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To work or to study? Postmigration educational investments of adult refugees in Germany – evidence from a choice experiment

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Abstract

In this article, we analyze individual factors and situational conditions under which immigrants are more or less likely to invest in host country-specific human capital. Theoretically, we root our expectations in a strand of the immigrant human capital investment model combined with a basic model of educational decisions. Using a choice experiment, we simulate a decision process among refugees in Germany and examine the determinants of investment decisions into host country-specific credentials such as vocational education. The choice experiment was introduced in the IAB-BAMF-SOEP Survey of Refugees (2020), a representative longitudinal survey of recently arrived refugees in Germany. We find that refugees' probability of investing in vocational education is guided by the transferability of foreign human capital, the time horizon to reap investments, and rational cost-benefit considerations. The probability of success is influential on its own but also bolsters the relevance of costs and benefits in educational choices.

Zusammenfassung

In diesem Artikel analysieren wir individuelle Faktoren und situative Bedingungen, unter denen Einwanderer mehr oder weniger wahrscheinlich in aufnahmeland-spezifisches Humankapital investieren. Theoretisch stützen wir unsere Analysen auf einen Ansatz des Humankapital-Investitionsmodells von Zuwanderern und verbinden diesen mit einem Basismodell für rationale Bildungsentscheidungen. Mit Hilfe eines Choice-Experiments simulieren wir einen Entscheidungsprozess unter Flüchtlingen in Deutschland und untersuchen die Determinanten von Investitionsentscheidungen in aufnahmeland-spezifische Qualifikationen wie z.B. Berufsausbildung. Das Choice-Experiment wurde im Rahmen des IAB-BAMF-SOEP-Flüchtlingssurvey (2020) durchgeführt, einer repräsentativen Längsschnittbefragung von neu nach Deutschland gekommenen Flüchtlingen. Die Ergebnisse zeigen, dass sich die Wahrscheinlichkeit von Flüchtlingen, in berufliche Bildung zu investieren, an der Übertragbarkeit von ausländischem Humankapital, dem Zeithorizont für Investitionen und rationalen Kosten-Nutzen-Überlegungen orientiert. Die Erfolgswahrscheinlichkeit der Investition ist für sich selbst maßgebend, verstärkt aber auch die Bedeutung von Kosten und Nutzen bei Bildungsentscheidungen.

JEL classification

I24, I26, J24, J61, F22

Keywords

Choice experiment; immigrant human capital investment; refugees; IAB-BAMF-SOEP Survey of Refugees in Germany

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1 Introduction

It is widely known that immigrants have a labor market disadvantage in Western societies, and empirical evidence has shown a consistent pattern in host countries (e.g., Storer/Schneider/Harknett 2020; Elliott/Smith 2004; Zeng/Xie 2004; Spörlein/van Tubergen 2014). Compared to natives, immigrants have a higher unemployment rate, and if they manage to find employment, their wages and their status positions are lower (OECD 2019). These disadvantages are often traced back to the human capital approach, suggesting that foreign qualifications imply an insufficient accumulated human capital endowment and signal lower productivity (Lancee/Bol 2017; Zeng/Xie 2004; Kanas/van Tubergen 2009). In line with this, previous research revealed that employers prefer native-educated applicants to foreign-educated applicants, ceteris paribus (Damelang/Abraham 2016). Foreign education is therefore one of the major causes of immigrants' labor market disadvantages. Given this striking evidence, it is remarkable that only a few immigrants enroll in adult education programs and invest in formal qualifications in the host country (Pallas 2002; Elman/O'Rand 1998; Bilger 2006; Hillmert 2013); this is notable in particular because such investments seem to mitigate labor market disadvantages (e.g., Bratsberg/Ragan Jr. 2002; Kaida 2013; Damelang/Ebensperger/Stumpf 2020; Kanas/van Tubergen 2009). While the mechanisms driving immigrants' labor market disadvantages are well studied, we know relatively little about their postmigration human capital investments.

Previous empirical research on immigrants' postmigration human capital investments shows, for example, that young immigrants and those with higher education are more likely to engage in education and training (Chiswick/Miller 1994; Cobb-Clark/Connolly/Worswick 2005; Banerjee/Verma 2012; van Tubergen/van de Werfhorst 2007; Khan 1997; Hum/Simpson 2003). The propensity to invest increases with the time spent in the host country (Adamuti-Trache/Sweet 2010). These studies have primarily examined individual factors determining postmigration investment in education, such as educational level, age, and settlement intentions. However, different contextual conditions of investment in formal education have mostly been neglected.[1] This is unfortunate, as education and training opportunities differ in terms of cost, length, potential remuneration and difficulty. These conditions structure perceived (monetary and nonmonetary) costs and benefits, as well as the perceived probability of success related to postmigration investment in education. Favorable conditions should promote immigrants' intentions to invest and thus reduce their labor market disadvantages.

To advance our understanding of postmigration human capital investments, we seek to determine who invests in host country-specific human capital after migration and under which conditions investments are more likely. We thereby contribute to the literature on postmigration investments in at least three ways. First, we combine the model of immigrant human capital investment (Duleep/Regets 1999; 2002) and a basic model of educational decisions (e.g., Erikson/Jonsson 1996) to derive expectations regarding situational factors of postmigration investments, particularly conditions of formal education. We expect such conditions to be crucial for immigrants' investment decisions because they vary considerably regarding the attractiveness and expected returns.

[1] One notable exception is a study by van Tubergen & van de Werfhorst (2007), who focused on macro-level conditions at arrival, such as (un)favorable macroeconomic conditions, thereby approximating the potential opportunity costs of investments in human capital.

Researchers have given relatively limited attention to educational investments among the adult population compared to those among the youth population, and the immigrant perspective contributes substantially to this literature. However, understanding the causes of and barriers to immigrants' educational engagement would not only advance our theoretical and empirical knowledge of postmigration investments in human capital (Duleep/Regets 1999; 2002) but also be fundamental for developing effective interventions aimed at supporting immigrants' postmigration education and training intentions, thereby contributing to their social integration process more broadly.

Second, previous empirical evidence on postmigration investments primarily relies on observed associations between immigrants' educational investments and sociodemographic characteristics. A fundamental problem of this identification strategy is that we can only indirectly derive the underlying mechanisms for decisions from the observed behavior. Consequently, distinguishing between cause and effect is challenging. For example, the propensity to invest in human capital after migration is closely associated with (premigration) educational attainment (Chiswick/Miller 1994; Cobb-Clark/Connolly/Worswick 2005; e.g., Banerjee/Verma 2012; van Tubergen/van de Werfhorst 2007). However, it is an open question whether less educated immigrants invest less because they have fewer educational opportunities (e.g., lack of information) or lower willingness and motivation. To address this question, our analytical framework focuses on educational decisions rather than observed investments.[2] By means of choice experiments, we are able to experimentally vary conditions of formal education and draw causal inferences on the impacts of perceived (monetary and nonmonetary) costs, benefits, and the probability of success on decisions to invest in human capital after migration (cf. Auspurg/Liebe 2011). In our choice scenario, an immigrant can choose between a low-quality job offer and a vocational education offer. By enabling the choice between the two options – short-term labor market returns vs. long-term returns to education – the choice experiment simulates a very realistic scenario, giving us a deeper understanding of postmigration educational choices.

Third, we focus on the investment decisions of adult refugees in Germany, which is of particular interest from a sociological perspective (FitzGerald/Arar 2018): Among immigrants, refugees represent a special group (cf. Cortes 2004), which becomes particularly obvious when they are compared to economic immigrants. Due to their often sudden and less voluntary migration patterns (Chiswick 1999; Borjas 1987), refugees lack time "to prepare" for migration by making appropriate investments, such as host country language acquisition and social connections, that are important for the labor market in the host country (Brücker/Jaschke/Kosyakova 2019; Brücker/Kosyakova/Vallizadeh 2020). Moreover, refugees are usually less likely to be selected based on their human capital characteristics and – compared to economic immigrants – usually possess lower levels of human capital upon arrival (Dustmann et al. 2017; Chiswick 1999; Borjas 1987; Spörlein et al. 2020). In this regard, refugees are particularly disadvantaged in the labor market and may be more inclined to obtain new qualifications in host societies. Furthermore, while the return intentions of economic immigrants are high and they migrate essentially to access earning opportunities to improve their life conditions in the home country, refugees do not have the opportunity to return

[2] To conduct a causal test of factual educational investments, one would require an experimental design with a systematic manipulation of immigrants' educational choices with the consequence of high economic costs of such an experiment and ethical concerns (cf. Daniel/Watermann 2018).

home for the time being (Kogan/Kalter 2020). Given their need to remain in the host society for a long time, refugees should be particularly inclined to invest in formal training in the host country (Cortes 2004). By looking specifically at refugees' decisions to invest in host country human capital, our study adds important theoretical value to the literature on postmigration human capital investments.

The choice experiment used in this study was introduced in the third wave of the IAB-BAMF-SOEP Survey of Refugees (2020),[3] a longitudinal household study representative of refugees who arrived in Germany between 2013 and 2016 (Brücker/Rother/Schupp 2017). We admit that our dataset is limited to the German context and to a specific immigrant group, thereby limiting external validity. Nevertheless, the experimental design ensures strong internal validity and allows us to overcome the typical problems of observational studies related to omitted confounding factors (e.g., motivation, performance, intelligence, external influence or beliefs in one's own success) and lack of randomization. Moreover, the richness of our dataset allows us to consider not only the choice experiment but also abundant information on pre- and postmigration factors that may serve as important determinants of postmigration educational choices in the context of humanitarian migration.

2 The situation of refugees in Germany

In recent years, Germany has accepted more refugees than any other country in the European Union (EU). A total of 1.6 million first-time asylum applications were submitted in the country from 2015 to 2018; this figure corresponds to 41 percent of the 3.9 million first-time asylum applications in the EU-28 during the same time span (Eurostat 2019). To consider in a comparative perspective relative to other OECD countries, from 2015 to 2018, the United States had the second largest number, with 1.021 million first asylum applications (out of 5.648 million submitted to OECD countries), followed by Turkey (419,000), Italy (385,000), and France (348,000) (own calculation based on OECD 2019).

The recently arrived refugees were disproportionally male (73 percent of adults) and young; 65 percent of adult women and 75 percent of adult men were 35 years old or younger. Two-thirds of the refugee population arrived from Syria, Afghanistan, Iraq, Eritrea, and Iran, which are countries affected by armed conflict, group persecution, or other human rights violations (Brücker/Kosyakova/Vallizadeh 2020). The first studies of the situation of adult refugees in Germany show that these refugees lack the educational qualifications needed to successfully participate in the German labor market (Brücker/Kosyakova/Vallizadeh 2020; Brücker et al. 2019). In fact, employers in Germany often classify refugees' qualifications as insufficient (Dietz/Osiander/Stobbe 2018). Accordingly, the labor market integration of refugees is still in an early stage and is progressing rather slowly (Brücker/Kosyakova/Schuß 2020), especially compared to that of other immigrants (Brücker/Jaschke/Kosyakova 2019).

[3] This study uses the factually anonymous data from the IAB-BAMF-SOEP Survey of Refugees, waves 1-3. Data access was provided via a Scientific Use File supplied by the Research Data Centre (FDZ) of the German Federal Employment Agency (BA) at the Institute for Employment Research (IAB). DOI: 10.5684/soep.iab-bamf-soep-mig.2018.

Given the strong occupational boundaries and importance of educational credentials in the German labor market, refugees' economic success might be particularly improved through investments in educational credentials in Germany (Schreyer/Bauer/Kohn 2018). While the self-reported educational aspirations of adult refugees seem to be quite pronounced (Brücker/Kosyakova/Vallizadeh 2020), only 9 percent of adult refugees actually participated in vocational education in 2018 (Brücker/Kosyakova/Schuß 2020). For refugees who do not pursue educational credentials, the integration process is difficult. Unequal investment behavior as well as barriers to such investments can lead to social inequality among refugees.

3 The theory of immigrant human capital investment

After migration, immigrants can either opt for employment or invest in host country-specific human capital (Chiswick/Miller 1994). According to the theoretical model of immigrant human capital investment (Duleep/Regets 1999; 2002), adult immigrants' investments in host country-specific human capital are based on cost-benefit considerations: They make such investments as long as the investment costs are lower than the expected returns. In this setting, key mechanisms are the *transferability of foreign human capital*, *settlement intention*, and *opportunity costs* (cf., van Tubergen/van de Werfhorst 2007). We enrich this model with a very basic rational action framework explicitly developed in analyses of educational choices in childhood (e.g., Erikson/Jonsson 1996) and add another important dimension related to the probability of success in education. Beyond being decisive for educational choices on its own, the probability of success may consolidate the perceived benefits of educational choices or lessen its perceived costs (Daniel/Watermann 2018; e.g., Becker/Hecken 2009).

3.1 The transferability of foreign human capital

The transferability of foreign human capital is crucial for immigrants' labor market chances and depends on their professional experience and skill sets (Lancee/Bol 2017; Chiswick/Miller 2009). If the transferability of foreign human capital to the host country is high, i.e., foreign human capital is valuable in the host country, immigrants have little incentive to invest in additional human capital after migration (Duleep/Regets 1999; Chiswick/Miller 1995). The incentives for educational investments after migration are thus higher in contexts where transferring foreign human capital is challenging.

Following the formalized model of immigrant human capital investment (Duleep/Regets 1999; 2002), origin-country human capital cannot be fully transferred to the host country labor market and "is more valuable in learning than in earning" (van Tubergen/van de Werfhorst 2007: 885). This is because the investment costs of highly educated immigrants are lower than the productivity losses on account of migration (van Tubergen/van de Werfhorst 2007). Likewise, highly educated immigrants are more likely to succeed in acquiring host country credentials because such efforts should be less demanding for them (Banerjee/Verma 2012). In particular, they are expected to

have greater intellectual capacity and greater motivation than less educated immigrants. Moreover, having host country credentials increases the value of educational credentials and skills acquired in the home country (Pratomo 2017; Chiswick/Miller 1994). In sum, given the limitations of human capital transferability, we expect better-educated refugees to be more likely to invest in host country educational credentials (*H1*).

Work experience gained in the origin country is argued to increase skill transferability to the host labor market (van Tubergen/van de Werfhorst 2007; Chiswick/Miller 1994). As prior research indicates, premigration work experience may compensate for the lower signal value of foreign credentials, particularly if employers regard foreign work experience as relevant (Damelang u. a. 2019; Banerjee/Verma 2012). Following this idea, immigrants with premigration work experience are likely to possess skills directly transferable into the labor market of the destination country (van Tubergen/van de Werfhorst 2007). Hence, we expect refugees with premigration work experience to be less likely to invest in host country credentials (*H2*).

Occupational closure – such as that in Germany – may create additional hurdles for job-seekers with foreign qualifications since legal restrictions restrict labor market access in the destination country (Lancee/Bol 2017). At the same time, recognition of foreign qualifications would not only remove legal barriers to the labor market but also help signal the potential productivity of job seekers, since employers usually base their hiring decisions on educational credentials (Bills/Di Stasio/Gërxhani 2017). In line with that, prior research observed improved labor market outcomes for immigrants with recognized foreign qualifications (Tibajev/Hellgren 2019; Kogan 2012; Brücker et al. 2020; Damelang/Ebensperger/Stumpf 2020). Hence, since recognition of foreign qualifications enhances the transferability of foreign human capital, we expect refugees with recognized foreign qualifications to be less likely to invest in host country credentials (*H3*).

3.2 Settlement intentions

The theoretical model further predicts that the decision to invest in host country credentials depends on the return intentions or expected duration of stay (Duleep/Regets 1999; Cortes 2004). Obviously, those who intend to stay longer in the host country have a longer time horizon for realizing returns to postmigration human capital investment (Adamuti-Trache et al. 2011; Khan 1997; Hum/Simpson 2003). The same argument applies to younger immigrants (van Tubergen/van de Werfhorst 2007). Likewise, acquiring an educational credential in the host country is less attractive for older immigrants and those with shorter stay intentions since the investment costs likely exceed the returns (Chiswick/DebBurman 2004). Against this background, we expect that younger refugees (*H4*) and refugees with longer staying intentions (*H5*) are more likely to invest in host country credentials.

Considering the specificities of refugees' reception in the Germany context, we expect legal status additionally to affect the settlement perspectives and corresponding investment decisions of refugees. In most destination countries, refugees are subject to specific procedures to verify their asylum applications. During this process, refugees' access to the labor market and educational systems of the host countries are usually restricted (Bakker/Dagevos/Engbersen 2014; De Vroome/van Tubergen 2010; Hainmueller/Hangartner/Lawrence 2016; Kosyakova/Brenzel 2020). This limitation also applies in the case of rejected applications. Beyond restrictions on the supply side, refugees with pending or rejected asylum requests have highly uncertain perspectives and,

hence, an unclear time horizon of their potential stay in Germany; such uncertainty is likely to deter them from investing in host country human capital (Kosyakova/Brenzel 2020). In turn, a positive decision on an asylum application promotes such investments because once refugees' status is approved and protection is granted, independent of whether the protection is temporary or permanent, legal limitations on access to the education system do not longer exist, and the stay perspective becomes certain. Correspondingly, we expect that refugees with approved asylum applications are more likely to invest in host country credentials (*H6*).

3.3 Opportunity costs

Opportunity costs are the third crucial factor shaping decisions to invest in host country-specific human capital (Duleep/Regets 1999). The concept of opportunity costs refers to forgone income or other losses when a specific alternative is chosen. We draw on this idea and consider the conditions of attaining vocational education in the German context.[4] An alternative option is a low-quality job in accordance with immigrants' limited labor market chances in their initial years after immigration (OECD 2015). With the exception of van Tubergen and van de Werfhorst (2007), previous research has not addressed different contextual conditions of postmigration investment in human capital.

To acquire a vocational credential in Germany, one must pass the vocational training system. While the vocational training system is highly standardized, institutional conditions of vocational education differ to some extent, for instance, with regard to its duration, remuneration, and difficulty. Given the different conditions, the expected returns after completion of training are also likely to differ, particularly with regard to remuneration and unemployment risk (BMBF 2017). We exploit this variation in institutional conditions and argue that the effort, the expected probability of successfully completing vocational education, and the expected benefits of education determine educational decisions (e.g., Erikson/Jonsson 1996). Following the idea of rational choice, adult immigrants would opt for vocational education (versus labor market entry) if it promises the highest subjective expected utility, which can be expressed by $U = p * B - C$. Correspondingly, the utility of the vocational education option (U) is derived based on the objective (i.e., observed) benefits from vocational education (B), probability of successful completion (p) and costs required for completing an education (C).

Regarding the expected benefits of the vocational education option (versus direct labor market entry), host country credentials represent "an entrance ticket" to the skilled labor market segment (Damelang/Abraham 2016). In the skilled segment, employment conditions are generally good but still vary in terms of remuneration and unemployment risk. Given that both high remuneration and low unemployment risk raise the returns on training, we expect that refugees are more likely to invest in host country credentials when they have higher remuneration after training (*H7*) and a lower expected risk of unemployment (*H8*).

[4] A similar institutional context applies to other countries characterized by a dual education system with a strong vocational orientation, strong occupational boundaries and high importance of educational credentials (Allmendinger 1989).

The difficulty of training is associated with the probability of success (p), for which immigrants are not able to amortize training costs. Such probability could be derived based on their own previous educational performance or observed previous failure rates through final exams. Hence, we expect immigrants to favor the vocational education option if it is considered easy (*H9*).

The costs of the vocational education option C encompass the direct monetary and nonmonetary costs of education as well as forgone earnings, which could be realized instead of participating in education. Given that vocational education in Germany is financed by employers, the costs include (longer) duration of and (lower) earnings during vocational education. These costs emerge due to a loss of revenue that may arise because one is not working. Accordingly, we expect that refugees are more likely to invest in host country credentials when they have a shorter duration of vocational education (*H10*) and higher remuneration during training (*H11*).

As further argued by Stocké (2008) and supported empirically (Daniel/Watermann 2018; Stocké 2008), the perceived benefits of the educational option may be obscure when the probability of their realization is perceived to be low. For instance, if the chances of successful graduation are in doubt, then even very high expected remuneration after training may be less valuable, causing one to refrain from choosing the educational option. Applying this argument to adult refugees, we expect that if training is considered easy, higher remuneration after training and lower expected unemployment risk are more decisive for refugees' propensity to invest in host country credentials (*H12*). Similarly, if the probability of failure through exams is extremely high, then relatively high costs of vocational training could divert immigrants from educational investments to the less risky option of labor market entry (cf. Becker/Hecken 2009). In the corresponding hypothesis, we expect that if training is considered difficult, lower remuneration during training and its longer duration constitute a greater deterrent to refugees' propensity to invest in host country credentials (*H13*).

4 Empirical strategy

4.1 The IAB-BAMF-SOEP survey of refugees in Germany

To analyze refugees' willingness to invest in host country credentials, we employ a choice experiment introduced in the third wave of the IAB-BAMF-SOEP Survey of Refugees (2020), a longitudinal survey of refugees and their household members. This survey was launched in 2016 and is conducted annually. The anchor persons in the survey were drawn from the Central Register of Foreigners (*Ausländerzentralregister*, AZR), the national registry of all foreign citizens in Germany. The data are representative of asylum-seekers and refugees arriving in Germany between January 1, 2013, and December 31, 2016.

The third survey wave was conducted in the second half of 2018 and covered 4,376 adult refugees. The response rate for the Panel respondents was 68 percent, while the Panel stability reached 80 percent (Britzke/Schupp 2020). The interviews were conducted face to face with computer assistance (CAPI) and – if needed – were supported by translators, auditory instruments and questionnaires in seven languages (Arabic, English, Farsi/Dari, German, Kurmanji, Pashtu, and Urdu).

The choice experiment was introduced only by the Panel respondents (89 percent of the participants in the third wave). Hence, for our analysis, we excluded new respondents (465 observations)

and those who refused to participate in the choice experiment (5 observations). To ensure data representativeness, we further excluded respondents who arrived before 2013 (42 observations) and those identified as nonrefugees by the survey institute (29 observations). We also excluded respondents with missing responses on the choice regarding the offer (96 observations) and those who refused both the vocational education and the job offer because they were not available for the labor market (89 observations). Finally, we confined our data to the respondents in the working age population (aged 18 to 64; 13 observations were omitted). After these exclusions, we had a sample of 3,637 respondents (93 percent of Panel respondents).[5]

4.2 Construction of the choice experiment

In the classic choice experiment, respondents choose the most preferred option from various options. In our specification, we simulate a scenario in which refugees can opt for either employment or vocational education. By randomly varying the attributes of the options, one can causally determine their influence on respondents' decisions (Auspurg/Liebe 2011).

More specifically, the respondents faced two competing offers, a vocational education offer and a job offer, and were able to choose their most preferred offer. Table 1 shows an example. The choice experiment started with a short introduction outlining the education system in Germany and the importance of credentials. To minimize problems of cognitive understanding, both offers were described in simple sentences. The respondents were asked to choose their preferred offer, and each respondent was given only one decision situation. The order of the offers (training and job) varied randomly among the respondents to adjust for order effects.

Given our interest in the role of training conditions in the decision to undertake postmigration human capital investment, the vocational education offer randomly varies across respondent (we discuss this in detail below). The job offer is fixed and described as a simple job requiring no formal education. The aim was to provide a realistic scenario in which refugees have access only to low-status jobs. Accordingly, the level of remuneration is based on the minimum wage, and the risk of becoming unemployed is considered high. In particular, people without vocational qualifications are disproportionately at risk for unemployment (IAB 2017).

Table 2 presents an overview of the five dimensions of training offers (i.e., benefits, costs and probability of success) and their levels (i.e., low, medium, high). Given that educational decisions are based on rational considerations (see Section 3), we varied the costs, benefits and probability of success. In particular, the benefits of the vocational education offer encompass the expected remuneration and the risk of unemployment after training, the cost refers to duration of vocational education and remuneration during training, and probability of success is proxied via the difficulty of the training and corresponding final exam. These dimensions should be considered as alternatives to the job offer. Recall that the offered job is a low-quality job with high unemployment risk (see Table 1).

[5] Overall, there is a slight positive selection on observables into the analytical sample. Choice experiment respondents with non-missing responses on the decision regarding the vocational education offer tend to be younger, healthier and more educated and to have more years of working experience. The corresponding marginal effects are, however, conservative in size.

Table 1: Example of a training offer and a competing job offer

Introduction
In this next part of the survey, we wish to find out more about what is important to you regarding your professional future. Even though we cannot offer you a place in a training course or a job yet, in this section, we would like you to imagine that somebody has sent you two completely different offers and you have to choose between them. One of the offers is the possibility of commencing training. The training alternates between two locations – in a company and at a vocational college. If you complete the training, you'll receive a German vocational qualification. To pass the training, you must take a final exam. The other offer gives you the opportunity to start in a simple job, mainly involving helping people, and you don't need a German qualification to do this. Take a careful look at both offers on the next page, and think about whether you would choose the training or the job.
Offer of a simple, basic job
You do not have to be qualified. The salary is €1350 per month. The risk of unemployment in this job is high.
Offer of a place in a training course
The training lasts 2 years. The salary during the training is €750 per month. The final exam is hard, and many have to take it twice. When the training is complete, the salary for the job you've been trained for is €2000 per month. When the training is complete, the risk of unemployment in this job is very low.
Decision
Which offer would you choose? In both instances, you can start immediately. I would choose the training I would choose the simple, basic job I would choose neither

Notes: For the survey instruments, refer to SOEP Group (2020a).

Data source: IAB-BAMF-SOEP Sample of Refugees (2020), v35.

In our choice experiment, we considered the levels of the dimensions following the usual conditions for vocational education in Germany in the year of the survey. Given that vocational education usually lasts 24 to 36 months, we introduced these two options. The typical remuneration during vocational education ranges from just under Euro 500 to just over Euro 1000 (see, BMBF 2017). Correspondingly, we employed remuneration levels of low (Euro 500), medium (Euro 750) and high (Euro 1000). With regard to the difficulty of training, we distinguished between two extreme types, easy and difficult. We further distinguished between three levels of expected wages after completing vocational education: Euro 1400, Euro 2000, and Euro 2600. While Euro 1400 und Euro 2000 are in the range of the usual starting salaries of skilled workers (Gehalt.de 2018), we additionally operationalized a higher-income job. Finally, we described the expected unemployment risk following training as very low or medium.

Table 2: Dimensions and levels of training in the choice experiment

Dimensions		Low	Medium	High
Costs	Duration of training	The training lasts 2 years.	-	The training lasts 3 years.
	Remuneration of training (per month)	The salary during the training is €1000 per month.	The salary during the training is €750 per month.	The salary during the training is €500 per month.
Benefits	Expected remuneration after training (per month)	When the training is complete, the salary for the job you've been trained for is €1400 per month.	When the training is complete, the salary for the job you've been trained for is €2000 per month.	When the training is complete, the salary for the job you've been trained for is €2600 per month.
	Expected unemployment risk after training	-	When the training is complete, the risk of unemployment in this job is medium.	When the training is complete, the risk of unemployment in this job is very low.
Probability of success	Difficulty of training	The final exam is hard, and many have to take it twice.	-	The final exam is easy, and many have to take it only once.

Notes: For the survey instruments, refer to SOEP Group (2020a).

Data source: AB-BAMF-SOEP Sample of Refugees (2020), v35.

4.3 Variables and statistical method

Dependent outcome. Our dependent variable is a dummy indicator for having chosen education over the job offer. Approximately 57.5 percent favored the vocational education offer, 32.3 percent favored the job offer, and 10.3 percent chose neither offer.[6] Given the nonlinear nature of our dependent variable, we apply a linear probability model in the multivariate analyses with robust standard errors.

Transferability of foreign human capital. To test our hypotheses on the transferability of (pre-migration) human capital, we introduce years of education, years of work experience, and recognition of foreign credentials. *Years of education* is a continuous measure of the self-reported years of schooling attended, vocational training, and college or university education before arrival in Germany. Likewise, *work experience* is a continuous measure of the total years in which respondents were employed before arrival in Germany. *Recognition of credentials* is a categorical variable with the following categories: (1) recognition was not requested, (2) credentials were fully or partly recognized, (3) recognition requests were rejected, and (4) recognition requests are under consideration.

Settlement intentions. To address settlement intentions, we account for age, attachment to the origin country and asylum request status. *Age* is a continuous measure based on the self-reported birth year and interview year. *Attachment to the origin country* measures the extent of the self-reported feeling of being attached to the country of origin on a scale from 1 ("not at all") to 5 ("very much"). Attachment to the origin country should well predict the probability of return migration (e.g., Constant/Massey 2002).[7] *Asylum request status* is a categorical variable with three categories: (1) approved, (2) rejected or (3) pending (if the decision has not yet been made).

[6] We also asked for the reason why the respondent would choose neither offer. Approximately 39.4 and 7.5 percent preferred to wait for a better job offer or for a place in a better vocational education course, and the other 53.1 percent reported other reasons.

[7] We do not use a "more direct" measure of the intention to stay in Germany since the majority, 95 percent, reported the intention to stay forever in Germany, while only four percent intended to stay for couple of years and less than one percent had no

Opportunity costs. Variables that proxy for individuals' opportunity costs are derived from the choice experiment (see Section 3.2) and reflect considerations regarding expected benefits (expected remuneration and unemployment risk after training), costs (training duration and remuneration) and probability of success (difficulty of training). *Expected remuneration after training* is a categorical variable with three categories: low = Euro 1400 per month, medium = Euro 2000 per month, and high = Euro 2600 per month. Post-training unemployment risk is measured via a dummy indicator for *low expected unemployment risk after training* (versus medium unemployment risk). Since lower remuneration of training mirrors the greater (opportunity) costs of training, the corresponding categorical variable for *costs of training* includes three categories: (1) low = Euro 1000 per month, (2) medium = Euro 750 per month, and (3) high = Euro 500 per month. *Longer duration of training* leads to greater (opportunity) costs as well and is coded as one for a training duration of three years (zero for a duration of 2 years). *High probability of success* is measured via a dummy indicator for low difficulty of training, which is the case when the final exam is easy and many have to take it only once (versus twice).

Controls. We control for commonly observed predictors of educational decisions that may confound the relationship between our predictor variables and dependent outcomes. In particular, we control for being *female*, being *in a partnership*, and having *preschool children in the household* because of women's and men's distinct life course patterns and the potential impact of family roles in educational and employment trajectories (e.g., Bozick/DeLuca 2005; Elman/O'Rand 2007). Since health status is crucial for individual educational achievements (Baird et al. 2016) and economic integration (e.g., Chatterji/Alegria/Takeuchi 2011), we control for *self-rated current state of health* (from 1 "poor" to 5 "very good"). Postmigration educational investments might be a risky endeavor, particularly in the adult life course. To account for individual risk-taking propensity, we consider the self-reported *willingness to take risks* (scaled between 1 "low" and 5 "very high").

The controls specific to migrants and refugees include the *country (group) of origin* fixed effect (aggregated into Syria, Afghanistan, Iraq, Eritrea, Iran, the remaining Middle Eastern and North African countries (MENA), Russia, the remaining states of the former Soviet Union, the West Balkans, the remaining countries in Africa, the rest of the world, and stateless), *months since arrival* (as of the interview date), *good or very good German skills* (derived from self-reported speaking, writing, and reading German skills), and *private accommodation* (versus shared accommodation). Since the labor market and educational opportunities vary by region, we account for the local context of reception. This includes municipality-level *population density* (population size per square kilometer), district-level *unemployment rate*, district-level *share of foreigners* and a dummy indicator for *East Germany* (to absorb time-invariant or long-lasting differences across the two regions).

Finally, we consider fixed effects for the *survey sample* (to absorb systematic differences related to the survey design), an indicator for the *influence of the third person during the interview*, and an indicator for the *order of the offer* (to encompass systematic differences related to the choice experimental design). The descriptive statistics for the dependent and independent variables are presented in Table 3; details on the variable construction are presented in Table A1 in the appendix.

such intentions. Additional analyses implied that attachment to the origin country did well in predicting the probability of intending to stay in Germany forever (marginal effect: –1.95 percentage points, $p<0.001$).

Table 3: Descriptive statistics on (selected) model covariates

Variables	Mean/Share	(SD)	N	Min	Max
TRANSFERABILITY					
Years of education	9.59	(5.27)	3,311	0	37
Years of work experience	8.35	(9.51)	3,564	0	47
Recognition of credentials					
No request	0.84		2,505	0	1
Fully/partly recognized	0.07		2,505	0	1
Not recognized	0.01		2,505	0	1
Under consideration	0.08		2,505	0	1
SETTLEMENT INTENTIONS					
Age	34.37	(10.03)	3,637	18	64
Attachment to the origin country	3.29	(1.29)	3,587	1	5
Asylum request status					
Approved	0.85		3,225	0	1
Rejected	0.13		3,225	0	1
No decision	0.02		3,225	0	1
OPPORTUNITY COSTS					
Expected remuneration after training					
Low	0.33		3,637	0	1
Medium	0.34		3,637	0	1
High	0.33		3,637	0	1
Low expected unemployment risk	0.51		3,637	0	1
High probability of success	0.51		3,637	0	1
Longer duration of training	0.48		3,637	0	1
Remuneration of training					
High	0.32		3,637	0	1
Medium	0.36		3,637	0	1
Low	0.32		3,637	0	1
CONTROLS					
Female	0.37		3,637	0	1
In partnership	0.38		3,535	0	1
Preschool children in the household	0.74		3,632	0	1
Self-rated health status	4.05	(1.03)	3,635	1	5
Willingness to take risks	4.31	(3.47)	3,632	0	10
Country (group) of origin					
Syria	0.55		3,637	0	1
Afghanistan	0.13		3,637	0	1
Iraq	0.12		3,637	0	1
Eritrea	0.06		3,637	0	1
Iran	0.02		3,637	0	1
Other MENA	0.02		3,637	0	1
Russia	0.01		3,637	0	1
Other former Soviet Union	0.01		3,637	0	1
West Balkans	0.01		3,637	0	1
Other Africa	0.04		3,637	0	1
Rest of the world	0.02		3,637	0	1
Stateless	0.01		3,637	0	1
Months since arrival	40.95	(9.07)	3,416	10	72
(Very) good German skills	0.32		3,636	0	1
Private accommodation	0.82		3,620	0	1
East Germany	0.17		3,637	0	1
Local population density	1125.47	(1061.41)	3,561	18	4736
Local unemployment rate	6.18	(2.66)	3,523	1.5	14
Local share of foreigners	12.12	(5.17)	3,523	1.9	29
Survey sample					
M3	0.31		3,637	0	1
M4	0.37		3,637	0	1
M4	0.32		3,637	0	1
Influence from the third person during the interview	0.04		3,637	0	1
VE offer before job offer	0.50		3,637	0	1

Notes: SD = standard deviation. Variation in the number of observations is due to differences in missing data across variables.

Data source: IAB-BAMF-SOEP Sample of Refugees (2020), v35.

To address missing information, we use multiple imputation with chained equations (van Buuren 2012). We construct 25 imputed data sets that use all available information from the full models and additional variables that may be correlated with the model variables in some way. The nonparticipants of the choice experiment were included in the multiple imputation but not in the analyses (only Panel respondents participated in the choice experiment). Missing information was present to varying degrees, with a maximum of 31 percent in the measure for recognition of credentials (see Table 3, column 3).

5 Results

The results from the multivariate regressions of the educational decisions on the entire set of explanatory variables are presented in Table 4. We build our models gradually by starting with the inclusion of the factors approximating the transferability of foreign human capital, settlement intention, and opportunity costs (Model 1), followed by the inclusion of individual controls (Model 3) and origin country, regional and survey design controls (Model 5). Models 2, 4 and 6, respectively, add interaction effects between the success probability and costs of training and between success probability and the expected benefits of training.

Transferability of foreign human capital. The results from Table 4 indicate that each year of education increases the individual probability of choosing the vocational education offer by approximately one percentage point (Model 1). The effect is reduced slightly but remains statistically significant when accounting for further model covariates (Models 3 and 5). This result confirms *H1*, predicting a higher propensity for investment in host country credentials among highly educated refugees. This result also follows the idea of the life course literature positing that the more education people have, the more likely they are to seek even more education (Pallas 2002; Elman/O'Rand 1998).

Years of work experience are also positively associated with postmigration investments in education and become a statistically significant predictor only after accounting for individual-level controls (Model 3; see also Model 5). The observed relationship, however, contradicts our expectations (*H2*), though this result conforms to the empirical findings of Chiswick and Miller (1994), who found a positive impact of premigration skill levels on the postmigration probability of education. The authors argued that there might be stronger relative devaluation of premigration human capital through work experience in the case of noninvestment in host country credentials (Chiswick/Miller 1994).

The effect of credential recognition is negative (statistically significant after accounting for individual-level controls, Model 3; see also Model 5). Full or partial recognition of foreign credentials (versus no recognition request) reduces refugees' incentives to invest in host country-specific education by nine percentage points, thereby supporting *H3*.

Table 4: Determinants of investments in host country-specific human capital (in percentage points)

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Coef	(SE)	Coef	(SE)	Coef	(SE)	Coef	(SE)	Coef	(SE)	Coef	(SE)
Transferability of foreign human capital												
Years of education	0.86***	(0.17)	0.87***	(0.17)	0.67***	(0.17)	0.68***	(0.17)	0.61***	(0.18)	0.61***	(0.18)
Years of work experience	0.12	(0.12)	0.12	(0.12)	0.24*	(0.13)	0.24*	(0.13)	0.24*	(0.13)	0.24*	(0.13)
Recognition of credentials (Ref.: no request)												
Fully/partly recognized	-3.60	(3.30)	-3.56	(3.31)	-7.06**	(3.36)	-7.03**	(3.36)	-7.22**	(3.35)	-7.22**	(3.35)
Not recognized	5.96	(7.36)	6.06	(7.39)	3.74	(7.42)	3.85	(7.44)	4.03	(7.40)	4.09	(7.43)
Under consideration	-1.09	(3.03)	-1.21	(3.03)	-3.45	(3.08)	-3.59	(3.09)	-3.00	(3.08)	-3.13	(3.09)
Settlement intentions												
Age	-1.53***	(0.11)	-1.53***	(0.11)	-1.42***	(0.13)	-1.42***	(0.13)	-1.42***	(0.13)	-1.42***	(0.13)
Attachment to the origin country	-2.07***	(0.62)	-2.05***	(0.62)	-1.95***	(0.62)	-1.93***	(0.62)	-1.87***	(0.63)	-1.84***	(0.63)
Asylum request status (Ref.: approved)												
Rejected	2.16	(2.49)	2.19	(2.49)	3.60	(2.57)	3.60	(2.57)	4.53	(2.89)	4.41	(2.89)
No decision	0.69	(4.84)	0.52	(4.81)	1.49	(4.89)	1.27	(4.86)	0.09	(5.07)	-0.25	(5.04)
Opportunity costs												
Expected renumeration after training (Ref.: low)												
Medium	5.15***	(1.91)	6.15**	(2.77)	5.14***	(1.91)	6.34**	(2.76)	5.07***	(1.90)	5.71**	(2.75)
High	6.42***	(1.94)	6.65**	(2.79)	6.56***	(1.93)	6.85**	(2.80)	6.35***	(1.92)	6.28**	(2.79)
Low expected unemployment risk	1.84	(1.56)	-0.01	(2.25)	1.96	(1.56)	-0.10	(2.24)	2.22	(1.55)	0.55	(2.23)
High probability of success	2.60*	(1.57)	6.22	(4.20)	2.68*	(1.56)	6.38	(4.19)	2.72*	(1.55)	5.89	(4.17)
Longer duration of training	-1.04	(1.57)	-1.62	(2.25)	-1.44	(1.56)	-1.93	(2.24)	-1.30	(1.55)	-1.98	(2.22)
Remuneration of training (Ref.: high)												
Medium	-1.61	(1.89)	2.32	(2.72)	-1.35	(1.89)	2.69	(2.72)	-1.67	(1.87)	2.40	(2.70)
Low	-4.17**	(1.95)	-0.01	(2.83)	-3.74*	(1.95)	0.37	(2.83)	-4.12**	(1.93)	-0.33	(2.79)
Interaction effects: high probability of success x												
x medium expected renumeration after training			-1.73	(3.83)			-2.10	(3.82)			-1.03	(3.80)
x high expected renumeration after training			-0.39	(3.89)			-0.47	(3.88)			0.23	(3.86)
x low expected unemployment risk			3.70	(3.13)			4.08	(3.12)			3.30	(3.10)
x longer duration of training			1.22	(3.13)			1.04	(3.12)			1.40	(3.10)
x medium remuneration of training			-7.73**	(3.78)			-7.93**	(3.77)			-8.02**	(3.75)
x low remuneration of training			-8.04**	(3.90)			-7.93**	(3.90)			-7.34*	(3.87)
Controls												
Female					4.60**	(1.93)	4.62**	(1.93)	5.00***	(1.93)	5.00***	(1.93)
In partnership					0.30	(2.10)	0.27	(2.10)	0.68	(2.09)	0.66	(2.09)
Preschool children in the household					-3.21*	(1.85)	-3.14*	(1.85)	-2.30	(1.87)	-2.26	(1.87)
Self-rated health status					1.11	(0.81)	1.15	(0.81)	0.83	(0.81)	0.86	(0.81)
Willingness to take risks					0.29	(0.23)	0.28	(0.23)	0.29	(0.24)	0.28	(0.24)
Months since arrival					-0.18**	(0.09)	-0.18**	(0.09)	-0.27***	(0.10)	-0.27***	(0.10)

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Coef	(SE)	Coef	(SE)	Coef	(SE)	Coef	(SE)	Coef	(SE)	Coef	(SE)
(Very) good German skills					10.04***	(1.90)	10.14***	(1.91)	9.48***	(1.90)	9.56***	(1.90)
Private accommodation					1.08	(2.20)	0.89	(2.20)	1.33	(2.34)	1.09	(2.34)
East Germany									-7.29***	(2.50)	-7.18***	(2.51)
Local log(population density)									3.88***	(1.03)	3.79***	(1.03)
Local unemployment rate									0.94***	(0.36)	0.95***	(0.36)
Local share of foreigners									-0.35	(0.21)	-0.34	(0.21)
Constant	104.01***	(4.43)	102.03***	(4.94)	97.61***	(7.11)	95.45***	(7.46)	75.53***	(9.30)	74.35***	(9.53)
Number of observations	3637		3637		3637		3637		3637		3637	
R^2	0.100		0.101		0.110		0.112		0.129		0.131	
Adjusted R2	0.096		0.096		0.104		0.105		0.119		0.119	
Country (group) of origin FE	No		No		No		No		Yes		Yes	
Survey sample FE	No		No		No		No		Yes		Yes	

Notes: Robust standard errors are in parentheses. FE = fixed effect. Omitted controls include indicators for influence from the third person during the interview (Models 3, 4, 5 and 6) and order of the offer (Models 3, 4, 5 and 6). * p<0.1, ** p<0.05, *** p<0.01 (two-tailed test).

Data source: IAB-BAMF-SOEP Sample of Refugees (2020), v35.

Settlement intentions. We further expected the incentives for postmigration human capital investment to increase with a longer time horizon for realizing returns to such investments. This time horizon was expected to be protracted for younger refugees (*H4*), refugees who intended to stay in Germany (*H5*) and refugees with approved asylum applications (*H6*). The probability of opting for vocational education decreases with increasing age and strength of attachment to the origin country, but it does not vary by asylum request status (Models 1-6). Hence, *H4* and *H5* are empirically supported, while *H6* is not. Given that deportation from Germany is a rather rare event (Kosyakova/Brenzel 2020), the security of legal status might be less relevant to decisions to invest in education.

Opportunity costs. Turning to the opportunity cost of vocational education – which constitutes the core of our choice experiment and is represented by the conditions of formal education – we observe several remarkable results. We start with the models without interaction effects, i.e., those measuring the direct effect of the costs, expected benefits and success probability of vocational education. According to the full specification in Model 5, the probability of educational investment by refugees increases by five to six percentage points if the expected monthly remuneration after education increases (from low to medium or from low to high). This result supports *H7*. However, low unemployment risks have no statistically significant effect (despite being positive, as expected). Hence, *H8* found no empirical support. Models 5 further implies that the probability of success in vocational education – measured by how easy the final exam is – increases the investment probability by three percentage points. This result is consistent with *H9*. The effect of longer education does not have a statistically significant effect (although it is negative, as expected) on the decision to invest in host country credentials, in contrast to *H10*. However, remuneration during studies does have such an effect, which is in line with *H11*. Altogether, in terms of costs and benefits, only (expected) remuneration during and after training seems to significantly affect educational investments.

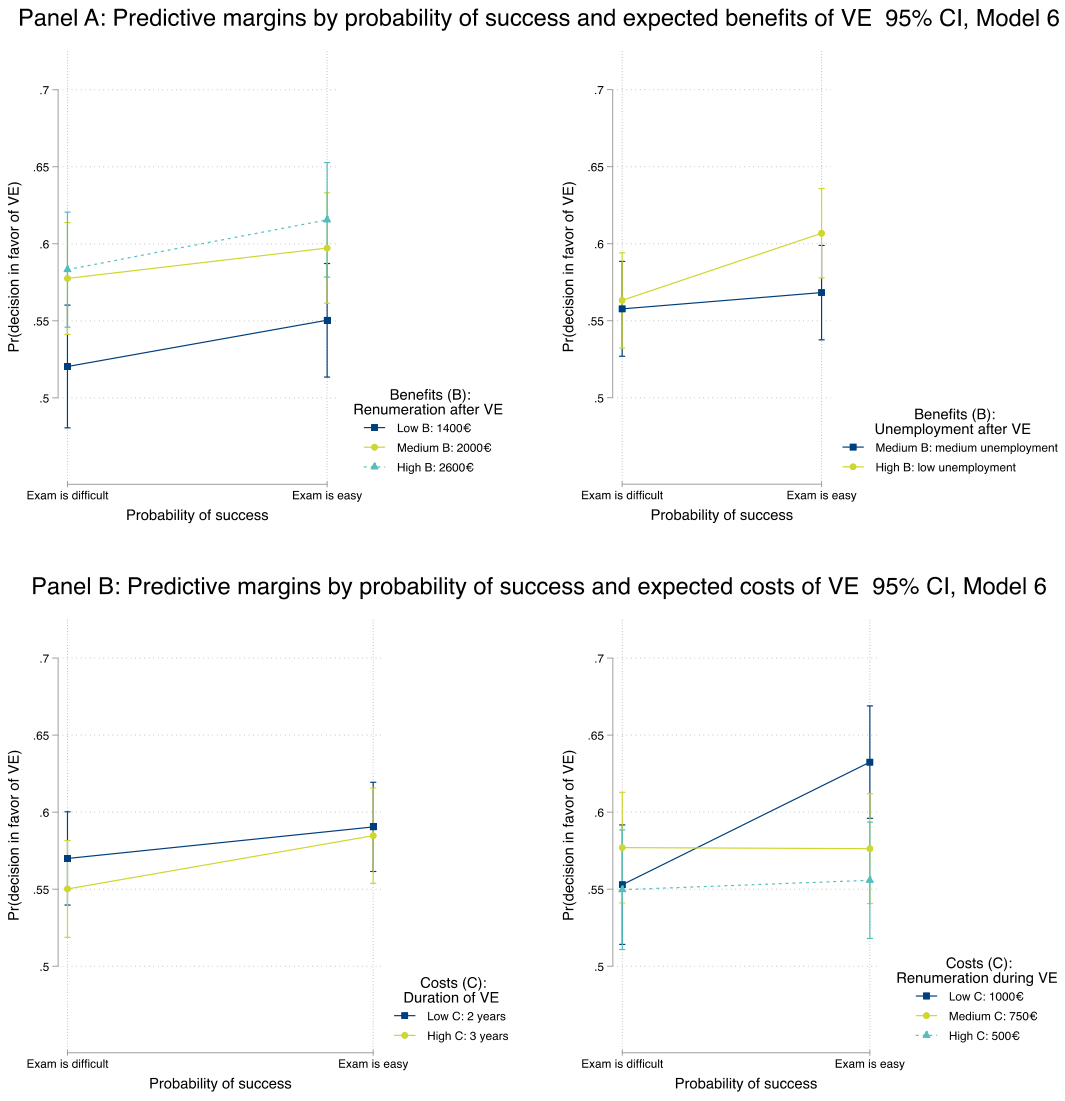
We now turn to the test of interaction effects (Model 6, Table 4). *H12* predicted greater importance of the perceived benefits of training if the success probability is high. Empirically, this should be mirrored in the positive interaction effects between (1) success probability and post-training remuneration and (2) success probability and post-training unemployment risks. Following Model 6, neither interaction effect is statistically significant. However, an additional test suggests that when the probability of success is high, low unemployment risk may indeed promote educational decisions (significant only at $p<0.10$).[8] Figure 1, Panel A, additionally visualizes this relationship. Accordingly, *H12* found some empirical support.

Following *H13*, training difficulty should strengthen the negative effect of lower remuneration during training and its longer duration on refugees' propensity to invest in host country credentials. The corresponding hypothesis is tested in Model 6, and the results are presented in Figure 1, Panel B. Indeed, the negative effect of longer training duration is stronger when the probability of exam failure is high: the interaction effect between the success probability and duration of training is positive but not statistically significant. Model 6 and Figure 1 (Panel B) further imply a negative statistically significant interaction effect between success probability and (lower) remuneration

[8] According to the Wald test, the average marginal effect of lower post-training unemployment risk is not statistically significant for refugees with a low probability of success (p=0.805), while it is positive (four percentage points) and statistically significant (p<0.10) for refugees with a high probability of success.

during training. These results are not fully consistent with *H13*, since we do not find a lower probability of favoring vocational education decisions if enrollment seems to be relatively expensive, while there is a high probability of exam failure. Instead, a decision in favor of vocational education becomes more likely if the training costs are low but there is also a high probability of successful graduation. In other words, if training is considered easy, higher remuneration during training is more of a catalyst to refugees' propensity to invest in host country credentials.

Figure 1: Predicted probabilities for decisions in favor of training based on Model 6 in Table 4



Data source: IAB-BAMF-SOEP Sample of Refugees (2020), v35.

Although it is not our primary focus, we briefly discuss the other relevant factors associated with refugees' decision to invest in education (Model 6). Female refugees and refugees with (very) good German language proficiency are more likely to choose a vocational education offer than other refugees are. In contrast, a longer stay reduces the incentives to invest in host country credentials. Moreover, partnership, preschool children, self-rated health, risk aversion and accommodation

situations do not significantly predict educational decisions. The local context seems to shape educational decisions as well. Correspondingly, refugees opt to invest in vocational education more often in more densely populated areas and when local labor market opportunities are worse. Refugees are less inclined to make educational investments in localities with more foreigners and in East Germany.

6 Discussion

Given their (often) dramatic migration experiences, interrupted educational progress and limitations in the transferability of their foreign human capital and credentials, refugees' successful and sustainable integration into the receiving economy is challenging (FitzGerald/Arar 2018; Dryden-Peterson et al. 2019). This is particularly true for the German labor market, which places very high importance on educational credentials, relative to the labor markets in Anglo-Saxon countries, in part because of the dominance of its vocational training system (Allmendinger 1989). Despite a growing trend of educational participation among recently arrived refugees (Brücker/Kosyakova/Schuß 2020), individuals' overall lower levels of tertiary and especially vocational education can be a substantial obstacle to their labor market integration. In this regard, our study contributes to the migration and integration literature by causally examining the determinants of and barriers to refugees' investments in education – undoubtedly a crucial instrument to alleviate ethnic disadvantages in the labor market and society. Moreover, studying refugees' educational decisions is increasingly important in times of growing numbers of global conflicts and forced migration and correspondingly growing numbers of asylum-seekers and refugees in refugee-hosting nation-states (Dryden-Peterson et al. 2019).

To address our research question, we simulated a decision process among recently arrived refugees in Germany and evaluated the chances that they would invest in host country-specific education, such as vocational education. Methodologically, we relied on a choice experiment that enables the experimental logic in a classical survey. In our choice scenario, refugees were able choose between a job offer and a vocational education offer. A choice experiment is ideal because the randomized allocation of educational opportunities among the respondents makes it possible to exclude the selectivity of educational decisions that is always present in real survey data. Moreover, studies of the external validity of choice experiments have shown a high level of consistency of hypothetical and real decisions (e.g., Louviere/Hensher/Swait 2010; Telser/Zweifel 2007). The choice experiment was introduced in the IAB-BAMF-SOEP Survey of Refugees (2020), a representative large-scale longitudinal survey of recently arrived refugees in Germany.

Our results show that, in line with the theoretical predictions, refugees' incentives to invest in education are shaped by skill transferability, settlement intentions, and opportunity costs – three main mechanisms formulated by the theory of immigrants' human capital investment (Duleep/Regets 1999; 2002). In detail, we find that postmigration investments in vocational education increase with initial levels of education and work experience. In turn, postmigration educational investments decrease with the transferability of premigration education – proxied via credential recognition – to the German labor market. Our results also support the idea that educational investment is more likely among refugees who have longer time horizons to reap the returns on such

investments. This applies to younger refugees and refugees with a lower probability of returning home. Likewise, opportunity costs measured according to the conditions of vocational education unequivocally predict the conditions under which refugees choose to make postmigration educational investments. Consistent with rational choice theory (e.g., Erikson/Jonsson 1996), we find that the lower probability of successful graduation (proxied by the difficulty of training), greater costs of training (proxied by lower remuneration during training) and lower future returns to training (proxied by lower remuneration after training) preclude refugees' consideration of vocational education as an alternative to labor market entry. Moreover, the probability of success seems to bolster the cost and benefit considerations in educational choices.

To conclude, our findings for refugees mostly conform to the predictions of the general theory of immigrants' human capital investment (Duleep/Regets 1999; 2002). In this view, the integration of refugee immigrants is not an exceptional or special case of the general immigrant integration process; our study implies that patterns of refugee integration follow the empirical regularities that apply to different types of immigrant groups (Kogan/Kalter 2020; see also FitzGerald/Arar 2018). We find that refugees' educational decisions are guided by rational considerations of costs and benefits, success probability, the difficulty of transferring foreign human capital and the time horizon in which refugees could use their newly obtained educational qualifications. Hence, our findings suggest that despite the different migration motives and histories of refugees and the different societal and legal circumstances surrounding their postmigration experiences, the factors relevant to immigrant integration also apply to refugees.

In this paper, we focused on immigrants' decisions to invest in vocational education. Whether these decisions translate later into successful enrollments obviously depends not only on the applicants' intentions but also on employers' estimates of those applicants' potential productivity and corresponding returns (Bills/Di Stasio/Gërxhani 2017). In this sense, employers could be seen as gatekeepers regarding hiring and investing in the human capital of refugees. For instance, official statistics in Germany implies that there is room for improvement: among 2018/2019 vocational education applicants, refugees constituted 7.2 percent of the applicants, but only 4 percent of those successfully enrolled (own calculation based on the Bundesagentur für Arbeit 2019b; 2019a). Hence, while our study has revealed the mechanism driving refugees' decisions to invest in host country-specific human capital, future research should explicitly address the supply-side perspective and examine employers' preferences and intentions to subsidize such demand-side investments.

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Appendix

Table A1: Information about the coding of variables

Variable	Coding
DEPENDENT VARIABLE	
Decision for vocational education offer	
= 0	= Simple job offer has been accepted; neither vocational education nor job offer has been accepted
= 1	= Vocational education offer has been accepted
TRANSFERABILITY OF HUMAN CAPITAL	
Recognition of credentials	Derived based on the block of questions regarding Training and educational qualifications from the biographical questionnaire and the block of questions regarding credentials recognition from the questionnaire for panel respondents. Mainly, we considered questions (1) whether the respondent applied for recognition of his/her qualifications in Germany; (2) whether the respondent has attempted to have a professional qualification he/her gained abroad recognized in Germany since your last interview; (3) where the respondent has you already received notification of either recognition or rejection of his/her qualifications?; (4) what was the decision stated in the notification.
= 1	No application for recognition
= 2	Qualifications were given equal recognition; qualifications were given partly equal recognition
= 3	Qualifications were not recognized
= 4	Notification of either recognition or rejection of the qualifications has not been already received; the procedure is still ongoing, no decision has been taken yet
Work experience	Continuous variable based on the so-called "calendar block" with annual information about activities respondents pursued from the age of 15 onwards. We sum up the years that people pursued in part-and full-time before arriving to Germany.
Years of education	Continuous variable constructed based on the self-reported years of school, vocational education and university/institute attended before migration to Germany. Migration biographies were asked at the respondents' first interview. The related questions are a part of the biographical questionnaire and are asked only in the first respondent's interview.
SETTLEMENT INTENTIONS	
Age	Continuous variable derived based on the birth year of the respondent and date of the interview.
Attachment to the origin country	Continuous variable based on the survey question "How connected do you feel to your country of origin?". Response scale from 1 "Not at all" and 5 "Very much".
Good prospects to stay	Assigned based on the country of citizenship. Information on countries' inclusion in the cluster was retrieved from Grote (2018)
= 1	Syria, Eritrea, Iraq, Iran, and Somalia.
= 0	Otherwise
Status of asylum request	Variable is coded based on the questions (1) whether the respondent has already officially applied for asylum at the German Federal Office for Migration and Refugees (BAMF); (2) whether an official decision regarding respondent's application for asylum has been made yet by the Federal Office for Migration and Refugees; (3) whether respondent's application for asylum has been approved by the Federal Office for Migration and Refugees. For the respondents with asylum decisions in the previous waves, the information was carryforwarded.
= 1	Asylum application has been approved
= 2	Asylum application has been rejected
= 3	An official decision on asylum application has not been made yet
OPPORTUNITY COSTS	
Difficulty of training	Based on the offer of a place on a training course in the Choice Experiment. The respondent is offered a training alternative to a simple job with a dimension on difficulty of the final exam.
= 1	The final exam is easy, and many pass first time.
= 2	The final exam is hard, and many have to take it twice.
Duration of training	Based on the offer of a place on a training course in the Choice Experiment. The respondent is offered a training alternative to a simple job with a dimension on training length.
= 1	The training lasts 2 years
= 2	The training lasts 3 years
Expected remuneration after training	Based on the offer of a place on a training course in the Choice Experiment. The respondent is offered a training alternative to a simple job with a dimension on salary after completion of training.

Variable	Coding
= 1	When the training is complete, the salary for the job you've been trained for is €1400 per month
= 2	When the training is complete, the salary for the job you've been trained for is €2000 per month
= 3	When the training is complete, the salary for the job you've been trained for is €2600 per month
Expected unemployment risk after training	Based on the offer of a place on a training course in the Choice Experiment. The respondent is offered a training alternative to a simple job with a dimension on unemployment risk after completion of training.
= 1	When the training is complete, the risk of unemployment in this job is very low.
= 2	When the training is complete, the risk of unemployment in this job is moderate.
Remuneration of training	Based on the offer of a place on a training course in the Choice Experiment. The respondent is offered a training alternative to a simple job with a dimension on salary during the training.
= 1	The salary during the training is €500 per month.
= 2	The salary during the training is €750 per month.
= 3	The salary during the training is €1000 per month.
CONTROLS	
Country (group) of origin (TC)	Based on self-reported country of citizenship.
= 1	Syria
= 2	Afghanistan
= 3	Iraq
= 4	Eritrea
= 5	Iran
= 6	Rest of MENA
= 7	Russia
= 8	remaining former Soviet Union
= 9	West Balkans
= 10	remaining Africa
= 11	rest of the world
= 12	stateless
East Germany	Based on the survey information on the federal state of the current residence.
= 0	Schleswig-Holstein, Hamburg, Lower Saxony, Bremen, North Rhine-Westphalia, Hesse, Rhineland Palatinate, Saarland, Baden-Wuerttemberg, Bavaria
= 1	Berlin, Brandenburg, Mecklenburg Western Pomerania, Saxony, Saxony-Anhalt, Thuringia
Female	Self-reported gender.
= 0	Male
= 1	Female
Had first job entry	Derived based on the current employment status and previous employments if not employed at the interview dat.
= 0	No, has never been employed in Germany
= 1	Yes
Influence during the interview	Based on the interviewers' agreement with the question (interviewer questionnaire) on whether the other person or persons unavoidably influenced the interview in cases in which there were other people present when completing the questionnaire besides the interviewer.
= 0	No
= 1	Yes
In education	Based on the series of questions related to respondents' education.
= 0	Not studying now
= 1	Studying now at school, vocational education and university/institute
In partnership	Self-reported information on the marital status and whether the respondent has a partner (if not married).
= 0	No spouse or partner
= 1	In a partnership, not necessarily married or living together
Local share of foreigners	Continuous variable capturing number of foreigners as a share of the total population in the current district of respondents' residence in Germany in the year of arrival to Germany. Data on district-level share of foreigners was downloaded from INKAR (INKAR 2020).
Local population density	Continuous variable measuring the average number of people living per km^2 for each German municipality the year 2018. We consider the population density in the current municipality of respondents' residence in Germany. Data on municipality-level population density was downloaded from DESTATIS (DESTATIS 2019).
Local unemployment rate	Continuous variable measured as the percentage of all civilian labor force (employed + unemployed) registered with the Federal Employment Agency as unemployed. We consider the unemployment rate in the current district of respondents' residence in Germany in the year of arrival to Germany. Data on district-level unemployment rate was downloaded from INKAR (INKAR 2020).

Variable	Coding
Months since arrival	Continuous variable derived based on the year and month of the interview and the year and month of arrival to Germany. Underlying survey question: "When did you arrive in Germany?"
Preschool children in the household	Self-reported information on own children, their birth year and residence place.
= 0	Own children are above 6 years old or own children live outside the household
= 1	Own children below 6 are living in the household
Private accommodation	Based on a survey question on type of accommodation the respondent lived. The question was answered by the interviewer.
= 0	In shared accommodation
= 1	In a private apartment, a private house
Sample (TC)	Indicator of respondents' belonging to the specific sample.
= 1	M3, registered adults as of January 2016, newly registered adults between February and April 2016; first surveyed in 2016.
= 2	M4, registered adults as of April 2016 and registered underage persons as of June 2016; first surveyed in 2016.
= 3	M5, adults who arrived between 2015 and January 2017 (not registered when the first wave was drawn from the AZR, first delivery; first surveyed in 2017).
Self-rated current state of health	Continuous variable based on the survey question "How would you describe your current state of health?". Response scale from 1 "poor" and 5 "very well".
Support for education	Based on the survey question "Have you received help to look for schools, higher education institutions/universities, training places or further education/training courses?"
= 0	No, I needed help but did not receive any; No, I did not need any help
= 1	Yes, I received help
Training offer before job offer	Derived based on the oder of the offer in the Choice Experiment.
= 0	Job offer first
= 1	Training offer first
(Very) good German skills	The survey question asked is the following: "How well did you know German before moving to Germany?". The respondent reported his or her language skills in speaking, writing, and reading on a scale from 1 "Not at all" to 5 "Very well". For language proficiency, we used the mean across three variables.
= 0	German language proficiency < 4
= 1	German language proficiency >= 4
Willingness to take risks	Based on self-reported degree of agreement with the following statement about themselves: in general, are you someone who is ready to take risks or do you try to avoid risks (from 0 = not prepared to take risks at all to 10 = prepared to take risks). For the panel respondents, the first non-missing value was used. In the case of missing values, the measure is set to 0 and controlled for.

Notes: (Pre-)migration biographies were asked at the respondents' first interview. The related questions are a part of the biographical questionnaire and are asked only in the first respondent's interview. For the survey instruments, see SOEP Group (2020a; 2020b).

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