ORIGINAL PAPER

The immigrant-native gap in risk and time preferences in Germany: levels, socio-economic determinants, and recent changes

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Abstract

We present new descriptive evidence on the immigrant-native gap in risk and time preferences in Germany, one of immigrants' most preferred destination countries. Using the recent waves of the Socio-Economic Panel (SOEP) dataset, we find that the immigrant-native gap in risk preferences has widened for recent immigration cohorts, especially around the time of the 2015 European Refugee Crisis. We attribute the recent widening to decreased assimilation rates of new immigrants caused by reduced integration due to sudden increases in immigrants flows from culturally diverse parts of the world, particularly around the year 2015. We also find that the immigrant-native gap varies across different migrant groups: "Opportunity seekers," which we define as economic immigrants who intend to stay in Germany only temporarily, are very similar in their risk preferences to natives. Other immigrants, however, are substantially more risk averse than natives. A smaller gap in risk preferences is also found among migrants who are female, highly educated, proficient in the host language, self-employed, and working in predominantly high-skilled jobs. Concerning time preferences, a noticeably large immigrant-native gap is evident, but the gap does not vary across most individual-level socio-economic variables.

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1 Introduction

As per the latest Gallup World Poll, if the opportunity arises, approximately 15% of the world's adults—or more than 750 million people—would prefer to move to another country (Esipova et al. 2018). Their preferred destinations include the usual suspects of host countries, such as the USA, Canada, and Germany. As most preferred host countries are developed economies, it is safe to assume that economic motives form the basis of potential migrants' decision to migrate. However, successful immigration depends not only on immigrants' economic motives (Akgüç et al. 2016; Gibson and McKenzie 2011; Jaeger et al. 2010) but increasingly on the economic benefits they can bring to the host country. Consequently, many countries are designing immigration policies that maximize natives' benefit net of immigration's fiscal burden, as in Australia, Canada, and New Zealand (Brücker et al. 2012; de Haas et al. 2018).[1] To understand immigration's economic impact on the host country, a better understanding of immigrants' economic preferences and culture is mandatory. Among the economic preferences, risk and time preferences play an essential role.

To this end, this paper provides a detailed empirical investigation of the immigrant-native gap in economic preferences (*EP gap* hereafter) in one of the preferred host countries, Germany. Such a gap might have multiple causes, e.g., cultural or economic differences between the migrant's home country and Germany, or a self-selection effect among migrants. Instead of attempting to distinguishing between diverse origins of the EP gap, in this paper, we restrict our focus to investigating the EP gap's extent and evolution for Germany and list factors associated with this gap. More precisely, we first estimate the EP gap and underline its demographic and economic correlates. After that, we ask whether the EP gap has evolved in the last 70 years and list the correlates explaining its evolution. In particular, we ask whether the European Refugee Crisis in 2015, during which Germany received almost 890,000 asylum seekers (BAMF 2016; BMI 2016),[2] might have widened this gap and, if so, whether this is caused by a more considerable cultural distance of recent immigration cohorts or by reduced assimilation, caused by the arrival of a large number of immigrants within a relatively short timespan which overwhelmed usual integration programs. Following the existing research (Bonin et al. 2012; Constant et al. 2011), we highlight the pertinence of immigrants' assimilation of host characteristics and identity in explaining the immigrant-native gap. Finally, we ask whether immigrant type (refugee vs. non-refugee, EU vs. non-EU origin) and their reason for immigration to Germany (economic vs. noneconomic) help moderate the EP gap.

Our empirical analysis employs the latest waves of the German Socio-economic Panel dataset (SOEP, v35). To estimate the EP gap, we apply the random effects estimation technique with economic preferences as dependent variables. We consider the respondents' following two economic preferences: risk attitudes and time preference (patience). The immigrant-native gap in these economics preferences are hereafter

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[1] Other examples of easing restrictions include EU Blue Cards for high-skilled immigrants in Europe (*Council Directive 2009/50/EC*) and special treatment often given to investors in the UK and the USA.

[2] In comparison, the average number between 2000 and 2014 was less than 75,000.

referred to as the *risk gap* and the *time gap*, respectively.[3] The estimation sample is restricted to first-generation immigrants (*FGIs* hereafter) and German natives with no immigration background. Our focus on FGIs stems from the intention to shed light on immigration policy's role in deciding the EP gap in the host country.

Before discussing our main results, in Fig. 1, we provide a plot of the raw data showing the extent of the EP gap in Germany. The figure compares the average economic preferences of German natives to those of major immigrant groups in Germany and shows that the EP gap is substantial. In other words, immigrants in Germany report lower average risk-taking levels but register as being more patient than German natives. We also notice a significant variation in the immigrant-native gap across different immigrant groups, which we exploit later in the empirical analysis.

The formal empirical investigation begins by confirming earlier observations of the existence of a non-zero EP gap in Germany. After that, we study whether the immigrant respondents' demographic and economic characteristics help explain the narrowing of the gap in economic preferences. Regarding demographic characteristics, we find that being married further widens the risk gap compared to their non-married counterparts. Female immigrant respondents report a narrower risk gap than male immigrant respondents. Regarding economic characteristics, on the one hand, the respondents with lower education and those working in low-skilled occupations or being inactive on the labor market report a wider risk gap than their respective reference counterparts. On the other hand, compared to employed respondents, while unemployed immigrant respondents report a wider risk gap, the self-employed report a narrower risk gap. Concerning the individual-level correlates of the time gap, while the self-employed immigrant respondents report a narrower time gap, females and unemployed immigrants report a wider time gap.

Next, we ask whether the EP gap has changed during the last few decades in Germany. In Fig. 2, we plot the averages of the absolute difference in economic preferences, a proxy indicator of the EP gap against the immigrant respondents' year of immigration to Germany. We construct this indicator by subtracting the natives' average value of the economic preference for the survey year from the immigrant respondent's economic preference (for details, *see* Subsection 3.2). The size of the bubbles indicates sample weights applied using the number of observations in each immigration year. We make the following two observations: First, the EP gap is very high but remarkably stable across immigration years, especially the gap in patience. Second, recent immigration cohorts show a substantial increase in the risk gap, but we do not find any noticeable pattern in the time gap.

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[3] Our separate consideration of the two economic preferences demands establishing whether they are distinct aspects of personal characteristics or two sides of the same coin. To this end, we refer to the existing research that investigates this concern, starting with Anderhub and Güth (2001). Moreover, we present the sample correlation between these two variables separately for immigrants and natives using the estimation sample. We observe that the correlations are minuscule -0.0246 and 0.0232, respectively, helping us conclude that the two preferences represent two uncorrelated aspects of individuals' personalities.

A priori, the increase in the risk gap for recent immigrant cohorts might simply be an artifact caused by their recent arrival in Germany: The gap might close once they have been here for a longer time. Therefore, using the respondents' year of immigration to Germany, we investigate whether recent immigrant cohorts report distinct levels of the immigrant-native gap compared with older cohorts, controlling for the time since their arrival. Our results find that recent immigrant cohorts to Germany indeed report a larger risk gap, but do not report a distinctly different time gap. As immigrants nowadays often originate from culturally distinct parts of the world, we additionally study the role of immigrants' assimilation of host characteristics and identity in bridging the immigrant-native gap. The results indicate that the immigrants' host language skills, both written and oral German, are negatively associated with the risk gap, irrespective of the risk gap's association with their year of immigration to Germany. Moreover, immigrants' assimilation of the host identity is negatively associated with the risk gap. Interestingly, the time gap is not associated with the respondents' host language proficiency.[4]

We investigate the role of the immigrants' origin, the reason for migration, and the intended duration of stay. Our results indicate that the recent cohorts of *European* immigrants report a smaller risk gap than others, whereas immigrants originating from *other* world regions report a recent widening of the risk gap. Regarding the above discussion of the 2015 European Refugee Crisis, we also ask whether recent refugee immigrants report distinct risk gap patterns. While recent refugees report a much larger risk gap than non-refugee immigrants do, we do not see any evolution patterns of refugee immigrants' time gap.

Finally, we employ the information on immigrant respondents' reason for migration and intended duration of stay together and conduct a policy-relevant investigation distinguishing how the EP gap differs between "stayers" and "opportunity-seeking" immigrants to Germany. For this analysis, we divide the immigrant sample into two broad categories of our own construction: We define *opportunity seekers* as those immigrants who immigrated to Germany for economic reasons and have a finite intended stay in Germany. We define all other immigrants with a permanent intended stay in Germany as *stayers*. The results indicate that opportunity seekers report a smaller risk gap than Stayers.[5]

The paper is structured as follows: Sect. 2 summarizes relevant literature, particularly on immigrants' risk and time preferences in various contexts. Section 3 describes the survey instrument, the data set, and the statistical methods we employ. Section 4 presents the main results of our paper and discusses them. Section 5 concludes.

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[4] The relation between the time gap and host identity could not be studied since there was no overlap in the data between the waves where these two items had been elicited.

[5] The association between immigrants' migration reason and the time gap could not be studied since there was no overlap in the data between the waves where these two items had been elicited.
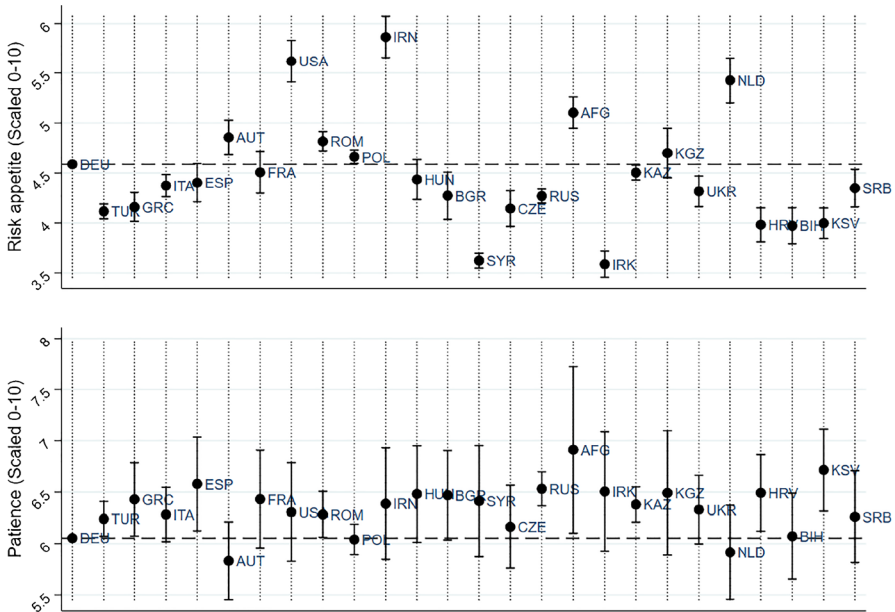
Source: SOEP v35. Survey years 2003–2018, unbalanced panel, own calculations.
Note: This figure plots the averages of economic preferences for major population groups in Germany. Information is shown for only those home countries from which at least 500 immigrants originate. The dashed horizontal reference lines indicate the average values of economic preferences for German natives. The immigrant sample is restricted to first-generation immigrants only

Fig. 1 Economic preferences of immigrants in Germany

2 Literature review

As immigrants constitute a sizable minority in many countries, their productive use for the natives has become an essential consideration of immigration policies. A large research body in economics and social science is devoted to understanding immigrants' performance in the host country. This research underlines immigrants' struggle to achieve equality in economic outcomes in the host country. For instance, Kahanec and Zaiceva (2009) show that immigrants experience lower employment and earnings than natives in many countries. Uhlendorff and Zimmermann (2014) find that unemployed immigrants need more time to find jobs than natives. Others show that the immigrant-native gap in economic outcomes can also persist among second-generation immigrants (Algan et al. 2010). A sizeable portion of this research attempts to unearth the long-debated immigration surplus (See Borjas 1995) by testing several positive theories that help understand the quantitative impact of international immigration. Researchers find a positive association between migration and new firm formation (Bettin et al. 2019; Jahn and Steinhardt 2018;

Source: SOEP v35. Survey years 2003–2018, unbalanced panel, own calculations.
Note: This figure plots the absolute difference in economic preferences for immigrants, an indicator of the EP gap, in Germany. The following two steps estimate the absolute difference in economic preferences. First, we calculate the absolute difference between the immigrant respondent's economic preference and the average of natives' level for the survey year. The *x*-axes represent the immigrants' year of immigration to Germany. In the second step, we show the immigrants' EP gap averaged for the year of immigration to Germany (shown on *y*-axes)

Fig. 2 Immigration cohort and the immigrant-native gap in economic preferences in Germany

Olney 2013). Others highlight that immigrants are, on average, younger and healthier than comparable native-born (Cunningham et al. 2008; Goldman et al. 2014), and studies are devoted to investigating the healthy immigrant effect (Constant et al. 2018; Kennedy et al. 2015; Maskileyson et al. 2019).

An immigration policy that facilitates immigrants' productive use demands a better understanding of their economic preferences as they are intimately associated with immigrants' various behaviors (Batista and Umblijs 2014, 2016; Dohmen et al. 2011; Gibson and McKenzie 2011; Vischer et al. 2013). Moreover, the immigrants' two economic preferences, risk attitudes and patience, are also associated with their *social or generalized trust* (Albanese et al. 2017), which researchers deem to be a crucial determinant of their socio-economic success in the host environment (Butler et al. 2016). The next two subsections provide supporting arguments for our expectations of the existence of nonzero EP gap in Germany. To this end, we review the existing literature studying how movers (immigrants) and stayers (in this context, natives) differ in immigrants' home country and their host country.

2.1 Willingness to take risks or risk appetite

The first economic preference that we consider is the respondent's self-reported willingness to take risks (*risk appetite*). Existing research shows that individuals prone to taking more risk earn higher wages (Bonin et al. 2007). However, risk-takers can also be involved in suboptimal behaviors, such as smoking (Dohmen et al. 2011; Vischer et al. 2013). Pannenberg (2010) finds that a higher risk appetite is associated with a higher reservation wage, resulting in lower employment probability. In contrast, the research focused on immigrants' risk appetite sheds a positive light on its importance. For example, Batista and Umblijs (2014) demonstrate a positive association between immigrants' risk-loving behavior and their decision to be self-employed and entrepreneurs. Their risk appetite is also negatively related to their tendency to send remittances (Batista and Umblijs 2016). The two findings noted above, in addition to the finding that immigrants are likely to save more than natives (Islam et al. 2013), highlight immigrants' potential to generate new investments and be productive members of the host society.

Immigrants may differ from natives in their risk preferences for several reasons, forming supportive arguments for a nonzero risk gap. For the residents of many countries, emigration is often arduous and is better suited for risk-takers among the populace.[6] This may make immigrants a highly selected group of risk-neutral individuals, especially compared to the natives of the host country with no migration background. Conversely, the more risk-neutral among the immigrant population in the host country may be more likely to migrate to other countries or remigrate back to their country of origin. In other words, this suggests that only the risk-averse among the immigrants decide to stay longer in the host country, predominantly forming the stayers group. Both these possibilities are inherent to immigrants' migration decisions and contribute to the selection issue well-known in the migration literature. Although not addressed directly in this paper, it is worth mentioning that the selection issue likely biases our estimates of the EP gap. Finally, immigrants' choices in the host environment can reinforce their risk appetite, demonstrating individual characteristics' vital role in explaining the levels and changes in the risk gap. For example, research shows that immigrants are likely to take up riskier jobs/occupations than that of natives as these jobs allow them to skip native language requirements of the formal market and bypass the discrimination in paid employment (Clark and Drinkwater 1998; Constant and Zimmermann 2006; Orrenius and Zavodny 2009).

Finally, as immigrants nowadays originate from culturally distant parts of the world, their cultural makeup and post-migration assimilation of host characteristics and identity are also crucial in explaining the risk gap. The existing research shows that risk attitudes differ across the respondents' ethnicity and country of origin (Bonin et al. 2012; Rivers et al. 2010). Moreover, Bonin et al. (2012) show that while immigrants' assimilation of host identity helps bridge the risk gap, different levels of persistence of home identity are observed among various immigrant groups, crucial in the endurance of the risk gap. Their findings also indicate that immigrants originating from Turkey and East Europe are

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[6] Many assume that immigrants' risk preferences are intrinsic to their nature and are not affected by the act of migration (Gibson and McKenzie 2011; Jaeger et al. 2010).

not only among the least socially assimilated population subgroups, but these immigrant groups also report the highest risk gap.

While the direction of the bias induced by sources noted above is unclear, theoretical models often assume that migrants are generally more risk-loving than natives populations of home and host home countries (Chiswick 1978; Constant and Zimmermann 2006; Heit-mueller 2005; Todaro 1980). The empirical research on the topic, however, finds mixed evidence. While the assumption that risk-loving individuals among the home populace are likely to migrate finds support in the existing research (Gibson and McKenzie 2011; Gold-bach and Schlüter 2018; Jaeger et al. 2010), immigrants are not consistently found to be more risk-loving than the host population. For example, Bonin et al. (2009) show that first-generation immigrants in Germany have a lower risk appetite than natives.[78] In this paper, we attempt to estimate the extent of the immigrant-native gap in risk appetite in Germany. In doing so, we pay special attention to the issues of immigrants' assimilation of host characteristics and investigate their role in narrowing the risk gap.

2.2 Time preference or patience

The second economic preference we consider is the respondent's time preference or patience. Dellavigna and Paserman (2005) find that impatience is negatively correlated with individuals' job search efforts and the unemployment exit rate and is orthogonal to reservation wages. Dohmen et al. (2010) find that more pronounced impatience is associated with lower cognitive ability. Like risk attitudes, patience is also inherent to individuals' migration decisions. Migrants generally face a tradeoff between the short-term costs of migration and the long-term benefits of the relocation. The time horizon of their migration, i.e., their intention to stay in the host country permanently or to re-migrate, also indicates their attitudes towards time preference (patience).

Existing empirical literature finds supporting evidence to the common belief that out-migrants have lower time discounting than that of nonmigrants of the community (Goldbach and Schlüter 2018). Gibson and McKenzie (2011) study the emigration data from Pacific countries and show that the decision to migrate is indeed associated with the respondent's patience, especially among the high-skilled emigrants. Concerning the empirical studies focused on host countries, however, only limited research is devoted to this. For instance, Constant et al. (2011) investigate the German data and find no significant difference in patience among the unemployed second-generation immigrants and their native counterparts. However, the authors'

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[7] Bonin et al. (2009) find that the difference between natives and migrants disappears in second-generation migrants (SGIs). Constant et al. (2011) find that second-generation migrants show a significantly higher willingness to take risks than natives. After adding SGIs to our estimation sample, we find weak support for the findings of Constant et al. (2011). We present the results of this exercise in the Online Appendix Table A1 and discuss them in detail in Sect. 4.

[8] A supporting argument for this result is the finding of Dohmen et al. (2010), who show that greater risk aversion is associated with lower cognitive ability. As many immigrants to Germany originate from relatively underdeveloped countries, they are also relatively less skilled than German natives. Together, these two statements support our earlier observation that immigrants in Germany are on average more risk-averse than German natives and that the risk gap in Germany is negative.

focus on second-generation immigrants, and the unemployed makes it difficult to draw general conclusions. Our focus on first-generation immigration and whether their individual-level characteristics and social assimilation influence the time gap is a notable contribution to the literature.

3 Data and methodology

3.1 Survey items and dataset

We use the latest version of the SOEP dataset (1984–2018, v35).[9] SOEP records extensive information on approximately 20,000 German households annually. To improve the SOEP's coverage for better representativeness of the migrant population residing in Germany, in 2013, SOEP collaborated with the Institute of Employment Research (IAB) for data collection, referred to as the IAB-SOEP migration sample (Eisnecker et al. 2017). For our analysis, we consider information on German natives and foreign-born individuals currently residing in Germany.[10] Table 1 reports the summary statistics of the variables of interest.[11] For easy reference, we show these statistics as a comparison between German natives and foreign-born persons.

The survey question recording the respondent's *risk appetite* asks, "How would you describe yourself: Are you generally willing to take risks, or do you try to avoid risks?" This question's responses range from *0* (*risk-averse*) to *10* (*fully prepared to take risks*). The question was asked in survey years 2004 and 2006, and since the year 2008, it has been asked annually. Despite being a subjective measure, experimental validation studies show that it is a valid predictor of actual risky behavior (Dohmen et al. 2011). Table 1 shows that compared to German natives, immigrants in Germany are, on average, more risk-averse.

The second economic preference records the respondent's *patience*, asking, "How would you describe yourself: Are you generally an impatient person, or someone who always shows great patience?" The individual responses to this question range from 0 (*very impatient*) to 10 (*very patient*). The respondents' patience is recorded once every 5 years since 2008 in the following three survey years: 2008, 2013, and 2018. Table 1 confirms the earlier observation from Fig. 1 that the immigrants in Germany are, on average, more patient than natives. Both questions have been shown in experiments to reflect actual risk and time preferences very well (Falk et al. 2016).

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[9] For more information on the SOEP data, see Goebel et al. (2019).

[10] Our focus on the individual's country of birth to separate foreigners among the populace distinguishes our paper from existing research that considers the respondents' nationality (Bonin et al. 2009, 2012). It is plausible that the SOEP respondents with multiple nationalities can report their preferred nationality biasing immigrants' selection in the sample. The birth of the respondent, on the other hand, avoids this particular issue.

[11] The table is constructed using information on all those respondents who reported their risk appetite. Therefore, in total, the estimation sample consists of information on 238,391 observations of German natives and 58,275 observations of first-generation immigrants (FGI) residing in Germany.

Table 1 also reports information on individual characteristics that we employ as explanatory variables in the empirical investigation. Accordingly, natives are, on average, older than immigrants (50 years vs. 43 years). Other explanatory variables are dummies representing the respondent's gender (*female*), urban residence (*urban*), marital status (*married*), and current residence in East Germany (*east*). Most notably, only 7% of the East German population is foreign-born.

The second part of the empirical investigation considers individual-level supplementary information, as shown in Table 1. The analysis begins by studying the role played by the respondent's demographic characteristics (age, gender, marital status, urban, and East German residence) in explaining the EP gap. For the analysis of the respondents' age, we construct a dummy variable indicating whether the respondent is younger (aged below 35 years). As economic characteristics, the analysis considers indicator variables denoting the respondent's education (*low educated* vs. *high educated*), labor market participation (*active participants* vs. *non-working*), employment status (*unemployed*, *self-employed*, or *employed*), and current enrollment status as *in education or training* (*edu training* vs. *others*). The analysis also considers the role played by the employed respondents' skill levels. To do this, we generate a set of dummy indicators denoting whether the respondent is currently employed in a *low-skilled*, *medium-skilled*, or *high-skilled* job.

After that, we consider several characteristics that are predominantly available for immigrant respondents only. Therefore, the subsequent analysis is restricted to the immigrant sample only. First, we consider social assimilation variables, i.e., the respondent's self-reported assimilation of the German identity (*GI*). The survey asks respondents the following question: *To what extent do you feel German?* The responses to this question range from 1 (*Completely*) to 5 (*Not at all*). We reverse responses to this question for the ease of interpretation so that higher values indicate increased identification. In Table 1, we observe that immigrants report their German identity to be between 3 (*in some respects*) and 4 (*for the most part*).

Additionally, we consider information about immigrants' oral and written language proficiency in German. In doing so, we employ dummy variables that take the value of 1 if the respondent reports having good knowledge of oral and written German and 0 otherwise. Finally, we consider several variables recording the immigrant respondents' experience of the host country. These include three dummy variables indicating immigrants' duration of stay in Germany as follows: short stay (less than 6 years), medium stay (between 6 and 20 years), and long stay (more than 20 years). Aside from this, we use a continuous variable indicating the immigrant respondent's year of immigration to Germany. The following subsection justifies the inclusion of these variables in detail.

3.2 Estimation methodology

The empirical investigation begins by examining the association between the respondents' economic preference and their immigration status. Given that the same

Table 1 Summary statistics

	Natives		First-generation immigrants (FGI)	
	Mean	SD	Mean	SD
	(1)	(2)	(3)	(4)
Baseline analysis				
Dependent variables				
Risk appetite (range 0–10)	4.554	2.298	4.326	2.861
Time preference or *patience* (range 0–10)	6.070	2.322	6.303	2.512
Control variables				
Age	51.53	16.96	43.12	14.80
Female (dummy)	0.534	0.499	0.513	0.500
Married (dummy)	0.600	0.490	0.696	0.460
Urban (dummy)	0.624	0.484	0.752	0.432
East DE (dummy)	0.246	0.431	0.071	0.257
Supplementary analysis				
Young age dummy (≤ 35 years)	0.191	0.393	0.345	0.475
Low educated (dummy, education ≤ 11 years)	0.359	0.480	0.690	0.462
Labor market status				
Nonworking (dummy)	0.362	0.481	0.369	0.483
Unemployed (dummy)	0.057	0.232	0.136	0.343
Working (dummy)	0.580	0.493	0.495	0.500
Self-employed (dummy)	0.065	0.246	0.039	0.194
In education or training (dummy)	0.044	0.205	0.044	0.206
Skills (only employed report)				
Low-skilled job (dummy)	0.216	0.412	0.494	0.500
Middle-skilled job (dummy)	0.429	0.495	0.277	0.447
High-skilled job (dummy)	0.210	0.408	0.112	0.316
Immigrant characteristics				
Social assimilation variables				
German identity (*GI*)				
How much German you feel (1–5)	-	-	3.464	1.164
German proficiency				
Oral: very good (dummy)	1	0	0.543	0.498
Written: very good (dummy)	1	0	0.469	0.499
Duration since migration				
Years since migration	-	-	16.51	13.46
Short (dummy)	-	-	0.286	0.452
Medium (dummy)	-	-	0.366	0.482
Long (dummy)	-	-	0.348	0.476
Immigration year (*Immiyear*)	-	-	1,997	15.19
Reason for migration				
Family reasons	-	-	0.298	0.457

Table 1 (Continued)

	Natives		First-generation immigrants (FGI)	
	Mean	SD	Mean	SD
	(1)	(2)	(3)	(4)
Economic reasons	-	-	0.179	0.384
Political reasons	-	-	0.281	0.449
Other reasons	-	-	0.242	0.428
Refugee dummy	-	-	0.289	0.453
Intended stay in Germany				
For a few years (dummy)	-	-	0.147	0.354
Stay permanently (dummy)	-	-	0.853	0.354
Total number of observations	238,391		58,275	

Source: SOEP v35. Survey years 2003–2018, unbalanced panel, own calculations
Note: The variable, *Risk appetite,* is available biennially for survey years 2004, 2006, and 2008. After that, from the survey year 2009 onward, it has been included annually in the SOEP. The variable *patience* was asked in survey years 2008, 2013, and 2018. The table is constructed using the information of all those respondents who reported their risk appetite

individual is surveyed multiple times, we exploit the panel dimension of the data and employ the random effects estimation technique with the respondent's economic preferences as dependent variables.[12] The baseline empirical model is as follows:

$$EP_{it} = \beta_0 + \beta_1 Immigrant_i + \beta_2 X_{it} + \gamma_s + \gamma_t + \mu_{ist}. \tag{1}$$

In this specification, the dependent variable EP_{it} measures self-reported economic preference of the respondent i; $Immigrant_i$ is the time-invariant dummy indicator variable taking the value of 1 if the respondent is a foreign-born person and 0 otherwise; X_{it} is the vector of the individual characteristics listed as explanatory variables in Table 1; γ_s and γ_t are the state and survey year fixed-effects; and μ_{ist} is the error term.[13][14] The main parameter of interest is β_1, which denotes the estimate of the immigrant-native gap in economic preferences.[15] As the respondents' immigrant status is not assigned exogenously, we suggest that β_1 should not be interpreted as a causal estimate.

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[12] We also test the robustness of our main results by re-estimating specifications using OLS regressions and confirm that the results hold.

[13] Research also highlights the role of individual-level demographic characteristics in explaining individuals' risk appetite. For example, Bonsang and Dohmen (2015) find that individuals become less willing to take risks as they age. Therefore, baseline specifications include variables for individuals' linear and nonlinear age terms, i.e., age, squared age, and age cube.

[14] Given our focus on estimating the immigrant-native gap in two distinct economic preferences and their qualitative comparison, the empirical estimation is performed with the standardized dependent variables.

[15] To account for systematic within-person correlations, we report results with standard errors clustered at the individual level.

After that, we consider the role of the respondents' pertinent demographic and economic characteristics in moderating the immigrant-native gap denoted by the coefficient β_1. For this analysis, we consider dummy variables indicating the respondent's demographic and economic information and modify Eq. (1) by interacting these indicators with the primary variable of interest (*Immigrant$_i$*). The coefficient on the interaction term is the new association of interest.

Next, we study how the immigrant characteristics listed in Table 1 are associated with the EP gap. For this analysis, we consider several variables representing immigrants' assimilation of the host culture and year of immigration to Germany. Given that some migration-related supplementary information, particularly German language skills and level of self-reported German identity, is predominantly available for immigrant respondents only, we perform analysis from here onward using the immigrant sample only. For this empirical investigation, we modify Eq. (1) in two significant ways. First, we consider the absolute difference in economic preferences (*Abs_Diff_EP$_{it}$*) as the proxy indicator of the EP gap. We construct this variable by subtracting the average value of the economic preference of the native of similar age and gender for the survey year ($\overline{EP}_{native,t}$) from the immigrant respondent's economic preference (*EP$_{immi,it}$*), i.e., $Abs\_Diff\_EP_{it} = EP_{immi,it} - \overline{EP}_{native,t}$. Second, in place of the dummy indicator representing the respondent's immigration status (*Immigrant$_i$*), we now consider a continuous variable indicating immigrant's year of immigration to Germany, denoted by the term *Immiyear$_i$* in Eq. (2):

$$Abs\_Diff\_EP_{it} = \delta_0 + \delta_1 Immiyear_i + \delta_2 X_{immi,it} + \delta_2 X_{it} + \gamma_s + \gamma_t + \mu_{ist} \qquad (2)$$

We provide the following supporting argument for our focus on *Immiyear$_i$*. The respondent's year of immigration acts as a proxy for the immigrant cohorts to Germany and allows the cohort-level evolution of immigrants' economic preferences to be pinned down.[16][17] We motivate this research by referring to earlier research. For instance, Bonin et al. (2009) suggest that the migration of older immigrant cohorts to Germany, especially those who arrived in the 1960s as guest workers and obtained jobs upon entering the country, might have involved a meager amount of risk compared to later cohorts. Also, these immigrants were, on average, low-skilled and thus are relatively more risk-averse than German natives. Therefore, we ask the following policy-relevant research question: Is Germany increasingly attracting immigrants with relatively distinct economic preferences compared to natives, particularly since the refugee crisis of 2015?

As our analysis studies immigrant-native differences in the destination country, the estimates of the EP gap crucially rely on the assumption that the EP measures are valid and capture the same thing across the populations of immigrants and natives. While we cannot assume away the systematic differences in responses to outcome measures originating from differences in linguistic and cultural backgrounds between different population subgroups, we employ numerous migration-related

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[16] For this analysis, the standard errors are clustered at the survey year level to account for systematic correlations across survey years.

[17] Alternatively, we run a regression model similar to (1) and discuss our findings.

characteristics and investigate their independent role in the EP gap estimations. To this end, as noted earlier, we investigate the role of immigrants' assimilation of host identity, host language proficiency, duration of residence, refugee status, origin, migration reason, and intended length of stay in explaining the EP gap. This migration-related information is denoted as $X_{immi,it}$ in Eq. (2).

4 Results and discussion

4.1 The immigrant-native gap in economic preferences (EP gap)

4.1.1 Baseline estimates

In Tables 2 and 3, we report the estimates of EP gap, following the estimation strategy in Eq. (1). The results in the first column of Table 2 indicate that immigrants report lower risk appetite than German natives, statistically significant at the 1% level.[18] Column (1) of Table 3 reports that immigrants are more patient than German natives, also statistically significant at the 1% level. In terms of magnitude, ceteris paribus, being an immigrant is associated with a decrease in risk preferences of 0.256 sample standard deviations and an increase in time preference of 0.151 sample standard deviations.[19]

Our findings that immigrants report lower risk appetite and higher time preference than natives demand auxiliary exploration along the distributional lines.[20][21] That is, we ask whether the EP gap estimates hold for the most/least risk-loving individuals in the sample. We estimate the EP gap by dividing the estimation sample below (and equal to) and above the median levels of risk (median of 5) and time preferences (median of 6).[22] The findings discussed here are available upon request. For the below (and equal to) median sample of risk preference, we find that

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[18] The finding is consistent with earlier research (*see* Bonin et al. 2009).

[19] The estimates presented in columns (1)–(2) of the Online Appendix Table A1 show that, while SGIs report a slightly higher risk appetite than natives, SGIs and FGIs do not statistically differ in their risk appetite (see column (2)). Concerning time preferences, the estimates presented in columns (9)–(10) find that, while SGIs report lower time preference than FGIs, they do not differ in their time preferences than German natives.

[20] We additionally explore the distributional approach using the method described in Fortin et al. (2011). We estimate the 90–10 interquantile differences using the *recentered influence functions (RIF)* regression approach. To do this, we employ a s *rifhdreg*, as developed in Rios-Avila (2019), which reports OLS estimates of the EP gap at the 90th and 10th quantiles of the distribution using the model otherwise identical to the baseline model. We confirm that we find qualitatively similar results to those discussed in the text.

[21] We also implement Stata command *robvar* that performs Levene's test to verify whether immigrant and native subsamples have equal variances in economic preferences. The command reports test statistics centered at the mean, the median, and centered using the 10% trimmed mean (the top 5% and bottom 5% of values). The *p* value for each version of Levene's test is below 0.01, indicating a statistically significant difference in the variance of economic preferences of immigrants and natives.

[22] Interestingly, immigrants are around 20% of the population in subsamples of both outcomes, indicating that immigrants are not necessarily overrepresented in the below-median subsample and have equal representation.

immigrants report a lower risk appetite than natives. In comparison, immigrants register a higher risk appetite than natives for the above-median sample. We do not find any immigrant-native difference in the below (and equal to) median sample of time preference. In contrast, in the above-median sample, immigrants report higher time preferences than natives.

4.1.2 Supplementary analysis

Next, we perform supplementary analysis by studying the role of the respondent's pertinent demographic and economic characteristics in narrowing the EP gap. We begin by considering the role of the respondents' following demographic characteristics: age, gender, marital status, urban, and East German residence. Columns (2)–(6) of Tables 2 and 3 present the results. We find that the risk gap is smaller among female respondents, whereas it is larger among married respondents. The results in Table 3 suggest that the time gap is wider among females, significant at the 10% level. The analysis does not find any evidence of heterogeneous association concerning the respondents' urban and East German residence.

In Tables 4 and 5, we consider the respondents' economic characteristics. In column (1), we begin the discussion by considering the role of the respondent's education level. The results suggest that the risk gap is much wider for the low educated than among the highly educated. Conversely, education does not play any role in moderating the time gap.

Next, we consider the respondent's labor force status. The analysis begins by studying the immigrant-native gap among the respondents inactive on the labor market, indicated by a non-working dummy (see column 2). The reference group consists of respondents who are active in the labor force, which includes unemployed and employed respondents. In column (3), we restrict the sample to active labor market participants and consider the role of the respondent's employment status as unemployed and those who are self-employed. In column (4), we further restrict the sample to employed respondents and study the role of their skill level. We find that the risk gap is wider among non-working respondents, unemployed respondents, and those working in low- and middle-skilled occupations, while it is narrower for the self-employed. Concerning the time gap, we find that it is wider among the unemployed respondents, while it is narrower among the self-employed.

4.2 Immigration cohorts, social assimilation, and the immigrant-native gap

The past success of immigrants' social integration is only a good indicator for future success when factors influencing their integration are stable. These factors can be on the side of the host country—where even singular events can change integration outcomes significantly, see, e.g., Deole (2019), but also on the side of the immigrants, e.g., the role played by immigrants' home culture (Constant et al. 2006). Therefore, it is of interest to detect potential changes in the immigrant cohorts over time, leading to changes in integration outcomes in

Table 2 Immigrant-native gap in risk appetite (entire sample)

	Risk appetite					
	(1)	(2)	(3)	(4)	(5)	(6)
Immigrant dummy	−0.257***	−0.247***	−0.295***	−0.219***	−0.242***	−0.254***
	(0.008)	(0.010)	(0.012)	(0.013)	(0.016)	(0.009)
Age group (reference: older respondents, > 35 years)						
Young		0.009				
		(0.009)				
Immigrant × Young		−0.026*				
		(0.015)				
Gender: Female dummy						
Immigrant × female			0.077***			
			(0.016)			
Marital status: married						
Immigrant × married				−0.059***		
				(0.015)		
Type of residence: urban						
Immigrant × urban					−0.020	
					(0.018)	
Resides in East Germany (east DE)						
Immigrant × east DE						−0.025
						(0.028)
Age	−0.044***	−0.044***	−0.044***	−0.043***	−0.044***	−0.044***
	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Age-squared	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age-cubed	−0.000***	−0.000***	−0.000***	−0.000***	−0.000***	−0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	−0.344***	−0.344***	−0.365***	−0.343***	−0.344***	−0.344***
	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)
Married	−0.062***	−0.061***	−0.063***	−0.050***	−0.062***	−0.062***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Urban	0.006	0.006	0.006	0.006	0.010	0.006
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
East DE	0.115***	0.115***	0.114***	0.115***	0.115***	0.118***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)

Source: SOEP v35. Survey years 2003–2018, unbalanced panel, own calculations

Note: The table presents the estimates of the immigrant-native gap in economic preferences estimated using the random effects estimation strategy. Sample size is 296,666 observations. Standard errors (clustered at individual-level) are in parentheses: $*p < 0.1$; $**p < 0.05$; $***p < 0.01$

Additional controls: The table shows the coefficients of the demographic characteristics used as control variables in the analysis. All specifications include state and survey year FEs (not shown)

the future. To this end, we study the association of the immigrants' immigration year with the EP gap. We also investigate whether the immigrants' host country experience mediates in the immigration year's relationship with EP gap. Following the estimation strategy shown in Eq. (2), in column (1) of Tables 6 and 7, we demonstrate whether EP gap has evolved across different immigration

Table 3 Immigrant-native gap in patience (entire sample)

	Patience					
	(1)	(2)	(3)	(4)	(5)	(6)
Immigrant dummy	0.151***	0.151***	0.123***	0.126***	0.171***	0.145***
	(0.015)	(0.017)	(0.021)	(0.026)	(0.028)	(0.015)
Age group (reference: older respondents)						
Young		−0.005				
		(0.022)				
Immigrant × young		0.001				
		(0.033)				
Gender: female dummy						
Immigrant × female			0.051*			
			(0.029)			
Marital status: married						
Immigrant × married				0.037		
				(0.030)		
Type of residence: urban						
Immigrant × urban					−0.026	
					(0.032)	
Resides in East Germany (east DE)						
Immigrant × east DE						0.094
						(0.058)
Age	0.007	0.006	0.007	0.007	0.007	0.007
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Age-squared	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age-cubed	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	−0.009	−0.009	−0.017	−0.009	−0.009	−0.009
	(0.010)	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)
Married	−0.063***	−0.063***	−0.063***	−0.067***	−0.063***	−0.063***
	(0.010)	(0.010)	(0.010)	(0.011)	(0.010)	(0.010)
Urban	−0.022*	−0.022*	−0.022*	−0.022*	−0.019	−0.023*
	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.012)
East DE	0.042	0.042	0.042	0.042	0.043	0.037
	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)

Source: SOEP v35. Survey years 2003–2018, unbalanced panel, own calculations

Note: The table presents the estimates of the immigrant-native gap in economic preferences estimated using the random effects estimation strategy. Sample size is 58,335 observations. Standard errors (clustered at individual-level) are in parentheses: *$p<0.1$; **$p<0.05$; ***$p<0.01$

Additional controls: The table shows the coefficients of the demographic characteristics used as control variables in the analysis. All specifications include state and survey year FEs (not shown)

cohorts. The results show that the risk gap shares a positive association with the immigration year, i.e., the recent immigrant cohorts report a larger risk gap, demonstrated by increased absolute difference in risk appetite. In contrast, the time gap shows a negative and statistically significant association with the immigration year.

Table 4 Economic characteristics and the immigrant-native gap in risk appetite (entire sample)

	Risk appetite				
	(1)	(2)	(3)	(4)	(5)
Immigrant dummy	−0.056*** (0.014)	−0.169*** (0.0100)	−0.136*** (0.011)	0.002 (0.018)	−0.189*** (0.009)
Education: low educated					
Immigrant×low educated	−0.212*** (0.017)				
Labor market status (reference: active)					
Immigrant×nonworking		−0.048*** (0.013)			
Employment status: (reference: working, besides the self-employed)					
Immigrant×unemployed			−0.195*** (0.019)		
Immigrant×self-employed			0.224*** (0.031)		
Skill levels at the job (reference: high skilled job)					
Low skilled				−0.054*** (0.010)	
Immigrant×low skilled				−0.164*** (0.021)	
Middle skilled				−0.052*** (0.008)	
Immigrant×middle skilled				−0.043** (0.020)	
In education and training					
Immigrant×edu/training					0.031 (0.026)
Age	−0.056*** (0.004)	−0.0570*** (0.00357)	−0.038*** (0.007)	−0.051*** (0.007)	−0.058*** (0.004)
Age-squared	0.001*** (0.000)	0.000971*** (7.14e−05)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Age-cubed	−0.000*** (0.000)	−6.10e−06*** (4.47e−07)	−0.000** (0.000)	−0.000*** (0.000)	−0.000*** (0.000)
Female	−0.334*** (0.006)	−0.333*** (0.00645)	−0.329*** (0.008)	−0.327*** (0.008)	−0.333*** (0.006)
Married	−0.056*** (0.006)	−0.0574*** (0.00608)	−0.084*** (0.007)	−0.078*** (0.007)	−0.057*** (0.006)
Urban	−0.001 (0.008)	−0.00271 (0.00787)	0.003 (0.009)	−0.002 (0.010)	−0.002 (0.008)
East DE	0.108*** (0.022)	0.105*** (0.0216)	0.108*** (0.026)	0.089*** (0.028)	0.105*** (0.022)
Low educated	−0.059*** (0.008)	−0.111*** (0.00696)	−0.046*** (0.008)	−0.013 (0.009)	−0.112*** (0.007)
Nonworking	−0.059*** (0.006)	−0.0479*** (0.00610)			−0.061*** (0.006)
Unemployed	−0.038*** (0.008)	−0.0424*** (0.00831)	0.011 (0.010)		−0.038*** (0.008)

Table 4 (continued)

	Risk appetite				
	(1)	(2)	(3)	(4)	(5)
Self-employed	0.179***	0.180***	0.168***	0.163***	0.179***
	(0.010)	(0.0100)	(0.011)	(0.012)	(0.010)
Edu/training	0.045***	0.0473***	0.038***	−0.052***	0.044***
	(0.010)	(0.0102)	(0.014)	(0.017)	(0.011)
Observations	296,666	296,666	188,751	167,202	296,666

Source: SOEP v35. Survey years 2003–2018, unbalanced panel, own calculations

Note: The table presents the estimates of the immigrant-native gap in economic preferences estimated using the random effects estimation strategy. Standard errors (clustered at individual-level) are in parentheses: *$p<0.1$; **$p<0.05$; ***$p<0.01$

Additional controls: The table shows the coefficients of the demographic and economic characteristics used as control variables in the analysis. All specifications include state and survey year FEs (not shown)

In column (2) of Tables 6 and 7, we study whether immigrants' German language skills show an independent association with the immigrant-native gap.[23] The results show that immigrants' German language skills are negatively associated with the risk gap but share no association with the time gap. Column (3) of Table 6 considers the association of the immigrants' social assimilation variable, i.e., *German identity*, with the risk gap. We do not perform a similar analysis for the time gap as the social assimilation question was not asked in the years where patience information is available. The results for the risk gap show that the immigrant respondent's acquisition of German identity is unrelated with the risk gap. It is noteworthy that the magnitude of the association of *Immiyear* is much smaller when we control for the social assimilation variable, suggesting that the role of the immigration cohorts in explaining the risk gap becomes smaller (yet statistically significant) upon controlling for the respondent's social assimilation.

The finding suggesting that migrants' assimilation of German identity is, on average, unrelated to the risk gap is in direct contrast with the findings of the existing literature and needs further clarifying discussion.[24] To this end, we re-estimate the model specification in Eq. (2) by using individuals' economic preferences as dependent variables. In other words, we now regress immigrant individuals' risk

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[23] While immigrants' German language proficiency may indicate their social assimilation level; it may also represent the linguistic and cultural differences in understanding the survey questions and, thus, different response patterns without reflecting actual differences in preferences. In our efforts to test our results' robustness, we re-estimate the EP gap presented in Tables 2 and 3 after controlling for information on the respondents' language proficiency and region of origin (a proxy for regional culture). We find qualitatively similar estimates to baseline results (available upon request). We also re-estimate the risk gap after controlling for the available information on the respondents' German identity (only 2209 natives responded to this question) and confirm the baseline estimates' robustness (available upon request).

[24] For instance, Bonin et al. (2012) find that when migrants adapt to the attitudes, culture, and behavior of native Germans, the immigrant-native gap in risk proclivity closes. In columns (5)–(8) of the Online Appendix Table A1, we additionally employ all the available information on German residents' assimilation of host identity (GI) and show whether GI and risk appetite share a correlation for different population subgroups. The results indicate that higher values of GI are associated with higher risk appetite only among FGIs.

Table 5 Economic characteristics and the immigrant-native gap in patience (entire sample)

	Patience				
	(1)	(2)	(3)	(4)	(5)
Immigrant dummy	0.169***	0.156***	0.164***	0.127***	0.158***
	(0.023)	(0.0175)	(0.020)	(0.037)	(0.015)
Education: low educated					
Immigrant×low educated	−0.026				
	(0.030)				
Labor market status (reference: active)					
Immigrant×nonworking		−0.007			
		(0.0289)			
Employment status: (reference: working, besides the self-employed)					
Immigrant×unemployed			0.111**		
			(0.048)		
Immigrant×self-employed			−0.176**		
			(0.068)		
Skill levels at the job (reference: high skilled job)					
Low skilled				0.070***	
				(0.020)	
Immigrant×low skilled				0.019	
				(0.046)	
Middle skilled				0.051***	
				(0.016)	
Immigrant×middle skilled				0.037	
				(0.047)	
In education and training					
Immigrant×edu/training					−0.110
					(0.068)
Age	0.010	0.00958	−0.024*	−0.027**	0.010
	(0.006)	(0.00641)	(0.012)	(0.013)	(0.006)
Age-squared	−0.000	−2.91e-05	0.001**	0.001***	−0.000
	(0.000)	(0.000124)	(0.000)	(0.000)	(0.000)
Age-cubed	−0.000	−1.57e-07	−0.000**	−0.000***	-0.000
	(0.000)	(7.50e-07)	(0.000)	(0.000)	(0.000)
Female	−0.009	−0.00862	−0.034***	−0.053***	−0.009
	(0.010)	(0.00989)	(0.012)	(0.013)	(0.010)
Married	−0.063***	−0.0632***	−0.040***	−0.043***	−0.063***
	(0.010)	(0.0102)	(0.013)	(0.013)	(0.010)
Urban	−0.022*	−0.0225*	−0.027*	−0.021	−0.022*
	(0.012)	(0.0123)	(0.015)	(0.016)	(0.012)
East DE	0.043	0.0433	0.016	−0.017	0.044
	(0.033)	(0.0334)	(0.042)	(0.044)	(0.033)
Low educated	0.004	−0.000146	−0.002	−0.017	−0.001
	(0.012)	(0.0108)	(0.014)	(0.016)	(0.011)
Nonworking	−0.017	−0.0163			−0.017
	(0.012)	(0.0127)			(0.012)
Unemployed	−0.036*	−0.0361*	−0.071***		−0.036*
	(0.019)	(0.0195)	(0.023)		(0.019)

Table 5 (continued)

	Patience				
	(1)	(2)	(3)	(4)	(5)
Self-employed	− 0.048**	− 0.0479**	− 0.038*	− 0.017	− 0.048**
	(0.019)	(0.0194)	(0.021)	(0.024)	(0.019)
Edu/training	0.038	0.0386	− 0.024	0.024	0.052**
	(0.025)	(0.0248)	(0.035)	(0.039)	(0.026)
Observations	58,335	58,335	36,971	33,687	58,335

Source: SOEP v35. Survey years 2003–2018, unbalanced panel, own calculations

Note: The table presents the estimates of the immigrant-native gap in economic preferences estimated using the random effects estimation strategy. Standard errors (clustered at individual-level) are in parentheses: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

Additional controls: The table shows the coefficients of the demographic and economic characteristics used as control variables in the analysis. All specifications include state and survey year FEs (not shown)

appetite on their immigration year and other immigration-related characteristics. Tables A6–A9 in the Online Appendix present the results estimated using alternative specifications, which correspond more closely to the main analysis and have a straightforward interpretation. The results shown in columns (1)–(2) of Table A6 present evidence highlighting the role of immigration year and host language proficiency in determining immigrants' risk preference. Notably, in column (3) of Table A6, we observe that immigrants' German identity is positively associated with their risk appetite. This therefore resolves the seeming discrepancy to previous literature that we encountered in Table 6.

After that, we investigate whether immigrants' more prolonged stay in the host country reduces the EP gap. In column (6), we study the association of the EP gap with indicators representing the immigrants with a shorter and medium stay in Germany. The results show that, while the risk gap exists for the recently arrived immigrants, it is inexistent for the immigrants residing for more than 6 years in Germany. The results of column (3) in Table 7 do not show any association between the immigrants' length of stay in Germany and the time gap.[25] The results presented in Table A7 also show qualitatively similar results indicating statistically insignificant role of immigrants' duration of residence in Germany.

4.3 Immigrants' origin, migration motive, intended stay, and the immigrant-native gap

Tables 8 and 9 consider the role of additional pertinent migration-related information in the relationship of the variable *Immiyear* with EP gap. First, we use the

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[25] In columns (3) and (11) of the Online Appendix Table A1, we study whether the FGI's duration of stay in the host country is associated with reducing the EP gap when we include natives in the estimation sample. The results find supporting evidence that FGIs with a relatively longer duration of stay in Germany report a smaller risk gap and time gap. A similar pattern of results is observed in columns (4) and (12) when FGIs are compared with SGIs.

Table 6 Immigrants' social assimilation and risk appetite (immigrant sample)

	Absolute difference in risk appetite (risk gap)						GI
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Immigration year (*Immiyear*)	0.013***	0.011***	0.003**	0.006***	0.005***	0.003***	−0.014***
	(0.003)	(0.003)	(0.001)	(0.002)	(0.001)	(0.001)	(0.004)
German language skills							
Oral: very good		−0.084***					
		(0.026)					
Written: very good		−0.060***					
		(0.013)					
German identity (GI, standardized)			−0.013			−0.012	
			(0.008)			(0.009)	
Duration since migration							
Short				0.248***	0.169***	−0.015	−0.321***
				(0.078)	(0.061)	(0.029)	(0.059)
Medium				−0.004	0.009	−0.008	−0.026
				(0.016)	(0.014)	(0.013)	(0.065)
ERC					0.259***	0.201***	−0.155
					(0.071)	(0.038)	(0.099)
Observations	56,246	56,246	20,563	56,246	56,246	20,563	22,697

Source: SOEP v35. Survey years 2003–2018, unbalanced panel, own calculations

Note: The table presents the results estimated using the random effects estimation strategy. The table shows the coefficients of the variables of interest. Standard errors (clustered at the survey year level) are in parentheses: $*p<0.1$; $**p<0.05$; $***p<0.01$

Additional controls: The control variables not shown here include continuous variable age and dummy variables denoting female, married, urban, and East German residence. Nonlinear terms for the variable age (age-squared and age-cube) are used. All specifications include state and survey year FEs (not shown)

Table 7 Immigrants' social assimilation and the time gap (immigrant sample)

	Absolute difference in patience (time gap)		
	(1)	(2)	(3)
Immigration year (*Immiyear*)	−0.001**	−0.002***	−0.003
	(0.001)	(0.001)	(0.002)
German language skills			
Oral: very good		−0.023*	
		(0.012)	
Written: very good		−0.012	
		(0.019)	
Duration since migration			
Short			0.087
			(0.093)
Medium			0.026
			(0.052)
ERC			0.029
			(0.073)

Source: SOEP v35. Survey years 2003–2018, unbalanced panel, own calculations

Note: The table presents the results estimated using the random effects estimation strategy. The table shows the coefficients of the variables of interest. Sample size is 7,478. Standard errors (clustered at the survey year level) are in parentheses: $*p < 0.1$; $**p < 0.05$; $***p < 0.01$

Additional controls: The control variables not shown here include continuous variable age and dummy variables denoting female, married, urban, and East German residence. Nonlinear terms for the variable age (age-squared and age-cube) are used. All specifications include state and survey year FEs (not shown)

information on the immigrant's country of birth and designate immigrant respondents to major home regions.[26] Accordingly, the following home regions are considered: (1) Western Europe (WE); (2) Central and East Europe (CEE); (3) Turkey, the Middle East, and North Africa (TMENA); (4) and other regions (OOC). The results are estimated using Western European immigrants as the reference category. The results in column (1) of Table 8 find that TMENA immigrants report a statistically significantly larger risk gap than other immigrant groups in Germany. Interestingly, column (2) shows that the recent cohorts of TMENA, CEE, and OOC immigrants report a higher risk gap than recent cohorts of EU immigrants. Concerning the time gap, in columns (1)–(2) of Table 9, we observe a similar pattern of results for TMENA immigrants, while CEE and OOC immigrants do not show any distinguishable changes across immigration cohorts compared to that of European immigrants.

Being part of the *Schengen* Area, Germany allows free mobility to the residents of 26 European countries. The possibility to enter the country freely reduces the costs of migrating for the citizens of these countries, which makes it possible for relatively

[26] An obvious source of bias in the EP gap estimation worth mentioning stems from cultural differences between natives and immigrants originating from culturally diverse parts of the world. In addition to the results discussed here, we compute the EP gap estimates in columns (1) of Tables 2 and 3 separately for immigrants originating from different world regions and confirm that the estimates are qualitatively similar (results available upon request).

Table 8 Immigrants' origin and the risk gap (immigrant sample)

	Absolute difference in risk appetite (risk gap)					
	(1)	(2)	(3)	(4)	(5)	(6)
Immigration year (*Immiyear*)	0.010*** (0.002)	0.001** (0.001)	0.012*** (0.003)	0.016*** (0.003)	0.006*** (0.001)	0.003*** (0.001)
Region of immigrants' origin (reference: West European immigrants)						
Turkey, Middle East, and North Africa (TMENA)	0.282*** (0.045)	−26.110*** (4.321)				
Central and East European countries (CEE)	−0.023 (0.033)	−10.224*** (2.892)				
Other origins (OOC)	0.010 (0.038)	−23.343*** (4.553)				
Immiyear×TMENA		0.013*** (0.002)				
Immiyear×CEE		0.005*** (0.001)				
Immiyear×OOC		0.012*** (0.002)				
EU Schengen origin (EU origin)						
EU origin			−0.161*** (0.037)	23.121*** (5.777)		
Immiyear×EU origin				−0.012*** (0.003)		
Refugee status						
Refugee					0.375*** (0.055)	−33.326*** (6.724)
Immiyear×refugee						0.017*** (0.003)
Observations	56,191	56,191	56,191	56,191	56,161	56,161

Source: SOEP v35. Survey years 2003–2018, unbalanced panel, own calculations

Note: The table presents the results estimated using the random effects estimation strategy. The table shows the coefficients of the variables of interest. Standard errors (clustered at the survey year level) are in parentheses: *$p<0.1$; **$p<0.05$; ***$p<0.01$

Additional controls: The control variables not shown here include continuous variable age and dummy variables denoting female, married, urban, and East German residence. Nonlinear terms for the variable age (age-squared and age-cube) are used. All specifications include state and survey year FEs (not shown)

Table 9 Immigrants' origin, intended stay, and the immigrant-native gap in patience (immigrant sample)

	Absolute difference in patience (time gap)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Immigration year (*Immiyear*)	−0.001 (0.001)	−0.003** (0.001)	−0.002** (0.001)	−0.000 (0.000)	−0.002*** (0.001)	−0.002*** (0.001)	−0.002*** (0.001)	−0.001 (0.009)
Region of immigrants' origin (reference: West European immigrants)								
TMENA	0.162*** (0.061)	−9.517*** (1.706)						
CEE	−0.004 (0.037)	−3.991 (4.778)						
OOC	0.010 (0.041)	−6.561 (4.520)						
Immiyear×TMENA		0.005*** (0.001)						
Immiyear×CEE		0.002 (0.002)						
Immiyear×OOC		0.003 (0.002)						
EU Schengen origin (EU origin)								
EU origin			−0.059** (0.029)	4.468*** (1.502)				
Immiyear×EU origin				−0.002*** (0.001)				
Refugee status								
Refugee					0.173*** (0.002)	5.218*** (1.009)		
Immiyear×refugee						−0.003*** (0.001)		

Table 9 (continued)

	Absolute difference in patience (time gap)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intended stay in Germany (reference: return to home country within 1 year)								
For a few years							0.037 (0.173)	12.640 (11.991)
Stay permanently							−0.013 (0.156)	−0.739 (17.401)
$Immiyear \times$ for a few years								−0.006 (0.006)
$Immiyear \times$ stay permanently								0.000 (0.009)
Observations	7,469	7,469	7,469	7,469	7,464	7,464	6,904	6,904

Source: SOEP v35. Survey years 2003–2018, unbalanced panel, own calculations

Note: The table presents the results estimated using the random effects estimation strategy. The table shows the coefficients of the variables of interest. Standard errors (clustered at the survey year level) are in parentheses: $*p < 0.1$; $**p < 0.05$; $***p < 0.01$

Additional controls: The control variables not shown here include continuous variable age and dummy variables denoting female, married, urban, and East German residence. Nonlinear terms for the variable age (age-squared and age-cube) are used. All specifications include state and survey year FEs (not shown)

risk-averse individuals to take up the act of migration. Alternatively, immigrants from EU countries are culturally more similar to natives than other immigrants and report a smaller EP gap. Therefore, in columns (3)–(4), we investigate whether these immigrants are distinct from other immigrants in Germany. To do this, we divide the immigrant sample into European (i.e., EU Schengen countries) and non-European immigrants. We do this by generating a dummy indicator *EU origin*, which takes the value 1 if the immigrant was born in a country currently a member of the EU Schengen agreement (26 European countries recorded in the SOEP) and 0 otherwise. The results of column (3) indicate that EU immigrants have a smaller risk gap than other immigrants. In column (4), we find that recent cohorts of EU immigrants have a smaller risk gap than recent cohorts of non-EU immigrants.[27] In columns (3)–(4) of Table 9, we observe similar results for the time gap for immigrants with European origin. Columns (5)–(6) of the tables consider the mediation by the immigrant respondent's refugee status. The results report that while refugee immigrants report a larger risk gap, the recent cohorts of refugees report an even larger risk gap.[28] Interestingly, as the results in columns (5)–(6) of Table 9 suggest, while refugees report a larger time gap than non-refugee immigrants, recent cohorts of refugees report a smaller time gap than earlier cohorts. The results in columns (1)–(6) of Table A8 in the Online Appendix report findings consistent with those discussed above.

Now we consider the role of immigrants' main reasons for immigration to Germany and the intended duration of stay. The results for the risk gap are reported in Table 10. The analysis begins by employing the SOEP question recording immigrants' main reasons for immigration to Germany. The survey records a total of seven individual responses to the question, which we group into four broad categories of migration reasons: (1) family (*partnership* and *other family reasons*), (2) economic reasons (*own economic perspective*, *economic perspective for children*, *other economic reasons*), (3) *political reasons*, (4) *other reasons*.[29] The results in column (1) show that immigrants who immigrated for political and other reasons report a higher risk gap than that of those who immigrated for family (and economic) reasons. Column (2) reports that recent immigrant cohorts who immigrated for political and other reasons show an even larger risk gap than others. The results in columns (3)–(4) consider the role of immigrants' intended length of stay in Germany (return to home country *within this year*, *in a few years*, or *never*). A broad reading of the estimates suggests that the immigrant respondents' intended length of stay does not mediate in the relationship presented in column (1) of Table 6.

Finally, in columns (5)–(6) of Table 10, we reconsider the variables indicating the immigrants' migration reasons and intended length of stay in a novel way. We want to distinguish between immigrants who have a short-term horizon and had migrated

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[27] De Coninck (2020) shows that European natives prefer European immigrants to non-European immigrants. The finding that EP gap is smaller for European immigrants is interesting.

[28] Recent literature finds that natives hold more positive views towards refugees than immigrants (De Coninck 2020). While refugees receive a larger share of political and media interest, the finding that the EP gap is higher for refugees is particularly interesting.

[29] We do not perform a similar analysis for the time gap as the survey question recording migration reasons was not asked in the years where patience information is available.

Table 10 Migration motive, intended stay and the risk gap (immigrant sample)

	Absolute difference in risk appetite (risk gap)					
	(1)	(2)	(3)	(4)	(5)	(6)
Immigration year (*Immiyear*)	0.011*** (0.002)	0.004 (0.002)	0.013*** (0.003)	0.011** (0.004)	0.018*** (0.004)	− 0.003 (0.008)
Reason for migration (reference: migrated for family reasons)						
Economic reasons	− 0.036 (0.029)	3.560 (6.879)				
Political reasons	0.336*** (0.051)	− 34.371*** (7.728)				
Other reasons	0.259*** (0.073)	− 38.367*** (5.023)				
Immiyear×economic reasons		− 0.002 (0.003)				
Immiyear×political reasons		0.017*** (0.004)				
Immiyear×other reasons		0.019*** (0.003)				
Intended stay in Germany (reference: return to home country within 1 year)						
For a few years			0.056 (0.071)	9.626 (6.317)		
Stay permanently			0.098 (0.071)	− 6.550 (6.196)		
Immiyear×for a few years				− 0.005 (0.003)		
Immiyear×stay permanently				0.003 (0.003)		
Stayers vs. opportunity seekers						

Table 10 (continued)

	Absolute difference in risk appetite (risk gap)					
	(1)	(2)	(3)	(4)	(5)	(6)
Stayers					0.239*** (0.076)	−42.752* (22.307)
Immiyear × stayers						0.021* (0.011)
Observations	28,770	28,770	53,112	53,112	27,715	27,715

Source: SOEP v35. Survey years 2003–2018, unbalanced panel, own calculations

Note: The table presents the results estimated using the random effects estimation strategy. The table shows the coefficients of the variables of interest. Standard errors (clustered at the survey year level) are in parentheses: $*p < 0.1$; $**p < 0.05$; $***p < 0.01$

Additional controls: The control variables not shown here include continuous variable age and dummy variables denoting female, married, urban, and East German residence. Nonlinear terms for the variable age (age-squared and age-cube) are used. All specifications include state and survey year FEs (not shown)

for study or job-related reasons (economic reasons), which we refer to as *opportunity seekers*, and those who have a permanent intended stay in the host country and had migrated for economic as well as noneconomic reasons (stayers). A motivation for this distinction is that the latter group is the one that is typically in the political discussion, while there is little opposition to the former group. We call those economic immigrants opportunity seekers who plan to return to their home country in the future, i.e., within this year or in a few years. We call all other immigrants stayers, including all noneconomic immigrants and those economic immigrants who plan to stay in Germany permanently. We study whether stayers and opportunity seekers report a distinct EP gap. Column (5) finds that opportunity seekers register a smaller risk gap than stayers, whereas, in column (6), the results indicate that recent cohorts of opportunity seekers are not distinct in their risk gap to older cohorts.

4.4 Dealing with unobserved heterogeneity

Earlier, we argued that our results should not be interpreted as causal estimates. For instance, the selection of immigrants to Germany, or more narrowly in our survey, is not exogenous and depends on many foreseeable factors, not accounted for directly in our analysis. Other effects how omitted variables impact our results also can not be ruled out. These factors include innate/pre-migration levels of economic preferences, the original reason for migration and decision to migrate to Germany specifically, and their post-migration decision to (or not to) remigrate to other countries or back to their home countries, which again largely depend on their economic preferences and acquisition of host characteristics and identity. These unobservable factors may bias the results to the extent that it overturns our main finding. Therefore, we conduct the bounding exercise described in Oster (2019) and estimate the level of bias in the unobserved variables necessary to overturn our EP gap estimates.

The method attempts to measure the level of unobserved heterogeneity that would invalidate our point estimates of the EP gap. It assumes a maximum R-squared value of 1 in a hypothetical regression, including all observed and unobserved covariates. The method then estimates a ratio (referred to as *delta*) that indicates how large the relationship between unobservables and the immigrant dummy has to be relative to the relationship between the observables and the immigrant dummy to overturn the observed EP gap estimates. The method estimates the delta after assuming proportionality between these relationships. To be precise, the estimated delta indicates the relative size of the relationship needed between unobserved omitted variables and immigrant indicator relative to the relationship between observed covariates and immigrant indicator to result in the coefficient of 0.

We employ this method on the baseline estimates presented in column (1) of Table 2 using the *Stata* command: *psacalc*. As the command is incompatible with the random effects panel estimator, we perform this analysis using the OLS estimates. The OLS estimates for the risk gap are -0.120 (0.010), and the delta ratio estimated using *psacalc* command is approx. 5.52. In other words, the delta value indicates that to eliminate any observed effect of the immigrant indicator, the

relationship between risk appetite and unobserved heterogeneity must be 5.52 times the size of the relationship between the observables and risk appetite. As our baseline model included detailed information on individual's pertinent characteristics, we find it challenging to imagine sources of unobserved heterogeneity with such great predictive power so that the risk gap estimates can be overturned. In other words, we argue that the risk gap estimates noted above are likely to hold even in the presence of substantial unobserved heterogeneity. The OLS estimates for the time gap are 0.140 (0.016) with a delta ratio of -0.041, indicating that, unlike earlier results, unobserved heterogeneity may overturn our estimates of the time gap. This potentially limits the viability of the findings for the time gap, which therefore requires further studies.

4.5 European refugee crisis (ERC) and the immigrant-native gap in economic preferences

In this subsection, we consider the episode of the 2015 European Refugee Crisis (ERC hereafter). In particular, we verify the robustness of our earlier findings when the effect associated with the ERC is taken into account. To do this, we generate a dummy indicator *ERC* taking the value of 1 if the immigrant respondent immigrated to Germany from 2015 onward and 0 otherwise. In column (5) of Table 6, we present the results and confirm that all earlier findings hold. We also demonstrate that those who immigrated during the ERC report a much larger risk gap than others. These results support the claim made earlier that the 2015 ERC changed the pattern of immigration to Germany regarding the risk gap: Our results suggest that lower degrees of assimilation in this immigrant cohort led to larger differences in the risk gap. What causes these lower degrees of assimilation cannot be answered with our data, but natural explanations would be inherent differences in the self-selection of migrants and larger integration problems due to the sheer number of immigrants arriving during a relatively short time. In column (6), we study whether the results in column (5) hold if we control for the immigrants' assimilation of German identity. While the findings reiterate that the main message holds (column (5)), coefficients for the variables indicating German identity and FGIs shorter duration of stay in Germany are not statistically significant. However, we refrain from concluding that this implies a mediator effect of assimilation on the risk gap due to the smaller sample size.

Therefore, in column (7) of Table 6, we re-estimate the baseline model with *GI* as the dependent variable to test the mediator effect. The model also controls for dummies indicating the respondent's immigration duration and sheds light on the role of immigrants' duration of stay in Germany. The results suggest that *Immiyear* is negatively associated with *GI*, suggesting that the increase over time in the risk gap can be attributed to recent drops in newcomers' social assimilation (after controlling for the time of their stay in Germany). The findings also provide supporting evidence of the argument made earlier that immigrants' recent cohorts report lower assimilation outcomes, including those who arrived in Germany around the 2015 European Refugee Crisis.

4.6 Limitations

SOEP data is widely considered of high quality, and the sample is representative of the German population. Nevertheless, of course, there are some limitations worth mentioning. First, the dataset was boosted multiple times since its inception to improve its coverage of the immigrant sample, most notably, in 2013, near the onset of the European Refugee Crisis. The frequent survey boosting can make it challenging to generalize some of the findings to all immigrants. However, according to the survey information document, SOEP's particular attention to gathering in-depth information on the labor-market integration processes of migrants in Germany makes it better suitable for the exploration of long-time societal changes, notably, the speed of convergence between migrants and natives (Goebel et al. 2019), like the one performed in this paper. On the other hand, Germany's unique situation in the aftermath of the refugee crisis, when the country observed a substantial increase in immigration inflows, poses exciting questions and challenges, some of which we addressed with our research. Another limitation when studying recent migration waves is obviously that long-term outcomes are not known yet. While we acknowledge this limitation, our study can help fill in some gaps in the knowledge about immigrants' relatively recent cohorts.

Any investigation of survey responses to individuals' economic preferences mandates discussion of item nonresponse to sometimes complicated survey questions. Existing research shows that older, female, low-income, and less educated respondents are disproportionately likely to skip answers to survey questions recording individuals' economic preferences (Wärneryd 1996). Moreover, the issue becomes severe given immigrant-native differences in host language proficiency needed to answer complex survey questions. However, as Coppola (2014) states, compared to lottery questions recording the respondents' risk preferences, nonresponse rates are significantly lower for general risk-taking questions, such as those used in this analysis, as they are easier to comprehend. In the SOEP version used for this study, the nonresponse rate for the risk appetite question was 0.52% (i.e., only 1720 of total 331,293 did not provide an answer to the question), whereas that for the patience question was a mere 0.16% (i.e., 102 of total 64,795 abstained from answering this question). Finally, there are certain limitations regarding the measurements of risk and time preferences. The SOEP survey is not a laboratory experiment, so the measurement of economic preferences is necessarily less precise than we would wish for. This distinction leaves room for further studies, but these simple measures are undoubtedly useful as a general indication.

5 Conclusion

These days, a sizeable portion of the Western population shares an immigrant background. According to Eurostat (2019), around 22.3 million non-EU citizens are currently living in EU countries. However, increasingly, Europeans consider immigration as the EU's primary concern (Eurobarometer 91, 2019). The recent successes

of the anti-immigration political rhetoric (Trump, Brexit) have given traction to economists investigating immigration's economic impact on the host countries. As migrants' economic preferences are intimately associated with their economic success in the host country, the study of migrants' economic preferences, such as their risk and time preferences, is topical.

Our analysis observed a substantial immigrant-native gap in economic preferences (what we call the EP gap) between natives and immigrants. However, we also found that the EP gap differs across immigrant groups and their pertinent characteristics and performance in the host country, especially for risk preferences. While male immigrants, those with lower education and low-skilled or no work are more risk-averse than natives, the differences tend to disappear for other groups. We also find that integration reduces this gap. Interestingly, when comparing different immigrant cohorts, our results indicated that the gap in risk preferences has increased over time (even when controlling for the time immigrants have stayed already in Germany). Notably, our findings suggest that those immigrants who arrived in Germany around the 2015 European Refugee Crisis tend to have a larger gap in risk preferences than older cohorts of immigrants. We further find that the difference of results between cohorts is mediated by lower degrees of their social assimilation of German identity. The gap in time preferences is, on the other hand, remarkably stable and does not respond to the immigrant respondents' demographic and economic characteristics, their time spent in the host country, or their assimilation to the host language and culture.

Our results suggest that the increase in risk aversion among recent migration cohorts should be taken seriously. For instance, future research should be devoted to investigating how immigrants' economic preferences mediate in their various behaviors that are important for their economic integration in the host society, i.e., entrepreneurial activity, job perspectives, and ultimately integration outcomes. Future research can also study whether these recent increases in the immigrant-native gap in economic preferences have macroeconomic and fiscal costs for the host country. Another relevant question is whether other economic preferences, such as intra- and interpersonal trust or honesty, also show similarly large immigrant-native gaps and whether similar factors contribute to this. Finally, it would be pertinent to understand the drivers of differences in economic preferences among different immigrant groups: To what extent are these based on cultural differences of the home countries, self-selection effects, or migration experiences?

Author contribution All authors contributed to the study conception and design. Data analysis was performed by Sumit Deole. The first draft of the manuscript was written by Sumit Deole, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Availability of data and material All used data are publicly available. See references for details.

Code availability None.

Declarations

Competing interests The authors declare no competing interests.

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