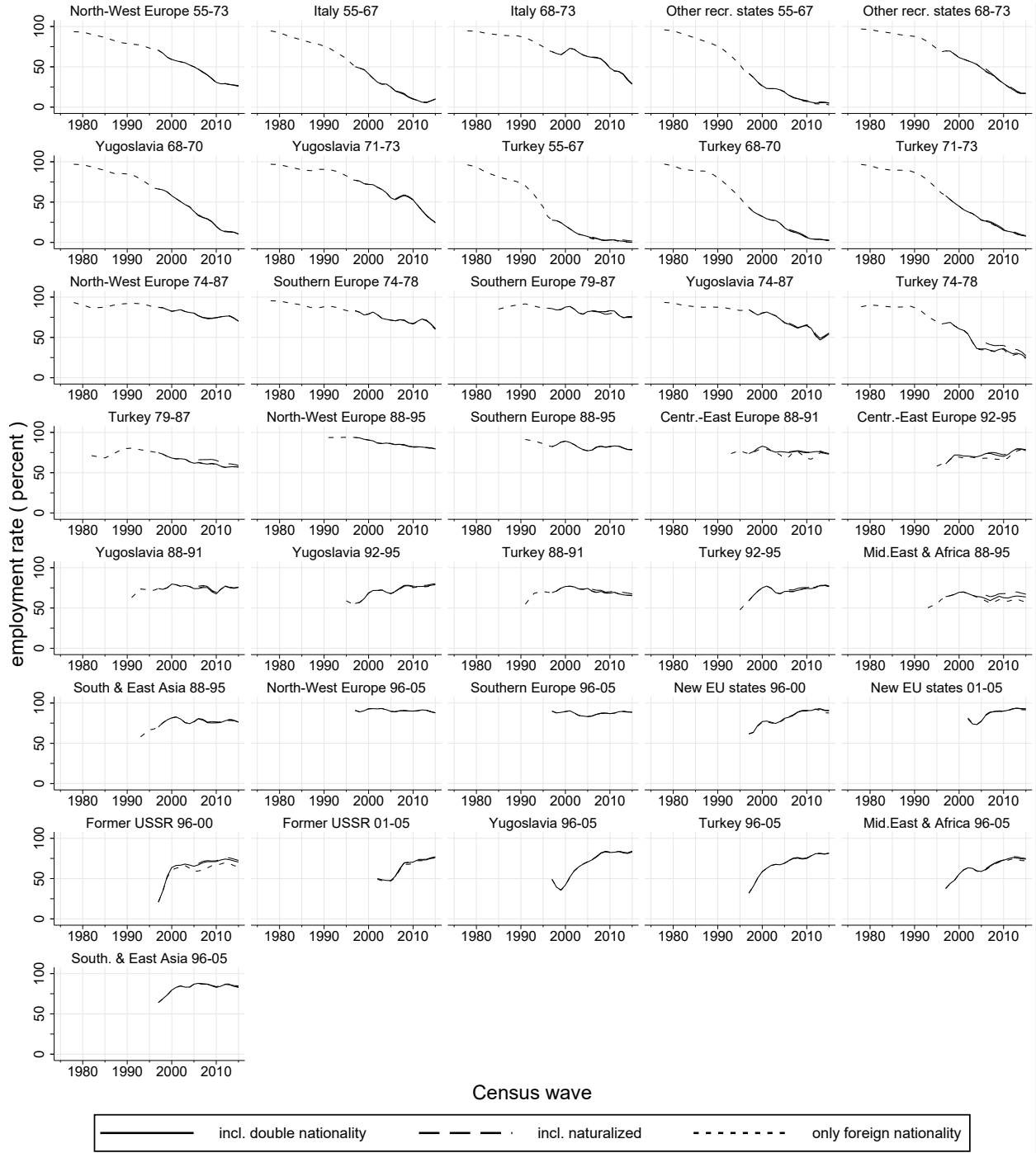
naturalized immigrants without foreign nationality nationality (available since 2005). Importantly, here we exclude ethnic Germans and other immigrants that obtained the German nationality during their first year after arrival. In particular among immigrants from non-EU countries, a non-negligible fraction eventually gets naturalized. In Figures A2 and A3 we similarly plot employment shares and mean personal real incomes of these cohorts, using the different immigrant definitions. Only for three cohorts we observe important deviations between those including double nationality and those including naturalized (Turkey 1974-1987 and Middle East and Africa 1988-1995). For that reason we are confident that our results on employment and income gaps between immigrants and natives is not strongly biased because of selective naturalization.

Figure A1: Different immigrant definitions: Number of observations



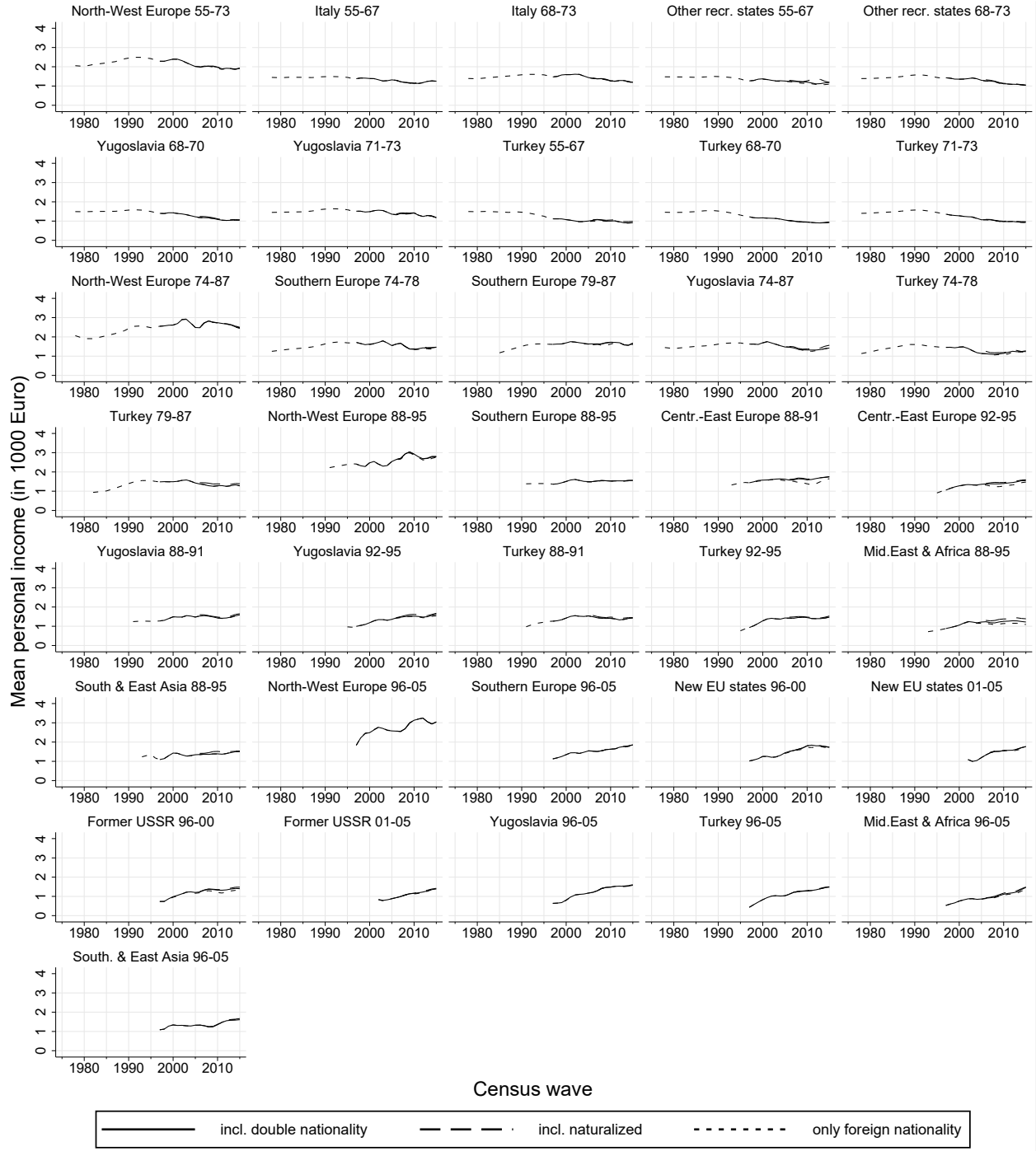
Notes:

Figure A2: Different immigrant definitions: Employment rates



Notes:

Figure A3: Different immigrant definitions: Mean personal income



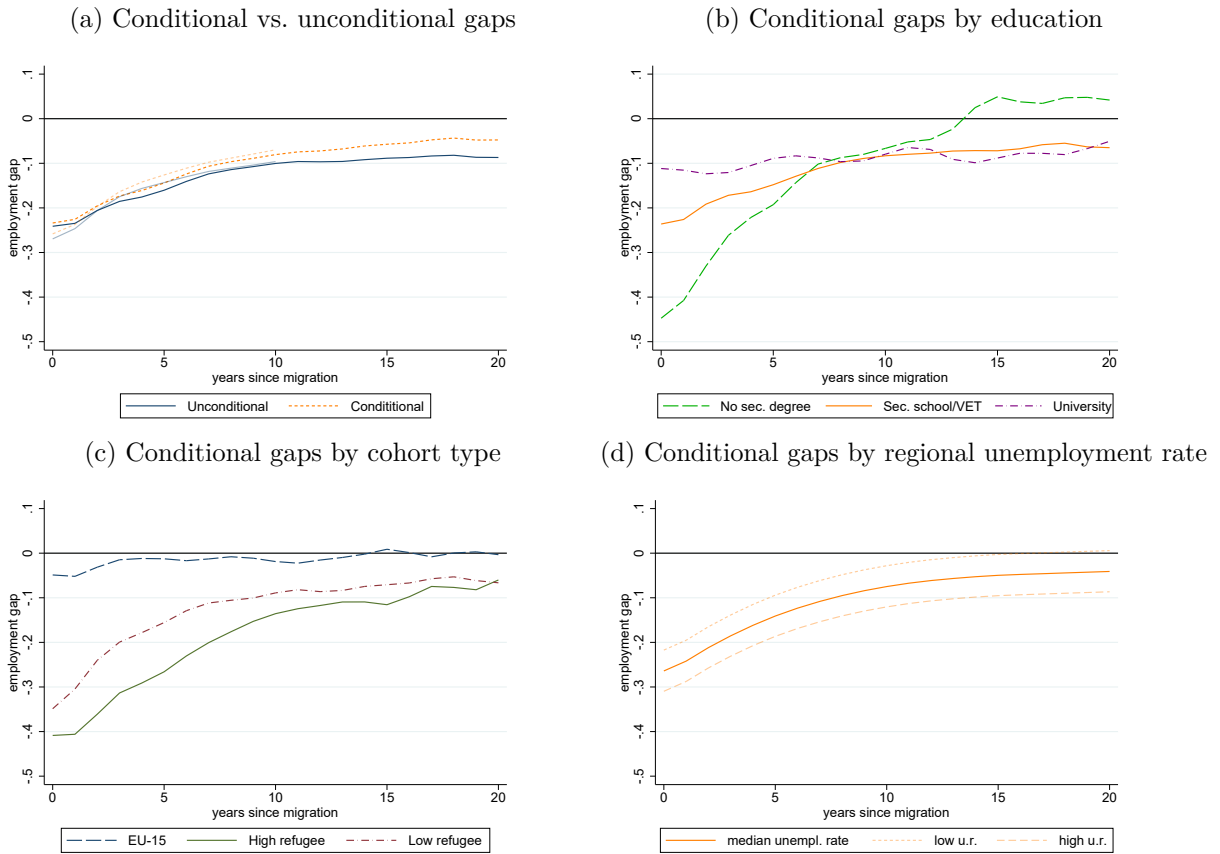
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C Conditional comparisons

C.1 Employment

In section 4.1, we focused on an unconditional comparison of migrants to similarly aged natives, without attempting to match their education or other characteristics, as our aim is to quantify the overall economic integration of migrants compared to natives. Still, conditional comparisons could be indicative about the mechanisms that contribute to the immigrant-native gap in employment.

Figure A4: Conditional employment gaps



Notes: **Sub-figure (a):** Blue line: Unconditional immigrant-native gaps estimated non-parametrically according to eq. (1). Orange dotted line additionally control for education group x year dummies. Dark lines include arrival cohorts 1974-95 (observable over 20 years since arrival), light lines include cohorts 1974-2005 (observable over 10 years). **Sub-figures (b) and (c):** Conditional gaps (non-parametric estimates) by different immigrant groups **Sub-figure (d):** Conditional gaps, based on variants of eq. (3) and (4) including interactions between the regional unemployment rate (federal states) and dummies for immigrants and natives. Predicted gap at the median regional unemployment rate (7.9 percent, solid line), bottom decile (4.4 percent, dashed line) and top decile (11.8 percent, dotted lines).

Figure A4 shows four types of conditional comparisons. Sub-figure (a) compares the unconditional

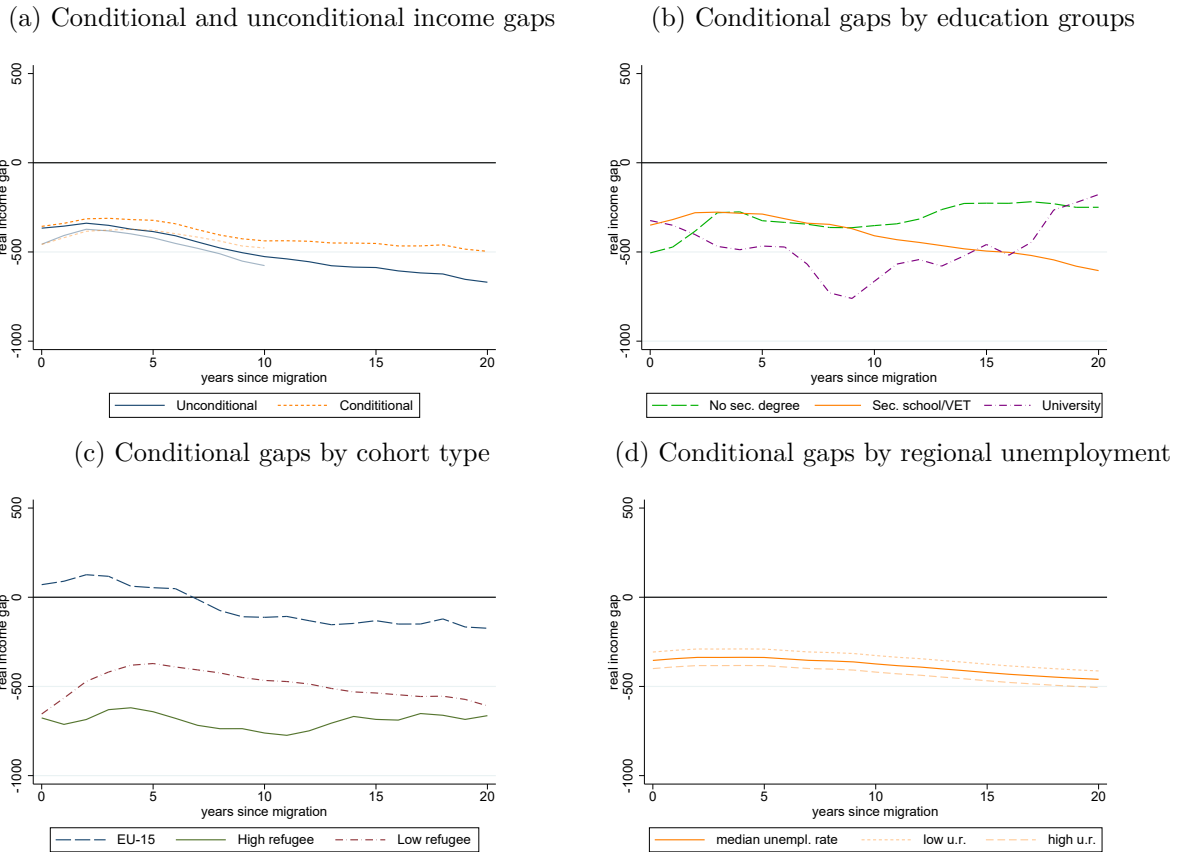
immigrant-native gap as defined in equation (1) with a conditional gap that controls for education (interacted with observation year). The dark lines correspond to arrival cohorts 1974-95, which we can track over at least 20 years. The light lines include our full set of arrival cohorts 1974-2005, whom we can track over 10 years.⁴⁸ As expected, the lower education level of migrants as compared to natives explains part of the employment gap. Interestingly, education explains very little of the employment gaps in the first 10 years after arrival, but an increasingly larger share in later years. Indeed, 20 years after arrival, nearly half of the remaining employment gap can be explained by the lower educational attainment of immigrants.

This pattern is illustrated further in sub-figure (b) of Figure A4, which plots the employment gap separately for immigrants without any secondary school or vocational degree (13.2 percent of immigrants vs. 3.2 percent of the native control group), with secondary school or vocational training (68.5 vs. 77.4 percent), and with a university degree (18.3 vs. 19.4 percent). Each group is compared to corresponding natives with the same education, age and observation year. We find that the lower the education of immigrants, the larger the initial employment gaps and the stronger the catch-up over time. After about 10 years, the employment gaps do not differ much for those with a university education or a vocational degree, while immigrants without an educational degree overtake their native counterparts (perhaps reflecting that the latter are a particularly small and selective group).

Sub-figure (c) compares the employment profiles of three types of immigrants: Predominantly from EU-15 countries⁴⁹, from non-EU-15 countries with a low refugee share, and from non-EU-15 immigrants with a high share of refugees. Consistent with Figure 2, we observe that EU-15 arrivals have small initial gaps and catch up quickly (within 3-4 years) to their similarly-aged native counterparts. In contrast, the employment gaps remain substantial for non-EU migrants, even conditional on education. Interestingly, the gap between non-EU cohorts with low vs. high share of refugees shrinks throughout, and becomes negligible after two decades. This finding is in line with Fasani et al. (2021b); Marbach, Moritz; Hainmueller, Jens; Hangartner, Dominik (2018) who find that the integration process tends to be much more long-lasting for refugees than for non-refugees.

Finally, sub-figure (d) of Figure A4 illustrates that the size of the employment gap between immigrants and natives varies with economic conditions. Following the literature (Barth et al., 2004), we include the current regional unemployment rate and educational attainment interacted with time dummies into a parametric estimation based on equation (5). The predicted employment gap is plotted at the median regional unemployment rate (7.9 percent, solid line), at the 10th percentile (4.4 percent, dotted line) and the 90th percentile (11.8 percent, dashed line). Regional unemployment conditions have a strong association with integration trajectories: 10 years after migration, the immigrant-native gap in regions at the 10th percentile of unemployment has closed (conditional on education) but remains close to 10 percentage points in regions at the 90th percentile.

Figure A5: Conditional gaps in real personal income



Notes: **Sub-figure (a):** Blue line: Unconditional immigrant-native gaps estimated non-parametrically according to eq. (1). Orange dotted line additionally control for education group x year dummies. Dark lines include arrival cohorts 1974-95 (observable over 20 years since arrival), light lines include cohorts 1974-2005 (observable over 10 years). **Sub-figures (b) and (c):** Conditional gaps (non-parametric estimates) by different immigrant groups **Sub-figure (d):** Conditional gaps, based on variants of eq. (3) and (4) including interactions between the regional unemployment rate (federal states) and an dummies for immigrants and natives. Predicted gap at the median regional unemployment rate (7.9 percent, solid line), bottom decile (4.4 percent, dashed line) and top decile (11.8 percent, dotted lines).

C.2 Income

To illustrate the observation made in section 4.2 that the unconditional immigrant-native income gaps start to widen after about 10 years after migration, Figure A5 reports four different conditional comparisons. Sub-figure (a) compares the unconditional income gap between immigrants and similarly-aged natives with the corresponding gap conditional on education. The pattern are similar for earlier cohorts (1974-95,

⁴⁸Here, we exclude cohorts that arrived before 1974, because we can only observe them only starting in 1976 and have no data for the first years since arrival.

⁴⁹including cohorts from North-West and Southern Europe, including Italy and “other recruitment states”

dark lines) that can be tracked over 20 years and our full set of cohorts (1974-2005, light lines). Education cannot explain the initial immigrant-native gaps, but explains some of the widening of those gaps over time. Still, the income gaps also tend to widen conditional on education. As illustrated in sub-figure (b) of Figure A5, this pattern is driven by the large share (68.5 percent) of immigrants with secondary school or vocational training. The absolute gaps are instead highest for university-educated immigrants, after *widening substantially* over the first decade after arrival (from 600 Euro to about 900 Euro per month), before closing partially in later career stages. This observation is in line with the "downgrading" literature (Eckstein & Weiss, 2004), which suggests that high-skilled immigrants are strongly affected by the depreciation of country-specific human capital.

Sub-figure (c) of Figure A5 illustrates that the income gaps are largest for non-EU migrants. As for employment, we observe that the integration process takes longer for cohorts with a high share of refugees, but the income gaps are in fact similar for low- and high-refugee cohorts in the long run. Finally, Sub-figure (d) demonstrates that income gaps vary surprisingly little with local economic conditions. Based in variants of equations (3) and (4) that include the regional unemployment rate (interacted with an immigrant indicator and years since migration), we plot the predicted income gap at the median regional unemployment rate (7.9 percent, solid line) and the 10th and 90th percentiles (4.4 and 11.8 percent, dotted and dashed lines). We therefore find that economic conditions have a large effect on the immigrant-native gaps in employment (Figure A4(d)), but their effect on the corresponding gaps in income is smaller (the difference in the monthly income gap between the 10th and 90th percentile is 100€).⁵⁰

D Other outcomes: Integration profiles for Welfare dependency and intermarriage

Figure A6 shows that welfare dependency, defined as any kind of public transfers being the main source of income⁵¹, is higher among immigrants than natives, for all cohorts except arrivals from North-West Europe. Upon arrival, the gap is particularly large for refugee cohorts, in line with the observation that refugees are eligible for special asylum-related benefits while facing restrictions in labor market access (see Appendix A for details). Welfare dependency upon arrival is low for some Turkish cohorts. Turks often rely on support from relatives during the first year ("assistance by friends and family" in the Microcensus), which is less feasible for other origin groups with a smaller diaspora in Germany. Welfare dependency tends to decline quickly in the first years after arrival, mirroring the profiles for employment (Figure 2). However, some groups, in particular the Turkish cohorts, develop higher welfare dependency in the second and third decade after arrival (as previously noted by Riphahn, 2004; Riphahn et al., 2013). While dependency also increases among their native counterparts (due to the correlation of years since migration with age), the increase is much more pronounced among immigrant cohorts – resulting in divergence, rather than convergence. We thus find non-monotonic integration profiles: after large improvements in the

⁵⁰One likely explanation is that the marginal immigrants who lose their jobs during economic downturns are negatively selected, in the sense of their earnings being only moderately higher than the benefits that they receive in unemployment.

⁵¹These include unemployment benefits, social assistance, but also other programs like asylum seeker benefits, parental benefits or student aid (BAFoeG). Pensions from the pension insurance are *not* considered.

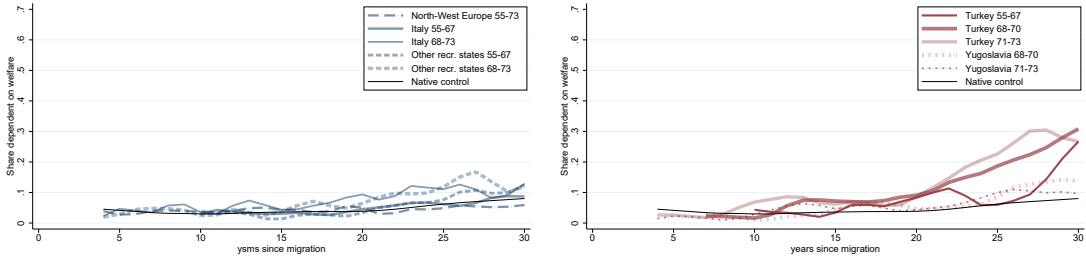
Table A1: Inter- and Intramarriage rates of immigrant cohorts

	at arrival		10 years after arrival	
	intermarriage	intramarriage	intermarriage	intramarriage
1. Recruitment period (1955-1973)				
North-West Europe 55-73			38.0%	30.6%
Italy 55-67			15.8%	67.9%
Italy 68-73			13.7%	63.8%
Turkey 55-67			1.4%	91.6%
Turkey 68-70			0.8%	89.8%
Turkey 71-73			0.9%	90.7%
Yugoslavia 68-70			4.7%	82.0%
Yugoslavia 71-73			3.5%	79.0%
Other recr. states 55-67			4.1%	73.8%
Other recr. states 68-73			2.3%	57.4%
2. Consolidation period (1974-1987)				
North-West Europe 74-87	13.8%	35.3%	40.9%	22.7%
Southern Europe 74-78	3.2%	47.1%	21.5%	55.4%
Southern Europe 79-87	6.6%	39.7%	14.9%	54.1%
Yugoslavia 74-87	8.7%	51.0%	14.0%	65.4%
Turkey 74-78	3.9%	65.6%	5.5%	83.2%
Turkey 79-87	4.3%	45.5%	8.8%	77.3%
3. Fall of the Iron Curtain (1988-1995)				
North-West Europe 88-95	9.3%	21.5%	28.3%	16.9%
Southern Europe 88-95	1.5%	46.5%	9.4%	59.6%
Centr.-East Europe 88-91	11.8%	55.7%	21.4%	58.8%
Centr.-East Europe 92-95	12.7%	54.7%	18.7%	58.4%
Yugoslavia 88-91	11.9%	58.1%	19.6%	59.2%
Yugoslavia 92-95	2.6%	60.1%	17.5%	59.6%
Turkey 88-91	6.9%	72.5%	12.1%	72.3%
Turkey 92-95	13.3%	67.5%	22.9%	63.6%
Mid.East & Africa 88-95	12.3%	20.3%	23.9%	32.9%
Centr. & East Asia 88-95	4.2%	34.9%	11.9%	60.4%
4. Period of East-West integration 1996-2005				
North-West Europe 96-05	5.8%	20.6%	27.5%	21.2%
Southern Europe 96-05	2.9%	24.2%	7.6%	40.2%
New EU states 96-00	14.7%	29.2%	18.2%	48.7%
New EU states 01-05	11.3%	33.0%	11.4%	48.4%
Former USSR 96-00	20.0%	57.0%	20.4%	58.5%
Former USSR 01-05	23.7%	50.8%	27.2%	52.1%
Yugoslavia 96-05	15.0%	37.0%	21.6%	54.2%
Turkey 96-05	39.6%	41.7%	42.0%	41.6%
Mid.East & Africa 96-05	22.4%	15.2%	20.6%	32.1%
Centr. & East Asia 96-05	5.0%	26.9%	15.5%	46.6%

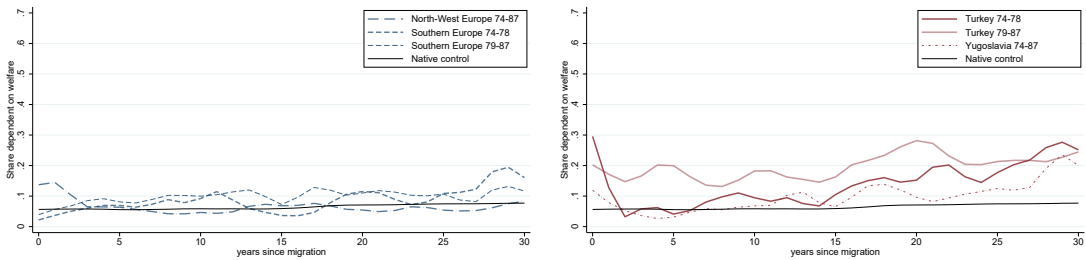
Notes: Percentages are taken from the entire sample, regardless of marital status. This implies that non-married persons are included in the percentages and treated as "zeros". Intramarriage refers to be married to a spouse of the same nationality group (the same groups our cohorts are based on); intermarriage refers to being married to a spouse that only holds the German nationality.

Figure A6: Mean welfare dependency of cohorts

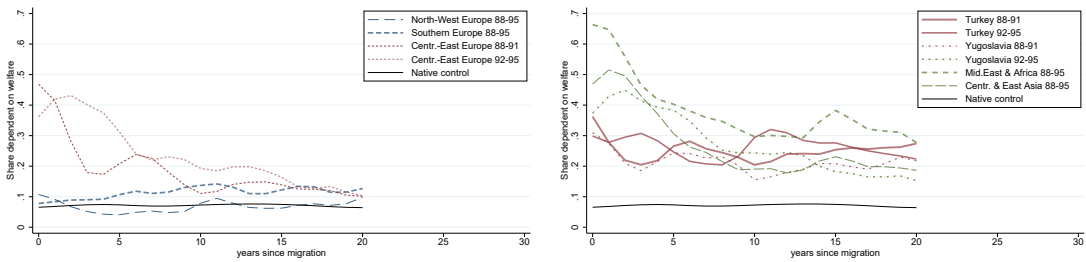
(a) Arrival period: 1955-1973



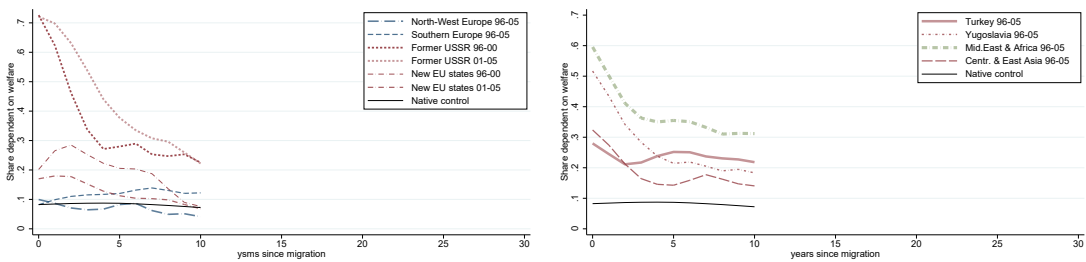
(b) Arrival period: 1974-1987



(c) Arrival period: 1988-1995



(d) Arrival period: 1996-2005



Notes: Mean share of persons whose main source of income is public transfers. This includes unemployment benefits and social assistance, but also other programs like asylum seeker benefits, parental benefits, student aid (BAFoEG). Pensions are *not* considered. The counterfactual native employment rates are for natives of the same age observed in the same year as the immigrant sample (estimated according to equation 2).

early years after arrival, the immigrant-native gap stagnates and then widens again for some groups – both in employment (Figure 2) and welfare dependency (Figure A6).

Table A1 shows intermarriage and intramarriage rates by arrival cohorts, upon arrival and ten years after arrival.⁵² While our focus is on labor market outcomes, assortative patterns can be an indicator for social integration or segmentation, which may interact with economic integration (Meng & Gregory, 2005). The observed patterns reflect cultural and religious distances to the native German population (as well as a decline in the overall importance of marriage over time). North-West-European immigrants are most likely to be married to a German spouse, in particular when accounting for their low baseline probability of being married. They are the only group that is continuously more likely to be married to a German spouse rather than to a spouse of the same nationality group. Reasons might include small cultural differences and relatively low incentives to move for economic reasons. In contrast, the vast majority of immigrants that arrived previous to 1987 from the traditional guest worker countries and in particular from Turkey, married within their communities: Ten years after arrival, about 90 percent of all Turks that arrived between 1955 and 1973 and about 80 per cent of 1974-1987 arrivals were married to a Turkish spouse, but only about 1 respectively 7 percent to a German spouse.

E Individual vs. cohort-level predictors

Are *individual characteristics* or *group-level characteristics*, i.e. the average characteristics of the “cohort” defined by arrival period and region of origin (Section 3.3), more predictive of labor market success? If the aim is to predict individual outcomes, the answer may appear obvious – a person’s own education should be more predictive for that person’s success than the average attainment of the group he happens to belong to. Interestingly, that is not generally the case, and cohort-level characteristics tend to be important predictors even conditional on the persons’ own characteristics.

To illustrate this point, we regress the individual labor market gaps \hat{y}_i^{gap} at around 10 years after arrival as defined in equation (1) on

$$\hat{y}_i^{gap} = \alpha + \beta X_i^{individual} + \gamma X_{c(i)}^{cohort} + \varepsilon_i$$

where $X_i^{individual}$ a vector of individual level controls and $X_{c(i)}^{cohort}$ cohort-level controls at the time of arrival (the results are similar if $X_{c(i)}^{cohort}$ are measured at the time of observation). We standardize all regressors such that the coefficients represent the effect of a one-standard deviation increase in the respective variable.

The results are shown in Panel A of Table A2 for employment and Panel B for income. Apart from the (adjusted) R-square on the individual level, we also report the corresponding R-square on the cohort level, defined as the share of variation between cohorts that can be explained by the covariates. The coefficients on education (column 1) have the expected sign⁵³ and are highly significant, explaining about 60 percent

⁵²Intramarriage refers to be married to a spouse of the same origin group (the same groups our cohorts are based on); intermarriage refers to being married to a German spouse. Since "German spouse" refers to the current nationality, it includes those foreign-born that hold only the German nationality. Non-married persons are treated as "zeros".

⁵³The negative sign on cohort-share university degree turn positive when including a time-trend. The negative

Table A2: Individual- vs. cohort-level predictors of labor market gaps

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Employment gaps (Percentage points, 10 years after arrival)							
School degree (coh. mean)	5.23*** (0.58)		5.39*** (0.65)				4.74*** (0.66)
University degree (coh. mean)	-1.71* (0.89)		-0.75 (0.83)				-0.92 (0.78)
Cohort size at arrival (coh. mean)		1.80* (0.95)	1.25 (0.80)				1.01 (0.74)
Age at migration (coh. mean)		1.26 (1.14)	-1.46 (1.17)				-1.41 (1.08)
School degree (ind.)				2.10*** (0.28)		2.07*** (0.28)	1.53*** (0.24)
University degree (ind.)				0.82 (0.57)		0.95 (0.57)	1.43*** (0.36)
Age at migration (ind.)					-2.49*** (0.72)	-2.61*** (0.72)	-3.02*** (0.71)
Observations	21,296	21,296	21,296	21,296	21,296	21,296	21,296
Adj. R^2 (individual)	0.027	0.003	0.028	0.021	0.002	0.024	0.045
Adj. R^2 (coh.-level)	0.594	0.079	0.641	0.607	0.068	0.696	0.680
Panel B: Income gaps (2010 Euro, 10 years after arrival)							
School degree (coh. mean)	178.9*** (31.1)		201.6*** (26.9)				199.1*** (28.8)
University degree (coh. mean)	83.7 (61.0)		173.5*** (57.7)				99.4* (57.2)
Cohort size at arrival (coh. mean)		2.3 (30.6)	57.1** (25.1)				55.5** (26.5)
Age at migration (coh. mean)		-6.8 (48.3)	-204.7*** (49.1)				-166.2*** (49.2)
School degree (ind.)				42.0*** (6.3)		38.1*** (5.8)	19.8*** (3.8)
University degree (ind.)				255.8*** (60.1)		271.8*** (60.0)	258.0*** (34.9)
Age at migration (ind.)					-319.0*** (43.1)	-343.4*** (39.9)	-347.8*** (33.7)
Observations	20,632	20,632	20,632	20,632	20,632	20,632	20,632
Adj. R^2 (individual)	0.041	-0.000	0.066	0.063	0.043	0.113	0.164
Adj. R^2 (coh.-level)	0.433	0.001	0.691	0.149	0.001	0.172	0.667

Notes: The regressions include immigrants 9-11 years after arrival. Dependent variables: Predicted individual gaps according to Equation 1. Panel A: Employment or in education (in percentage points). Panel B: Real individual post-tax income (in 2010 Euros). Cohort mean variables are measured upon arrival. Cohort size is measured as the share of all working-age immigrants that arrived in the 5 years previous to an immigrant's arrival year in the working-age population in the arrival year. Explanatory variables are standardized (mean=0, standard deviation=1). Standard errors are clustered on the cohort level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

of the variation in employment gaps between immigrant groups. In contrast, the mean age of the cohort or the overall migrant share at their arrival (the population share of immigrants regardless of origin who arrived within the previous 5 years) explain little of the differences in integration outcomes (columns 2 and 3).⁵⁴ The latter result contrasts with recent findings by Albert et al. (2021) for the US, who find that the immigrant-native gaps are larger when larger number of immigrants arrive in the US at the same time.

As is perhaps intuitive, the cohort-level variation can be at least as well explained by cohort average as by individual-level characteristics (cf. columns 4-6 of Table A2). Cohort-level controls can explain about two thirds of the between-cohort variation in employment and income after 10 years (column 3) while individual-level characteristics are predictive for cohort-level employment gaps but not for income (column 6 of same tables).

More surprising is that the cohort-level characteristics can be also better predictors for *individual* outcomes. For example, the cohort shares with a school or university degree explain 2.7 percent of the variation in individual employment, while own education only explains 2.1 percent. For income, individual education becomes more predictive, as having a university degree is associated with substantially higher individual incomes. Finally, column (7) shows that cohort-controls (in particular the cohort share with a completed school degree) remain predictive even after conditioning on an individual's own education and age at arrival.

Why are cohort-level characteristics so predictive? One potential explanation is that the composition of an arrival cohort does indeed have a causal effect on their members because of peer or network effects. For example, Borjas (1992) introduces the concept of “ethnic capital” to characterize the ethnic context in which individuals take decisions, e.g. to invest in country-specific human capital. An alternative explanation is that the discernible membership to certain groups leads to labor market disadvantages because of discrimination. For example, Weichselbaumer (2019) shows that among female job applicants with identical resumes, those with a Turkish name receive much fewer callbacks. Finally, the reported education of an immigrant may simply not be very informative about his or her actual level of productive knowledge and skills, partly because educational credentials may not be fully translatable from origin to destination country (see Fortin, Lemieux & Torres, 2016, Basilio et al., 2017). The individual-level information is then only a noisy proxy, and cohort averages constructed over many individuals may be a more precise signal for individual skills. Irrespectively of which explanation applies, we can conclude that cohort-level statistics are the most relevant predictors for the labor market success of immigrant cohorts, and that individual characteristics yield little additional power (compare R²: cohort-level for columns 3 and 7). We therefore collapse our data on the cohort level for the next analysis steps.

sign is thus probably driven by improving education over time that is not reflected in improving employment.

⁵⁴In interpreting the coefficient on age at migration, it is helpful to consider two distinct mechanisms: On the one hand, highly-educated immigrants with university diplomas tend to migrate at higher ages than other immigrants, which probably explains the positive coefficients in columns (2). On the other hand, younger migrants might be more willing or able to accumulate country-specific human capital. These arguments are consistent with the observation that once we condition on education the coefficient on age at migration flips sign and becomes negative.

F Decomposition of age-specific components in the employment profiles of Turkish immigrant groups

We estimate for each immigrant group I separately:

$$\hat{y}_i^{gap} = \lambda^I + \sum_{a=18}^{58} \delta_a^I A_{ia} + \sum_{t=1976}^{2015} \gamma_t^I \Pi_{it} + \varepsilon_i \quad (6)$$

Where \hat{y}_i^{gap} denotes the immigrant-native employment gap for immigrant individual i predicted according to equation 1. λ^I is a (cohort-specific) constant, A_{ia} a dummy for age a and Π_{it} a dummy for year t . For individual i , observed at age \hat{a} in year \hat{t} , \hat{y}_i^{gap} can be predicted by:

$$\hat{y}_i^{gap} = \hat{\lambda}^I + \hat{\delta}_{\hat{a}}^I + \hat{\gamma}_{\hat{t}}^I \quad (7)$$

We can drop the year-parameter $\hat{\gamma}_{\hat{t}}^I$ to obtain what we call the age-component, which is the part of the gap that can be explained by the age structure of immigrant groups, which could be for instance be caused by systematically earlier retirement of immigrants compared to natives:

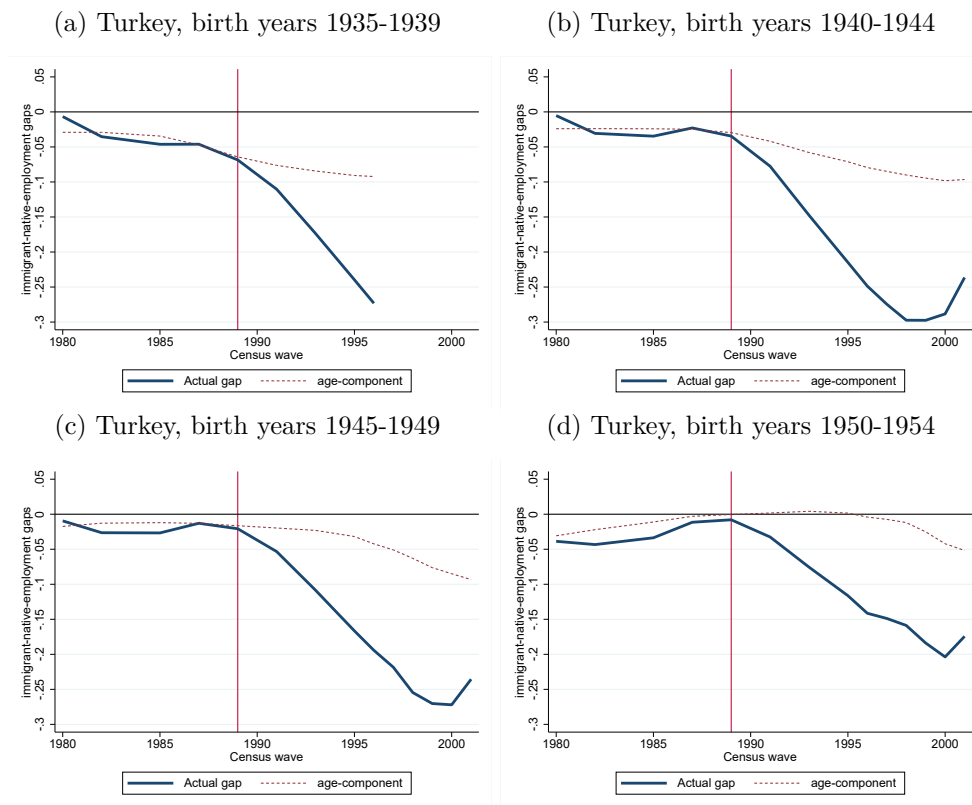
$$\hat{y}_i^{age-component} = \hat{\lambda}^I + \hat{\delta}_{\hat{a}}^I \quad (8)$$

G Descriptive overview: Unemployment and Bartik shocks of immigrant cohorts in the 1990s

Table A3 illustrates that immigrants were not generally living in regions with higher unemployment rates in 1991 (Column 1), but in regions where unemployment increased stronger between 1991 and 1997 ("Unemployment shock", Column 2). Turkish immigrants were already allocated in the most unfavorable regions before their employment rates collapsed, both in terms of baseline unemployment as well as unemployment growth. A second potential reason why immigrant employment rates dropped could be their concentration in industries that went into decline during the 1990s. To explore this mechanism, we predict how much the employment of each immigrant cohort would have dropped based on their 1989 allocation into industries and industry-wide employment trends between 1989 and 1997. We define this type of Bartik-shifter as:

$$BS_{1997-1991,c} = \sum_{s=1}^N \left(\frac{emp_{cs,1989}}{emp_{c,1989}} \times \frac{emp_{s,1997}}{emp_{s,1989}} \right) \quad (9)$$

Figure A7: Age-specific components of employment gaps of Turkish immigrants arrived 1955-1978, by birthyears



Notes: The solid lines show the predicted immigrant-native employment gap as defined in equation 7 and the dotted line the age-specific component as defined in equation 8.

where $emp_{cs,1989}$ is the number of workers in cohort c working in sector s ⁵⁵ in 1989, $emp_{c,1989}$ the total number of employed persons in cohort c and $emp_{s,1997}$ respectively $emp_{s,1989}$ total employment (including immigrants and natives) in sector s in the years 1997 and 1989. $BS_{1997-1991,c}$ thus captures the employment trend (between 1989 and 1997) of the industry sectors that a group c was employed in in the base year 1989. Column 3 of Table A3 thus shows that employment in the sectors in which

⁵⁵Harmonizing industry sectors over the census waves represents is not straight-forward because the used industry classifications change frequently. Also in many (service) industries only very small numbers of migrants work. We therefore aggregate sectors to the following broad industries: 1 Agriculture, forestry and fishing; 2 Mining, quarrying, manufacture of non-metallic mineral products; 3 Manufacture of food and beverage products; 4 Manufacture of textiles, wearing apparel, leather and related products; 5 Manufacture of wood and products of wood, paper and paper products; 6 Manufacture of coke, refined petroleum, chemicals and chemical products, rubber ad plastic products; 7 Manufacture of basic metals, metal products except machinery; 8 Manufacture of electrical equipment, computers, electronic and optical products; 9 Manufacture of machinery, motor vehicles and equipment; 10 Manufacture o; 11 Construction, Electricity, gas and water supply, waste management, repair and installation; 12 Wholesale and retail trade; 13 Transport and storage; 14 Accommodation and food service activities; 15 Other services

Table A3: Balancing of Cohorts: Unemployment rates and Bartik-Trends during the 1990s

Cohort	Unemp. rate 1991	Δ Unemp. rate 1997-1991	Bartik shock 1997-1989
Natives	6.37	4.70	4.49
North-West Europe 55-73	6.11	4.72	5.88
Italy 55-67	5.84	4.71	-0.38
Italy 68-73	5.84	4.76	0.22
Yugoslavia 68-70	5.47	4.74	-0.33
Yugoslavia 71-73	5.53	4.75	-1.15
Turkey 55-67	6.93	4.87	-4.94
Turkey 68-70	6.73	4.86	-8.03
Other recr. states 55-67	5.96	4.75	-4.57
Other recr. states 68-73	6.35	4.70	-5.88
North-West Europe 74-87	5.93	4.77	7.95
Southern Europe 74-78	6.16	4.78	3.69
Southern Europe 79-87	5.79	4.81	8.25
Yugoslavia 74-87	6.33	4.71	2.08
Turkey 71-73	6.38	4.79	-9.20
Turkey 74-78	6.71	4.70	-6.51
Turkey 79-87	6.76	4.78	-3.96

Notes: Column (1): Mean unemployment rate at residence in 1991; Column (2): Change in mean unemployment rate at residence 1997-1991; Column (3): For definition of the Bartik shock see equation 9

natives were employed in 1989 grew on average by 4.5 percent until 1997, whereas many immigrant cohorts worked in sectors that on average shrank. Again, Turkish cohorts were already previously allocated to the most unfavorable industries, with predicted employment declines of up to 9.2 percent. More recent immigrants from predominantly EU countries instead selected in sectors with even better growth prospects than natives. This could be due to younger and higher educated cohorts sorting into booming industries, whereas older migrants that have already spend about 20 years or more in Germany are less able to change into promising jobs.

H Methodological details: The 1990s employment collapse

We estimate the following parametric regressions that are based on equations (3) and (4) for the census waves 1976-2001. Specifically, we model the outcome y_{ictr} (employment or income) for immigrant i in cohort c in calendar year t and region r as:

$$y_{ictr} = \delta^I A_i + \alpha^I YSM_i + \sum_{t=1985}^{2005} \gamma_t^I \Pi_t + \sum_{t=1985}^{2005} \mu_t^I \Pi_t \times UR_{shock1997-1989,r} + \sum_{t=1985}^{2005} \xi_t^I \Pi_t \times BS_{1997-1989,c} + \varepsilon_n \quad (10)$$

where A_i is a third-order polynomial in age, YSM_i a third-order polynomial of years since migration and Π_t denotes a set of indicator variables for each calendar year (where we omit the year 1989 as base year). $UR_{shock1997-1989,r}$ denotes the regional unemployment shock of the 1993 recession (unemployment rate in 1997 - unemployment rate in 1989) and $BS_{1997-1989,c}$ is a type of Bartik-shifter (details above in appendix G) that varies between immigrant cohorts. The corresponding regression model for native individual n , where the subscript c refers to 5-year birth cohorts reads:

$$y_{nctr} = \delta^N A_n + \sum_{t=1985}^{2005} \gamma_t^N \Pi_t + \sum_{t=1985}^{2005} \mu_t^N \Pi_t \times UR_{shock1997-1989,r} + \sum_{t=1985}^{2005} \xi_t^N \Pi_t \times BS_{1997-1989,c} + \varepsilon_n \quad (11)$$

We estimate coefficients separately for natives and immigrants as a whole and *not* separately for different immigrant cohorts, because we are interested in average effects for immigrants. As is commonly done (Barth et al., 2004), we assume identical time effects for immigrants and natives $\mu^I = \mu^N$, but we allow the coefficients on age, unemployment shocks and Bartik shifters to differ between immigrants and natives.

Our goal is firstly to estimate how much of the unemployment collapse among immigrants in the 1990s can be explained by deteriorating labor market conditions and structural change and secondly whether immigrants were already previously allocated into regions or industries that were stronger affected or whether they were systematically more sensitive to these shocks compared to natives.

For that purpose we perform Oaxaca-Blinder decompositions of the parts in the immigrant-natives gaps that can be explained by the severity of the regional unemployment shocks Δgap_t^{UR} (and perform identical decompositions for the Bartik-shifters):

$$\begin{aligned} \Delta gap_t^{UR} &= \hat{\mu}_t^I \bar{UR}_{shock1997-1989,r(i)} - \hat{\mu}_t^N \bar{UR}_{shock1997-1989,r(n)} \\ &= \underbrace{\hat{\mu}_t^I (\bar{UR}_{shock1997-1989,r(i)} - \bar{UR}_{shock1997-1989,r(n)})}_{\text{Difference in exposure}} + \underbrace{(\hat{\mu}_t^I - \hat{\mu}_t^N) \bar{UR}_{shock1997-1989,r(n)}}_{\text{Difference in coefficients}} \end{aligned} \quad (12)$$

The first component captures whether immigrants on average lived in regions that were stronger affected by increasing unemployment than the regions where natives lived ("Difference in exposure") and the second component whether immigrants were more negatively affected by a given increase in regional unemployment compared to natives ("Difference in coefficients").

I Methodological details: Refugee cohort application

We are interested in comparing the employment trajectories of recent refugee cohorts to the integration profiles of previous immigrant cohorts. In particular we ask which role the favorable labour market conditions in the late 2010s played.

In a first step, we estimate employment for immigrants and natives *in the microcensus data* using parametric equations that are similar to equations 3 and 4:

$$y_{ic} = \lambda^I + \delta^I A_i + \alpha^I YSM_i + \phi^I X_{ctr} + \chi^I X_{ctr} \times YSM_i + \sum_{t=1976}^{2015} \gamma_t^I \Pi_{it} + \varepsilon_i \quad (13)$$

$$y_n = \lambda^N + \delta^N A_n + \sum_{t=1976}^{2015} \gamma_t^N \Pi_{nt} + \varepsilon_n \quad (14)$$

where y is a dummy for employment of immigrant individual i from cohort c or native individual n . λ denotes a separate intercept immigrants I and for natives N .⁵⁶ A_i a vector of polynomials up to the power three for age and YSM_i up to third-order polynomials of years since migration. Higher order polynomials are not shown for simplicity. As previously, X_{ctr} a vector of control variables that vary between cohorts c , points in time t or regions r . X_{ctr} always includes the cohort-specific share of immigrants with a school degree as well as the share of immigrants with a university degree, measured immediately after arrival and the refugee share of each cohort. Depending on the specification, we additionally include regional unemployment rates. We fully interact all these control variables with the different polynomials of YSM_i to allow the integration trajectories to differ flexibly depending on education, refugee share and economic conditions. We include X_{ctr} only for immigrants and not for natives, because we are interested in unconditional, raw comparisons. The purpose of including group-level covariates is to account for differences in cohort composition between newer and older refugee groups and not to account for differences between immigrants and natives. For simplicity, consistency and in order to be able to perform out-of-sample predictions, we assume that time effects for migrants and natives are identical ($\gamma_t^I = \gamma_t^N$).

In a second step, we use the microcensus-based coefficients $\hat{\lambda}^I$, $\hat{\lambda}^N$, $\hat{\delta}^I$, $\hat{\delta}^N$, $\hat{\alpha}^I$ and $\hat{\phi}^I$ from equations 13 and 14 to predict the individual immigrant-native wage gaps:

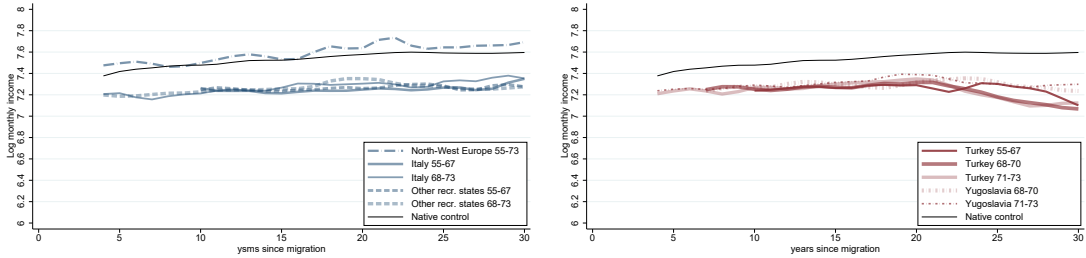
$$\hat{y}_{ic}^I - \hat{y}_{ic}^N = (\hat{\lambda}^I - \hat{\lambda}^N) + (\hat{\delta}^I - \hat{\delta}^N)A_i + \hat{\alpha}^I YSM_i + \hat{\phi}^I X_{ctr} + \hat{\chi}^I X_{ctr} \times YSM_i \quad (15)$$

where X , A and YSM are taken from the newly arrived asylum seekers *from the IAB-BAMF-SOEP sample* of refugees. We interpolate the data backwards also for the year 2015 based on retrospective questions on arrival date and date of first job in Germany.

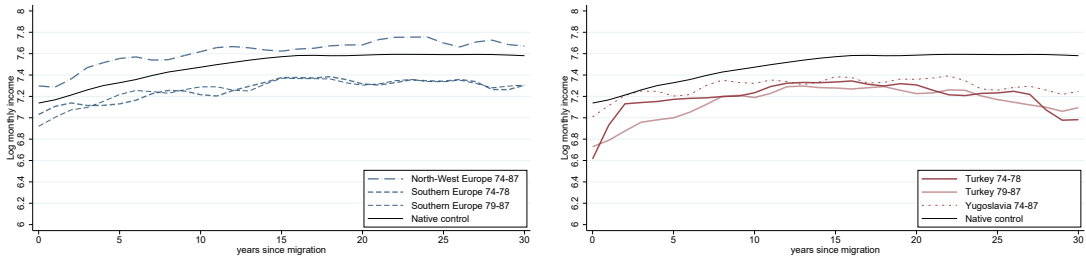
For the second type of predictions, where we are more interested in forecasting, we force the immigrant-specific intercept in equation 13 ($\lambda^I - \lambda^N$) to be equal to the cohort-specific employment gap at arrival. We also add the cohort-specific initial employment gap as additional control variable to the vector X_{ctr} . In addition we drop $\phi^I X_{ctr}$ and keep only the interaction of X_{ctr} with YSM . By doing so, we force the forecast to start at the true observed initial employment gap and avoid differences in initial gaps between the forecast and the observed integration profile.

Figure A8: Log monthly income of cohorts

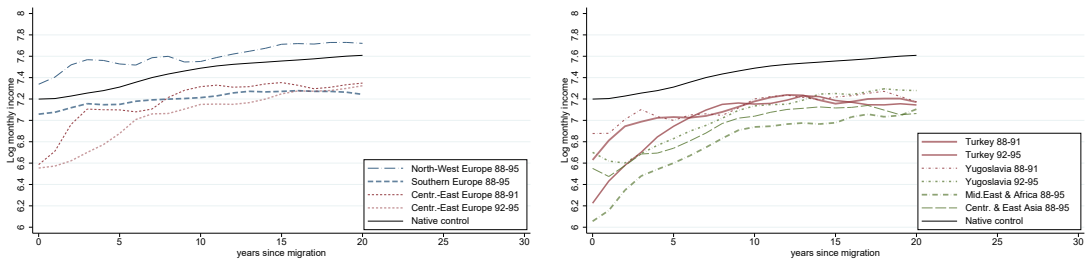
(a) Arrival period: 1955-1973



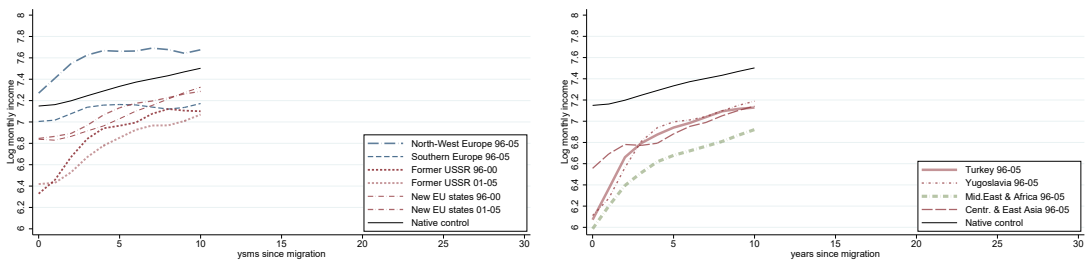
(b) Arrival period: 1974-1987



(c) Arrival period: 1988-1995

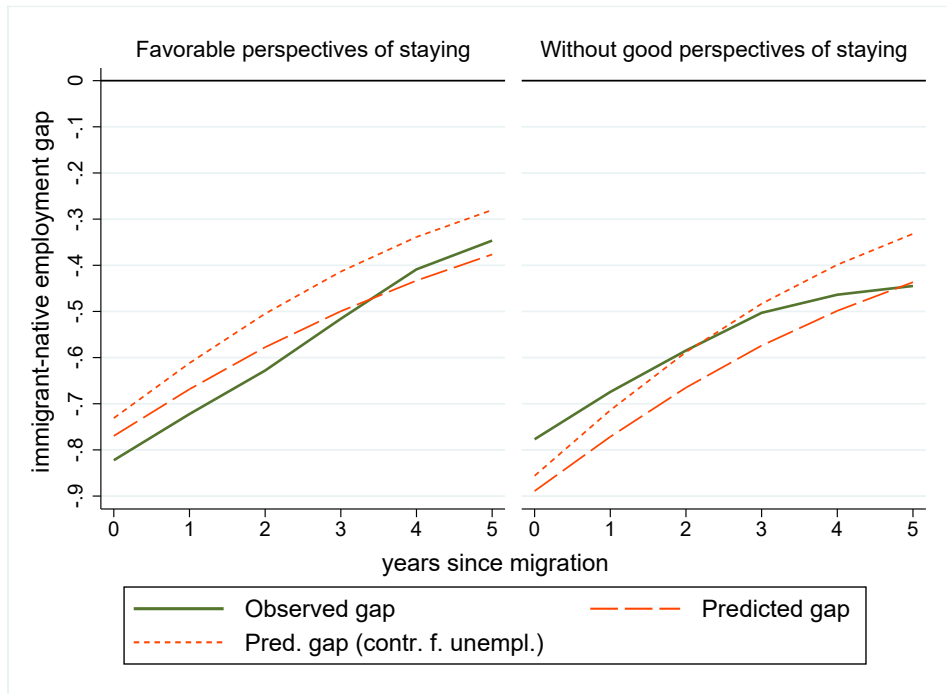


(d) Arrival period: 1996-2005



Notes: Log of mean personal income of different immigrant cohorts and a native control group by year since migration. We consider real individual post-tax income (measured in 2010 Euros). Income does not only consist of labor earnings, but also other forms of income like capital gains or welfare benefits. The counterfactual native employment rates are for natives of the same age observed in the same year as the immigrant sample (estimated according to equation 2).

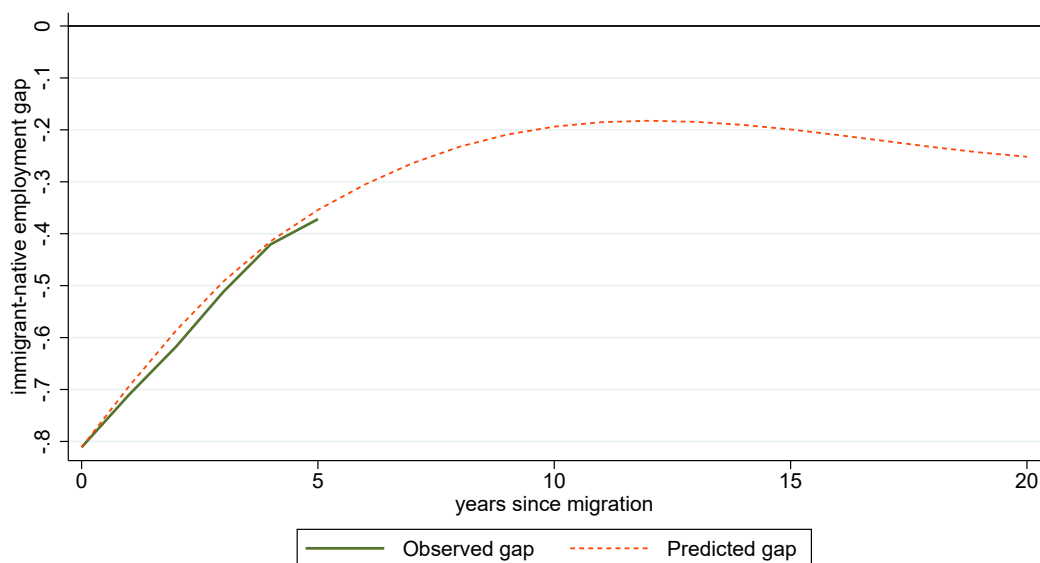
Figure A9: Employment gaps for recently arrived refugees by perspectives of staying



Notes: See notes of Figure 7 (a) for methodology. Countries with good favorable perspectives of staying include Syria, Iraq, Eritrea, Iran and Somalia.

J Additional figures and tables

Figure A10: Forecasts for employment gaps of recently arrived refugees



Notes: The green line shows the actually observed immigrant-native employment gaps for recent asylum seeker cohorts based on the IAB-BAMF-SOEP sample and the SOEP. Non-parametric estimates for the observed gaps are based on equations 2 and 1, adjusting for age, year and interactions of the two, but without any additional covariates. The predicted gaps (orange lines) are estimated parametrically based on our immigrant sample in the Microcensus (including only cohorts that we can observe from their arrival onwards), accounting for age, education, refugee share -and in the case of the dotted line additionally also for regional unemployment- of recent refugee cohorts in the IAB-BAMF-SOEP data. See Appendix I and equation 15 for details. We assume unemployment levels to stay constant at their 2021 rates. In contrast to Figure 7 (a), we force the intercept of our predictions to be identical to the observed immigrant-native at arrival. For details on the forecasted profiles, also see last paragraph of Appendix I.

⁵⁶In this application we cannot estimate coefficients separately for different immigrant cohorts because we use them for out-of sample predictions where new immigrants belong to none of the cohorts the model is estimated on.

Table A4: Definition of origin regions

Label	Countries
North-West Europe	Austria, Belgium, Denmark, Finland, France, Iceland, Ireland, Liechtenstein, Luxembourg, Netherlands, Norway, San Marino, Sweden, Switzerland, United Kingdom
Southern Europe	Greece, Italy, Portugal, Spain
Italy	Italy
Other recruitment states	Greece, Morocco, Portugal, Spain, Tunisia
Eastern Europe	Former USSR (including Estonia, Latvia, Lithuania), Albania, Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia, excluding former Yugoslavia
Fomer USSR	Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan (excluding the new EU members Estonia, Latvia and Lithuania)
New EU member states	Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia.
(Former) Yugoslavia	Bosnia and Herzegovina, Croatia, Kosovo, Montenegro, North Macedonia, Serbia, Slovenia
Turkey	Turkey
Middle East and Africa	All African states plus Bahrain, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, United Arab Emirates, Yemen
Central and East Asia	All East Asian and South-East Asian states plus Afghanistan, Bangladesh, Buthan, India, Iran, Pakistan, Nepal, Sri Lanka